THE ARCHITECTURAL FORUM

INDEX TO VOLUME XXXVI JANUARY TO JUNE INCLUSIVE, 1922

Index to Illustrations According to Subject

BUILDINGS (complete)

KEY TO PAGES AND PLATES

	Pages	Plates
January	1- 42	**1-16**
February	43- 84	**17-32**
March	85-126	**33-48**
April	127-168	**49-62**
May	169-210	**63-80**
June	211-252	**81-96**

Numbers preceded by month and **Ser.** refer to Service Section.

BRIDGES

GARDENS

INTERIORS

*Illustrated; ex. exterior; in. interior; pl. plan.

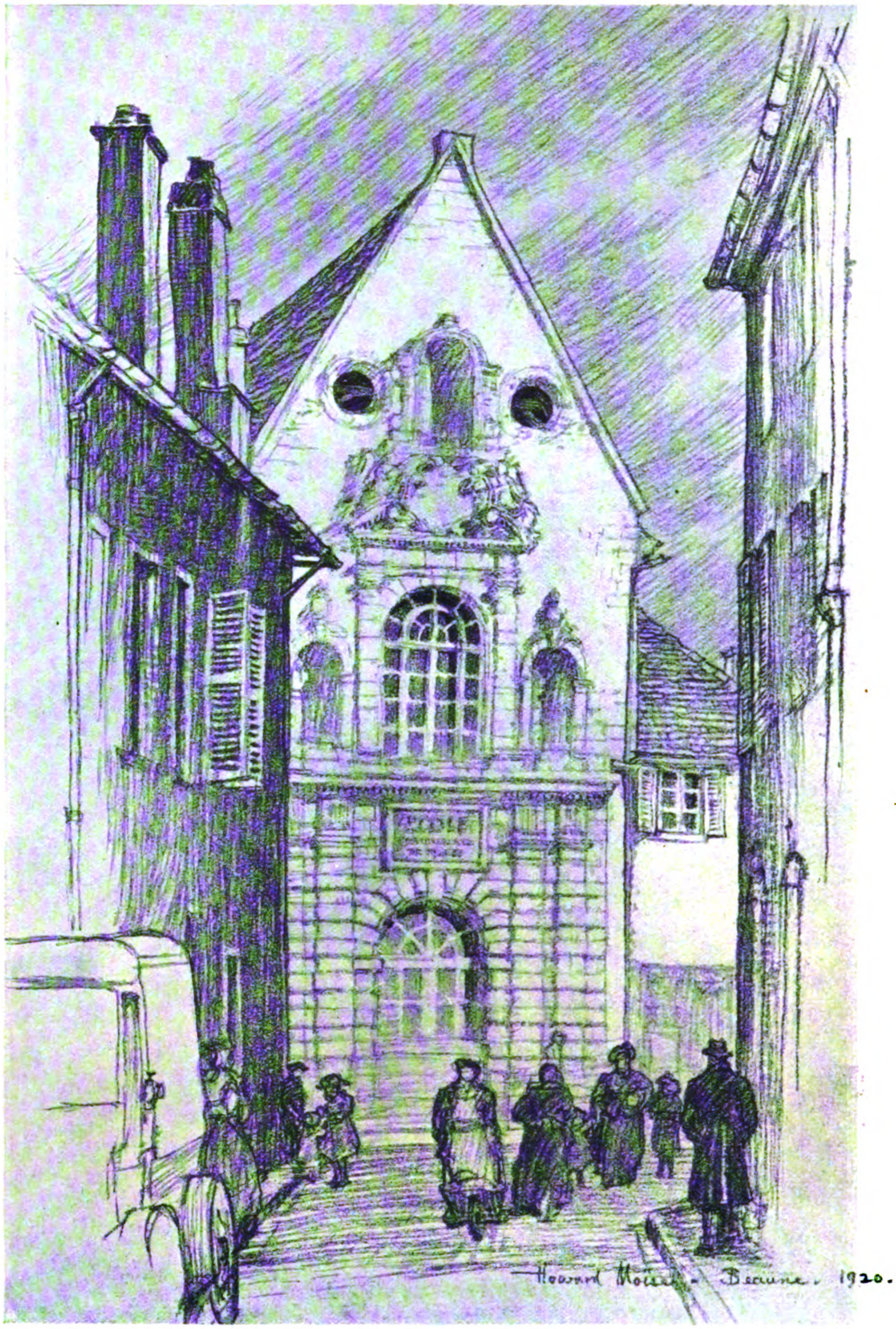
Index to Illustrations According to Architect

*Illustrated; ex. exterior; in. interior; pl. plan. See also key on page i

Index to Articles According to Subject

*Illustrated; ex. exterior; in. interior; pl. plan. See also key on pagei

*Illustrated; ex. exterior; in. interior; pl. plan. See also key on page i



L'ECOLE COMMUNALE, BEAUNE, BURGUNDY
FROM THE PENCIL DRAWING BY HOWARD MOÏSE

The ARCHITECTURAL FORUM

VOLUME XXXVI | JANUARY 1922 | NUMBER 1

Some Ideas on Bank Buildings—Artistic and Practical

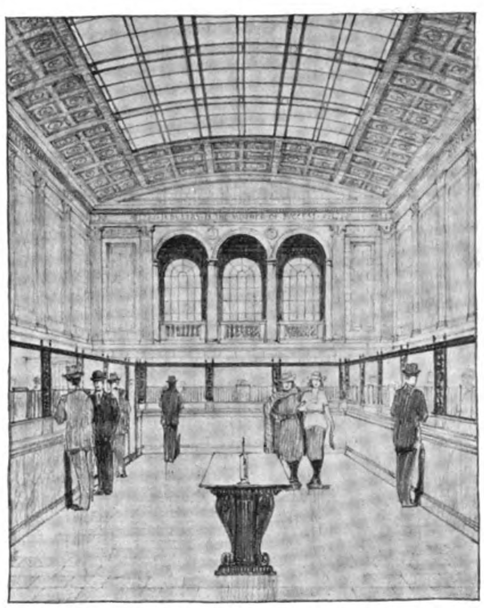
By ALFRED HOPKINS

With illustrations from buildings designed by the author

TO the architect with imagination the possibilities offered by the bank building for noble and appropriate architecture should make an instant appeal. The influence of the bank on the daily life of the community is continually increasing, and it is not too much to say that just as the church stands for the highest ideals in the spiritual life, so the bank seeks to elevate and maintain them in the business and social life of the community. The bank is therefore becoming more and more the place where good counsel may be obtained, where practical help for the sound enterprise is given, and, in the larger institution, where records and information which will assist the business man in maturing his judgment are kept, tabulated and freely distributed. Such in brief is the distinguished position of counselor and friend which the bank has come to occupy in the community. In what way, therefore, should its house be built? The accompanying text and illustrations give some suggestions.

The Bank a Public Institution

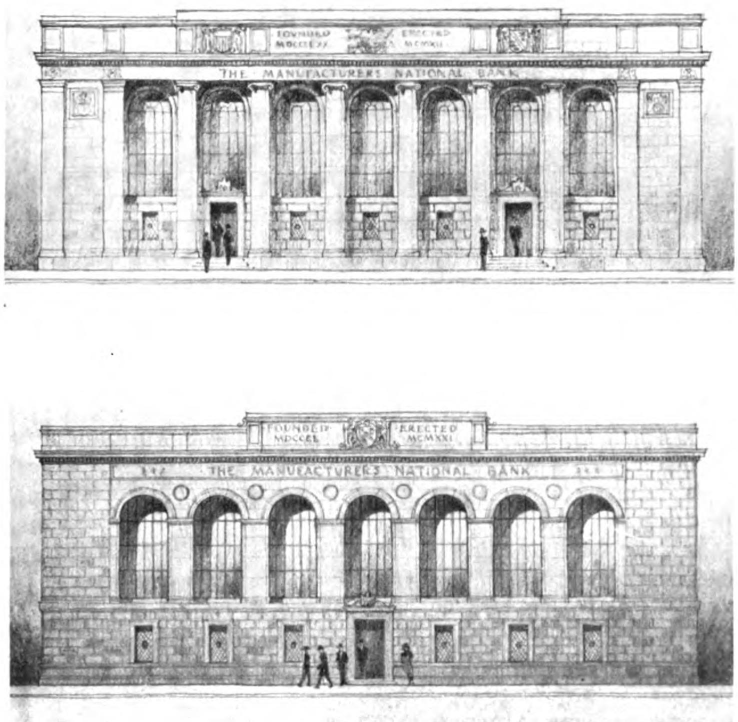
As the bank is a public institution its most appropriate architectural expression is to be found in the classical style, but that does not mean the tasteless iteration and reiteration of pediments, columns, arches and the general jumbling of classical motives with which the commercial bank builders have made us all familiar. Noble architecture is the bank's greatest asset so far as its house is concerned. Taste and refinement should be in its every feature, and it has many features which may be treated originally and appropriately.



Interior, Commercial Bank and Trust Company Building
Bridgeport, Conn.

Two Types of Buildings

When the time arrives for the bank to take thought of the increased comfort and advantages afforded by a new building there are two types of structure which come to mind,—one the individual home for the bank's exclusive use, and the other a building which shall seem to be primarily the bank's, but with sufficient additional renting space to return a revenue. This latter type at first thought seems to be preferable, but the writer's experience is that banks which build office buildings for their income return sooner or later regret it. In such a building the quarters of the bank, to which it is vitally necessary to give distinction, and particular emphasis, become only incidental. The bank, after all, is but one of many occupants; consequently it is difficult to focus public attention upon it. Then, too, the bank ties up money which ordinarily it can use to better advantage in its own business and embarks on a venture which is foreign to it. Renting office space is not banking, and a bank president to whom was expressed this view thus explained his position: "Having been associated with the National Bank of Commerce and having participated in the erection of its building, I heartily concur in all you have to say with respect to an individual bank office. It certainly gives distinction



Alternative Sketches for Exterior of a Bank in Troy, N. Y.

to an institution and relieves those in charge of a great deal of annoyance, care and responsibility. I found in my old position, that although we had a capable superintendent, the tenants' complaints finally reached me."

This is the expression of a man who had to do with the erection of a 14-story office building. Only where the bank seeks something quite apart from the ordinary relation between landlord and tenant, as when it wishes to have others with it in a reciprocal association of interest, or when the bank is limited in what it may do in reaching out for new business or if the property it owns is very valuable, or when some special condition prevails, would it seem desirable to build other than the individual bank building. In the individual building only is it possible to attain that distinction already referred to and which will be emphasized throughout this article.

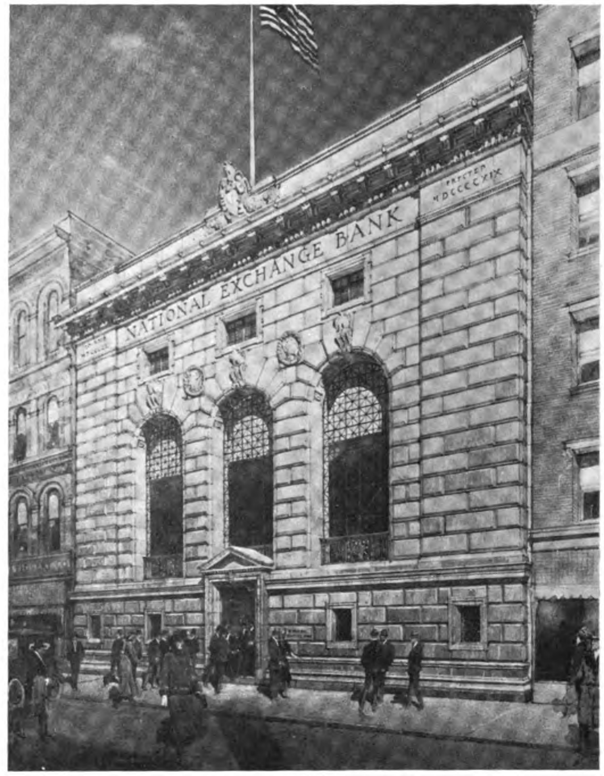
Ventilation and Lighting

Where the conditions make it possible, the first thing to change in the usual bank's construction is the indiscriminate use of the overhead skylight. No building so constructed can be considered fireproof. Large skylights are always a hazard, either through the possibilities of fire or accident from adjoining properties or from leaks due to the contraction and expansion of its material exposed to the extremes of temperature from both within and without. Then the best opportunity of the interior for the display of design is in the ceiling, because the view of it is always uninterrupted and the intrusion of the skylight here detracts from the dignity of a purely architectural treatment. Ordinarily a much better method of lighting is to employ the light well, either at the side or at one end, which not only gives light, but what is equally important, ventilation. On these two factors, light and ventilation, hang all the law and the prophets of the architect's bible. A building which fails in these essentials fails irrevocably. A mechanical ventilating plant is usually as poor a substitute for the fresh air which blows in at the window as the electric bulb is for the light of heaven. Consequently a bank situated on an interior lot, with only the front open, should be provided with area lighting and ventilation whether the skylight is used or not, for the chief difficulty in depending entirely upon the skylight is that while it may be made to give light, it is impossible to use it to advantage as a means of obtaining fresh air.

Different Banking Plans Described

With regard to the interior arrangement of the banking plan there are three general possibilities: the so-called "U" plan, the "island" plan, and the "half-island" plan, which leaves the banking screen open on three sides with the fourth against the wall. All of these schemes are useful, but their adoption depends largely upon the needs of individual cases.

The island plan is always convenient for the bank, and especially for the savings bank. The intercommunication between the various departments which it affords is immediate, but on the other hand such an arrangement is always inconvenient to the public. The author knew of one bank which had used the island plan for 40 years, and in its new building it chose the U plan solely on account of the greater convenience it gave to its customers. On the other hand, when this instance was cited to a bank president, who was in the throes of deciding upon the type of plan for his new building, he promptly dismissed the island plan with an equivalent to that classic phrase, "the public be damned." What he wanted to consider solely was the convenience of the bank. In special in-



Design for Commercial Bank on Wide Interior Lot in Important City

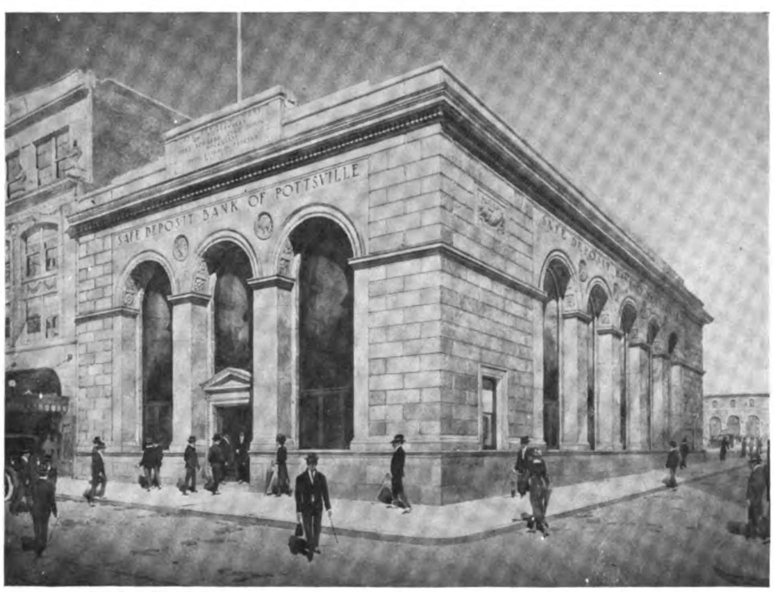
stances, perhaps not all like that just cited, the island plan may be desirable, but for the usual commercial bank it is better to use either of the other types. These give the public more direct contact with the service which the bank has to offer and by care in the design of their equipment can be made to serve the bank as well as the island plan, and the public better.

The U plan, on the other hand, is always a good arrangement for the public, as it puts all departments within easy view and reach. A central space less than 14 feet in width is not advisable in a busy bank, though ample in the smaller institution where crowded conditions seldom prevail. This brings up the width of the cages. The teller's space can be relatively small if conveniently arranged, a depth of four feet clear floor space, and a width of four feet, six inches between center to center of the tellers' windows are the minimum though satisfactory dimensions for the city bank. Country banks usually desire more room than this because accustomed to it, and there is no reason why they should recede from that position. There are still some advantages left for the country which the city lost long ago, and one of them is space.

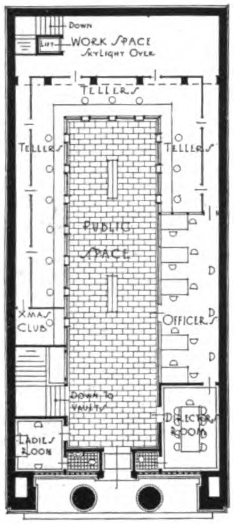
What has been called the "half-island" plan or, if one wishes to persist in the geographical idiom, the "promontory plan," is a compromise between the two schemes and sometimes, if the lot will permit, it is possible to combine the advantages of both without the difficulties of either. The half-island plan leaves the screen open on three sides, or it may run down one side of the building and across the end, and this arrangement generally obscures the view of the interior less than the other. The plan which gives the effect of the most spacious interior is always the best architecturally and is usually the best from the practical side.

The shape of the plot, or its situation or exposure, is what most frequently determines the plan. It is much better to use one of the types of bank plans which can be worked out naturally and logically with all elements considered—those of convenience for the bank and public, not forgetting consideration for a proper architectural expression—than to try to develop a plan the principles of which fit everything but the lot on which it is to be built.

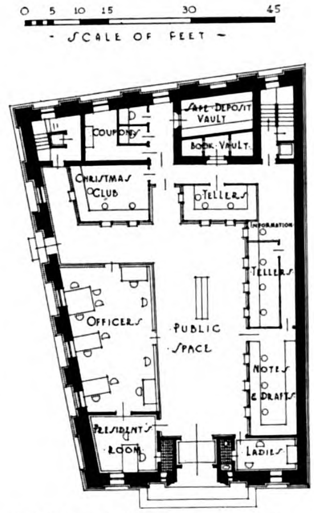
There is one feature, however, which should be considered in every plan of whatever variety, and that is the possibility of future



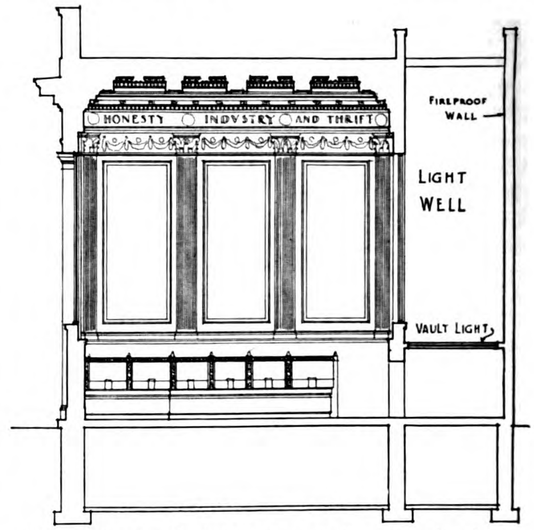
Sketch for a Small Building in Pottsville, Pa.
Showing the value of large, low windows in bank design



U-shaped Plan on Interior Lot; Overhead Light



Half Island Plan Giving Convenience and Good Interior View



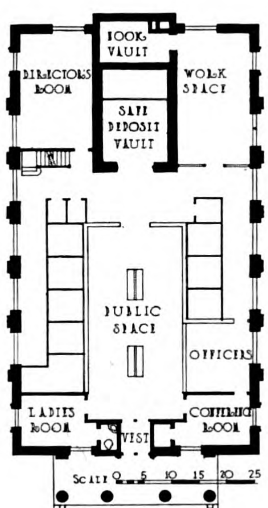
Section Showing Daylighting from Well at Rear of Building Working Space Below

expansion. It is safe to say that no bank was ever built too large, and that it has been the experience of all that the new building is outgrown in half the time expected by the most optimistic member of the building committee. This is a matter now recognized by everyone so that the architect's tentative plan should show a way of increasing the number of wickets and of adding materially to the working space, and the preliminary survey should always take this necessary feature into careful account.

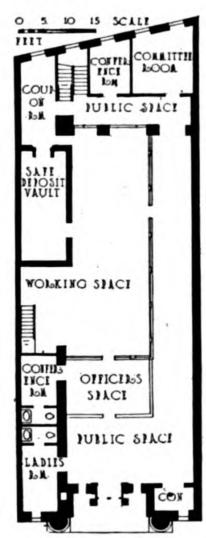
Locations of the Officers and of the Vault

In the discussion of the type of plan there are always two things of importance which come up for consideration: they are the locations assigned to the officers of the bank and to the vault. Since it is slowly coming to be known that the bank is a human institution—which one might take the liberty of suggesting as the chief reason for its increasing prosperity—it is very necessary that its officers be where they are immediately accessible to the public. When they have been for years at the rear of the banking room, as frequently happens in the old buildings, sometimes there is a certain hesitancy about arranging for an officers' space too far forward. Experience proves that, finally, everyone prefers a forward position and indeed for increasing business it is an absolute necessity. The president should always have his own private office and it is frequently desirable that other rooms, in the form of committee rooms or meeting rooms for the public, be provided. An alcove in the public space is always useful where the out of town depositor may make out his slips, sometimes long ones, at a table where he can be seated, while the women's room has now become a necessary accommodation in every banking institution, though it must be confessed this feature is sometimes overemphasized.

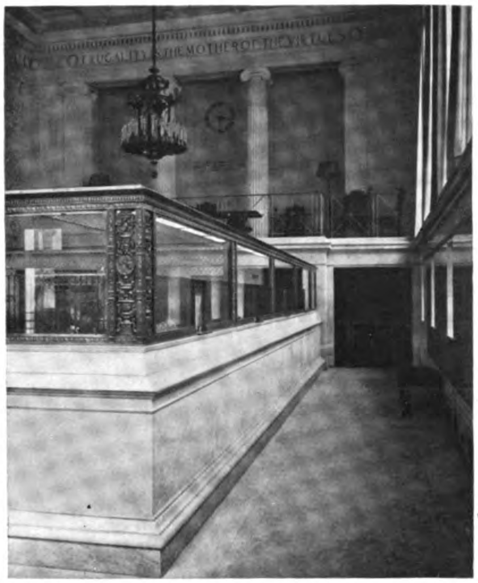
The location of the vault is preferably on the main floor and in plain view, but when every foot of space must be utilized there the vault may be put in the basement to advantage. In the busy city bank this is the best place for it. There is no doubt that a fine vault is not only an absolute necessity, but it is a prime factor in increasing public confidence and securing new business. The tendency is clearly to develop it to afford greater security. Heavier linings are being used with doors of proportionate thickness. The processes of manufacturing the different types of steel are continually being improved and steel more and more immune to tool cutting is being perfected. A non-burnable metal has

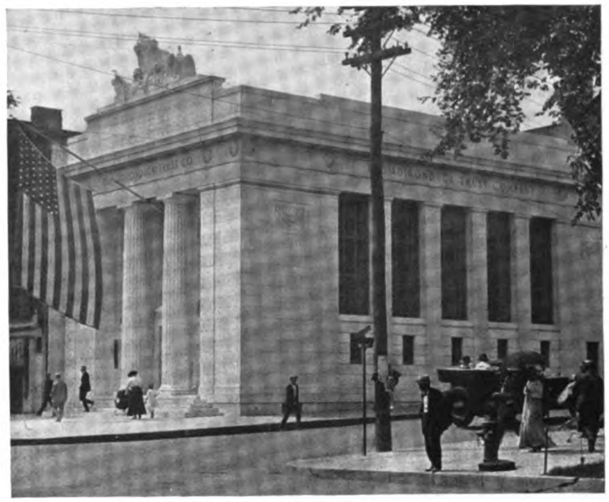


Typical U-shaped Plan with Light on Both Sides



Half Island Plan on Narrow Interior Lot





Exterior and Interior Views of the Adirondack Trust Company Building
Saratoga Springs, New York

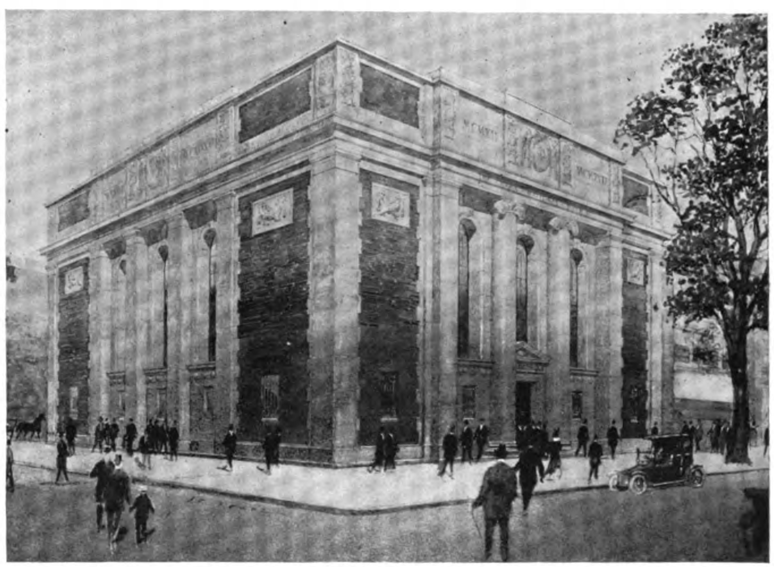
been developed and the contents of the modern vaults can now be absolutely protected against three distinct methods of attack—open hearth against explosives, chrome steel against drilling, and non-burnable metal against the cutter burner.

The vault door is a splendid piece of mechanical engineering. Whether it is square or circular is a matter of personal preference. The circular door takes twice as much metal as the square door and requires a larger area in which to swing properly, but mechanically it is a more perfect fit, being ground into its jamb with emery and oil, thus forming its own contact bed. In its advertising value it is always effective and in its security always efficient. The steelwork of the vault is best reinforced by concrete walls in preference to walls of brick, and this preference is more pronounced when the concrete walls are in turn reinforced with bars of tool-proof steel. This makes assurance doubly sure, and the comparatively small additional cost is always a good investment.

The vault may be made large enough so that it contains both the rented safety deposit boxes and the bank's money chests. When this is done the bank's portion is separated from the public spaces by a grille. When, however, separate vaults are provided, one for the public and another for the bank, they are sometimes identical in design in order that they may carry out a uniformity of appearance. There is never any advantage in lining a book vault with metal. All that is ever needed here is protection against fire and this can be had with masonry walls and an adequate fireproof door, and the same thing applies to the vaults for the storage of trunks and silver.

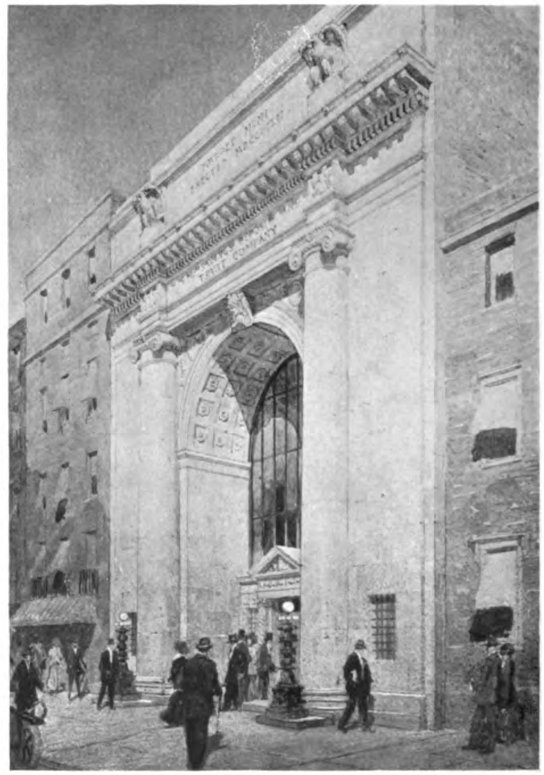
Details of the Banking Floor

The intimate details of the banking floor will be dealt with briefly here, but important to and well worthy the consideration of the busy city bank is the recently developed custom of paying and receiving at the same window. This is more



Design Showing the Value of Brick in Exterior Design, a Material
Too Often Neglected in Bank Building

Bank Design for 30-ft. Interior Lot. Architectural Effect through Vertical Emphasis

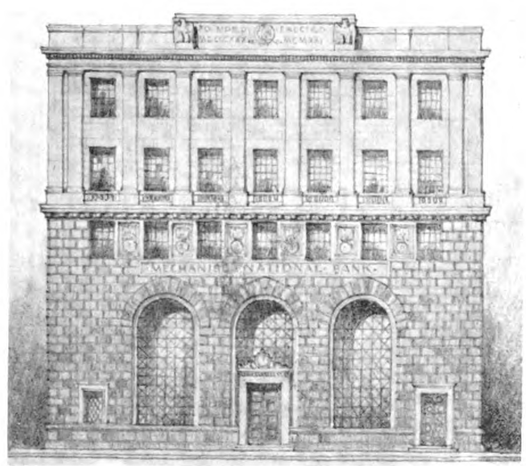


Savings Bank at Elyria, Ohio, Showing Dignified Treatment on 35-ft. Interior Lot

general on the Pacific coast than elsewhere and seems to have been inaugurated by the First National Bank of Los Angeles, but the custom is now in use by several large city banks.

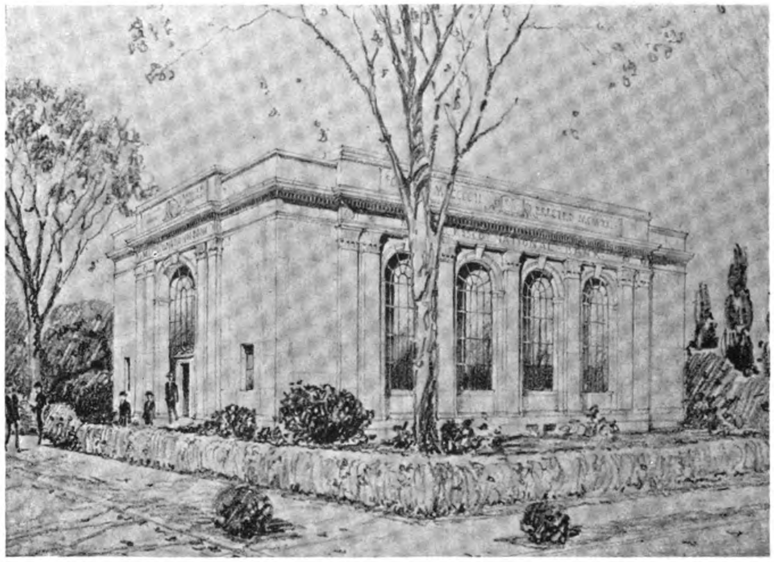
The improved method is quite simple. In one cage, six feet by nine feet free floor area, there are two windows and two tellers, each of whom receives and pays from the same window. If the area of the working space is sufficient the bookkeepers should adjoin them, this combination making a unit for the drawing account business. Each teller keeps his account independently of the other and each is provided with his own money and key to his side of the money safe in the cage. One teller may borrow money from the other, but he must give a receipt for it.

The advantages of paying and receiving at the same window, from the bank's standpoint, are that the tellers have fewer accounts to handle and are consequently much more familiar with them, and the important fact that they work on both sides of the account, paying and receiving, increases that familiarity very materially. The advantage from the public's point of view is a very great increase in accommodation over the usual system; when during some parts of the day the crowd is depositing, with few drawing money, the receiving tellers would be very busy while the paying tellers would be idle. Paying and receiving at the one window make the bank service much more flexible and also promptly equalize any disparity in numbers between those who wish to deposit and those who wish to draw money.



Sketch for a Bank Building in Pennsylvania

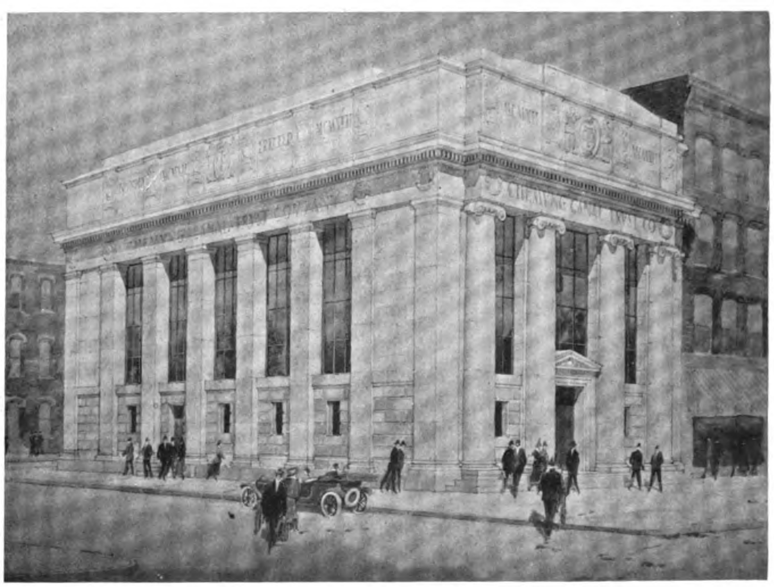
It is always important to place the working portion of the bank where it will receive all possible benefits from natural light, where it is necessary to make a choice between natural and artificial light. The public spaces may very properly be left to artificial lighting. With respect to the bank's equipment, in the larger institution it is always advisable to carry this out on a unit system which greatly facilitates extension in the future. The telautograph, the pneumatic tube and the autophone are all such satisfactory methods of communication that there is little disadvantage in having the clerical force removed from personal contact with the tellers. In the large institution this separation is quite usual, but in the smaller bank, where floor space is always available, the entire work of the bank may well go on behind the screen. This well tried plan should be continued.



Mt. Kisco National Bank Building, Mt. Kisco, N. Y.

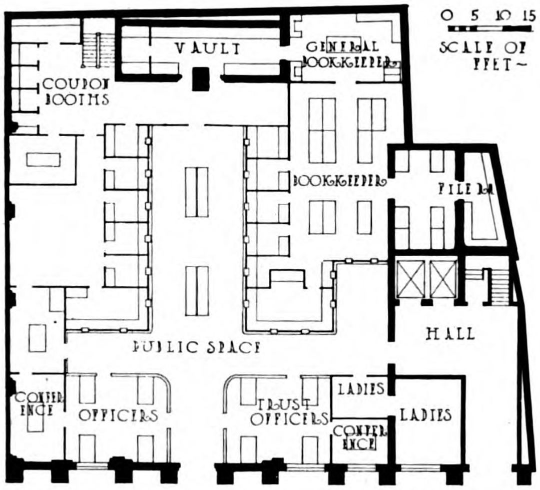
Opportunities for Artistic Treatment

The general practical problems which are considered in the modern bank building have been dealt with briefly, but these in the really successful structure are part and parcel of the architectural scheme. Every detail of the bank is just as responsive to artistic treatment as it is to the latest practical device. The screen offers endless opportunities for originality in its ornamentation. Designs of old coins, of which there are countless varieties, are always appropriate; in the screen of the Adirondack Trust Company, Saratoga Springs, N. Y., pine needles and pine cones are interwoven in the ornament, and in an Ohio bank the buckeye was conventionalized into a flowing and graceful design, together with the outlines of ships denoting commerce, the beaver symbolizing industry, and the winged hourglass and the dollar sign typifying time and interest. Opportunities are endless for appropriate ornamentation, but this should not be overdone, and following out an important architectural principle already expressed, that of giving to the interior the greatest possible effect of space, the screen is best kept light in appearance and as low as practicable. To fill up the bank's interior with the screen is a pernicious architectural error which is frequently made. It is the effect of space which should be emphasized and not those things which may so easily take away from it.



Design for Building on Corner Lot Showing Value of an Attic to Give Solidity to Bank Design

With the interior of spacious effect it is quite possible for the architect to provide things which are worth looking at. It is not at all necessary for the directors to convene behind closed doors, as is usually supposed to be the case. Frequently the directors' meetings take place after banking hours and an open balcony, removed from but



A U-shaped Plan for Building of Large Floor Area

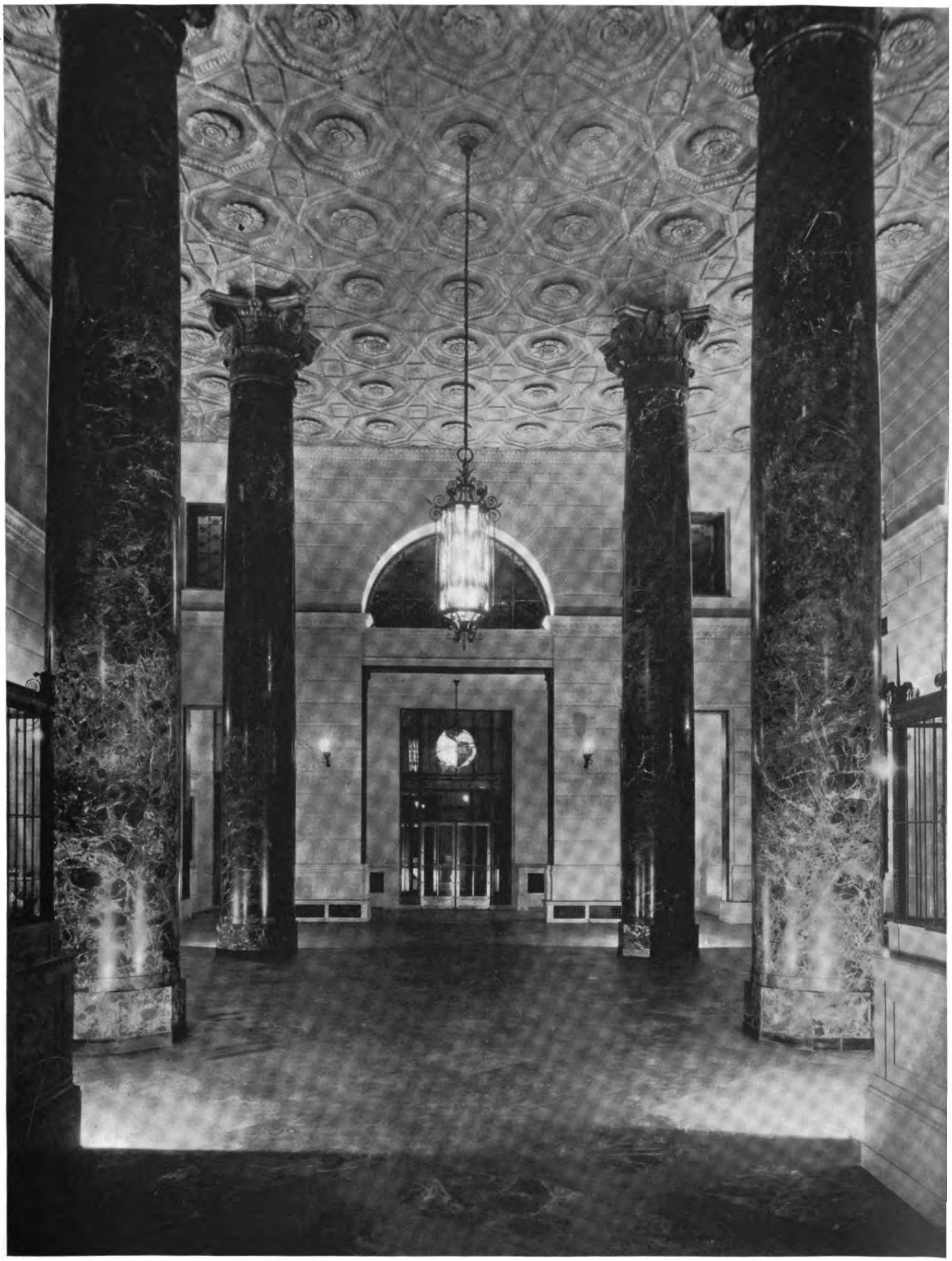
looking down into the main banking room, is an entirely practical place and one which is architecturally attractive. The open directors' balcony in the Adirondack Trust Company has proved entirely satisfactory. A balcony can, and should, be treated architecturally and should certainly be used for a dignified purpose. A very recent and important banking office in New York has two balconies contained within a series of arches which surround the great banking room. These have been used for the clerical force, and the din of the typewriters and the adding machines, deflected to the floor by the arched ceiling, is literally deafening. The bank should not sound like a miniature manufacturing plant, and to prevent this is important.

Instead of the usual cut and dried ornament in the frieze it seems proper and appropriate that fitting inscriptions be placed here. George Washington said: "Economy makes happy homes and sound nations. Instil it deep;" and Abraham Lincoln said: "Teach economy. This is one of the first and highest virtues. It begins with saving money." Both these names and characters have a strong popular appeal. Among other expressions of good advice which the author has used for this purpose are: "Saving is a greater art than earning;" "A penny saved is a pound earned;" "Diligence is the parent of Fortune;" "Frugality is the mother of the virtues;" "The first years of a man should prepare for the last." This latter maxim is perhaps the most direct and clear cut of all, and how few of us realize the importance of it! It ought to be engraved in the back of every man's mind, and it is good business for the bank to help put it there.

So it is seen that all functions of the bank may find their proper and beautiful expression in architecture, whether they be related to those things which are needed for a practical purpose or to that position of prestige and influence which the bank should occupy in its community, and it was just this which the writer meant when he wrote: "To the architect with imagination the possibilities offered by the bank building for noble and appropriate architecture should make an instant appeal."

A Simple and Dignified Treatment for a Board of Directors' Room

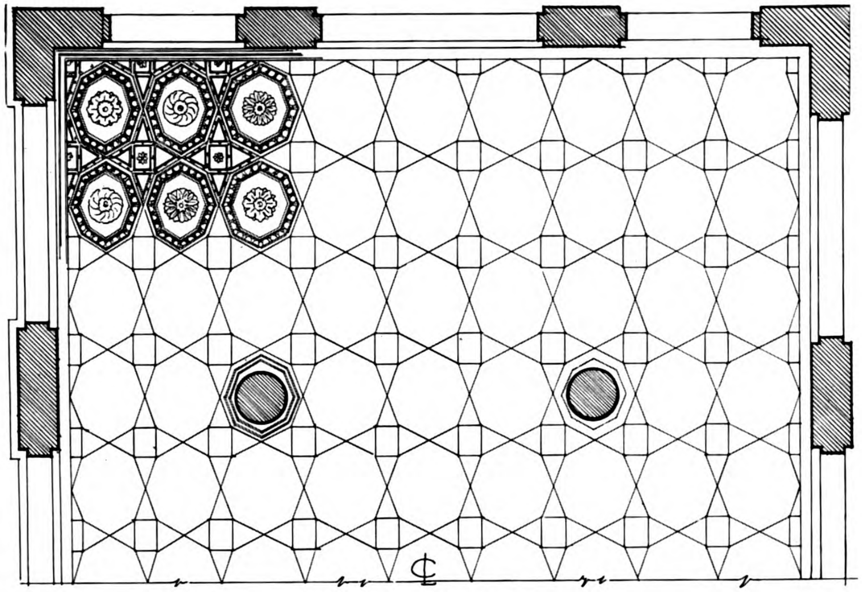
Corner in the Ladies' Room in Adirondack Trust Company Building



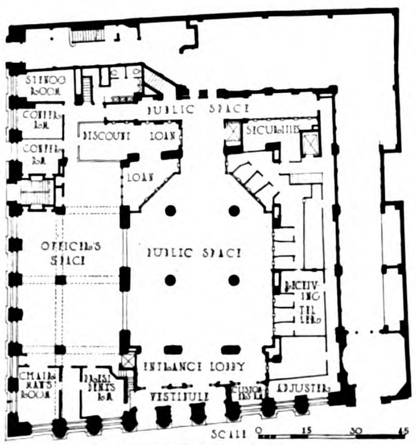
VIEW LOOKING TOWARD ENTRANCE

BANKING ROOM, NEW YORK TRUST COMPANY, NEW YORK

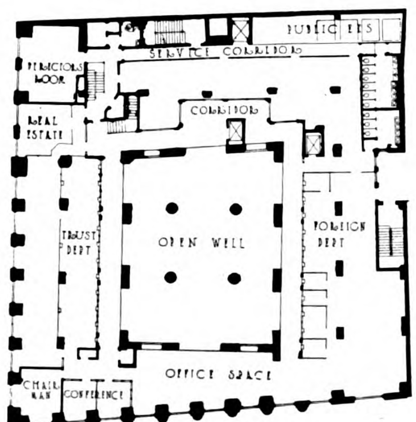
WALKER & GILLETTE, ARCHITECTS



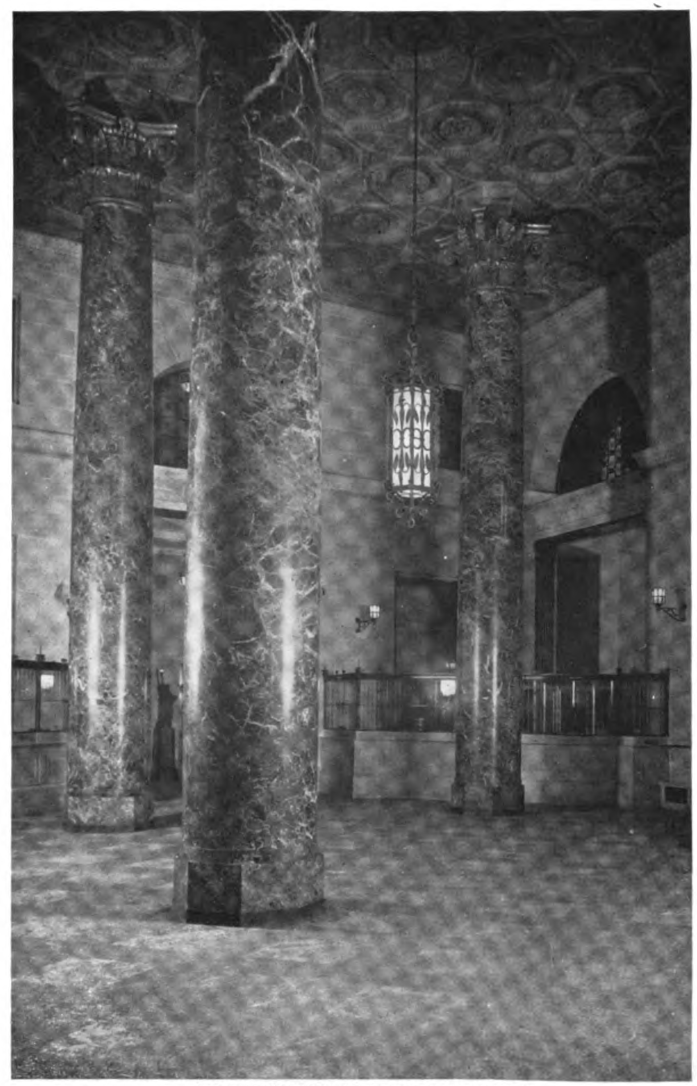
HALF PLAN OF MAIN CEILING



FIRST FLOOR PLAN



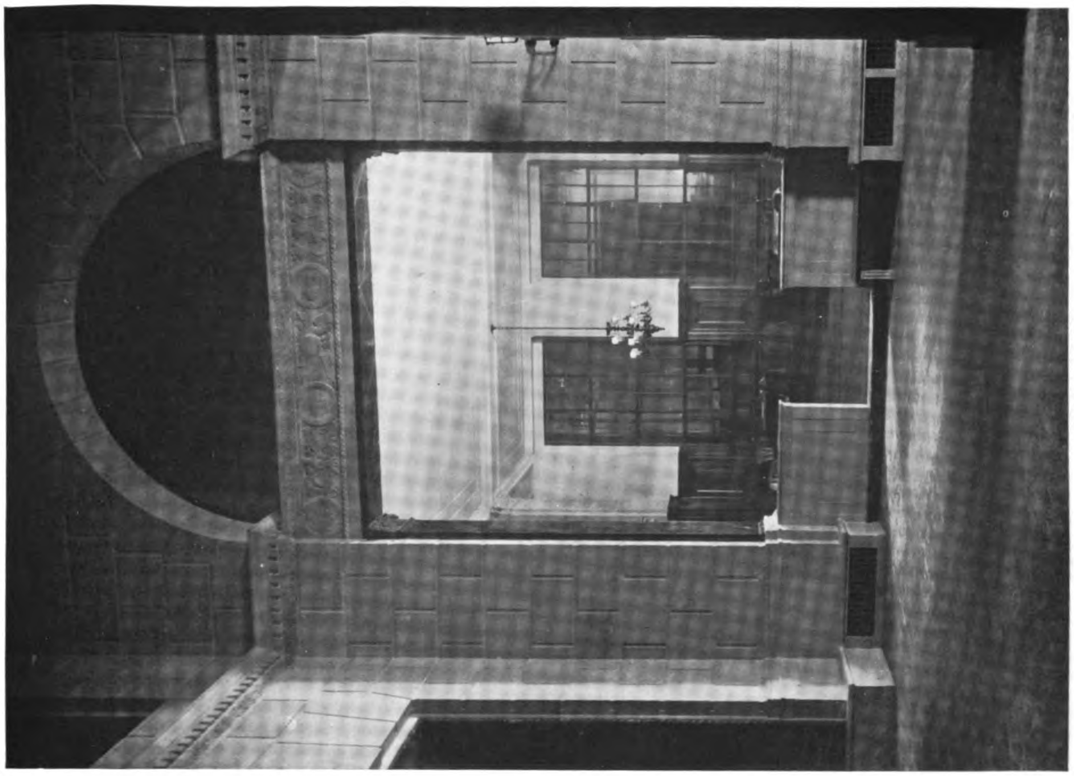
SECOND FLOOR PLAN



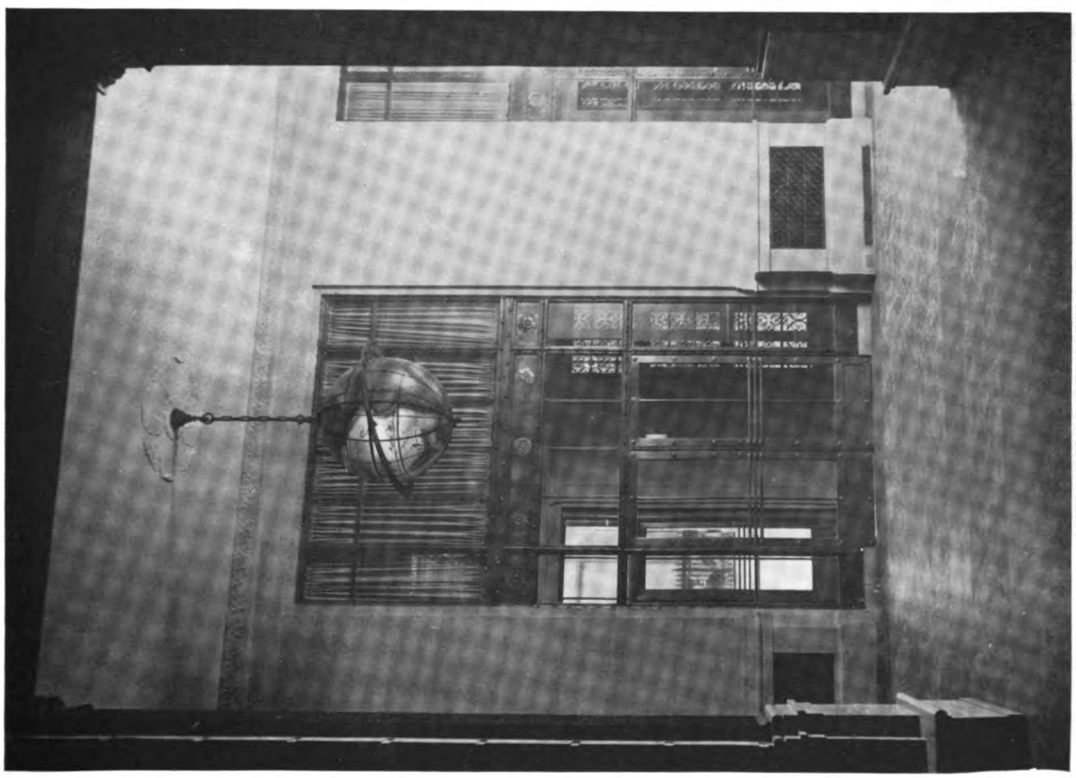
VIEW TOWARD PAYING TELLER'S CAGE

BANKING ROOM, NEW YORK TRUST COMPANY, NEW YORK

WALKER & GILLETTE, ARCHITECTS



OFFICERS' SPACE

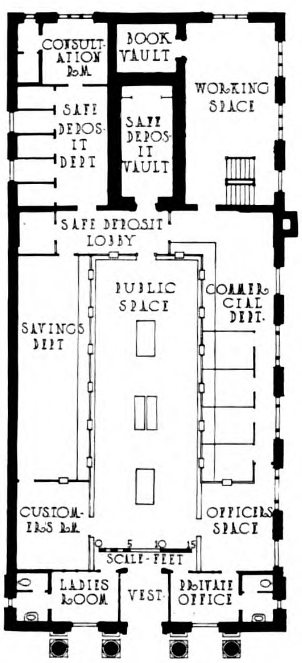


DETAIL OF LOBBY

BANKING ROOM, NEW YORK TRUST COMPANY, NEW YORK

WALKER & GILLETTE, ARCHITECTS

GENERAL EXTERIOR VIEW

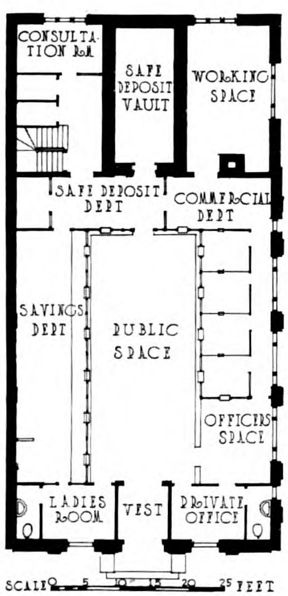


FIRST FLOOR PLAN AND INTERIOR VIEW

NATIONAL BANK OF COMMERCE BUILDING, NEW LONDON, CONN.

THOMAS M. JAMES, ARCHITECT

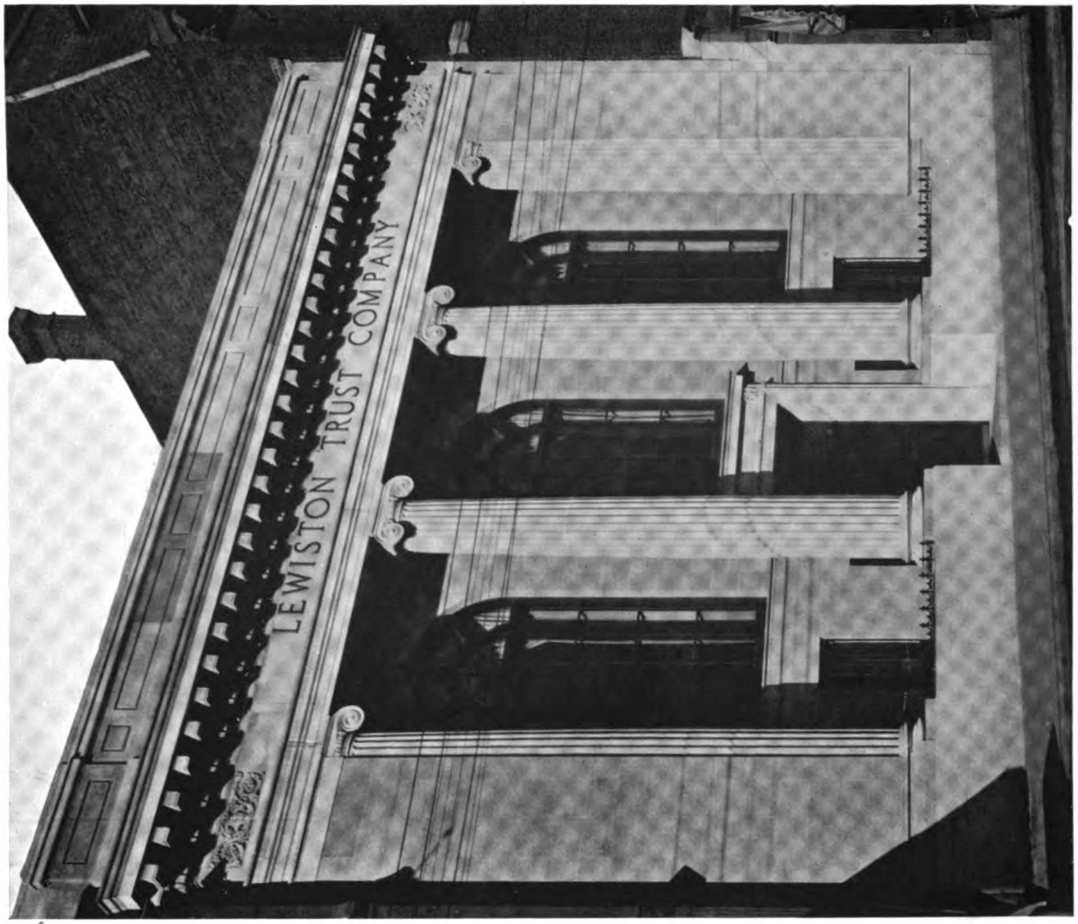
GENERAL EXTERIOR VIEW



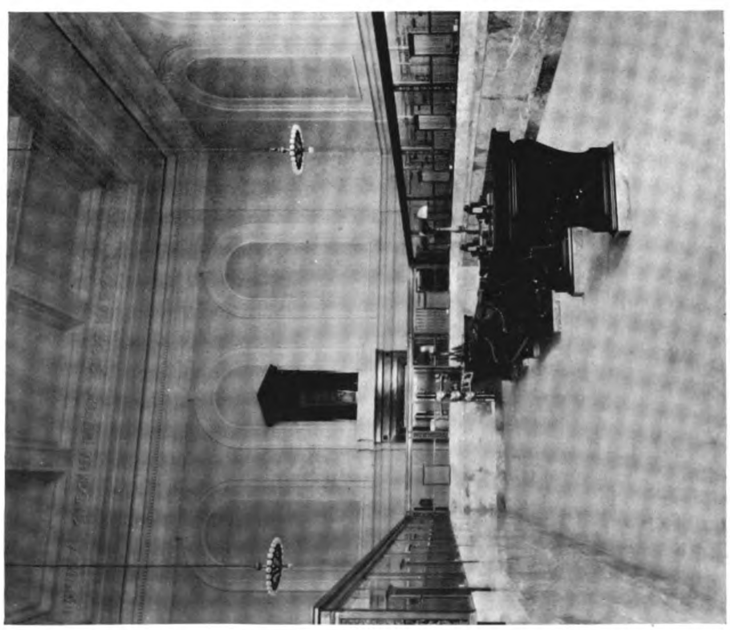
FIRST FLOOR PLAN AND INTERIOR VIEW

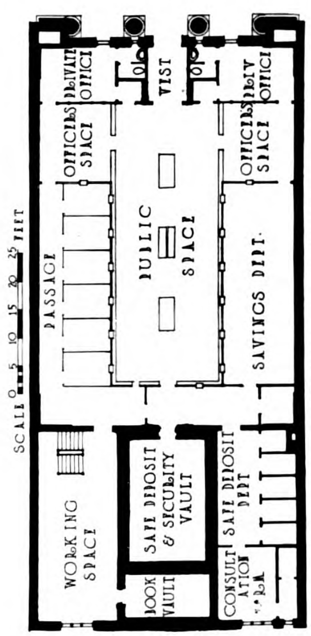
FIRST NATIONAL BANK BUILDING, BIDDEFORD, MAINE

THOMAS M. JAMES, ARCHITECT



GENERAL EXTERIOR VIEW



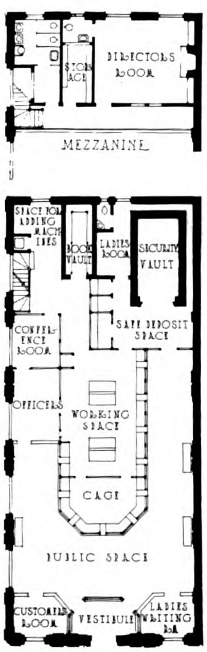


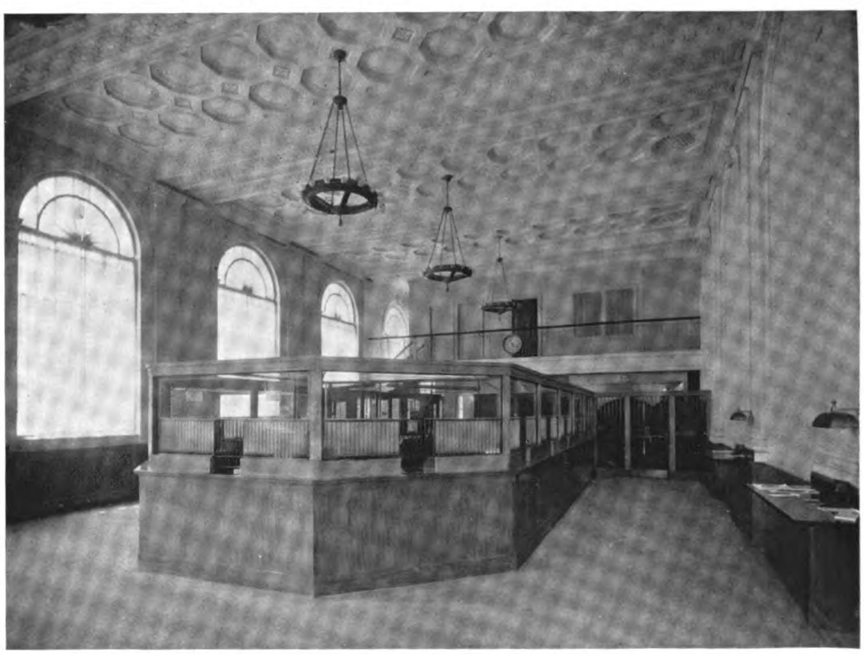
FLOOR PLAN AND INTERIOR VIEW

LEWISTON TRUST COMPANY BUILDING, LEWISTON, MAINE

THOMAS M. JAMES, ARCHITECT

GENERAL EXTERIOR VIEW





FLOOR PLANS AND INTERIOR VIEW

FIRST NATIONAL BANK BUILDING, SOUTH AMBOY, N. J.

HOLMES & WINSLOW, ARCHITECTS

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Systems for Building Heating and Domestic Hot Water Supply

PART II

By JAMES A. McHOLLAN, *Vice-president, The R. P. Bolton Company, Consulting Engineers*

IN addition to the services of building heating and hot water supply, discussed in the December issue, steam may be required for restaurant, laundry or manufacturing purposes. In buildings equipped for the production of electric light and power, the steam required for these services is obtained direct from the main boilers. In buildings for which the electric light and power is purchased, and in which the heating boilers should operate at low pressure, new methods of providing steam for these services have been found economical, and information regarding them will be of interest to architects and engineers.

RESTAURANTS AND KITCHENS.—Cooking appliances may be gas- or steam-operated. Ranges are operated by gas, coal or electricity, but in these varieties of apparatus, found in almost every kitchen, either gas or steam must be used in operation:

Stock kettles	Vegetable steamers
Coffee urns	Clam, lobster or potato steamers
Steam tables	Egg boilers
Plate and cup warmers	

Gas is being successfully used under all these appliances and appears to be coming into more general use. If steam is to be supplied it is not necessary that the supply be at high pressure. If the piping system is made large enough, low pressure steam at a pressure not exceeding 10 lbs. per sq. in. will cook effectively and economically. Higher pressures used in existing installations, ranging from 30 to 80 lbs. per sq. in., are unnecessary, and they sometimes require the presence of a licensed engineer in attendance.

These figures deal with the quantities of steam consumed by kitchen devices and may be used in arriving at the sizes of steam boilers required:

Appliance	Steam-used boiler; horse power per hour
Stock kettles (per 10 gals.)	.5
Coffee urns, etc. (per gal.)	.1
Steam tables (per ft.)	.2
Plate and cup warmers (per 20 cu. ft.)	1.0
Vegetable steamers (per compartment)	1.0
Clam, lobster or potato steamers	1.0
3-compartment egg boilers	.5
Jets for sinks—½-in.	1.0
Bain Marie (per ft.)	.5
2-compartment tube type dish washers	2.0
Dish washers of the conveyor or roller type	2.0

This table shows the sizes of supply and return steam pipes to kitchen appliances to be operated with low pressure steam:

Appliance	Supply pipe (inches)	Return pipe (inches)
Stock kettles (40 gals.)	1¼	1
Coffee urns (6 gals.)	¾	¾
Bain Marie (36 ins. long)	1¼	1
Plate and cup warmers (20 cu. ft.)	1	¾
Vegetable steamers (per compartment)	1	
Clam, lobster or potato steamers	1	
Egg boilers (3-compartment)	¾	

In addition to these devices, a supply of steam should be provided at silver sinks and dish washing machines, unless a hot water supply at about 180° Fahr. is provided. If hot water of lower temperature is supplied, it is necessary to inject steam to raise the temperature so that silver and dish cleaning may be quickly and properly done.

These results of observations show the actual amounts of steam used in a large restaurant kitchen, in relation to the number of persons served. Steam was measured over a period of four days.

Time of kitchen operation	Hours per day	Average lbs. steam per hour	Lbs. steam per day	No. of persons served	Lbs. steam per person served
7 a.m.—1 a.m.	18	332	5976	1705	3.5
7 a.m.—1 a.m.	18	330	5940	1548	3.78
7 a.m.—1 a.m.	18	299	5382	596	9.04
7 a.m.—1 a.m.	18	319	5742	1114	5.16

Average steam used per hour of kitchen operation . . . . . 320 lbs.
Steam used per person served . . . . . 4.64 lbs.

These observations show a certain relation to the number of persons served, although as might be expected the usage per person is lower on busy days.

STEAM IN LAUNDRIES.—In a hotel, club or institutional building a laundry is usually provided and a supply of high pressure steam is required in the operation of mangles and pressing and ironing machines. The steam pressure required varies from 70 to 100 lbs. per sq. in. For drying rooms, drying tumblers, starch kettles and washing machine, it is only necessary to provide a low pressure steam supply.

Unless coal- or oil-fired high pressure boilers to provide steam to produce electric power are to be installed in a new building, in which case steam for the mangles and ironers is obtained direct, the proper usage is to install an individual gas-fired boiler for the laundry service. Even with manufactured gas at prices over $1 per 1,000 cu. ft., these boilers have proved economical. Operation is automatic; city regulations do not require a licensed engineer in attendance, and the cost of operation is lower than might be expected as the boiler is in service only when the mangles or ironers are being used. Washing machines in laundries require very hot water. Some operators insist that the water should be practically at boiling point, yet in some laundries the washing is done with water at as low a temperature as 170°. A supply of low pressure steam to the washing machines can be used to raise the water temperature, although this is usually wasteful in operation.

Steam for Manufacturing.—In loft and manufacturing buildings, in which printing, chemical processes, hat making and other similar kinds of business are carried on, high pressure steam may be required. The use of the automatic gas-fired boiler in such cases cannot be too strongly advocated. The boilers can be installed after the building is erected, proportioned to the tenants' demands for steam, and placed under their control. The gas supply can be metered and each tenant charged in proportion to the amount used. In loft and manufacturing buildings, a main gas supply pipe of 4 ins. from the street mains should be arranged for. A main rising line 3 ins. in diameter should be erected with outlets at each floor. Thus equipped, the needs of future tenants for steam supply for industrial processes can be taken care of in the way most economical to the building owner.

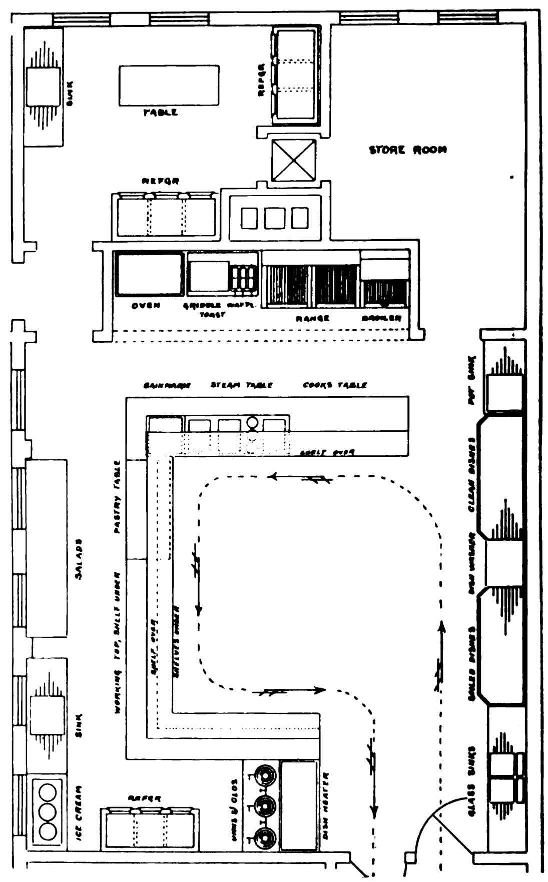
Data on Gas-fired Boilers.—This table gives data on maximum gas consumption and sizes of supply pipes for gas-fired boilers:

Size of boiler; horse power	Maximum hourly consumption cu. ft. gas	Size of service supply pipe; diameter in ins.
5	375	1½
10	750	2
15	1125	2
20	1500	2½
25	1875	2½
30	2250	3
35	2625	3
40	3000	3
45	3375	4
50	3750	4

A summary of the systems of steam supply in new buildings in which it is planned to purchase electric light and power may be of interest.

Building Heating.—Gas-fired, low pressure heating boilers in residences and small office buildings. Coal-fired, low pressure heating boilers in larger buildings. Vacuum or hot water heating systems should be adopted.

Hot Water Supply.—Gas-fired boilers for summer use. In winter, steam to be obtained from building heating boilers. Water temperature should be automatically controlled at heating tanks. Temperature of water leaving tank should be from 140° to 150° Fahr. Higher temperatures use more fuel and accelerate corrosion of piping. In kitchens and laundries, provide auxiliary heaters to raise temperature of hot water to about 190°, or arrange for supply of low pressure steam to individual appliances to mix with and raise temperature of water. Provide apparatus for de-activating water or other devices capable of arresting corrosion in hot water piping system.



All-gas Equipped Kitchen, Rogers Hall School, Lowell, Mass.
Kitchen proper 25 ft. x 25 ft. 6 ins. Accommodations for 250 people
Cram & Ferguson, Architects

Kitchen.—Either gas-operated appliances or low pressure steam for cooking. If steam is used, provide gas-fired steams boiler for summer use. In winter, steam for cooking is to be obtained from building heating boilers.

Laundry.—Gas-fired automatic boilers, operating at 100 lbs. pressure to operate mangles, ironing and pressing machines. These boilers also to provide steam to dryers, starch kettles and washers unless a supply of low pressure steam is available from the building heating boilers.

Manufacturing Processes.—Install gas-fired, high pressure boilers on the floors, besides the machines in which steam is to be used. Install proper sized gas piping to allow for installation of boilers when tenants' demands for steam are known or in event of changes in occupancy.

Electrical Wiring Layouts for Modern Buildings

PART I

By NELSON C. ROSS
Associate Member, A.I.E.E.

DURING the past year the writer has been asked by a number of architectural and engineering draftsmen where they could obtain a book, written in non-technical terms, that would give them a working knowledge of the electrical wiring layouts and equipment which are required in our modern buildings — something which would give them sufficient understanding of the subject to enable them to talk intelligently with electrical contractors doing work under the direction of their offices, to help them to become familiar with the different construction details of the work, and above all to be of assistance in the preparing of plans and specifications covering this type of equipment. While books covering all branches of electrical science are readily obtainable, to the best of the writer's knowledge, no work of the kind described exists, and it is the intention that these papers will, as far as is possible, furnish this information in the form required.

It is not the intention that these papers will be in any way technical, but rather descriptive of wiring layouts; each type of building is to be considered in turn, a typical layout described, and simple wiring diagrams furnished, so that anyone conversant with building plans may understand the details of the different layouts and the specifications covering the work. The layouts hereinafter described will, as far as is possible, be complete for each class of building, including circuit wiring and equipment. In the use of the schedules, tables and other information, however, judgment must be used, and this checked as far as possible by experience, as the buildings will require equipment and circuiting in proportion to the uses to which they are to be put.

Each building is a separate problem and must have separate treatment, as two buildings, particularly with reference to schools, even if built from the same plans, may require different wiring and equipment, depending upon whether the courses taught are industrial, commercial, academic or scientific, or whether any combination of these courses is taught in the same building. Again, the volume and control of the lighting will depend upon whether the building is to be used only for day work, or whether it is to be used also at night. In all cases, however, before any work on the plans is begun, it is advisable to get all possible information as to the use of the building and to proportion the wiring circuits and equipment accordingly.

Electrical Terms

Before taking up the discussion of the different wiring systems and equipment, however, it may be well to consider the meaning of the electrical terms in common use, as well as their application to the work. We are often told that the electrical service on a certain street, or in a certain town, is delivered at 110 volts or 220 volts, and in another town at 500 volts or 2300 volts, while power may be delivered over a three-phase alternating current circuit or a direct current circuit, until the terms become confused and are not well understood.

It may be said that on interior wiring layouts we are seldom required to consider high voltage, excepting possibly on the service wires, and this only when primary service is carried into the building and connected to a transformer bank. As a rule the voltage in the building will seldom be higher than 220 volts, and never higher than 550 volts. The latter voltage is used only on motor circuits.

The electrical terms with which we are chiefly concerned are the "voltage or pressure on the circuits," the "amperes or current flowing in the circuits," the "resistance of the wiring circuits and of the apparatus connected," the "wattage required for the lamps and equipment," and the "characteristics of the available electrical service for the building."

The "volt" is the unit of electrical pressure, just as the pound is the unit of steam pressure. On a steam plant or in a system of steam piping, the higher the steam pressure that is used in the system the greater becomes the strain on the boilers, equipment and piping, requiring heavier steam pipe and fittings, and greater care and skill in the installation of the work. Likewise on electrical wiring systems, the higher the voltage used the greater becomes the strain or stress on the wires and equipment, thus requiring a higher grade of insulation, greater spacings between exposed terminals, and greater care in the installation of the wires and equipment.

Broadly, the reason for the use of high pressures on either steam or electrical transmission lines is that, other things being equal, the higher the pressure used the greater becomes the over-all economy of operation. Again, as will be explained later, the greater the pressure used on the line the greater becomes the amount of power that can be delivered over a wire or through a steam pipe of a given size. And of course, with the use of smaller piping or smaller wire, the lower becomes the cost of installation. It is common engineering practice to operate cast iron heating boilers at from 5 lbs. to 15 lbs. pressure. Medium pressure boilers are operated at from 90 lbs. to 110 lbs. pressure, while certain types of marine boilers and large boilers in central power stations are often operated at pressures as high as 250 lbs. Likewise, on electrical wiring systems, low tension equipment, including bells, clocks, time recording systems, telephones, signaling devices, etc., is operated on pressures ranging from 5 volts to

30 volts, the service taken from primary battery, storage battery, or from motor-driven generating units. Incandescent lamps, flatirons, toasters, heating equipment and other electrical devices in domestic use are as a rule operated on a pressure of 110 volts, this pressure being standard on both direct and alternating current circuits.

Small motors are operated on both 110-volt and 220-volt circuits, on both alternating and direct current. 440 and 550 volts are standard pressures for alternating current motors. Very large alternating current motors of the synchronous type are operated direct from the transmission lines, without transformers, at pressures as high as 5,000 volts, while pressures used on certain transmission lines may be as high as 66,000 volts. Such pressures, however, are used only in connection with long distance power transmission.

The "ampere" is the electrical unit of current, and the ampere load may be considered as the volume of electrical energy flowing in the circuits. In water systems, when a large amount of water is required, a large pipe must be used to carry this water. Likewise, on electrical circuits, the greater the current required the larger must be the size of the wire to carry this current. The ampere load or current flowing in the circuits is of importance, as the volume of current determines the size of the wires in the feeder systems, and hence influences the cost of construction.

The "ohm" is the unit of electrical resistance, and may be regarded as the amount of resistance that will permit one ampere to flow in a circuit under a pressure of one volt. The equation $I = \frac{E}{R}$ is known as Ohm's law, and this equation shows the relation which the three electrical units bear to each other:

Where I = the current strength, or amperes,
E = the electromotive-force, or voltage,
R = resistance,

or $\frac{\text{voltage}}{\text{resistance}} = \text{amperes}$, $\frac{\text{voltage}}{\text{amperes}} = \text{resistance}$, and $\text{amperes} \times \text{resistance} = \text{voltage}$.

The "watt" is the unit of electrical power and is the product of the current and pressure, or the amperes flowing in a circuit multiplied by the voltage of the circuit. Thus, in a circuit carrying 10 amperes under a pressure of 110 volts, the watts would be, 10 amperes x 110 volts = 1100 watts.

The "kilowatt" equals 1000 watts, and is the unit upon which all charge for electrical energy is now based.

The "electrical horsepower" equals 746 watts and is equivalent to the mechanical horsepower of 33,000 foot-pounds.

The "watt-hour" equals one watt maintained through the period of one hour.

If we were to purchase an electrical generator, capable of operating 100 lamps continuously, and each lamp consumed 100 watts, the capacity of the generator required must be 100 lamps times 100 watts, or 10,000 watts, or 10-kilowatt (k.w.) capacity. Again, if we were to operate 100 lamps on an electrical circuit for one hour, and each lamp consumed 100 watts per hour, the consumption of energy would be 100 lamps times 100 watts, times one hour, or 10,000 watt-hours, or 10 k.w. hours, and if we were paying 5 cents per k.w. hour for energy, the cost of operating these lamps for one hour would be 10 k.w. hours times 5 cents, or 50 cents. If operated for two hours the cost would be twice as much or $1, and if operated for one-half hour, the cost would be one-half as much, or 25 cents.

Service and Voltage

We are asked why one voltage is used on one plant and a different voltage used on another plant; also why a building in one district is served by alternating current, while a similar building in another district is served with a direct current. It may be said that all modern central station distributing circuits use alternating current where electrical energy is transmitted over distances exceeding 2,000 or 3,000 feet. The reason is that the characteristics of alternating current are such that the voltage or pressure can be raised or lowered by means of transformers, thus permitting the use of high transmission voltage, with consequent small wires, to carry the current from the generating station to the points where the energy is to be used, and at these points the pressure can be again lowered through step-down transformers to the voltage required.

Direct current voltage cannot be raised and lowered as just described without the aid of moving apparatus, and the characteristics of direct current are such that it is not advisable to generate at pressure higher than 550 volts. Direct current systems were in use, however, long before the alternating systems were developed, and direct current is still used on circuits operated by private generating plants where the distances over which the energy is to be transmitted are comparatively short. When direct current electric lighting service was first installed in the larger cities, the three-wire system of distribution, using pressures of 110–220 volts, was developed, and the current generated at this pressure. The generating stations were located in different sections of the city and an underground cable system installed, forming a network of mains, these mains being connected with the several generating stations.

The direct current systems as a rule cover but a certain area in the heart of the city. On all new installations to supply outlying districts, alternating current is used, and this accounts for the use of direct current in some sections of a city, and the use of alternating current in other sections. In the smaller cities and towns we do not, as a rule, find direct current used on central station circuits, as the use of central station current did not become common in these smaller towns and cities until after the development of alternating current.

The average pressure in use on alternating current primary circuits does not exceed the standard pressure of 2,300 volts, and this is transformed at the points of service to 110, 220, 440 or 550 volts, depending upon the type of service that is required. Some of the older plants in the smaller towns, where little or no power service is supplied, are still using the single-phase current, and where motors are required, the single-phase motor is used. This is connected to operate from the lighting circuit, a separate meter being installed for this motor service and a special power rate made the consumer. Certain of the larger cities are still using the two-phase system for power service, with single-phase circuits for lighting service, the lighting service being taken from either phase of the two-phase system. The more modern plants, however, standardize on the three-phase system for power and the single-phase system for lighting, the lighting service being taken from either of the three phases of the system.

The two-phase system is seldom considered on new installations as the three-phase system is more economical and requires less copper in the transmission lines than the two-phase system. It may be said that alternating current motors are designed to operate on single-phase, two-phase or three-phase circuits, respectively, and at any standard voltage. The two-phase and three-phase motors will operate only on the two-phase and three-phase circuits, respectively. The single-phase motor will, however, operate on any one of the phases of the two- or three-phase circuit, provided it is designed for the voltage of the circuit to which it is connected. Direct current motors will not operate on alternating current circuits, nor will alternating current motors operate on direct current circuits. Lamps and heating devices, however, will operate equally well on either alternating or direct current circuits if of the proper voltage.

The Underwriters' Rules

All electrical wiring circuits using pressures greater than 10 volts must be installed in accordance with the rules and requirements of the National Board of Fire Underwriters, or the so-called "Underwriters' Rules," and in addition to the rules of the underwriters nearly all of the cities and towns have certain rules and ordinances regarding the installation of electrical wires and equipment which must be observed. Usually the city requirements are based on the rules of the underwriters, although many cities have more rigid requirements for certain fire districts than are required by the underwriters' rules.

Each city or town has an Inspector of Wires, who must keep in touch with all electrical work under his jurisdiction, and who must see that all rules and city ordinances are observed. When work is completed he must make a final inspection, and if the work is satisfactory, will give permission for the work to be connected to the service wires. In the design of any wiring layout it is advisable to get in touch with the Inspector of Wires in the town where the work is to be carried out, and also to confer with the representatives of the service company with reference to the location of the service and the meter requirements, as well as the type of the service to be supplied, in order that there may be no misunderstanding when the construction work is under way.

Electrical fittings, equipment, wires and other electrical materials pertaining to electrical wiring must have the approval of the underwriters' laboratories, and bear the underwriters' stamp of approval before they may be installed. The underwriters' rules cover the construction requirements on all types of electrical wiring circuits, both on low, medium and high voltage systems of distribution; they also include tables showing the current-carrying capacity of the different sizes of wire, fuses and switches, etc., and these rules must be strictly adhered to in the installation of the work. The rules are the results of the experience of years, and are intended to insure construction work that is safe both from the standpoint of danger to life as well as from fire hazard. The underwriters' rules, however, are not intended to cover the exact methods of installing the conduits, wires and other fittings, or the details of the work to be carried out at each outlet, as such details must be left to the skill and experience of those who are laying out the system and to the men who actually make the installation. The type of construction, however, as well as all wires and equipment that are installed, must conform to the requirements of the rules, in order to insure a satisfactory installation.

Early Methods of Construction

In the early development of interior electrical wiring systems, the matter of fire hazard was not well understood; high grade rubber insulation was unknown, switches, fuses and other current-carrying devices were of the crudest type, made up on wooden bases and with shells not always insulated from the current-carrying parts of sockets and fixtures. Fuses were of the open type and the wiring circuits were installed on the ceilings and walls, using weatherproof wire supported on wooden cleats. Where the circuits passed through walls and floors, they were protected only with a short piece of fiber or paper tubing, and no protection was given to the circuits from mechanical injury. As a result, many disastrous fires were caused by defective wiring and equipment, as well as from the lack of care and experience in the installation of the work.

As the appearance of exposed cleat construction on the ceilings and walls was unsightly, it was soon demanded that the circuits be concealed; this led to the development of wood mouldings in which the wires were carried, and also led to the concealing of the circuits, in buildings of frame construction. On new buildings of frame construction the wires were installed in the interior of the walls and floors, being supported on cleats or knobs, which in turn were secured to the floor timbers, etc., and where passing through walls were protected by short pieces of vulcanized paper tubing. Later, porcelain knobs and tubes were substituted for wood, and the use of porcelain became universal for the bases of switches and other small electrical devices.

On buildings of masonry construction the wires were concealed in fiber conduits or brass-armored paper tubing; this tubing was also installed on exposed work, being stapled to the walls, etc., and the wires drawn in to the tubes. Where concealed wiring was first installed in existing frame buildings (old work), the wires were simply fished into the construction without protection other than the insulation, the floors being pocketed to permit this to be done; tap circuits were made in the concealed spaces and the taps run through the ceilings and connected to the fixtures. Later, this method proving unsatisfactory, flexible fiber tubes were used for protection, these being slipped over the wires before they were drawn into the building construction.

As the use of electrical power became more general and the wiring systems became larger, the danger of fire from these types of construction became apparent. Porcelain, slate, marble and other non-absorbent materials took the place of wood, on switches and other equipment; further, construction materials became standardized, and rules were established covering the methods of electrical construction, which, if followed, will insure an installation which will in no way become a fire hazard to the building.

On the early systems it was customary to carry the service wires from the nearest pole to the attic of the building; brackets and insulators were located on the outside of the structure, the service wires secured to these brackets and then passing through tubes in the building wall to the master switch, which was located in the attic. If a meter was considered for the measurement of the energy consumed, a meter loop was provided at a point near the master switch, while on the other hand the service might be sold at a certain rate per lamp-year.

Present Methods of Construction

Under present methods of construction (on large installations) it is customary to provide a service switchboard or panel at some point in the basement of the building, this panel containing the feeder switches, instruments and protective devices, as well as the recording watt-hour meters of the service company. At times the service switches and the watt-hour meters may be installed separately from the service switchboard, as these meters as a rule are the property of the service company. The service company brings the service wires to a point opposite the property of the consumer at its own expense. From the point of the property line the consumer assumes the expense of the service cables, and these may be installed from the pole to the building underground, or poles may be set on the consumer's property and the lines pass direct from the pole to the building. In the event of the overhead lines passing direct from the pole to the building, a cross arm or brackets are located on the outside wall, and a conduit of ample size to contain the service mains is run from the cross arm or brackets, down, on the outside of the building, to a point at the wall of the basement, thence through the basement wall and terminating at the service switches or switchboard.

As a rule the building is laid out in sections, and the location of lighting outlets, switches, lamps, motors and other equipment carefully considered before the plans are made; then the approximate load is computed, and centers of distribution established for the location of the panel boards. The location of the panel boards is not arbitrary, but these should, building conditions permitting, be located as near as is possible to the centers of distribution on each floor, so that the length of the branch circuits leading from the panels to the outlets may be as short as possible. The feeders, or sub-mains, are run from the service switchboard to the panels, these feeders being controlled from switches on the service switchboard. This method of construction tends to insure good voltage regulation as it equalizes the pressure on the lamps, due to ample feeder copper and comparatively short branch circuits. If the building is square or is built around a light well, there would as a rule be four panels located on each floor, each panel controlling one-fourth of the load, and the four feeders would run from the switchboard to the basement panel at each of the four locations, thence up, looping through the panels on the different floors.

Motor circuits would be grouped and carried back to one or more power panels, each fed from separate power feeders from the switchboard, excepting in the case of very large motors, which would be controlled on separate feeder circuits. Branch circuits would be run from each panel to the outlets and would pick up the different outlets of the lighting system, these outlets to be connected in groups. Each branch circuit is of No. 14 wire and there should be not more than 12 outlets connected to any one branch circuit. Where the wattage of the lamps is known, however, the number of outlets on a circuit should be controlled by this wattage. As a rule, a load of 660 watts is allowed on ordinary branch circuits, although where keyless sockets are used a greater wattage is permitted. If, however, it were determined to use 1,000-watt lamps, not more than one outlet should be connected to a circuit, while if 100-watt lamps were to be used not more than six outlets should be connected on any one circuit.

In the event of a private generating plant being installed in the building, or in an adjacent building, for the operation of the wiring system, the type of construction just described would still be considered, this regardless of whether the wires were installed in conduits, exposed, as on mill construction, finished work, or on knob and tube concealed work.

The National City Bank Building

MADISON AVENUE, 42D AND 43D STREETS, NEW YORK

McKIM, MEAD & WHITE, ARCHITECTS

THE old Manhattan Hotel, which stood for 20 years at the corner of Madison avenue and 42d street, has been converted into an office building, with the lower stories devoted to the uptown branch of the National City Bank and the National City Company.

The casual observer will not see any great change in the familiar exterior. He will note that the building has been sand-blasted, that the old main entrance with its portico and polished granite columns has completely disappeared and that in its stead the small corner entrance, which formerly led to the basement, has been expanded into a quite noble Roman portal, leading to the banking room on the first floor. Then he will observe that the old sidewalk subway entrance has been eliminated and combined with the new office entrance at the west side of the building on 42d street, and that this entrance leads into a corridor which passes between banks of elevators through to 43d street. Also it will appear that the many small windows which marked the hotel bathrooms on the old facades have given place to large office windows Except for these changes, the judicious pruning away of a few

Smaller Public Space Opposite Entrance

Uptown Branch Bank Building, National City Bank, New York

McKim, Mead & White, Architects

outside balconies, and some modifications to the old mansard, the building from the outside looks substantially as before. This problem was clearly not one of the monumental type, but one of adaptation —an adaptation of a hotel, built in two parts, to the needs of a strictly modern bank and office building. We will not dwell upon the difficulties of such a problem nor on the compromises which, of necessity, were accepted, but proceed directly to the solution of what was a difficult problem.

The two courts, or shafts, which formerly gave light and ventilation to the hotel,were thrown into a large central court of about 30 x 90, giving light to the office floors, and by means of a skylight to the central portion of the banking room. This room occupies the entire first floor, with the exception of the elevator hall and entrance. This gives a great room about 100 x 200 in floor area. In order to obtain a large clear space on the Madison avenue side, it was necessary to remove several columns between the two old dining rooms, in the middle of the Madison avenue frontage. This required carrying their loads on a number of 72-inch girders on the second floor, these in turn requiring new columns extending to footings at bed rock.

This banking room is designed to accommodate the uptown branch of the National City Bank and the offices of the National City Company. There are entrances from the corner of 42d street and Madison avenue, from 43d street, and from the office building elevator hall to a generous public aisle. On the street sides of this public space, and separated from it by marble balustrades with bronze gates, are located the platforms for the officers of the bank and of the National City Company, the bond salesmen, and the trust department. The entire central portion of this floor, separated from the public space by a colonnade of 16 marble columns and a marble and bronze counter screen, is given over to the tellers' cages and the clerical working force. This space is splendidly lighted from the great central court above. In the northwest corner of the first floor there is a department for women, with special tellers' and retiring rooms.

Over the public space and the officers' platforms extends a coffered ceiling of ornamental plaster. The walls of the banking room above a Botticino marble base are of artificial stone. The floor of the public space is of Knoxville marble with Travertine borders and steps. The working spaces are floored with cork tile and the carpeted spaces on platforms have cement floors with Travertine borders. Door trim, balustrades, counters and columns are of Botticino marble.

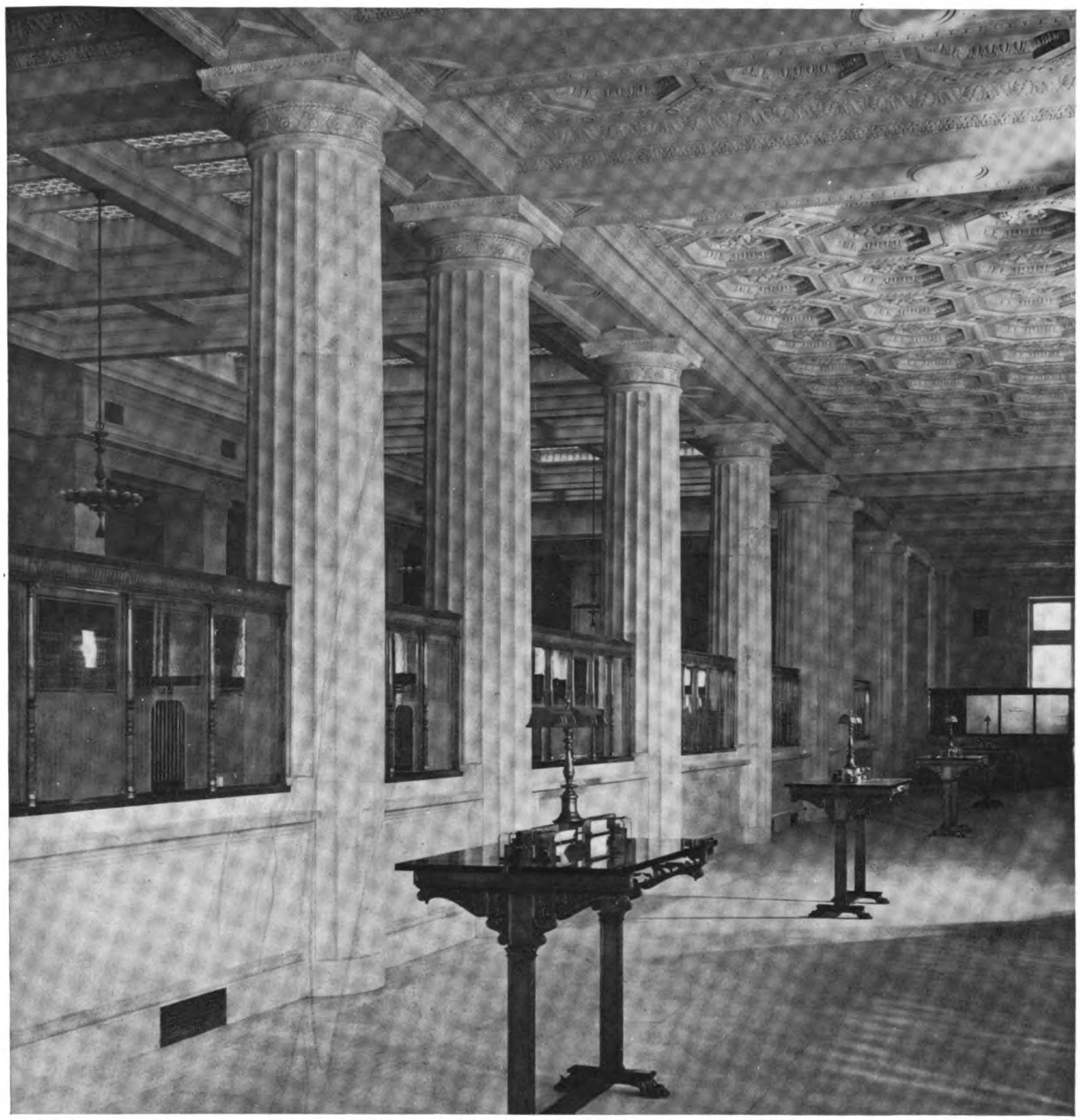
Stairways and elevators at each end of the first floor give access to the quarters of the National City Safe Deposit Company in the basement. The area of the vault is 30 x 60, and it is divided into two stories. Access is by means of two 40-ton vault doors. The walls are of concrete, 18 inches in thickness, heavily reinforced in both directions by steel bars, lined inside with 3 inches of steel plates, and provided over the entire exterior with electric protection. The upper level is devoted to safe deposit boxes, 4,000 of these being provided in varying sizes. Coupon booths and committee rooms to the number of 40 are directly accessible on the basement floor. The lower level is devoted to safe deposit space for the bank's funds and papers, the remainder of the sub-basement being given up to the necessary machinery and other service spaces.

A complete system of mechanical ventilation has been installed for the basement and first floor. The Madison avenue side of the basement has been very simply treated to accommodate the special interest, payroll and foreign exchange departments of the bank, and has new public entrances at both the 42d and 43d street ends and from the subway platform.

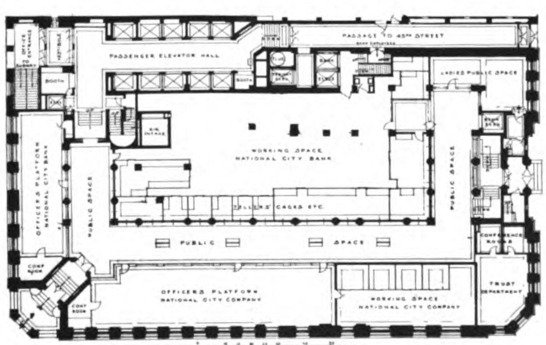
As may be seen from the typical floor plan, the layout of the office building is simply of one row of outside offices and one of court offices, served by a dividing corridor of normal width, extending entirely around the floor and passing between the banks of elevators. This corridor in part remains from the old hotel plan. In certain cases, however, where tenants have rented all or a large part of a floor, this corridor is eliminated and the sub-divisions, largely of standard wood and glass office partitions, have been made to suit individual requirements. The entire 14th floor has been leased by the Uptown Club and designed to meet their requirements with extensive dining rooms, reception rooms and elaborately equipped kitchen service with necessary auxiliary rooms.

A few words about the material used may be interesting. As far as practicable in the office portion, old material was refinished and re-used. In general, however, all that remains of the old building is the outside shell, somewhat modified, together with most of the steel frame and floor arches, part of the interior court walls, the old bedroom doors in offices, and a small portion of the mechanical equipment. The new materials are principally standard and limited by cost; for offices, cement floors and cove bases throughout; office corridors, terrazzo floors with domestic marble bases; lining of elevator halls, Botticino marble, and skylights are of vault light construction.

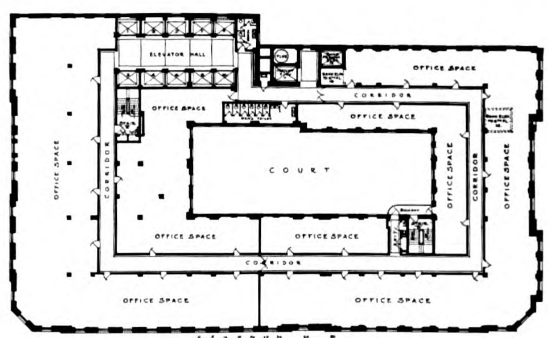
On the first floor the change is quite complete. We find all the vestibules and halls lined with Botticino marble, Tennessee marble floors, Travertine steps and a barrel vault with ornamented plaster coffers in the elevator hall. Extensive use has been made of steel combination buck and frame for doors and windows, thus eliminating trim. The alterations have involved the transformation of a building planned for one definite, specific purpose into a structure equally well adapted to a purpose wholly different, and the building possesses that combination of solidity and architectural dignity which fittingly symbolizes that strength and power which belong to a great financial institution.



VIEW IN PUBLIC SPACE



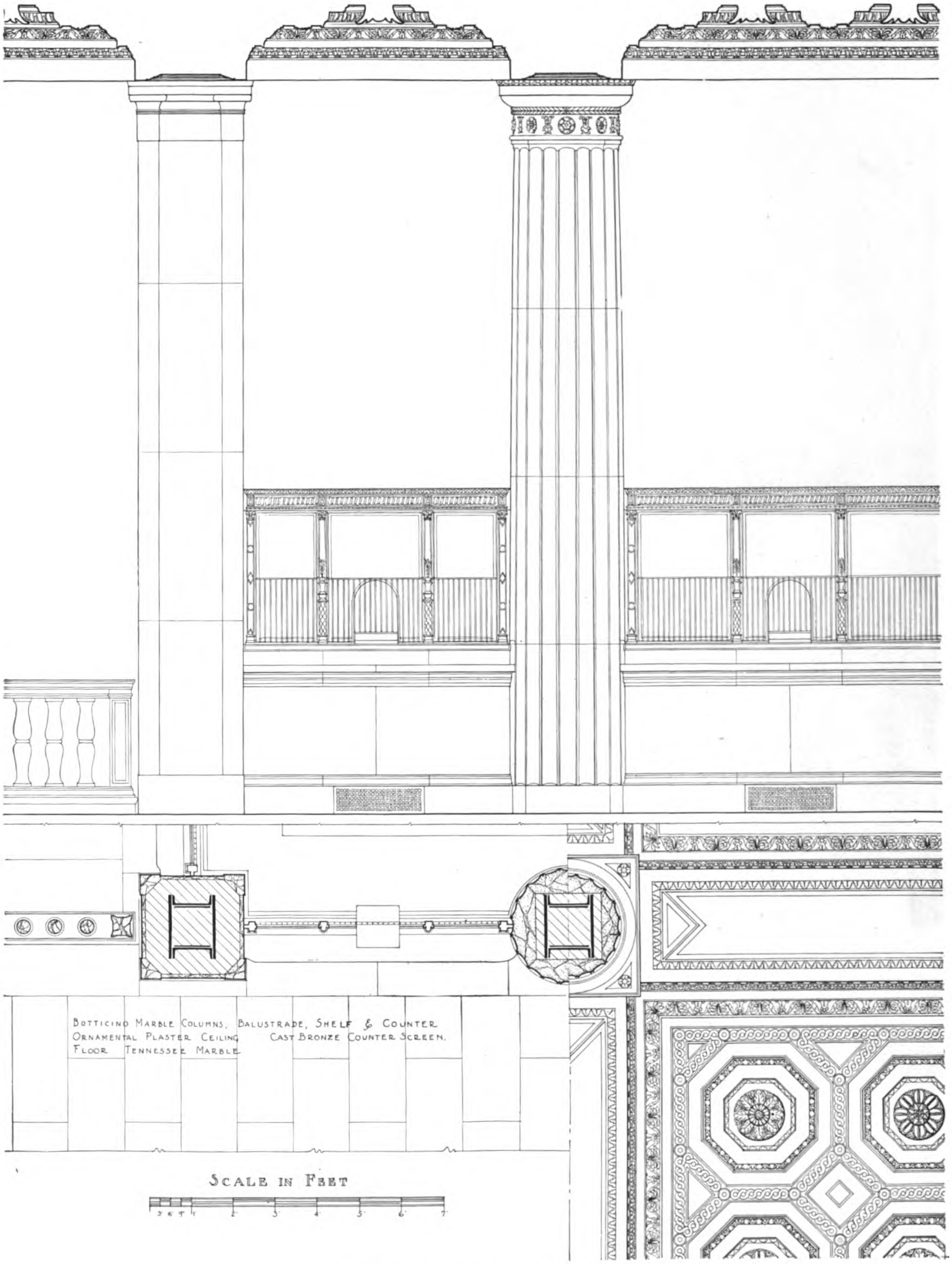
FIRST FLOOR PLAN



TYPICAL OFFICE FLOOR PLAN

UPTOWN BRANCH BUILDING, NATIONAL CITY BANK, NEW YORK

McKIM, MEAD & WHITE, ARCHITECTS



DETAILS OF COLONNADE AND BANKING SCREEN

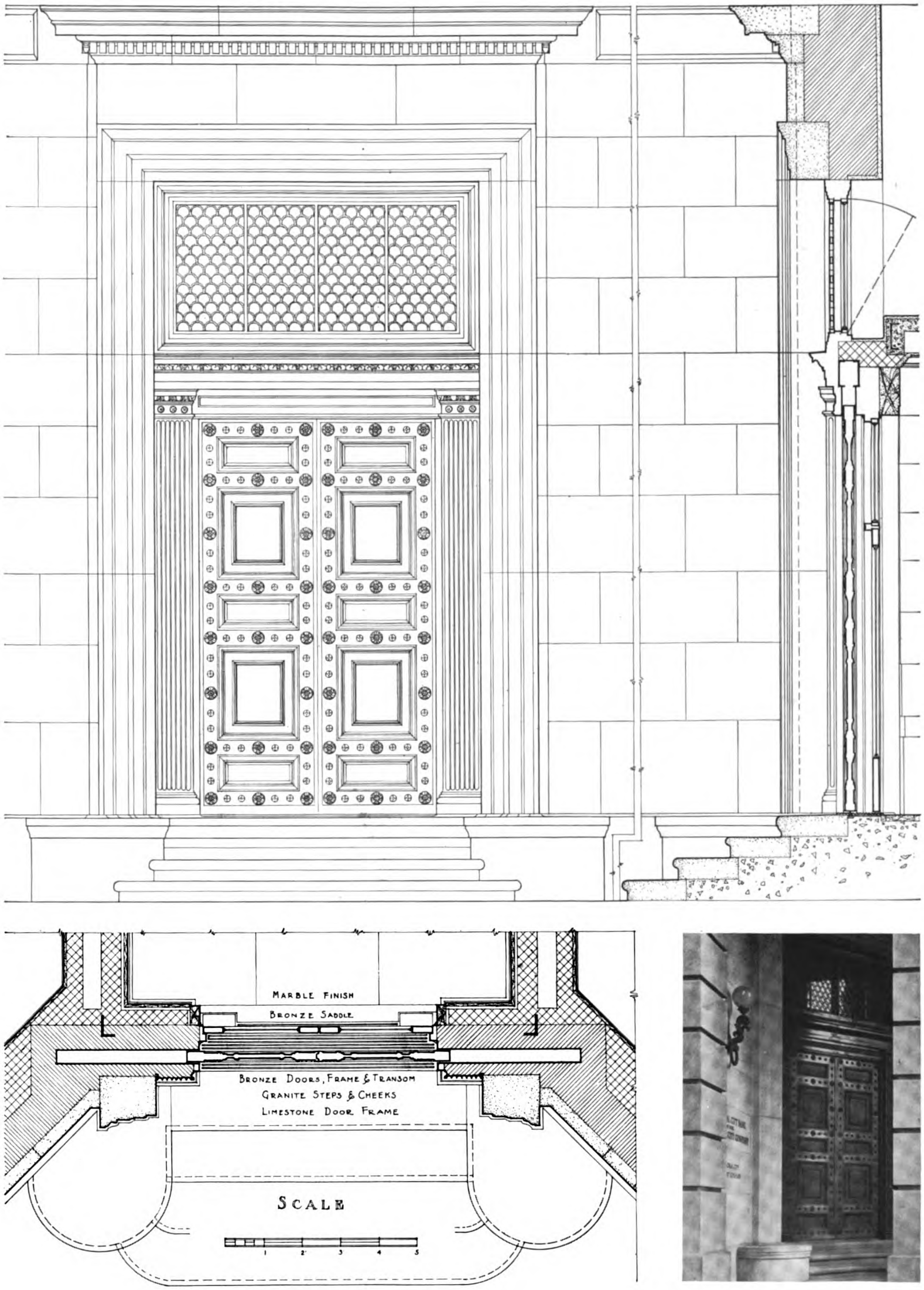
UPTOWN BRANCH BUILDING, NATIONAL CITY BANK, NEW YORK

McKIM, MEAD & WHITE, ARCHITECTS

DETAIL OF OFFICERS' SPACE

UPTOWN BRANCH BUILDING, NATIONAL CITY BANK, NEW YORK

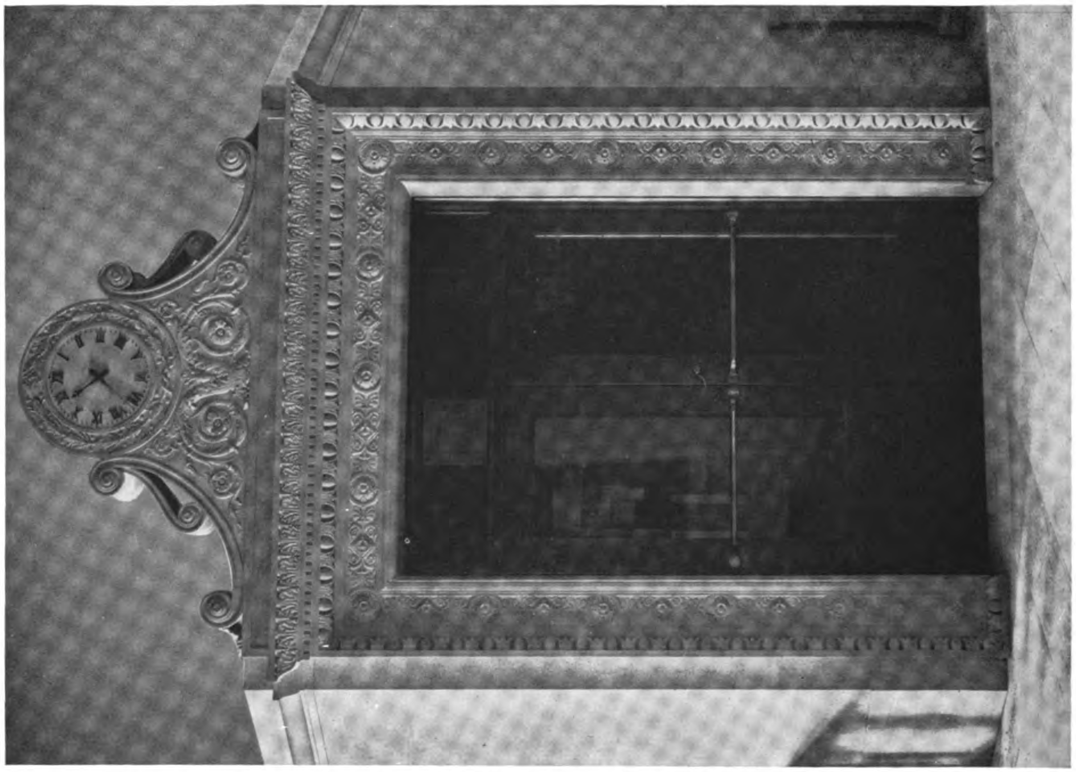
McKIM, MEAD & WHITE, ARCHITECTS

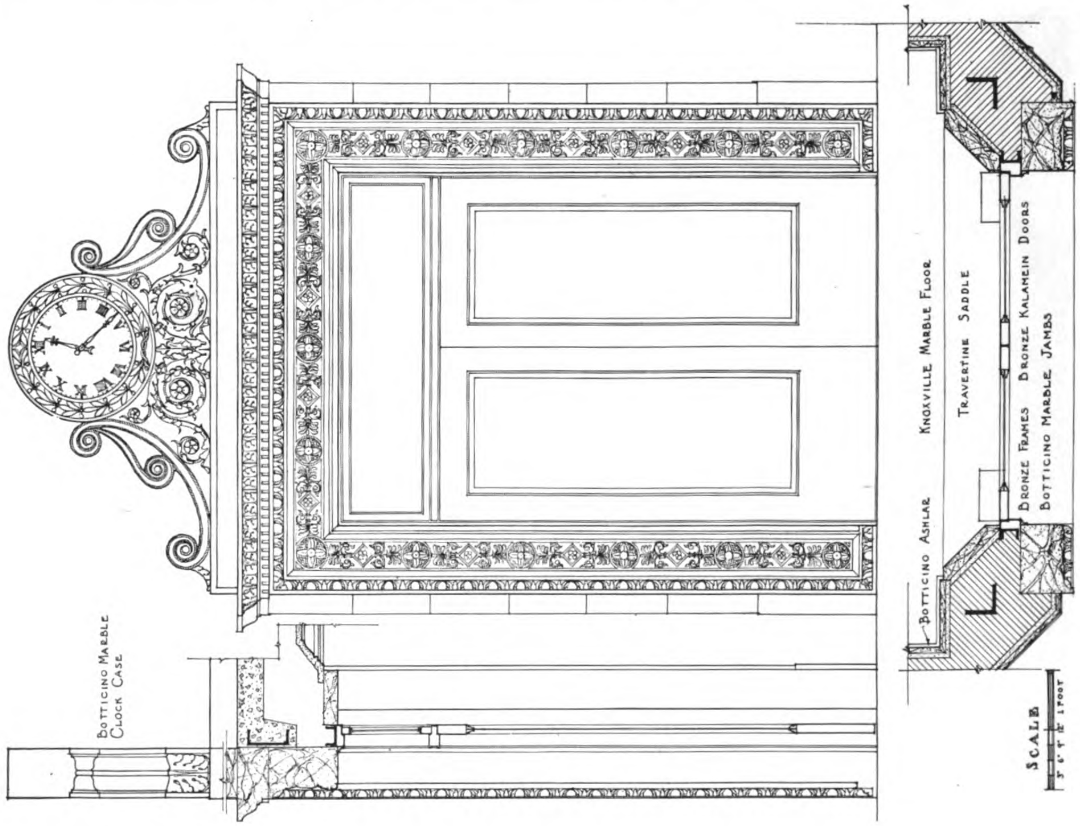


EXTERIOR DETAILS OF MAIN ENTRANCE

UPTOWN BRANCH BUILDING, NATIONAL CITY BANK, NEW YORK

McKIM, MEAD & WHITE, ARCHITECTS





INTERIOR DETAILS OF MAIN ENTRANCE
UPTOWN BRANCH BUILDING, NATIONAL CITY BANK, NEW YORK
McKIM, MEAD & WHITE, ARCHITECTS

Villas of the Veneto

V. THE VILLA VELLUTI, AT MIRA VECCHIA, CANALE DI BRENTA

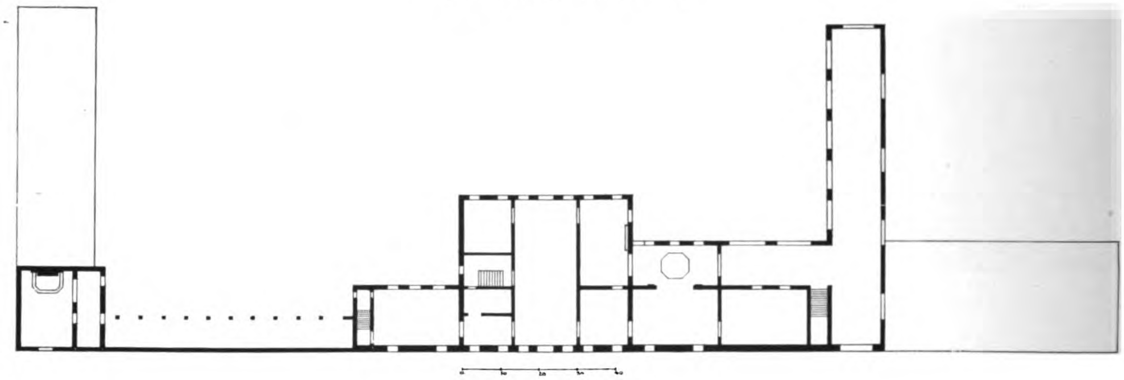
By HAROLD DONALDSON EBERLEIN *and* ROBERT B. C. M. CARRERE

THE Villa Velluti, at Mira Vecchia on the Canale di Brenta, is a typical example of the lesser villas so common all along that thoroughfare, especially between Malcontenta and Strà, and also in other parts of the adjacent region. It is of a later period than Palladio's time, and later than most of the great villas designed by his immediate successors or imitators. It dates from the eighteenth century or, perhaps, very late in the seventeenth. At one period of its history it was a shooting box belonging to the Bishops of Padua and occupied by them when they came down in the autumn with a numerous following of guests and retainers to shoot marsh fowl that abounded in the fens and on the canals. Witness, in one of the rooms, the great elevated octagonal hearth, surmounted by a funnel hood, upon which the sportsmen were wont to roast the results of their day's bag on spits over the glowing coals.

Who the architect was we do not know, nor do

Villa Velluti, Barns and House from the Garden

Elevation of Front toward Road



Floor Plan of Villa Velluti

we know many of the details of the villa's individual history which, for the most part, is unrecorded. But the house is significant as a local type and because it reflects so plainly the enduring prevalence of Palladian influences, albeit those influences appear in an unpretentious and greatly simplified or, indeed, modified form.

To understand the plan of this villa and its connection with a rather unusual environment—the same may be said of numerous other villas of which it is a representative type—one must form some mental picture of the Canale di Brenta and of the exceptional conditions that obtained along its course from the fore part of the sixteenth century, when the Venetians began to extend their zone of habitation to the mainland for a portion of the year. The Canale di Brenta is in many respects more like a street than a mere waterway. In the sixteenth century, and for hundreds of years after, the canal and the roads on each side of it formed the main artery of communication between Venice and Padua. The Venetians, with their natural predilection for water travel, found it convenient to come in their barges or gondolas to the very doors of the country houses they built along its banks. Many of these craft were exceedingly magnificent, with canopies of crimson and gold, curtains of rich silk or brocade, and the gondoliers or rowers in the gay liveries of their masters. In the seventeenth and eighteenth centuries each family had for this suburban journey a sort of light houseboat, called a *burchiello*, fitted with all possible comforts. The occupants dined or supped sumptuously on board and spent the time between whiles playing cards.

Some of the nobles would come in their barges as far as the mainland and there be met by their great coaches in which—or else upon horseback—they would complete the journey to their villas with all the splendid pomp and circumstance so dear to the Venetian temperament. This multicolored and picturesque life upon the canal and its flanking roadways, along with the flow of more prosaic traffic, reached the zenith of its activity in the eighteenth century and continued unabated until the fall of the republic.

Now all this is changed. A tramway, with becoming deliberation, transports the traveler from Fusina to Padua. The canal bears only freight boats on its surface. On the roads are no longer seen the stately equipages of the great, but in their stead a motley stream of motor cars, bicycles, two-wheeled and four-wheeled horse-, donkey- or ox-drawn vehicles of nondescript and antiquated patterns—especially on market days—and even wheelbarrows as means for the conveyance of humans, vegetables and poultry. Many of the villas have come upon evil days and are either falling to decay or are tenanted by the swarming families of *contadini*. Enough traces of the canal's former glory remain, nevertheless, to give one a fair idea of what it once was and to well repay the architect traveler.

When a bend of the canal, or some other chance occasion, deflects one or the other of the roads for a short space from the immediate banks of the stream, the villa grounds in that interval extend to the water's edge. The water steps and gates to such estates were sometimes the objects of very engaging architectural treatments and contributed an unusual element of interest to the general composition. The majority of the villas, however, like the Villa Velluti, lay directly on the road between which and the canal was an open stretch of green-

DETAIL OF FACADE TOWARD THE ROAD

VILLA VELLUTI, MIRA VECCHIA, CANALE DI BRENTA, ITALY

Court at Junction of House and Stables

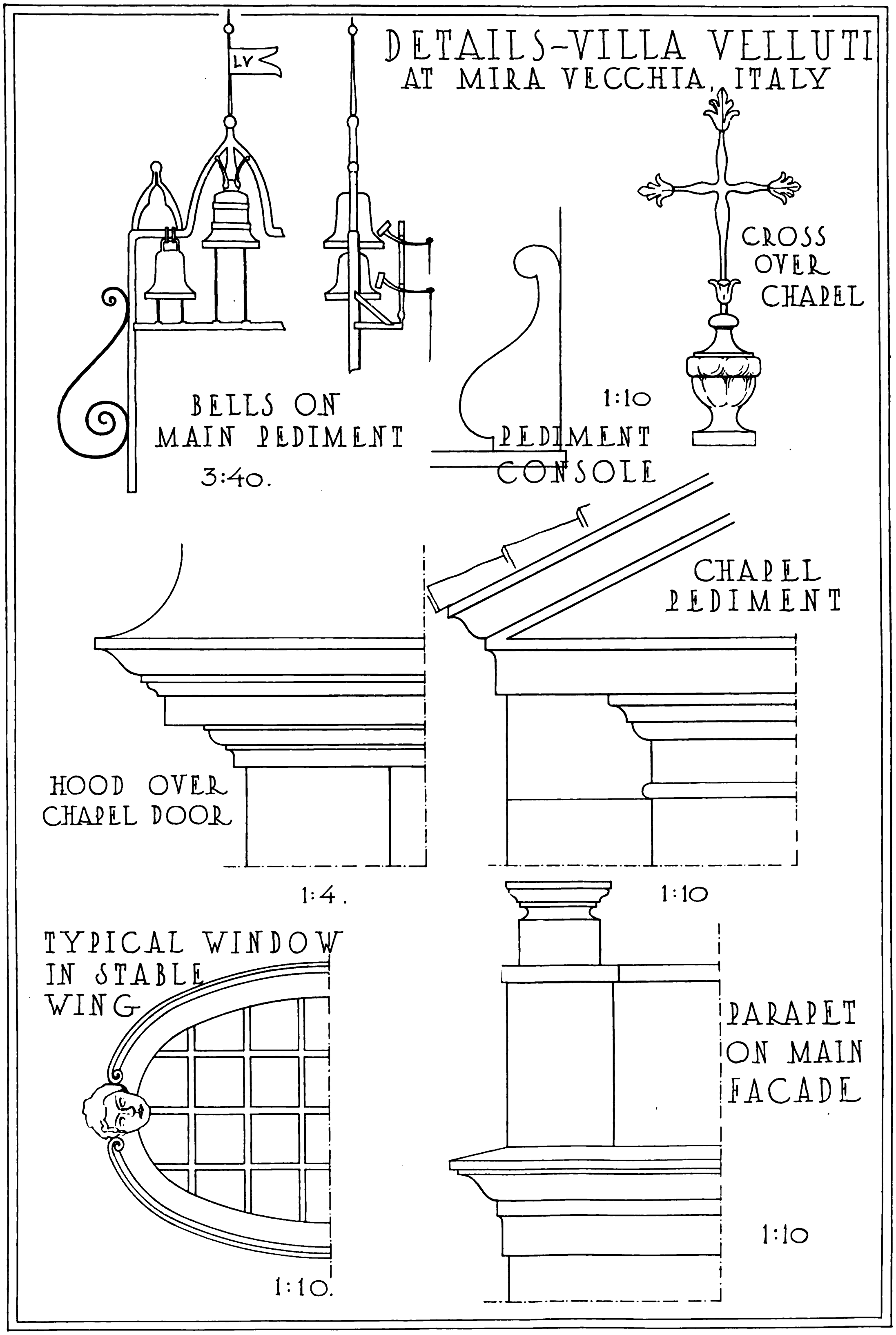
poses so that eventually there were two continuous chains of country houses, facing each other from the opposite banks and separated by the width of the stream and its parallel highways.

The long established custom of placing the stables, *cantine*, granaries and other farm buildings in close proximity to the master's house, making one unbroken group of the whole assemblage, was too strongly entrenched in popular favor to be set aside merely by the advent of more and more neighbors desiring a water frontage. Besides, why should such a usage be modified or discarded? Its convenience and desirability had been approved by centuries of experience. It

sward so that those arriving by gondola or barge crossed the grass and the road and presently entered the house without passing through courtyard or garden. As the villa habit increased among the Venetians, the land on both sides of the canal became more and more in demand for residence pur-

was an essential element in the amplitude of villa life as the Italian conceived it, and it was wholly in accord with a highly organized system of domestic economy—and had not the great Palladio sanctioned and glorified it by bestowing upon it a broader degree of "decorum" than it had pre-

Villa Velluti, Farmyard and Stables

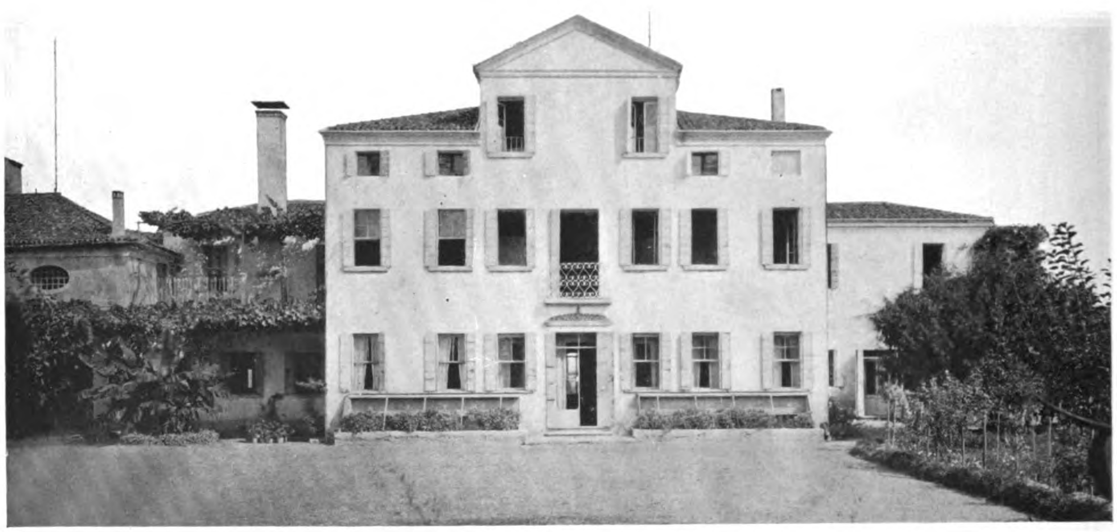

DETAILS-VILLA VELLUTI
AT MIRA VECCHIA, ITALY
BELLS ON
MAIN PEDIMENT
3:40.
PEDIMENT
CONSOLE
1:10
CROSS
OVER
CHAPEL
CHAPEL
PEDIMENT
HOOD OVER
CHAPEL DOOR
1:4.
1:10
TYPICAL WINDOW
IN STABLE
WING
1:10.
PARAPET
ON MAIN
FACADE
1:10

Entrance to Chapel and Part of Roadside Wall

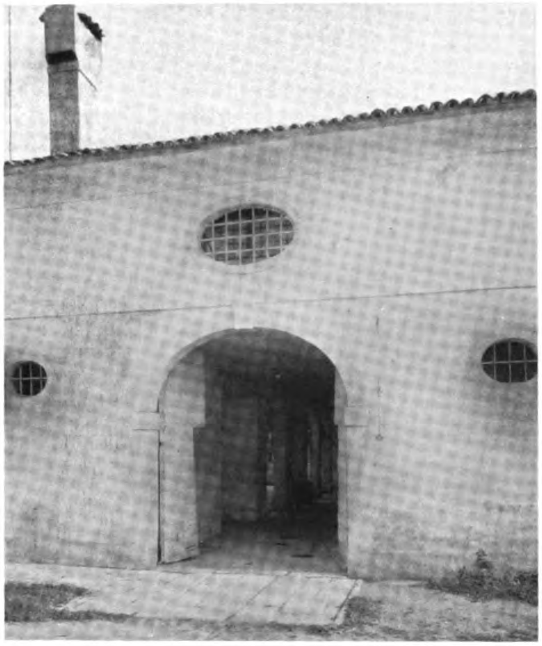
conditions along the canal made it generally expedient to modify one well defined scheme of Palladian layout by reversing it, and the Villa Velluti affords a good instance of such a reversal. Whereas one of Palladio's favorite types of country house plan prescribes a central block with wings returned *forward* towards the approach, here we see the central block with wings returned *backward* from the principal facade so that a straight run of wall may be exposed along the road front.

As the plans show, the actual dwelling part of the Villa Velluti is of modest proportions. To the west are the stables, granaries, *cantine* and other necessary accommodations for farming operations. To the east are the greenhouses, quarters for the farm people and, as a flanking feature and proper point of emphasis in the composition at the eastern end of the road front, the chapel, an essential adjunct invariably found either within the dwelling itself or in connection with every villa of any importance. Upon examining the plan of the master's dwelling it will be seen that the most conspicuous characteristic of the

viously possessed? Furthermore, it had the advantage of keeping the next neighbor on each side at a sufficient distance to insure one's own privacy. And so these villas displayed on the road front a length of wall calculated at a casual glance to magnify the impression of size, while in reality they were of but moderate extent. The gardens and farm lands stretched away to the rear. In one respect



Villa Velluti, Garden Front of Master's House



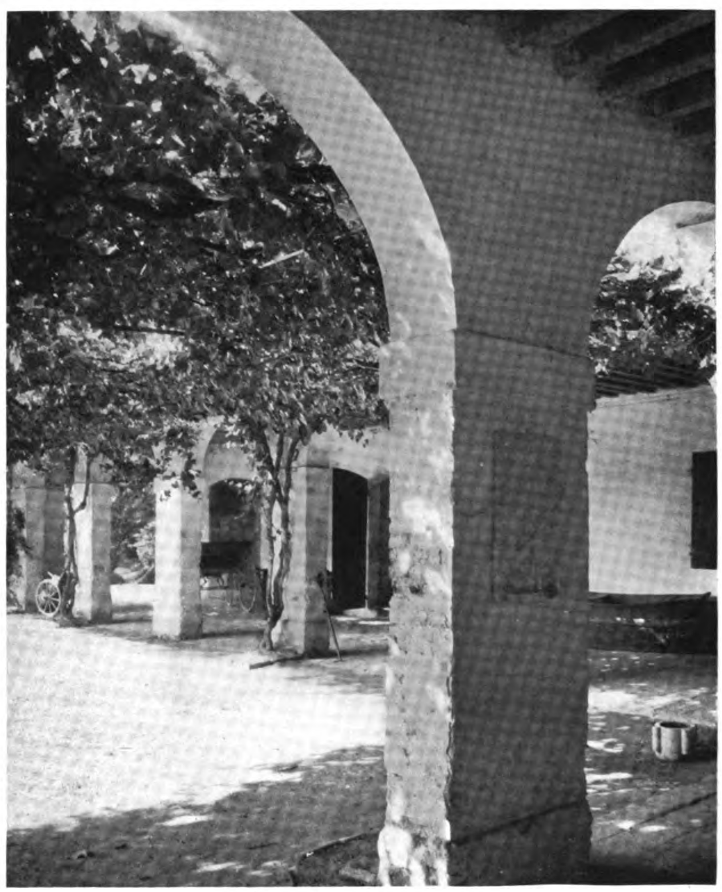
Carriage Entrance from Road

to the grounds, on the south side, with its decorous urn-topped piers and wrought iron gates, on axis with the central hall of the house, can yet be discerned something of the old garden plan. But the passion for the *giardino Inglese*, which at one time swept Italy like a pestilence, destroying much that was valuable and leaving in its stead only a small measure of what was good, conquered the masters of the Villa Velluti too. As a result there is a *boscheria* with a little brook, an obviously artificial island, wooded mounds the contrivance of which proclaims equally obvious artificiality, rustic bridges, and all the other petty deceptions in which the Italian "Capability Browns" of that age reveled.

As one would expect, the house is built of brick and covered with stucco. This sounds prosaic enough until we remember what diversities of color the Italians impart to stucco surfaces, and likewise call to mind the gradations of hue to be found in the tile roofs—brown, red, yellow, orange, and the deep greens of mosses and lichens. In this case the stucco is a distinctly pinkish gray, the sills are of white stone, and the shutters, cornices and figures are white.

arrangement is the great central hall of the ground floor, which one enters directly from the outside. The same arrangement is repeated above stairs. The staircase is not an object of any architectural effort; it is shut off from both lower and upper halls by doors and its presence is virtually suppressed. The central hall plan, with rooms opening out from each side, prevailed both in the larger Venetian town houses and in Palladio's country houses, so it is easy to see how this manner of interior disposition became so general in the later villas. No matter how far the local architects in subsequent centuries may have departed from Palladian usage, there were two particulars in which they adhered to the practice emphasized in the Palladian age—the great central hall or *sala* as the pivotal feature of the plan, and symmetry of arrangement in exterior composition.

The garden to the south of the Villa Velluti (the side away from the road) was doubtless once laid out in formal manner according to the custom obtaining throughout the region, and some traces of this erstwhile formality still remain. From the far entrance

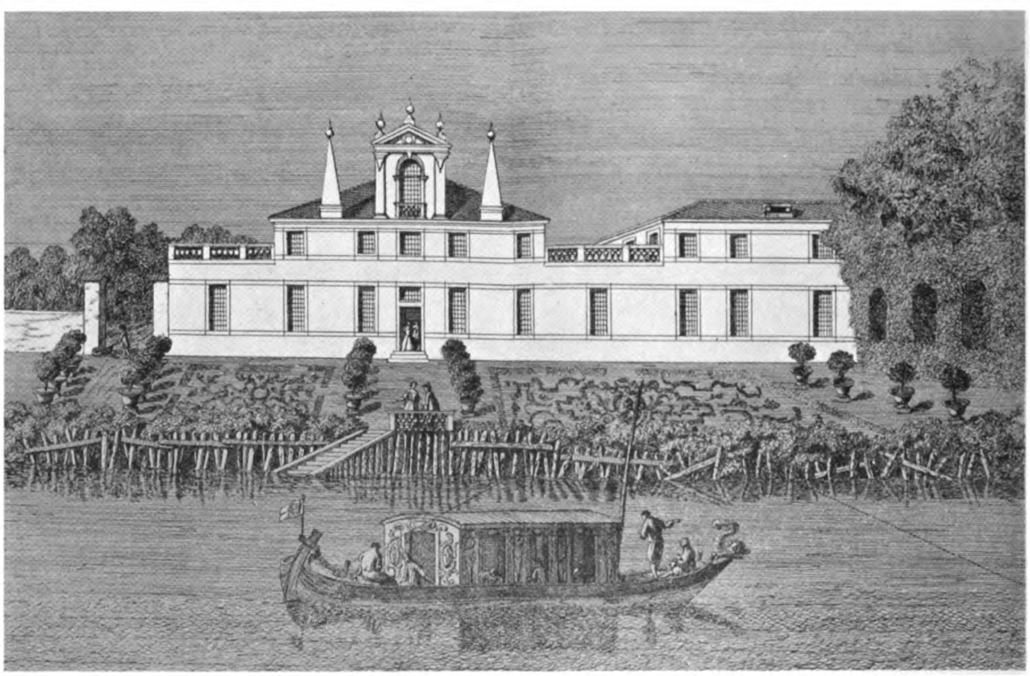


Villa Velluti, the Stable Arcade

On its road front the Villa Velluti displays extremely little ornamental detail and what there is on the facade of the dwelling itself is of the simplest sort—a modest cornice, a fillet and fascia carried as a belt course across the face of the gable to form pediment-wise what Palladio would have called a "frontispiece," the small inverted supporting scrolls, the wrought iron belfry on the gable peak, the clock face, and the stone figures on the gable and (originally) at the corners of the parapets. A long, unbroken stretch of intervening wall to the east serves as a foil for the modest decoration of the chapel facade. To the west, the expanse of walling is more varied by the arched carriage entrance and the succession of oval windows enclosed by mouldings with *mascarons* at each side. The garden front is even more severely plain. Here, however, the eye is arrested and interested rather by the arcaded ell of the stable and barn, with the oval, cross-barred openings in the upper story. The stucco of the barn ell is the same pinkish gray as the house, while the cornice and the mouldings about the windows are white.

The Villa Velluti, more than many of the villas of the Palladian following which fill the Veneto, possesses certain qualities which should be of value to the designer today. Without possessing strict and literal symmetry the villa exhibits a well balanced appearance such as is often striven for in designing American country houses. The placing of the chapel, as shown upon the plan, at some distance from the villa proper and the screening of the connecting arcade by a brick and stuccoed wall, increase the breadth of the group of buildings and balance the long wing upon the opposite side which contains the stable and other domestic offices, a string course of brick between the windows of the upper and lower floors continuing the line established in the wing to the left by the cornice and tiled roof of the arcade between the villa and the chapel.

That the Villa Velluti possesses distinct charm one feels sure at first sight. To determine exactly wherein lies the essence of the charm, however, is a more elusive process. The ensemble of the whole group of buildings is doubtless an important contributory element; the color and sundry other items, such as that truly Palladian touch, the clerestory gables at the sides with semi-circular Roman windows, have likewise their several values to contribute; but what is, perhaps, most significant of all in any thorough analysis is the symmetrical and straightforward composition of the principal mass with its agreeable disposition of voids and solids. The dominating symmetry of the master's dwelling is quite sufficient in formal accent to invite the play of moderate dissimilarity between the two flanking members and yet maintain the measured orderliness of the entire group. Altogether, there is a felicitous union of simplicity and elegance that cannot fail to invest the Villa Velluti with a very substantial quality which merits our interest in it today.



Courtesy of Biblioteca Marciana, Venice

An Early 18th Century Print or a Villa and Garden on the Canale di Brenta, Italy, Showing a Barge Characteristic of the Period

Concrete in the Field

By WALTER W. CLIFFORD
of Clifford & Roeblad, Engineers, Boston

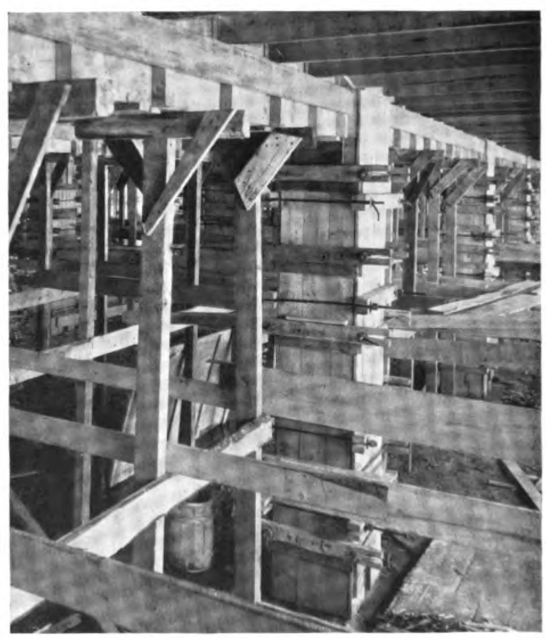
WHEN a muddy appearing, gray substance is being spread over some steel rods on a wood floor form, it requires considerable faith on the part of the layman to believe that this is to become a strong, rigid floor. Even the architect or engineer with limited field experience, who knows that the mud will change to rock, finds it easier to visualize this change in the office than in the field. The architect who is supervising by occasional visits to the site has a difficult task on concrete work, because finished appearance is a poor criterion for internal strength. The best he can do is to avoid too great regularity in his visits, and assume that what he sees in process is typical. The clerk of the works or resident inspector has an advantage, being constantly on the ground, but he has plenty to do.

The forms should first be considered in concrete construction. In a way, they are merely a contractor's problem as he is responsible for the results obtained by their use. In practice, however, it is most satisfactory to have things right from the beginning; therefore, the field inspector ought to make sure that the forms are correctly constructed. The first requirement of forms is that they be accurately built to plan dimensions. A corollary to this is that they be rigidly braced so that they will retain their sizes and shapes under the loads of wet concrete. Metal interior column forms, in particular, need careful attention to insure plumb columns. The inspector will not have time to check the strength of forms, but while pouring is in progress the forms should be watched and any evidence of serious buckling should be the signal to stop work until the form is properly braced. A frequent cause for form failure is settlement of shores under first floor forms, when they rest on fill and do not have sufficiently large sills to spread concentrated loads. This point should always be carefully checked.

Cleaning forms just before pouring is a difficult point for the inspector. He should be forehanded enough to have clean-out holes at the bases of all columns and walls. Without them it is often impossible even to see conditions at the bottom, much less to clean out the sawdust and mortar chips which are sure to accumulate in such places. Clean-out holes should be so placed that it is possible to reach in and pick up chips anywhere along the construction joint. If a compressed air or steam hose is available, clean-out holes may be 10 to 20 feet apart and the nozzle attached to a pole used to blow all rubbish to the nearest hole. Clean-out holes are not ordinarily provided in round steel column forms as used for flat slab construction. Such forms can be placed after the forms above and the joints below are cleaned out, but even then watchfulness is needed to be sure no more dirt gets in. The construction joint at the base of the column cap in this type of construction is difficult to clean without compressed air. Great care should be taken to keep this joint clean. If this is not successful, or if laitance is allowed to form, dirt and chips must be gotten out through the vertical steel and spirals by hand.

Reinforcement looks more simple on the floor than it does on drawings. Well placed reinforcing is so regular in appearance that the omission of rods is quickly noticed. The number, size and general location of rods are easily checked. The condition of the rods often needs attention. A slight film of rust is not objectionable, but any loose, scaly rust should be removed with a wire brush. It sometimes happens that rods in storage or in places near where there has been previous pouring are spattered with mortar; where this is so, they should be brushed clean, as such mortar adheres only loosely to the rods.

It is important to have the rods properly located with respect to the form surface. Metal chairs, of which there are several good types on the market, should be used. Where these cannot be afforded, small concrete blocks of the required thickness may be substituted. Under no condition should the rods be laid directly on the form and pried up to



Typical Forms for Beam and Slab Construction
Clean-out hole may be seen on right side of column base

allow a film of mortar to flow under. When this is done the location of the steel is uncertain, fireproofing may be damaged and the slab may easily be greatly weakened.

Conduits for wires and occasional short lengths of service piping wander around rather promiscuously in the concrete of a modern building and often cause trouble to the inspector. Conduits, however, as ordinarily used, need cause no difficulty. The plane of conduits should be just above the main reinforcing in slabs. This necessitates the use of outlet boxes of suitable depths, or offsetting of the conduits at the box. Shallow outlet boxes are a frequent cause of interference between conduits and steel.

Iron conduits, parallel to reinforcing, are not harmful if they are satisfactorily spaced. The ordinary small conduit encased in concrete will safely take as much compressive stress as the concrete it replaces. In tension — longitudinally — it will aid the reinforcement. In the matter of spacing, conduits parallel to the main reinforcing may be considered as additional rods. Two adjacent rods should be spaced at least twice the maximum size of the aggregate apart in the clear. Conduit paralleling reinforcing rods should be placed between them rather than directly over a rod, for in the latter case the conduit is likely to destroy the bond over half the circumference of the rod.

Conduits 1¼ inches or less, crossing the main reinforcement, have sufficient strength as supported by the concrete to transmit stress. Larger conduits should be of heavy pipe if they must be located at points of high compressive stress. Conduits crossing the main reinforcement should be at least 4 inches apart in the clear, under ordinary conditions, to insure the concrete's flowing around the crossing point and bonding with the reinforcement between conduits. Outlet or panel boxes are often placed in columns. In such cases care must be taken to see that the conduits as they turn horizontally into the box are so spaced that they do not sift out coarse aggregate, causing a pocket underneath. Where conduits are running in several directions in a panel and crossing each other it will be best to have the lower layer under the reinforcing. These conduits will come very close to the surface and it is a good idea to wind them with fine wire to prevent spalling of the mortar film from the smooth surface of the conduit.

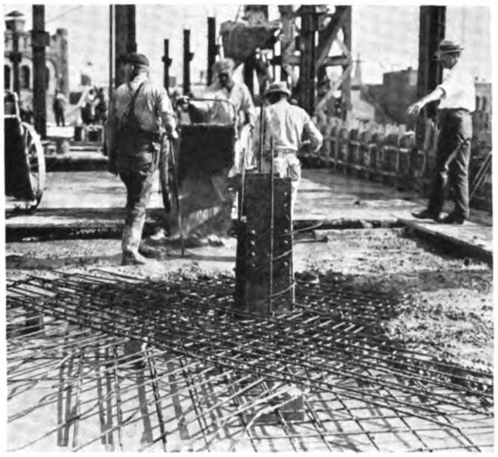
For the inspector the critical details on inserts are to see that all necessary inserts are placed, and that they are secured to the forms in a manner which will insure their remaining in place during the spading of the concrete. Some contractors prefer not to place inserts in the forms as they find it difficult to get them in the right positions and claim that it is cheaper to drill holes in the concrete afterwards and use inserts of the expansion bolt type. This is satisfactory if the loads to be supported are light and do not vibrate.

The approval of aggregates is an important duty which falls to the inspector and which requires the exercise of good, quick judgment. Specifications are sometimes indefinite on the subject, and often conditions at the work arise which could not be foreseen when the specifications were written. The maximum size of coarse aggregate is usually specified. In slabs or any other place where reinforcing bars are closely spaced, this should be rigidly adhered to, observing the relation that the maximum size of aggregate should be not greater than one-half of the clear spacing of the rods. On the other hand, in plain mass footings or walls there is almost no limit to the size of aggregate so long as the proportion of the whole mass is such that all pieces of coarse aggregate are firmly imbedded in mortar.

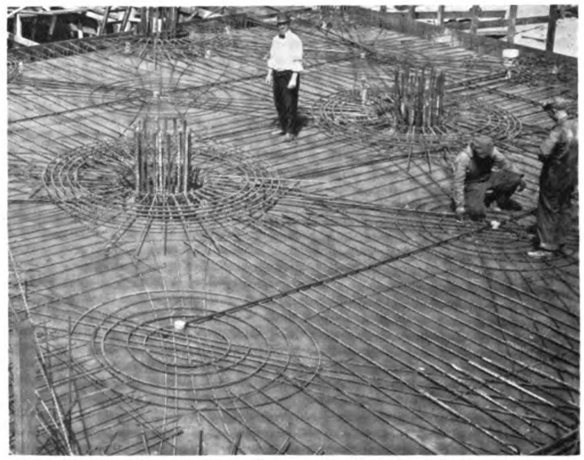
Hardness and soundness of the rock used as coarse aggregate is more important than whether it is gravel or crushed stone. Flat or finger-shaped pieces to an amount greater than 5 per cent should be excluded. Clean aggregates are essential. A film of dust, particularly on gravel, is detrimental to good concrete. Sand was for many years specified as "clean and sharp." Its cleanness is of paramount importance, but sharpness is now an obsolete requirement. Cleanness, as required for sand, is not easy to judge by inspection. 3 per cent of clay is not objectionable, but the same amount of organic matter would mean digging out the concrete and replacing it. There are various field tests given in standard text books which can be resorted to. A simple field test is to mix a small amount of 1: 2 mortar and see if it sets up hard within the proper time. On important work it is just as necessary to get laboratory tests on the sand as on the cement. Sand should be well graded, that is it should have coarse (¼-inch), medium (⅛-inch), and the fine grains (1⁄16-inch or less) in approximately equal proportions. A sand of which all particles will pass a No. 8 or 10 sieve, such as is used for plastering, is not good concrete sand.

Cement is measured by the bag, assuming that a bag is equivalent to 1 cubic foot. Sand and stone for hand mixing are usually measured in a bottomless box built of a size to give the required quantities for one batch. For machine mixing, aggregates are usually measured in wheel barrows or hoppers. For calibrating, a box of known content, conveniently 1 cubic foot, should be provided. With this as a measure all barrows or hoppers should be filled with the proper amount of material and paint or crayon marks made on the sides to show the proper filling depth. This process of measuring should be repeated from time to time as the markings become faint.

Barrows for measuring should not be of the flat pan type since a small difference in depth of filling, hardly noticeable, means a large error in measurement. There are various deep-bodied barrows and carts obtainable with vertical sides. All measuring barrows should be of the same type and size to avoid confusion. Two or more different mixtures are often used alternately. In varying the



Pouring Concrete from Carts



Good Example of Reinforcing Showing Conduit

Chairs show in foreground of illustration at left while in that on the right they are not yet installed

amount of aggregate, the measuring barrows should be so calibrated that one or more barrows can be omitted from the richer mix. This is more accurate and less likely to cause error than to change the filling line of the barrows.

Mixers are of many kinds. The batch or intermittent mixers are most satisfactory, owing to the difficulty of charging continuous mixers uniformly. Charging hoppers should be used on batch mixers as far as possible. They may save 80 per cent of the charging time of the mixer and reduce the temptation to skimp the time of mixing. For all reinforced work or water-tight work there should be at least one full minute of mixing from the time that the last of the materials is in the mixer until the first of the batch is dumped. It is not possible to tell from appearance whether concrete has been mixed a sufficient time or not. It will be found, however, that concrete mixed a full minute will require less water for the same consistency than concrete mixed half as long.

The consistency of concrete is most important. It is regulated by the amount of water used and the time of mixing. The desired consistency is that of a heavy paste which will of itself flow very sluggishly around the reinforcement. A batch of the proper consistency, when dumped from a barrow, will neither break nor flow readily over the edge. On the floor form, it will settle slowly but retain the shape of a mound and no water will run out. In the future, standard slump tests * for consistency will be more and more required. Having determined by trial the proper quantity of water at the beginning of a mixer run, this same amount can and should be controlled by some water-measuring device and used until conditions change. Alternate dry and wet batches made at the whim of some laborer are unsatisfactory. The first or trial batches should be put where they can be taken care of even if of poor consistency—not in a column or deep girder. One gallon of water for each cubic foot of stone is a good quantity for the trial batches.

From the mixer, concrete is dumped into a bucket and hoisted up in a tower to a hopper from which distribution is by chutes or by barrows and carts. With chute distribution of concrete the temptation to make the concrete too wet is great. Slopes varying from 1 in 6 for distances up to 50 feet to 1 in 3 for a 300-foot distribution should be the minimum slopes. Open metal troughs, about 10 inches wide, are most used and are suitable for slopes ranging from the minimum, as just given, to about a 1 in 2 slope. Open troughs should have a uniform grade or increase slightly in pitch as they get farther away from the tower; there should be no reversals in grade. Where slope greater than 1 in 2 is used, the trough should be replaced by a 5- or 6-inch sheet metal pipe. Barrows or two-wheeled carts are also commonly used to distribute concrete. They are economical on ordinary sized work and have the great advantage that a mixture of better consistency can be used with them.

Thorough cleaning of every piece of equipment used for mixing, placing or transporting concrete is essential. Mixers, chutes, barrows, hoppers and tools should always be thoroughly washed down before and after using. Caked concrete in the mixer reduces its efficiency greatly and in chutes or barrows it will clog the flow of fresh concrete and as it breaks will introduce spongy, worthless material.

The placing and spading of concrete require both skill and strength. The laborers wheeling concrete or handling the chute must be efficiently directed, and in addition some shoveling as well as spading must be done to get all the concrete in place. Footings and walls are placed in layers 6 to 12 inches deep. The sections should be small enough so that not more than half an hour will elapse between the placing of separate layers at any point. Columns should be poured their full height at one time and are usually allowed to get their shrinkage (half an hour is sufficient in summer weather) before

* See "Tentative Specification for Workability of Concrete for Concrete Pavements," Am. Soc. Test. Mat., D62—20T.

the floor is poured. Slabs are poured their full thickness progressively along the floor, filling the beam forms at the same time. Temporary screeds are set to give grade and the surface is struck off to grade as it is poured. Without special attention the slabs near upstanding spandrels will come up from the weight of concrete in the beam. This necessitates expensive picking to get it down to grade for finish. Rough slabs which are to have granolithic finish can be roughened up most economically with a short-tooth garden rake as soon as the concrete has had its initial set.

Spading along the face of the form used to be considered necessary, but it has been found that spading in the middle of the beams will give just as good a surface. A sufficient amount of any spading, rodding or joggling will answer all necessary purposes. The main reason for spading is to liberate entrained air and prevent pockets by joggling the mass so that the cement and sand will have a chance to flow around all coarse aggregate and all reinforcing. A secondary function, important in many cases, is that of insuring a film of cement between the form and any aggregate so that the surface will present an even texture without voids or honeycomb when the forms are removed. From three to five men are needed to place and spade the output of a ¾-yard mixer.

Location of construction joints is left to the inspector's judgment. Beams and slabs are stopped against vertical bulkheads in the middle of simple spans. These bulkheads usually have to be notched over the reinforcement. Girders with a single beam framing in the center should be stopped at about the third point. Beams and slabs should always have vertical joints, never allowing the material to stop at its angle of repose. Horizontal joints should be so located that they can be cleaned before the pouring is resumed. Where this is not possible, as in the joint in a flat slab column at the base of the capital, all laitance should be chipped off down to clean aggregate before pouring again.

For laitance—the greasy scum which accumulates on over-wet concrete to the depth of an inch in bad cases—contains much valuable cement but has no load-carrying capacity. Horizontal construction joints should be indented with pieces of 2 x 3 or 2 x 4 wood, placed in the fresh concrete to form a key.

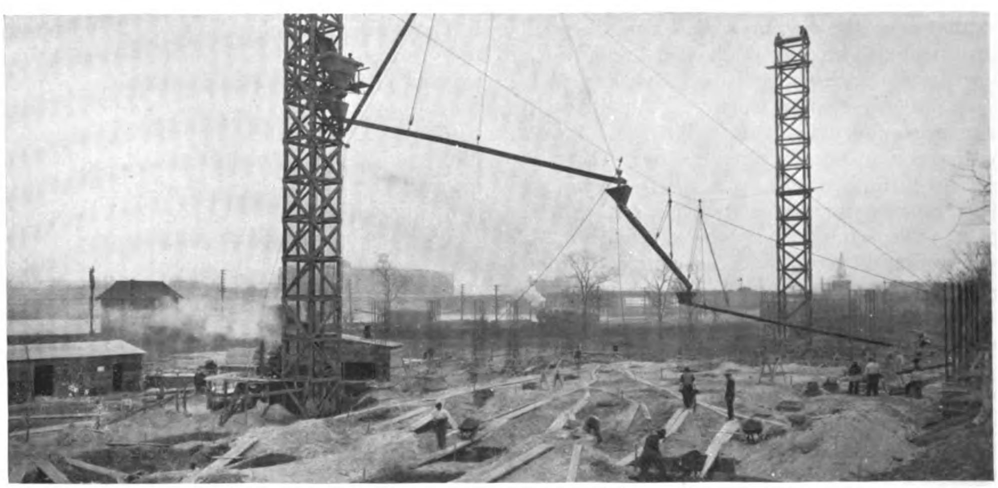
The time of form removal may well be left to the contractor, if he be a man of known skill. The time varies greatly according to weather conditions, from 24 hours for walls in good summer weather to several weeks for beams and slabs in cold weather.

Floor forms should not, of course, be stripped until the floors above are poured and preferably not until the second floor above is poured, to avoid the possibility of a fire in the upper forms dumping concrete on a young slab.

Frozen concrete is the usual excuse for premature form removal. Frozen concrete will ring from a hammer blow like well set concrete, but a little boiling water will quickly show the difference. Forms for mouldings or other ornamental work should be left as long as possible. The harder the concrete the less likely are the corners to chip.

Voids or stone pockets, which show upon removal of the forms, should be patched as soon as possible after examination has shown that the fault is not dangerous. When all precautions are taken, however, a little patching is usually necessary on the best of jobs—it is not necessary, however, to admit this to the contractor.

But all this knowledge without common sense is nothing worth. Good common sense and practical experience are necessary in order to make intelligently the exceptions to which every rule is subject. And, after all, satisfactory concrete work can only be obtained by selecting a capable contractor and adopting co-operation in dealing with him.



Pouring Concrete Footings by Towers and Chutes

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Straight Talks to Architects

V. WHAT IS YOUR METHOD OF CHARGING FOR PROFESSIONAL SERVICES?

IF there is any question calling for frank, open discussion by the architectural profession today it is that of methods of charging for professional services. It would seem that there are very few architects entirely satisfied with the fees received for their work and the methods by which they are paid. There are times when injustice is done to the client, but in most instances it is the architect who suffers.

The sale of direct valuable professional service constitutes a sound business proposition. Methods of charging for such service should, therefore, meet the requirements of sound business judgment. During the past few months we have had an opportunity of discussing this subject with a number of architects in various sections of the country. Naturally, wide divergence of opinion and practice has been found, but all methods tend toward similar objectives. It will, therefore, simplify this discussion to outline some of these objectives and to develop different methods which are employed toward their attainment.

Any method of charging for professional service is unsuccessful if it does not insure these results:

1. Payment for service which represents a fair profit to the architect, in accordance with the value of his services.
2. That this payment shall represent to the owner a charge against the cost of his building which is offset by the increase of intrinsic value directly resulting from services rendered by the architect.
3. That the architect shall be regularly reimbursed for the expenditures which he makes during the course of work done for a client, and that he shall regularly receive a fair proportion of his profit.
4. That the profit which the architect receives shall be commensurate with his skill.
5. That no project in the architect's office shall be the result of unfair and unethical competition with another architect on a basis of professional charges.
6. That the architect shall do no work without payment or make any expenditure on a client's project for which he is not reimbursed, unless he deliberately chooses to speculate on future possibilities of bringing profitable work into his office.

Considering these points in their order of presentation, the first objective should be to make certain that the method of payment for architectural service shall be fair to both parties. Also, that in developing the amount of this payment, the elements of guesswork and gambling on profits should be eliminated as far as possible. The method of reimbursing an architect for his work generally employed today is, of course, that of a flat percentage of the cost of the building to cover the cost of the architect's work and his profit. If all building problems involved a similar amount of architectural work, the percentage method would be a simple solution to the problem of charging for service. The fact remains, however, that there is a wide divergence, not only of draftsmen's time required but of requirements which affect the time the architect himself spends in connection with the work, including conferences with the owner and studying the owner's problem in order to produce a building efficient for his purpose. The usual method employed today is an attempt to set the percentage charge in accordance with these requirements. Thus in the designing of an industrial building or an office structure where every floor is the same, it is sometimes the case that an architect can work on a profitable basis for as low as 3 per cent. In the case of better class residential work, 10 per cent will sometimes scarcely reimburse the architect for his expenditure of time and money in satisfying a client.

Charges Governed by Work Performed

It is indeed quite apparent that in the design of most types of buildings, a straight percentage method of charging is not sound even though a definite attempt is made to set the percentage according to the estimated amount of work involved. When the architect places a percentage charge as a gross return for complete services, it is evident that he is to all practical purposes fixing a lump sum for his work, a sum under which he stands to gain or lose in accordance with the disposition of the client and the success of his own guesswork as to the ultimate cost of the work to him. Admitting that the percentage method of charging, on a basis of past experience, shows the architect a profit for the work he has done at the end of the year, it is still a fact that this profit has varied considerably on individual projects and that in some instances the architect has actually worked for little or no profit, while in other instances the owner may have paid more than should be required for the work which has been done. In other words, the percentage method of charging is often one of loose averages and as such cannot be sound.

The best method for charging should be so arranged that it will include reimbursement to the architect for all his costs, including the proper proportion of overhead together with a fair net profit. From the owner's viewpoint, the payment which he makes to the architect should constitute a real investment which provides him with a building having greater utility, æsthetic or real estate value, because of the services which he has received from the architect. The desire on the part of an owner to insure a high order of design in any type of building constitutes today only one of the actuating motives in the selection of an architect. The owner seeks also practical planning and equipment which will make the building a more efficient machine for its purpose. He seeks also service, which includes a knowledge of construction methods to insure the carrying out of this project on a basis of economy, representing the lowest possible initial investment. For this complete service he pays the architect; and the architect's return should be fairly in accord with his ability to meet these requirements on the part of the owner.

It is because of this condition of demand which is developing on the part of the building public, that we are entering into a period of specialization in many architectural offices. It is for this reason that, without the sacrifice of good design, the architect must appreciate the financial and business requirements of a project and must maintain a thorough knowledge of structural methods to aid in keeping down capital investment in building construction.

The next problem involves the question of the payment of the architect's expenses and fees. In the average arrangement, made between an architect and his client, the architect is called upon to finance much of the work during the planning stages. In many instances his profit on the work which he does is not realized until the building is actually under construction and often until the building is actually finished. This fact has worked hardship on many architects, particularly in connection with large projects where considerable sums of money are required to pay drafting, overhead and general expenses. It is not fair that the architect should be called upon to bear this burden nor that he should have funds tied up indefinitely in plans which await the owner's pleasure before entering the stage of actual construction. Regardless of the method of charging, arrangements should be made by which the architect is reimbursed at least monthly for his expenses and is paid some profit on the work done.

The Money Value of Professional Skill

We have set forth as one of the requirements of a sound basis of charges for professional service that architects' profits should be commensurate with their relative skill and experience. We realize that this is opening up a subject which has many complications because there is a definite question of the value of individual service in this consideration.

In every known profession skill and experience carry their premium. In the medical profession, the specialist receives a higher rate for his time than the average practitioner. In the legal profession, able and experienced attorneys who have developed reputations along specialized lines or in general practice can and do command larger retainers than those who have not demonstrated this skill and capacity for rendering valuable legal service. In the architectural profession an attempt is often made to standardize fees regardless of the complexity of the building project involved, or the architect's ability to render real service. If a prospective building investor should ask almost any young architect as to his ability to design a building of any nature, he would receive a positive and optimistic reply that no one could serve him better. This is not a fact, excepting perhaps in the designing of moderate cost buildings where the requirements of architectural service might be comparatively simple. Otherwise, there will usually be a considerable difference in the quality and value of service — a difference which represents the relative ratio of experience and skill. This very fact explodes the theory of standard charges for architectural service. The building public recognizes this difference and pays to the young and unknown architect $100 or less for the complete plans and specifications of a moderate cost residence, but will pay 10 per cent and many extras to the architect who has a record of unusually good service. How is the young architect to get this record of good service if he cannot work at a low rate until he has demonstrated his skill and can logically charge more for his services? There is certainly a misconception of ethics in any statement or any attempted regulation which would impose a charge of unprofessional conduct or which erects an artificial barrier against this natural course through which an individual progresses to an important position in his chosen profession.

At this point there must also be brought into the discussion the question of competing for work on a basis of professional charges. Section 11 of the Canon of Ethics of the American Institute of Architects says definitely that it is unprofessional for architects to compete *knowingly* for employment on the basis of professional charges. From the ethical viewpoint this is a sound principle but it does not define the term, "to compete knowingly." It would, of course, be not only unethical but unbusinesslike for an architect knowingly to seek the favor of an owner by offering to do work for a smaller fee than that which he knows another architect has already proposed. On the other hand, if we admit that the services of one architect are worth more than the services of another, because of the elements of skill and experience, it is evident that the architect with lesser experience should be able to work for a smaller fee on the same project without violating professional ethics. This, of course, assumes that the client knows by general reputation or otherwise that the less expensive service is inferior and that the architect admits this fact. In spite of any artificial standard of charges which architects may set up, the public in one way or another will pay in accordance with skill and experience. As a rule, the buyer of architectural service will seek this service in accordance with his requirements. If they are not complex, the owner will seek the services of an architect whom he believes capable of doing the work and who will do it at what he is pleased to term a "reasonable cost" — a price which would be less than cost with its attendant overhead. On the other hand, if the problem is complex in nature, the owner will seek the services of an experienced architect because he realizes that although he might have the work done more cheaply by an architect of less experience, the investment in the service of a specialist is logical if the operation is difficult. At this point we reach the problem of ethics between the more experienced organizations, and here we are frankly at a loss to know where to suggest limitations. This much, however, is apparent in our opinion — that an owner has a perfect right to take his problem to the office of an architect whom he believes capable of carrying out the work and to ask him on what basis of professional charges he is willing to develop the necessary plans and specifications and to give requisite supervision. If he then goes to another architect of equal standing and requests the same information, to be considered coevally with the first, it does not seem to us unethical for the second architect to refuse to do business with him.

Ethics and Architects' Charge Systems

It would be shortsighted to deliberately cut prices. If an architect is flatly asked by an owner to do work for a price less than that quoted to him by another architect, and if he is aware of this price, there is but one ethical and businesslike course, which is to turn down the proposal. On the other hand, even if he knows that another architect is receiving consideration and has also been asked to make suggestions and to quote his price for doing the work, there seems to be no reason why he should not quote a figure which represents a satisfactory profit to him. If we consider the two offices in question, we may find that because of the greater knowledge of the cost of doing work or because of several other conditions which may affect the situation, including perhaps a more careful consideration of repetitious work, the cost of architectural services given to the owner by the second office may be less than would be received from the first office. The selection would then be a matter of judgment on the owner's part as to the value of services which he may expect to receive from the individual offices. From the architect's viewpoint, this is not competing on a basis of professional fees, but is giving a quotation of price for service on the basis of production ability, which, after all, is the only sound basis of competition throughout all business and professional activities.

This condition applies particularly to commercial and industrial work, where the efficiency of the building as a machine designed for a specific purpose and its value as an investment are of paramount importance. In certain classes of institutional and residential work the element of design is of particular importance and selection of architects will usually be made on a more directly personal basis. Consequently, we find a condition developing today through which even many of the larger offices are taking work on any reputable business basis which represents a profit to them and a payment for the time of principals which they believe equals their own valuation. Similarly, we find that in spite of any standards which may have been set forth, the young architect is working for a price to the owner, which to him represents the profit which he is willing to take for his services and in consideration of his lower overhead costs.

In the foregoing paragraphs, we have outlined definite objectives toward which the fixation of methods of charging for architectural service should be directed. The next logical consideration is an examination of present-day methods of charging for professional service in order to determine the strength and weakness of various systems and to establish grounds upon which the ideal method of charging for service may be determined.

The detailed information furnished by the American Institute of Architects on this subject, together with some of the more interesting methods of charging developed by individual offices, will be considered in the second section of this article which will appear in the February, 1922, issue of THE ARCHITECTURAL FORUM. In the second part of this article there will also appear the various conclusions which have been drawn as a result of a careful survey of this field and such practical recommendations as may have been developed through a consideration of the methods employed by various architects. Before entering into this detailed consideration, however, it will be of value to outline briefly a number of the methods through which architects are receiving compensation today. There are, of course, the three methods more or less in common use: the straight percentage and the fee-plus-cost methods, both of which are recommended by the American Institute of Architects, and the salary method, a variation of the fee-plus-cost system, each of which has its advantages.

In the application of the straight percentage method, various means are employed to develop what might seem to be a fair fee. In the case of a building where there is a considerable amount of repetitious work, such as a number of floors having practically the same layout, it is the practice of some architects to deduct from the total cubic footage of the building that number of cubic feet which represent repetitious work in planning and thus arrive at an estimated cost much lower than the actual cost of the building on which the percentage fee may be applied. Others take into consideration the fact that there is repetitious work and reduce the percentage of the fee accordingly. It is quite often the case that architects quote lump sums covering the entire work involved in the planning of a given project. In effect, these architects become sub-contractors sometimes, and perhaps unknowingly, bidding for the architectural work and establishing their price on a lump sum basis which, because of the nature of the work, is often a greater gamble than that taken by the material and labor sub-contractor who bids on the actual construction. It is evident that an architect can make a lump sum proposal for his services in designing a small building when he expects to do all the work himself and considers this money as actual income for the time he may spend on the work. This is done very extensively in the speculative building field, particularly for moderate cost houses and for speculative apartment houses for which the owner wants nothing but an elevation, floor plans and a building permit. Certainly in a more complex project, when the architect maintains an organization, this form of lump sum bidding or bidding on a low flat percentage basis is often a cause for grief.

A well known architect told us not many days ago that in earlier stages of his career he tried the lump sum method of fixing a fee for his work. On a large office building project he quoted a flat sum of $25,000 to do all necessary architectural work, including supervision. The owners agreed to this price and then proceeded to make so many changes and to exert such a pressure of demand for his service and that of his organization that by the time his work was three-quarters finished, he had used up in actual expense all of the money which was to be paid for the work. In this dilemma, he went to the owners and told them the story, showing them as best he could a record of office costs. He was very fortunate in the type of people he had to deal with. They recognized the justice of his viewpoint and appropriated an additional $10,000 for the architectural work. This amount saw him through, but with a very small profit and one which was almost negligible considering the amount of his personal time given to the work. The terms of his contract were such that the owners could have forced him to go through on the original proposal, and probably three out of four owners would have insisted on this. Many other architects have had equally unfortunate experiences and have depended upon other commissions which were more profitable to bring up the average, annual earnings of the year.

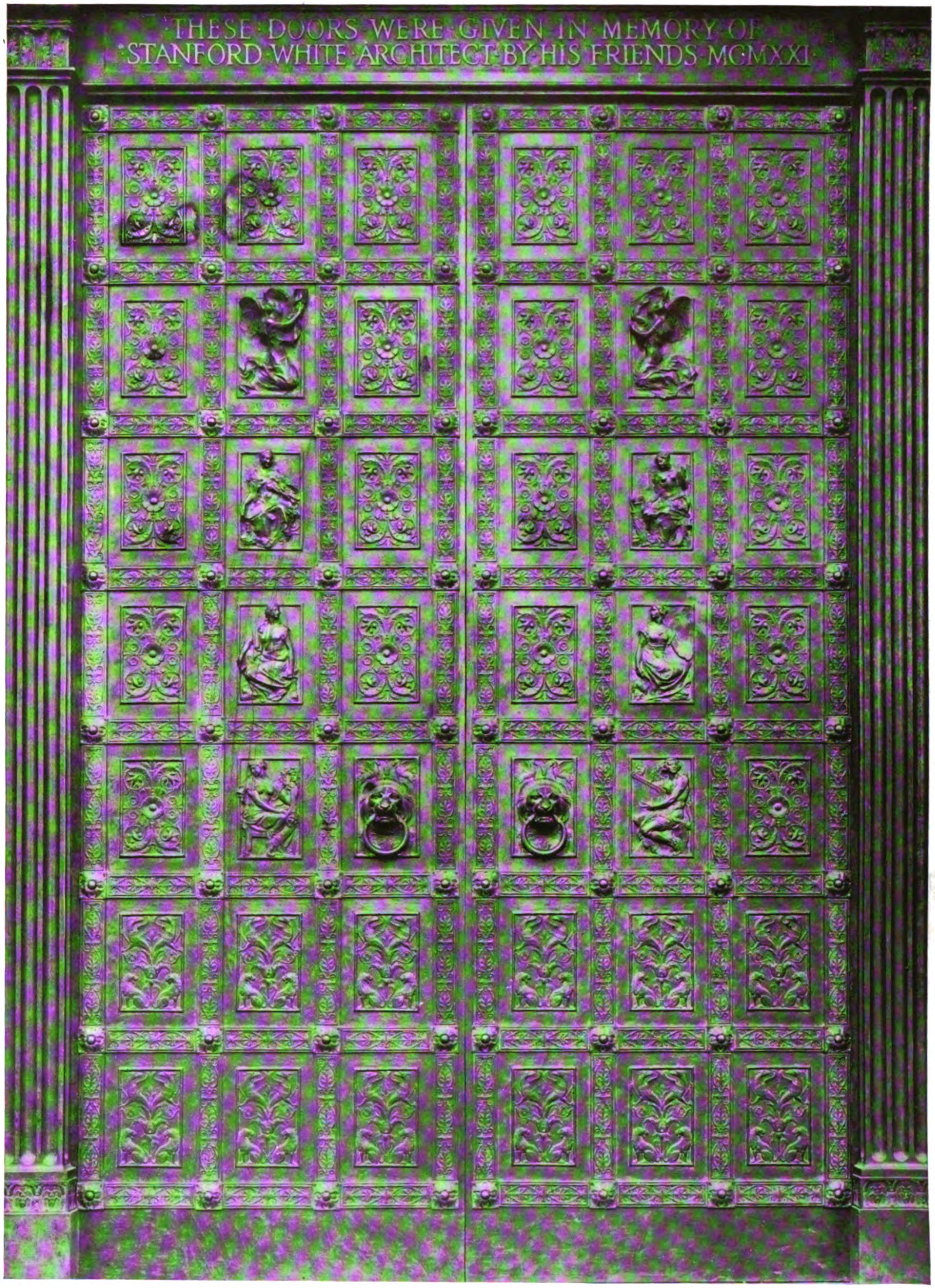
Variations of the Cost-Plus Method

Several forms of cost-plus contracts as between architects and owners have been developed and put into operation. Among these may be noted the cost-plus-fixed-fee basis on which all costs of the work in the architect's office are paid by the owner and a small net percentage of the cost of the building is given to him for profit. Among forms which the cost-plus contract may take are:

1. The contract by which the owner pays the architect his drafting cost, doubled to meet overhead, and a percentage of the total amount of this entire cost taken as profit.
2. The contract which calls for double drafting expenses to cover overhead, plus a monthly salary to the principal or principals over the estimated period covered by the designing and construction of the building.
3. The contract which calls for the payment of actual cost by the owner with the daily or hourly rate for principal's time which is spent on the work.
4. There are several other variations of the cost-plus method, including one interesting example which has come to our attention, wherein one room of the architect's office was set aside for a definite project. A rental was charged for this room during the planning period, together with salaries of an estimator, three draftsmen and a stenographer. Payment was made for principal's time at conferences as called upon by the owner and a lump sum was set aside as his profit.

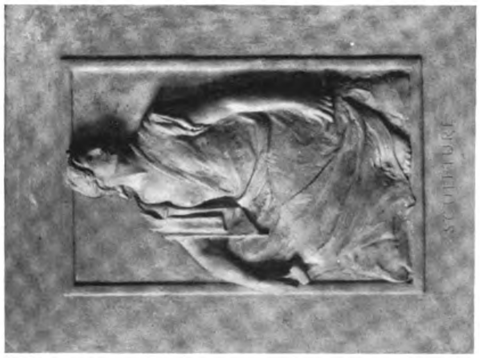
It will be seen that there are numerous variations of the cost-plus method of rendering architectural service. These all have certain definite value, however, as opposed to the percentage method, particularly in that it is possible to render a monthly accounting to the owner and to be reimbursed at stated periods for all costs; that the owner pays only for the amount of work which he wants; that at any time, if the project is abandoned, the architect has actually been paid all the cost of the work to him, together with some profit and has not been forced to tie up his own money, awaiting future reimbursement.

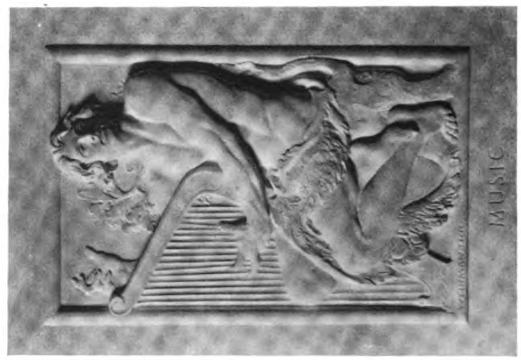
The details of some of these methods, together with logical conclusions which may be drawn from the facts which are here presented, will prove of definite interest to many architects who may wish to revise their own financial relations with clients. In the February issue of The Forum, therefore, this detailed consideration will be given. Meanwhile, we shall be glad to receive correspondence from architects who have opinions to express on this subject or who may have had experiences, the knowledge of which will be of benefit.

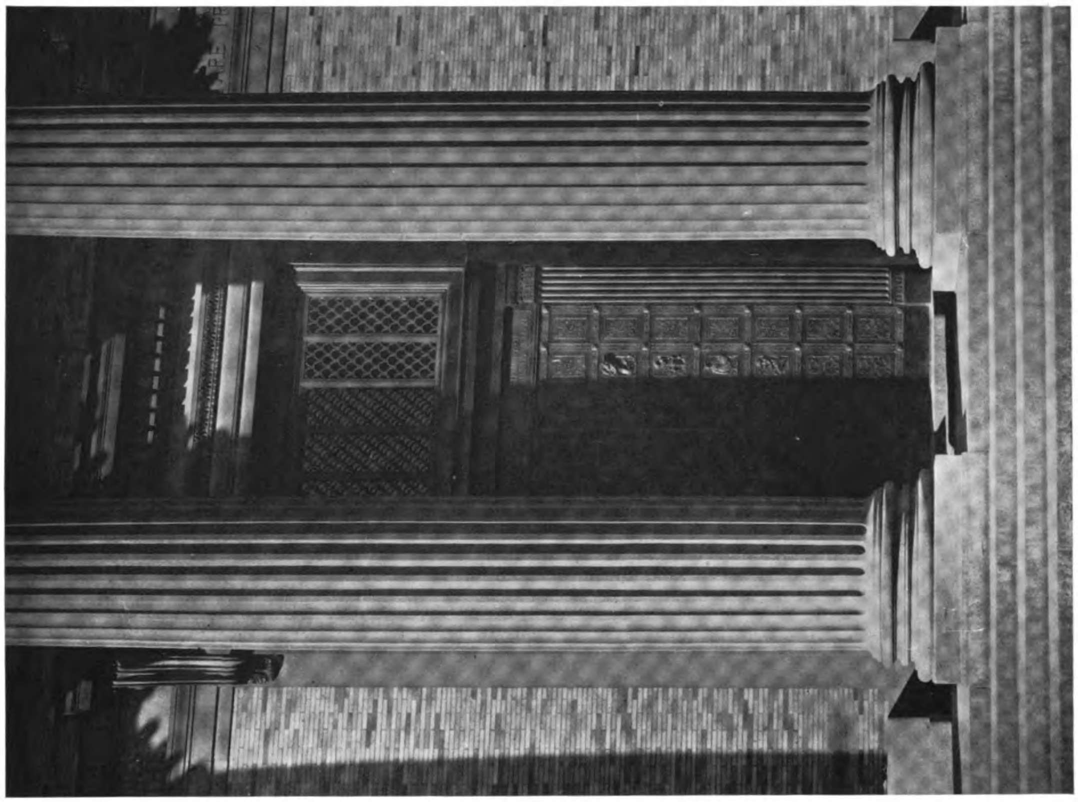


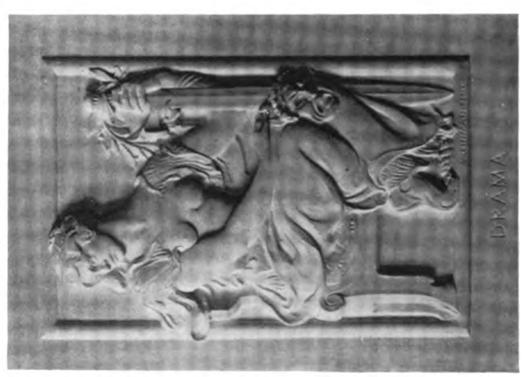
STANFORD WHITE MEMORIAL DOORS, LIBRARY OF NEW YORK UNIVERSITY, NEW YORK

LAWRENCE GRANT WHITE, ARCHITECT









GENERAL VIEW AND DETAILS OF SCULPTURE

STANFORD WHITE MEMORIAL DOORS, LIBRARY OF NEW YORK UNIVERSITY, NEW YORK

LAWRENCE GRANT WHITE, ARCHITECT

Plate Description

BANKING QUARTERS FOR NEW YORK TRUST COMPANY, New York. PLATES 1–3.

This bank occupies space in the American Surety Building, recently remodeled and enlarged. The basement, first, second and third floors, and parts of the sub-basement, the fourth and fifth floors, are utilized for the bank quarters, the different departments to which the public has access being grouped about the main banking room. To afford suitable height for this room the architects, Walker & Gillette, removed portions of the second floor which gave opportunity for a lofty ceiling and yet made possible the connecting of the second floor departments to the general plan.

The use of color which characterizes this large banking room marks a departure from the usual treatment of such rooms. Here the walls are formed of piers and arches made of Rosato marble, of pinkish color, quarried near Verona, Italy, with the openings defined by pilasters which, together with the soffits beneath the beams that carry the second floor across the arches, are of Blue Belge marble. The faces of these beams are ornamented with reproductions of American coins, from the "pine tree shilling" to the "buffalo nickel."

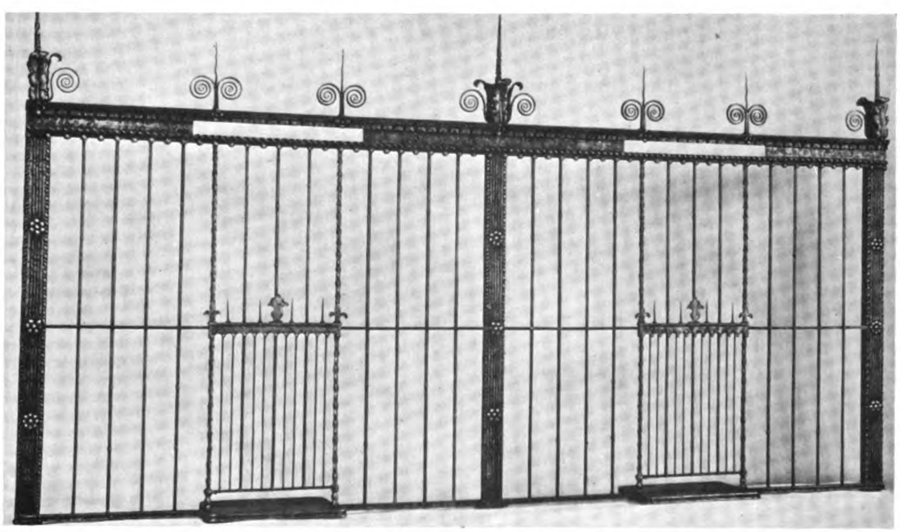
The elaborately modeled plaster ceiling, painted in bleached wood tones and slightly gilded, is supported by four columns, 30 feet high, in the center of the room, each made up of three blocks of reddish purple Levanto mottled marble and having a bronze renaissance capital. The floor pavement has a Blue Belge border and a field of alternating squares of Levanto and Tinos green marbles, separated by bands of Blue Belge. Metal work, such as screens and grilles, is of wrought iron, made after the early Italian manner and slightly oiled. The officers' platform and offices have a wainscoting of Italian walnut, 7 feet 6 inches high, which gives to their quarters the appearance of a library. The necessary vaults are placed in the basement and sub-basement.

STANFORD WHITE MEMORIAL DOORS, New York University, New York. PLATES 13, 14.

There have recently been unveiled at the library of New York University a pair of bronze entrance doors, given by a group of his friends as a memorial to the late Stanford White.

Few instances are known in which so many individuals have entered into collaboration, the models for the panels of bronze being given by various sculptors who had worked with Mr. White on numerous projects. The two upper figures, typifying "Inspiration" and "Generosity," are by Andrew O'Connor. They are winged, and in higher relief than the others, in order to obtain an accent of shadow. The next two lower panels, representing "Architecture" and "Decoration," the two principal activities of Stanford White's career, are by Philip Martiny. Below these are "Painting" and "Sculpture," by Herbert Adams, and "Music" and "Drama," by A. A. Weinman, these panels typifying the allied arts in which he took an especial interest. The lions' heads are the work of Ulysses Ricci, and the inscription was modeled by Janet Scudder.

These doors, which were designed by Lawrence Grant White, of McKim, Mead & White, show a departure from the usual modern practice of casting each door in a single piece. They are, instead, built up of plates of bronze, each panel, stile and rail being cast in a separate piece. The rosettes are structurally significant, as they form the heads to the bolts which fasten the bronze to the wooden doors. This is the method used in the construction of many of the mediæval doors.



Detail of Wrought Iron Counter Screen

Banking Rooms, New York Trust Company, New York

Walker & Gillette, Architects

EDITORIAL COMMENT

THE NEED FOR CRAFT REVIVAL

NOTWITHSTANDING present widespread unemployment, there exists in the building trades the ridiculously paradoxical situation that in many of the country's important cities there is a serious shortage of plasterers, which enables those available to demand and receive in some cases as much as $18 per day. In paying this no one expects to receive equivalent value in work; he is the victim of the manipulation of the law of supply and demand to serve selfish ends. It is a warning of the end of productive building and the choking of architecture as an art unless these pernicious practices of basing everything on the dollar, which are quite as evident in modern business as in the labor unions, are promptly stopped. Curtailed production, which creates artificial scarcity, will enrich a few manufacturers in industry. The same principle in the labor unions—restricting the number of apprentices—will insure short hours, easy work and high pay for the favored few.

But what is it building? Chaos and disorganization, compared with which our past troubles will seem small. This state of affairs cannot last because it is unnatural, but if the shortsightedness of leaders makes them insist on standing in the way of readjustment to reasonable premises, no small amount of general suffering will be experienced. Not content with creating a temporary financial advantage for their members, the unions have encouraged and followed a policy of putting a premium on general inefficiency that has brought the standards of craftsmanship to a state low indeed. Simple, routine methods, regarded as matters of intuition some years ago, seem to be unknown to the present generation of workmen, and this adds largely to the responsibility of the architect who, in person or through his assistants, must now supervise the simplest details of building construction. That so small a number of plasterers are to be had is due to the restrictive regulations regarding apprentices which have been kept in force by plasterers' unions, while the poor quality of work is due partly to lack of training and partly to the pernicious system which teaches a workman to carefully conceal any particular ability he may possess and to produce as little work as possible—only as much as is necessary to insure employment, which, to be sure, is practically guaranteed by his union.

And yet architecture, more than most of the arts, is absolutely dependent for its life upon the intelligent co-operation of a trained body of craftsmen, artisans and workmen with the architect himself. If all initiative and pride in work well done are to be strangled through following ruinous economic policies, and financial costs are to remain so high that expenditure in artistic effort cannot be afforded, architecture will surely perish. The movement has fortunately not gone so far that it cannot be stopped. Architects in visiting their work under construction occasionally come in contact with individual workmen and are surprised to find that often beneath the dull, lethargic attitude which is one result of the union's dominance, there still live and struggle for expression the pride in achievement and at least something of the ability which characterized the well trained workmen a generation ago. Work occupies a large part in any man's existence, and if he cannot find enjoyment in it and will make no effort to do so, he can surely expect to find but little happiness.

We have sometimes wondered if a revival of interest in craftsmanship and an advance toward higher ideals might not be led by architects themselves. There is excellent reason why their influence might be powerful in stimulating the numerous crafts and trades upon which architecture so largely depends. Architects have always maintained a studied aloofness from the turmoil which rends the building field, and this neutrality might now serve as a fulcrum from which a friendly pressure might be exerted. Whether they will or not, architects will sooner or later be forced into a position where they must take an active interest in this absorbing question. Before they can render intelligent and impartial service, and the lack of that is all that stands in the way of an amicable settlement, architects must, however, study the subject in all its ramifications. At present labor and capital are ranged in hostile camps and there is no intermediary capable of impartially analyzing their just claims.

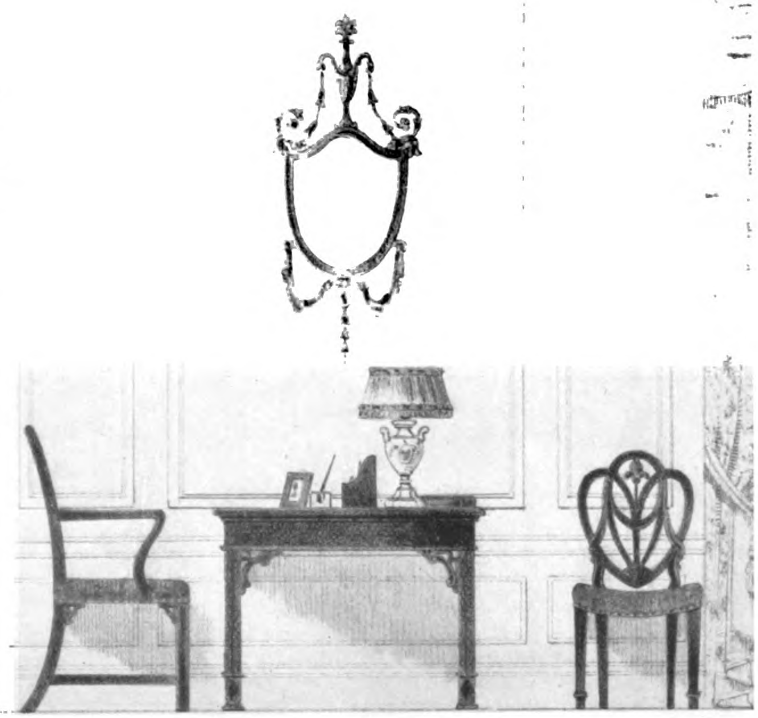
It is not for us to suggest the means by which real craftsmanship can be revived; it is rather our purpose to emphasize the seriousness that the matter of training possesses for the progress of architecture. Whether the present workers in the unions must be abandoned and a new group of men, trained along more intelligent lines, be formed is something that only careful consideration could determine. The chief point, however, is that architects must recognize the trust reposed in them to preserve the glorious traditions of architecture and further its development in our own day. Architects know the difficulties under which they are required to work; they know what is necessary to correct present wrong conditions, and it is certainly their duty to take an active interest and see that their suggestions and advice are used, as far as it is in their power to have them used.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED PROFESSIONAL & DESIGN INTERESTS WITH SPECIAL REFERENCE TO AVAILABLE MATERIALS

It will be the purpose in this Department to illustrate, as far as practicable, modern interiors furnished with articles obtainable in the markets, and the Editors will be pleased to advise interestea readers the sources from which such material may be obtained

Chippendale Style Chair against Background of Pilasters and Paneling in Good Scale Relation



Portion of Side Wall of Drawing Room in Eighteenth Century English Style Showing Good Scale Relation between Architecture and Furniture

Scale of reproductions, ½ inch equals 1 foot

Francis H. Bacon & Co., Decorators

Adam Chair in Black and Gold Lacquer against Larger Scaled Background, Appropriate Because of Its Light Tone

Scale in Interior Architecture

By JOHN T. SIMPSON

PROPORTION is the relation between the different parts of a composition; scale is the relation between the sizes of all these parts and an imaginary unit of measure which is determined by our sense of the fitness of things." In these words Thomas Hastings has defined two of the most vital principles which govern good designing. A study of these definitions and of their practical application will explain why violation of simple precepts, grown out of usage and good taste, results in so many failures in architecture.

Architecture is so fundamentally dependent upon good proportion and appropriate scale that if these are provided in a design, beauty can be definitely expected even though details are left to take care of themselves. Proportion and scale have a close relation but they are essentially different things. The distinction is not obvious and confusion between the two may easily be made. A motif may have good proportions and be out of scale with its setting, but if a part of the motif be too large or too small it is both out of scale and out of proportion. Correct sense of scale is a subtle quality that can be grasped only through a complete knowledge of architectural styles and a keen, almost inherent, sense of the fitness of things. It is something intuitively sensed by the well trained architect, but in common with other results of intuition is difficult to describe.

Scale may be referred to as the quality of a composition which enables us, irrespective of its actual size, to suggest dimensions for it. This practical application of scale is daily utilized unconsciously by architect and layman alike. We readily appreciate large scale or small scale in a facade, because in our streets we have people and objects with which we associate standard sizes, and these we unconsciously use as units of measurement in viewing the building. The human figure is the normal unit of measure in determining scale. This is entirely reasonable because architecture was created by and for the use of man. The rise and run of stairs are adjusted to the human step; chairs and tables are made of certain heights for comfortable use; these sizes are recognized as correct from a utilitarian standpoint and because things fully meeting practical requirements are also generally artistic, we know they are right from an æsthetic angle, and we

Drawing Room in President's House, Columbia University, New York

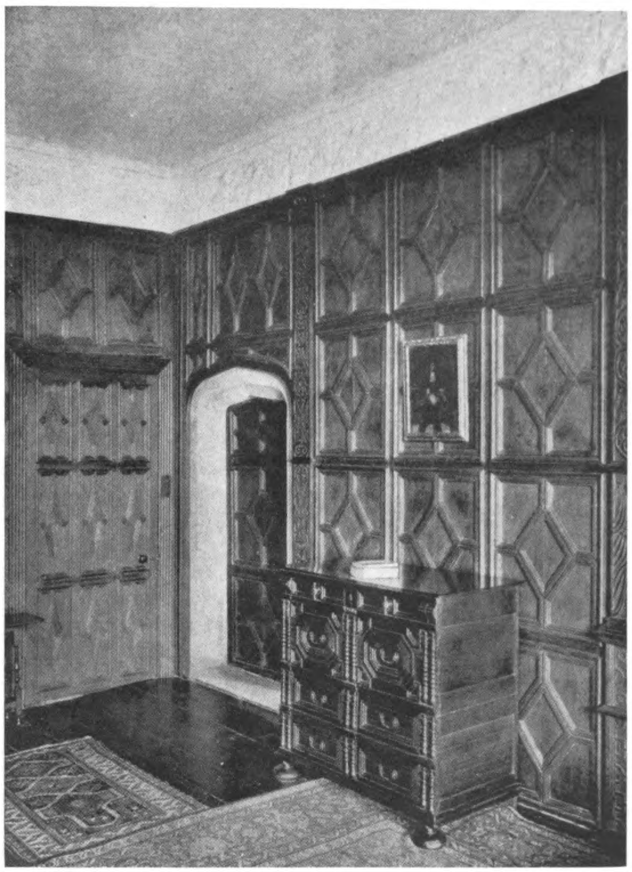
A room in classic style with excellent proportions and relation in scale between architecture and furniture

McKim, Mead & White, Architects

refer to them as being in scale. Other details such as cornices, windows, doors, mantels, etc., are not fixed in size by utilitarian considerations, but the architect through his training is able to make them of such sizes that they appear reasonable to us in comparison with articles of definite sizes fixed by utility. A building or an interior is, therefore, most perfect in scale when it exhibits a natural relation in the sizes of its parts to the human figure.

Large scale is often purposely used and with good effect in exterior design to give prominence to a facade in comparison with surrounding buildings. If, however, the same building were to stand alone on a level space its imposing character would largely be lost because visual comparison of the sizes of the parts with the whole would instinctively make the building appear to us smaller than its actual size. From the standpoint of exterior design, the qualities of scale are quite generally understood. It may be said that with exteriors on the whole it is better to err on the side of large scale because small scale, even though it has the effect of increasing the apparent size of the mass, robs the detail of the vigor necessary for holding it in proper balance.

When we come to consider scale for interior architecture we have to adopt different standards, and it is in not sufficiently recognizing this distinction that so many architects produce interiors of lesser merit than their exteriors. Too frequently the interiors are spoiled by too large a scale. Here we have enclosed space, not in association with trolley cars, cabs and other street objects but with articles of furniture and intimate domestic life. This essential difference must be recognized, and for an interior to be successful a proper relation of scale must be maintained between furniture and architectural background. Much of the poor scale that is evident in our interior architecture is due largely to the forcing of motifs of other periods into modern rooms of comparatively lesser size and height. We are trying to adapt to modern requirements architectural compositions that were designed for great baronial halls, and is it any wonder that our rooms are crowded, restless and exhibit a constant struggle for dominance between furnishings and setting? In the average domestic interior half the architecture could be eliminated and the resulting gain would be immediately apparent.

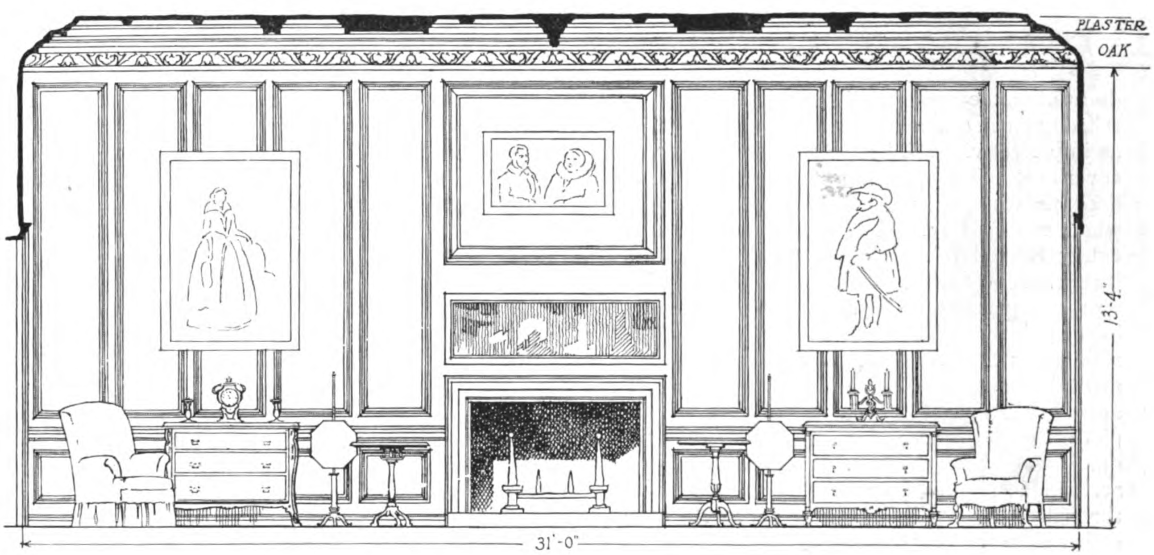


The Angel Room, Quenby Hall, Leicestershire, England (1620)
Excellent scale relation between paneling and furniture

If in our search for pleasing architectural motifs in the past periods of architecture we devote our energy to studying the basic principles of proportion and scale that these rooms exhibit and forget about trying to reproduce a miniature model of whatever strikes our fancy, we will be on the right road to an interior architecture that will compare favorably with the best of the old work. The work produced by the great architects of England and France in the eighteenth century, if studied for its underlying principles, provides a wonderful source of information for the modern architect. Here he will find rooms of great proportions and vertical emphasis given by height of ceilings, but withal a relation of scale between furniture, architectural motifs and detail that in the majority of cases is nearly perfect. There has been no temptation because of the height of these rooms to increase the scale of cornices, mantels or other features. The rules of proportion determine the general mass of these features with respect to the wall spaces, but irrespective of the size of the apartment there is a uniform scale relation between the furniture and the architecture.

The French interior of the eighteenth century was a marvel of harmony between architecture, decoration and furniture and even the

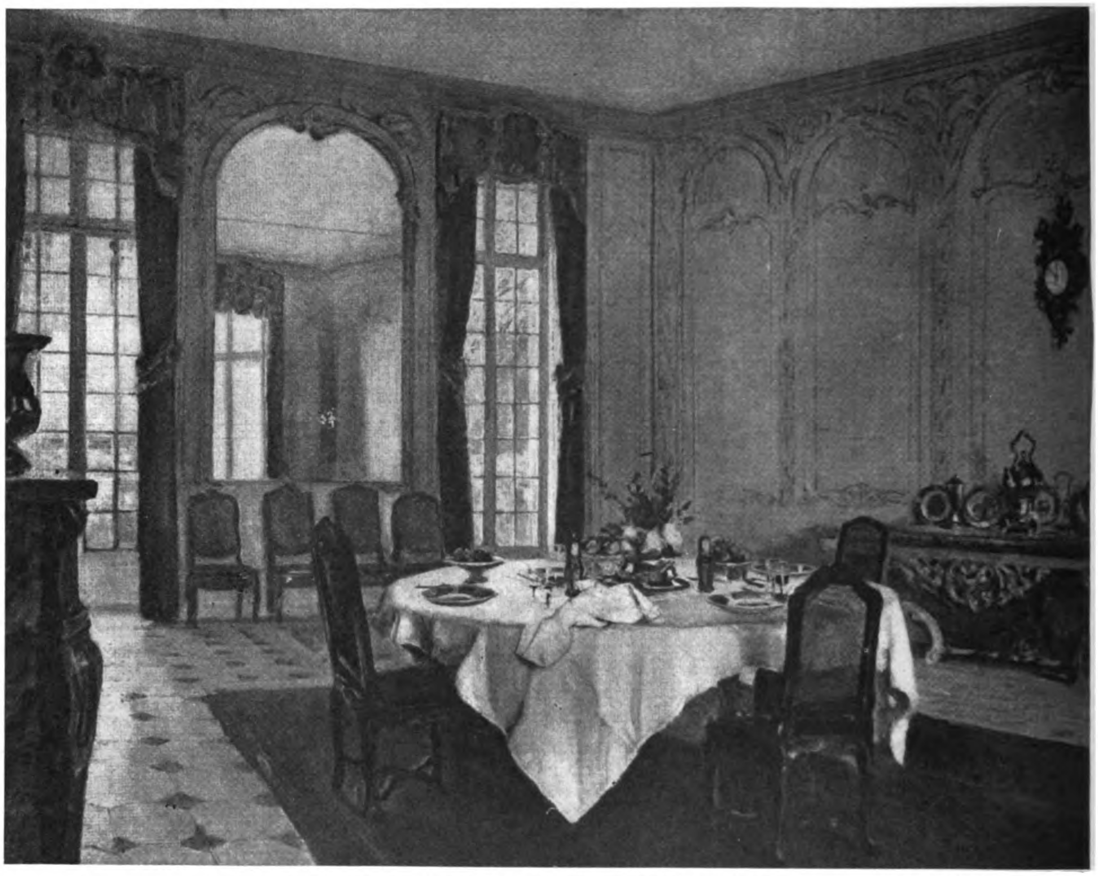
EARLY 18TH CENTURY ROOM WITH GOOD SCALE IN FURNISHINGS AND ARCHITECTURE



ELEVATION OF FIREPLACE SIDE OF ROOM SHOWING SCALE RELATION OF FURNITURE

The dimensions of the room are 31 ft. by 19 rt. 4 ins. and the height of the oak paneling 13 ft. 4 ins. The scale of the ceiling ornamentation is somewhat too large, but in other respects the room is excellently scaled. The relations between panels, doors, paintings, chandelier and most of the rurniture are noteworthy. Although of generous proportions the scale of the woodwork is comparatively small; the panel stiles are 3¼ ins. wide, the wainscot cap is 3½ ins. deep and all moulded parts are made up of a series of fine members.

THE OAK PARLOR, BALLS PARK, HERTFORD, ENGLAND



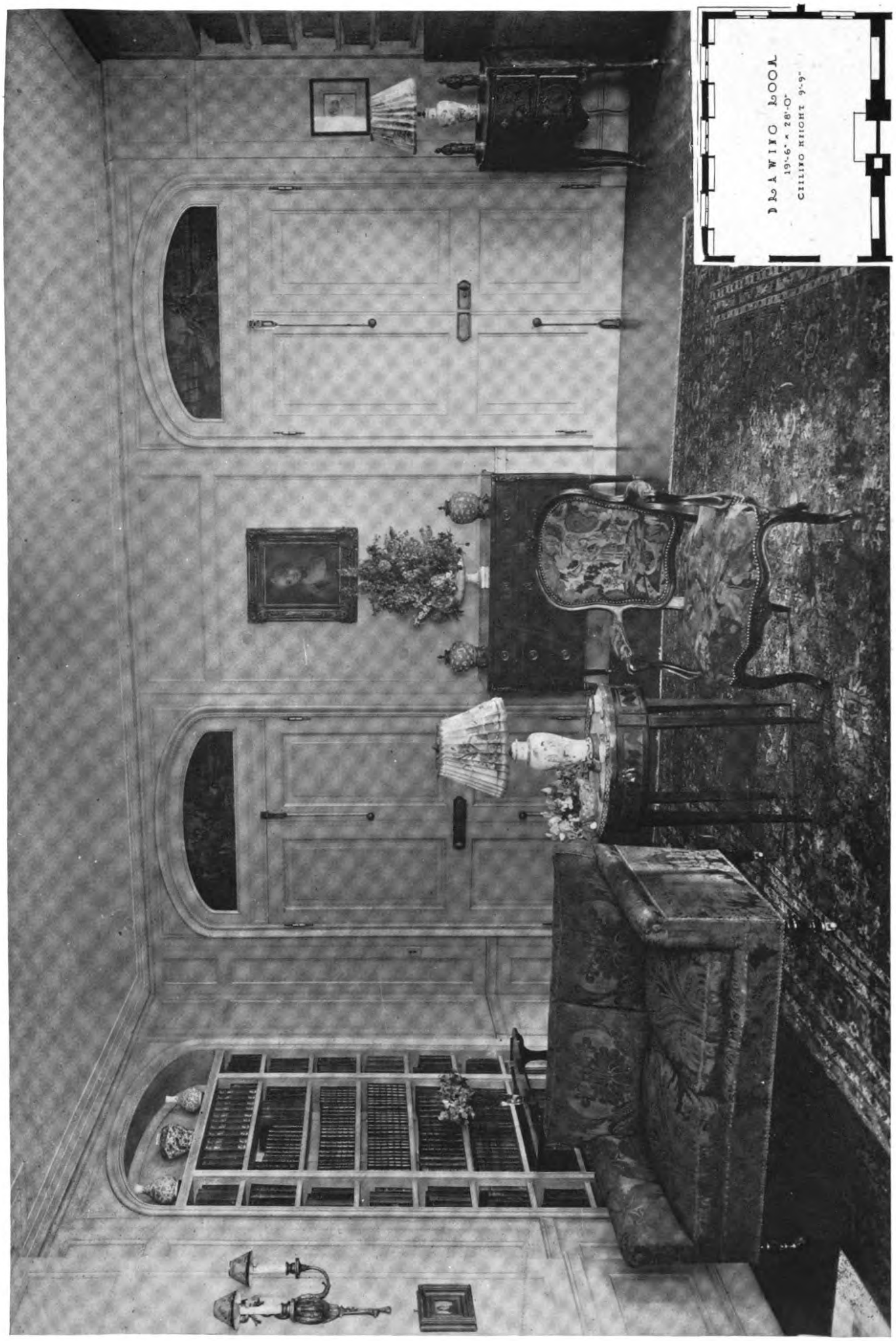
Dining Room, Chateau du Breau, from painting by Walter Gay *Courtesy of E. P. Dutton & Co.*
An excellent example of the charm and perfection of scale in the 18th century French interior

dress of its occupants. The artists of this period relied upon an ensemble of which we can but imagine an imperfect view. The use of color in damask wall coverings, panel mouldings and decorative overdoor paintings was echoed in the costumes, the whole reflected again and again by the tall, delicately framed mirrors characteristic of the time. The charm of these eighteenth century French rooms is perhaps nowhere better illustrated than in the paintings by Walter Gay, an American artist resident in Paris. The very human and temperamental qualities of these rooms possess such an appeal that a painting with no human beings in the picture conveys a complete sense of their livable qualities. These pictures, incidentally, indicate to architects suggestions for conveying to their clients through color studies the real spirit of the room rather than the cold delineation of the architecture.

The results produced in the eighteenth century were probably due to the fact that the schools of architectural design and furniture design were developed at the same time and by artists, in many cases identical, but in all cases working on the basis of common tradition and understanding. We are not so fortunate today as to be developing styles; information concerning the past is readily available to everyone, and since we have such a wide field from which to select according to individual inclination, it is perhaps only natural that errors in the assembling of things derived from so many sources should be made.

As a general statement it can truthfully be said that the modern interior is over-scaled. Motifs are frequently too large in their mass, and when not wrong in that respect, their mouldings and ornament are too heavy. There is little thought given to the sizes of panel rails, mouldings and the treatment of panels themselves. Door openings are often made too wide, and then pilasters and pediments are added to further injure scale. These may in themselves have good proportion and they may show pleasing relations of mass with the walls against which they are placed, but as soon as the average furnishings are introduced there is immediately apparent a wide gulf between architecture and movable objects.

To be successful in scale, any composition must be built up with some unit of measurement as a guide. The human figure provides this, but in the case of interiors it is well to consider also relation to articles of furniture. These may be used to establish the module of the room. If furniture of



DRAWING ROOM, HOUSE OF EGERTON L. WINTHROP, JR., ESQ., BROOKVILLE, LONG ISLAND

DELANO & ALDRICH, ARCHITECTS

A room of eighteenth century precedent influenced by the French in which there is excellent scale relation between architecture and furniture. Woodwork is ivory and general color scheme light in tone. Overdoor paintings by Albert Sterner

DOORWAY, DINING ROOM, HOUSE OF C. M. MacNEILL, ESQ., NEW YORK

FREDERICK J. STERNER, ARCHITECT

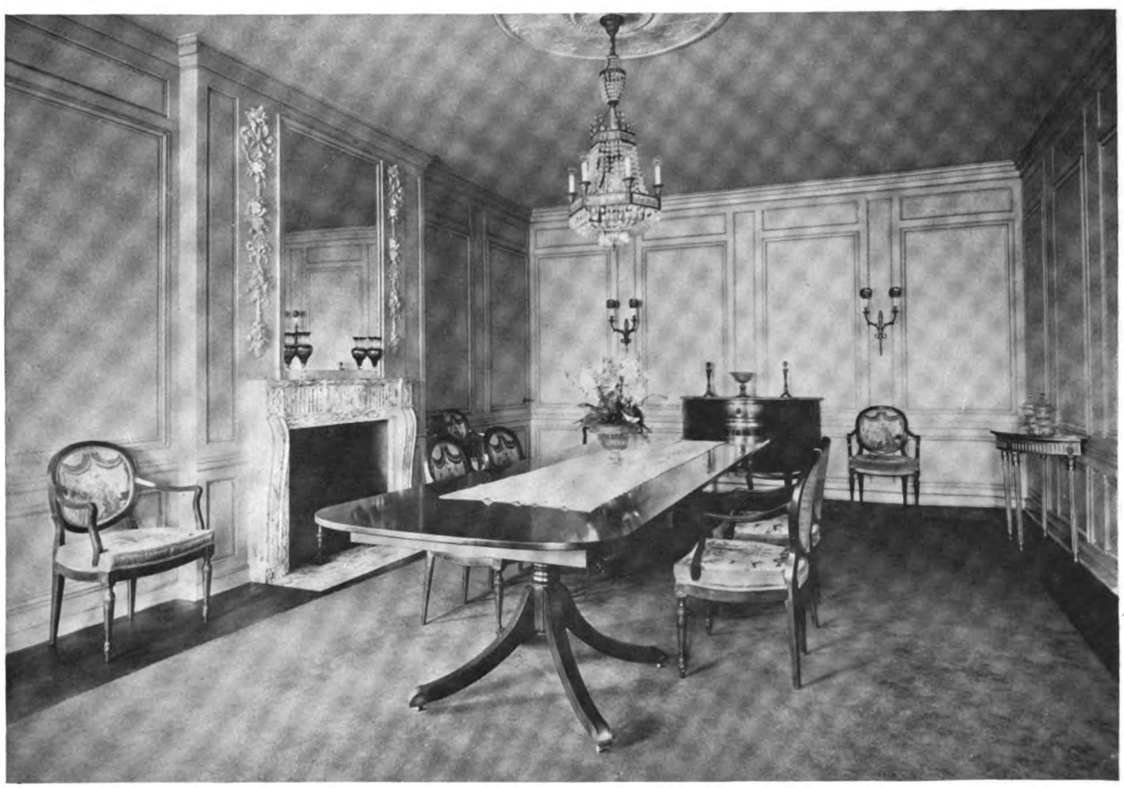
An interior doorway in Georgian style, with excellent scale relation to furniture and room. Finish is natural pine; height of door opening, 6 feet 10½ inches

the Adam character is to be used, we must provide a background correspondingly small in scale; the room can be comparatively small in floor area because no large pieces of furniture are to be accommodated. We can adopt any ceiling height in good proportion to the floor area and secure desirable vertical emphasis by means of pilasters, tall windows, narrow panels and other devices. A high ceiling should, however, not tempt us to increase the scale of ornamentation in the upper part of the room; the scale must be consistent throughout.

A study of old work in which the original furnishings still exist will show a marvelous harmony of line and scale between panel mouldings and other architectural details and the mouldings and turnings of the furniture. In English work of the latter part of the seventeenth century we find that the carving and turning and cane work of the Stuart chairs and the moulded and paneled chests accorded well with the small geometrical wall panels of the period; later the broad, heavy, Dutch lines of William and Mary furniture are in harmony with the vigorous, fat architectural mouldings and generous panels of the times. Similarly, in eighteenth century French work uniformity of character appears in both architecture and furniture. The chair backs of Louis XV furniture for instance reached to the height of the lower panel moulding and frequently had a curving pattern that complemented that of the panel. The perfect relation of scale gave to the smallest French apartment a sense of spaciousness that is all too often absent in modern work.

Color has an important bearing on scale because it has the property of altering the apparent size of an object. In the use of contrasting colors that strongly outline form, additional difficulties arise. A paneled room in which the walls are painted may have the panel mouldings colored differently from the rails and the fields. A moulding or panel size that appears in scale when in monotone may be made the reverse by causing it to stand alone through contrasting color. Similarly, an article of furniture apparently in good scale when it is closely related in color to its background takes on undue importance if it is strongly contrasting in color. Thus a room paneled in dark oak and designed to accord with definite furniture could not be painted in light tones and harmonize in scale with the same furniture.

In an interior we may combine furniture of English, French and Italian periods and the architectural background may be reminiscent of one period or a modern version with no distinct period traces. The success of such a room will depend to a large extent upon form and detail, but the great-



A Modern Dining Room Showing Influence of 18th Century French and English Styles with Furniture of Differing Periods Carefully Chosen for Scale and Beauty of Line

Howard Major, Architect

Simple Motifs and Small Scale Afford Satisfactory Background in Small Room

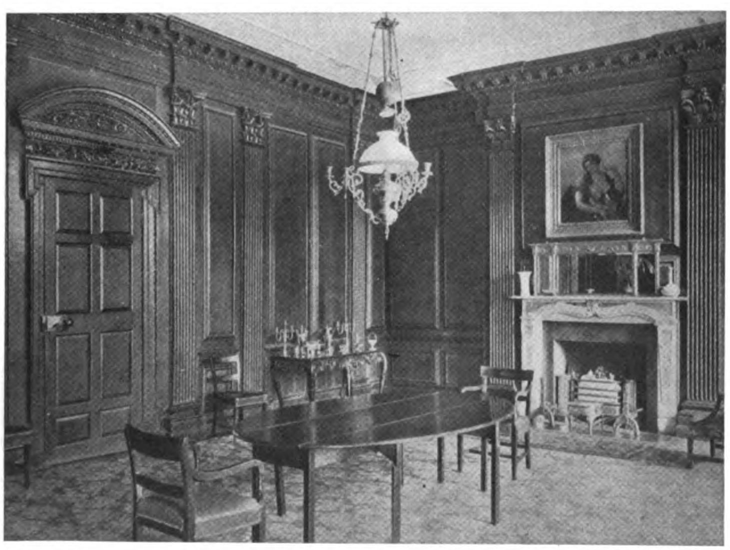
Over-scaled Mantel in Small Living Room Emphasized by Dark Color

est factor will be scale relation. Nor are we done when we have carefully correlated furniture and architecture; elements disturbing to good scale may enter in hangings, floor coverings or upholstery. Large patterned fabrics are by no means to be eliminated; they must, however, be placed where they belong. A group of windows may be framed at the sides, and have a valance above showing a bold pattern, but sufficient plain surface should be near to give a setting. Color, and particularly contrasting color, will be important in selecting a fabric that is to be in scale. Furniture upholstery, on the other hand, is rarely successful in large pattern — there is a wrong relation in the size of the ornament and the article ornamented. Large figured fabrics should be used sparingly — perhaps only on one generously proportioned piece of furniture to provide an accent. Carpets and rugs in the average room will take their places in the room ensemble if contrasting colors and bold patterns are avoided.

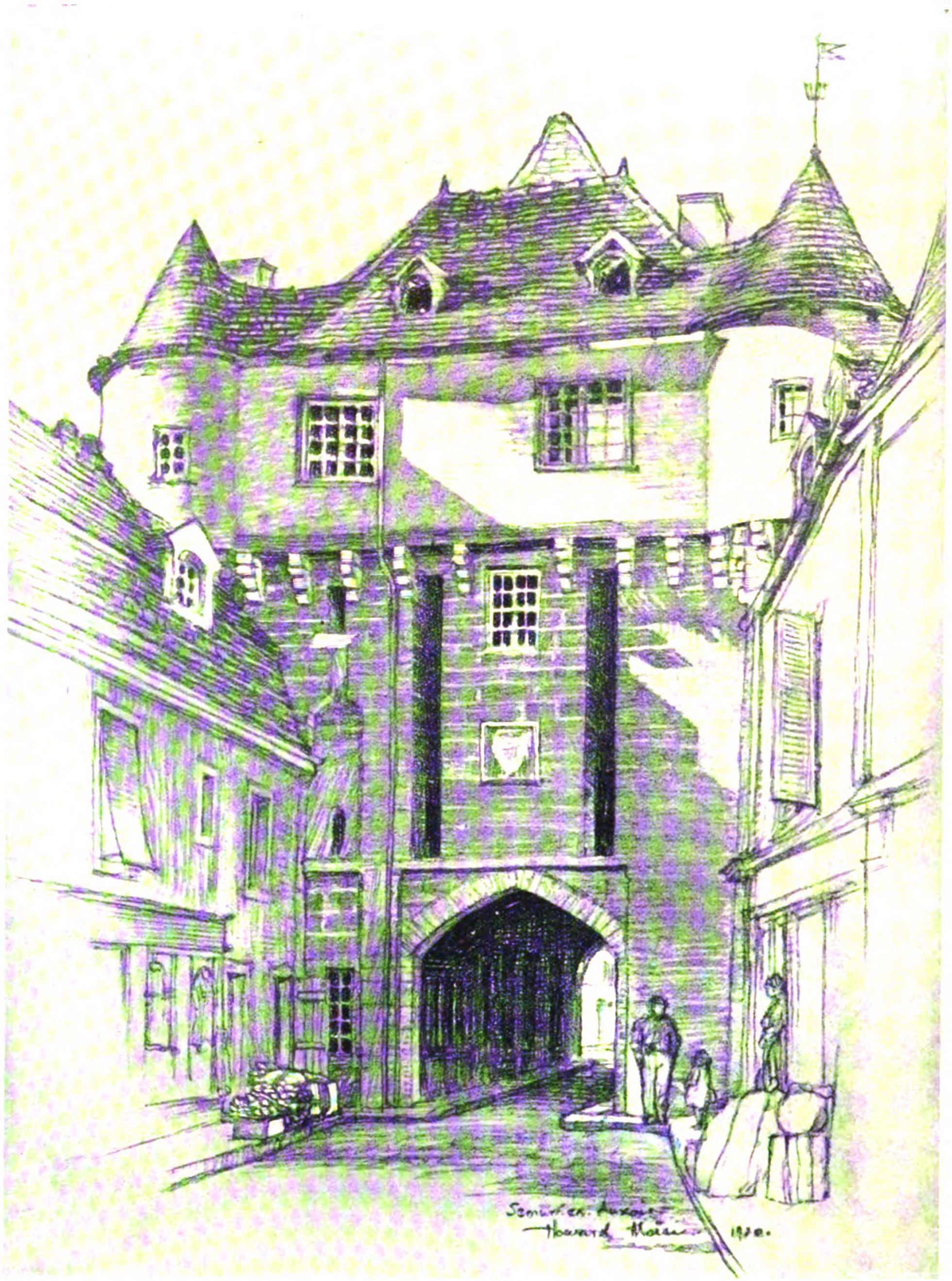
Scale must be studied from three angles,— mass, detail and color. Perfection in any one relation is not sufficient; all three must receive equal consideration.

Whether in our present interiors we adhere strictly to period distinction or not, appreciation of the essentially interior qualities of scale, proportion, color and balance between decorated and plain surfaces can be achieved only through diligent comparison of the elements that make up the fine rooms of the past, and the lessons thus learned can be applied with benefit to any original work. While scale is a subtle quality and defies description, it can in a measure be tested in the preparation of drawings. If we adopt the human figure as the unit of measurement, to which our architecture is scaled, the figure of a man when drawn against an elevation should be of normal height, measured at the scale at which the drawing is made if the design is in scale. If the figure scales 8 or 10 feet, the design is over-scaled and should be restudied; if but a few feet high the fault is too small a scale and an entirely new start should be made.

It is evident that interiors, depending as they do for perfection upon such subtle qualities as scale and proportion, cannot be satisfactorily achieved with methods in use today. There must be either a distinctly co-operative spirit in the efforts of architect and decorator, or the architect must expand his activities generally to include furnishing and decoration. It was the latter method that produced the work of the eighteenth century.



Room in Early Georgian House in Ireland
An example of bad interior scale; note extreme heaviness of architectural finish and doorway, both out of scale and out of proportion



OLD GATE, SEMUR-EN-AUXOIX, BURGUNDY
FROM THE PENCIL DRAWING BY HOWARD MOÏSE

The
ARCHITECTURAL
FORUM

VOLUME XXXVI FEBRUARY 1922 NUMBER 2

Baroque, Justice and Common Sense

PART I

By COSTEN FITZGIBBON

BAROQUE architecture is a rock upon which architectural critics split into two parties—baroquists and anti-baroquists. The ranks of the critics are swelled by those of the laity who are sensible of architectural appeal, and the battle between the camps rages sharply, with considerable intemperate language on both sides.

Some of its more ardent defenders, exulting in the "decadence and depravity" which their adversaries profess to discover as the essence of baroque style, are ever alert to justify *every* baroque manifestation whether it be really justifiable or not, and sometimes they let their zeal run away with their reason. The more numerous adherents of the opposing camp, whose attitude it is necessary just now to discuss in rather greater detail, are wont to look upon the baroque manner as a sort of "ugly duckling" in the architectural world, if they be temperate in their judgments; if they feel more strongly, they hold it wholly anathema and its very name a term of disparagement and opprobrium. It has consequently suffered more obloquy than any other

Church of Sant' Agnese, Piazza Navona, Rome, 1645-1650
Designed by Francesco Borromini

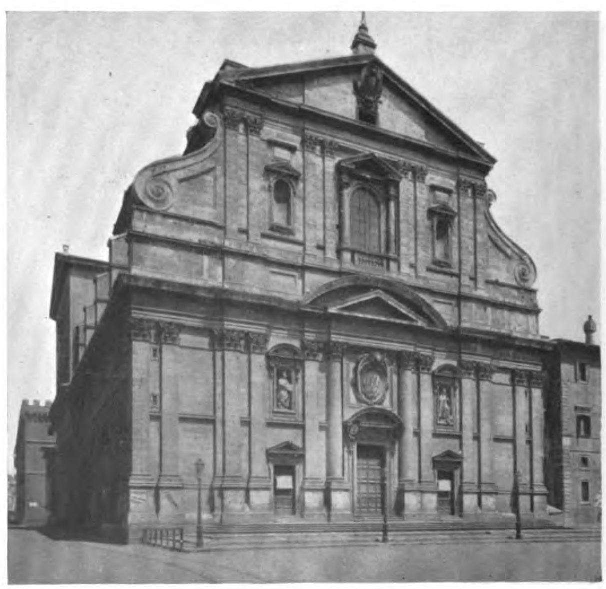
Church of San Domenico e Sisto, Rome, 1623
Designed by Vincenzo della Greca

"In that head is embodied the type of the evil spirit to which Venice was abandoned in the fourth period of her decline, and it is well that we should see and feel the full horror of it on this spot, and know what pestilence it was that came and breathed upon her beauty and melted it away." Again, after paying tribute to the impressiveness of Santa Maria della Salute "by its position, size and general proportions," he observes that "the proportions of buildings have nothing whatever to do with the style or general merits of their architecture. An architect trained in the worst schools and utterly devoid of all meaning or purpose in his work may yet have such a natural gift of massing and grouping as will render all his structures effective when seen from a distance; such a gift is very general with the late Italian builders, so that many of the most contemptible edifices in the country have good style effect so long as we do not approach them."

When he can find no deeper obliquities to castigate, he discovers affectation and hypocrisy, as when he inveighs against "the ridiculous disguise of the buttresses" to the dome of Santa Maria della Salute, "under the form of colossal scrolls; the buttresses themselves being originally an hypocrisy, for the cupola is stated by Lazar to be of timber and therefore needs none." As a matter of fact, Ruskin seems to have looked upon not only the recognized mode of architectural expression.

Mr. Ruskin is no doubt responsible for much of this hostile and often unreasoning attitude. Steeped as he was in the cult of romanticism, he led the chorus of those who poured a torrent of obloquy upon the baroque age and all its works, and was always eager to empty the vials of his vituperative rhetoric upon what he conceived to be pagan hodge-podge inspired by the devil. His influence was augmented by the charm of a fascinating literary style and by the great services he undeniably rendered in capturing attention for the art of building, enhancing the dignity and appeal of his subject, and endowing architecture with popular importance as no critic before him had done. It is unfortunate that so many people remember what he wrote in his prime and do not remember that late in life he materially revised many of his earlier sweeping judgments.

Dubbing the baroque period the "grotesque renaissance," and writing of a carving upon a church, Mr. Ruskin says:



Church of the Gesu, Rome, 1568-1575
Facade by Giacomo della Porta

baroque mode in particular, but also upon the whole "foul torrent of the renaissance" with rancorous disapproval, such as a strict theologian might display towards a pernicious heresy. In his reckoning, that way lay damnation.

Even such historians as Banister Fletcher and James Fergusson are acid in denunciation of whatever savors of the baroque "fallacy." The former dismisses the age of "anarchical reaction" with this disapproving summary:

"Sinuous frontages, broken curves in plan and elevation, and a strained originality in detail are the characteristics of the period. Columns are placed in front of pilasters, and cornices made to break round them. Broken and curved pediments, huge scrolls and twisted columns are also features of the style. In the interiors, the ornamentation is carried out to an extraordinary degree without regard to fitness or suitability, and consists of exaggerated and badly designed detail, often over-emphasized by gilding and sculptured flowers in exaggerated attitudes." According to Fergusson, Italian architecture in the seventeenth century "broke out into caprice and affectation till it became as bizarre as it was tasteless."

Now, no matter how incurably Victorian an outlook historian or critic may labor under, it is sheer folly and unworthy of a scholar to stop short at the seventeenth century in Italy and either wholly ignore all that comes after, or else set it aside with a brief but all-inclusive blanket condemnation as an age of unmitigated error, corruption and vitiated ideals. Surely the case of the obnoxious period is entitled at least to a hearing in court. Now and again such friendly critics as Martin Shaw Briggs or Geoffrey Scott essay a more sympathetic and rational interpretation of the baroque manner. Occasionally an "open minded" but timid minority venture to "praise with faint damns"; they really like baroque but hesitate to admit it for fear of ridicule or censure at the hands of the orthodox element of Ruskinian mental bias, but the general tide of conventional deprecation still sweeps on because too many people, instead of thinking for themselves, are content to harbor prejudiced prepossessions and to repeat the strictures they have heard or read.

Notwithstanding vehement denunciation on the part of men whose opinions are unquestionably entitled to respect, but not

Church of Santa Caterina dei Funari, Rome, 1549-1563
Designed by Giacomo della Porta

Church of Santa Maria della Pace, Rome, 1655-1667
Facade by Pietro Berrettini da Cortona

necessarily to acquiescence, it is surely but mere justice to lay aside the "passions of schools," at least long enough to scrutinize facts with judicial candor; it seems but mere common sense to appraise calmly the inherent value of the baroque style, sifting the wheat from the chaff, and to note the effects it has produced upon the course of architectural history. A movement that expressed with such singular fidelity the temper of the age in which it flourished and left to posterity so prolific a record of its structural activities can neither be dismissed with a contemptuous gesture by the upholders of "settled views" nor apotheosized by an unreserved acceptance on the part of its apologists. It demands more of analysis and of detailed consideration. It is a factor to be reckoned with and its existence has the obstinacy of historic fact that refuses to be downed by such generalizations as saying that it was "the renaissance run to seed."

That the baroque architects often indulged in gross exaggerations and exuberant absurdities, nobody can deny. No sane person would attempt to defend some of their work. Nevertheless, a vast amount possesses undeniable merit and we are deeply indebted to them in more ways than one. Having noted the prevalent state of divided opinion —might we not rather call it divided *prejudice?*— it will conduce to clarity of judgment to define the general limits of the baroque age; to review briefly some of the chief exponents of the style and their most significant performances, and to call attention to the general temper of the age of which the architectural expression was a necessary outgrowth. After that, having gained some sort of substantial ground as a point of departure, we shall be in a position to judge more rationally the really essential qualities of baroque architecture and to appraise the value to ourselves of the legacy bequeathed to us by a period of prolific and dynamic activity.

Church of Santa Maria della Salute, Venice, 1631-1656
Designed by Baldassare Longhena

For the sake of convenience we may say that the baroque period began about 1550, reached its most fully characteristic manifestations in the seventeenth century, and continued well into the eighteenth. Prior to the middle of the sixteenth century there were, of course, distinct foreshadowings of what was to come—we discern them in the Villa Madama at Rome, in Michaelangelo's work, and in sundry other instances—but about the date just given the line of cleavage becomes unmistakably defined. Those who dislike arbitrary and absolute dates may be better pleased with Mr. Briggs' definition when he writes: "The baroque period dates from the times when architects began to revolt against the pedantic rules of the later renaissance school-

Interior of Santa Maria della Salute, Venice, 1631-1656
Designed by Baldassare Longhena

men, and it lasts until they tired of their untrammeled freedom and returned to their pedantry once more." The baroque movement grew out of the renaissance, and in great measure under the impulse of external contemporary conditions, and though there are many who prefer to classify it as a phase of the renaissance, the fruitage of its principles was so distinct and so intensely individual that it seems more logical to reckon it a separate episode of architectural evolution. The seeds were there—indeed they may be said to have been planted in ancient Rome—and merely awaited a favorable environment, which the sixteenth century supplied, in order to germinate.

Strictly speaking, it would be inaccurate to style Michaelangelo the first baroque architect. As a matter of fact he always disclaimed being an architect, just as he long disclaimed being a painter. Sculpture was his chosen art. It was only under pressure of continued papal importunity that he finally consented to undertake architectural labors, just as years before he had yielded only to the most urgent papal persuasion in taking up the brush for the Sistine Chapel. His method of attack plainly showed that he was not an architect, either by training or by conception, and his completed architectural productions, while embodying some elements that the baroque masters freely availed themselves of, do not exhibit certain other elements that subsequently proved essential earmarks of the baroque manner. But once he set himself to the task of architectural composition, he was too independent and self-reliant to proceed by an evolutionary adaptation of precedent. He advanced by leaps and bounds. He was a man of such dynamic daring, intellect and genius that he threw precedent to the winds and made straight toward the goal of his conception, which was often — as in the Sagrestia Nuova—a magnificent setting for sculpture.

In pursuing such a course he inevitably loosed the flood gates of license, and license in his day was at a premium, notwithstanding the creative diffidence and super-reverence for authority shown in certain quarters. As Symonds points out, Michaelangelo, essentially the genius of transition between the periods of hybrid picturesqueness and scholastic exactitude, "can neither be ascribed to the barocco architects, although he called them into being, nor yet can he be said to have arrived at the Palladian solution" of Vitruvian dogma. "He held both types within himself in embryo, arriving at a moment of profound and complicated difficulty for the practical architect; without technical education, but gifted with supreme genius, bringing the imperious instincts of a sublime creative amateur into every task appointed him. In other words, Michaelangelo's architectural

The Spanish Steps, Rome
Designed by Francesco de Sanctis, 1722-1724
Church of La Trinita de Monti, rebuilt in 1595, in background

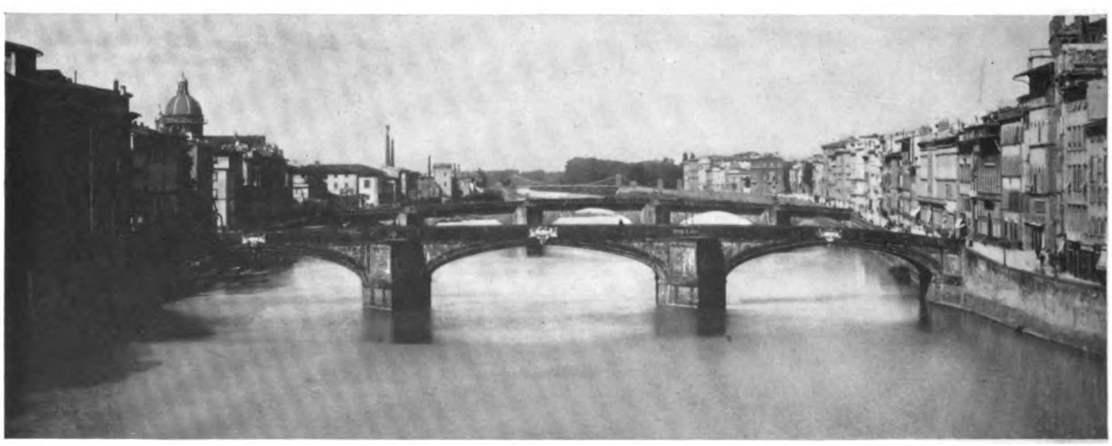
work was coeval with the incipient impulses that blossomed into baroque; his example was destined to affect profoundly the conceptions of his contemporaries, and while not to be reckoned a baroquist, he marked the parting of the ways and was unquestionably the baroque "major prophet."

Among the outstanding masters of the baroque style, one naturally thinks first of Lorenzo Bernini, architect, sculptor, versifier, and all around craftsman, who "would design a coach or a cathedral, a costume or a group of statuary, with equal readiness"; an embodiment of the creative exuberance and facile versatility of his day; a man to whom Urban VIII said, "You were made for Rome, just as Rome was made for you," when Mazarin was trying to entice him to the French court. Like so many of the other architects of his period, he ran the gamut of good and evil in his performances. We can never forgive his vandalism in filching the bronze from the ceiling of the Pantheon to make for St. Peter's his monstrous baldachino. Neither can we withhold perennial admiration from the colonnades before St. Peter's. Francesco Borromini found it in him to perpetrate San Carlino alle Quattro Fontane, a veritable architectural jazz, and yet, five years later, he could compass the design of Sant' Agnese, whence Wren drew some of his inspiration for St. Paul's.

Giacomo della Porta has left us the facade of the Gesu in Rome and Santa Caterina dei Funari, to mention only two of his achievements; Annibale Lippi wrought the Villa Medici; Martino Longhi the Elder gave us the Palazzo Borghese and the noble front of Santa Maria in Vallicella; Domenico Fontana the Fontana Acqua Felice and the Vatican Library, among other undertakings, at the command of that most ardent baroque builder, Sixtus V; Pietro da Cortona left his individuality stamped upon the facade of Santa Maria della Pace and the dome of San Carlo al Corso. If Carlo Maderna did put the "ass's ears" on the Pantheon, he also conceived the design for the facade of St. Peter's; Vincenzo della Greca designed San Domenico e Sisto—did Gibbs know this church when he planned St. Mary-le-Strand?—and Baldassare Longhena afforded a source of perpetual delight in Santa Maria della Salute in Venice; Salvi's name is remembered by the Fountain of the Trevi; Francesco de Sanctis has contributed to the joy of thousands by his Spanish Steps, and Bartolommeo Ammannati left a legacy of surpassing beauty in the Ponte alla Santa Trinita, over the Arno.

Merely to mention the names and chief works of the rest of the representative baroque architects of Italy, to say nothing of those who won fame elsewhere, would require far more space than could possibly be given here. Regarding only the men and structures specifically alluded to in these paragraphs, it is obvious that they can be condemned without reservation only by prejudiced obscurantists who throw dust in the eyes of the laity, or by those whose minds and sympathies, steeped in timid conventionalities, are so narrow and inelastic that their judgment in this field can be of little value.

The temper of the age in Italy, and especially in Rome, was a strange complex into which, among other elements, entered the effects of Spanish influence and its tendency toward formality and ostentation; the great increase of papal and secular wealth, along with lavish spending and luxurious living; the growth of the centralized power and authority of the papacy and the augmented intellectual stimulus of humanism, together with the innate Italian spirit of experimentalism and adventure; and, by no means least of all, the richly exultant joy of living, of doing and of giving free rein to the emotions. It would have been impossible for the spiritual, intellectual and temperamental groundwork of the age to have brought forth Gothic architecture or any form other than that which it did produce.



Ponte alla Santa Trinita, Florence, 1567-1570
Rebuilt by Bartolommeo Ammannati

ITALIAN RENAISSANCE DETAILS

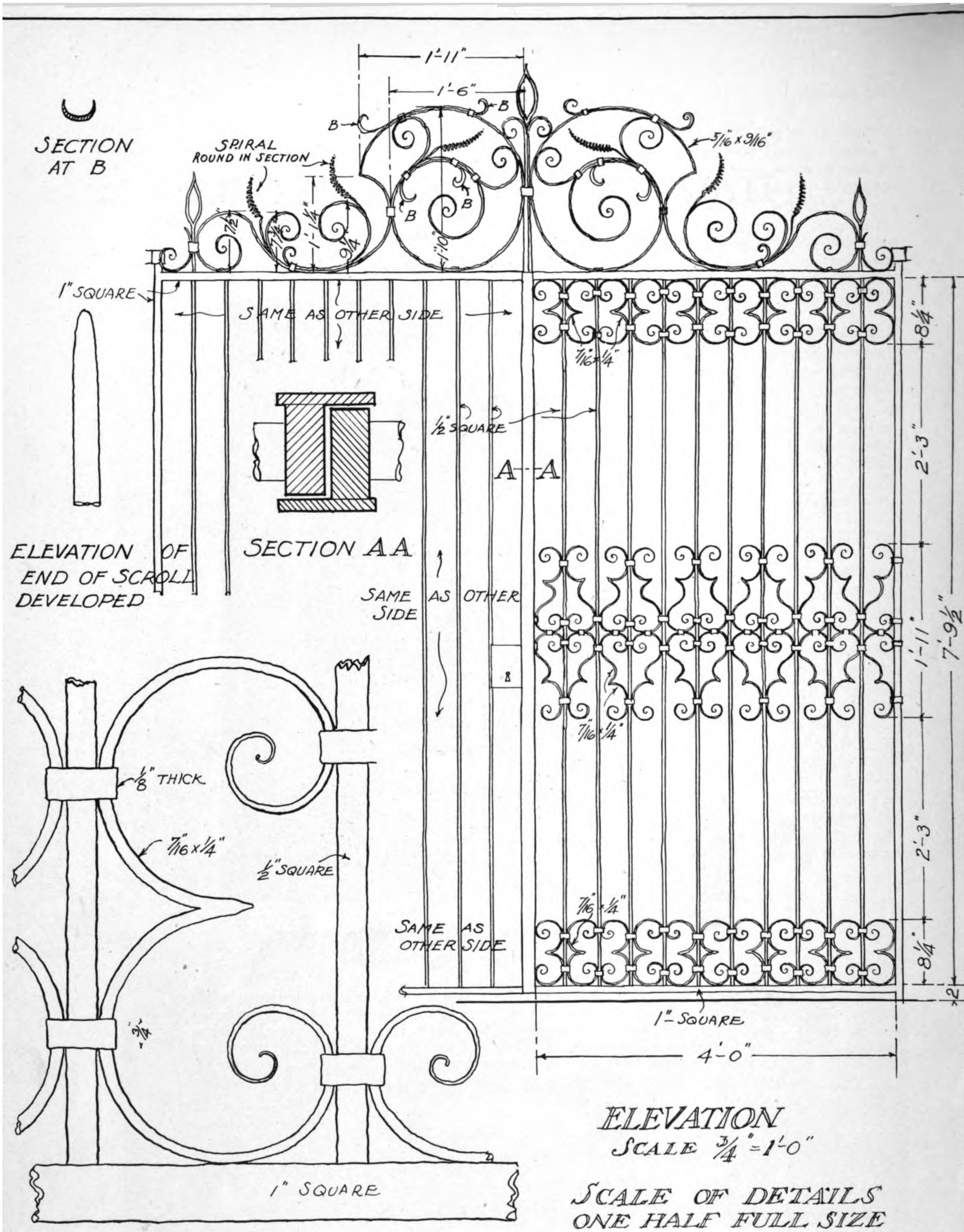
A SERIES OF MEASURED DRAWINGS

By F. NELSON BREED

WROUGHT IRON GRILLE AT COURTYARD ENTRANCE

VILLA AT ISOLA BELLA, LAKE MAGGIORE, ITALY

IN the west wing of the villa at Isola Bella there is a series of interesting wrought iron grilles. They are designed with similar motifs, adjusted to harmonize with differently proportioned openings and varying in weight to accord with their respective sizes. One can see from a glance at the unevennesses of the different parts that they were forged by hand; these slight differences in the curves and thickness of scrolls lend quality to the work. At the upper part there are some spirals, round in section, which represent tendrils.

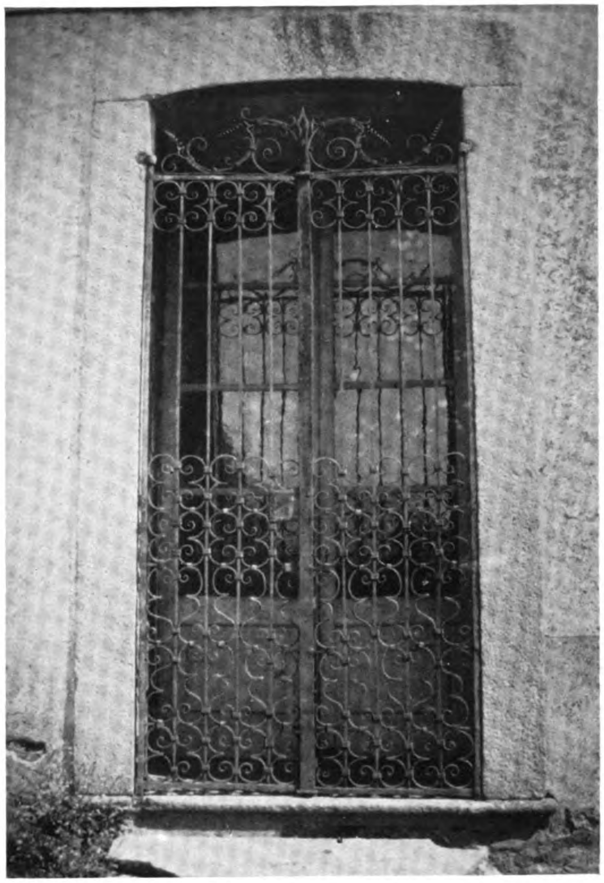


WROUGHT IRON GATES AT ISOLA BELLA

LAKE MAGGIORE, ITALY

MEASURED AND DRAWN BY F. N. BREED

ITALIAN RENAISSANCE DETAILS

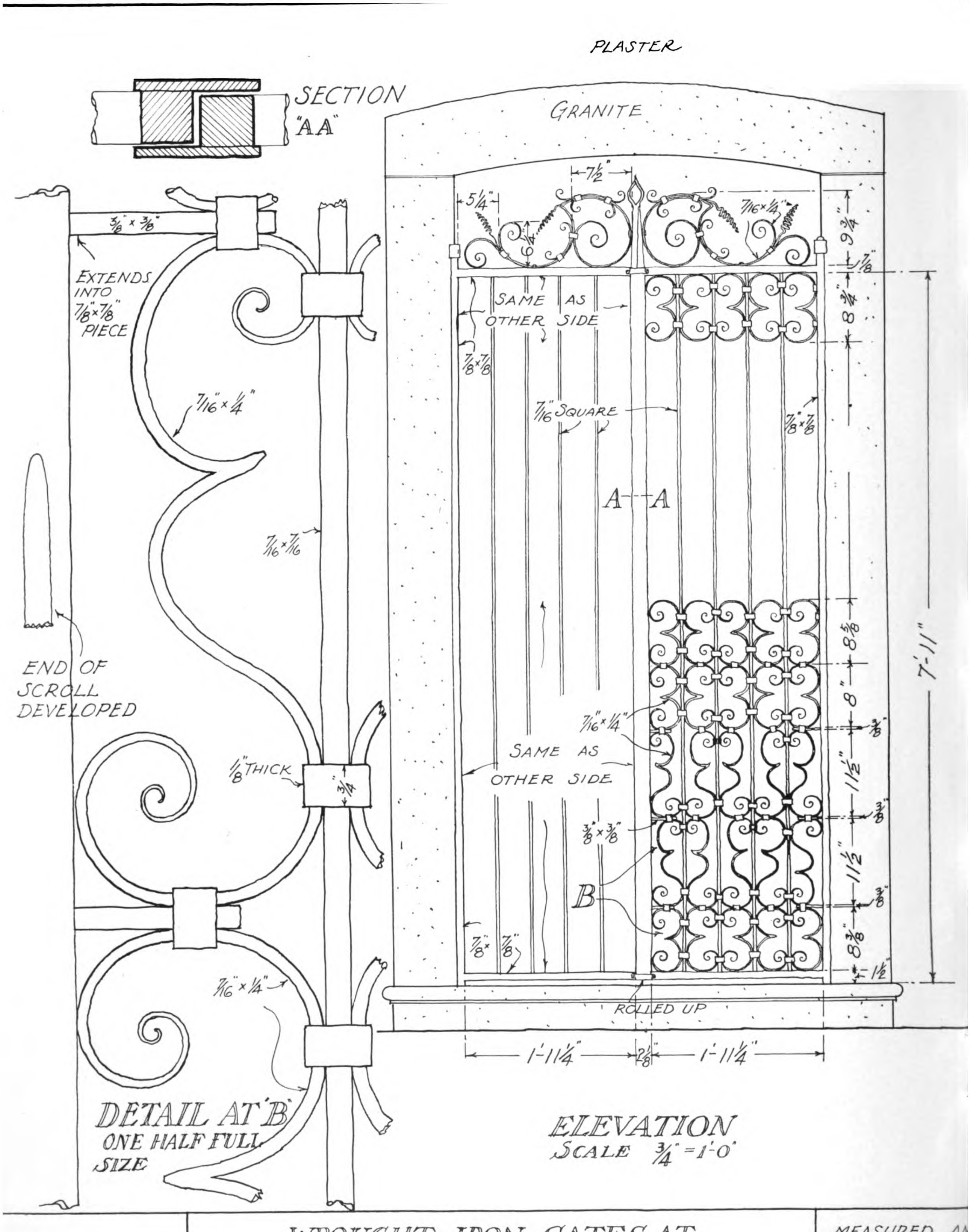


WROUGHT IRON CASEMENT DOOR GRILLE

VILLA AT ISOLA BELLA, LAKE MAGGIORE, ITALY

THE grille illustrated here is one of a series at openings which lead from a large salon to a terrace of the villa at Isola Bella, from which one looks far up the lake to the distant mountains.

The impression given by the grilles is one of delightful delicacy and grace, expressing the lightness and strength of the material of which they are made in contrast to the heavy granite trim which surrounds them. From the inside the effect is very successful, as the grilles silhouetted against the light have the appearance of lace. One does not get the effect of a formidable barrier shutting out the light and air. The delicacy of the work may be appreciated from the fact that the curl at the center of each scroll is flattened out to less than one-sixteenth inch in thickness, from which it gradually grows heavier to a maximum thickness of one-quarter inch.



WROUGHT IRON GATES AT
ISOLA BELLA
LAKE MAGGIORE, ITALY.

MEASURED AN
DRAWN BY
F. N BREE

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Electrical Wiring Layouts for Modern Buildings

PART II

By NELSON C. ROSS
Associate Member, A.I.E.E.

IN the preceding paper we described the general methods of electrical construction in buildings, with reference to the location of panels and switchboards and the general methods of feeder control. This will apply to any modern system of wiring, whether the circuits are run exposed or are concealed in the construction of the building.

While conduit wiring is without question to be preferred to any other method of installing electrical circuits, conduit wiring is more expensive than other methods and there are several other systems of wiring in common use, each applicable to certain types of buildings, and each approved and accepted by the National Board of Fire Underwriters, if the work is properly installed.

The general types of interior wiring systems in common use are given here, it being understood that we are not considering work in power stations, or considering pressures higher than 550 volts:

Full conduit work, concealed, in which all wires are installed in iron or steel conduits, these together with steel outlet boxes, junction boxes and panel board cabinets forming a complete raceway throughout the building, this raceway being installed complete before wires are drawn in. The wires of the different circuits may be withdrawn from the conduits and replaced with new wire without disturbing the conduit system in any way, and without disturbing the plaster or finish of the building. The conduits are all concealed, either by being imbedded in the cement or masonry or installed under the floors, as in second class building construction.

As all wires are inside steel or iron conduits, with splices, fuses and live parts of the switches inside iron boxes or cabinets, the conduit system is in every way fireproof. The outlet boxes, junction boxes, and panel board cabinets, etc., are all set flush with the surfaces of the walls and finish.

Full conduit work, exposed, in which all wires are installed in steel conduits as just described, but these conduits are run exposed on the surfaces of the walls and ceilings. Panel board cabinets are of the surface type and all outlet and junction boxes and special fittings are likewise of the surface variety to insure a workmanlike installation.

Exposed conduit work is equal in every way to concealed conduits, is fully fireproof and if properly installed is not unsightly. It interferes more or less with building repairs, however, and should not be used on new buildings where it is practicable to run the conduits concealed. On mill construction and on some reinforced concrete construction, where the floor slabs will not permit the conduits to be concealed, exposed conduits must be used.

Flexible steel conduit work, concealed, in which flexible steel conduit of the Greenfield type is drawn into the building, forming a raceway for the wires as in conduit work. This flexible conduit cannot be embedded in masonry or cement, but is used in buildings of second class construction. This conduit is fitted with special terminals, permitting standard steel and iron outlet boxes to be used; it is fully fireproof and permits of being drawn or fished into the building construction after the floors and ceilings are in place. The complete raceway of flexible conduits may be installed, and the wires may be drawn in or withdrawn from the flexible conduit system at will.

Flexible armored wires, concealed, in which the wires of the circuits are wrapped with metal ribbon, generally known as "B.X." armored wire. Such armored wire cannot legally be imbedded in cement or masonry, but is generally used throughout buildings of second class construction, in frame buildings, and in the wiring of old buildings.

"B.X." work is fireproof if properly installed; it is used with special fittings and outlet boxes, and is made in sizes of Nos. 14, 12, 10 and 8 B. & S. gauge; it is also made with two, three and four conductors under one steel covering, and when used in damp places it is made up with a lead sheath covering the conductors, the armor being wrapped over the lead. When made up in this way it is known as "B.X.L." "B.X." is less expensive to install than either rigid or flexible steel conduits; it is of less weight and diameter, and can be fished where it would be impossible to install the larger pipe; its disadvantage is that the wires cannot be withdrawn or replaced without more or less injury to the building.

Exposed work, using "metal mouldings," in which steel mouldings are secured to the walls and ceilings (for branch circuits), the work being installed exposed. The moulding comes in two parts — a backing and capping; the backing is secured to the wall or ceiling surface and the capping snapped on as the wires are put in place.

As a rule, when this system is used the risers and feeder circuits are run in conduits, the branches only being run in the mouldings. Metal mouldings are flat and are not as unsightly as exposed conduits; they are not as rigid as conduits, however, and greater skill is required in their installation in order to secure a satisfactory result. A complete line of special outlet boxes and fittings is made for metal moulding work.

Exposed work, using special flat steel conduits, is installed exposed as with the use of metal mouldings; it is not installed in two pieces, however, but the wire is drawn in after the conduit is in place. It is smaller than metal moulding and if properly installed makes a fireproof and satisfactory installation. A complete line of boxes and fittings is available for this device, permitting the use of the system either as a complete installation or in conjunction with other methods of construction.

Exposed work, using wood mouldings, in which wires are installed in slotted mouldings made up of pine or whitewood, the moulding being screwed or nailed to the wall or ceiling surfaces, the wires installed in the slots and the whole covered with a wood capping, secured to the moulding by means of brads. At one time wood mouldings were in general use, and were made up for all sizes of wire; they are now seldom used excepting for short runouts from existing outlets or for temporary wiring.

Wood mouldings must be coated with shellac before being installed, and are permitted only in places that are thoroughly dry. This type of construction is in no way fireproof and is not as durable as some form of conduit work.

Knob and tube work, concealed, in which single wires are used and the wires of the circuits tied to porcelain knobs, these in turn nailed to the studding of the building or between the beams and timbers; this work is permitted only in buildings of frame construction. Where wires pass through timbers or walls they are run through procelain tubes; joints are made in the building construction, and where tap circuits pass to the fixtures, a knob is installed at a point close to the outlet and the wire protected with tubing of the circular loom type, from the knob to a point within the fixture canopy.

Knob and tube work may only be installed in new frame buildings in districts where this type of construction is permitted under the local rules. Where installed, it is necessary to use some type of metal construction in the basement, unless the ceiling of the basement is lathed and plastered. In knob and tube work the wires are in no way protected, and are liable to injury from nails being driven through the walls and floors, either at the completion of the building or in fact at any time. The work is not fireproof and has nothing to recommend it other than the fact that it is the least expensive of any type of concealed wiring.

Concealed work, using flexible fiber tubing, in which flexible fiber tubing of the circular loom type is used and fished into the building construction as with Greenfield conduit, except that there is a separate tube used for each wire of the circuit; metal outlet boxes are used with this tubing, and the tube system is complete before the wires are drawn in. This type of work is used only in existing buildings where additions are made to the circuits; it is seldom now used for complete installations, as it is more expensive to install than armored wire. It is not fireproof nor does the fiber tube afford the same measure of protection to the wires of the circuits as the steel of the armored wire.

Exposed work, using cleat construction, in which the wires are run exposed on the surface of the walls and ceilings with wires supported by means of porcelain cleats or knobs. This type of construction is used on small installations where low first cost is of importance and where the appearance of the circuits is not considered. The wires are installed on porcelain cleats which carry the wire 1 inch from the surface of the ceiling or wall; where the wires pass through walls or floors they are protected by means of porcelain tubes. Where the circuits are not subjected to mechanical injury, the work is fairly safe.

This type of construction is also used throughout mill buildings for the running of heavy feeder circuits, the wires being insulated with a slow-burning insulation and covered with a flame-proof braid. As a rule these feeder circuits are fitted with insulated turnbuckles in each of the conductors by which the heavy wire may be drawn up and kept tight.

Information Necessary for the Preparation of Plans and Specifications

In the selection of a wiring system for any particular building one must be governed by several factors, which include the construction of the building, the requirements of the underwriters' rules, the local ordinances of the town or city in which the building is to be located and the requirements of the electric lighting and power company furnishing the service as well as the expense of the installation.

Each town or city has its local rules and ordinances covering the installation of electrical wiring, the work being either under the control of the local building department or under a special department of wires with its own inspectors. While all such requirements are based on the rules of the National Board of Fire Underwriters, many city ordinances covering the installation of wires within certain fire districts are far more rigid than the requirements of the underwriters, both with reference to the class of work installed, the location of service lines, and methods of the protection of the electrical circuits and equipment. Also, the service requirements of the lighting and power company furnishing service to the building must be considered and provided for, so that all circuits and equipment installed will operate properly on the service provided.

If one is making a layout which includes a generating plant it is obvious that one may select the type of wiring and voltage that is desired. If, however, current is to be taken from the general service mains one must design the layout to conform to the service at hand. This does not mean that one may simply ascertain the characteristics of the current furnished by the lighting and power company, but one must know the available current at the site of the building, as while three-phase power lines may be in general use, single-phase lines only may be available at the building site, and if this is the case, power in the building may have to be operated on single-phase circuits and taken from the lines supplying the lighting service.

Before commencing the work on the plans it is advisable to visit the site of the building and determine the best location at which to bring in the service lines, also to get in touch with the building department and the inspector of wires and, if possible, to secure a copy of any local ordinance governing the installation of the electrical work. In the event of the smaller towns having no local ordinances governing the installation of electrical wiring, the work is always done in accordance with the requirements of the underwriters, or as it is generally called, the "National Code."

It is also advisable to confer with the inspector of wires and to find if there are any special requirements covering the district where the building is to be located. The inspector or his assistants will be in touch with the work during installation, and when completed they must make a final inspection and issue a permit for the installation of the meters and service. The inspectors are always ready to co-operate with the architect or engineer designing the work, and many misunderstandings, as well as expense, can be avoided by conferring with the wire department before the work on the plans is begun, and in laying out the work so that it conforms to all local requirements.

After conference with the wire inspector and ascertaining the city requirements, it is also necessary to take the matter up with the lighting and power company, and see to the "service requirements." Many wiring layouts are made without this important work being done, and the writer has known instances where switchboards and panel boards, and even motors of large capacity, have been shipped to the building, and have had to be changed at considerable expense because they could not be operated from current of the types available.

If the building under consideration were small and the power and lighting requirements not exacting, the service wire would connect to the existing feeder lines without difficulty. If on the other hand the building were a large factory or a school building in which there would be a heavy lighting and power load, the existing service lines might not be of the necessary capacity to take care of the requirements of the building, in which case it would be necessary for the company to provide new service lines from some large center of distribution to the building. It would therefore be advisable to have certain load data at hand when the matter of the service is taken up with the company.

Before taking the matter of service up with the company the writer has always found it advisable to rough over the plans and determine as nearly as is possible the approximate connected load in the proposed building. This can easily be done by checking up the number of rooms and the approximate number of lighting outlets in each room and then assuming that a lamp of a certain wattage is to be used at each outlet, doing the same with the corridors and stair halls, etc. (and with the gymnasium and assembly hall, in the event of the building under consideration being a school); then multiplying the number of lamp outlets by the wattage determined at each outlet will give the approximate total watts connected load for lighting, and this divided by 1,000 will give the approximate connected load in kilowatts. The approximate connected power load can also be obtained by determining the approximate number of motors to be used and the horsepower of each motor. Both results will be sufficiently accurate for estimating purposes.

In a city where the electrical distribution throughout the streets is underground, it is obvious that the service to the building will also be by means of an underground cable. Where, however, the company's wires are on poles, it is necessary to determine whether the wires will be carried overhead to the building or be carried to the building underground from certain poles located in the street. In small buildings the service should be carried in on low voltage and from transformers, if required, located on the street. In large buildings, however, where large transformer capacity is required, it is advisable to locate the transformers in a fireproof vault in the building and to carry the service into the building at the primary voltage of 2300 volts, rather than to locate the transformers on poles on the street.

In order that there be no misunderstanding, the information given to the lighting company should give:

1. The location of the building.
2. The type of the building and the use to which it is to be put.
3. The approximate connected lighting load.
4. The approximate number of motors to be used.
5. The approximate connected load in horsepower.
6. The point where it is desired that the service cables enter the building.

One should also request this information from the company:

1. The point of service where the company's lines will enter the building.

2. The class of service available for lighting. This will be one of these types:
   Direct current, two-wire service at 110 or 220 volts.
   Direct current, three-wire service at 110 or 220 volts.
   Alternating current, two-wire service at 110 or 220 volts.
   Alternating current, three-wire service at 110 or 220 volts.
   Alternating current, primary service at 2300 volts.
3. The class of service available for power. This will be one of the types listed here:
   Direct current, two-wire service at 110 or 220 volts.
   Direct current, two-wire service at 500 volts.
   Single-phase alternating current, two-wire service at 110 or 220 volts.
   Two-phase, three-wire service at 220 or 440 volts.
   Two-phase, four-wire service at 220 or 440 volts.
   Three-phase, three-wire service at 220 or 550 volts.
   Three-phase, four-wire service at 220 or 550 volts.
   Two-phase primary service, three- or four-wire, at 2300 volts.
   Three-phase primary service, three- or four-wire, at 2300 volts.
4. Does the company require a transformer vault in the building?
5. Will the company install underground service to the building?
6. Does the company assume the expense of the underground service?
7. Does the company furnish the service switches?
8. Does the company install the service switches?
9. Does the company furnish the transformers?
10. Does the company install the transformers and make service connections thereto?
11. Does the company provide separate power and lighting services?
12. What are the metering requirements?
13. What is the frequency of the current (number of cycles)?

All this information is required in order that the wiring plans may be completed and the specifications be properly drawn to cover the work. The information given the service company, including the load values, permits them to arrange their feeder circuits to cover the requirements of the building, while the character of the current available for lighting and power service determines the types of motors required for the building as well as the wiring circuits to motors and panel boards.

On large buildings there is little doubt but that a transformer vault will be required in the structure, and in such cases it is always advisable to carry the service wires into the building underground, from the standpoint of appearance as well as that of efficiency, as with the transformers in the building fuses can be replaced and repairs made without difficulty; while if the transformers are installed on poles, or in vaults under the street, there will be a certain delay in the replacing of fuses or in the making of repairs, particularly in the winter when the streets are covered with ice and snow.

Many of the service companies run in underground cables on large installations at their own expense, while others will do the work but require payment from the owner. Again, many service companies furnish and install the service switches and also furnish and install the transformers, making all connections to the primary sides and leaving all connections from the secondary sides to be made under the electrical contract. If this work is not done, or if service switches are not furnished by the company, the material as well as the labor must be provided for under the electrical contract, or it may be left out of the contract and taken up as an extra after the wiring of the building is completed. It is, however, necessary that the meter loops and meter boards shall be installed under the electrical contract, and in accordance with the requirements of the company, the meter loops to be left in readiness for the installation of the meters, after the work is completed. It is always advisable, where possible, to provide separate services for lighting and power, as the regulation of the voltage on alternating current lighting circuits, when these are taken off the power lines, is apt to be unsatisfactory.

On small buildings the telephone service lines are as a rule carried into the basement, underground, or to a cross-arm or bracket on the side of the building, and some protective device or connection box is installed at the point where these wires enter the building; from this point the telephone wires are run exposed and clipped to the walls or are run behind picture mouldings. On large buildings, however, it is advisable to provide a conduit system or some other method by which the wires may be extended without disfiguring the walls and finish, as the locations of the instruments are changed or new instruments added.

Before the plans are laid out, it is well to confer with the local telephone company and determine where the telephone service lines will enter the building, and whether these lines will enter underground or overhead. Also to determine as far as is possible the approximate number of telephone instruments that will be required in order that the service to the building may be properly proportioned. This also applies to the service wires of the A.D.T. system or to the wires of the city fire alarm, in the event of these services being considered for the building.

The Use of Liquid and Gas Fuels in Heating of Small Buildings

By MAURICE M. OSBORNE, M. E.

WE are all familiar with the disadvantages of coal as a fuel for the small building heating plant. It is impracticable to burn soft coal under the average small cast iron boiler, and the present cost of hard coal is great. The method of taking care of the fire does not allow of frequent attention, and even with good damper regulators the effect of this intermittent firing is felt in varying degrees of heat at the radiators throughout the day. The coal is heavy and dirty to handle and the disposal of the ashes makes it almost impossible to keep a basement clean and free from dust.

The average small boiler with inexpert attention is far from efficient, and probably less than 60 per cent of the heat value of the fuel is actually utilized. Expert attendance would improve this figure somewhat, but a constant cleaning of the flues of the boiler will be necessary and much more careful and frequent attention to the fire itself than would be practicable. Owing to the air spaces between lumps, ordinary anthracite furnace coal occupies considerable space in storage. It is dirty and noisy to put in and the labor charge for carrying it from the carts to the bins is often high.

To offset these disadvantages it was long ago proposed to burn fuels other than coal. Probably the first modern instance of this was after the discovery of natural gas in the central section of the United States. The gas at first was wasted, as it was incident to the production of oil and was merely in the way. Later, it was saved and piped through gas mains to cities and towns adjacent to the wells, where it was distributed to the houses and buildings. The gas was sold at such extremely low rates that it began to be used as a fuel for every purpose. There is no question that under these conditions of low cost no more satisfactory solution of the fuel problem could be found. The question of efficiently burning the gas was not serious. There were none of the agonies of starting a coal fire. When heat was needed, gas was simply turned on and lighted. The difficulty of obtaining a man to take care of the furnace had no bearing on the obtaining of heat.

Before long, automatic devices were perfected by which the main fire could be lighted from a distant point on the same general principle that operates a modern instantaneous hot water heater. This system had, in fact, none of the disadvantages of the coal fire system and except for the occasional danger of explosion from leaking gas pipes or from an inoperative automatic device, it was ideal. Such systems exist today and are in use in the natural gas regions of this country. The gas can be arranged to be turned on and off through the action of a thermostat, and the main burner is lighted by a small pilot light which burns continuously. The most efficient method of burning the gas is to pass it through a thick bed of rock of a refractory nature. The rock becomes incandescent under the action of heat and the gas is burned with maximum efficiency. There is no noise, smell or dirt. There is practically no soot nor any need for constant attendance.

In regions far from the natural gas fields, the only gas fuel usually available is illuminating gas. This has come into use more and more as fuel for cooking and heating service, and for hot water in dwellings, hotels and apartment houses. Its use for these purposes is legitimate, in that coal burned for heating hot water or for cooking is burned under such wasteful conditions that even at the comparatively high cost of gas its use pays, because it is used only as needed.

But, it is questionable whether it pays to burn illuminating gas under heating boilers. The only exact data known to the writer was obtained in St. Louis several years ago, where gas burners were installed under the boilers of several large residences. The results show that, not taking attendance into account, the gas cost more than coal. The houses were of such sizes that each required practically all of one man's time to take care of the heating system. This man's service was eliminated by the use of gas and in each case this elimination just about balanced the account and showed that the gas and the coal cost about the same.

There is one other application of gas for household heating which deserves mention. This is the gas-steam radiator. In this device a radiator of the ordinary type is arranged with gas burners beneath it with some provision for carrying off the burnt gas. When the burners are lighted, water with which the radiator is partly filled is turned to steam and heats the radiator in the usual way. Such an arrangement is convenient in buildings where the central system is found to be inadequate for certain rooms, or where additions are made which are difficult to reach with the original system. But it is not only more expensive to operate, but also more difficult to obtain uniform regulation in all rooms with minimum attention than a central system with one boiler and distribution piping.

It would be advisable at this point to give a comparison of the number of heat units obtainable for one dollar in the vicinity of New England, from the different kinds of fuel under discussion. If a pound of any fuel is burned, it will give off a fixed amount of heat. This heat can be measured in a number of ways and can be expressed in British thermal units; one British thermal unit is the amount of heat required to raise one pound of water one degree Fahr. in temperature. The heat values of fuels have been accurately measured in laboratories and are published in all engineering reference books. By taking the current value of the units of fuel, as usually sold, this tabulation has been made up. For one dollar we may obtain:

Coal (anth., $14 per ton) .	1,972,000 B.t.u.
Illuminating gas (14c. per 100 ft.)	428,571 "
Fuel oil (5½c. per gallon) .	2,690,904 "
Kerosene (19c. per gallon) .	687,388 "

Even though the gas may be burned more efficiently than the coal and is only burned when needed, it will be seen that it is questionable how much it would pay to use gas.

It has been proposed to burn heavy fuel oil in small heating installations. So far, no successful apparatus has been devised to do this and the smallest plants operating successfully on fuel oil are those which formerly burned not less than 200 tons of coal per year. The reasons for this are simple. The low priced fuel oil, though very high in heat value, is extremely thick and viscous. It does not even flow readily through a pipe unless it is heated. The mechanical difficulty of burning such small quantities of it as would correspond to a few shovelfuls of coal placed on a furnace night and morning has not yet been solved. Some experimental work has been done with burners for small boilers using a mixture of fuel oil and kerosene, the purpose of the kerosene being to make the oil more liquid and capable of passing through a nozzle in a very tiny stream. This work has not passed beyond the experimental stage. Even if it succeeds, on a dollar-and-cents basis it will not compare with coal.

A device has been perfected, and is now widely advertised and used, which burns kerosene successfully in small heating plants. This consists of a cast iron fire pot placed in the furnace instead of a grate. The fire pot is connected through a pipe to a blower set outside the furnace. Connected to the blower is a small carburetor, very much like that used on automobiles, and an automatic device which turns on the blower and the supply of fuel in accordance with the actions of a thermostat placed in one of the rooms in the building. A pilot light burns continuously in the fire pot. When heat is needed, the fuel and the blower are turned on. The atomized kerosene ignites at the pilot light and burns with a fierce flame. When the rooms of the building have been brought up to a proper temperature, the thermostat automatically turns off the blower and the fuel.

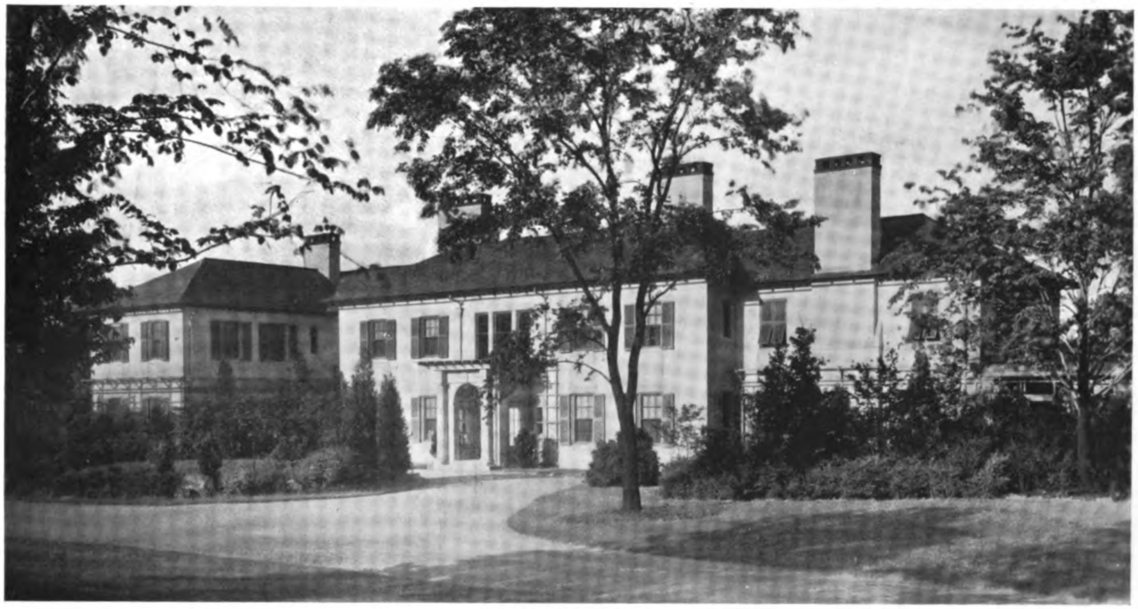
In spite of the high cost of kerosene, this automatic feature results in a considerable economy in the quantity of fuel used. The makers claim that 100 gallons of kerosene should easily do the work of one ton of anthracite coal. In an installation in Chicago, which has 750 square feet of steam radiation, 2000 gallons of kerosene were used for the heating season. In zero weather 15 gallons per day were required. In addition, there was the expense of the operation of the motor. This motor consumes about 110 watts when it is running. Even if it were run all the time it would not take more current than two ordinary 60-watt electric lamps burning continuously. As a matter of fact, the motor operates about one-half of the time in extreme cold weather, and in mild weather about one-quarter of the time. Of course there is no necessity of having a furnace man for an installation of this kind, as there are no ashes and no coal has to be shoveled.

There are on the market small kerosene heaters for preventing the freezing of automobiles in garages not provided with some regular heating system. These are nothing but small kerosene lamps provided with a wire gauze protection just like that used on miners' lamps which employ an open flame. The gauze works on a well known principle and prevents any gas from reaching the flame and being exploded. At the same time the heat and light of the flame can pass outward through the gauze. In use such devices are hung on the front of the radiator of the automobile to be heated. A sheet metal hood directs the heated air through the radiator of the car, and maintains a temperature above freezing in the radiator and around the engine.

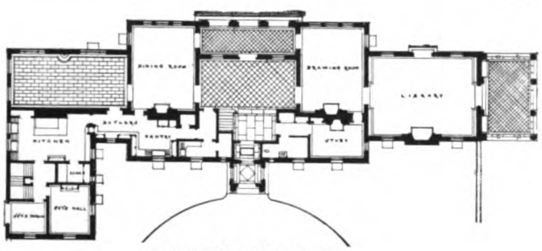
It appears from this discussion that in the eastern states, coal is still the paramount fuel for heating small buildings, if considered from an economic point of view. Its many disadvantages are offset by its greater economy.

The whole question of fuel for any purpose is very much in the mind of the world at present. Indications are that the tendency will be to conserve the hydrocarbon fuels for internal combustion engines and for marine use, particularly with reference to their military and naval value. It is believed that the world will fall back more and more upon coal as a fuel, in that there are far greater coal reserves than petroleum reserves in sight. One new development to be expected is the use of powdered coal. Devices are now being perfected for burning this satisfactorily. It is safe to predict that as time goes on and our petroleum reserves are exhausted, we shall have discovered new methods of coal distillation which will yield us fuel oils which will do everything that the petroleum oils now do for us. We shall be able to run our motor cars, fire our marine boilers, and perhaps heat our houses with these new oils.

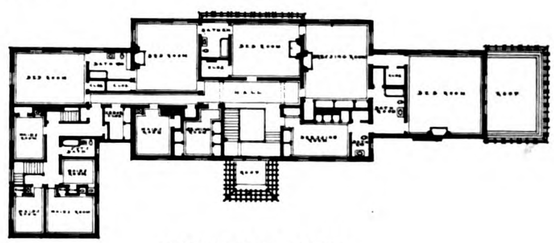
This is already beginning to be an accomplished fact in Germany, where under pressure of the war and lack of petroleum methods were developed in distillation of low grade coal, known as "brown coal," which are now yielding ever increasing quantities of oils of all kinds. That these methods are not impracticable is vouched for by the enormous financial backing they are receiving from the Stinnes group and other huge industrial interests.



ENTRANCE FRONT



FIRST FLOOR PLAN



SECOND FLOOR PLAN

TERRACE FRONT

HOUSE OF RICHARD GARLICK, ESQ., YOUNGSTOWN, OHIO

CHARLES A. PLATT, ARCHITECT

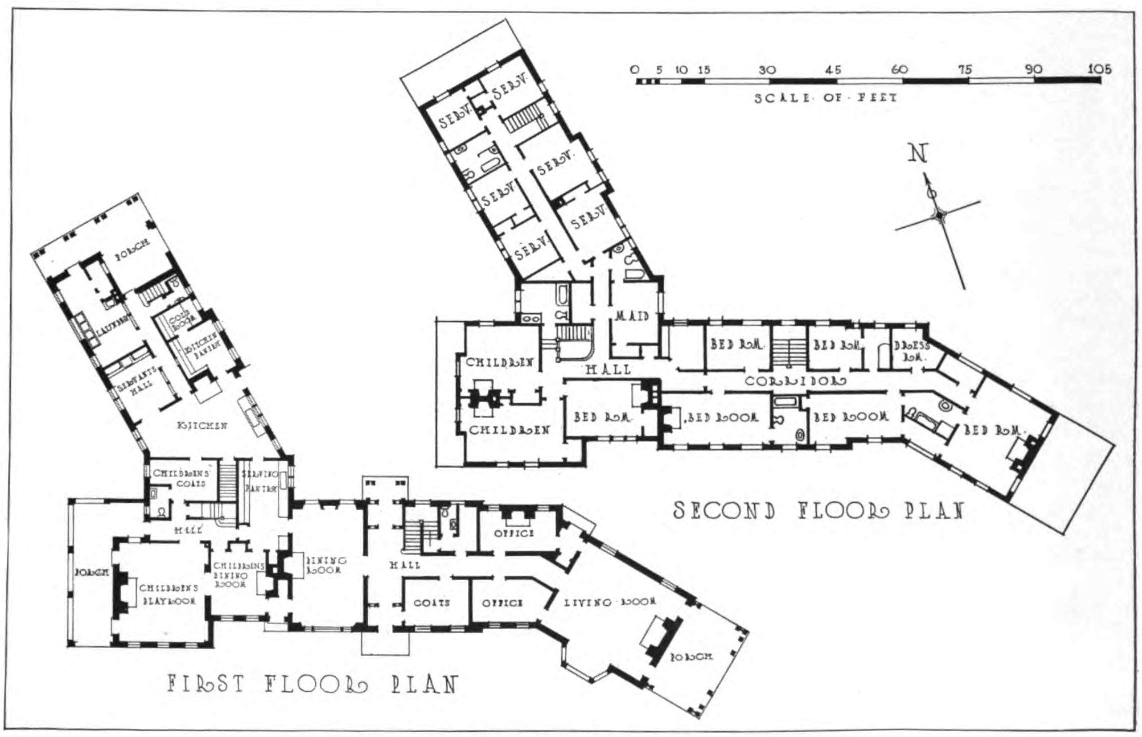
ENTRANCE FRONT AND SERVICE WING

VIEW FROM APPROACH

HOUSE NEAR MT. DESERT ISLAND, MAINE

KILHAM, HOPKINS & GREELEY, ARCHITECTS

VIEW FROM SERVICE DRIVE



HOUSE NEAR MT. DESERT ISLAND, MAINE

KILHAM, HOPKINS & GREELEY, ARCHITECTS

"Building in Cocoon"

A HOUSE ON THE NORTHERN COAST OF MAINE

KILHAM, HOPKINS & GREELEY, ARCHITECTS

IT is seldom that a more difficult problem confronts an architect than to build a fireproof dwelling 30 miles from a railroad, in a part of the country where an early winter is the rule, and to have to start the work late in the fall of the year and finish it by the middle of the following June. These were the major difficulties (the minor troubles are always present) in the case that is here described. On the other hand, the location was on the coast and therefore had the facilities of water transportation for both materials and labor.

The most important point in any work, however, is to obtain the services of the best contractor possible for the kind of work to be done—one who is used to arranging beforehand for his material, and also one whose equipment both in men and machinery is most up-to-date. In this case the architects were most fortunate in having a man well fitted, in their minds, for the work. He not only had all the advantages named, but also possessed enthusiasm and interest which are quite unusual. In this instance it was necessary to have somebody who could decide, from an engineering point of view, a great many important details at the site. This was also one of the important characteristics which the contractor had.

Construction in Progress under "Cocoon" in January with Temperature below Zero

It was almost as necessary in this case to have the materials on hand at the site before winter set in as it is in a North Pole expedition. At first the rough materials were transported by schooners and unloaded on scows and towed to the shore. Later, on the first of November, a temporary but substantial wharf was built so that vessels could be brought up and unloaded onto the wagons direct. A road had to be constructed from the wharf to the building site, and a small village sprang up near the location of the house for the storage of the various materials and offices for the different trades. The men in general took over about all the boarding facilities in the small town.

In order to continue the work during the unusually cold weather of this neighborhood it was decided to build a temporary enclosure, which was filled with old window sash for light and contained a large heating plant with about one mile of steam pipes around the inside of the entire structure, within which the building could be continued throughout the winter, and this was built large enough and high enough to complete even the slating of the roof and the building of the chimneys. This structure was of a very irregular shape, as will be noticed by the illustrations. It was made large enough to leave a sort of courtyard at the front entrance of the house to store building material to be used; when this was partly used up other material was moved in from out of doors and allowed to thaw out before it was incorporated in the building. In this way work progressed in temperature at zero and below on the outside, with perhaps 50 or more degrees of heat within. In fact it was possible for men to work in their shirt sleeves and without hats during the entire winter.

On the first of May this "cocoon" building was removed. As the work progressed at the building the supporting posts of the temporary enclosure were gradually cut off to rest on each floor as it was completed, until the posts were resting on the attic floor and some of them pierced the roof. When this temporary building was removed roofers were ready and closed these holes before night. The owner's furniture was sent by a privately chartered schooner, unloaded at the wharf and placed in the house about June 1. The house was ready and occupied by the owner by the middle of June, as originally intended.

It is believed that this record would be considered excellent even in the neighborhood of a large city, but considering its distance from the base of supplies it is remarkable. Besides the house, a large combination cow barn, horse barn and garage was built, and also several small dwelling houses which together with grading and drives completed this operation. An interesting feature, however, which was a great help in getting supplies and materials promptly, was the use of the Eastern Steamship Company's boats running from Boston and connecting with the local boats at Rockland, Maine. In this way, and with the telephone installed on the site, the foreman could telephone in the early afternoon of any day to his office in Boston for a certain shipment of material; this could usually be put on the afternoon boat at Boston and received at the site at about 10.30 the following morning. This would be considered very prompt even for an order placed for work in the immediate vicinity of a large city. A few dates and facts regarding the building progress of the work may be interesting:

August 18, sketches were started.

August 30, sketches approved and taken up with the contractor.

September 7, actual work started at the site.

Meanwhile there had to be rapid work to keep the architects' working plans ahead of the progress of the work.

November 26, temporary enclosure started and finished in about three weeks.

January 7, visit to the building, the condition of which is shown by the accompanying snapshot; temperature below zero; work progressing with temperature of 52 degrees inside.

May 1, temporary structure removed. Owing to conditions in the lumber market caused by the war, the "Cocoon" was sold at a figure but little below its cost.

June 9, water system and work in general completed.

The layout of the plan was made to meet the owner's personal requirements and also the exposures and character of the site. In designing this house an effort has been made to adapt the farmhouse type which is common in that part of Maine. Most of the old farmhouses are the result of additions made from time to time and this house, in its finished state, suggests an old home which has been extended by many additions to the original structure. The house is entirely of fireproof construction, much of the flooring upon the lower floor being of tile.

A General View of the "Cocoon" Showing Provision for Light in Clerestories

The Most Notable Examples of Architecture of a City —What Are They?

By CHARLES HENRY CHENEY*

WHY is it that the average public discusses so little what is worth while in the existing architecture, landscape architecture or public sculpture of its city? Not enough attention has been given by architects in the past to this important matter of public interest and education regarding the things worth while near home. Practically every city in the country now possesses a few respectable, and sometimes quite notable, examples of American art, but when interested local citizens ask local architects which examples should best be held up to their children for study, they cannot get any satisfactory answer. Local architects are embarrassed by the comparisons with their own work necessary to give a full and honest opinion. Also, two or more local architects can seldom agree on such intimate matters. Hence the layman generally finds his question unanswered, and interest wanes.

It was to meet this difficulty, and in the hope of arousing wide public interest and discussion in architecture, landscape architecture and public sculpture, that the Portland Chapter of the American Institute of Architects in 1919 requested a jury of three out of town architects, the Curator of the Art Museum, and the Professor of Art at the University of Oregon, to name the most notable examples of these three arts existent in Portland, for the benefit of the public. It was not expected that everyone would or should agree with the exact findings of this jury. In fact it was somewhat the object of this determination to provoke intelligent discussion and to bring out honest differences of opinion as much as possible. The important thing was that some list of the things worth while in the city be set up as a standard by which to measure and balance off other examples of art, with which everyone was more or less accustomed from long familiarity.

Old National Bank Building, Spokane
D. H. Burnham & Co., Architects

Standards of comparison are what the average layman lacks. We ought to realize that most men, including a very large percentage of the leading citizens in each city of this country, are very little traveled and have seldom, if at all, given much attention to the arts. Their powers of appreciation and determination are mostly dormant. No standard of what is worth while has been presented to them for attention, study and approval or rejection.

The selections of the jury in Portland caused discussion in the press and for a while at least journals in different parts of the country published some of the good things of the city, such as it had a right to be proud of, instead of the usual admixture of a few good things and a lot more not so good. Interest aroused by the selections in Portland led the Los Angeles Chapter, in the spring of 1920, to carry out a similar experiment, and the selections of a Los Angeles jury are now shown the children of the Los Angeles schools, by their art department, as examples worthy of their study. It is interesting that the Los Angeles jury found no public sculpture in the city as yet that seemed of a high enough standard to be held up to public notice.

More recently the architects of Spokane, Washington—an inland city of something over 100,000 population—appointed a jury under the auspices of the City Planning Commission, and their selections are published in this issue, together with the jury's report.

In each of these three cities, the newspapers conducted a contest for laymen and school children, who could guess nearest to what the jury would select, with prizes offered by merchants and public spirited citizens. This was a means of arousing the interest of large numbers of people, which however so far has not had as great a success as it should, because of the large

*Member of Juries for selection of most notable examples of architecture, in Portland, Los Angeles and Spokane; member American Institute of Architects and Amer. City Planning Inst.

Davenport Hotel, Spokane

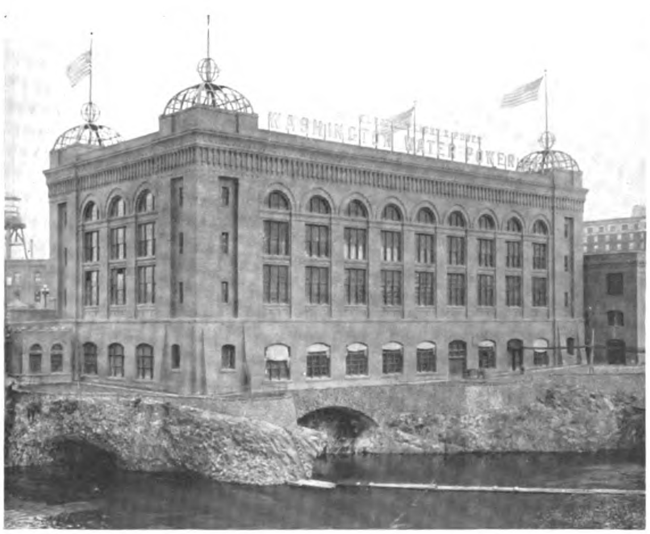
Detail of Lobby, Davenport Hotel

Cutter & Malmgren, Architects

amount of time required in organizing. Other cities in conducting similar jury selections might benefit by the experience of Portland, Los Angeles and Spokane in this regard.

As a member of the jury of selection, named by the architects in each of these three cities, the writer is convinced that the public welcomes such opportunities to get a better understanding of architecture, landscape architecture and sculpture, and evidently has too long suffered from a lack of intelligent direction in the attention which it bestows on these arts. It is sincerely to be hoped that the architects of many cities will take some such authoritative method of arousing greater general interest in their work.

In making such a jury selection, high standards can only be held up where a jury whose judgment they will respect is selected by ballot of local architects, and the members of the jury should preferably be disinterested men from outside, who of course could not pass on any of their own work. Any guessing contest, conducted by newspapers for the public, must be carefully guided to call attention to what the jury will probably select, and not become a matter of popular nomination, else there will be no standards set up.



Washington Water Power Co. Substation, Spokane
Cutter & Malmgren, Architects

The report of the Spokane jury is here given:

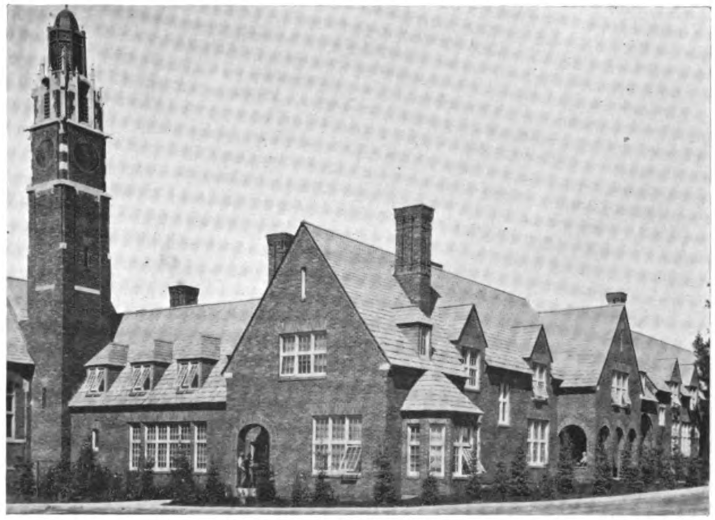
The Most Notable Examples of Architecture and Landscape Architecture in Spokane

To the President of the City Planning Commission, Spokane, Washington:

The jury appointed by you, on nomination of the architects of Spokane, for the purpose of selecting, in its opinion, the ten most notable examples of architecture, the three most notable examples of landscape architecture, the two most notable examples of public sculpture, and the five most notable small houses to be found within ten miles of the County Court House, met for two successive days, on October 7 and 8. Together, they visited all sections of Spokane and vicinity and noted with care all buildings, parks, gardens and sculpture that seemed worthy of consideration.

The jury's instructions were that "points of architecture to be considered are: usefulness, arrangement, relation of exterior design to interior design, beauty, harmony of detail, setting, purpose, color and appropriateness." The size or cost of a structure did not unduly influence its decisions. It is to be regretted that people generally are often misled on account of mere massiveness or the cost of a building or garden into thinking of it as an important example of design.

There is also a special quality possessed by some buildings and gardens, appealing to both trained architects and laymen—the elusive quality of charm, which is not easily definable, but which might be said to represent the soul of the building. It may embody this quality, even when open to criticism in matters of detail. All kinds and uses of buildings—residential, commercial, industrial, educational, religious, public and semi-public—were compared by the jury to determine which seemed to express the highest development of architecture. The final selections and lists are made up from those found most notable in the opinion of the jury, regardless of size, type or use.

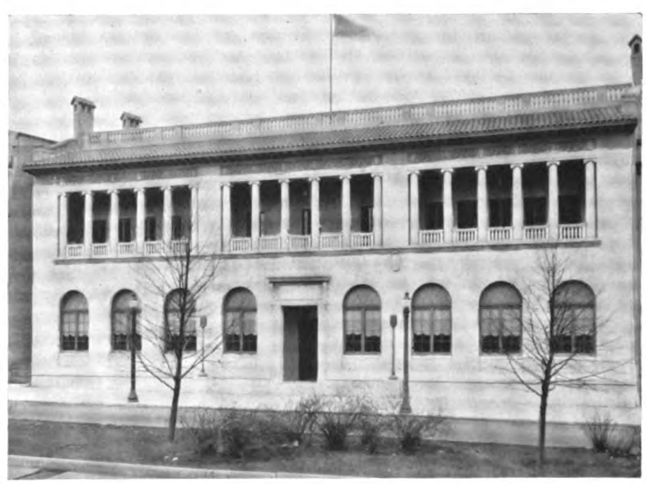


Hutton Settlement for Orphan Children, Spokane
Whitehouse & Price, Architects

The fact that stood out pre-eminently to the jury in Spokane was that while a few fine buildings were evidently designed and superintended by trained architects, and set a very high standard which is cause for national comment and much local pride, many of the commercial buildings, particularly in the center of the city, seem to have been put up without the help of any competent architects at all, and hence are not only structures of questionable utility but also such as to make a bad impression on visitors to Spokane and on resident public alike.

There is undoubtedly much to be proud of in Spokane and many of the buildings, parks and gardens selected by the jury should be notable for their high merit in comparison with the best of any city in the country. It seems to us, however, that the city authorities should find a way to make it more worth while, particularly on the downtown streets, for property owners to put up structures that will make a better appearance. It is not the intelligent property owners, who naturally seek competent help in order to be sure of obtaining a permanent and satisfactory result in their building, who need to be appealed to; rather must we look out for those who have had little opportunity to weigh and understand the value of good design. Whether it be by the remission of a small percentage of taxes to those who will design their buildings on

Lobby of Elks' Club



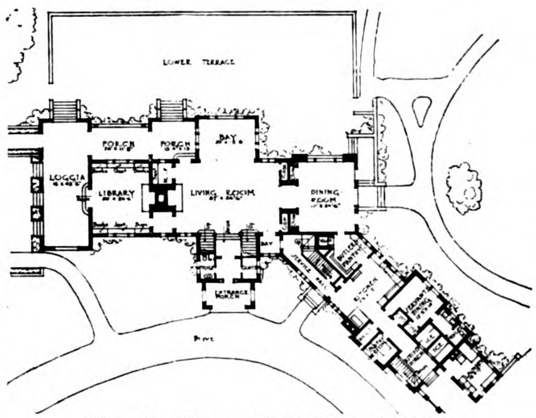
Elks' Club, Spokane

E. J. Baume, Architect

View of Service and Dining Room Wings, House of J. P. Graves, Esq., Spokane
Kirtland Cutter, Architect

a standard approved by the city, as in Paris, or by some other compensatory method, is not for this jury to suggest, but we believe and recommend that the City Planning Commission and Chamber of Commerce should take up this important matter and find a solution. We feel sure that owners will fall in with the city's suggestions to provide uniformly better design. But the way to get them to do so on any worth-while scale, we believe, is to see that they feel compensated for their effort.

The jury much regretted not being able to discover any public sculpture in Spokane which is deemed worthy of honorable mention, judged by the high standard set by our foremost sculptors.



Floor Plan, House of J. P. Graves, Spokane

ARCHITECTURE

In the unanimous opinion of your jury the ten most notable examples of architecture in Spokane, arranged alphabetically and with their architects, are:

Davenport Hotel, Cutter & Malmgren.

Elks' Club, E. J. Baume.

J. P. Graves residence, Kirtland Cutter.

*Hutton Settlement, Whitehouse & Price.

Monroe Street Bridge, Kirtland Cutter; J. E. Ralston, engineer.

Old National Bank, D. H. Burnham & Co.

R. B. Porter residence, Cutter & Malmgren.

*The Hutton Settlement was fully illustrated and descriptive article published in The Architectural Forum, December, 1920.

House of E. A. Lindsley, Esq., Spokane
H. E. Smith, Architect
Awarded Honorable Mention

House of C. A. Weiss, Esq., Spokane
Keith & Whitehouse, Architects
One of the most notable small houses

Washington Water Power Co. Substation, Cutter & Malmgren.

Western Union Life Building, Cutter & Malmgren.

J. R. Wilson residence, Whitehouse & Price.

Landscape Architecture

In the unanimous opinion of the jury, the three most notable examples of landscape architecture in Spokane are, alphabetically arranged:

J. P. Graves grounds, Kirtland Cutter, architect.

Manito Park, Olmstead Bros., landscape architects.

R. B. Porter grounds, Cutter & Malmgren, architects.

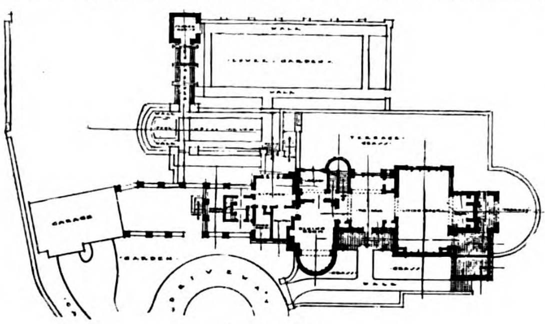
Some of the gardens in Spokane are unusually interesting and well laid out, but undoubtedly the most attractive landscape work in the city has been done for the Park Board. The jury cannot too highly commend the breadth of vision, energy and results obtained by A. L. White, President of the Park Board, who more than 10 years ago secured a comprehensive park and boulevard system plan from America's foremost landscape architects, Olmstead Bros. of Boston, and since that time has secured gifts of more than 32 miles of boulevards.

House of J. R. Wilson, Esq., Spokane
Whitehouse & Price, Architects

Most Notable Small Houses

In the unanimous opinion of the jury, the five small houses which are found to be the most notable of those seen by the jury, alphabetically arranged, are:

Condon residence, Albert Held, architect; R. H. Goodhue residence, Morrison & Stimson, architects; Ernest V. Price residence, Whitehouse & Price, architects; Dr. Charles F. Rigg residence, C. A. Weiss residence, Keith & Whitehouse, architects.



First Floor Plan

General View from Highway

Detail of Entrance Front

House of R. B. Porter, Esq., Spokane
Cutter & Malmgren, Architects

Two Views of Western Union Life Building, Spokane
Cutter & Malmgren, Architects

The jury believes that Spokane is fortunate in being able to present to the world such excellent examples of architecture and landscape architecture as have been selected. Properly displayed and brought to the attention of others, they are bound to provoke favorable impressions and comment. That the most may be made of the city's opportunities, these suggestions are made by the jury:

1. To the Chamber of Commerce—That while this jury knows it is not infallible, and that there may be differences of opinion as to the selections here made, it is unanimous in the recommendation that the Chamber use exclusively in its publicity, reproductions of the buildings or gardens here selected in order to show what a high standard Spokane has developed—one that compares favorably with the best in the country—and not try to substitute other buildings unless selected by a similarly competent and disinterested jury.

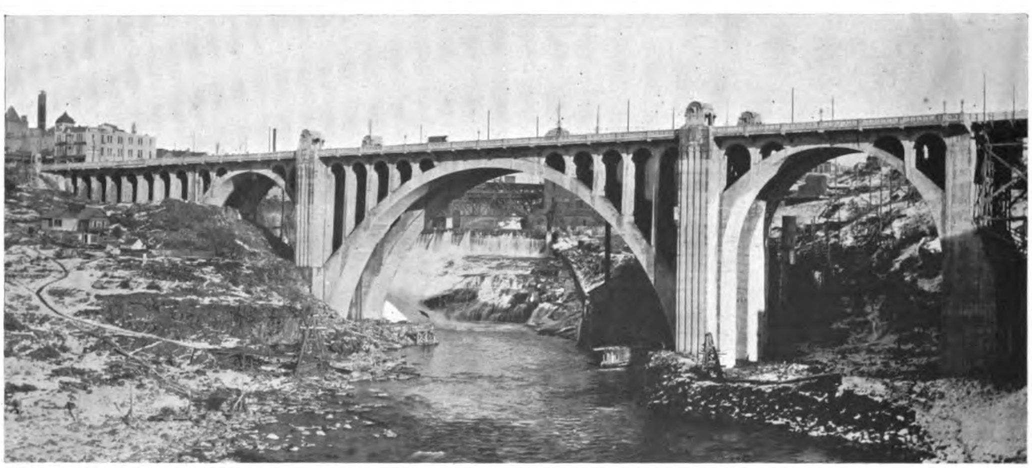
2. To the City Council—That the city secure, by lease or otherwise, the property surrounding Spokane Falls, and plant and park it as soon as possible. This would transform one of the greatest potential scenic assets of the city from a condition now unsightly and greatly disappointing to visitors, into one of note to tourists from all parts of the world.

3. To the City Planning Commission—That the Commission persevere in securing for Spokane a zoning ordinance, a major traffic street plan, and civic center plan for the grouping of public buildings, the need and advantage of which are apparent to the most casual student of civic growth.

Members of the Jury of Award

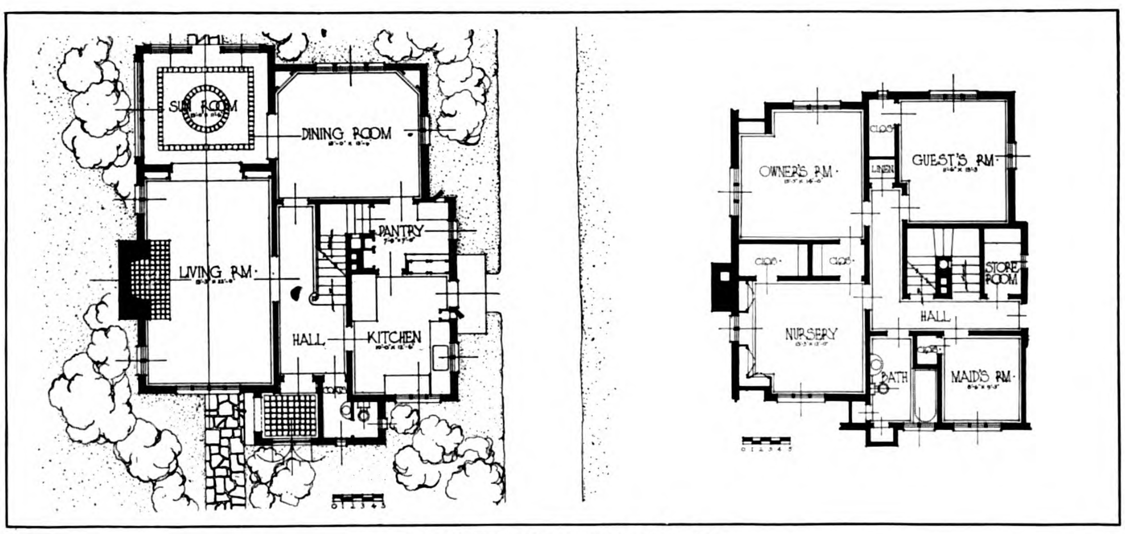
Carl F. Gould, A.I.A.
Albert E. Doyle, A.I.A.
Arthur Loveless, A.I.A.
George W. Fuller (Librarian Public Library)
Charles H. Cheney, A.I.A.

Editor's Note.—The jury selected a number of other examples in each division to which honorable mentions were awarded, but they are not illustrated in this necessarily limited review of the judgment.



Monroe Street Bridge, Spokane
Kirtland Cutter, Architect, J. C. Ralston, Engineer

VIEW FROM STREET



FIRST AND SECOND FLOOR PLANS

HOUSE OF E. V. PRICE, ESQ., SPOKANE, WASH.

WHITEHOUSE & PRICE, ARCHITECTS

VIEW OF ENTRANCE FRONT

GARDEN SIDE AND ENTRANCE DOORWAY

HOUSE OF K. K. CUTTER, ESQ., SPOKANE, WASH.

K. K. CUTTER, ARCHITECT

GENERAL VIEW

DETAIL OF EAST FRONT

SUNNINGDALE COUNTRY CLUB, SCARSDALE, N. Y.

ROBERT D. KOHN, ARCHITECT

Exterior Concrete

By WALTER W. CLIFFORD
of Clifford & Roeblad, Engineers, Boston

REALLY fine exterior concrete has been produced in recent years. All this excellent work, however, has not entirely overcome the unfortunate impression made by the original concrete blocks with their monotonous rock faces, dreary color, uninteresting texture and usually poor scale.

In the treatment of exterior concrete there are two considerations: outlines and surface treatment. Concrete is a very pliable material as far as mass outlines are concerned. The structural requirements for all concrete buildings, 10 stories high or less, will allow smaller dimensions for columns and spandrels than the architectural designer will wish to use. Ornamental outlines—cornices, belts, etc.—may be of pre-cast units or of cast-in-place concrete. Pre-cast concrete can be had in practically any shape or size in which cut stone is used. By means of glue forms, not ordinarily an economic possibility for field work, fine and undercut detail may be obtained. Sand moulds are commonly used and with them a pleasing texture can be economically obtained. All methods of surface treatment discussed later in this article are applicable to monolithic concrete, and the more elaborate methods are used most advantageously and economically in pre-cast concrete.

Concrete cornices and mouldings are used on all-concrete buildings as a matter of consistency and economy. These are usually cast in place and some very good work of this kind has been done. The scale and general treatment of concrete buildings, as well as practical considerations, make fine details inappropriate. Form work is the variable, so far as the cost of such construction is concerned. The designer must therefore know something of how the forms are to be built in order to satisfactorily combine good design with low cost. Wood forms for mouldings are of two types: narrow, longitudinal lagging on templates cut to the cornice outline as shown in Fig. 1, and solid pieces in combination as shown in Fig. 2.

When lagging is used the face of the form must be dressed, ordinarily by hand, after the lagging is attached to the templates. This is an expensive operation so that lagging forms are employed only when solid forms cannot satisfactorily be used. If the designer is familiar with the requirements of form construction this need seldom happen.

The second type of form is usually more substantial and better adapted to the handling which goes with repeated use, as well as being more economical in first cost than lagged forms.

In the construction of solid forms for mouldings there are several things which should be considered. A form joint invariably shows on the concrete surface and it is nearly impossible to completely remove it. Joints should therefore be made at angles where they will be harmless. Joints on curves or tangent points are always objectionable. Reversed curves should be cut from single pieces. If they are too large to be cut from a single piece, resort must be had to a lagged form unless a break can be introduced between the two curves. The fine, closely spaced joint lines of the lagged form will be much less objectionable than a single larger joint at the tangent point.

Forms are, of course, the reverse of the finished concrete surfaces. Wood mouldings of various curvatures and sizes are carried in stock by the larger lumber dealers, and they can often be combined into satisfactory designs which are economical in construction. Special curves are readily obtained, although not so quickly as stock mouldings. Breaks of less than 7/8 inch cannot be satisfactorily obtained in ordinary concrete work. Breaks can usually be made such that stock dressed lumber can be used. Fig. 2 shows the makeup of the forms and illustrates the points mentioned.

Surface finish of concrete is a large subject and improvements in such finish are constantly being

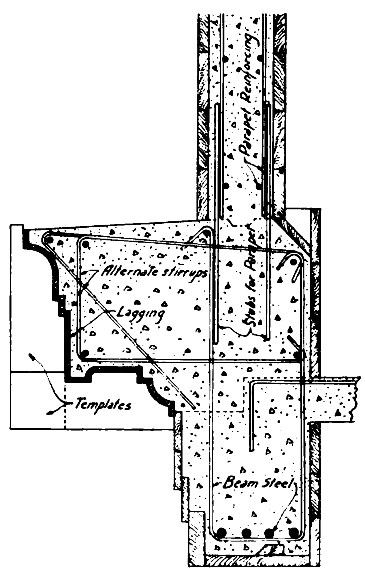


Fig. 1
Wood Lagging on Templates

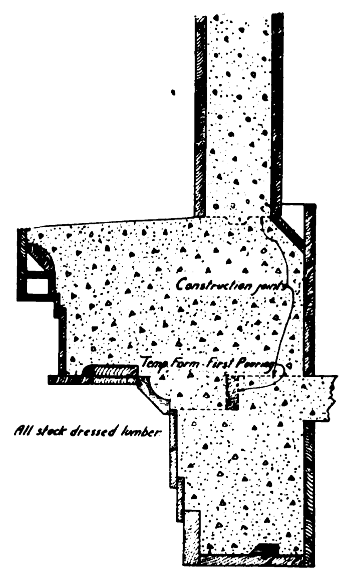


Fig. 2
Built-up Solid Wood Form

Varied Texture and Color in Concrete Blocks and Pre-cast Concrete Trim

The neutral gray of cement in the joints tones with any hue, but if desired the cement can be colored with any of the available pigments. Brick panels are built into recesses left in the concrete. The thinner pieces of burnt clay are usually placed before pouring. For ceilings the tiles may be placed directly on the forms. For vertical surfaces pieces may be glued to paper or canvas or set in the forms with clay. Larger designs may be made in pre-cast units and set in the wall. Some valuable suggestions for "The Decoration of Concrete with Colored Clays," by H. C. Mercer, are contained in Bulletin No. 10 of the Portland Cement Manufacturers' Association.

Since well placed concrete shows a cement surface when the forms are stripped, the simplest surface treatment is a cement finish. In the crudest of work, mostly on surfaces which are not exposed, the concrete is left as it comes from the forms. Concrete surfaces, in practice, usually show some voids which need to be filled, and some "fins" where the form boards or panels join. The simplest real surface treatment consists of chipping off these fins and filling the voids. Wood forms leave grain marks as well as joint marks. To remove these a cement wash is used. A creamy mixture of neat cement and water is applied with a brush and preferably rubbed in with carborundum stone. Simple brush treatment is cheaper than rubbing with stone and is moderately satisfactory if the grout is thoroughly rubbed in and not just painted on. By rubbing the grout in thoroughly with carborundum stone all form marks from good wood forms can be removed, leaving a surface of uniform appearance.

When steel forms are used a very dense, smooth surface results, with "fins" only at the edges of the panels, much farther apart than with wood forms. This "fin" from steel forms is almost indelible as far as ordinary treatment is concerned, and for certain simple work the smooth surface, paneled by form joints, affords an opportunity for surface treatment which has not been extensively improved. Steel forms are carried in stock by several companies, and for economical construction standard size panels should be used as far as possible.

The cement surface was also one of the first points of attack in the problem of decorating or improving concrete surfaces. The dreary gray of the ordinary Portland cement is not pleasing in large areas, and various colorings have been introduced into the mixture. This is attended with many difficulties; cement itself is a pigment which is of a different shade when hydrated. The final color of a concrete surface is therefore dependent on the degree to which the surface cement is hydrated as well as on the foreign pigments introduced. It should also be noted that cements from different

made. There are four possibilities in the surface treatment or decoration of concrete: it may be painted; decoration may be added in the form of brick panels or inserted tile patterns; the desired finish may be obtained with the cement, or the aggregate may be selected to give the desired tone and texture and then exposed by any one of the many available methods. Painting concrete is difficult because of the presence of free lime or alkaline material. The porosity of the surface and the probable presence of moisture add to the difficulty. Concrete should therefore be thoroughly dried out before any paint is applied. As a priming coat a solution of zinc sulphate may be applied to neutralize any free lime, or one of the various excellent proprietary paints which are especially prepared to resist alkalinity and fill the pores may be used. It is also necessary to exclude moisture permanently from a wall which is to be painted, as moisture working in behind a coat of paint will cause it to peel. Upon a good lime-resisting primer, which fills the pores, practically any paint may be used which is adapted to the exposure. In practice, the use of painted concrete surfaces is largely limited to interior work.

Surface applications of solutions of metallic salts have been patented and used in Holland for the last three or four years. These are applied with a brush and penetrate an appreciable depth into the concrete. This treatment hardens the surface and renders it more impervious. The coloring is imparted by the solution and already 35 colors have been produced. The solution leaves the colored surfaces dull, but they can be polished to any desired degree by treatment with wax.

The decoration of concrete with clay products is mechanically simple. Brick and terra cotta are fireproof, like concrete, and resist the weather equally well. Exterior brick panels are common and much can be made of burnt clay decoration.

sections of the country, although of the same brand, differ in shade. Specifications for ornamental concrete should require all the cement from the same mill. Pigments for coloring cement are limited to a few mineral colors because of the complex chemical reactions in the setting of the cement as well as the action of the weather. The use of pigment is further limited by the fact that more pigment than 10 per cent of the cement causes weakness.

It can hardly be said that even any of the mineral colors are permanent under severe exposure. In practice, use of cement colorings is largely limited to that of lamp black to darken pavements and some of the iron oxides to impart a slowly fading tint to stucco. White cement is permanent and satisfactory. It requires white sand and stone, however, for really white work.

Exposed aggregate offers the widest opportunity for artistic concrete work. Often, on large surfaces, the aggregates as selected for construction are satisfactory for brushing or tooling. Where a different and more expensive aggregate is desired, a facing mixture is used. It is made from 1 to 4 inches thick and bonded to the concrete backing. Marble, granite and limestone are commonly used as aggregates for ornamental work and offer an almost unlimited variety of colors. Any durable stone of satisfactory color may be used, however, and in most parts of the country some suitable local stone is available. Aggregates for special finishes are usually ¼ to ½ inch in size. The size of the aggregate will control the texture of the surface, which may thus be simply adapted to the scale of different portions of the work without change in aggregate. The tone of the surface can be materially changed for special parts of the work by the addition of a small percentage of aggregate of contrasting color, such as white or yellow marble to give a lighter tint, or black marble, iron slag or blue granite to give a darker shade.

Surface finishing mixtures may be poured at the same time as the backing by the use of a movable dam; they may be plastered onto concrete or other suitable walls (stucco work), or they may be poured 3 to 4 inches thick against the backing wall and bonded with wires left projecting from the earlier pourings. When the surfacing and backing are poured together a sheet metal dam with angles riveted on to keep it at the proper distance from the face is used. This is pulled up as the pouring progresses and the two mixtures thoroughly bonded by tamping. The thickness of surface mixtures placed in this way will be 1 to 2 inches. It should not be less than twice the maximum aggregate size.

All of the given methods of surface treatment are applicable to cast or pre-cast concrete work. Precast concrete is usually made with the face down. The face mixture is placed first and the backing is poured on top of it. More refinement is possible on pre-cast concrete work, but its use of course means the necessity of joints.

Aggregates are exposed in poured concrete by brushing, tooling or polishing. For brushing, the forms must be removed as soon as possible and the brushing done on the green concrete. The harder the concrete the more difficult will be the brushing. The concrete must, however, be allowed to attain sufficient set so that the particles of aggregate will not be disturbed. An ordinary stiff bristled scrubbing brush will answer, but a brush made by clamping together several sheets of wire screen cloth has been found more satisfactory. Water should be applied freely during the brushing. The surface of brushed concrete may be brightened by washing with a solution of commercial muriatic acid diluted with 2 or 3 parts of water. The acid should be thoroughly washed off with clean water. Sand blasting may be used on hardened concrete to give a similar effect to brushing. Tooling may be done with any of the hammers used for natural stone. Tools cannot be used, however, until the concrete is thoroughly hardened. When a hand pick is used a comparatively large amount of concrete is scaled off leaving a coarse textured finish. If the pick is used at right angles no lines or marks are left. By striking a glancing blow, tooth marks are left which may be made parallel or at various angles. Bush hammers give a surface similar to that produced by the pick but with a finer texture. Four- to eight-cut hammers are used with similar results to those obtained on natural stone. Polishing may be done by hand with a stone or by power. The concrete to be polished must be lean enough to

Texture with Exposed Aggregate in Pre-cast Work and Concrete Blocks
Note almost invisible joints in pier

show a large percentage of aggregate when polished, and the aggregate must be one which will take a polish, such as marble or granite.

Certain finishes are particularly applicable to stucco work owing to the fact that the fresh surface is available for treatment. Stippled finish is obtained by patting the freshly troweled mortar with a straw brush. Sand floating is obtained by troweling sand into the fresh mortar with a rotary motion of a wood float. Another sand finish may be obtained by throwing a sand grout against the surface with a brush. The slap dash and pebble dash are similarly obtained by throwing mortar or pebbles into the surface.

In pre-cast concrete work, in addition to the methods mentioned for exposing aggregates, a very light spray of water is sometimes used on fresh surfaces. Much drier concrete is used in pre-cast concrete than is possible for work poured in place, and the forms are removed almost immediately which makes brush or sprayed surfaces somewhat easier to secure than on monolithic work.

In practice, the production of ornamental concrete is similar to that of any other ornamental work in that no specifications can make an expert out of any merely well intentioned contractor. A contractor of experience and skill in the required work must be employed, and an approved sample rather than a description must be used as a measure of the quality of the work.

Some excellent concrete work has recently been done on the entrances to the new Arlington Street Subway Station in Boston, and excerpts from the Boston Transit Commission's specifications follow:

"The work consists of the erection of granite composite walls, with granite base courses and trimmings on three sides of stair openings, . . . with incidental granite composite roofs and vertical walls lining the two sides of the stairways.

"No granite composite work shall be begun until samples of the proposed cut and rubbed work shall have been submitted to and approved by the engineer. Such samples shall be in blocks 2 x 6 to 8 inches square and, after being approved, shall be left at the field office of the department and actual work shall conform with such samples.

"Build in place in carefully made wooden forms granite composite walls and roof around and over top of stairways, as shown on drawings. Form panels where and as indicated. Strap the forms together around the faces of the granite corner posts which are to be set in advance of pouring the composite.

"This composite for eight-cut work shall be a mixture of Portland cement and chips of pink Dedham granite, and of Portland cement and pink Tennessee marble chips for rubbed work. A small admixture of black iron slag in small specks shall be added. Rubbed work shall be used on the side walls of stairs from the top of above described granolithic base up to the under surface of granite belt—all as shown on drawings. These rubbed composite walls shall be 4 inches thick and set against the existing foundation walls, with the inner faces flush with the above described granolithic bases. Before pouring these lining walls, thoroughly rough up and wet down the surfaces of the existing concrete foundation walls. Dowels for this lining work will be set into the existing foundation walls by the department. All the other granite composite work shall be finished in eight-cut work except at external angles. These external angles to be slightly chamfered, as shown on detail, and to have chiseled surfaces, and such chiseling shall be carried around on each face of wall for one-half inch."

The cost of finishing concrete is made up of many variables and for the more elaborate work, where skill is so important, it is not possible to obtain as keen price competition as on simpler work. The cost of coloring cement is largely the cost of the color, which may vary from a fraction of a cent to 10 cents per square foot for a 1-inch thickness according to the pigment used. Measuring out the proper amount of pigment must be done with great precision in order to obtain uniform color; the cost of measuring is insignificant, however.

Brick panels cost only as much per 1,000 bricks as any other face brick veneer. The cost of leaving recesses for brick is that of extra form work—10 to 20 cents per square foot according to the shape and location of the panels and their number. Burnt tile decoration is such special work that estimates must be obtained for each job. Rubbing with cement wash and carborundum stone will vary from 1 cent a square foot for rough work to 3½ cents for the best work.

Placing a 1½-inch veneer, integral with the backing, will cost about 6 cents per square foot for local sand and screenings, but this may be increased very materially by the use of white cement or expensive aggregates. To this must be added the cost of finishing the surface after the removal of the forms. Brushing will cost about 5 cents per square foot, while tooling will vary from 2 cents per square foot for plain picking to 10 cents for fussy hammering. In tooling it is expensive to cut to a line so that small or long narrow panels will cost much more than large plain areas. Polishing will vary from 3 to 10 cents per square foot according to the amount to be done and its location. The various ordinary stucco finishes are not materially different in price. Of course these costs all vary greatly with the time and place, but their relation to each other will generally hold.

While structural concrete work is in its childhood, ornamental concrete work is hardly beyond infancy and, even where appropriations are limited, splendid opportunities are offered for original and artistic results in the treatment of a temporarily plastic material, the color and texture of which can be readily controlled.

Bibliography. Literature on the general subject of concrete finishing is largely limited to pamphlets of the cement companies and society proceedings, although the subject is treated in a general way in "The Handbook of Building Construction" and "Concrete Engineers' Handbook" by Hool & Johnson. Volume XVI of the Proceedings of the American Concrete Institute contains an excellent article by J. C. Pearson and J. J. Earley on "New Developments in Surface Treated Concrete and Stucco," dealing largely with exposed aggregate finish. Volume XVII of the same Proceedings has a report of committee on treatment of concrete surfaces which gives standard specifications for stucco, and papers on "Coloring Concrete" by John W. Lowell which deal largely with pre-cast concrete, and "Shrinkage of Portland Cement Mortars and Its Importance in Stucco Construction" dealing with one of the practical difficulties in stucco construction.

Technologic Paper No. 70 of the U. S. Bureau of Standards gives detailed results of a winter's exposure on 56 stucco panels varying in compositions and on various bases. "Cast Stone," published by the Atlas Portland Cement Co., gives many examples of artistic cast work; and "Concrete Surfaces," published by the Universal Portland Cement Co., gives valuable suggestions for the treatment of monolithic concrete.

Straight Talks to Architects

V. WHAT IS YOUR METHOD OF CHARGING FOR PROFESSIONAL SERVICE? (CONCLUDED)

IN developing the details of the various methods of charging for professional services, primary consideration must be given to the recommendations of the American Institute of Architects which directly affect this problem. These methods form the basis for service charge systems in many architects' offices today and were developed after a careful analysis of general practice. Members of the Institute are of course familiar with its recommendations. For the benefit of non-members, and to refresh the memory of those who have not recently given consideration to this matter, we present a brief review of the Institute's findings.

In its publication, "The Handbook of Architectural Practice," the Institute sets forth three recommended methods of compensation for architectural service. With these methods is presented a general schedule of charges, including minimum percentages for the various divisions of service. At this point it is important to emphasize the fact that this schedule is not mandatory in its nature. We believe that among architects today, particularly those who are not members of the Institute, there exists a misconception regarding this fact. It is well to realize, therefore, that it has not been the intention of the Institute to set forth any schedule of charges which is mandatory or binding on its members.

The attitude of the Institute is thus clearly set forth in "The Handbook":

"Even as a schedule of charges the document is not of a very precise nature. It indicates that the basic percentage under ordinary circumstances is 6, but that there are many cases in which it is greater. The percentage necessarily varies under different circumstances, since the architect's fee, like that of any professional man, must depend upon his skill, experience and standing and upon the character and location of the work to be done, as well as upon the kind and cost of the services to be rendered. Therefore, to base the architect's fee upon an unvarying percentage of the cost of the work is neither reasonable nor equitable; but since that method has long been and is still largely in use, the Institute names a certain rate lower than which, in ordinary cases, competent and complete services are not to be expected."

The three methods of charging for services as recommended by the Institute are:

1. The payment to the architect of a percentage of the final cost of the work executed from his designs, with the reimbursement of certain expenses.
2. The payment to the architect of a fee for his services and reimbursement of all his expenses.
3. A method by which the architect receives a salary for his work.

In carrying out the first method, an agreement is made with the owner by which the architect shall receive a fee for his services consisting of a basic percentage on the cost of the work, together with a reimbursement for costs of transportation and living incurred by him and his assistants while traveling in discharge of duties connected with the work, and the costs of the services of heating, ventilating, mechanical and electrical engineers with any other extra services to which the owner may agree. This basic fee recommended is 6 per cent on the average project, but it is understood that it may vary according to the amount of work necessary; or, in other words, according to the amount which the architect believes he must receive in order to meet his requirements of cost and profit. It is entirely ethical and not against the mandates of the A. I. A. to charge a fee based on *any* percentage at the architect's discretion.

The recommended method of arranging payment of this fee is:

"Upon completion of the preliminary studies, a sum equal to 20 per cent of the basic rate computed upon a reasonable estimated cost.

"Upon completion of specifications and general working drawings (exclusive of details) a sum sufficient to increase payments on the fee to 60 per cent 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.

"From time to time during the execution of work and in proportion to the amount of service rendered by the architect, payments shall be made until the aggregate of all payments made on account of the fee under this Article . . . shall be a sum equal to the rate or rates of commission arising from this agreement, computed upon the final cost of the work.

"Payments to the architect, other than those on his fee, fall due from time to time as his work is done or as costs are incurred.

"No deductions shall be made from the architect's fee on account of penalty, liquidated damages, or other sums withheld from payments to contractors."

The disadvantages of this method are obvious. In many instances the owner is not willing to pay a sum equal to 20 per cent of the basic rate upon the completion of preliminary studies. He may be perfectly willing to pay the actual cost of these studies, together with a reasonable profit which in some instances would approximate 20 per cent and in others would be far less. This is particularly true in case of speculative ventures in projects which require preliminary studies for purposes of financing. This same objection may hold good in regard to the payment to 60 per cent upon completion of specifications and general working drawings. Another objection to this method of payment is that the architect should have a definite understanding as to the time of payment, so that he will be compensated steadily for the work which he does and will not have too great an investment in the project at any time. This applies particularly to his reimbursement for expenditures.

The second method involves a fee payable to the architect and reimbursement of all costs to him. The amount of this fee should be determined and made part of the agreement between the owner and the architect. The Institute's recommendations on this method of payment are:

"In case of the abandonment or suspension of the work or of any part or parts thereof, the architect is to be paid in proportion to the services rendered on account of it up to the time of its abandonment or suspension, such proportion being 20 per cent upon completion of preliminary sketches and 60 per cent upon completion of working drawings and specifications.

"If the scope of the work or the manner of its execution is materially changed subsequent to the signing of the agreement, the fee shall be adjusted to fit the new conditions.

"If additional personal service of the architect is made necessary by the delinquency or insolvency of either the owner or the contractor, or as a result of damage by fire, he shall be equitably paid by the owner for such extra service.

"The architect shall maintain an efficient and accurate cost-keeping system as to all costs incurred by him in connection with the subject of this agreement, and his accounts, at all reasonable times, shall be open to the inspection of the owner or his authorized representatives."

"The costs referred to in this Article comprise these different items:

(a) The sums paid for drafting, including verification of shop drawings, for specification writing and for supervision of the work.

(b) The sums paid to structural, mechanical, electrical, sanitary or other engineers.

(c) The sums paid for incidental expenses such as costs of transportation or living incurred by the architect or his assistants while traveling in discharge of duties connected with the work, costs of reproducing drawings, printing or mimeographing the specifications, models, telegrams, long distance telephone calls, legal advice, expressage, etc.

(d) A proportion of the general expenses of the architect's office, commonly called "overhead," representing items that cannot be apportioned in detail to this work, such as rent, light, heat, stenographer's services, postage, drafting materials, telephone, accounting, business administration, etc.

"It is agreed that the charge for such general expenses shall be—per cent of item (a) of this Article.

"On or about the first day of each month the architect shall present to the owner a detailed statement of the payment due on account of the fee and the costs and the owner shall pay the architect the amount thereof."

In many ways this is a better type of agreement as it provides for the regular monthly reimbursement of the architect's expenses and the payment of a proportion of his fee. It is, however, difficult for the architect to arrive at the proper fee for this work as it involves his own time and that of principals in his office. Under this type of agreement the architect is more or less subject to the whims of the owner in the matter of conferences, and he may find that the work requires so much of his time that it does not represent adequate payment.

The third method recommended by the Institute is that under which an architect receives a salary for his work and there are no detailed recommendations in this connection, because it is anticipated that "all the expenses of his office are paid by his employer, which is usually a body politic or corporate." It would, of course, be difficult for the A. I. A. to go much further in the standardization of methods of charging. Any mandatory schedule, even though it were detailed according to building types, would be contrary to good judgment.

It is interesting to note that in one form or another the fee which the architect is actually successful in charging depends principally upon public demand and appreciation of his ability. The amount of the fee is usually affected by several conditions, depending somewhat upon the type of building in question. In the case of residential work and the design of monumental structures, substantial fees are paid for architectural merit. In the classes of investment and utility buildings, while good architecture receives a fair amount of consideration, the actuating motive in paying substantial fees is to obtain the service of an architect who has specialized in certain classes of design or who may have the experience and business judgment which recognize practical features that determine the success of the building from a business viewpoint.

As a matter of interest in this connection, we may cite the principal points of two methods of working on a basis of cost-plus professional charges which have been successfully instituted by well known architects. The plan used in the office of Robert D. Kohn, New York, involves the provision of full professional services, including all the usual plans, details, specifications and superintendence for which in compensation the owner pays the direct cost incurred by the architect's office, including principal's time charge, on a salary basis plus 1¼ times the amounts of such cost to cover overhead and profit. It is agreed that the total amount shall not exceed the basic rate calculated under the normal conditions of practice, mentioned in the latest schedule of the American Institute of Architects. Mr. Kohn's experience has been that in some cases the total costs of his services were actually less than under the percentage method, while in other cases the cost has been more than the normal percentage would have been. In other words, the owner has paid fairly for the service he has received and the architect has made a fair profit on each commission. The charge of 1¼ times the cost of the work to cover overhead and profit has been arrived at by adding to the original cost two-thirds of this cost for overhead (a figure developed by studying overhead through a period of previous years), and a profit of one-third of this actual cost plus overhead, which gives a total of about 225 per cent or 1¼ times actual cost for overhead and profit.

In the office of R. Clipston Sturgis, of Boston, a system of cost-plus professional charges is employed which differs somewhat radically from that used by

Mr. Kohn. This system was described in detail in THE ARCHITECTURAL FORUM (then *The Brickbuilder*) in the issue of May, 1913. The same system is still employed in Mr. Sturgis' office and has been in use about 15 years, to the evident satisfaction of all parties. The charge to the owner under this system is developed by doubling the entire cost of drafting, together with the expense of stenographic work on specifications. To this is added the cost of the services of engineers, but this amount is not doubled. Similarly, the cost of incidentals is added but not doubled. No direct charge is made for the time the architect spends in the office or in supervision. The compensation for this is paid in the form of a fee, the amount of which is fixed arbitrarily by the consideration of these three factors:

1. The character of the service.
2. The length of time estimated for completing the service.
3. The proposed expenditure.

By considering the character of the service required, the amount of time which the architect must spend personally is affected by the type of building under consideration. Thus on residential work, where the demand of the owner will be greater than on industrial work, compensation is fixed on a higher basis. The amount of time involved in the preparation of plans and in the carrying out of the project can be fairly well estimated and the agreement usually carries a provision for the suspension of services by the owner if he waits before proceeding with the work. All payments are made on a monthly basis in accordance with the architect's expenditures, and his fee is paid in definite monthly amounts, over the period of the work.

Undoubtedly there is considerable interest in a method of charging for service such as that employed in Mr. Sturgis' office. In the 1913 issue we published in full a text of the agreement which is used. Since that time there have been very few changes in this agreement, but in order that details may be available for reference we again present this agreement with Mr. Sturgis' permission.

ARCHITECT'S AGREEMENT

Agreement made this ——— day of ——— 192–, between —————, hereinafter referred to as the Owner, and R. Clipston Sturgis, hereinafter referred to as the Architect, as follows:

(1) *The Work Contemplated:*

The work for which the Architect is to render professional services under this agreement consists of the planning and construction of —————, estimated by the Architect to cost about —————. This agreement, however, will not be affected by any change in the final actual cost of the building, unless it is due to a substantial increase in the requirements.

(2) *Scope of Professional Service to be Rendered:*

(a) The Architect shall render complete professional services, consisting of such conferences, preliminary studies, working drawings, specifications, large scale and full size detail drawings as may be necessary, together with the supervision of the letting of the work. The charges noted below under "Architect's Salary" are for the personal professional services of the Architect. The expense of draughting, engineers, incidentals and superintendence will be paid by the Owner in addition to such salary, as noted below under "Additional Charges." The Architect will furnish ten typewritten copies of the specifications or copy for the printer, if printed.

(b) The Architect shall in person, or by representatives, give such superintendence to the work during construction as may be required to insure the work being executed in general conformity with the plans and specifications, and such further instructions as may be given from time to time. This superintendence cannot prevent poor workmanship or the use of poor materials, but can require the making good of such defects as appear in the work, so far as practicable.

(3) *Architect's Salary:*

(a) If the work as contemplated at this time is carried on steadily to completion, it is estimated that the Architect's services will terminate in —— months from ———. On this basis the Architect shall receive a total salary of ———. The amount shall be paid as follows: ——— a month for ——— months, payments beginning ——— 192–, final balance of ——— to be paid on issuance of final certificate to the contractor.

(b) If for reasons beyond the control of the Architect, the work is delayed so as to extend over a period materially in excess of that contemplated, as noted above, and so as to entail additional service on his part, then the total amount of the Architect's salary shall be increased by an amount to be mutually agreed upon by the Owner and Architect.

(c) The Owner may at any time abandon or suspend the work and the employment of the Architect shall thereupon terminate if the work is abandoned, and be suspended, if the work is suspended.

(d) If the undertaking is abandoned and the employment of the Architect consequently terminated, he shall be paid in addition to this salary to the date of such termination, the unpaid balance of ——— due at completion.

(e) If the work is suspended at any time so as to suspend also the work of the Architect, the Owner shall be at liberty to suspend payments on the Architect's salary until his work is resumed, without affecting otherwise the terms of this agreement.

(4) *Additional Charges:*

In addition to the Architect's salary determined above, there will be the following items of expense to be paid by the Owner through the Architect:

(a) Draughting: Strict account shall be kept by the Architect of the cost of draughting, such cost to be the total of the salaries paid to draughtsmen engaged on the drawings, or in superintendence, including time so spent in writing specifications, but no charge is to be made for time so spent by the Architect, and all expense of stenographic work on specifications or otherwise, done in the Architect's office, are to be considered as "regular office expense." No charge shall be made for superintendence on the part of the Architect. The total amount of such draughting expense shall be multiplied by two to cover the proportionate share of regular office expenses, and this resulting amount shall be paid monthly on statements in detail from the Architect. The total expense under this item is estimated at ———.

(b) Engineers: The services of structural, domestic and sanitary engineers shall be paid for through the Architect at cost. Expense under this item is estimated as follows:

Structural Engineers,	....
Domestic Engineers,	....
Total,	....

(c) Incidentals: Incidental expenses in connection with the work such as blueprinting, traveling expenses, models, long-distance telephone, telegraph, express and other miscellaneous charges directly applicable to this work including printing of specifications, if they be printed, shall be paid at cost on monthly statements from the Architect. Total expense under this item is estimated at ———.

(d) Clerk of the Works: A clerk of the works satisfactory to the Architect shall be employed by the Owner if he deems it desirable, and paid for through the Architect at cost. The clerk of the works shall be the representative of the Owner and of the Architect, and shall report to the Owner through the Architect as directed by him. If a clerk of the works is employed the total expense under this item is estimated at ———.

(5) *Survey Borings and Tests:*

The Owner shall furnish the Architect with a complete and accurate survey of the building site, giving the grades and lines of streets, pavements and adjoining properties; the rights, restrictions, boundaries and contours of the building site, and full information as to sewer, water, gas and electrical service. The Owner is to pay for test borings or pits and for chemical, mechanical or other tests when required.

(6) *Preliminary Estimates:*
When requested to do so, the Architect will make or procure preliminary estimates on the cost of the work and he will endeavor to keep the actual cost of the work as low as may be consistent with the purpose of the building and with proper workmanship and material, but no such estimate can be regarded as other than an approximation.

(7) *Ownership of Documents:*
Drawings and specifications as instruments of service are the property of the Architect whether the work for which they are made be executed or not.

(8) *Successors and Assignment:*
The Owner and the Architect, each binds himself, his successors, executors, administrators and assigns to the other party to this agreement, and to the successors, executors, administrators and assigns of such other party in respect of all the covenants of this Agreement.

The Architect shall have the right to join with him in the performance of this agreement, any architect or architects with whom he may in good faith enter into partnership relations. In case of the death or disability of one or more partners, the rights and duties of the Architect, if a firm, shall devolve upon the remaining partner or partners or upon such firm as may be established by him or them, and he, they or it, shall be recognized as the "successor" of the Architect, and so on until the service covered by the agreement has been performed. The Owner shall have the same rights, but in his case no limitation as to the vocation of those admitted to partnership is imposed. Except as above neither the Owner nor the Architect shall assign, sublet or transfer his interest in this agreement without the written consent of the other.

(9) *Summary:*
The summary of the items as above is as follows:
(3) Salary
(4) (a) Draughting
(b) Engineers
(c) Incidentals
(d) Clerks of the works

IN WITNESS of the above the parties hereto have duly signed this instrument the ——— day of ———, 192 .

It is quite necessary that we recognize the difference between residential work and practically all other classes of architectural service. Undoubtedly the cost-plus methods of charging for service will find more practical application and more prompt recognition where the details of the architect's contract are being negotiated with business men or business organizations. Residential work involves a high degree of personal interest on the part of the client which at times excludes lengthy consideration of the business details of the average contract for service. It will be found, therefore, that in connection with the design of residences the straight percentage method is often easier for the client to understand.

One factor which enters particularly into this situation is that of the method of letting the construction contract. Under the general conditions existing in the building field, particularly in connection with residential work, many architects have found it advisable to carry out the project under the "several contract method" instead of through a general contractor. This, of course, means considerably more work for the architect who really assumes the executive position of the general contractor. In this situation the cost-plus method provides an ideal arrangement.

If this arrangement is not satisfactory to the client, however, and if he demands some form of straight percentage, the best plan which has yet come to our attention for charges is:

1. That a straight percentage (usually 10 per cent for residential work) shall be charged to cover complete architectural services. This also includes the letting of the contract for principal items, such as masonry or carpentry.

2. On each of the additional separate contracts a special service charge is made by the architect, being a percentage (usually about 10 per cent) on the face value of these separate contracts. This amount serves to cover the additional cost to the architect of obtaining bids, letting the contract and providing more detailed supervision of these portions of the work than is to be expected under the general supervision agreement.

This entire consideration of the question of professional charges would seem to indicate:

1. That the safest and fairest method of charging for services is some form of cost-plus charge, which will render to the owner an accurate accounting of the architect's entire cost, together with a fixed profit and an agreement for payment on a monthly basis. This method makes it possible to order as little or as much work as the client may wish done. It relieves the architect of the necessity of financing work which is in his office and it makes certain for him a reasonable profit on all work which he does.

2. Particular stress is laid on the point of arranging for monthly payment of cost and profit—a requirement against which no sensible client can hold objections.

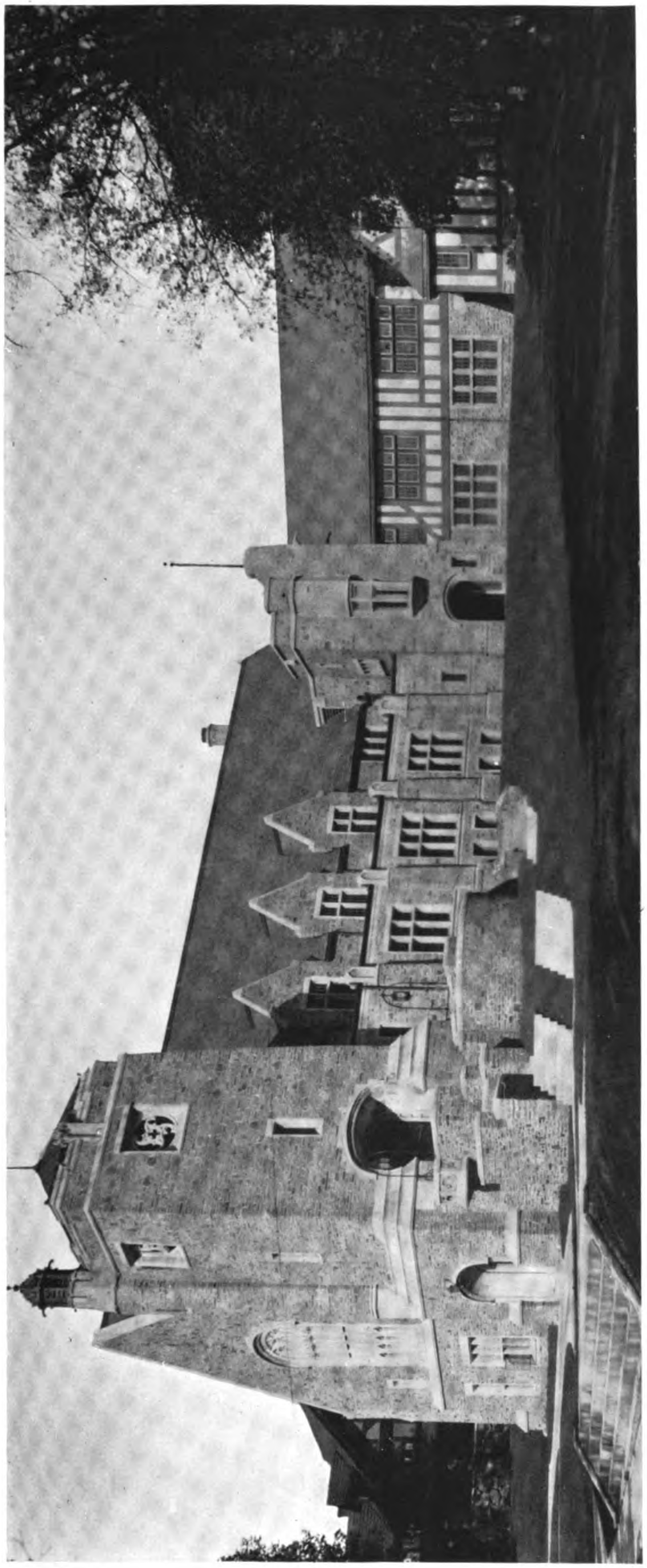
3. The importance of a proper accounting system in the architect's office, not only for the protection of the client under a cost-plus fee arrangement but for the architect's own protection in estimating his costs for the purpose of fixing a lump sum or percentage fee.

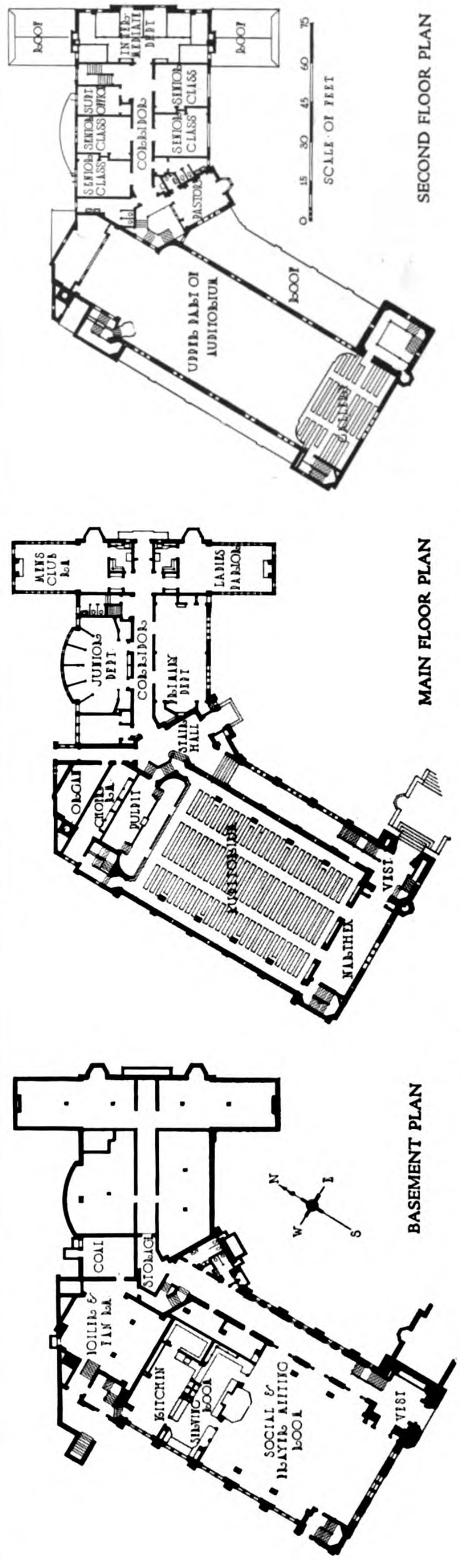
4. That it is entirely ethical and just for an architect's compensation to be dependent upon his skill and experience, and that it is impossible to impose standard charges for service regardless of its character.

5. That the requirement of the Canon of Ethics of the A. I. A. decrying deliberate price-cutting in professional fees shall be upheld by every architect as sound from both ethical and business viewpoints.

6. That every architectural office should know its own cost of doing business and its own requirements of profit, so that in quoting the cost of service to prospective clients each office may stand upon its own merits and ability. In this manner any variation in the amount of professional fees quoted on a given structure shall not be interpreted as a breach of professional etiquette, even though it may be known that the client has asked another architect for similar information.

We realize that the last clause of these conclusions may be subjected to much criticism. It is certain, however, that these statements constitute a brief summary of the actual methods used in many of the leading offices of this country; that in no wise does this depart from the methods used in other professions, and that for years the public has been demanding and getting architectural service on this basis. In the selection of architects the building public is becoming more and more discriminating as the ratio of complexity increases in all building operations. The architect who can render better service will receive larger fees. As the young architect develops his ability and experience, he will demand higher rates from his clients. Whether this variation be made by the calculation of percentages or by the establishment of a fixed fee or a salary, the amount which the client will pay primarily depends upon the service which he expects to get.





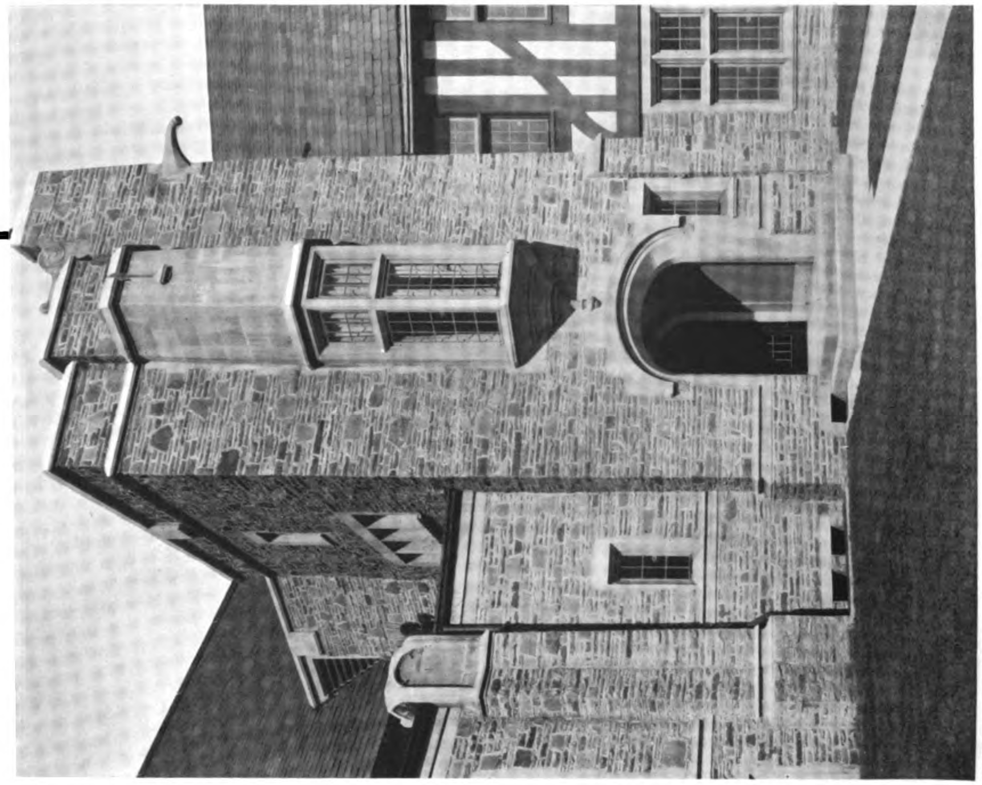
SECOND FLOOR PLAN

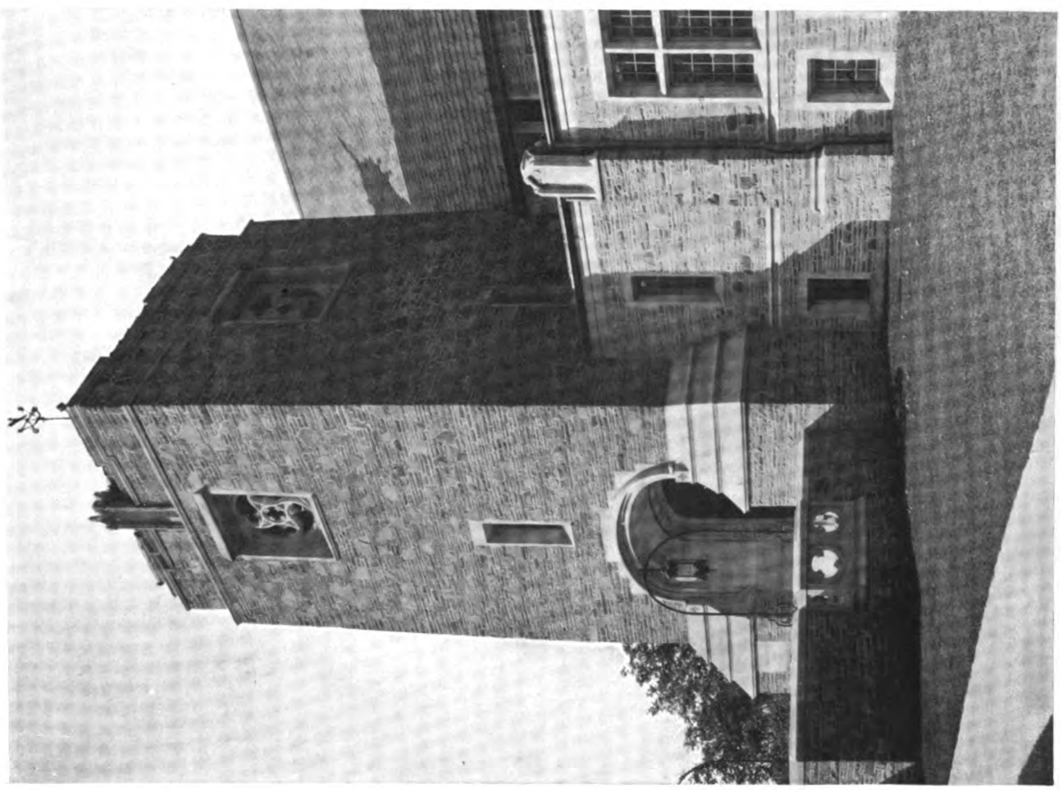
MAIN FLOOR PLAN

BASEMENT PLAN

GRACE METHODIST EPISCOPAL CHURCH, DAYTON, OHIO

SCHENCK & WILLIAMS, ARCHITECTS





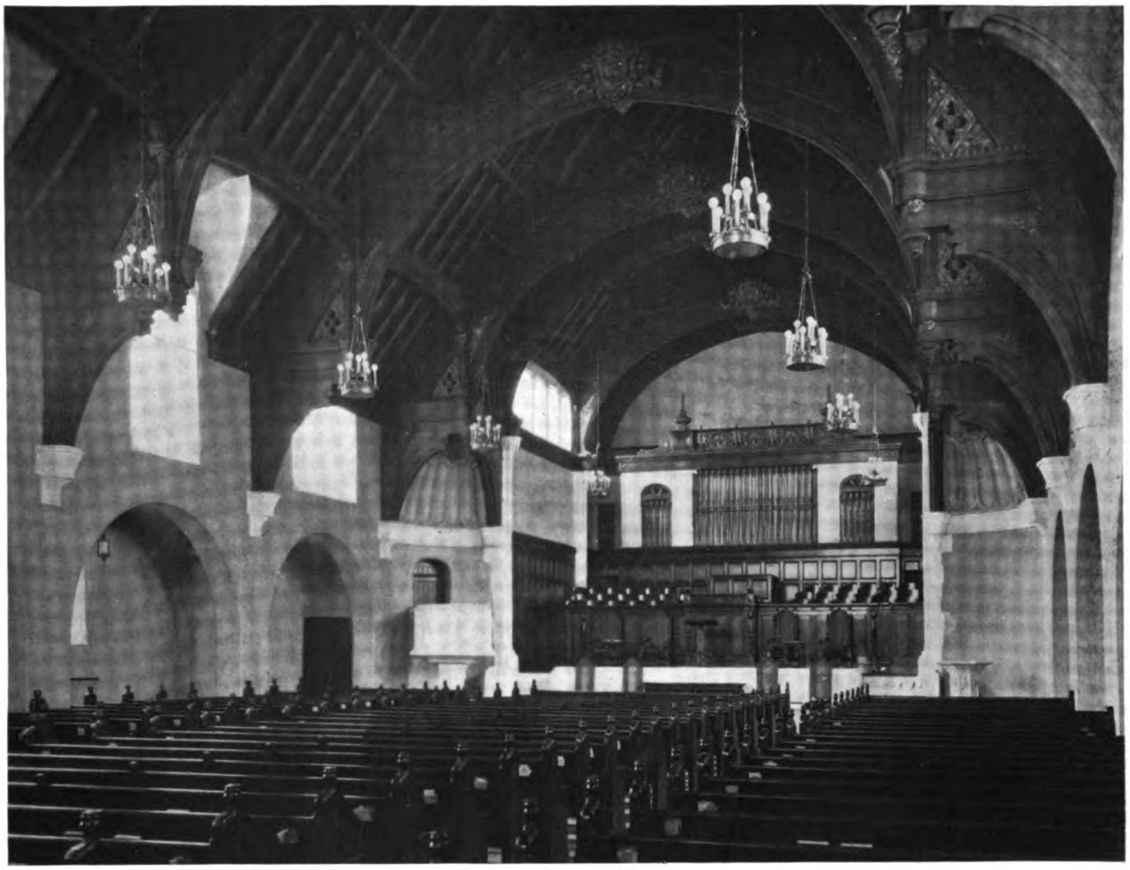
MAIN TOWER AND SUNDAY SCHOOL TOWER
GRACE METHODIST EPISCOPAL CHURCH, DAYTON, OHIO
SCHENCK & WILLIAMS, ARCHITECTS

SUNDAY SCHOOL WING FROM THE SOUTH

SUNDAY SCHOOL WING FROM THE NORTHEAST

GRACE METHODIST EPISCOPAL CHURCH, DAYTON, OHIO

SCHENCK & WILLIAMS, ARCHITECTS



VIEW OF CHANCEL

SUNDAY SCHOOL ROOM AND CLOISTER

GRACE METHODIST EPISCOPAL CHURCH, DAYTON, OHIO

SCHENCK & WILLIAMS, ARCHITECTS

The Grace Methodist Episcopal Church, Dayton, Ohio

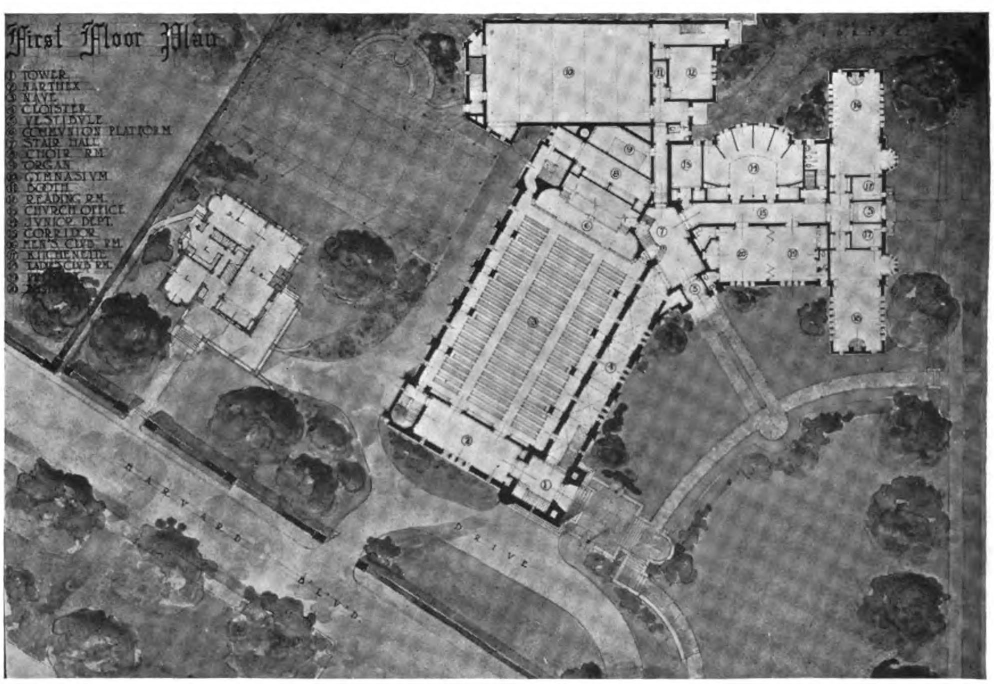
SCHENCK & WILLIAMS, ARCHITECTS

THE Grace Methodist Episcopal Church at Dayton, Ohio, is an interesting example of the modern church group comprising in addition to the usual facilities for devotion, accommodations for community and social activities. The plot plan shown here indicates the varied functions of the group and the manner in which the separate portions are accommodated to an irregular site.

The site itself undoubtedly suggested the scheme of the plan for owing to its unusual size and topography it made possible a building of considerable area with entrances to its different departments placed upon different levels. This segregation of activities has been skilfully worked out, the result being that those portions of the building devoted to purposes which are chiefly social are entered from the large doorway beneath the tower, at the street or sidewalk level while the entrance to the church proper is upon a higher level and reached by a walk with several runs of steps, while the Sunday school rooms with their auxiliary departments are placed in a wing which extends to one side of the main structure, the entire group forming a mass of buildings which possesses a high degree of architectural and ecclesiastical character. The gymnasium shown on the plot plan has not yet been built. The material used for the exterior walls is stone of a thin stratified shale formation obtained from an old quarry near Susquehanna, Pa., while the trimming is of Indiana limestone finely tooled. For the Sunday school wing these materials are used for the walls of the lower story, half timber being used above, and the roofs of the entire group are covered with slate of variegated color and graded sizes which harmonizes well with the stone of the walls.

The floor plans show that unusually complete equipment has been provided for a church of many activities. The various departments have been so planned that each is complete within itself without interfering in any way with the others. The nave or main auditorium is arranged to seat 1,000 people and the timbers of its open roof are carved and polychromed, while the aisles are floored with specially made tile. The pulpit may be seen from every seat in the church and the choir and organ have been placed in what is the position usually favored in evangelical churches — behind and above the pulpit or reading desk.

In the wing devoted to the use of the Sunday school there is every provision made for success in teaching. Different grades are provided with their own rooms, that for the intermediate department being subdivided into smaller rooms for individual classes. An office for the superintendent is provided, and the Sunday school wing has its own entrance from the street at the side of the property.



Plot Plan Showing Location of Various Elements in the Church Group to Fit Topographical and Street Conditions

EDITORIAL COMMENT

DEFINITE ENCOURAGEMENT OF THE CRAFTS

A MONTH ago we commented upon the very evident shortage of skilled mechanics in many of the building crafts, despite the unemployment conditions which are so generally existent. It is a condition that holds no great promise for lower building costs and, what is of equal moment, it points to the further deterioration of craftsmanship with its depressing effect upon architecture. This condition has come about on the one hand because of the selfish class interests of the labor unions in restricting apprentices and membership in the union and making the latter requirement obligatory for the man who wants work in the trades, and on the other hand by modern business demands that make it unprofitable for the master of a shop to give the time to train a young man to a trade.

Recently *The New York Times*, in an editorial on the industrial arts, noted that the shortage of mechanics is not a difficulty in the building trades alone; it exists in practically every industry where success depends upon good design and expert craftsmanship. It quotes a recent survey of the silver industry, made under the auspices of the National Society for Vocational Education, which revealed the fact that practically no silversmiths are being trained in this country except as they may pick up knowledge through experience in the shops. As one manufacturer expressed it, "Unless some way is found to train expert workers in silver, the industry will die out in this country within ten years."

Those attempts at education we have made are confined almost entirely to design schools; even they are of no high order and their graduates exert but little effect in the various industries. In this whole country there are but two important industrial art schools and no museum lending objects of merit to industrial studios that are removed from metropolitan centers.

How can we advance the arts in this country with such meager prospects for a capable body of craftsmen? It is useless to train designers if we lack craftsmen with the ability to execute designs. Contrast this condition with what we find in Europe. Before the war France had 32 industrial art schools, fed from over 200 schools of design; in England there were 37 industrial art schools, and the South Kensington Museum supplied traveling exhibits to some 350 art schools and to country museums, while Germany was credited with 59 industrial art schools, all comparatively new and well equipped. In our larger cities it is the men who come here with European training who are doing the craft work that architects demand and must have if their designs are to be carried out as they conceive them. Are many men of American training known to be expert ironworkers, decorative painters, stone carvers, workers in ceramics or any of the other countless crafts that contribute to the glory of architecture? Furthermore, ask the architects in the larger cities what their experience with the crafts is. They find some European lately come to the United States with his traditions for good workmanship; he comes to the office and eagerly enters into the work in hand and produces something that gives joy and encouragement to the architect. The second commission produces results perhaps as good as the first, but on the third occasion the craftsman is not seen; he is represented by a salesman; he has built up a shop; union principles have been forced on him; he has to struggle against dollars and cents — the product is the inevitable result, and the architect must look for a new and unsophisticated craftsman.

We are, therefore, not only *not* creating or training craftsmen, but because of short sighted and erroneous principles that hold sway in American industry we are actually destroying those who come to us from abroad. Who or what is going to stop this? Business will not bother with the problem until it becomes acute and it is forced to do so in the interests of commercial prosperity. In business the problems of the next generation are of little concern to the present. Architects cannot very well establish training schools in the many centers that need them. It is a matter of public responsibility and facilities should be provided for the training of mechanics and artisans in state or municipal schools, the cost of instruction to be largely met by tuition fees, just as we now furnish academic and technical education in our state universities. Architects can do their part in advocating such measures; they can point out to both commercial and educational sources the great necessity for practical training of this kind, and they can give encouragement and patronage to such craftsmen as now exist. A recent step that has been taken to find out some of the details of the problem is a series of conferences held by the Committee on Education of the Chamber of Commerce of the State of New York with representatives of various industries in which art is a factor. Such movements should have the approval and support of architects, and we suggest that all architects interested place at the disposal of the Committee their experiences and recommendations with regard to the crafts. The Committee's address is 65 Liberty street, New York.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

It will be the purpose in this Department to illustrate, as far as practicable, modern interiors furnished with articles obtainable in the markets, and the Editors will be pleased to advise interested readers the sources from which such material may be obtained

DETAIL OF DOORWAY IN LIVING ROOM, HOUSE OF CHARLES H. SABIN, LONG ISLAND, N. Y.

CROSS & CROSS, ARCHITECTS

An interior Georgian doorway illustrating breadth and dignity of the style. Typical enriched classic mouldings, wall panels formed with applied mouldings; woodwork painted greenish gray and gold. Ceiling height, 17 feet

English Georgian Decorative Precedent

I. THE EARLY GEORGIAN DOMESTIC INTERIOR, 1720–1760

By STANWOOD MACOMBER

TO the student of domestic interior architecture the period of the English renaissance presents an era of the greatest richness and variety that has undeniably more immediate application to present day conditions and tastes than any other of the great historic styles. This period produced some great architects, some of whom displayed marked originality, and with the varied continental influences that came through the affiliations of royal and political life, the course of development does not run so smoothly as in France or Italy. Personalities and fashion exerted first a strong Italian tendency, then a Dutch, later French and finally that culminating in a full classic revival based on the arts of Italy. All of these phases of style were tempered by sober English tradition and the transition from one to another was so gradual that analysis of the period requires discrimination of the nicest order.

Georgian is a term that has been loosely applied to much work of the English renaissance, although in the interests of accuracy a good deal of so-called Georgian work is definitely connected with an earlier regime. In architecture there are clearly defined characteristics that limit the period; in decoration and furniture, however, the first half of the eighteenth century was largely a transitional period in which nothing distinctly original was created; the work of the time reflects rather the refinement and elaboration of forms developed previously. The great houses of the nobility, it is true, show a development in decoration paralleling the "grand manner" of Louis XIV and based on the palaces of Italy, but this was purely a result of fashion which was not typical of England generally and was recognized even in its own day as a hollow striving for show and pomp that was fundamentally foreign to the English temperament and taste.

The "grand tour" was the necessary finish to the education of the English gentleman of the period. Patronage of the arts and the formation of collections were worthy pursuits in those days of peace and this spirit provided the fertile soil for a wonderful architectural development. Probably at no other time in the history of the world was a wider knowledge of architecture possessed by the educated layman. Palladio was accepted as the fount of all knowledge and his principles of architecture were held in such high favor by both architects and the cultivated amateurs that even the work of the

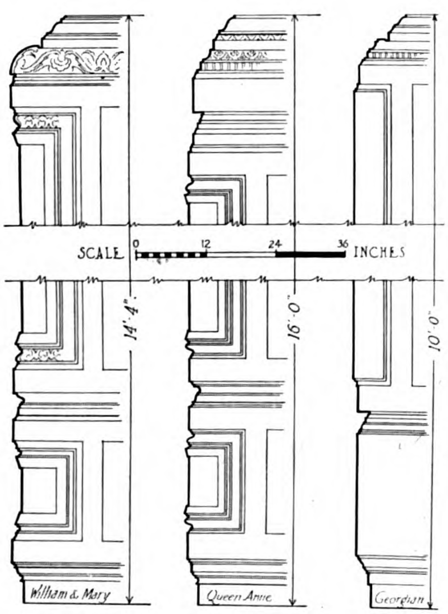
Interior of Porch of House on Long Island, N. Y.
Howard Major, Architect
A transitional room illustrating relation between Italian and Georgian styles

A Mid-17th Century English Mantel Showing Influence of Inigo Jones

great Wren was depreciated because it did not conform to the Palladian doctrine.

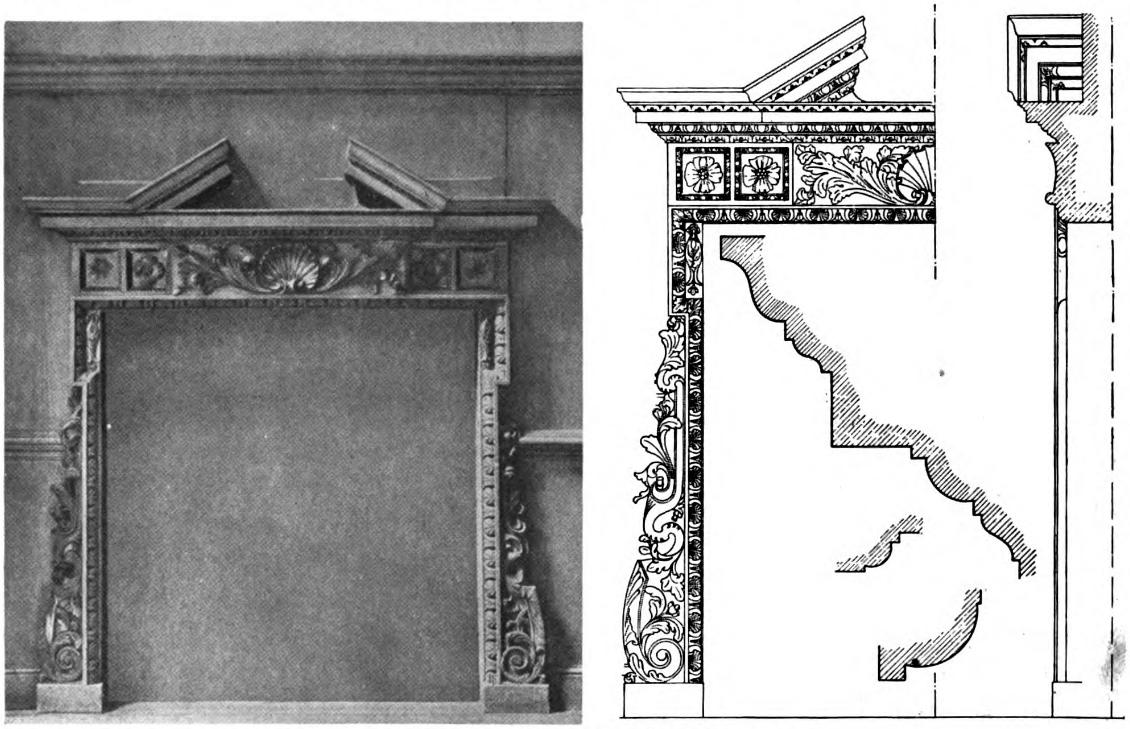
Wide publication of drawings and photographs of the great houses of this period has given rise to the opinion that they reflect the prevailing early Georgian taste. They really constitute but a phase, and the homes of the simpler people contemporary with them afford a truer picture of the times and likewise a precedent for modern architecture and decoration of particular merit. We should consider rather the simpler form of the Georgian town or country house and particularly the manor house or the home of the country squire, the prosperous commoner or the minor nobility. Houses of these types are full of rich suggestion. It would be difficult to find in any country a type of home more livable and beautiful than the plain, red brick house with wooden cornice and sash windows which was built in England during the entire eighteenth century. Probably it was not the work of an architect at all, but was designed and built by some country builder who had inherited his craft from his father before him. Much of the interesting work in England is not from the designs of great architects, but is the unpretending effort of the architect unknown. These smaller houses continued to express the fondness of the preceding generation for the Dutch influence, as far as it affected the arrangement of rooms, their relative sizes and grouping of windows. In the detail and design of the interiors, however, Palladian principles were followed and it is this peculiar Anglicizing of the Italian style that produced the distinctive Georgian work, the charm of which remains as great today as when first achieved.

The outstanding characteristic of the Georgian interior, and that of earliei styles as well, is wood paneling. This was developed from a practical



Details of English Paneling, Transitional and Early Georgian Periods

Modern Wood Carved Mantel in Georgian Style
Charles I. Berg, Architect



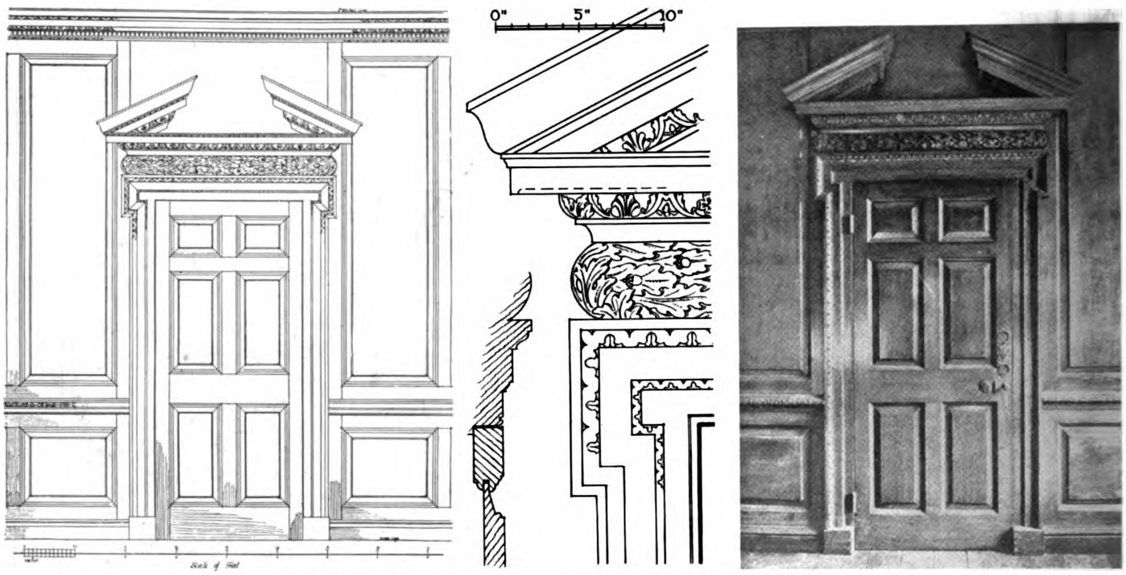
Details of Early Georgian Mantel Designed by Colin Campbell
Scale of reproduction, ¾ in. = 1 ft. *From the "Practical Exemplar"*

necessity which required the lining of walls to retain heat, and there is no other detail through which the changes from one style to another can be better traced. Large wall panels had become popular during the time of William and Mary and Queen Anne and in their detail they showed strong Dutch influence. In the Georgian period there is a distinct reversion to classic detail. The fields of the panels remain large and while their edges were beveled and the centers raised, as in earlier work, the panels themselves were set back of the face of the framing and the panel mouldings made more delicate and placed flush with the rails. The mouldings followed classic contours and when ornamented such classic motifs as the egg and dart and the Greek fret were used. The principles of the classic orders were followed in proportioning the vertical divisions of the wall; thus the dado corresponded to the pedestal of the column, the long vertical panel to the shaft and the frieze and cornice to the capital.

The interiors just preceding this period, which were largely influenced by Wren, showed frequent use of pilasters of the Corinthian order. These were quite generally omitted in the Georgian rooms, however, and a development of the paneling was adopted in their stead. Where pilasters would have been used in the earlier work the Georgian architects used a narrow panel with a very simple moulding and frequently this panel was not beveled and raised as the others. The wall spaces between these pilaster panels were then framed in large panels divided into one or more divisions in proportion with the wall spaces and occasionally the mouldings framing them were raised and decorated to give the necessary accent.

The typical Georgian dado was not broken into panels to conform with the divisions of the upper wall but was made up of plain woodwork with a simple moulded base and cap. The cornice of the room was generally of wood and followed classic proportions and detail, a typical Georgian feature being the cushion frieze. The moulded members were usually enriched with running ornament, and carved modillions were commonly used. A full entablature was used in the larger rooms, but in more instances the freize and architrave were omitted.

The fireplace continued, as in former styles, to be the dominating feature of the interior. In the early Georgian work it is nearly always worked out with an over-mantel treatment, and much beauty of proportion and dignity in carving are evident in the wide variety of types developed. The fireplace facing and the mantel itself were frequently of marble and toward the middle of the century often showed a decorative combination of marbles of different colors. The most popular form for either wood or marble was composed of a moulded architrave around the fireplace opening, surmounted by a carved frieze and cornice supported by elaborately carved trusses or sculptured terminal figures. A rectangular panel with sculptured bas-relief was sometimes introduced in the center of the frieze with swags of oak leaves or drapery on either side. The over-mantel was generally a carved decorative framing for a portrait or other painting, the framing



Details of Georgian Doorway from Room in Bourdon House, London, Shown Below

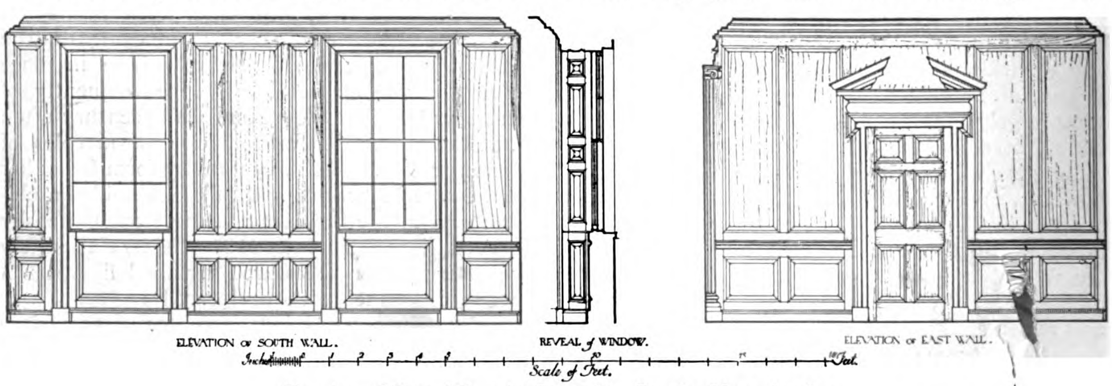
at the sides generally taking the form of a carved ramp or volute and the top was completed with an ornamented frieze and a broken or complete pediment. Occasionally these mantels were combined with pilasters to form a large motif, but in most cases a simpler character prevailed and they were made up of two elements, the upper and lower parts, which were related by similar ornament and uniform scale, but on the whole the early Georgian chimney-piece gives the effect of a super-imposed over-mantel of a decorative character without any structural significance.

The mantelpiece as developed in England differs widely from that of any other country and its form through the entire renaissance period is due solely to Inigo Jones, the father of the Italian phase of architecture in England. As shown by the illustration on page 80, which is of the period of Jones though not necessarily known to be his design, there were bequeathed to the architects of a hundred years later dignity and beauty of proportion that would be difficult to exceed.

The doorways of the Georgian room likewise received attention although in the main their treatment was a simple one. The typical doorway shows a moulded architrave surmounted by a frieze and pediment. The frieze was frequently round and decorated with the classic oak leaf and band ornament and the pediment shows plainly classic influence. The doors themselves were of broad proportions and framed with six or eight panels, beveled and raised, and outlined with simple flush mouldings. Door heights were as a rule kept comparatively low.

Windows were large in area and the sash divided into small panes with heavy muntins; the tops of the windows were kept well up toward the ceiling and they were generally placed toward the outer face of the wall following Italian custom and permitting a deep reveal on the interior which was paneled.

The period immediately preceding the Georgian was characterized by the use of oak, and with the enriched carved mouldings to give decorative interest the wood was frequently left in a natural state without finish of any kind. With the advent of the large panels and simple mouldings of the



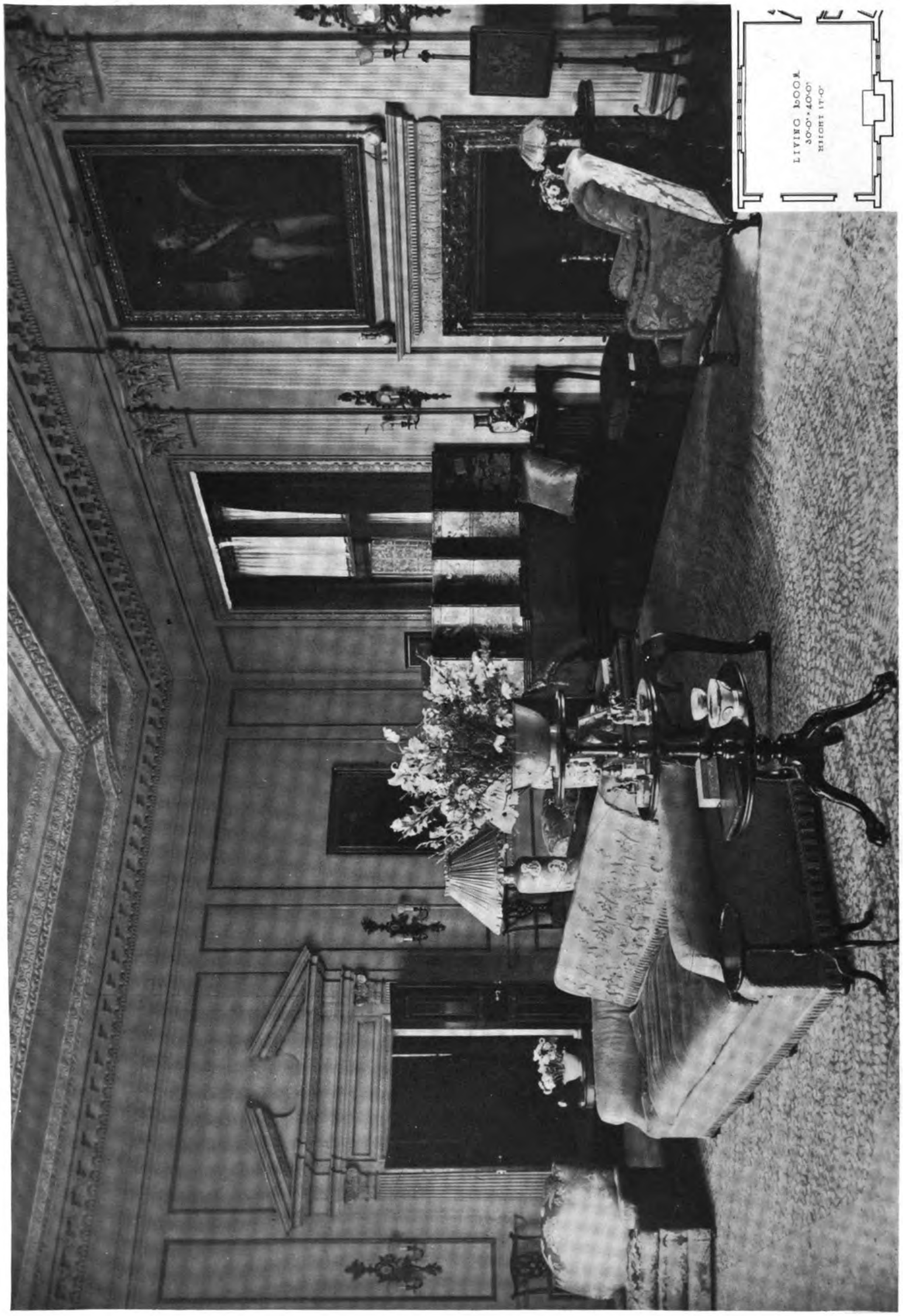
Elevations of Typical Georgian Room from Bourdon House, London

Reproduced from "Practical Exemplar"

DINING ROOM, HOUSE OF CHARLES M. MacNEILL, ESQ., NEW YORK

FREDERICK J. STERNER, ARCHITECT

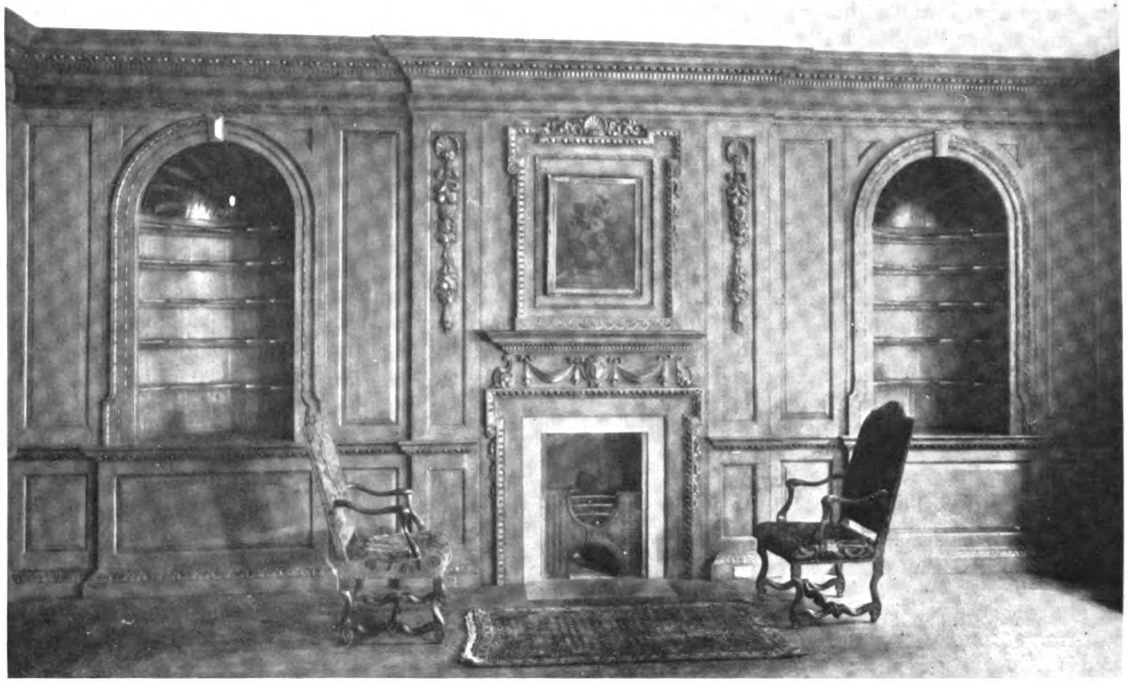
An early Georgian room with original paneling of 1710 and mantel and over-mantel painting from an old London house. Wood is pine in natural finish and furniture early Georgian with Queen Anne influence



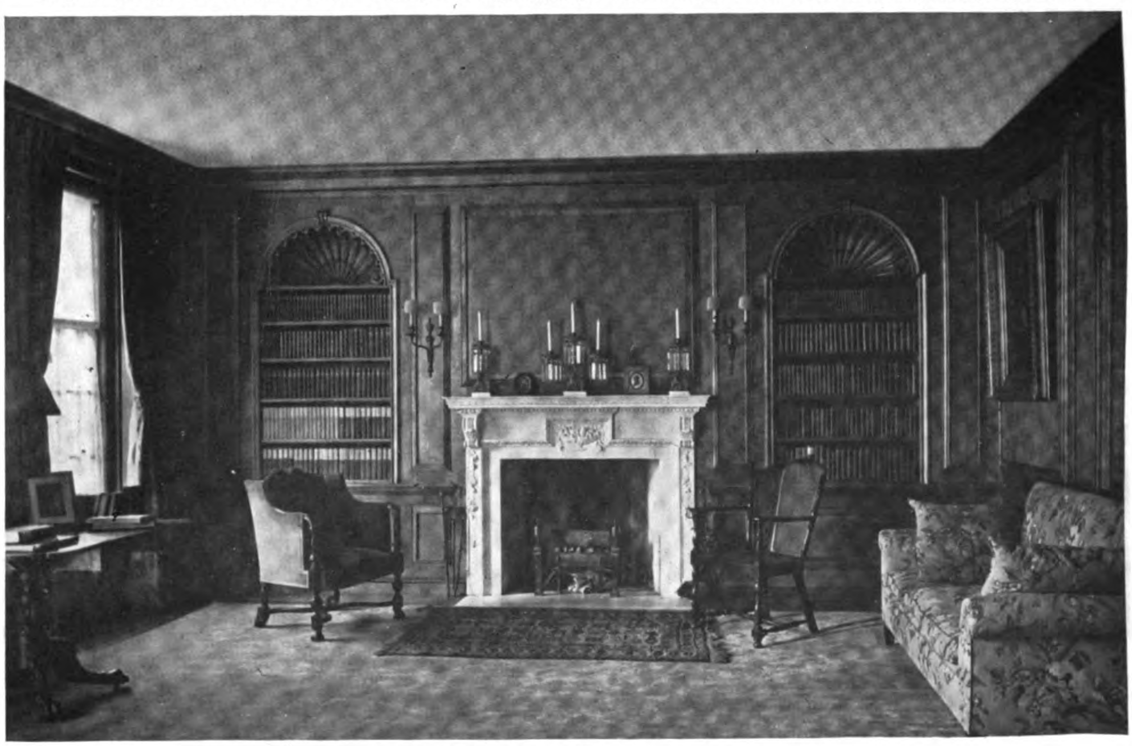
LIVING ROOM, HOUSE OF CHARLES H. SABIN, ESQ., LONG ISLAND, NEW YORK

CROSS & CROSS, ARCHITECTS

An early Georgian type of room with effect of dignity and spaciousness. Walls painted in greenish gray and hangings of reddish tone. Furniture of eighteenth century English type from Queen Anne walnut to Hepplewhite satinwood



SITTING ROOM, COLONY CLUB, NEW YORK
DELANO & ALDRICH, ARCHITECTS
Original Georgian room of about 1750. Walls painted light apple green, ornament gilt. Dimensions, 18 ft. by 22 ft., height 10 ft.



LIVING ROOM IN HOUSE AT WATERBURY, CONN.
MURPHY & DANA, ARCHITECTS
A modern version of Georgian with walls paneled in birch and stained only enough to equalize natural variations in tone. Dimensions of the room are 30 ft. by 18 ft. and 9 ft. 6 ins. high

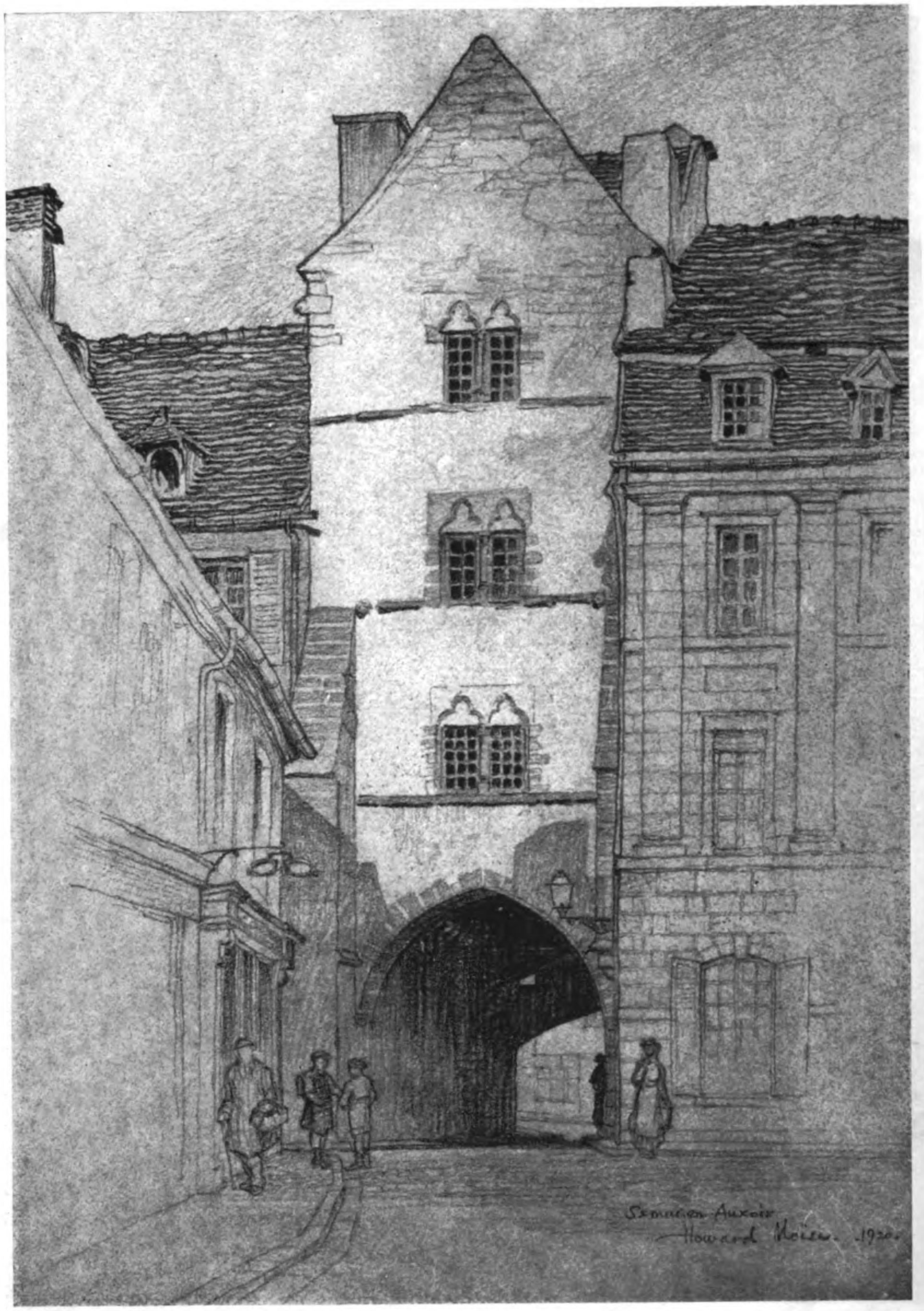
Georgian period, pine and fir came to be the popular woods and the walls were now painted. White paint was used in the earlier work probably to give the appearance of the plaster and stone halls of Italy, but it was far from universal; various shades of green largely prevailed and blue and brown were also used to some extent and the classic detail on the mouldings was frequently enriched with gilt. The early Georgian rooms were full and rich in color which gave them a much more comfortable appearance than some of our present day rooms in their timid white and cream coloring.

The dignity that was imparted to these rooms by classic paneling and architectural detail was further enhanced by the decorative treatment of ceilings. They were of plaster and carried out the traditions for craftsmanship that had been so evident in English plaster work for centuries. From the standpoint of composition they were made up of simple, large scaled, geometrical divisions with the central motif elliptical or circular. Ornament was confined to the ribs of the design and followed the crisp, deeply cut, conventionalized, natural ornament developed by Wren. The transition from wall to ceiling was occasionally made with a plaster cove.

The early Georgian designers and craftsmen could not forget entirely the character of the earlier Queen Anne rooms and we frequently see cropping out motifs such as a carved pendant or swag after the manner of Grinling Gibbons or a gracefully carved moulding of William and Mary times. The pine with which the Georgian rooms were largely built offered a tempting medium for carving and the comparatively small amounts that appear now and then are a decided asset in softening the tendency to rigid classicism. The spandrels over a curved doorhead or over a niche cupboard were often ornamented with this type of decoration, the detail of which was composed of leaf forms and scrolls recalling the ornament of the restoration.

These, then, are the chief characteristics of the style, and their handling by modern architects produces rooms of such varying effects as the formal drawing room in the Sabin residence and the charming pine dining room in the MacNeill residence which are shown in the accompanying plates. Present day customs of building and the individuality of designers are effecting changes which though they depart from the original in the letter, certainly sacrifice none of its spirit. Thus it is not always feasible because of limited appropriations or difficulty in obtaining seasoned wood to have walls entirely of wood paneling; a similar decorative effect can be secured by simple wood mouldings applied in panel form to plaster surfaces. If the general scale is right, proportions similar to the originals and care exercised in the sizes and detail of mouldings, the spirit of the style will be preserved.

Dining Room, House at Mt. Kisco, N. Y.
Trowbridge & Livingston, Architects
A modern room essentially early Georgian in character but with details inspired from later 18th century work. Dimensions, 22 ft. by 36 ft.



OLD GATE TOWER, SEMUR-EN-AUXOIS, BURGUNDY
FROM THE PENCIL DRAWING BY HOWARD MOÏSE

The
ARCHITECTURAL
FORUM

VOLUME XXXVI MARCH 1922 NUMBER 3

Whiteley Village, at Burhill, Surrey

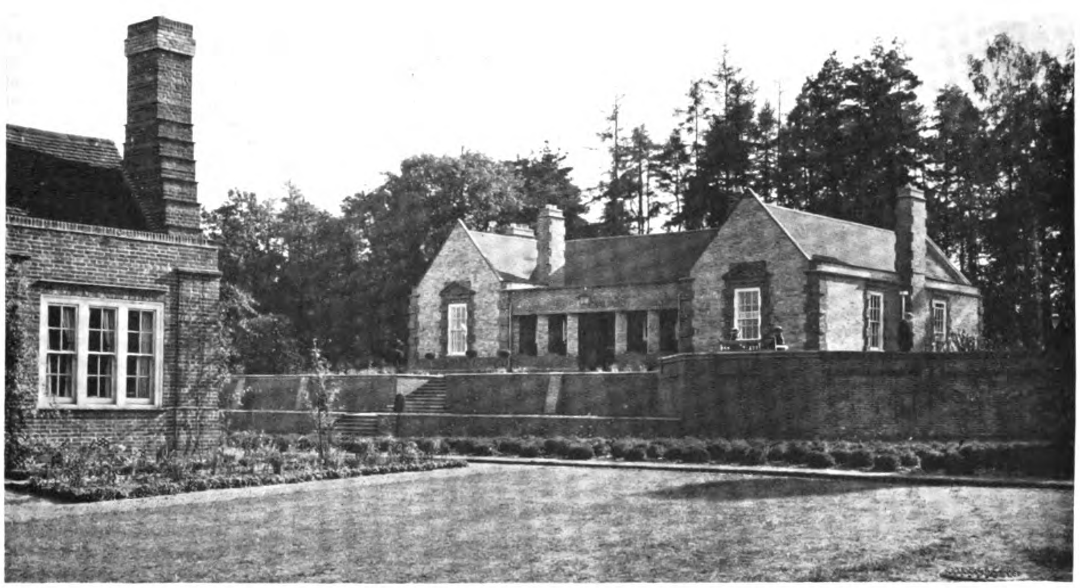
AN EXAMPLE OF MODERN ENGLISH PHILANTHROPIC HOUSING

By R. RANDAL PHILLIPS

PHILANTHROPY takes various forms, and some of these are open to criticism, inasmuch as in practice they defeat the very ends for which, in theory, they were designed. But nobody could say that the philanthropy embodied in Whiteley Park and Village is not excellent in every way. The original conception was indeed fine and it has been worthily carried out.

William Whiteley was the pioneer in England of the "big store" idea which was originated in America, and the fact that he became known to everybody as the "Universal Provider" is testimony enough to his commercial achievement. His own success sprang from thrift, and he had, therefore, the greater esteem for those who had been careful with their money, so that old age should not find them derelict and empty handed. Whiteley's plan, which has been carried out, was to provide a haven in which a goodly number of old folk could spend the evening of life in tranquil and happy surroundings.

First in the practical realization of the project was the selection of a site. Considerable difficulty

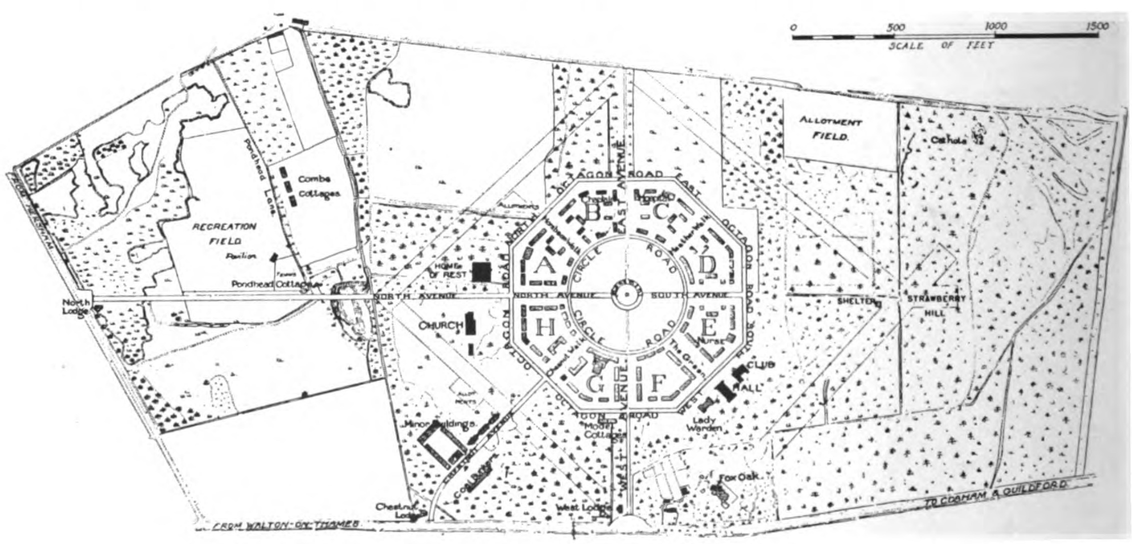


View of Club House from the Green on the Southwest Side of Octagon
Sir Aston Webb, P. R. A., Architect

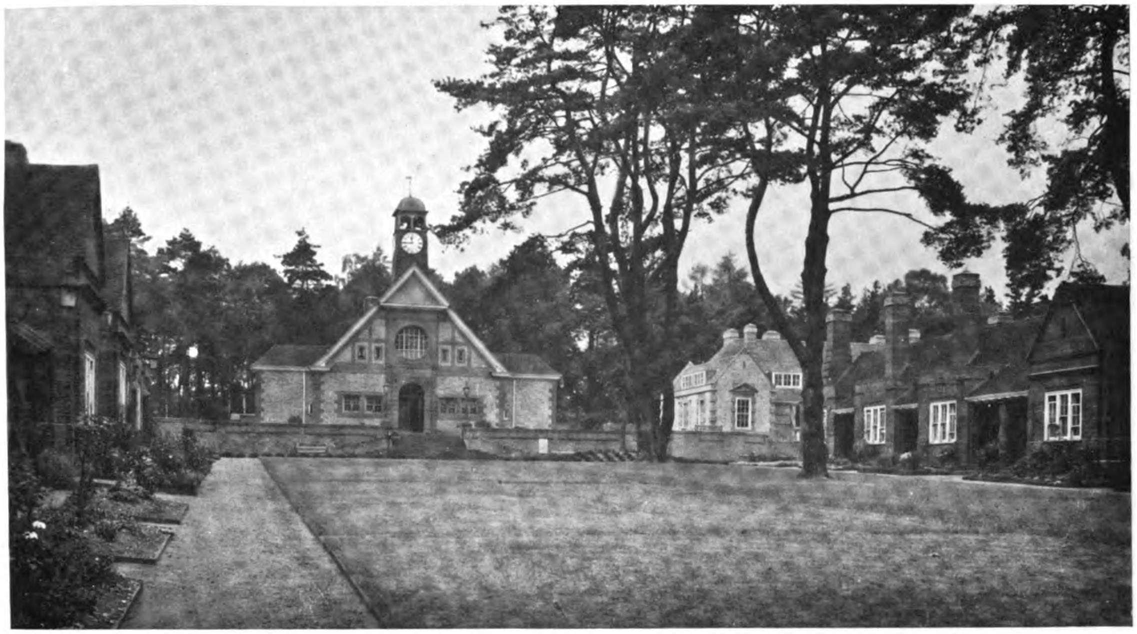
Entrance to Houses in Circle Road
Mervyn E. Macartney, Architect

was, of course, experienced in discovering just the spot which would meet the case, these difficulties arising from the fact that almost every good location near London had long since been appropriated. At length, however, a piece of ground, comprising 225 acres, was found at Burhill, which is a couple of miles from Walton-on-Thames and about 17 miles from Charing Cross. It is most beautifully wooded with pine, chestnut, oak and larch. There was also a considerable growth of rhododendrons, chiefly in connection with an existing large house on the estate, which was subsequently allotted to the resident agent. The site having been settled upon and acquired, the next matter was its layout. The trustees decided to invite six leading architects to submit designs for this, and in May, 1912, the design of Frank Atkinson was selected. This has as its principal feature a circle road within an octagon road, with blocks of small houses on the ground between these two, the area comprised within the octagon being 23 acres. The estate is roughly a rectangle, and in its length is bisected by an avenue running north and south, and in its width by an avenue running east and west, the circular and octagon roads coming in the center. The making of these roads was, of course, the first work to be undertaken; it was carried out under the direction of Sir John Oakley. Meanwhile detailed consideration was given to the standard accommodation that should be provided.

At this juncture it is necessary to explain exactly who the homes are intended for. Both men and women, married and single, are qualified to reside in Whiteley Village, provided that the men have reached the age of 65 years and the women 60 years, and provided also that each one has an assured income of not less than 7s.6d. per week and not more than £60 a year, or, in the case of married couples, a joint income not exceeding £75. Each applicant must be of good character and sound mind, not affected by any contagious or infectious disease, and never having been



Plot Plan of Whiteley Village and Estate
R. Frank Atkinson, Architect for Layout



View of the Institute, Lady Warden's House and Houses Facing the Green
Sir Aston Webb, P.R.A., Architect

convicted of any criminal offense. From this it will be realized that William Whiteley's intention was not to provide homes for paupers, but for thrifty people, who had provided as much as they could against the time when they would have to relinquish active, everyday work, yet who had not sufficient to enable them to live on their own resources. Thus it happens that one finds people of all sorts at Whiteley Village—gentlefolk who have known more affluent days, unmarried nurses whose long and strenuous careers have not enabled them to save a great deal; working women and men from various grades of the professional and business classes. These all now find themselves comfortably housed and provided for. Installed at Whiteley Village, each has a home free of rent and taxes, a free supply of coal and electric light, free medical attention and a grant of 6s. 6d. per week. The occupants bring their own furniture with them, but this does not need to be much, for the trustees provide bedsteads, mattresses, bolsters and pillows, and curtains for the windows and bed recesses.

The village is entirely self-contained. It has its own shop, post office, institute, club room and church; a communal kitchen where a hot dinner can be obtained even today for 6d.; its own bus, which takes residents for 2d. to Weybridge and Walton Stations (both two miles away); its own hospital; a home of rest where folk can be looked after when they are too old to look after themselves, and a guest house where relations and other visitors to the old people can stay, being there housed for a very nominal sum. In the institute, concerts and cinema performances are given on weekdays, while on Sundays the building is used as a meeting place for those who do not attend the Anglican church. There is a lending library for the villagers, and the club house has a billiard room which can easily accommodate two tables, as well as reading rooms provided with newspapers and magazines. The grounds round

Assembly Room of the Institute

The Home of Rest, Facing North Avenue
Sir Aston Webb, P. R. A., Architect

Frank Atkinson and Walter Cave. To each was allocated a certain portion, and in order that the effect of the entire group of buildings might be harmonious, the architects were instructed to use the same materials, and to keep more or less to one general character of design. Before the writer visited the village he had been told that the desired result had not been completely attained, inasmuch as the work of one architect did not fit in well with that of his neighbor; but two visits of inspection have removed this impression from his mind. It is true that all the work is not of equal merit, certain of the architects having been more successful than others, but the very disposition of the buildings within the octagon, set amidst the fine old trees, disarms the criticism that the buildings do not harmonize well—for the reason that from no one point can they be seen in their entirety. Only a section can be seen at a time, and the photographs here reproduced will serve to show how pleasing in general the houses are. They are all of brick with tiled roofs, and so soundly built in every part that they give a feeling of stability. All too often houses are spoilt by restrictions in cost, and this results in poor building. In Whiteley Village the very opposite is true, for here the best materials have been used in the very best way. There is nothing shoddy

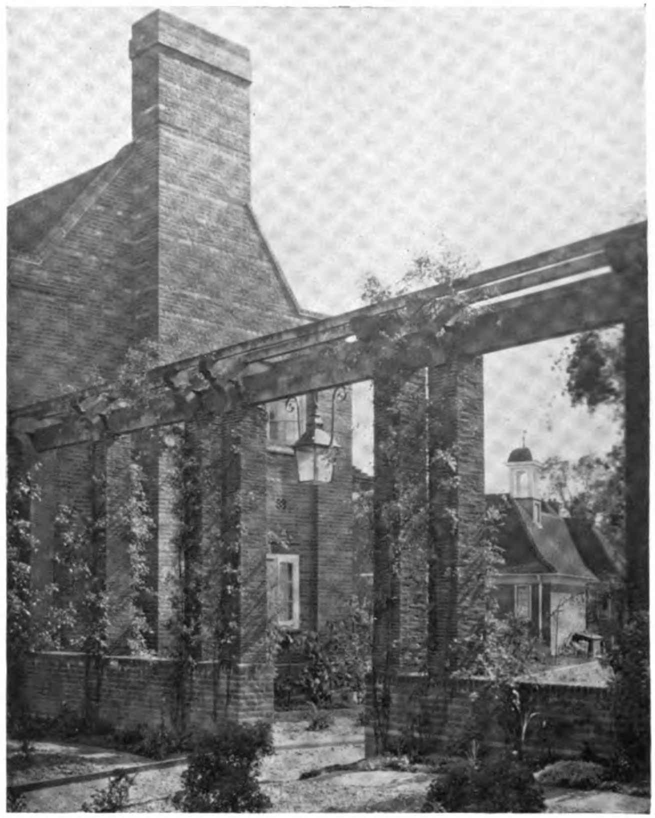
about have been very pleasantly laid out, great care having been taken to preserve the fine trees wherever possible. There are three bowling greens for the residents, and at one corner of the estate is a recreation ground for the members of the staff.

It now remains to say something about the buildings themselves and the architects who designed them. After the layout of the estate had been settled, the trustees invited seven architects to design the homes and auxiliary buildings: Sir Aston Webb, Sir Ernest George, Sir Reginald Blomfield, Ernest Newton, Mervyn Macartney,

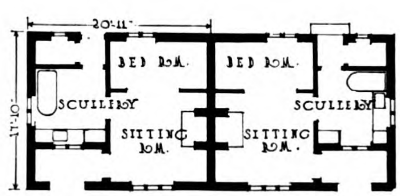
Houses at Corner of Hornbeam Walk and Circle Road
Ernest Newton, R. A., Architect

anywhere. The houses are meant to last, and they look like it.

The institute, with club house and lady warden's house to right and left, is set on a small plateau reached by a short flight of steps, and the approach to these main buildings is by way of a very charming green. Sir Aston Webb was the architect of this portion of the village, and also of the home of rest. The adjoining section of the octagon group to the south was apportioned to Mervyn Macartney, who has carried out the unpretentious and satisfying form of simple building which was common in England during the early part of the eighteenth century. The next section of the octagon, to the east, is by Sir Ernest George, who also designed the corresponding section on the north side. In between these two are the houses designed by Ernest Newton, typically his in their good proportion and pleasing, straightforward form. The flanking groups to North avenue are by Sir Reginald Blomfield. Then comes the section, including the village shop and post office, by Walter Cave, and lastly there is the western section of the octagon, by Frank Atkinson, who also designed the north and west lodges. From the experimental cottages built from Mr. Cave's design a standard plan unit was evolved. This has been followed throughout, though combined in various ways, both in one-floor and two-floor buildings, and enlarged in the case of the homes occupied by couples. The unit plan comprises an entrance porch, a living room with a bed recess (both lighted separately by windows), and scullery. The living room has a small range, and a dresser in an adjoining recess. The scullery opens directly out of this room. It is equipped with a sink, a gas cooker and a bath. Gas is supplied on the penny-in-the-slot system, and for the convenience of the old folk the bathtubs are placed on the floor, without legs. The sculleries have tiled floors, and the walls round about the sinks are white tiled; in fact, the interior equipment is excellent in every way. Each of the eight sections of the octagon has a staff cottage in telephonic communication with the administrative center, and each home is connected with the



Pergola between Houses on Circle Walk
Sir Aston Webb, P. R. A., Architect



Pair of Cottages off East Avenue and Typical Floor Plan
Ernest Newton, R. A., Architect

North Lodge and Gate at End of North Avenue
R. Frank Atkinson, Architect

staff cottage, so that in case of illness or accident, help can immediately be given.

The church, dedicated to St. Mark, is a very delightful example of Walter J. Tapper's work, full of true feeling, and imbued with a sense of repose and refinement. Set in the middle of the octagon is a monument to William Whiteley. It consists of a tall stone pedestal, surmounted by a female figure holding a beehive, typifying Industry, while on the face of the pedestal is a bas-relief plaque of the founder himself. Sir George Frampton was the sculptor, and Walter Cave designed the architectural setting. It is interesting to note that sealed up in a bottle beneath the foundation stone is a parchment plan of the octagon, with the general layout, and on this plan are written the names of the trustees, the architects and the contractors.

The laying of the foundation stone of the monument was the beginning of actual building operations on the estate and took place on July 21, 1914, but in less than a fortnight the great war had burst upon Europe, and, like many other projects, this was abandoned. It was not till October, 1917, that the first villager took up residence. Since then the work has been proceeding apace, so that at the present moment there are nearly 300 old folk in the village, the greater majority of them being single women. Eventually it is hoped to increase the accommodation to 500, but in view of the persisting high cost of labor and materials, no further building on an extensive scale is being undertaken It rarely happens that an institution of this size is carried out in such good taste with so homelike an atmosphere.

Houses on Circle Road at the Junction of the Green
R. Frank Atkinson, Architect

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

Straight Talks to Architects

VI. USING PRACTICAL INFORMATION TO STIMULATE YOUR PRACTICE

Editor's Note: How many of the building projects under consideration in your office today will develop into actual commissions—and when? This is the vital question facing every architect today.

Is there any logical way in which the architect can encourage immediate construction activity through his office? Read the letter in the first part of this article.

What practical information regarding general economic trends and conditions should the architect possess? Where can he get this information? How can he use it to better his service to clients?

ECONOMIC conditions have brought about in the average architectural office today an unusual business situation. Perhaps at no time in the history of the profession has there been so much contemplated work in view, but why are clients hesitating? The recent survey conducted by The Architectural Forum indicates the planning of approximately four billion dollars of construction work on which architects will earn commissions when clients decide to build.

The purpose of this article is primarily to give to the architect certain information regarding conditions in the building field which if presented to the client may assist materially in bringing about a decision to build in the near future. The possibilities opened up by this form of service on the part of the architect cannot be better illustrated than by presenting for consideration a typical letter which was recently received by The Forum from a New England architect. This letter is quoted in full:

"In talking over the building situation with prospective clients recently, I have had occasion to refer to the chart which you published on the 47th page of the January issue of The Forum, and have found it one of the most satisfactory reasons why building may be safely undertaken at the present time and one of the most convincing illustrations which can be given.

"Today in talking with a school committee I used the chart and they were so impressed that they wondered if they could not have a write-up for their local papers, with a chart of similar character but possibly somewhat simplified for easier understanding by the laity. I presume that you have no objection to such use of the information given in the chart and would appreciate your permission to use it in that manner."

The information referred to in this letter is the chart similar to that shown on the first page of the Service Section (page 59) in this issue. This chart, which is presented each month, conveys this information:

1. An index line showing the trend of building cost.
2. An index line showing the trend of general wholesale commodity prices.
3. A curve and area of stabilization which indicate the point in the general construction cost chart at which an owner may safely proceed with a building project without fear of too great a deflation of the reproduction value of his building.
4. Trend lines indicating the amount of money invested in new buildings each month and the volume of this construction.

It is not to be wondered at that many prospective building owners hesitate to proceed with actual construction, because of their lack of any definite measure as to future conditions. There exists also the general impression that financing for building construction is hard to obtain and that disturbed conditions of labor and material prices indicate difficulty and considerable added expense to the owner who undertakes building now. This state of mind is based naturally upon occurrences during the past few months, in the course of which the cost of building has declined materially, and the public press has many times indicated serious disturbances in the field of building labor.

What has actually taken place? There has been an unusually rapid deflation of building costs, dropping to a comparatively low level in a short period. It is but natural for the average prospective investor to believe that this momentum will carry prices much further down. While it is undeniably true that the average trend of building costs over the next few years will be downward, it is also true that this continued deflation will be in a much less marked degree and that this period will be one of ups and downs in the market resulting in only a slow, general, downward trend.

In regard to financing of new buildings, there has been considerable change in the last two or three months. There is more money available for building and permanent mortgages now than at any time during several past years. It is a fact that practically no useful building operation need be delayed because of the lack of mortgage money unless it is desired to operate on a slight margin of equity, beyond reasonable requirement from a business viewpoint. Finally, while we can look for no drastic reduction in material prices, it must be realized that there has been a marked increase in the hourly production of building trades labor. In the Service Section of this issue of THE FORUM we give some definite figures obtained directly from construction contracts, showing that while labor rates have not been materially reduced, the production of labor has most certainly increased. We have shown also another factor worthy of consideration, that is the saving of building cost due to brisk competition on the part of general and sub-contractors. As this point was completely covered in the February issue, it is not necessary to go into details here.

The important consideration is that the architect should realize the value of conveying such information to the prospective building owner who, as his client, is hesitating to proceed with a projected operation. In the letter just quoted we have shown what happens when such information is intelligently presented to a client, and we know from many office conferences with architects that this information is received with great interest. Not only has it definite value in helping the owner to make his decision, but it is also important in that the possession of such knowledge reflects credit upon the architect and increases the value of his services to the owner.

A natural question arises, "Why is the owner not in a position to get this information for himself?" Our only answer to this question is that there is no specific source of information covering all these points, and that the owner can reasonably expect the architect to be better informed on such subjects than he is himself. We do not doubt that there are literally thousands of projected building operations under discussion in architects' offices today which might be stimulated into actual construction activity if practical steps were taken by the architect to familiarize owners with actual conditions in the field and to take advantage of the present competitive state of the market to thoroughly comb out low sub-contract figures which would reduce the cost of the project to a point meeting the approval of the owner.

It may be interesting to note the general impression that building costs have increased slightly in the late winter months. This opinion has been based on the fact that there has been some increase in the cost of a few basic materials. It is not generally realized, however, that the various factors such as increased labor efficiency and contract competition have had a tendency to continue the decrease in cost of building. In fact, the trend line of building costs shown in THE FORUM'S graphic chart has shown a slight upturn until this issue, in which it has been corrected. This line has been based on the costs of materials and labor and it is only through an analysis of actual building costs and estimates taken from the offices of contractors and architects that we realize that building costs have not gone up again—even slightly. It will be noted, therefore, in the chart shown in the Service Section of this issue that we have weighted the line of building costs for the last three or four months by the factor of increased labor production and the saving due to active competition by subcontractors and general contractors. This line now represents very fairly the trend of general building costs.

In addition to presenting this graphic chart showing conditions in the building field, the entire Service Section of THE FORUM is given over to the presentation of facts and figures bearing on building costs, financing, labor conditions and other factors of direct interest to those who contemplate investment in buildings of any type. It will be noted that in the Service Section there is presented each month a digest of important information, conveyed through many publications, which has a direct bearing on the economic phases of the building situation. It must be realized that all this information is presented for the *active use of the architect* rather than to convince him regarding conditions in the field. Every item of information presented through the Service Section will be found of interest to some client, depending on the character of building in question. Certainly any architect who desires to do so might collect this information for himself, but it would be necessary for him to be in touch with many sources of such information and to read many publications each month to acquire the store of information presented through the Service Section.

* * *

The complexity of the modern building (as compared to those of several decades ago) has been a result of the increasing complexity of our commercial and social relationships. We must realize that the advance in the art and science of building construction is after all a result rather than a cause. It is the result of definite demands brought about by the concentration of commercial activities in certain districts of great cities and by the segregation of residential areas chosen as being more desirable than others. These are the basic factors in bringing about an increase of land values. In congested city districts land values have forced expansion upward, and with each added story of building height came new complications of construction, operation and maintenance. Standards of living have been raised and have been expressed in a demand for increased comfort and better conditions under which domestic and business life might function.

Thus we find an absolute demand that architects include in their professional equipment some knowledge of what might be termed the economics of their profession. It is already a recognized fact that modern architecture is complicated by engineering problems of various types, and it must be equally recognized that the practice of architecture today is to a certain extent complicated by the financial and business problems of the client. We may here emphasize the point that this condition applies to the entire architectural profession, not alone in America but in other countries as well.

In England, Sir Charles Ruthen, President of the Society of Architects, has within the past few weeks delivered an astounding address to the members of his organization. It will interest readers to consider briefly some of his remarks:

"The architectural profession as a body does not do well; it lives too much on its glorious past. I want to make it clear that we do not study our profession in the true professional spirit. We are divided against ourselves. We should first consider the state in which we live, then consider each other a little more. We are not sufficiently related to the commercial, competitive age in which we live, and we must bring ourselves into line with it.

"It is well known to a small group within the profession, that much of recent years has been heard of what are considered to be the proper modes and methods of providing efficient architectural education. The general public knows nothing of these momentous discussions, carried on energetically and almost continuously by a mere handful of professional enthusiasts, and has little knowledge of the real value of the architect and his craft to modern progress and civilization.

"Some, but comparatively few, understand the architect and value his work. Many others look upon the architect as a kind of necessary and expensive evil, mainly useful in connection with building matters, in avoiding difficulties in relation to regulations and by-laws, but generally a costly luxury and to be avoided whenever possible. The fact is very surely borne in upon one, that the great public has not the faintest idea of the important part played by the members of the architectural profession in the everyday life of the people, and one wonders whether the architect attaches to himself any share of the blame for this fatal ignorance, or whether he sometimes stops to think, and perchance realizes, that this lack of understanding is after all due in part, if not in a large measure, to a strange backwardness upon the part of the entire profession.

"Architecture is not an insignificant craft; it is not valuable or useful only to a few; it is necessary and essential to the full life of the nation, and should not be kept in the background. We may have come to the end of a long chapter in the history of architecture, or we may be reaching that point, but there are other important chapters to follow. We cannot, and should not, expect to live on the past reputation of our art. The greatness of its past should not prevent it from having a great present and a great future. Let us attempt to put behind us all preconceived ideas of what is proper or improper from the points of view of professional etiquette, and let us endeavor to apply to the necessities of the age in which we live a consideration of the value of the real science of building and architecture, so far as the latter term is applicable to the requirements of the people and the state, in regard to healthy and happy existence, and apart altogether from the art of the craft in the artistic or æsthetic sense.

"Architecture, it will be generally agreed, is a very wide and comprehensive term, and although there are thousands in this country who do not avail themselves of the services of the architect, it is yet passing strange that all the defects in all the buildings that are erected are ingeniously placed at the door of the architect.

"One would ask again, Does the architect occupy the place that is his due in the social structure of today, and has he taken his share in the burden of the present time? Is he in experience and knowledge, and by training, competent to undertake the duties he owes to the state? Is he serving his profession in the fullest sense, without giving his proper quota to the matters which are vital to the state?

"I want to be understood as discussing all these matters, not with the eminent and distinguished, but with the *struggling and trained efficient young practitioner*, the backbone of the profession!

"The fact is that the architect consistently ignores the science of his craft (and he is taught studiously so to do), and clings tenaciously to the art. He is supinely unconscious of the place of architecture in the structure of modern life."

These remarks, and others somewhat more caustic in nature dealing directly with conditions peculiar to practice in England, have resulted in focusing considerable interest on this subject. Naturally, many architects have constituted themselves critics of Sir Charles Ruthen, but it is interesting to note that many leading members of the profession have shown constructive interest and a recognition of the need for broader educational policies in the development of the coming generation of architects.

There can be no question that the complexity of problems which faces the architect today results from unusual development of the building industry, which next to agriculture is the greatest single industry in the United States. There is another fact which often escapes attention and which certainly is not recognized by the public—that is, the power of influence which is exerted by the architectural profession on standards of living. We find upon analysis that practically all improvements of living conditions are based on precedent established by the architect. An architectural competition in New York held 20 years ago resulted directly in the establishment of the so-called "new law" type of tenement house, a departure which was followed by builders and investors in this class of building and which resulted in great improvement of the living conditions of those having small incomes. Incidentally, another such competition has just been held in New York and it is safe to predict that a definite measure of improvement in low cost city housing will follow. Similarly, in the higher class residential field it is the architectural type of dwelling which is being more generally favored by the public than ever before, and the architect is really a pioneer in the use of modern utility and comfort-giving equipment for residential structures. It was an architect who introduced steel construction and made possible the towering commercial buildings of America,—in fact the influence of the architect cannot be overestimated, at least insofar as the standards of living and æsthetic appreciation may be concerned.

Architects must realize, however, that the rapid development of our economic structure has brought with it a definite demand for a service secondary only to that of design, and in certain classes of buildings exceeding even design in its importance to clients. The ability to give this secondary service (which for want of a better term we may call the economics of building construction) is already possessed in a number of active architectural offices. Its results may be recognized definitely in an analysis of successful modern buildings. It is the result of appreciating the fact that the modern building calls for the best in many fields of knowledge. It requires several types of engineering service; it requires understanding on the part of the architect of the nature of the purpose for which the building is to be used; it requires a knowledge of modern building finance, including a capacity to understand the functioning of buildings as investments; it requires a full measure of co-operation between the owner and his organization, the building manager, the contractor and the architect. It admits the value of special service by experts familiar with the financial and utility phases of the individual building problem. When we boil down this somewhat theoretical statement to an active project, such as the Cunard Building described in the July, 1921, issue of The Architectural Forum, we find it possible to establish a definition of the successful architect which will apply throughout the progressive centuries to come. The successful architect, now and in the future, is he who with full appreciation of his art will include in his professional equipment an appreciation of the modern science of building and the modern economics of the building field. One cannot and does not expect the architect to possess the great store of diversified knowledge which is called for by building projects today, but he is expected by the public to appreciate the business problems of the owner and to bring into co-operation with his efforts all knowledge and expert advice which will constitute a completely rounded and efficient service from the owner's viewpoint. He will help the owner to protect himself against a bad investment in the building field; he will use available consultation service to solve any problems which he is not able to solve himself, and he will endeavor in every possible way to keep himself sufficiently posted on the conditions affecting the building field to be able to discuss intelligently with his client those problems which relate not to design and equipment alone.

When we find today architectural organizations maintaining engineering departments, or recognizing the value of consulting engineers in relation to special building problems and maintaining within their organizations men well versed in modern business problems and methods, we find almost invariably successful and active organizations. Similarly, in an analysis of smaller organizations in which the principals are possessed to a degree of such general knowledge or at least a definite appreciation of such knowledge, we determine the class of architects who will control this professional business in the future. These are the men and the organizations capable of progress and expansion. The younger architects who are developing their careers in this atmosphere are losing none of their appreciation of all that is fine in architecture but are developing their capacity to make theirs an applied knowledge, of benefit to the community and to themselves. It is true that there will always be a few exceptions to this general rule,—perhaps designers of unusual ability and favored by fortunate circumstances. It is a safe prediction, however, that under these conditions those architects who are not receptive and who offer resistance to progress represent a class which will disappear before many years have passed. Professional ethics is a conventional term, and in many instances it is a convenient cloak for bad business practice as represented by inefficient building design, which costs the public dearly and brings to all architects a measure of criticism which is often unwarranted.

There are those who hold that the architect must keep aloof from the business world, selling his art to those who come to demand it, but the modern business world is building for success. Impracticability, however tempered by artistic achievement, is rarely to be forgiven and it is clearly the architect's duty to himself to use every possible means to broaden his own knowledge and equipment for service. He must read more comprehensively; he must keep alive to the practical developments in his own field,—in other words he should know his own *business* as well as his art.

* * *

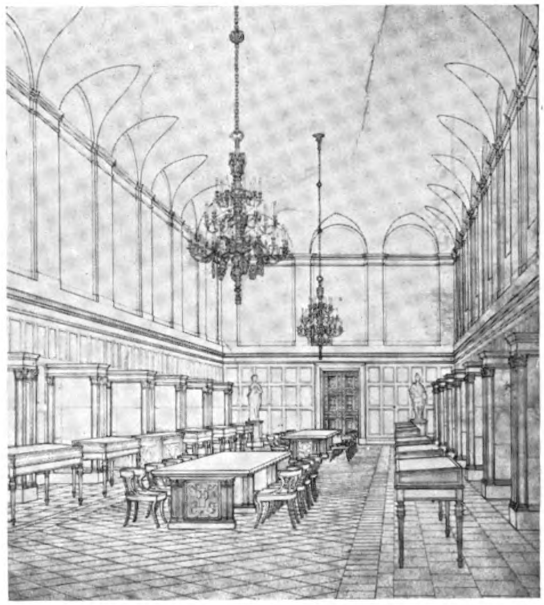
We realize of course that the "Straight Talks to Architects" have not direct application to every architect. In the course of their presentation through this and past issues of The Architectural Forum, we have endeavored to limit them to frank, unbiased statements which have been brought to our attention through an analytical study of professional activities and to make them serve as constructive assistance in shaping policies of the unreadable future.

The Henry E. Huntington Library

MYRON HUNT, ARCHITECT

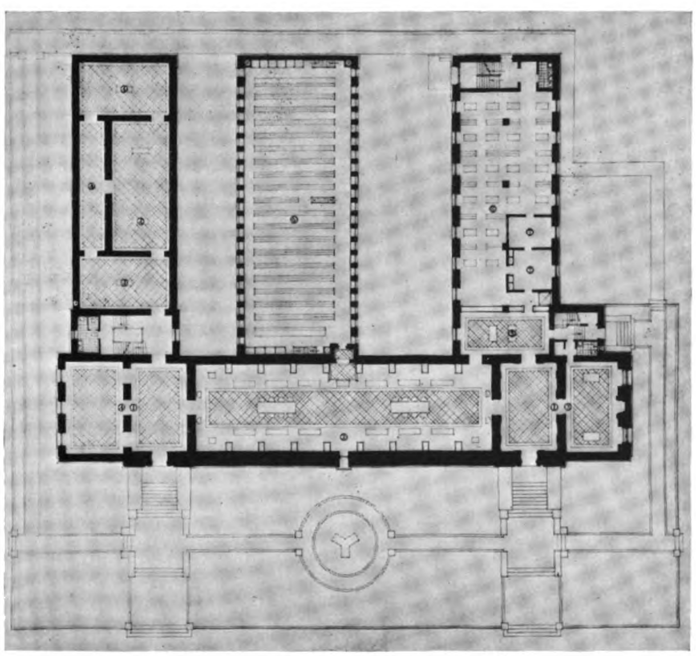
THE building up of the colossal fortunes which are many in America today sometimes makes possible achievements in other ways which are probably quite as characteristic of the spirit of America. Thus the acquiring of vast wealth affords the opportunity of creating foundations for educational purposes or for the promotion of medical or sociological research, or else it may take the form of establishing great centers for the study of literature or art.

A notable instance of the realization of a lifetime's dream is gradually assuming form at San Marino, California. In this sunny corner of the golden West, Henry E. Huntington is establishing what must ever be a magnet to attract to itself students of art and literature from all over the world, for here are being gathered the supreme treasures which have been garnered from all the countries of the globe—a gathering into one building of the rarest parts of many great collections, the smallest of which has been built up by years of patient effort added to great expenditure. The library is part of an estate covering 700 acres, and the plan of its owner is that the estate, with the library and its artistic and literary treasures, shall eventually become the property of the state of California. Although the library will hardly be opened for public inspection for two years, already 120,000 volumes are in place and are being catalogued under the direction of a trained librarian.



Design for Main Book Exhibit Room

The building into which these treasures are being assembled is itself notable. Built in the renaissance style, it presents an appearance of rich but refined luxury. The main facade includes a pylon at each end, in which the entrances are placed, while between these pylons and placed upon the high basement story rests a series of engaged marble columns which support the entablature and cornice, above which there rises the low pitched red tile roof. The structure is planned upon the model of a letter E, the middle wing being devoted to the stack room. The remainder of the building is planned as reading and exhibition rooms, an office for the personal use of Mr. Huntington and offices for the librarian, assistant librarian and the staff of catalogers. The catalog files are so arranged that their drawers may be removed from either the catalog room or from the room in which the catalog work is done. In addition to the main book exhibition hall, which extends the full height of the building and which occupies the greater part of the space within the main part of the structure, there are various smaller rooms



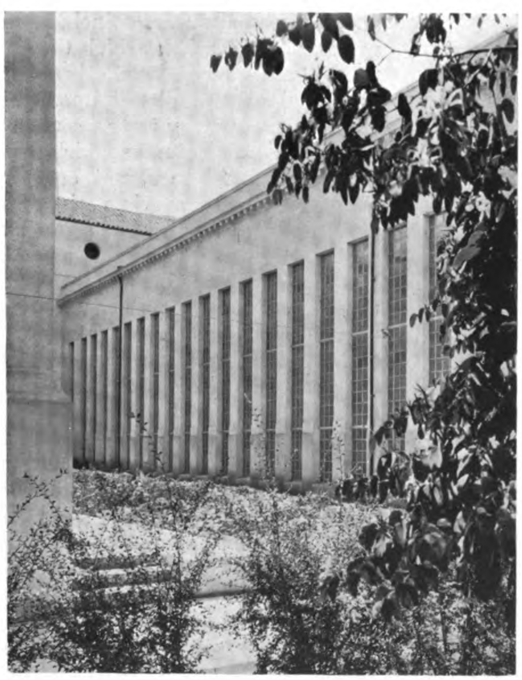
Main Floor Plan

1. Entrance Lobbies. 2. Book Exhibit Hall with Plenum Chamber Below. 3. Founder's Room with Boiler Room Below. 4. Exhibition Rooms with Storage Space Below. 5. Catalog Lobby. 6. Cataloging and Seminar Room with Distribution Stacks Above. 7. Librarian's and Assistant Librarian's Offices. 8. Middle Floor of Three-story Stack Room with Plenum Chamber Under

intended for the exhibition of prints, provided with wooden, cloth-lined walls and lighted from skylights.

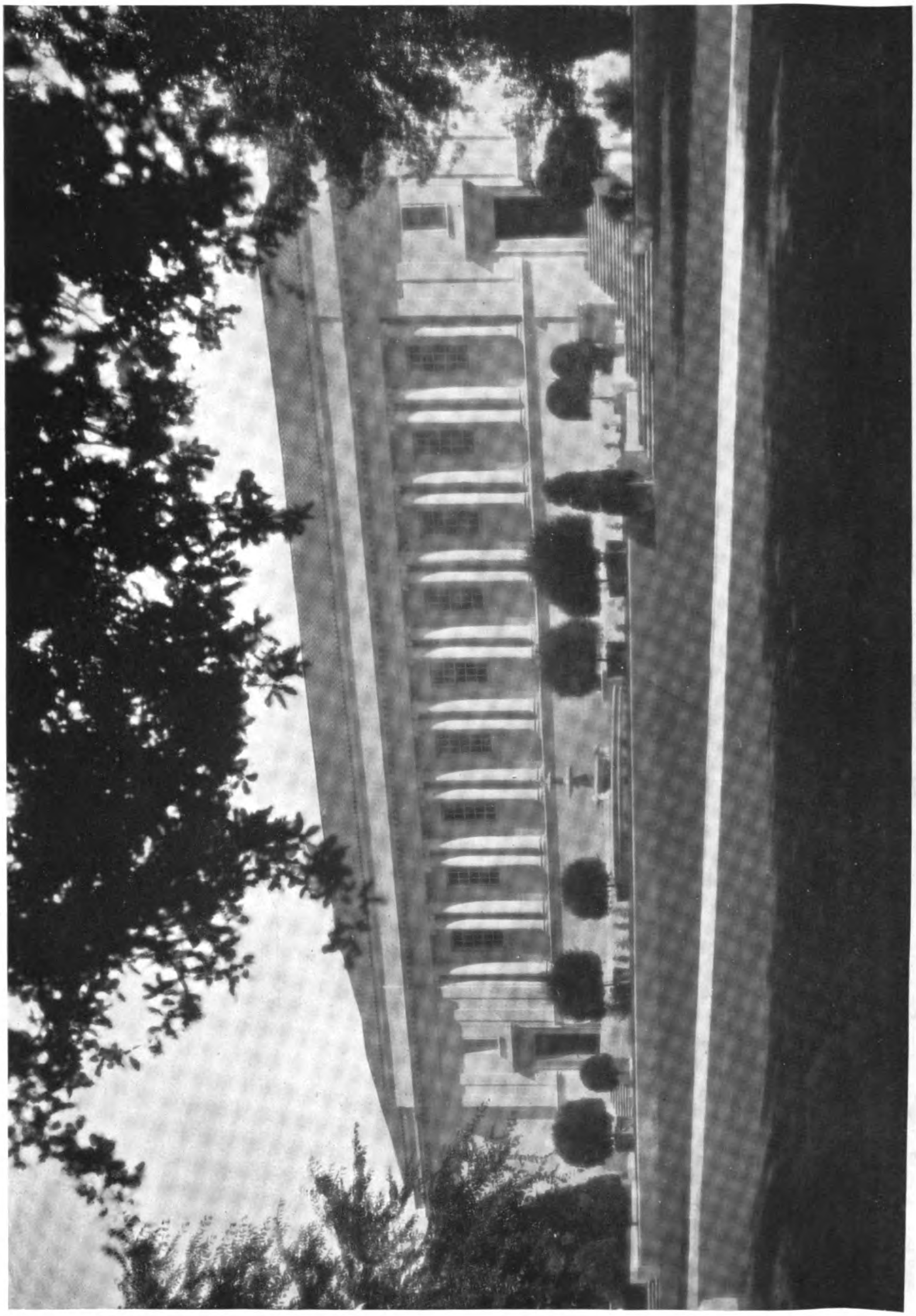
The main stack room is the last word in planning and equipment and includes every possible provision for safety and efficient working which has thus far been introduced. This wing of the building is three stories in height. Below the floor of the stack room there is a plenum space which allows for the intaking of fresh air which is humidified in the dry season by the evaporation of water placed in pans, the air being drawn beneath the book stacks, up through the books themselves and then out through the double roof. The arrangement which governs the regulation of humidity is not dependent upon the use of fans, as is generally the case, but is produced by the action of the sun on the upper roof which heats the 5-foot plenum above the main ceiling, the cool and temperate air being drawn upward through registers in the lower ceiling and then out through copper ventilators in the upper ceiling by the action of the sun in heating the upper roof plenum. The book stacks are of course arranged in rows or aisles, and each is separately locked with its own gate; in addition, each of the individual cases in each aisle is also grated and locked, and to provide every possible detail of protection the windows are fitted with hollow metal sash with panes of about 10 by 12 inches, a standard bank vault electric alarm system having been installed in the muntins. In the event of any wire or framework of the glass being broken, a monster gong situated on top of the building begins to ring and will continue to ring until the connection of wire or framework is mended. The safety of the stack room is made additionally secure by reason of the fact that but one doorway gives access to it; this entrance is in the main exhibition room, and behind the heavy bronze screen is placed a vault door such as are used in banks. The bronze doors which give entrance to the library at either end of the terrace are richly ornamented in the spirit of the Italian renaissance. The doors proper are arranged with eight panels, with two additional panels above which serve as a transom and give the effect of a higher opening when the doors are closed.

One Pair of Main Entrance Doors



Light Court Showing Stack Room Windows

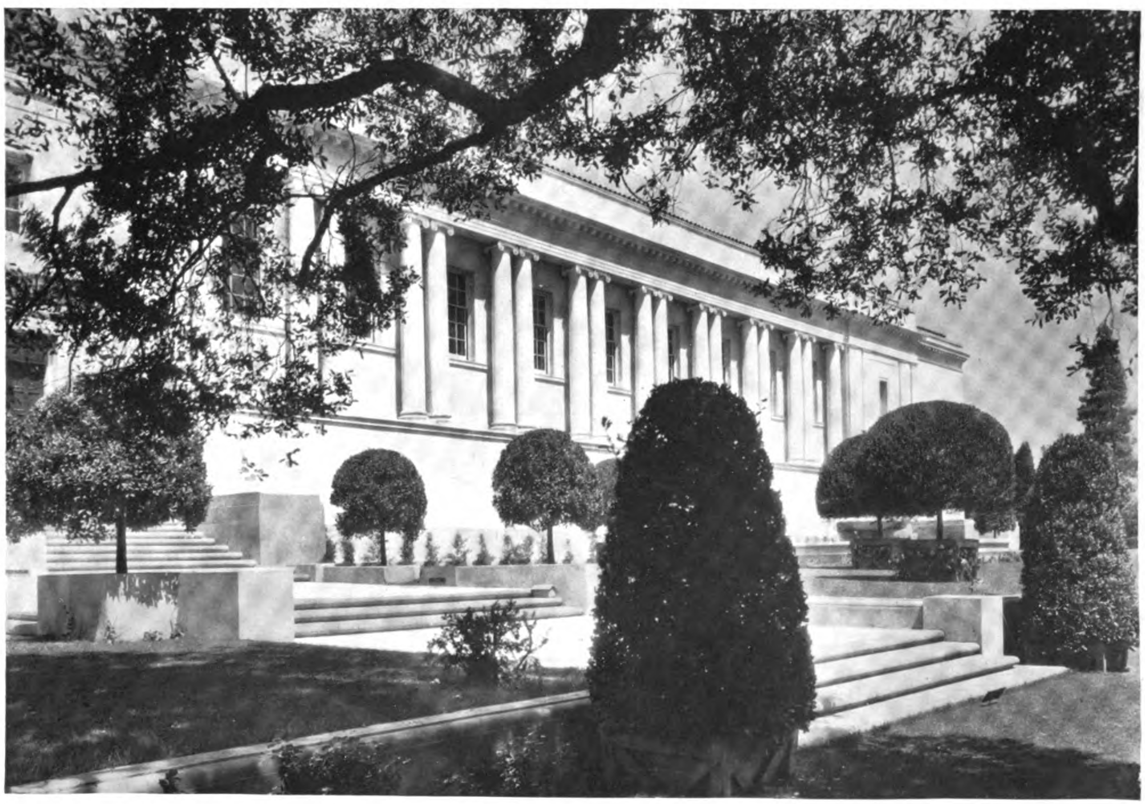
Rear Walls of Catalog, Stack and Exhibit Wings



GENERAL VIEW

LIBRARY FOR HENRY E. HUNTINGTON, ESQ., SAN MARINO, CAL.

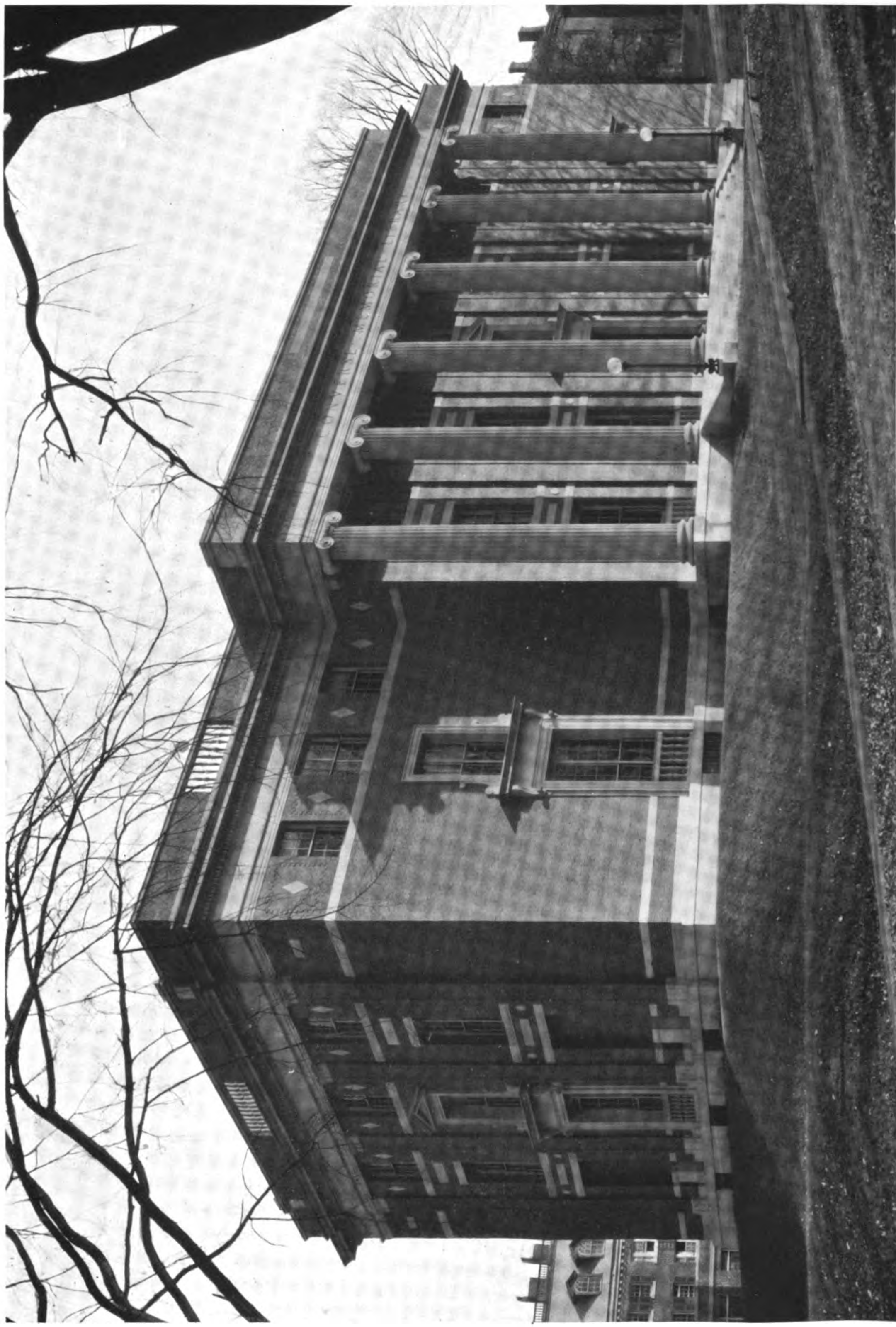
MYRON HUNT, ARCHITECT



MAIN FACADE FROM THE SOUTHWEST

LIBRARY FOR HENRY E. HUNTINGTON, ESQ., SAN MARINO, CAL

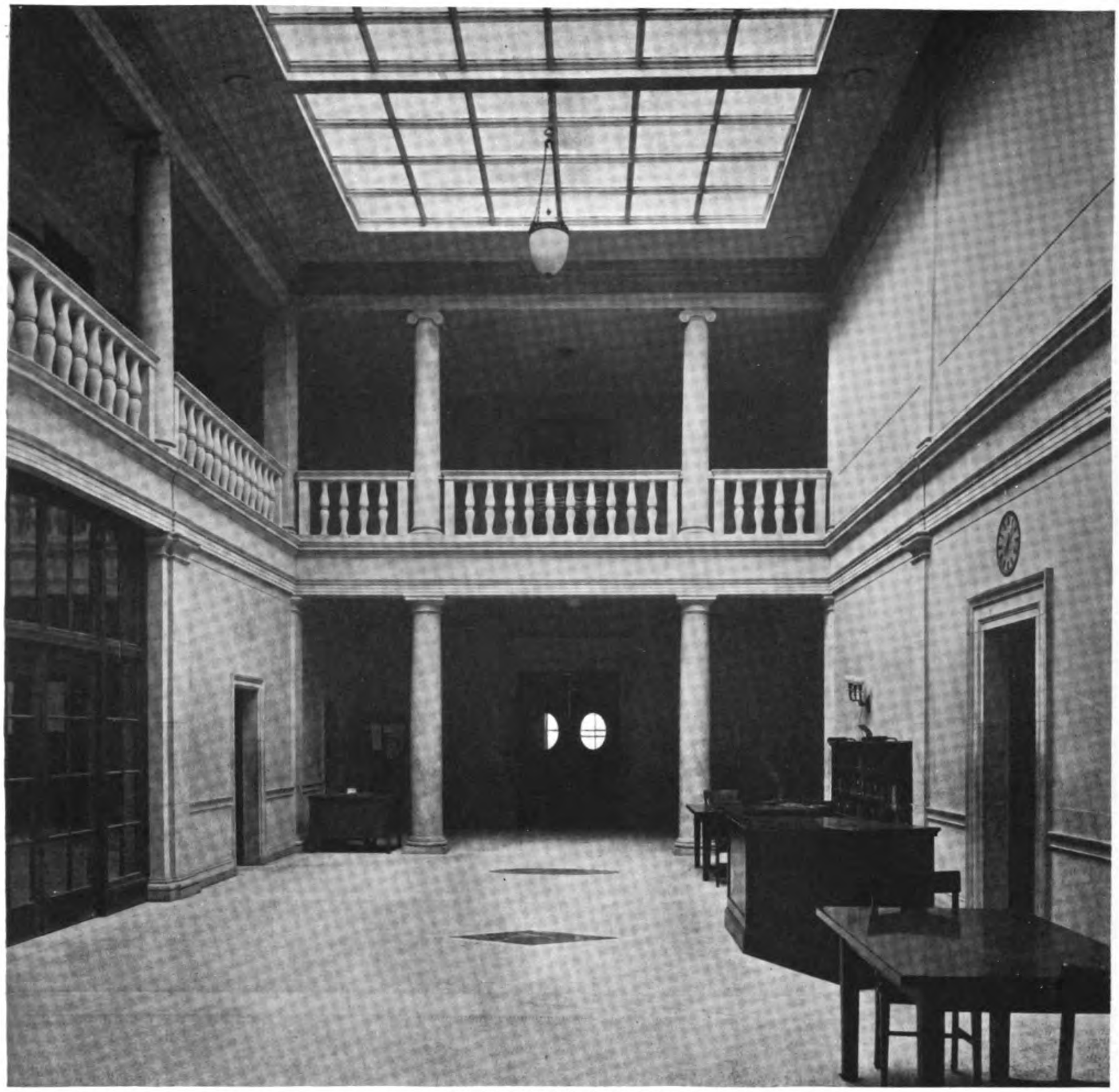
MYRON HUNT, ARCHITECT



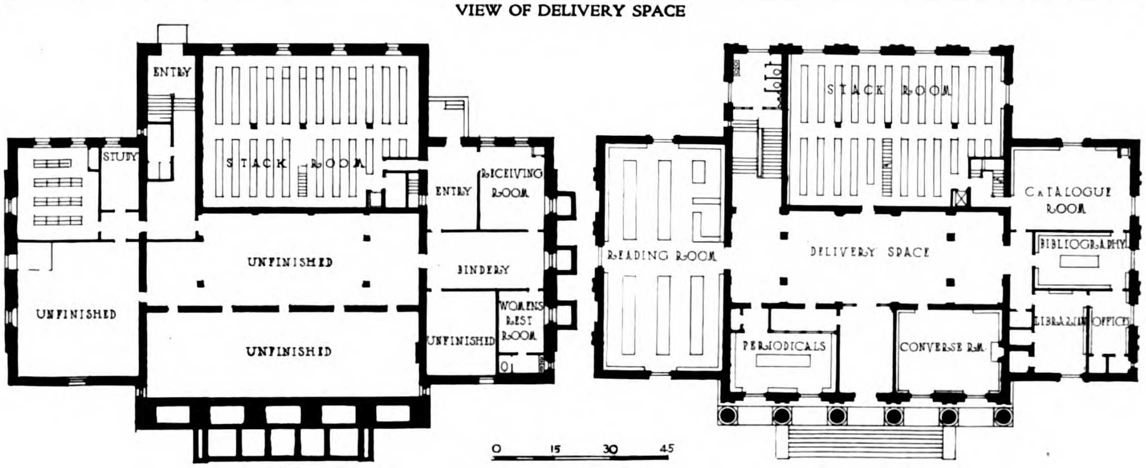
GENERAL VIEW

CONVERSE MEMORIAL LIBRARY, AMHERST COLLEGE, AMHERST, MASS.

McKIM, MEAD & WHITE, ARCHITECTS



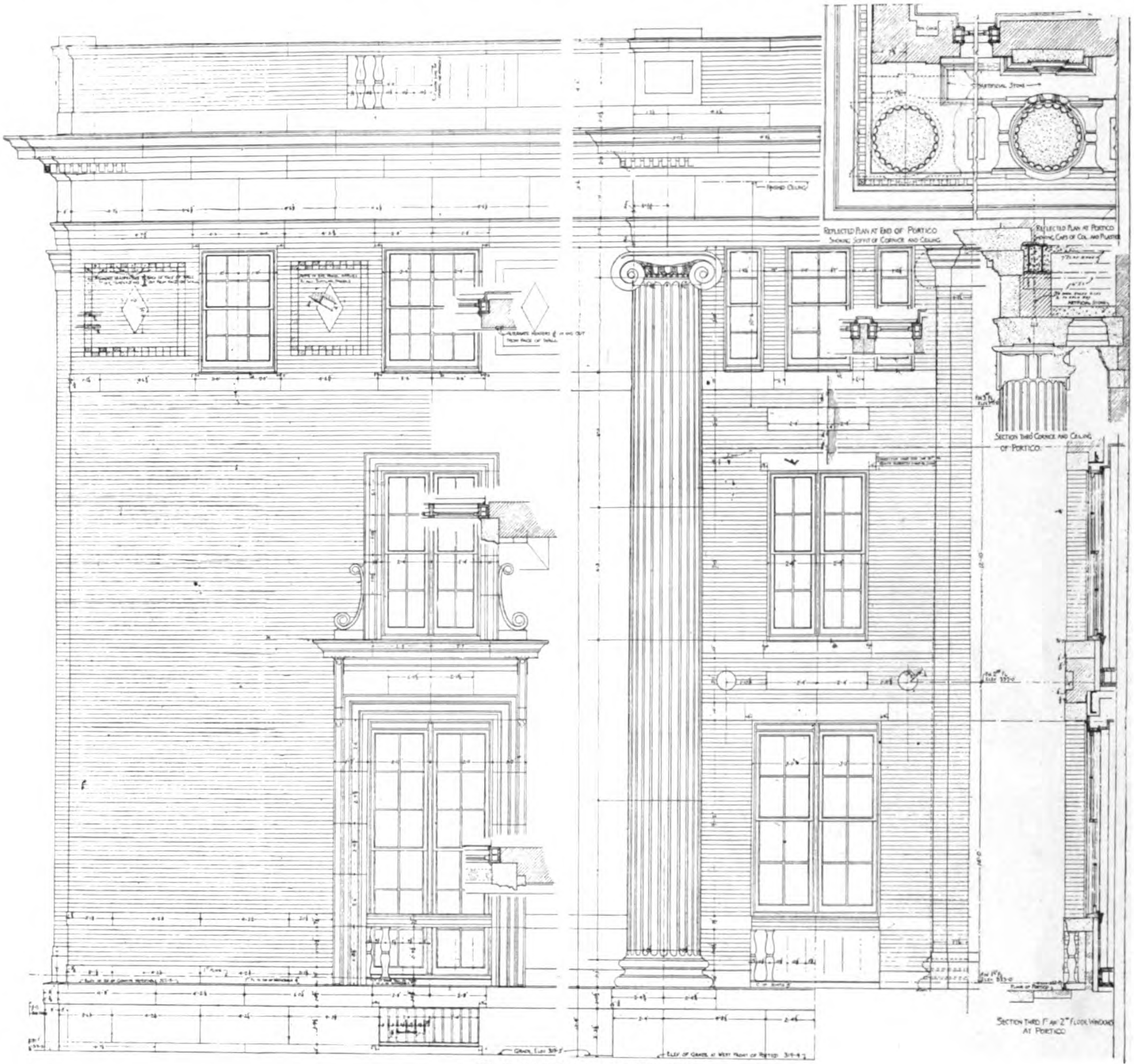
VIEW OF DELIVERY SPACE



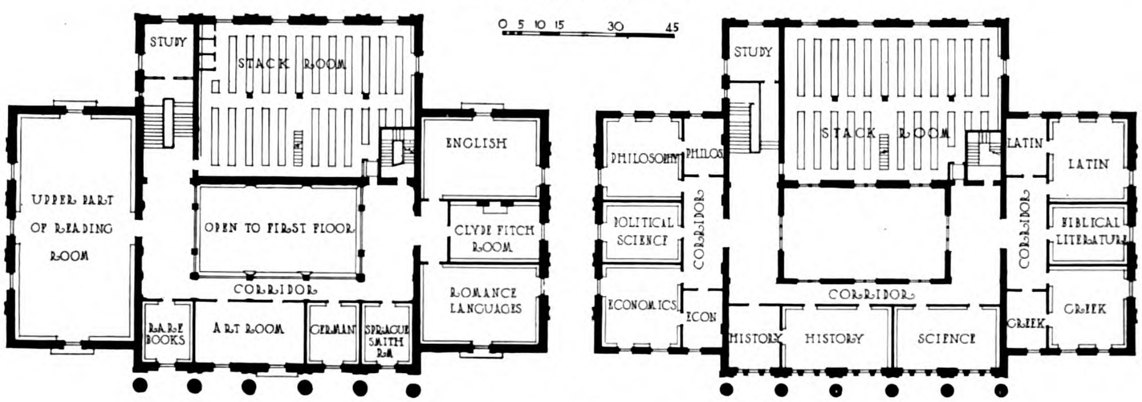
BASEMENT AND FIRST FLOOR PLANS

CONVERSE MEMORIAL LIBRARY, AMHERST COLLEGE, AMHERST, MASS.

McKIM, MEAD & WHITE, ARCHITECTS



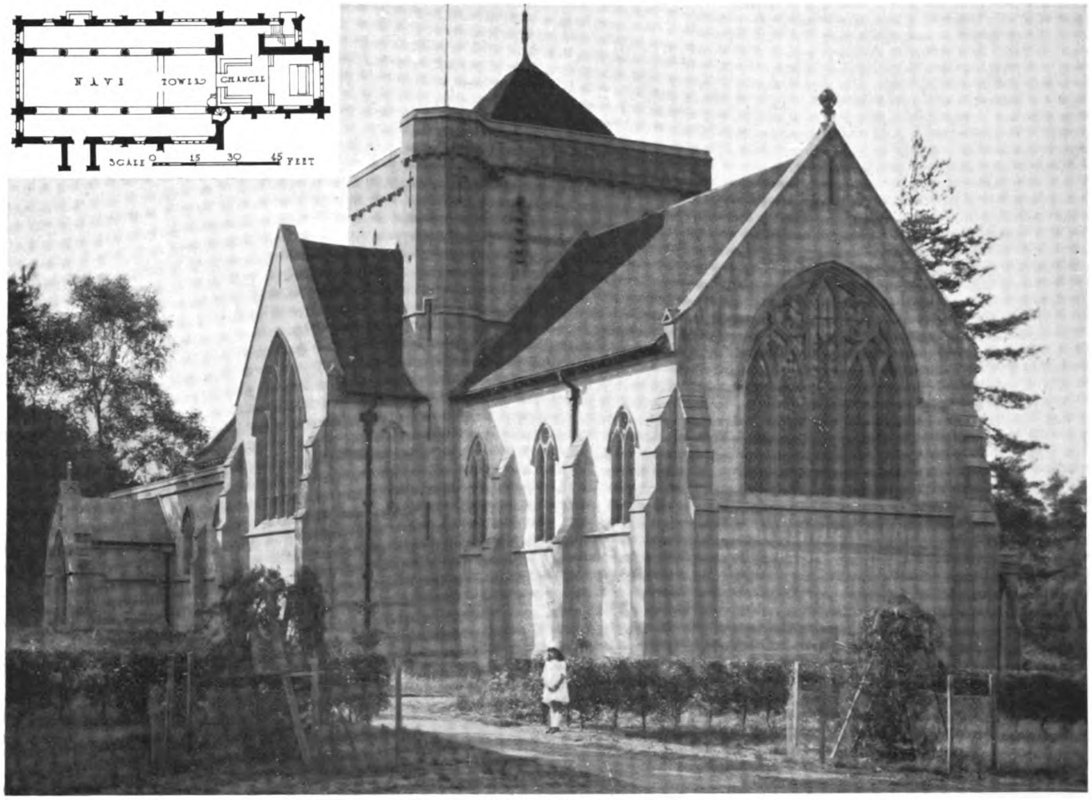
DETAILS OF MAIN FACADE



SECOND AND THIRD FLOOR PLANS

CONVERSE MEMORIAL LIBRARY, AMHERST COLLEGE, AMHERST, MASS.

McKIM, MEAD & WHITE, ARCHITECTS



GENERAL VIEW

VIEW IN NAVE

ST. MARK'S CHURCH, WHITELEY VILLAGE, SURREY, ENGLAND

WALTER J. TAPPER, ARCHITECT

CIRCLE ROAD

HOUSE ON CHESTNUT WALK

WHITELEY VILLAGE, SURREY, ENGLAND

ILLUSTRATING WORK OF WALTER CAVE AND SIR REGINALD BLOMFIELD, ARCHITECTS

Office Buildings for Individual Occupancy

ILLUSTRATING THREE RECENT NEW YORK BUILDINGS

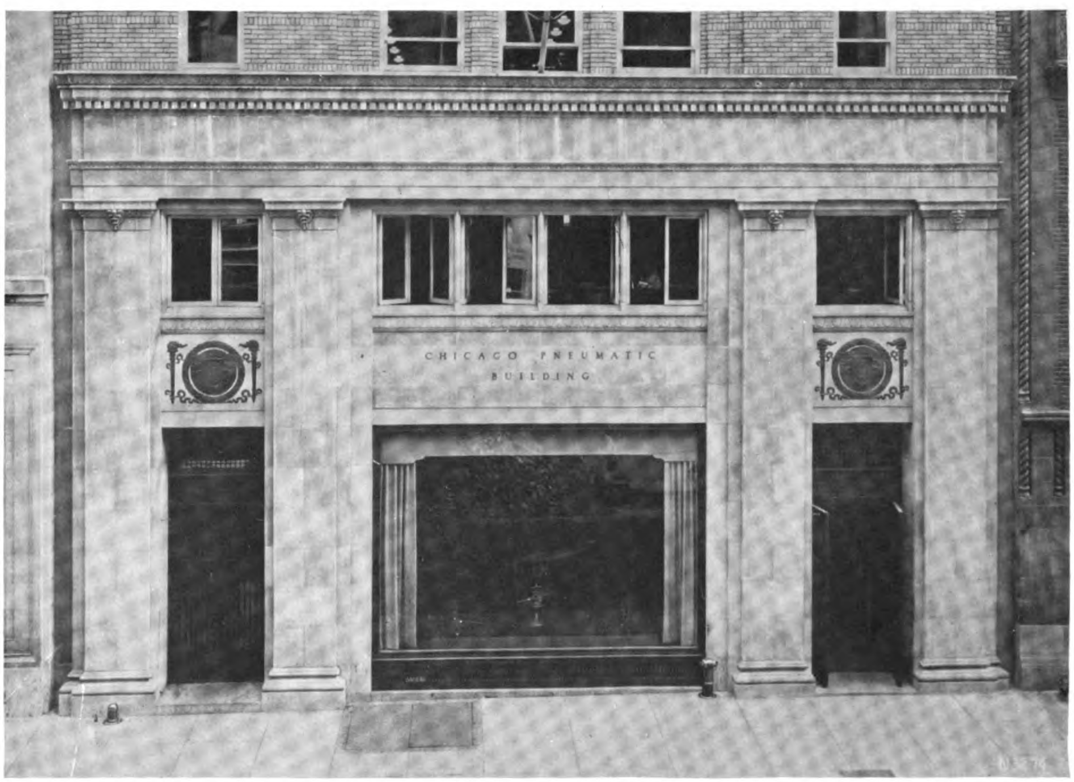
THE increasing difficulty of obtaining suitable quarters for high class businesses of different kinds in New York's congested retail district is among several reasons which have contributed to the practice of erecting what might be called the "individual" building. In many instances the structure is larger than is actually required for the immediate uses of the owner, the surplus space being leased to acceptable tenants until the growth of the owner's business shall make necessary its occupancy of the entire premises. The height of such a building is naturally governed by much the same economic aspects as regulate the height of any business structure, such as the original cost, costs of maintenance, and the probable rates of rental which may be obtained, the object being to make such a building reasonably profitable financially even when it is arranged largely for the owner's specific use and occupied chiefly by him.

Douglas L. Elliman & Co., Inc., Building

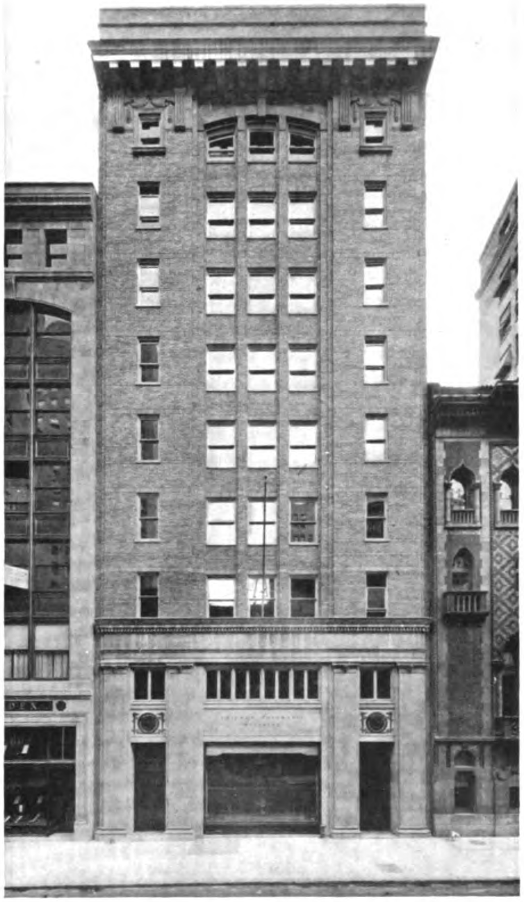
Cross & Cross, Architects

An excellent example of such a structure is that at 15 and 17 East 49th street, owned by Douglas L. Elliman & Co., Inc. The growth of this firm since its beginning in 1911 has involved the outgrowing of three different sets of business quarters and it was desired to provide here a structure which would afford space for any anticipated growth for the owning concern in addition to the three lower floors which it now occupies. With this end in view the 10-story structure has been built upon a plan so flexible that it may be readily adapted at very little expense to any future requirements. The floors now occupied by the company are connected by private stairways, and other floors could easily be included in their premises. These three floors as well as the seven stories above, now under lease to various tenants, are readily accessible by the elevators from the public hallways.

The floor plans of the quarters of Douglas L. Elliman & Co., Inc. indicate the completeness of the real estate, brokerage and insurance service which the firm renders to its clients. Upon the front of the ground floor there is the reception or waiting room for customers, back of which at the far end are the private offices of several members of the firm, the greater part of the area of this floor being given up



Lower Stories of Chicago Pneumatic Building, New York
C. W. Fairweather, Architect



Facade Chicago Pneumatic Building
C. W. Fairweather, Architect

to the desks of the solicitors, the records to which they require constant access and the "closing room," useful for concluding business arrangements and signing documents. Upon the floor above, a door from the public hall opens into a clients' reception room while the entire front of the floor is given up to the needs of the firm's insurance department. The remainder of the floor is occupied by the cashier's department and the quarters of those concerned with the management of buildings of different kinds. The front of the third or upper story of this firm's premises is arranged as private offices, the rear portion for the department devoted to the selling or leasing of country properties, while the area between is given up to the mailing and filing rooms, the telephone exchange and space for clerks and stenographers. The building was constructed by G. Richard Davis & Co.

Combustion Engineering Corporation Building

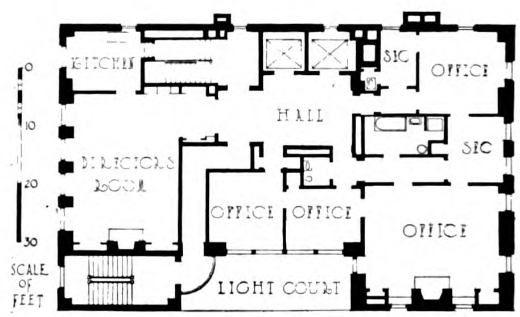
Ludlow & Peabody, Architects

Another interesting example of a building constructed for an owner-tenant is that at 43 Broad street owned by the Combustion Engineering Corporation. Here the owning concern occupies what is perhaps the least desirable part of the building—the three upper floors together with part of a fourth, the lower floors commanding higher rentals. The third floor of this structure is occupied by a banking and brokerage concern, and one interesting detail of the floor consists in planning a separate room for messengers and runners, reached by its own entrance from the public hall. The building was erected by the George A. Fuller Co.

Chicago Pneumatic Building

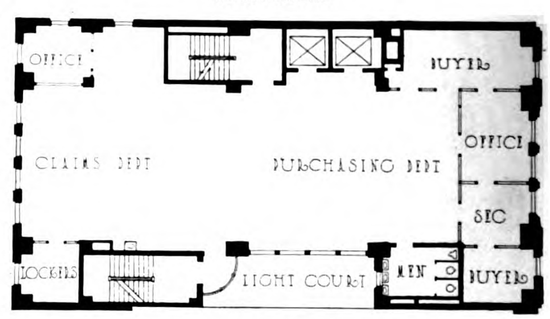
C. W. Fairweather, Architect

At 6 and 8 East 44th street is the 10-story and basement structure owned by the Chicago Pneumatic Tool Co. This building was designed en-



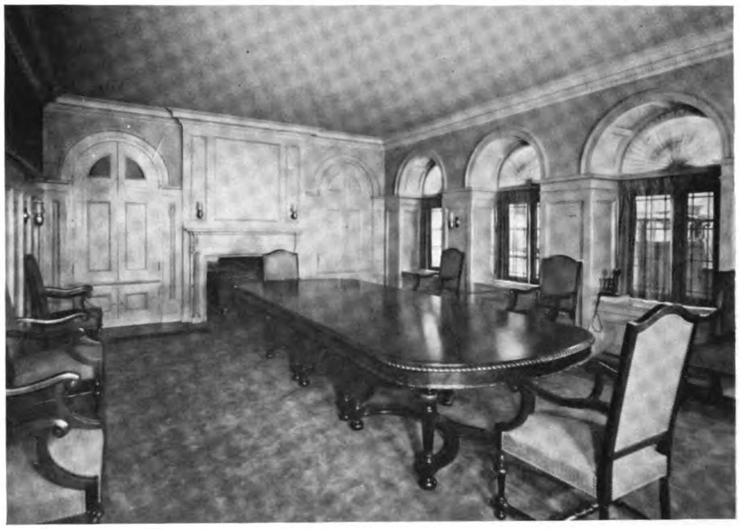
Tenth Floor Plan

First Floor Plan



Fourth Floor Plan

Chicago Pneumatic Building, New York


Directors' Room, Chicago Pneumatic Building

tirely for the occupancy of its owner, making possible many features in working out the plan which are generally lacking in the typical loft structure built for renting purposes.

Throughout the design and construction of the building careful attention was given to considerations of practical economy, with the result that the owners have secured modern offices designed specifically for their use at a cost approximately half that asked for similar space in the neighborhood.

At the inception of the work, a study of the requirements developed the fact that 10 stories and a basement were needed to take care of the immediate needs of the owners and prudence suggested that the frame be designed to permit, at some future time, the construction of five additional stories if extra space were required. In designing the frame, consideration was given to the method usual in office buildings measuring 50 by 100 feet of providing a line of columns on the central axis and spanning from these to the side walls. But at slight additional expense, and by a judicious spacing of elevators, stair and fire towers, it was found possible to eliminate detached columns altogether and provide a working space of maximum efficiency. Most of the floors are entirely open, as shown upon the plans, and such private offices as are required are partitioned off with open glass partitions.

To meet the requirements of the city's building laws, a light shaft had to be built at the rear of the property only, but because no room 90 feet long can be adequately lighted or ventilated by front and rear windows only, a side shaft was built, extending from the second floor up and having an area of 300 square feet. Rather than save a story and have all


First Floor Salesroom, Chicago Pneumatic Building, New York
C. W. Fairweather, Architect

Detail of Office Partitions, Chicago Pneumatic Building

floors dark, a small portion of each floor was sacrificed and the building carried as high as was necessary to provide the required space.

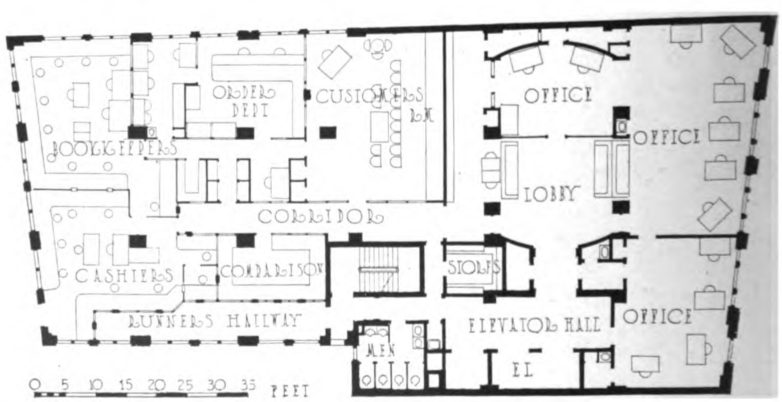
The base of the exterior is faced with limestone and the windows and doors are bronze. Over the doors are bronze plaques bearing the trade mark of the Chicago Pneumatic Tool Company. The shaft is of gray brick with every sixth course on edge, and the two top stories are of gray brick and limestone. Above the ninth story, the face is set back one foot from the property line to conform with the requirements of the zoning law, and to take away the harshness of this appearance the center of the shaft is also set back one foot.

In considering the general interior finish, the owners had two purposes in mind: First, it was desired that every part should be constructed to secure the maximum sanitary efficiency. Second, the offices were to be as attractive and cheerful as considerations of economy would permit. The toilet rooms have tile floors and walls, white marble stalls, electric dryers, and electric automatic urinal flushing devices.

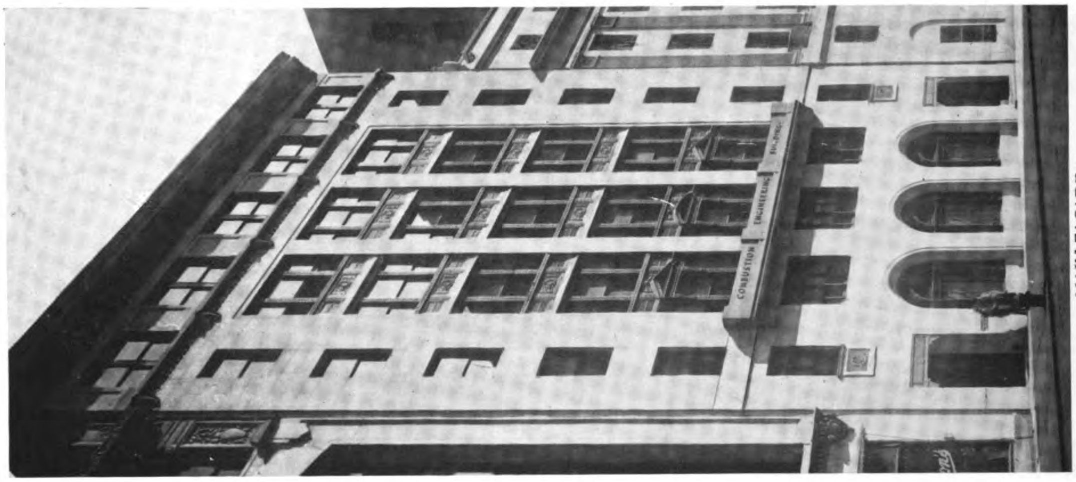
The original intention was to make the floors of concrete and cover them with linoleum. After considering the question of cost, it was found that economy would result from the use of terrazzo floor finish, which lends itself to cleanliness and requires no maintenance expense. As most stock wood and glass partitions are somewhat light in construction and poor in proportion and detail, a substantial and adaptable type of partition was evolved and carefully detailed. This was reasonable in cost and easily erected. The glass is carried down to within 18 inches of the floor and divided by slim muntins, resulting in a partition attractive to the eye and permitting a maximum of light. The plaster at the windows was returned to the frames and marble stools installed. After a careful consideration of the color scheme, the walls and ceilings were finished in oatmeal color and the woodwork was painted olive green.

In an attempt to get away from the conventional oak or mahogany executive offices, the rather daring idea of finishing the tenth floor in a gray, just off white, was discussed and finally adopted, with most gratifying results. An ample lobby, with tile floor and Belgian black marble base, is entered on leaving the elevators. All trim is colonial and all walls are treated with muslin. The executive offices and directors' room are wainscoted with birch instead of with the more expensive mahogany or walnut; all woodwork is enameled and the walls and ceilings are painted in the same gray tone throughout.

It was desired to have an attractive though inexpensively finished show room in front on the ground floor and to devote the rear of the floor to the New York district sales office. The floor was finished with buff tile with a black and orange border and black marble base, and high wainscoting and built-in show cases were provided. The detailing is in the Adam style and the lighting fixtures and hardware, finished in silver, are ornamental. The register faces are of cast bronze in an attractive pattern and all radiators are concealed behind either wood wainscoting or black marble. The Chicago Pneumatic Tool Co. building was erected by Dwight P. Robinson & Co.. Inc.

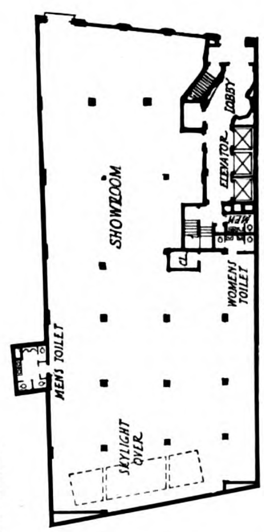


Third Floor Plan Combustion Engineering Corp. Building, New York
Showing office arrangement for brokerage firm

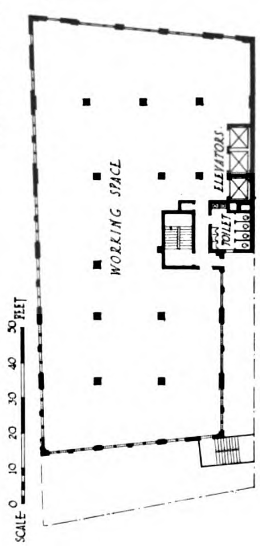


MAIN FACADE

DETAIL OF LOWER STORIES



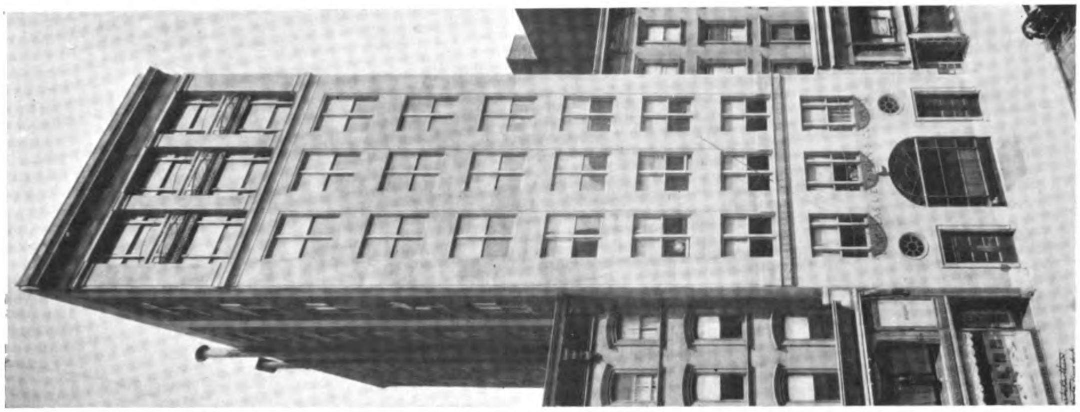
FIRST FLOOR PLAN



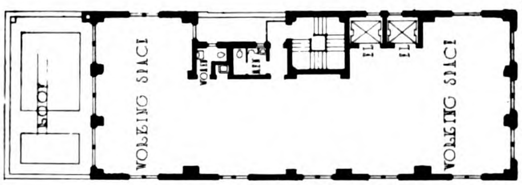
TYPICAL FLOOR PLAN

COMBUSTION ENGINEERING BUILDING, BROAD STREET, NEW YORK

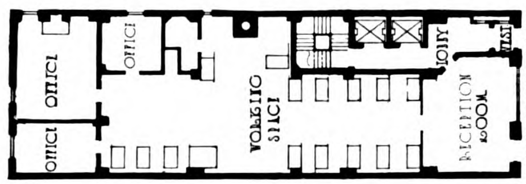
LUDLOW & PEABODY ARCHITECTS



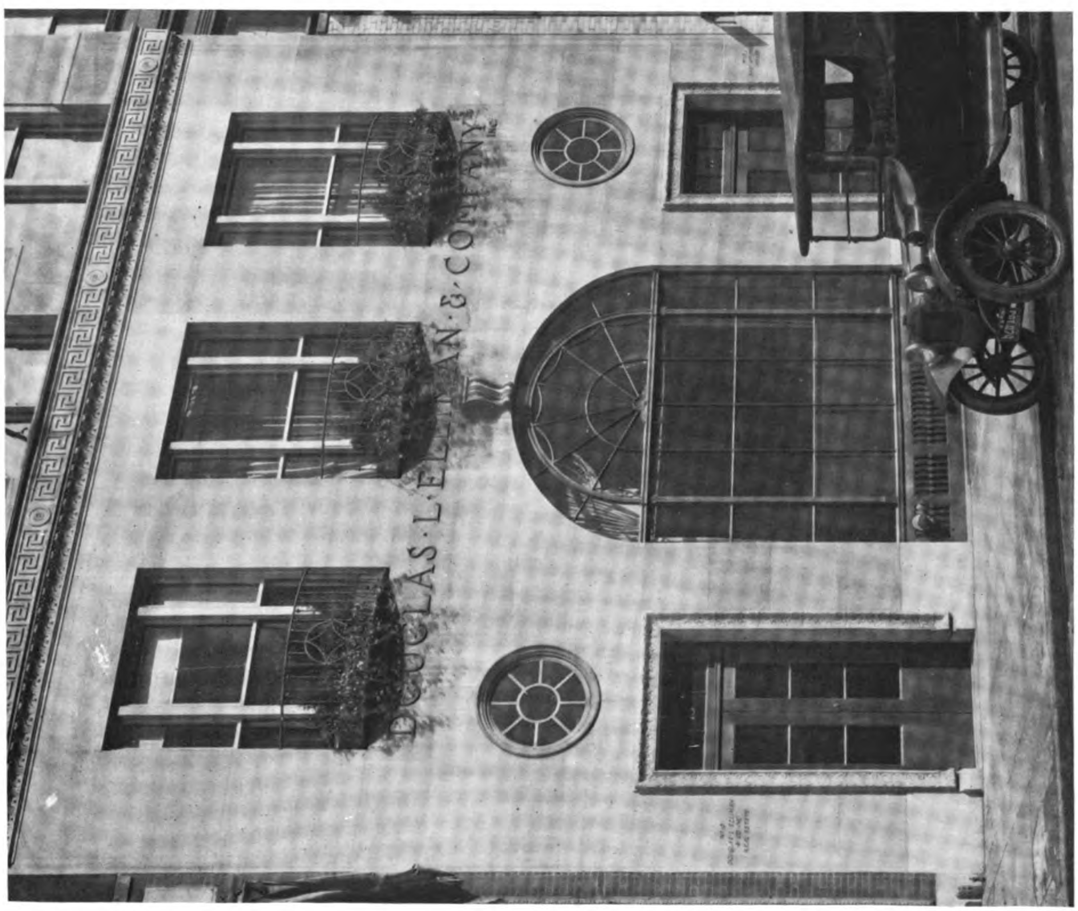
MAIN FACADE



TYPICAL FLOOR PLAN



FIRST FLOOR PLAN



DETAIL OF LOWER STORIES

OFFICE BUILDING FOR DOUGLAS L. ELLIMAN & CO., INC., NEW YORK

CROSS & CROSS, ARCHITECTS

An Eighteen-Story Concrete Structure

THE HIDE & LEATHER BUILDING, NEW YORK

THOMPSON & BINGER, INC., ENGINEERS. STARRETT & VAN VLECK, CONSULTING ARCHITECTS

By RAOUL C. GAUTIER, C.E.

ONE of the tallest reinforced concrete buildings in this country, an 18-story all-concrete office and loft building, has been recently completed at the corner of Frankfort and Gold streets, at the Manhattan end of the Brooklyn Bridge, in the heart of that part of New York commonly known as the "swamp." This building, which rises 213 feet above the curb, is known as the Hide & Leather Building, and has been erected for an association of prominent hide and leather manufacturers and merchants desirous of securing for themselves superior office quarters in a district which has few, if any, such quarters to offer. They occupy nine floors of the building, the balance being leased.

A building of structural steel, faced with brick, was originally contemplated, but a concrete alternate having been secured and the price for an all-concrete building being lower than that for a steel frame with brick and stone facing, it was decided to adopt the concrete design. The owners' decision was also influenced by the fact that they wanted the construction of the building to start at once although the plans were in a very indefinite state. A structural steel frame would have required a complete and final design before the order could be placed, whereas the elasticity of the concrete design would permit starting at once and making practically any change required at any time. As a matter of fact, it was not until the 12th floor had been reached that a final decision was secured as to how the 15th and upper floors would be built. Actual work started October 5, after the foundations were completed, and the roof was poured on March 23, six months later with a loss of 15 working days due to winter weather.

The first problem faced by the engineers, and without a doubt the most important in a structure presenting a good many, was that of the foundations. Borings had shown the upper strata to be muck and peat, and the under soil to be sand to a depth of 100 feet. Safety, economy and time were the deciding factors and, after rejecting wood piles, pre-cast concrete piles and moulded-in-place concrete piles, which for various reasons were not thought to be suitable, a method of securing footings was adopted that had particular merit. This consists of three foot sections of thin steel cylinders which are filled with concrete and forced down by means of hydraulic jacks as the building goes up, the necessary reaction being given by the weight of the upper structure itself. When the building is nearing completion and the weight of the building permits of it, the piles are tested to absolute refusal under the desired load, and wedged against the concrete footings (Fig. 1). This system had been used extensively in underpinning work during the construction of the subway, but in a few instances only as foundations for new buildings; it was, however, thought best in this particular case since, besides permitting an immediate start on the construction of the building proper, this means of reaching sub-strata appeared to give the best guarantee of no settlement or, at any rate, of very little. The system proved highly successful since, from the beginning of the operation until the end, the movement did not exceed ¼ inch.

The Hide & Leather Building, New York

With regard to the structural design, the engineers decided to use flat slab construction which would permit a considerable saving in height, and reinforced concrete columns from the top floor to the basement. It has often been said by the opponents of concrete that the enormous sizes of the lower concrete columns in high buildings make the material entirely inadequate except for the construction of buildings not exceeding five or six stories in height. It is interesting to note, in this respect, that in the first story of this building, the interior columns, carrying a load of 1,280,000 pounds, are only 38 inches in diameter. A comparison with steel columns fireproofed would show that the diameter of the concrete columns is not much larger than the diagonal of the rectangular spaces occupied by fireproofed steel columns. It is also worth while noting the

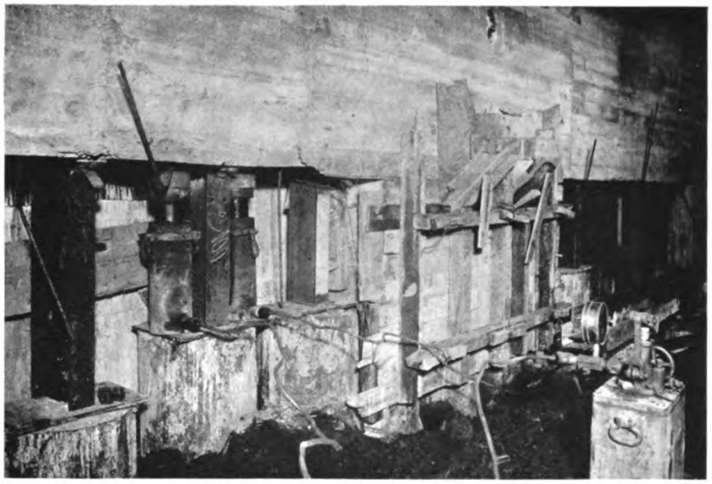


Fig. 1. View of Foundation Showing Hydraulic Jacks Used to Force Piles Down as Building Progressed

take care of the wind stresses. Thus, following a pet theory of the engineers, who claim that any necessary structural member should be shown, no attempt whatever was made at disguising the walls or columns; they were concrete, and concrete they remained. They were given a fine carborundum rubbing to eradicate the board marks, but no cement wash was applied, every effort being made, on the contrary, to preserve the color and texture of the original concrete.

On the two lower stories of the building, however, where it had been intended to use limestone, it was felt that something different in the way of finish was needed, although it was desired to maintain the monolithic appearance of the building, and, as a means to that end, a special facing, made of white cement with colored aggregate, was *poured* at the same time as the walls and columns. The aggregate in this facing was composed of particles of pink quartz, felspar and green stone. Now that the surface—which was allowed to weather for several months—has been bush hammered and well washed to bring out the colors, the base of the building appears to be carved out of a single piece of granite, thus giving a beautiful effect (Fig. 2).

The method employed in building this facing is believed to be original, and a description of it will undoubtedly prove interesting. The forms for the walls and columns were built as usual and metal lath wired to the vertical reinforcement approximately 2 inches from the face (Fig. 3). The special mixture with colored aggregate was then poured, very dry, into this narrow space and well tamped with a special flat tool; the metal lath was sufficient to retain the mixture and provided a good bond with the plain concrete backing which was poured into the form immediately after the facing was in place, care being taken always to keep the level of the facing 6 or 8 inches above that of the plain concrete to avoid any

fact that had the New York Building Department permitted the use of 1 : 1 : 2 concrete with a stress of 750 pounds per square inch on the concrete and 7,500 pounds per square inch on the vertical steel, the diameter of the column in question could have been reduced to 34 inches, which is only 2 inches larger than that of a steel column with a circular tile fireproofing, and 2 inches smaller than the diagonal of the same steel column with a rectangular tile fireproofing.

As the building was designed so that the floors could be rented for loft purposes, a live load of 120 pounds per square foot was used. Had the usual office floor load been used instead, the diameter of the columns would have been reduced to 34 inches for 1 : 1½ : 3 concrete, and 30 inches for 1 : 1 : 2 concrete. The original intention was to use concrete wall pilasters and 12-inch brick curtain walls with a limestone facing on the lower two stories. However, after careful consideration, 8-inch concrete curtain walls, which are allowed by the Building Code in place of the minimum of 12 inches of brick, were adopted throughout, thereby gaining 4 inches of space all around the building, and giving to the designers a deep spandrel which was used to great advantage to

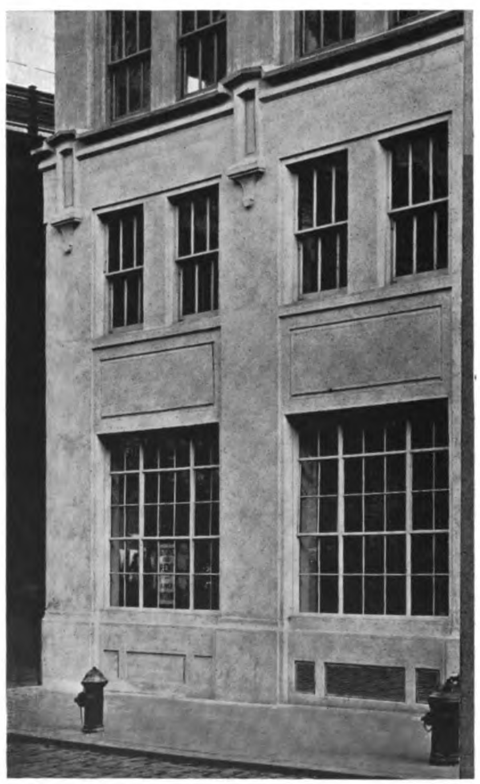


Fig. 2. Portion of Lower Stories Showing Concrete Surface Finish

of the plain mixture pushing its way through the metal lath into the front finish. It is interesting to note that some of this facing was poured from a height of 12 feet and, notwithstanding its thinness, such care had been taken in the tamping process that very few parts showed any honeycombing, and very little patching was required. The entire exterior surface was treated with a colorless waterproofing, and, although the building has stood some very severe storms, not a drop of water has yet found its way into the interior.

There is very little to be said in connection with the flat slab floors which were designed in accordance with the new city regulations for the two-way system. The design of the upper portion of the building, however, is interesting inasmuch as a considerable portion of the load of the structure above the 15th floor, including a 10,000-gallon tank, is carried directly on the 15th floor slab girders (Fig. 4). This type of construction was adopted at the request of the owners who were desirous of securing unobstructed spaces on the 15th, 16th and 17th floors (Fig. 5). Particular attention is called to the design of the tank and its roof above, as it is somewhat unusual. It was originally planned to use a steel tank, but when the shape of the upper portion was finally determined, it was found expedient to build the tank of concrete and to use its walls to carry a certain portion of the roof load. The horizontal reinforcement of this tank consisted of ½-inch round bars wired to $^{15}/_{16}$-inch rib-stiffened metal lath laid vertically, and the concrete was plastered on both sides of the metal lath to a total thickness of 4 inches. Integral waterproofing was used in the mortar and so far, under a 6-foot head of water, no leaks have developed. It may be said that a concrete pan (Fig. 4), connected to the drains, was provided under the tank to take care of any leakage and to prevent any possibility of the water seeping through the concrete into the offices below.

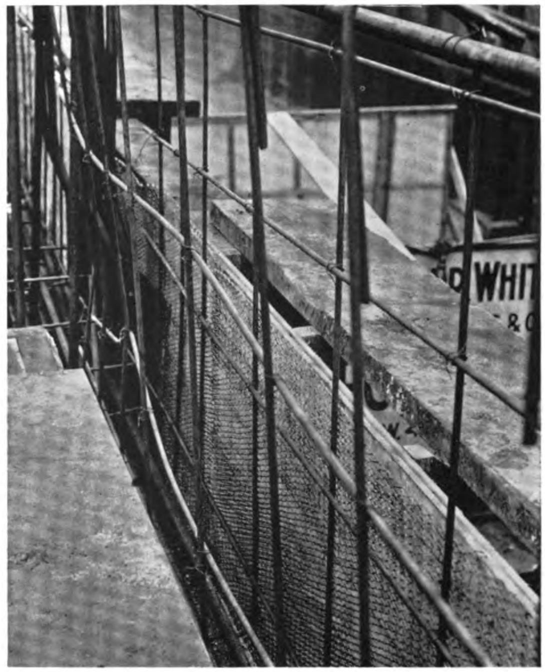


Fig. 3. View from Inside Forms Showing Metal Lath Wired to Reinforcing Rods to Retain Special Facing Mixture

The stack was originally designed in concrete, but it was found more convenient to build it of brick except in that portion showing above the 16th floor where the original design was followed. This chimney was made strong enough to resist any wind stresses by itself, the arched brace connecting it to the building (Fig. 6) being added for appearance only. As a matter of fact, this brace was built independently of the chimney so as to allow for expansion of the latter. The stairs throughout the building were entirely constructed in concrete; they do not present any particular feature except possibly their height.

Three inches of integrally waterproofed concrete were plastered over the reinforcement of the roof slabs, but as the slab was found to be not entirely waterproof against driving rains, an additional inch of waterproof concrete was

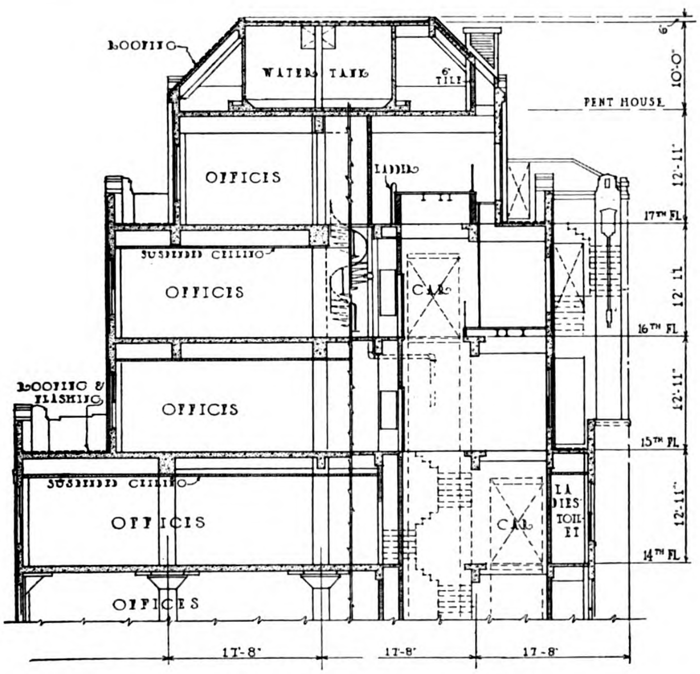


Fig. 4. Section through Upper Stories Showing Concrete Water Tank and Portion of Load Carried on 15th Floor Slab

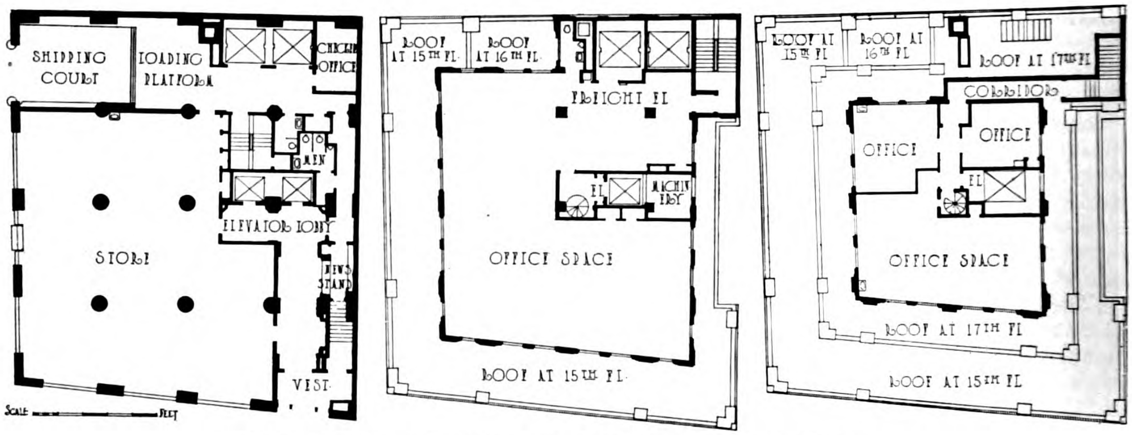


Fig. 5. First, Sixteenth and Seventeenth Floor Plans, Hide & Leather Building

plastered on the under side with complete success. Metal forms were used for the flat slab and depressed panels, with the result that fine and smooth ceilings, requiring little finish, were obtained. All the interior surfaces were rubbed, where necessary, with an electric grinding machine. The ceilings were left smooth and painted with two coats of hot water calcimine. As for the other ground surfaces, they were given a very thin sand floated finish, and painted. No concrete was plastered. Later on, when interior partitions were installed, they were plastered and also finished with a sand finish, and the textures are so similar that one can hardly tell the difference between the two materials used.

On account of the cold weather and the speed of the construction, five slabs were kept shored during the construction, two slabs being fully shored and three having only about half the shores originally required. Each slab was therefore shored for a period of approximately 30 days, and, to keep a check on the hardening of the concrete, a novel method was devised. At the time that the concrete was poured, 12 cylinders made of sheet metal were pressed into the concrete. They had first been placed within pieces of mailing tubes so that no difficulty was experienced in taking them out of the slab when needed, since the cardboard, rotting very quickly, permitted them to slip out easily. After the concrete had been in place for 7, 14, 21 and 28 days, respectively, three cylinders were taken out and immediately tested. In practically every instance the concrete reached a strength of 1,600 pounds per square inch at 28 days; it was therefore quite safe to remove the shores.

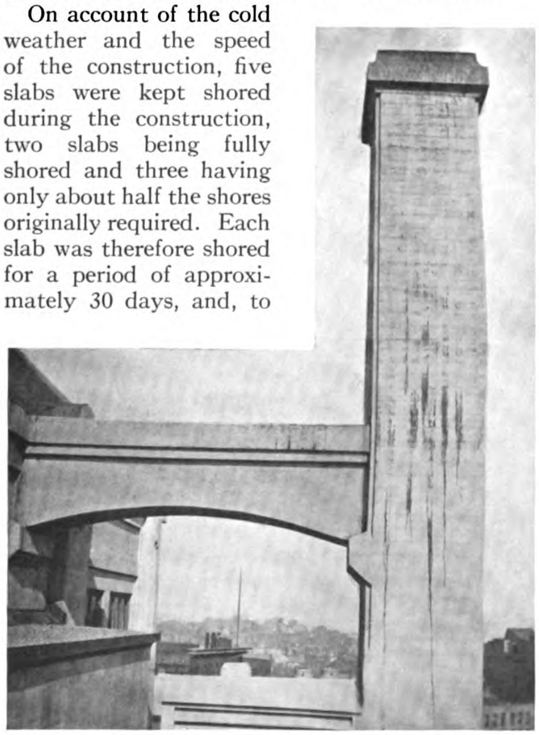


Fig. 6. Upper Part of Stack in Concrete with Independent Brace to Allow for Expansion of Stack

This figure of 1,600 pounds per square inch may appear high when one takes the winter weather into consideration. However, great care was taken to heat the materials even when the temperature was not actually below freezing point, and, when the temperature was below 40° Fahr., salamanders were kept going under the freshly poured slabs for 24 hours—the metal forms transmitting the heat to the concrete much better than wood forms. Furthermore, a slump of between 7 and 8 inches was specified and a rigid inspection was made several times a day from the office to make sure that the specification was followed. It is believed that the quality of the concrete was in great part due to this precaution.

In concrete buildings it is usual for the elevator contractor to wait until the shafts are completed to take the necessary measurements to order the cars, this being often the cause of delay. In this building, as it was necessary to have elevators running at the earliest possible moment, the dimensions and verticality of the shafts were guaranteed to the elevator contractor. A great deal of care had to be taken in the construction of these shafts, but they finally turned out very successfully. Inserts for the guides were placed in the concrete at the time of pouring, the elevator contractor following up the work so closely that two elevators, out of four, were in operation one month before the building was completed which facilitated finishing details.

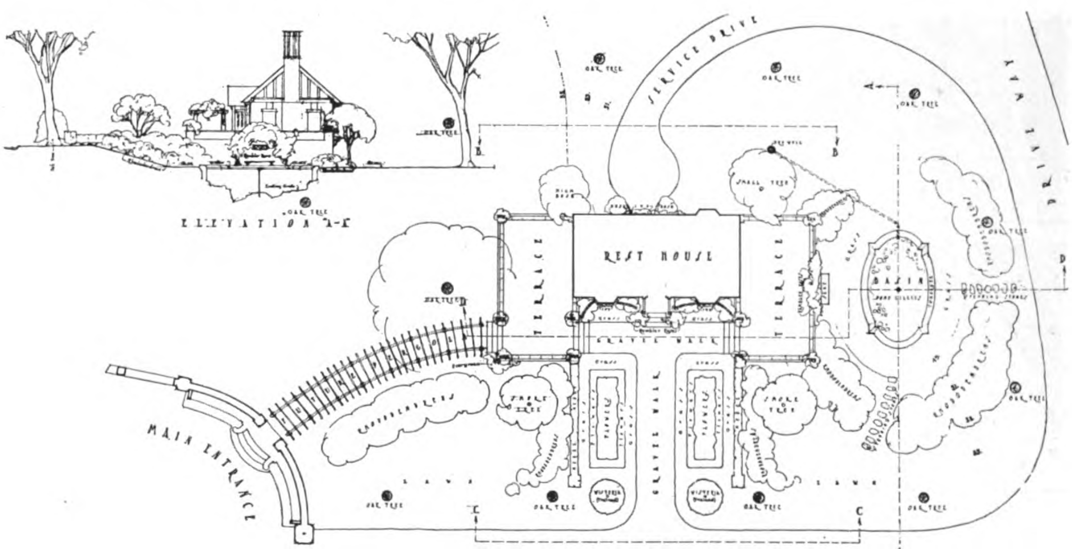
A Small Brick Building of Elizabethan Character

THE REST HOUSE AT MT. AUBURN CEMETERY, CAMBRIDGE, MASS.

RALPH HARRINGTON DOANE, ARCHITECT

IT occasionally happens that to the designing of the smallest and simplest building an architect finds opportunity to give that detailed study and research which we more regularly associate with monumental work. It is true, too, that to design a good small building requires more intensive study proportionately than is involved in designing a large structure. In a small building we are intimately associated with all the detail, and the scale and character of ornament must very nearly approach perfection for the building to receive unqualified approval. It is, however, the exceptional instance when circumstances favorable to detailed study surround the designing of the small building.

The planning of the Rest House at Mt. Auburn Cemetery, Cambridge, may justly be considered one of these exceptional instances. The cemetery is an old one with many historical associations and with a large area of undeveloped land. In studying the development of this plot it seemed desirable to arrange for a new entrance from a boulevard skirting the Charles River at this point, because of traffic difficulties involved in using the present entrance leading from an important thoroughfare. This little building is a part of the new entrance scheme. It lies to the left of the driveway and is planned to provide an attractive resting place for those waiting for funeral services and for visitors to the cemetery. The site, which slopes away from the road in bowl fashion, has determined the placing of the building

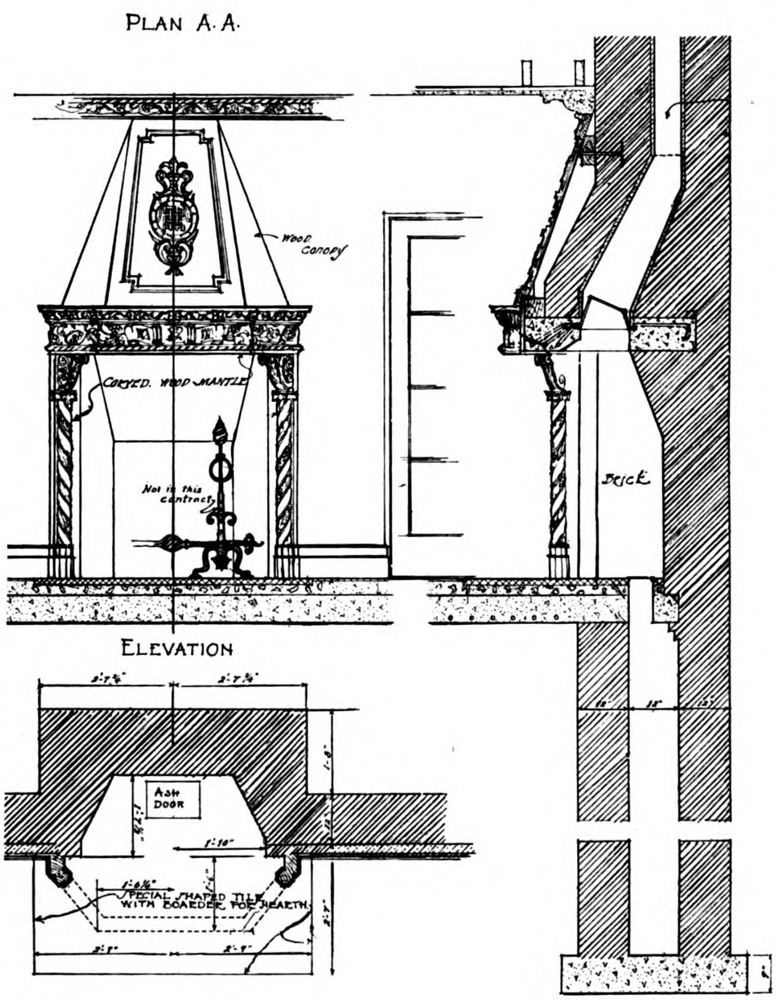


Plot and Planting Plan of Rest House, Mt. Auburn Cemetery, Cambridge, Mass.

and its surrounding garden development. The space in front is leveled to the grade of the roadway and wide terraces are arranged at each end. A curved and flower bordered walk with pergola shelter leads from the gate to the left terrace, and a service road is at the rear and below. The right terrace overlooks a sunken garden which is so planned that the natural grades are used to excellent advantage. The lowest point is used for a formal pool.

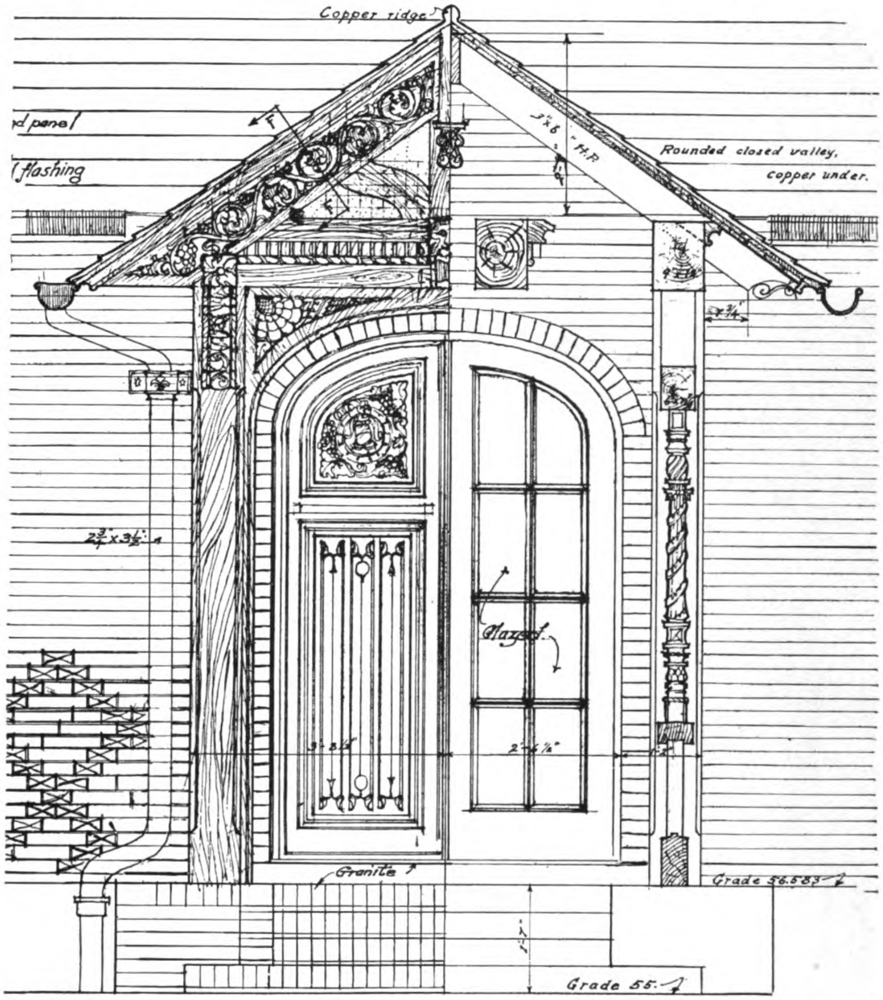
The building itself is designed with sixteenth century English precedent in mind and is particularly rich in the detail of its woodwork. The porch, oriel windows, verge boards and rafter ends show careful architectural design and good, vigorous craftsmanship in the carving. The wood is oak and has been bleached with a lime wash which gives it a pleasing lightly weathered tone. The walls are laid in Flemish bond, of New England water-struck brick of a light red tone, and a diamond pattern, well scaled with the building, is carried out with overburned headers, varying from blue to a greenish black color. Interesting brick detail is seen in the terrace balustrades. The interior is simply planned with an office and a public sitting room as the main features. The walls are of rough gray plaster with simple cast plaster cornices in conventionalized leaf forms in Gothic design. The floors are paved with tile and the interior trim is kept to the minimum, which affords excellent contrast between the paneled doors and carved oak chimneypiece in the principal room. The roof is covered with graduated and vari-colored slate, but special care has been taken to avoid undue exaggeration of roof texture with the attendant danger of destroying scale. Gutters, leaders and leader heads are copper.

In preparing the drawings the architect gave the greatest attention to his original small scaled studies. Here proportions and scale were carefully established and it became simply a matter of adhering to them in the finished drawings. Details of carving and turned woodwork were worked up in large scaled and full size drawings in soft pencil and crayon; from these the models for final approval were made. An interesting detail of the landscape work is the fact that consideration of this was likewise given in the sketch studies. The size and general character of planting were indicated in elevation and plan, and these were later transferred to final landscape draw-



Detail of Carved Wood Chimney Piece in Waiting Room

Cartouche on Mantel Canopy

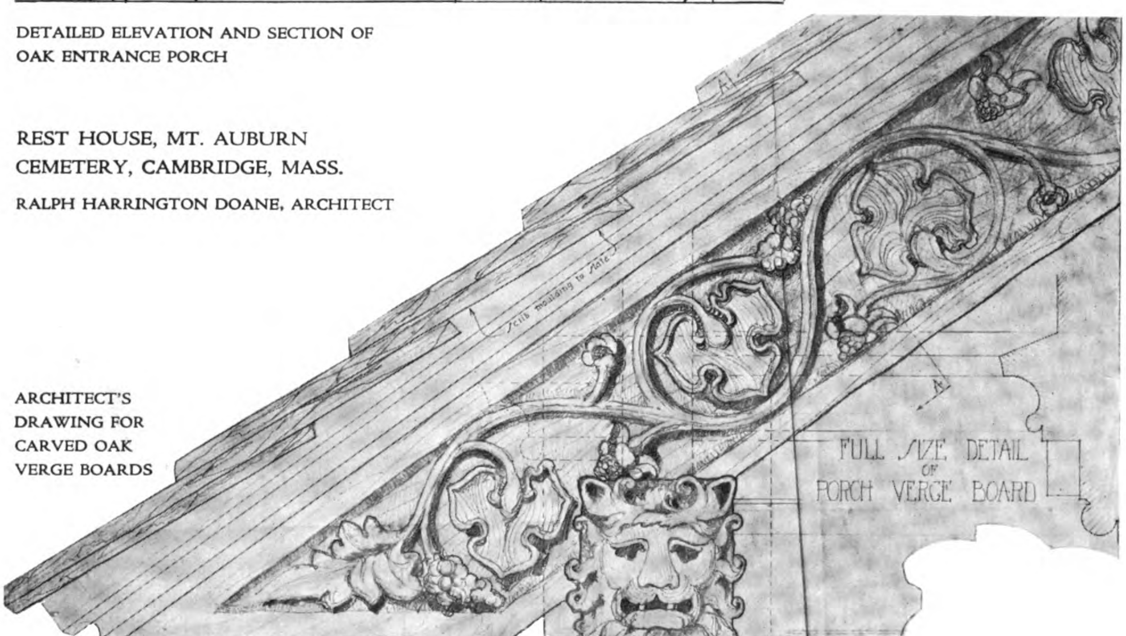


DETAILED ELEVATION AND SECTION OF OAK ENTRANCE PORCH

DETAIL OF BALUSTERS ON PORCH

REST HOUSE, MT. AUBURN CEMETERY, CAMBRIDGE, MASS.

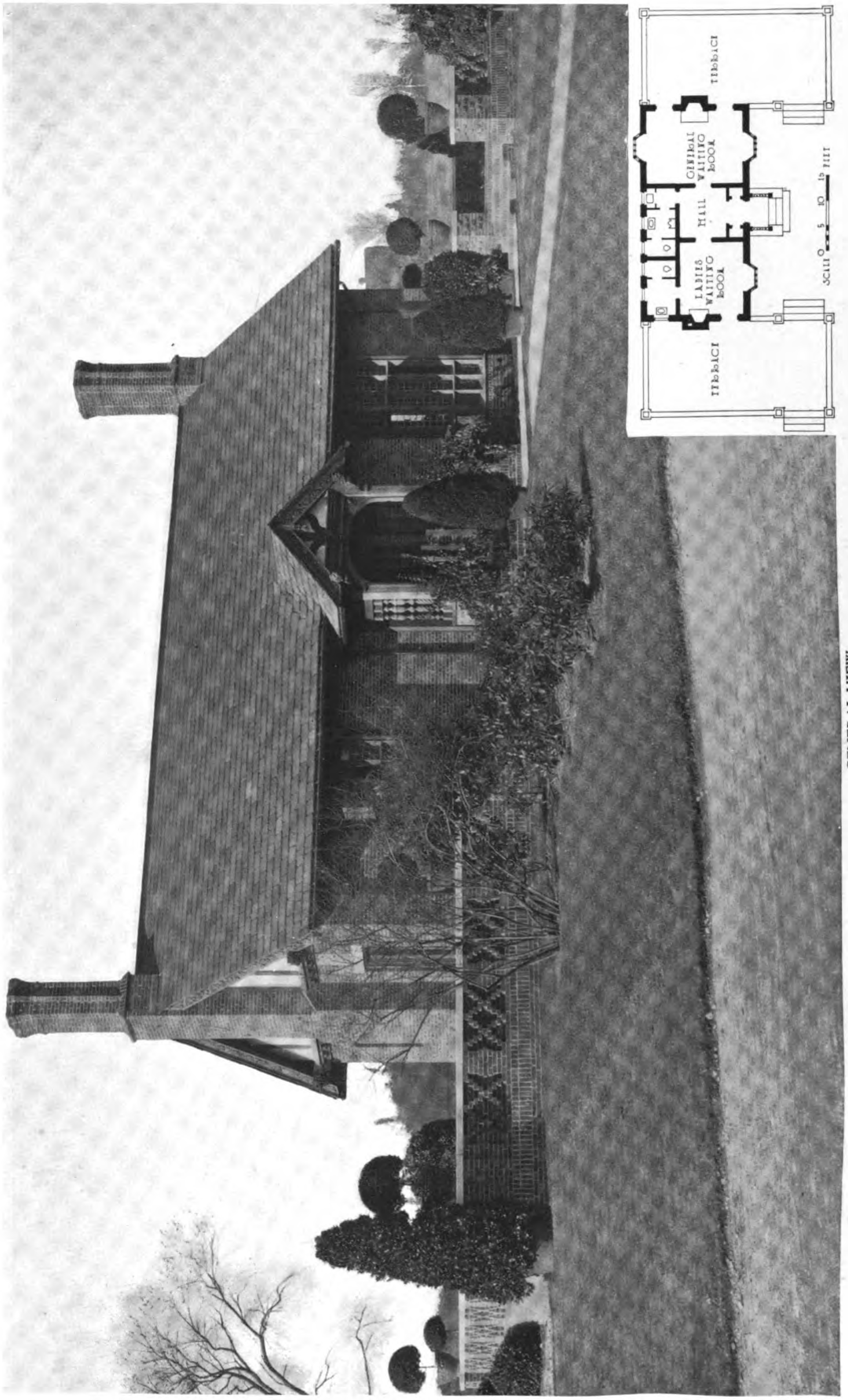
RALPH HARRINGTON DOANE, ARCHITECT



ARCHITECT'S DRAWING FOR CARVED OAK VERGE BOARDS ings. From the large supply of shrubs and trees owned by the cemetery, specimens were selected of the sizes and shapes indicated and the finished result shows a close resemblance to the studies.

The building was completed in the late fall of 1921 and the photographs from which our illustrations are reproduced were made just at the end of the season. They therefore do not portray the added charm that will come naturally to the building and its garden treatment with the growth of a season or two. The type of architecture is one, too, that greatly increases in interest with age. The architect has, however, been especially successful in imparting to a newly finished building the charm that sketch studies frequently display but which is rarely a part of the completed work, owing to the myriad steps that must be taken between the conception of a scheme and its final completion.

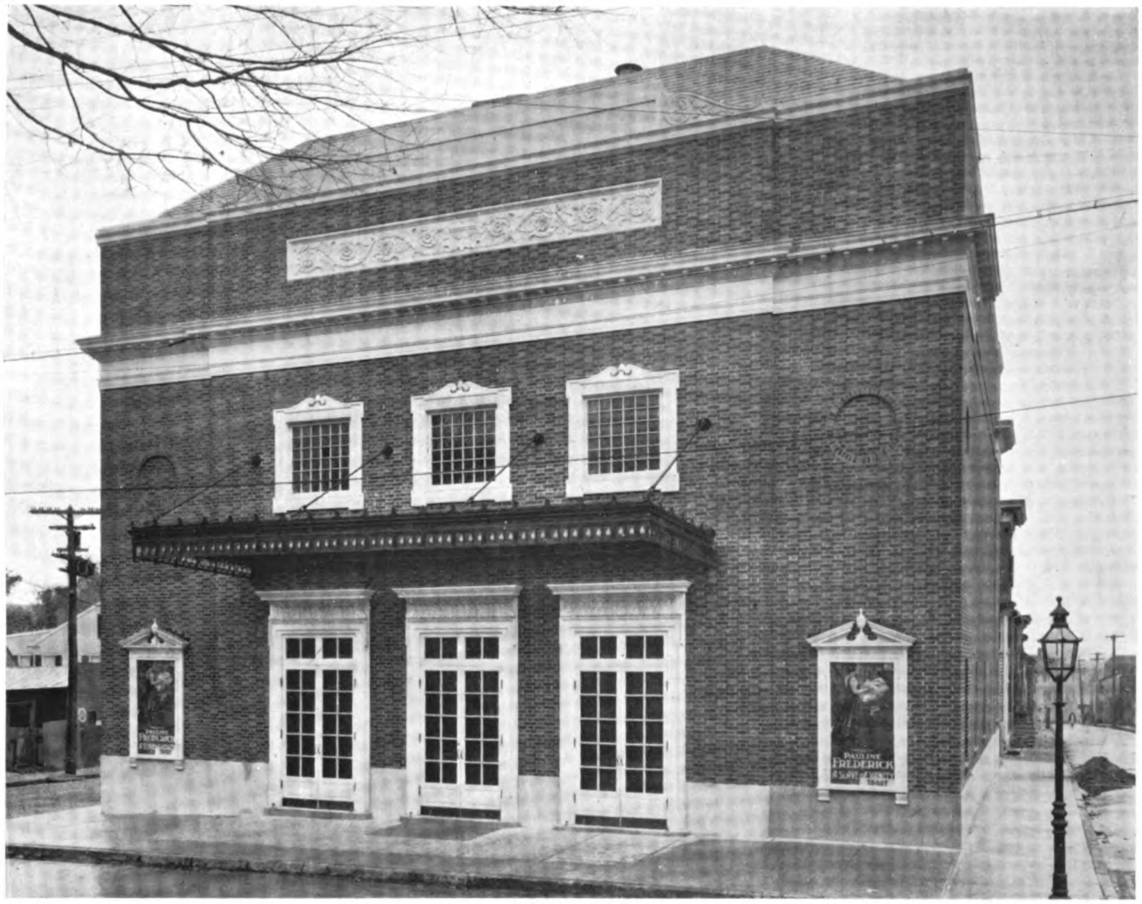
Detail of Porch, Rest House, Mt. Auburn Cemetery, Cambridge, Mass.
Ralph Harrington Doane, Architect



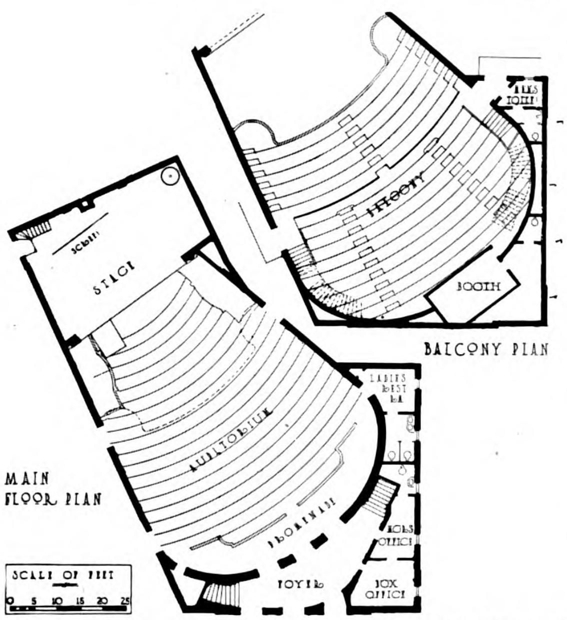
GENERAL VIEW

REST HOUSE, MT. AUBURN CEMETERY, CAMBRIDGE, MASS.

RALPH HARRINGTON DOANE, ARCHITECT



MAIN FACADE

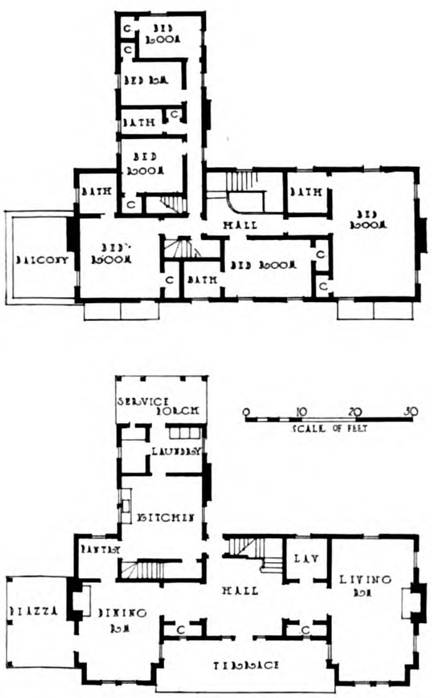


FLOOR PLANS AND FOYER

CIRCLE THEATER, ANNAPOLIS, MD.

HENRY P. HOPKINS, ARCHITECT

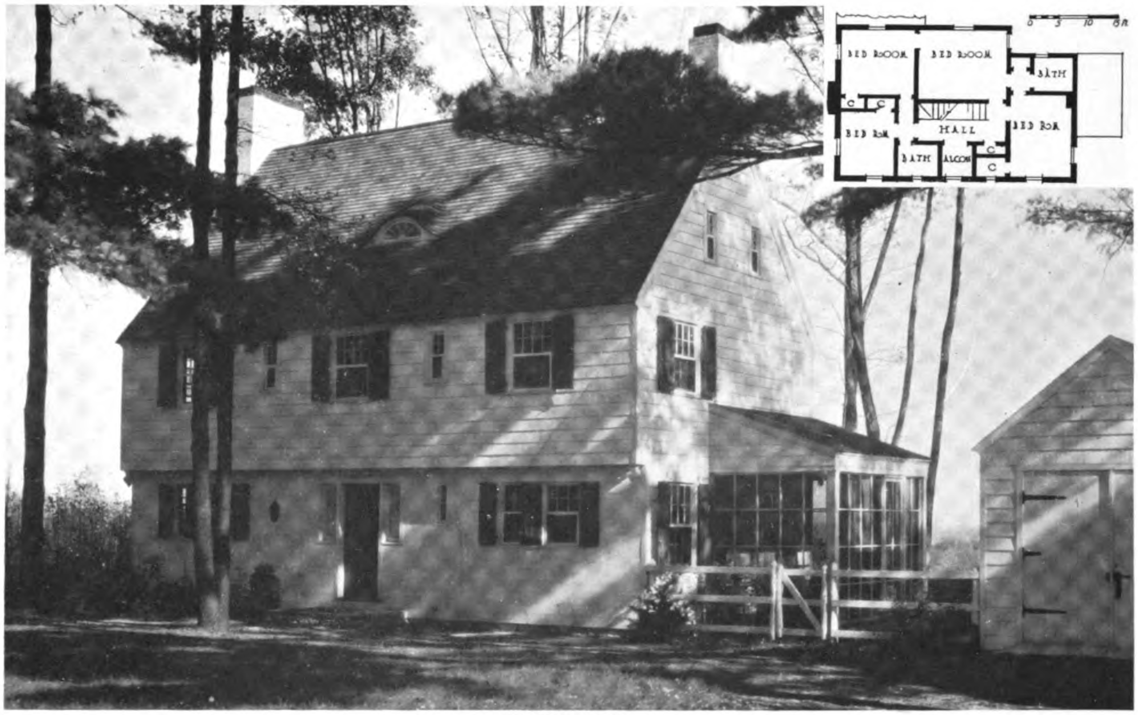
ENTRANCE FRONT



FLOOR PLANS AND VIEW FROM ROAD

"OVERLOOK COTTAGE," FOR E. CLARENCE JONES, ESQ., SARATOGA SPRINGS, N. Y.

LEWIS E. WELSH, ARCHITECT

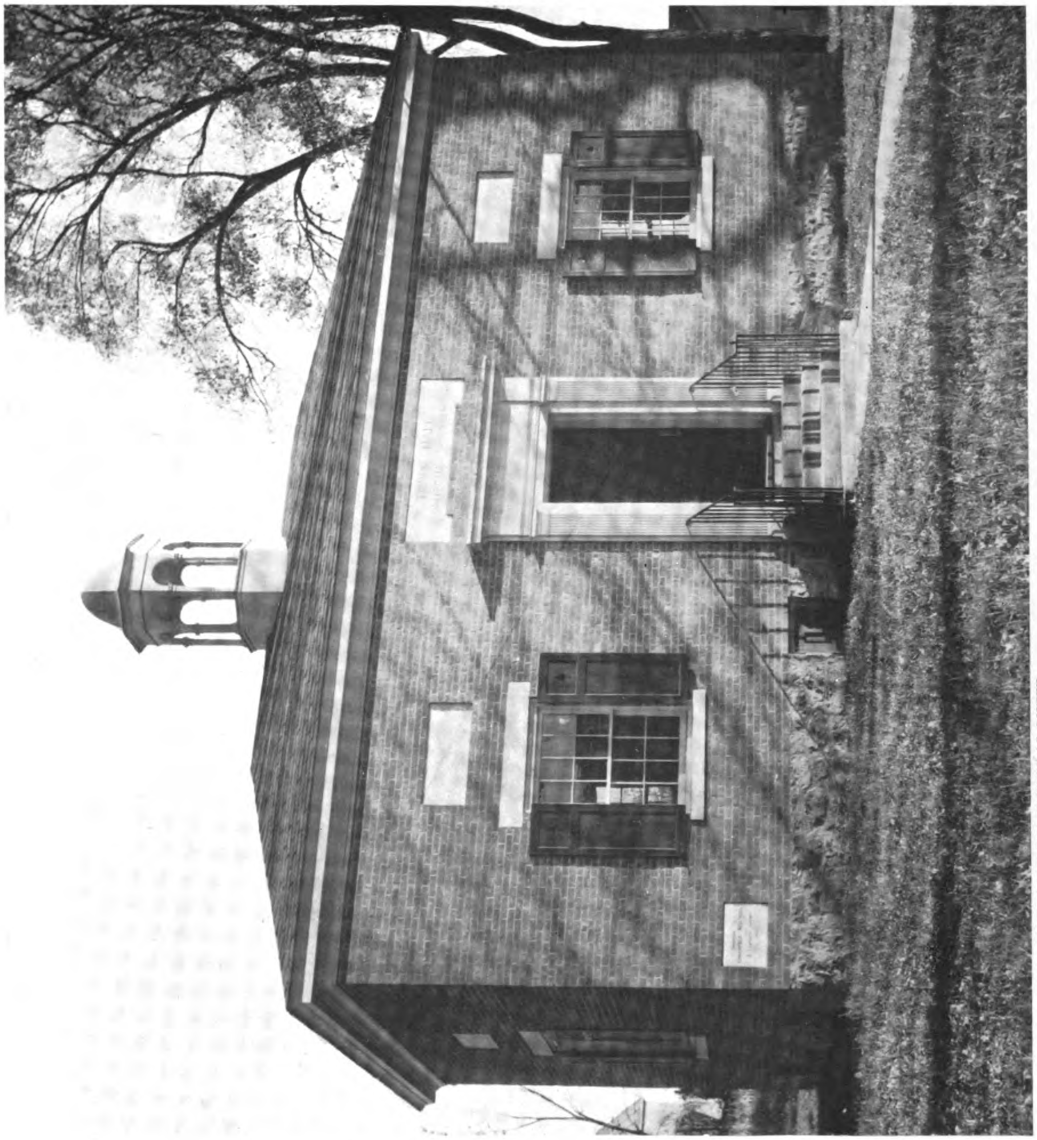


MAIN FRONT

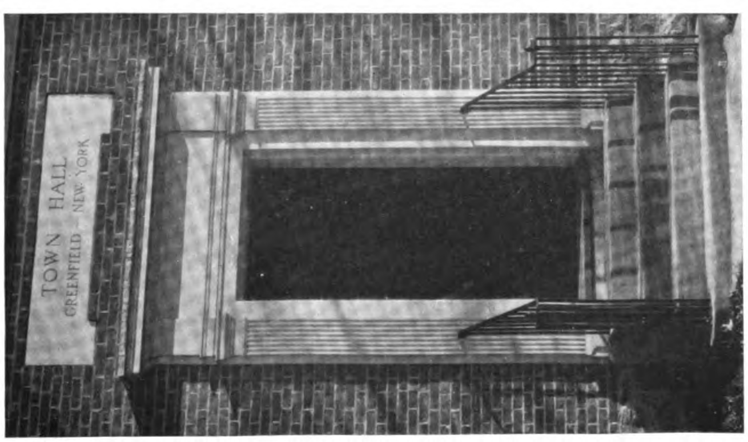
VIEW OF END AND REAR

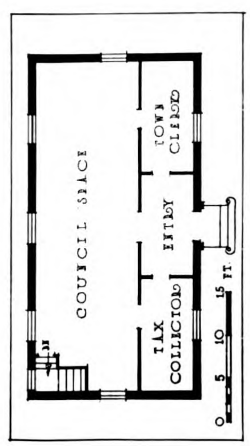
"PINE TREE COTTAGE," FOR E. CLARENCE JONES, ESQ., SARATOGA SPRINGS, N. Y.

LEWIS E. WELSH, ARCHITECT



DETAIL AND GENERAL VIEW
TOWN HALL, GREENFIELD, N. Y.
LEWIS E. WELSH, ARCHITECT





ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Electrical Wiring Layouts for Modern Buildings

PART III

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

IN the laying out of the plans and specifications, and with the necessary information at hand, the construction of the building must be outlined. *First Class Construction.* If the projected building is of first class construction, we are compelled to use a full conduit system, conduits being used for all wiring circuits, whether these wires control power, lighting or telephone and other low tension equipment. The outlets must all be of steel or iron and of the standard type in use for conduit work, the circuit wires looping from the outlets back to the panel boards, and the system of conduits and wires controlling from each panel board being complete in itself, the panels being connected either singly or in groups on the riser and feeder mains, which in turn are run back to and controlled from the main distributing switchboard.

The low tension circuits, including telephone, bell, clock, A.D.T., fire alarm and other signal wires, are carried back in conduits to distributing cabinets, and the master circuits are run from these cabinets to the general center of distribution for low tension wires. The conduits of each low tension system should be separate from all others, so that there will be no interference between the wires of the different circuits. This method of distribution of the wiring circuits and control would be practically the same for any type of building; the methods of feeding the distributing switchboard from the service, or the methods of connecting the low tension circuits with the entering service lines, will depend upon the type of building and the load. These methods will be considered later.

Second Class Construction. If the building is of second class construction and will warrant the expense, it is still advisable to consider the installation of a full conduit system of wiring, the outlets and materials being of exactly the types already noted. If, however, it is found necessary to reduce the expense of the electrical installation, conduits may be run for the installation of all large feeders and mains, and for runouts to motors. Again, conduits must be used in all damp places and where it becomes necessary to build the circuits in brick or masonry walls. In partitions of wood studding, however, and between wooden floor timbers, B.X. armored wires may be used at a considerable saving over the use of "all conduit." At points where the conduit circuits terminate and are continued in B.X. wire, it is necessary to provide junction boxes, excepting at panel board locations, as B.X. construction may be continuous from the panel boards to the outlets.

A further reduction in expense can be effected by the running of low tension bell wires in the stud partitions without protection of any kind, simply clipping the wires to the timbers. This form of construction, however, should be avoided wherever possible, as in the event of trouble on the circuits it is necessary either to abandon the circuits and run new wires, or to cut through walls and floors to find the source of the trouble. In buildings of this type, where it is impracticable to use rigid conduit, due to building conditions, flexible steel conduits may be run. This, however, is more expensive than rigid pipe, and is seldom used on new work excepting in difficult places.

Frame Buildings. Rules permitting, frame buildings may be wired with conduits, armored wires or knob and tube construction; conduit work is to be preferred, still B.X. gives a thoroughly satisfactory installation, as the wires may be secured in all ways to the timbers during the construction of the building, and with new work it is possible to set outlet boxes in a thorough and rigid manner before the lathing is begun.

On small buildings the panel board is generally located in the basement and branch circuits only carried above the basement floor (Figs. 1 and 2). Where possible, however, conduits or armored conduits should be run for the installation of bell, telephone and signal wires. Where knob and tube construction is used, careful inspection should be made during construction to insure an adequate number of knobs installed to support the wires properly, and also to insure a knob set on each wire at a point near the fixture outlet, with a length of circular loom reaching from the knob to a point well within the fixture canopy.

Porcelain tubes should protect the wires at all points where these wires pass through studding, timbers or wood of any kind, and porcelain tubes should be slipped on the wire and securely taped thereto at points where the wires may come in contact with metal or masonry. At points where wires rise through the floors there should be tubes through the wood and other tubes strung on the wire so that falling plaster will not come in contact with the wires at the points where they pass through the floors. Cutouts as a rule are of the porcelain type; these should be installed in a steel, or metal lined cabinet, and all wires entering the box should be protected with circular loom tubing.

Old Buildings. Unless being dismantled, old buildings should be wired either with B.X. armored wire or conduits. Of the two, B.X. will be cheaper and more easily installed. The locations of the panel boxes would be the same as for other types of construction, excepting that in old buildings it is advisable to install the panel boxes in locations where the wires may be readily carried to them. On large buildings it is sometimes necessary to run the riser and feed wires exposed, B.X. only being run for the branch circuits. Where signal or telephone wires are required, they may be fished through the construction, or may be installed in flexible steel conduit or in circular loom tubing. With B.X. construction in old buildings, the panel boards may be of the standard type and installed in steel boxes, or again steel boxes may be used with porcelain cutouts.

In old buildings which are already wired, and where it is desired to install new outlets, feeding them from existing outlets, it is common practice to use metal mouldings for the runouts, and special fittings can be obtained which fit over the existing outlets, permitting runouts to be made in any direction.

Exposed Work. In buildings of mill construction, or where exposed work must be considered, the wires may be run on cleat construction, in conduits, in metal mouldings or in wood mouldings. It is not advisable to use B.X. armored wire for exposed work unless the appearance of the wires is of no consideration, as it is impossible to install B.X. in straight lines or to use square turns, and in spite of the care with which the work is carried out, the wires are unsightly.

Rigid conduits, using the special outlets which are available, make a very satisfactory installation, and, aside from appearance, have all the advantage of concealed conduit work. Panels and cutout cabinets as well as fittings should be of the surface type and care should be exercised in the running of the conduits to insure a workmanlike appearance. Metal moulding, when properly installed, is less unsightly than exposed conduits. A complete line of steel fittings is made to be used with it. It can be broken around beams and fitted in corners more readily than conduit; again, this system is less expensive to install than exposed conduits. With this system it is customary to run all mains and feeder wires in conduits (Figs. 1 and 2).

Cleat construction is less expensive than any other type of electrical wiring, and it is fairly safe when properly installed. As the wires have no protection from mechanical injury, this type of construction should not be considered where it is possible to install some form of steel.

Residence Wiring; New Buildings. The work involved in laying out a wiring system for a residence is small compared with that required for a building of the school or commercial type, nevertheless, no building requires more careful consideration and study, as to the locations of the outlets, the types of lighting fixtures to be used, and the methods and convenience of switch control.

The description given here refers to residence building in general, and may be applied to a cottage of 6 or 7 rooms or to a building of many rooms and several floors. The number of outlets to be used in each room, convenience of switch control, the use of elevators, refrigerating equipment, electric cooking, etc., in fact the completeness of the electrical layout, must be determined for each particular installation. The general methods of installation, the manner of connecting outlets, placing of panels and switchboards, and the installation of the service, however, will apply to all residence buildings irrespective of their sizes.

Before beginning work on the layout, the building plans should be carefully considered, and if possible

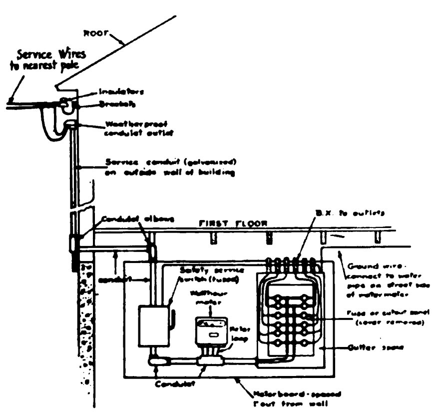


Fig. 1

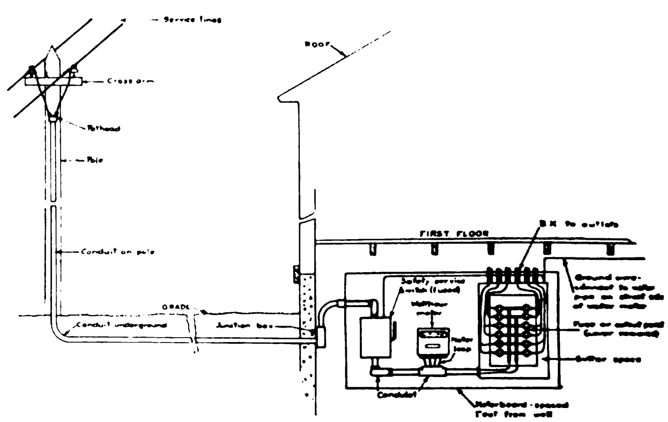


Fig. 2

Diagrams of Meter Board, Service Switch, Panel Board, etc., for Overhead and Underground Service the furniture layout secured, so that the outlets may be located with reference to the positions of the furniture. Furthermore, provision should be made in the contract permitting the exact locations of the outlets to be checked before actually installed, as the exact locations may have to be determined at the time of installation. Information must be obtained from the service company as to the location of the service switch and meter board, the point where the service wires will enter the building, and also whether the service will be two-wire or three-wire.

System of Wiring. If the building is of first class construction, all circuits must be run in rigid conduits. If of second class construction, the mains and feeder circuits may be run in conduits, while all branch circuits may be run with B.X. armored wires. If of third class, or frame construction, a combination conduit and B.X. system may be used, or, if it is desired to keep the first cost of the installation at the lowest point, a combination conduit and knob and tube system may be adopted.

On any combination system it is advisable to run all feeders and mains in conduits or in flexible steel tubing, and to run the branch circuits only on knob and tube construction. It may be said that with the use of B.X. armored wire for branch circuits, far less cutting of timbers and studding is required than is necessary with the use of rigid conduits. The locations of outlets, switches, panel boards and all other fittings will be the same, regardless of the type of wiring system selected.

Drawings. On the smaller buildings, it has sometimes been the custom to merely spot the locations of outlets and switches on the building plans and to leave the question of circuiting and control to the contractors estimating upon the work and to the wiremen making the installation. This is not good practice even on the smaller buildings, as contractors estimating to "get the work" will figure on the cheapest possible methods of construction and on the cheapest materials and fittings, and furthermore, will make no provision for possible additions to the wiring system. The prices received from contractors will depend on each man's ideas as to what should be installed and as a rule, on work laid out in this way, many extras are found necessary before the work is completed. Accurate drawings showing the locations of conduits and fittings, etc., are not required, yet the accurate locations of all outlets, switches and special equipment should be shown on the building plans. The panel boards and cutouts, service switches and meter boards should be located on the drawings, and all wires should be properly sized (Fig. 3). Switch loops should be connected up, showing the outlets controlled by the switches, and where there are three or more wires required between any two outlets, the number of wires should be indicated. All main and feeder wires from the service switches to the panel boards should be shown on the drawings. On large work it is advisable to make a riser diagram showing all panel boards, motors and special equipment, together with the connecting network of main and feeder circuits.

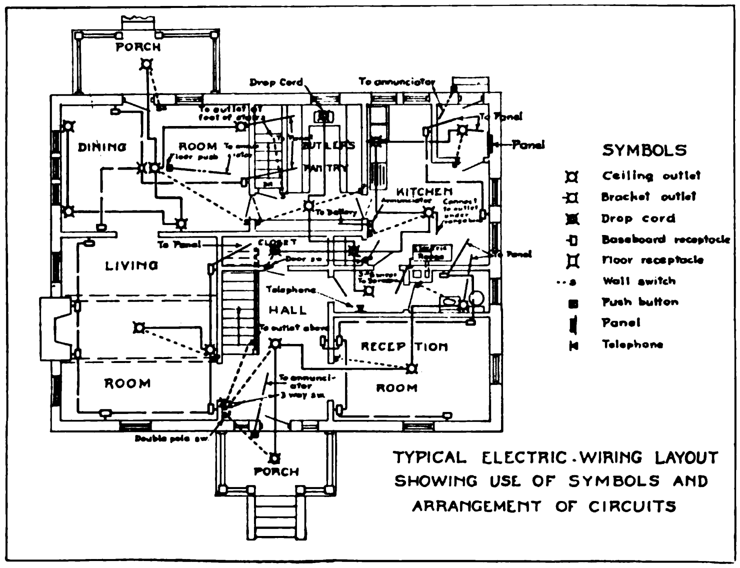


Fig. 3
Symbols and Circuit Arrangements on Typical Wiring Layout

The locations of concealed conduits or of armored wires cannot well be determined on the drawings, as structural conditions will more or less determine the exact locations of these conduits. The outlets and switches should be accurately located as well as the outlets that are to be connected to each branch circuit. The method of running the wires and the locations of the conduits in the building construction may be left to the judgment of the men installing the work.

Locations of Outlets and Circuit Connections

In locating lighting outlets, each room should be considered separately and the outlets set with reference to the positions of the furniture, trim, paneling, etc. If a furniture layout is not available, it is best to assume locations for the furniture in each room, to show the outlets, and to make provision so that the locations of these outlets may be changed if necessary at the time of installation. After the outlets and switches are determined, the circuits connecting these outlets should be drawn in, and the branch circuit shown from the feeding outlet to the panel board or cutout.

The outlets are noted by means of "symbols" (Fig. 3). Standard symbols have been devised and should be used on all electrical drawings so that the plans may be read without the necessity of referring to a key. Ceiling and bracket fixtures may be used for the lighting of the rooms in conjunction with wall and floor receptacles, permitting the use of portable lamps.

As a rule, bed rooms of average sizes are best lighted by means of brackets. In a small room, where but one light is to be used, the fixture should be at the left of mirror and 6 ft. 6 ins. above the floor. Where two lights are to be used, one should be at the mirror and one at the left of the bed, or if preferred, the second fixture may be located over a table or desk. Where bed rooms are large or where best results are required, there should be one bracket fixture at each side of the mirror, one at desk or dressing table, and either a bracket at the bed or a receptacle permitting the use of a portable lamp.

The use of reflecting electric heaters is becoming more common, for tempering the air of bed rooms, or for use in the fall and spring when the main heating system is not in operation. It is therefore advisable to consider the use of a heater receptacle in each bed room, controlled from a single circuit from the panel board. This receptacle will not only provide for the heater, but may be used to operate a fan or any portable equipment. Switches are not, as a rule, installed to control the lighting fixtures in bed rooms, as the lights are controlled directly from the sockets; expense permitting, however, a switch should be installed at the door.

Corridors, stair halls, toilets, etc., may be lighted either from ceiling or bracket fixtures, depending upon choice. A bath room should have two brackets one on each side of the mirror, and should also have one receptacle permitting the use of portable equipment. Each bath room or toilet should have a switch at the door, this switch controlling all outlets. Switches controlling corridor lights should be located near the stairs; if the corridors are long and there are two or more entrances, it may be advisable to use three-way or four-way switch combinations, permitting the lights to be controlled from two or more points. Three-way and four-way switch combinations should be used for the lighting of the stairs, the switches installed on the different floors and the stair circuits being separate from the circuits controlling the corridors. There should be a receptacle in each corridor for use with a portable vacuum sweeper, these connected on one circuit and controlled from the panel board.

Dining rooms, living rooms, music rooms, libraries, billiard rooms, etc., are best lighted by means of one or more ceiling fixtures, balanced with a number of wall brackets. Wall receptacles and floor receptacles should also be carefully located in these rooms to provide for the placing of portable fixtures at pianos, phonographs, at tables, book cases, sideboards, desks, buffets, etc. It is advisable also to consider the use of proper receptacles in all these rooms so that electric heaters may be used.

The kitchen is best lighted by means of bracket fixtures; if ceiling pendants are desired, they should be carefully located. The old practice of placing a single pendant, either gas or electric, in the center of the room is to be condemned, as anyone working at the range, table or sink must stand directly in the line of the light. It is well to use a single light at the table and, if the range is not under a hood, to use a ceiling pendant or a bracket at a convenient point. If a hood is used over the range the lamp outlet should be under the hood. If the sink is in the kitchen, a bracket or pendant should be located at or near it. The lighting in the kitchen may be controlled from the sockets or from a switch controlling all outlets. The pantry is best lighted from a ceiling collar, this controlled by a switch.

A ceiling outlet switch, controlled, should be used in the rear vestibule if the refrigerator is located there. A receptacle near the refrigerator permitting the use of a portable cord is also desirable. It is well also to provide an additional receptacle in the event of the use of an electric refrigerator.

If the building is to have a separate laundry, provision must be made for the use of electric laundry equipment; this will include an outlet for motor-driven washer (2 h.p.), a motor-driven extractor (2 h.p.), an electric ironer (1 h.p. motor and approximately 30-ampere load for the heating element), also a number of electric irons. If a separate laundry is not considered, then some provision should be made in the kitchen for the use of an electric iron and a portable washing machine; one receptacle outlet, fed from two No. 14 wires from the panel board will be sufficient. The receptacle, however, should be one of the standard type for this service and should be equipped with a switch and pilot lamp.

In the grouping and connecting up of the outlets not more than 660 watts should be allowed for each branch circuit, and not more than 12 outlets in any event should be connected to a single branch circuit, and this only when it is assured that the fixtures will not require more than 50 watts each.

It is obvious that if the fixtures connected to the outlet are to be used with three 50-watt lamps each fixture will require 150 watts, and not more than four of these outlets should be connected to the circuit, or, if single pendants, each fitted with one 100-watt lamp, are to be used, then not more than six outlets should be connected to the circuit. Where large fixtures, flatirons, electric heating devices, etc., are to be used, there should be a separate circuit run from the outlet to the panel board or cutout controlling these units.

On average residence work, however, it is good practice to allow from eight to ten lighting outlets to the circuit (this does not include switches) as this number will allow more or less leeway in the choosing of fixtures, without the danger of overloading the circuits.

Some Facts on Warm Air Heating

PART I

By L. A. BRISSETTE

HEALTH, comfort, economy of operation, ease of management and durability are the essential features desired in any heating system. There are many modifications of the four principal systems of heating,—warm air, steam, vapor and hot water, and many of them meet these requirements in part, but a good warm air furnace installation embodies all of these features.

A warm air system heats a house by means of fresh air drawn continually, from outside or within, into the heating system in the cellar. This air is heated quickly and driven up and through the house, and an automatic circulation of air continues as long as there is a fire in the heater. This circulation is constant and cannot stop, because it is based on the positive and natural law that cold air descends and warm air rises. Ventilation is of prime importance, and the warm air system guarantees an adequate supply of fresh air.

Many people believe that fireplaces or open grates provide sufficient ventilation. These cannot be depended upon for ventilation excepting for the rooms in which they are placed, because there will probably be no real ventilation unless there are fires in the fireplaces or grates, and also because the amount of air removed from the rooms is seldom correctly proportioned to the sizes of the rooms. The proper and adequate ventilation of homes is more important to health than the heating. The laws of the various states cover carefully the problem of ventilation in connection with the heating installations in schools, churches, theaters and public halls. In most states ventilation must be provided to the extent of supplying 30 cubic feet of air per minute per occupant. If it is necessary that public buildings, where the occupants remain for only a few hours at a time, should be thoroughly ventilated, it is much more important that residences should have adequate provision for health protection.

The value of moisture in the air is not given due consideration by the layman. A certain percentage of moisture in the air is essential for both plant and animal life. It is not unusual to find houses heated by direct radiation, where the percentage of moisture in the air is less than in the driest part of the Sahara Desert. Sometimes the wood in the finish and furniture will shrink and come apart. This is because the air in the room is drier than the kiln in which the lumber used in the finish and furniture was dried. Some people believe that the moisture from the water or steam in the radiator finds its way into the room. This is not so, because the radiators are constructed to hold the water or steam and there are no means provided for the moisture to escape.

Modern high grade warm air furnaces are equipped with water pans of generous proportions. These water pans are placed where the evaporation is greatest. The evaporation is governed by the amount of fire in the furnace. When there is a hot fire the evaporation is greater, causing an even distribution of moisture throughout the house. Some furnaces have a device which automatically keeps the water pan filled with water. This attachment, which is connected direct to the water supply, insures a constant and healthful degree of humidity.

During the heating season the air in the average house, which has no humidifying device, varies from 15 to 25 per cent relative humidity. All medical and scientific experts are agreed that the indoor relative humidity should never be permitted to fall below 40 per cent, and they are further agreed that atmosphere with a relative humidity of 55 to 65 per cent is best. Properly humidified air affords comfort at 65° Fahr., whereas dry air, owing to the excessive evaporation from the skin, thereby lowering the temperature of the body, must be heated to 72° to provide sufficient warmth. This difference of 7° represents a vast difference in the amount of coal burned during a heating season. In residences,

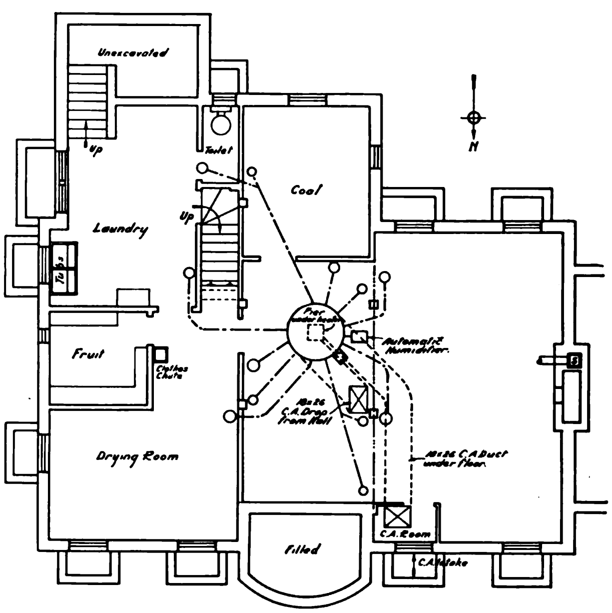


Fig. I

Typical Basement Plan Showing Pipe Runs

large, medium or small, the air can best be properly humidified with the minimum of expense and trouble when a warm air system of heating is installed.

The most common criticism of the warm air furnace system has been the complaint of dust and gas leakage and also the difficulty of heating certain rooms under certain wind conditions. There is no question but that if the furnace be properly constructed and properly cared for, as would be done in the case of any other mechanical appliance, the leakage of dust and gas will be found actually to be no greater than with any other type of heating system. Furnaces are constructed in a variety of ways, but that furnace which presents the smallest number of joints between the combustion chamber and the air chamber is obviously the higher type of furnace and is less apt to cause difficulty. If all of the joints are properly filled in setting up the furnace, and this is one of the things which the architect should superintend with care, there will be no connection between the fire box and the heat chamber. One must realize that gas will come out of the fire box door, due to back draft or natural "chimneys" through the house, and in this way escape from the basement to the various rooms through the spaces around the pipes, etc. This undoubtedly is far more frequently encountered than a leakage of gas directly from the fire pot into the chamber. The dust follows the same general channels and is deposited around the house in various ways. If a careful examination were made by those people who claim to have difficulty from these two sources, undoubtedly it would be found that a very small portion of all the gas and dust comes through the register openings. As has been previously noted, the warm air furnace installation is far preferable to other types from the standpoint of relative humidity.

One probable cause of criticism on the part of owners of warm air plants may be due to the fact that the architect in his plans does not provide proper facilities for conducting the pipes from the furnace to the register openings. Where there is a large room to heat and the architect insists that the heating contractor carry his pipe within the limits of a 4-inch partition, he is immediately taking one of the steps most effectual in condemning the heating system to giving poor results. The round pipe is the most efficient conductor of air, the oblong pipe is next, while the very flat pipe is the least desirable on account of the extreme friction developed. If, then, the architect, in planning a house where an efficient warm air installation is desired, will, in consultation with the heating contractor, arrange the proper spaces for the pipes, thickening partitions or furring around the pipes, the chances are greatly in favor of the client being highly satisfied with his installation.

The cold air box or duct, which provides fresh air for the system, should preferably be located on the leeward side of the house and frequently will have a damper and opening to the inside air, causing a recirculating action for days when the outside temperature is extremely cold. A practical size for this duct is about ¾ the area of the combined heating ducts or, for an average of 480 square inches in pipe conducting warm air, a cold air duct of 16 x 24 inches would be ample for providing fresh air.

Obviously, the heating unit should be located near the center of the house so that the length of runs of the various pipes may be as nearly alike as possible (Fig. 1). Also, the pipes should come out of the top of the furnace instead of the sides. Each pipe should have the maximum possible pitch allowable by the height of the basement, and ¼ inch to a foot should be the minimum. Common practice in obtaining the size of pipe for a room is to divide the glass area plus ¼ of the exposed wall area in square feet by 1.2 for the first floor, 1.5 for the second floor, and 1.8 for the third floor the result to be read as square inches. For example, ¼ of 500 square feet wall area, plus 60 square feet of window glass in a typical living room, resolves itself into an area, the diameter of which is, approximately, 14 inches. This would be rather large to adapt for wall registers so that oval or oblong sections would have to be used.

The registers always should be installed with slate or concealed borders. The additional expense of this over the border in wood is negligible and it serves so much better to protect the register and to protect the floor that in the highest type of installation slate or metal is always used.

From the practical housekeeping standpoint, the registers should be located in the walls rather than in the floors, as in this position they do not offer themselves as receptacles for anything that one wishes to discard, and incidentally the natural dust cannot settle in the registers and then be thrown back into the room by the action of the warm air current.

If the more exposed rooms have the windows equipped with weather strips, or if the sash are properly fitted and if the spaces around the windows are properly made weather tight as the building is constructed, there will be no difficulty in heating any room under any air condition. It will be at once apparent to anyone analyzing this situation that the reason warm air furnaces will not heat an exposed room with the wind blowing into the room around the windows or through walls, is because of the pressure established by the leakage of the outer air which makes a plenum chamber momentarily of the room, and forces the cold air down the registers rather than permitting the warm air to come up.

ITALIAN RENAISSANCE DETAILS

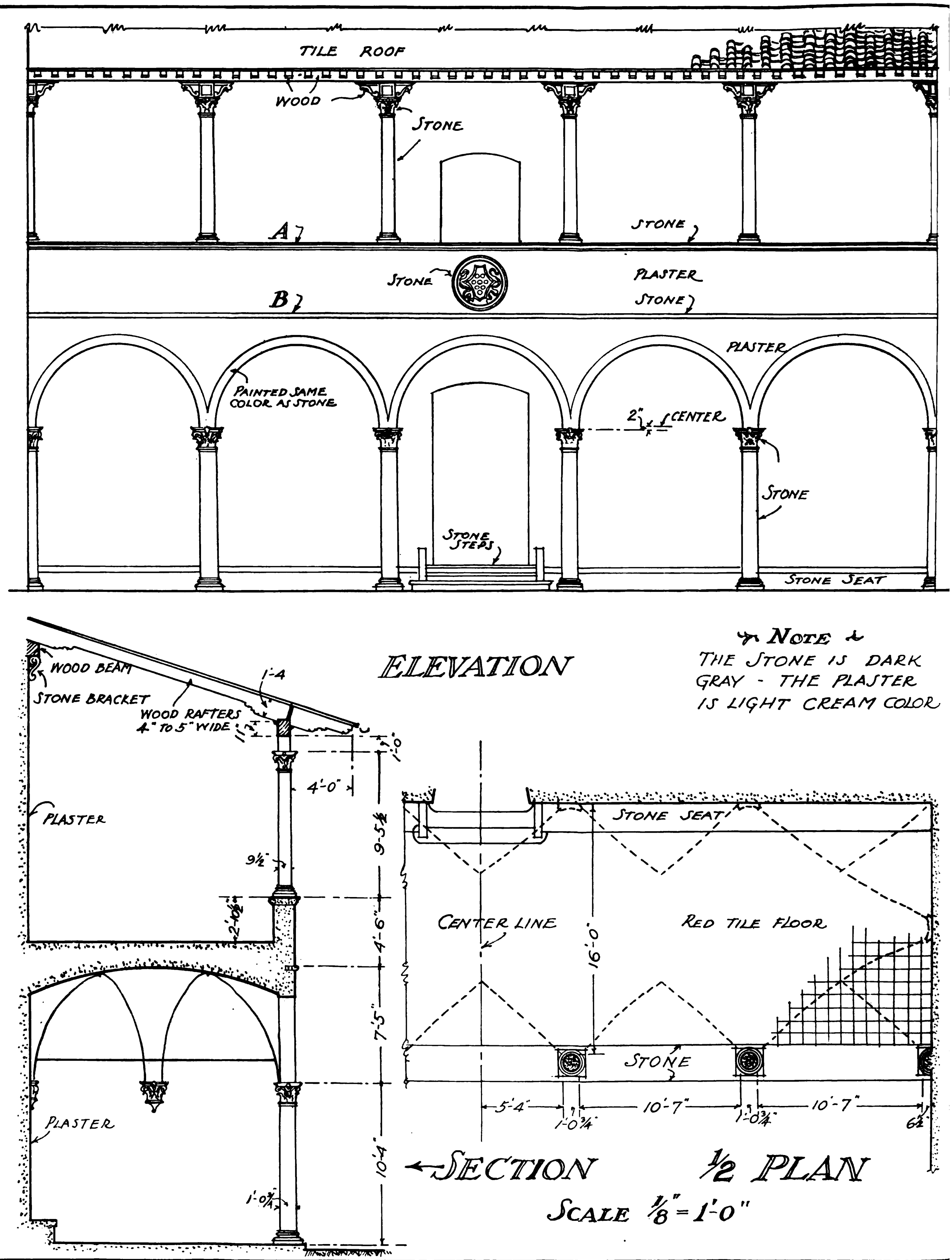
A SERIES OF MEASURED DRAWINGS

By F. NELSON BREED

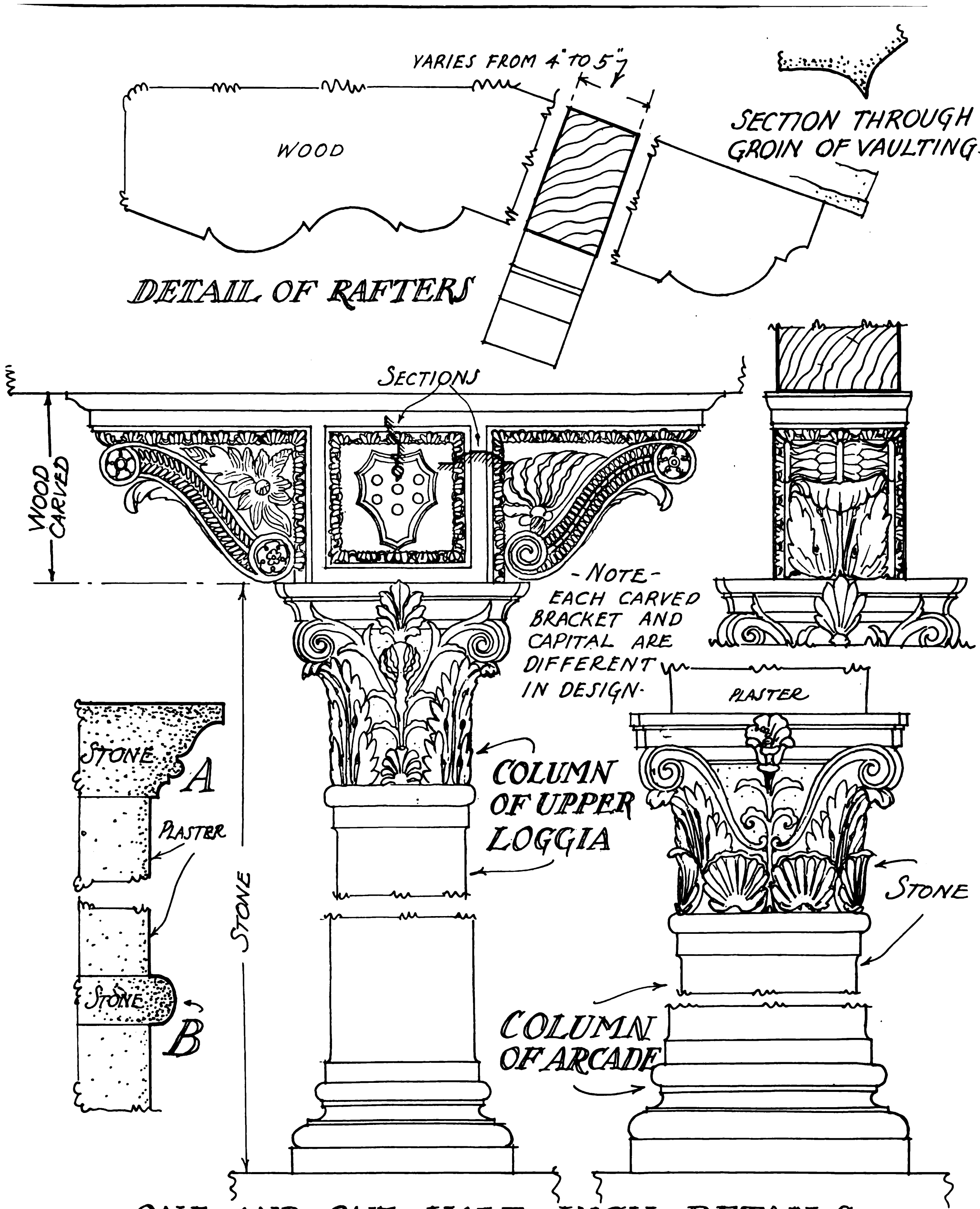
LOGGIA OF THE "BADIA DI FIESOLE"

NEAR FLORENCE, ITALY

THIS graceful loggia of a 15th century abbey attributed to Brunelleschi, situated on the axis of a quaint old apple orchard, is constructed of masonry with an open timber roof. The parts indicated on the drawing are covered with a smooth stucco of a light creamy yellow. The columns, seats, corbels, string course and coping are of a dark yellowish gray limestone. The dark band which shows around the semicircles of the arches is simply painted on the stucco in color to match the stone. The floors are of red tile similar to our quarry tile. Above the caps of the upper columns the construction is of wood of a rich dark brown, the color of walnut. The consoles immediately above the columns are beautifully carved, each one being a little different in design. The roof tiles vary in color from salmon red to yellow ochre, surmounting a composition of considerable warmth.



MARCH 1922	LOGGIA BADIA DI FIESOLE NEAR FLORENCE, ITALY.	MEASURED AND DRAWN BY F. N. BREED.



ONE AND ONE HALF INCH DETAILS

MARCH 1922	LOGGIA BADIA DI FIESOLE NEAR FLORENCE, ITALY.	MEASURED AND DRAWN BY F. N. BREED

EDITORIAL COMMENT

THE KNICKERBOCKER THEATER FAILURE

WITHIN the past few months a number of building failures have been the subject of wide publicity in the daily press, with the natural attendant damage to the general reputations of architects, engineers and contractors. The collapse of the roof of the Knickerbocker Theater in Washington, entailing the loss of 98 lives, was a most unfortunate and regrettable calamity. Study of the cause of the collapse has been very thorough, by engineers and special investigators, but the reasons advanced are largely based on theory, the occasion being one of most unusual type in the history of building failures. The presence of a heavy load of snow on the roof was merely incidental and not to be considered the reason for the failure. From investigations now made it is safe to say that the roof would have failed at some time, irrespective of snow load; it seems an evil play of fate that the time of failure should have been during a performance.

Faulty and careless construction usually brings its own disastrous results while building is yet in progress, as in the instances of the recent theater collapse in Brooklyn and the failure of the Masonic Temple at Salina, Kansas. Such occurrences as these are readily explained and the blame can easily be placed. When a building fails after six years of apparently satisfactory service a far different and more complex problem for solution exists.

In theater construction particularly the demand for a number of years has been for large, unobstructed open spaces in the interior; columns have been eliminated because of sight demands, and complicated truss and cantilever construction has been evolved. The framework, furthermore, has not been designed as an entity apart from its enclosing shell; use is still made of masonry bearings and these supports are reduced to the minimum because of space and cost requirements. At best the average theater structure is dependent on the minimum of bracing, and the forces and actions of loads, both live and dead, must be carefully anticipated under such conditions.

The details of the Washington investigation so far available indicate that the roof fell in its entirety and was not preceded by any failure of its frame or supports. The main truss appears to have been unseated from its bearing and the roof slab and trusses, falling within the walls, crushed down part of the balcony. Two features of the failure stand out as carrying a lesson to architects. The first involves too great dependence on the checking function of the building department. The theater structure was originally designed by an engineer in collaboration with the architect. The contractor who carried out the work, in submitting his bid, tendered an alternative scheme for the steel work, prepared by steel fabricators and designed to reduce the cost of construction. This alternative type of framing was accepted with the provision that it meet the approval of the building department. It is not contended that this steel design was faulty or caused the collapse; it does, however, indicate the possibilities for dangerous construction when one agency, and that often taxed beyond the powers of its personnel and frequently headed by a political appointee, is placed in the position of sole judge.

The second point relates to an inadequate building code and the opportunity that exists for sacrificing structural strength for considerations of architectural design. The north wall of the theater was in the form of a gentle curve and this was also the facade on a residential street. It was 35 feet high from curb to bottom chord of roof trusses, and provided one of the supports for the main truss, carrying a load of 50 tons. Owing to the failure of the Washington building code in effect at the time of construction to make any distinction between exterior walls of general type, such as those for apartment houses, and a large open space building, the structural wall was permitted to be built 18 inches thick; this was slightly increased at points by an exterior pilaster treatment and a 4-inch facing of brick or stucco on tile according to location. The wall was furthermore pierced with a number of window openings on the exterior, to give the building a residential appearance to accord with the character of the neighborhood.

The theory for the failure that seems most likely is that a gradual outward movement of this wall took place which was eventually sufficient to unseat the main truss. There is no explanation for this movement, nor was there any advance evidence of it, such as cracking of the plaster decorations within the theater. The actual progress of the failure may never be known, yet it has already stirred the attention of architects, engineers and contractors throughout the country, and if it is the means of focusing attention on the construction of a uniform building code, based on scientific knowledge, the tremendous loss of life will not have been in vain. No code, however, can be devised that will dispense with competent professional advice, and in the last analysis engineers and architects must so govern their respective professions that the incompetent are eliminated and that the safety of the public depends upon qualified professional men.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

At Left a Georgian Chair with Damask Covering and Typical Shell Carving on Cabriole Legs

Courtesy, Nahon Co.

At Right a Georgian Chair with Needlework Upholstery, Cabriole Legs with French Scroll Foot

Courtesy, Orsenigo Co.

Mirror of Queen Anne Type, Bordered with Beveled Glass between Narrow Gold Mouldings. *Courtesy, W. & J. Sloane*

Silk and Linen Brocatelle, in Blue and Gold, Suitable for Chair Coverings. Portion Reproduced, 20 ins. wide

Silk and Mercerized Cotton Damask with Stripes Introduced in Design. Width, 25 ins.

A Simple Georgian Sofa with Straight Legs and Stretchers in Character ot Chippendale's Early Chinese Designs Covering of Needlework

Courtesy, Hampton Shops

English Georgian Decorative Precedent

II. FURNISHINGS OF THE EARLY GEORGIAN DOMESTIC INTERIOR, 1720–1760

By STANWOOD MACOMBER

THE highly architectural yet simple background supplied by a Georgian interior offers an unsurpassed setting for furniture and decoration. Paneled walls, painted in a toned shade from a varied choice of colors, or else made of pine, purposely aged and waxed to bring out the deep orange tones of the wood, afford an excellent contrast for paintings—flower pieces, classic architectural subjects or portraits — generally in somewhat somber colors and set within simple architectural frames. Mirrors in rich frames of gold, or mahogany and gold, supply the high lights in wall accessories, those modeled after Chippendale's handling of rococo and Gothic motifs affording opportunity for the most gorgeous accents. Sometimes, as a variation from the usual paneling, walls of a Georgian room may be covered with damasks or other fabrics, choice being made of those of strong, definite pattern, and rich, sumptuous coloring, with a plaster cornice placed next to the ceiling.

An Excellent Modern Chair Showing Varied Influences in Georgian Design. Splat Carving Indicates French Rococo and Legs and Stretchers, Chinese Influence

Courtesy, Nahon Co.

For such an interior, which should have good ceiling height and be fairly large scaled, furniture must be selected which is ample in scale, colorful in its upholstery and rich in curved lines and carving. The furniture of the mid-eighteenth century, which has the necessary robust character to harmonize with Georgian architecture, was largely the result of the refinement and development of the earlier period of Queen Anne. Carving on the splats of chairs, the knees of chair legs and aprons of tables is a detail which largely characterizes Georgian pieces from their prototypes.

An important influence on furniture of this period was the work of William Kent, an architect of great popularity and manifold activities. The very large and imposing houses of the nobility, in which the

A Modern Sideboard of Walnut Veneer Exhibiting Simple Beauty of Queen Anne Furniture. Length, 6 ft., height, 34 ins., depth, 20 ins.

Courtesy, Kensington Mfg. Co.

Corner of Library in Georgian Style Showing Typical Richly Carved Furniture of Period. Hampton Shops, Decorators

An Unusual Type of Wall Cabinet in Walnut Veneer, William and Mary Period
Courtesy, W. & J. Sloane

ceilings of the important rooms were often as high as 30 feet, as in the case of the double cube room at Wilton, required furniture of grand scale and great richness. Much of this furniture was designed by Kent; it took on classic forms with most elaborate carving and was frequently gilded. It has but slight application today, excepting occasionally where a rich accent may be desired, and then there is nothing to equal in effect one of the simpler carved and gilded stands of this type used to support an oriental lacquered cabinet of black or red and gold.

Wall pieces are available for different uses and in different sizes to fit conditions. They comprise cabinets with wood or glazed doors, high secretaries and bookcases. A wide variety exists in the periods of William and Mary, Queen Anne, Georgian and Chippendale, any of which can be used. Georgian chairs preceding those of the Chippendale era follow the Queen Anne type closely, with the omission of the stretcher, and greater elaboration of the back and arms. Upholstered chairs are also available, the

French Louis XV Armchair of Sufficient Size and Restraint to Harmonize with Georgian Pieces
Courtesy, Nahon Co.

A Three-back Settee of Particular Grace and Restraint in Chippendale's Chinese Style
Courtesy, Irving & Casson - A. H. Davenport Co.

William and Mary Walnut Bookcase or Cabinet with Marquetry Decoration
Courtesy, W. & J. Sloane

Corner of Painted Georgian Room with Good Grouping of Modern and Period Furniture. Hampton Shops, Decorators

wing type belonging to the period and similarly the simpler form with open wood arms. Tables were of several distinct types, one of oblong shape supported by four cabriole legs and with a carved apron is frequently referred to as "Irish Chippendale"; an earlier type had a narrow framework supported by four plain cabriole legs, two of which were movable to support semi-circular drop leaves. The tripod table belongs also to this period, and was later greatly enriched with carving and fret galleries by Chippendale whose vogue began during this period.

The richness and color which are so typical of the Georgian room are acquired largely through the use of fabrics for upholstery and hangings. In the original rooms materials imported from Italy and France were at first used, and later many fine fabrics were woven in England. Modern weaves comprise damasks, cut velvets, brocatelles, mohair velours and block printed linens. True Georgian patterns and colorings are readily available, and combinations of all silk, silk and cotton, or silk and linen may

An Early Georgian Sofa with Richly Carved Cabriole Legs and Needlework Upholstery
Courtesy, Hampton Shops

An Excellently Proportioned Wing Chair of Queen Anne Period Upholstered in Block Printed Linen
Courtesy, Irving & Casson—A. H. Davenport Co.

Black and Buff Damask with Large Scale Georgian Figure. Width of Pattern, 25 ins.

Old Crimson Silk and Linen Damask with Tinsel Effect Background. Width of Pattern, 25 ins.

Block Printed Linen in William and Mary Pattern. Width of Pattern Shown, 25 ins.

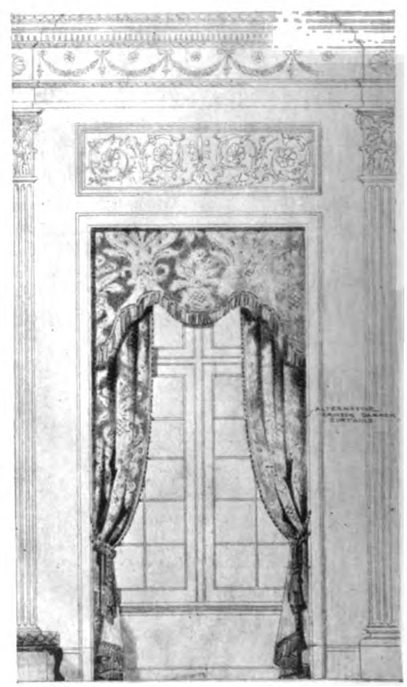
be selected according to requirements of wear and appropriateness. In some instances modern fabrics are better than the old, as, for example, gaining the effect of tinsel thread without its defect of tarnishing by winding silk about a linen thread. The damasks for hangings and upholstery are largely in bold figures and in two-toned combinations in old crimson, old gold, green and plum. Needlework was contributed from Holland, and this is available today in handwork or machine weaving. Originally used on furniture of the restoration period, it covers equally well a sofa of the slender, square legged type of Chippendale's early Chinese efforts.

Another material of great interest is crewel embroidery of large, naturalistic pattern of birds and flowers on natural colored linen; this likewise is available in modern weaves, either the product of hand or machine.

Windows in the Georgian houses are usually single and designed to emphasize the vertical dimensions. The hangings are frequently of damask or velvet, arranged in formal fashion and extending to the floor. They may be hung from cornices, painted the color of the walls or gilded, and below there is usually a shaped valance or one arranged in graceful folds; the curtains are looped back with heavy cords and tassels at a distance

Georgian Damask Hangings and Damask Wall Covering in House at Toledo, O. Henry F. Bultitude, Decorator

Silk and Cotton Damask in Blue and Gray. Width of Pattern, 18 ins.



Georgian Style Damask Hangings, Red Cross Building, Washington, D. C. Francis H. Bacon Co., Decorators

LIBRARY IN HOUSE OF HENRY P. DAVISON, ESQ, NEW YORK

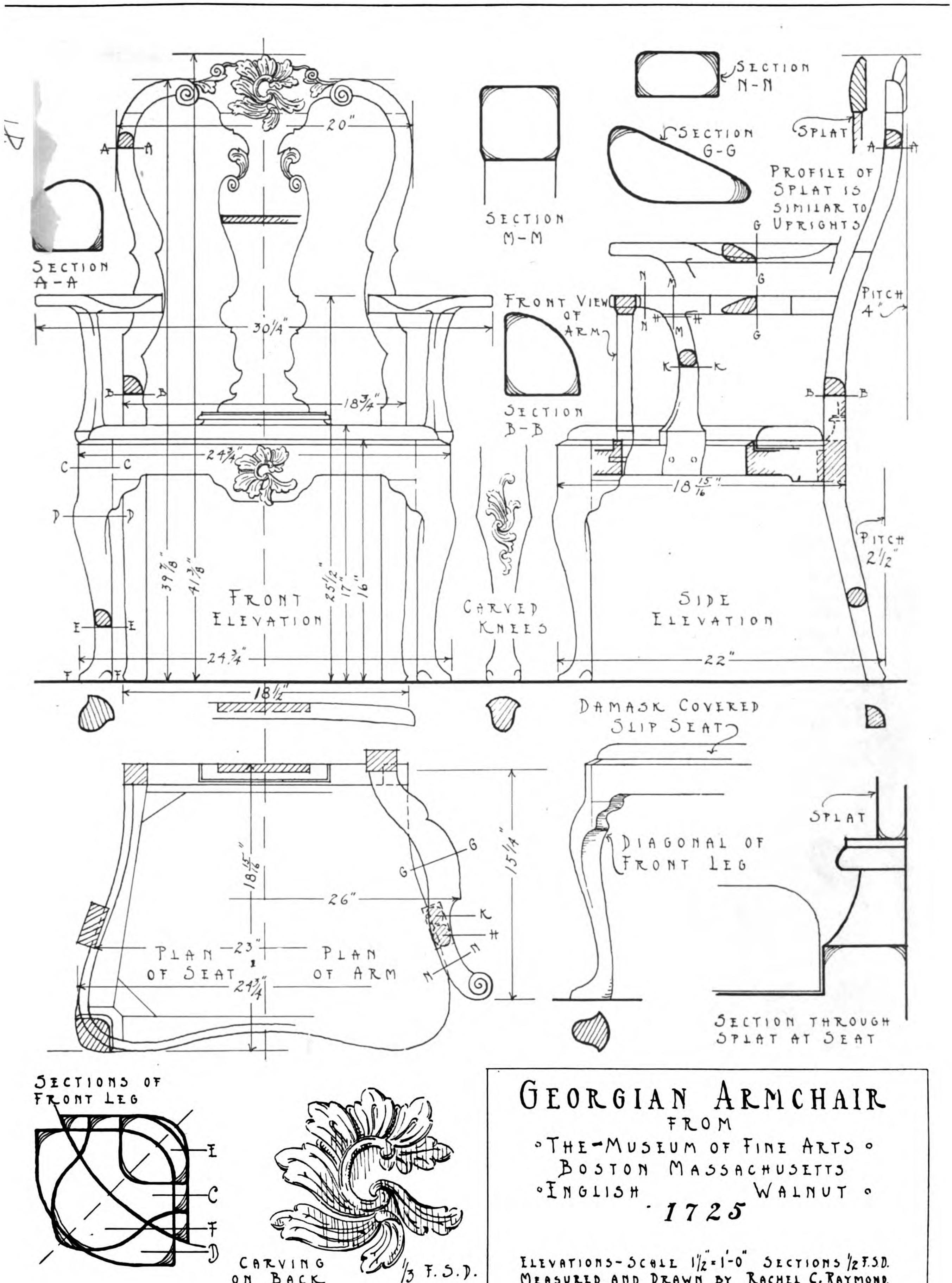
WALKER & GILLETTE, ARCHITECTS LENYGON & MORANT, DECORATORS

Typical Georgian chimney-piece treatment with two-toned marble mantel. Wall panels, ceiling and cornice of William and Mary detail. Furnishings in English eighteenth century, and modern over-stuffed pieces

DINING ROOM, HOUSE OF RICHARD GARLICK, ESQ., YOUNGSTOWN, OHIO

CHARLES A. PLATT, ARCHITECT

Excellent ensemble of Georgian furnishings. Modern adaptation of earlier English paneling with Georgian detail. Side table shows simplified classic form after Kent. Hangings of brocade with chinoiserie motifs



GEORGIAN ARMCHAIR

FROM

◦THE MUSEUM OF FINE ARTS◦
BOSTON MASSACHUSETTS
◦ENGLISH WALNUT◦

1725

ELEVATIONS-SCALE 1½"=1'-0" SECTIONS ½ F.S.D.
MEASURED AND DRAWN BY RACHEL C. RAYMOND.

either one or two-thirds of the window's height. Round headed windows are occasionally used, and if their heads are close to the ceiling a simple arrangement of hangings that will permit the curved architrave to show is satisfactory.

Floors in formal rooms such as halls and dining rooms were often of marble laid in tile shapes and in contrasting colors; oak in wide boards or simple parquetry patterns serves well for living rooms and libraries. Oriental rugs are appropriate floor coverings; so also are the plain, heavy chenille carpets. These latter can be obtained in shapes and sizes to fit any condition, and they are frequently made with ornamental borders displaying classic motifs. These rooms demand a dignity not supplied by small rugs.

Georgian Armchair from Museum of Fine Arts, Boston.
Measured Drawing on Preceding Page

Lighting fixtures of the time were of course fitted for burning candles, and the chandelier and wall sconce were widely used. The original forms are quite as well adapted to electricity, and there is a wide choice in design, scale and material among modern work suitable for the period. Wall sconces were frequently of silver with back plates, sometimes with mirror insets; ceiling fixtures took their forms largely from the Dutch chandelier having a central ball with curved radiating arms. Crystal forms, both in chandelier and wall brackets, belong to the period, and those most typical show the same tendencies in design as the metal and gilded wood fixtures.

One of the most admirable qualities of the Georgian style is its flexibility, coupled with the ease with which it may be adapted to different uses. It can as readily be employed for a dignified, quiet library as for a gay, colorful morning room. For modern rooms it should never be given a rigid formality; the furnishings should never be restricted to one limiting school or motif. It would be the height of dullness to see every chair, table and cabinet supported by cabriole legs. To be interesting and livable a room must show contrasts; a heavy, architecturally designed piece of furniture must be offset somewhere by a light, graceful piece.

The period has many possibilities for American country and city houses in which space is not held at too great a premium. It combines a considerable degree of formality and dignity with great luxury and ease of living; in its simpler forms, such as may be found in the university towns of England, it is frankly domestic and possessed of a strong character which gives it a certain satisfactory wearing quality.

Upholstered Georgian Side Chair with Needlework Tapestry Covering
Courtesy, Kensington Mfg. Co.

Lacquered Cabinet on Stand of Simple Georgian Design
Courtesy, Kensington Mfg. Co.

Georgian Side Chair with Heavy Frame and Elaborate Carving
Courtesy, Orsenigo Co.

THE CABARET DES TANNEURS, STRASBOURG, ALSACE
FROM THE PENCIL DRAWING BY HOWARD MOÏSE

The
ARCHITECTURAL
FORUM

VOLUME XXXVI APRIL 1922 NUMBER 4

The Fourth Dimension in Schoolhouse Design

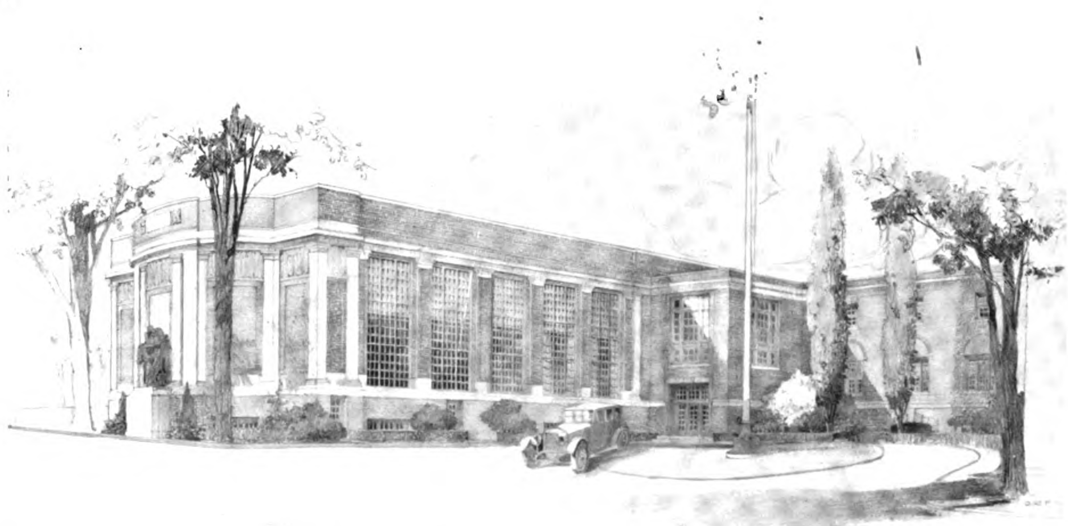
By WILLIAM ROGER GREELEY
Of Kilham, Hopkins & Greeley, Architects

THE cost of construction has decreased during the last two years until today it is again possible to build schoolhouses at something like pre-war prices. Figures received during January on a large, completely fireproof schoolhouse in the vicinity of Boston show a total cost, including work of all trades, of less than 35 cents per cubic foot, as against from 50 to 80 cents for similar buildings two or three years ago.

Construction is just commencing on a contract for a high school in Brookline, fireproof with respect to stair halls, auditorium and corridors, on a basis of about 32 cents per cubic foot. This building, plans of which are shown herewith, is complete in its equipment, and can be taken as an example of thoroughly and carefully studied high school planning. The materials used are the best. All stonework is Indiana limestone, and the brick used is dense and water-struck. The interior is likewise of the best materials. Another very important point is that the plan is open, arranged around a quadrangle or court. Such a building costs more than one with a cramped or congested plan. The moderate cost is therefore in this case very encouraging.

Under these conditions architects may take new courage and resolve to profit by the reduction in building costs by devoting new energy to the better solution of schoolhouse problems. If it may be so put,—"Now is the time to raise the standards without increasing the cost." With this in mind, let us review the schoolhouse situation historically and critically and try to find a secure foundation for future professional work.

Our grandmothers went to a one-room district school, and sat on benches. When they were study-

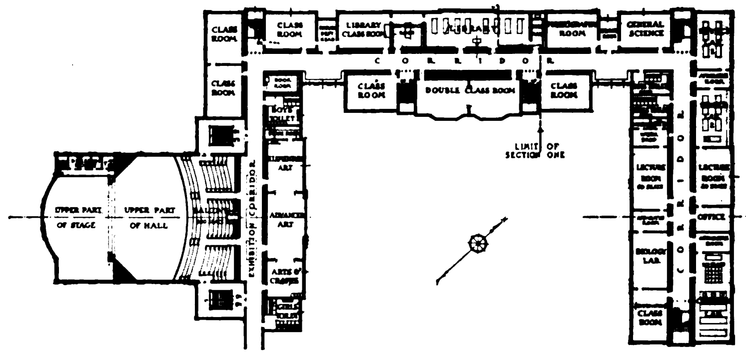


Perspective Drawing, Auditorium Wing of Brookline High School, Brookline, Mass.
Kilham, Hopkins & Greeley, Architects

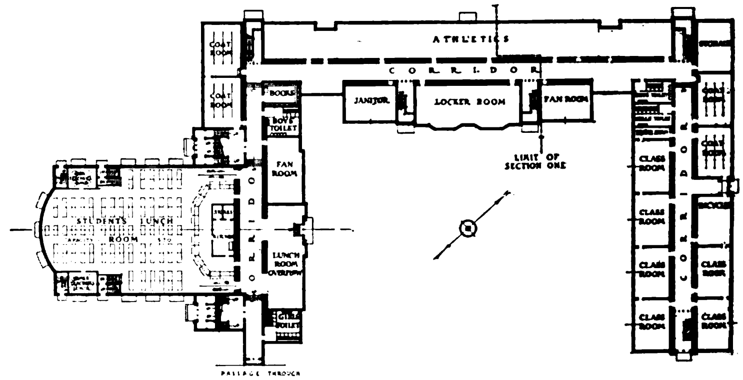
ing their backs were toward the teacher. When they recited, they threw their feet over the benches and faced the music. The buildings were heated by stoves, and ventilated by cracks in the floors. Very little in the way of "equipment" was furnished or required. The capital invested in the school building was about $5 per pupil, and the results were measured in 100 per cent Americans, six feet or more in their homespun stocking feet.

Today we put $250 to $500 per pupil into an elaborate building, and it is a question if the modern men and women that we turn out there excel the earlier type; at least it is doubtful if the 100-fold investment produces 100 times as good a result. The old wooden buildings were increased in size in the latter part of the last century, and large new buildings were constructed, often entirely of wood. Here and there one was burned with loss of life. There followed a crusade of building laws which brought about the construction of buildings that were safe as far as loss of life from fire was concerned. The building laws, however, went further and specified minutely how much air should be provided per pupil, just what toilet facilities were to be furnished per girl and per boy, and many other details of that kind.

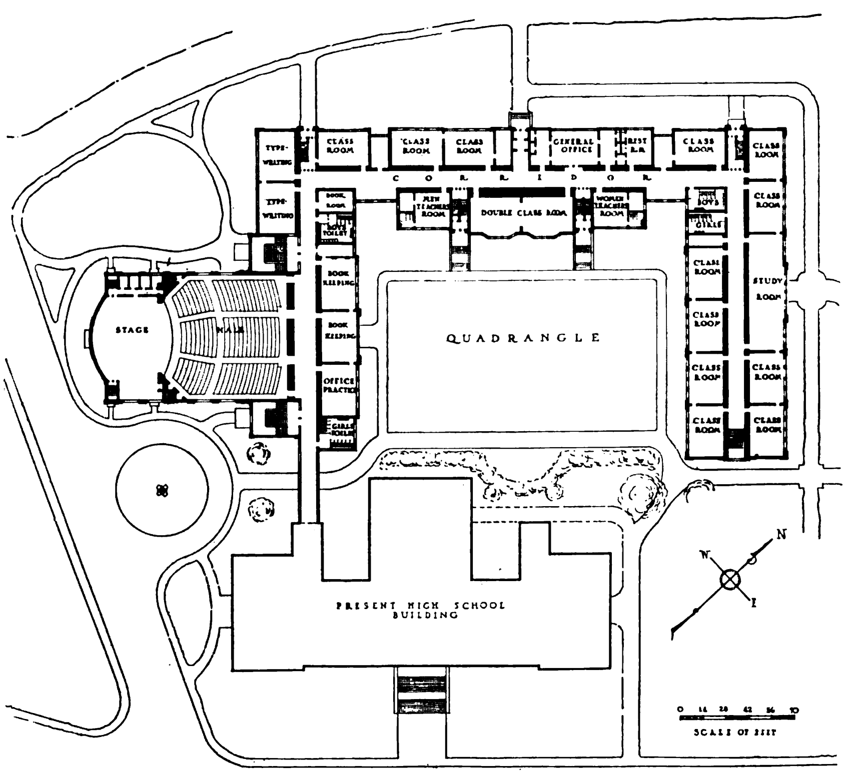
"Standardization" then followed and we are still under the spell of this panacea. To what does it lead? Probably the object is to produce a standardized American by the use of new, standardized desks, in a standardized room with standard air at a standard temperature, under standardized teachers whose old age will be pensioned by Stand-



Second Floor Plan, Brookline High School



Basement Floor Plan, Brookline High School



First Floor Plan, Brookline High School, Brookline, Mass.
Kilham, Hopkins & Greeley, Architects

ard Oil. The first weakness is that the effect of standardization is stagnation. Until a perfect form has been evolved, to standardize is to stifle further development. This is the case with schoolhouse design.

The second point of danger lies in the fact that most standards are minimum standards. The tendency of a standard is to seek the lowest level. If, for example, rigid economy during the last few years has forced the adoption throughout the country of 10-foot corridors as the minimum permissible width, 10-foot corridors become the "standard," and are accepted by committees and architects of limited experience as "standard" in the sense of being "ideal," which is really a mistake. Just as long as educational methods themselves are changing, just so long should schoolhouse design continue to change to meet the requirements. Any data, therefore, describing existing schoolhouses, should be labeled "Current Practice Relating to Schoolhouse Design," or "Prevailing Tendencies Governing the Schoolhouse Plan." To describe such data as "standards" is to ossify a growing organism, and to use the term "standardization" suggests some compelling force from above.

All these factors in the schoolhouse problem spell for the architect, and the committee too, hard study and firm courage rather than juggling with standardization. The community that is going to have the best schoolhouses is the one that insists on going over with its architect carefully the educational needs of the pupil, so that in addition to his experience in meeting similar problems elsewhere, he may have the fullest co-operation of all hands in solving the particular local problem. No architect is competent to work out the plan without drawing constantly upon the ideas of the committee and superintendent, with an intimate understanding of the methods of instruction in all its varied branches.

Approached in this way, one problem will be solved in one fashion, another differently, and all communities will profit in the end by the diversity of solutions. Through standardization, all design becomes flat and stale, and finally unprofitable, as standardization is the acceptance of existing mediocrity as a criterion of excellence. Through individual study and experience comes a diversity that lends zest to the solution of the problem and hastens the millennium. The art must be kept plastic, and not be allowed to solidify. So completely is this the case that the well-meant restrictive laws or "standards" of the last two decades are now a serious impediment to progress. The futility of endless legislation is nowhere more glaringly evident than in the field of schoolhouse design. It would seem unwise to add to this mass of legislative restriction a new load in the form of "standardized requirements."

During this period of development in educational methods, planning must develop too, and this can be accomplished not by the "adoption" of "standards," but by the constant "application" of "common sense" to schoolhouse design.

The application of common sense to present-day schoolhouse needs discloses many simple truths. Here are some of them:

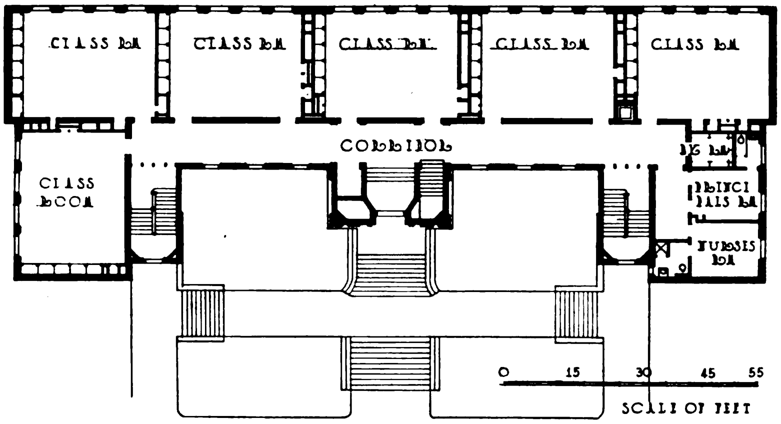
1. The average community is growing. It is not enough to plan smugly a single building. Consideration of future school districts, and enlarged capacities of present buildings, must form part of the program. A study of the school situation throughout the town is usually required before approaching the individual schoolhouse problem.

2. Teaching methods are changing, and knowledge of how to teach has outstripped financial ability to pay. Therefore buildings should make easy the gradual future subdivision of classes to meet requirements already set down as necessary. Classroom spaces should be subdivisible at will into different sized units.

3. Subjects of instruction are changing. Rooms should therefore be readily convertible from one use to another.

4. The point of view on life as a whole is changing. It will soon be considered as defeating one of the great advantages of education if children must be sent to spend their days in a purely mechanical building without any redeeming graces of color or

Michael Driscoll School, Brookline, Mass.
A design to accord with residential character of community
Kilham & Hopkins, Architects



Floor Plan of School for City of Boston, Recently Contracted for Less Than 35c. per Cubic Feet
Kilham, Hopkins & Greeley, Architects

proportion. The illustration of the Michael Driscoll School shows an attempt in a residential neighborhood to avoid the "packing box" type of school building by the employment of such features as a pitched roof and a bay window in the corridor, neither of which is a "standard" form. The extravagances of the bygone florid period of schoolhouse design are not to be commended, but the idea is constantly and rightly gaining ground that *cultivation* as well as mere *education* is our next objective and, as far as the appropriation will allow, a schoolhouse should have an open, airy, cheerful and homelike effect, even if a certain factory-like "efficiency" is impaired.

It should be both: (1) Agreeable in appearance, though not necessarily monumental, and

(2) Of such a type of construction and finish as to avoid a large expense for upkeep and repairs. And herein lies one of the most important points of the "fourth dimension." How many committee men, when they are about to select an architect, are carried away by colored pictures and plausible talk about "standardization," thermal units, single-floor plans, and so on, which the facile salesman uses to divert attention from the fact that in his past work his roofs leak, his floors sag, and his pipes freeze? And how many are willing to take the trouble to find out personally whose buildings are intact after five or ten years, and whose have had so much repairing that little remains of the original structure?

In the development from the old wooden building to the present highly standardized and "efficient" schoolhouse, much of the cheerfulness and comfort of the older building has disappeared. In the modern schoolroom, with close ranks of monotonous desks screwed to the floor, windows confined to one wall, and the other walls made gloomy by great expanses of blackboards, there is little to cheer the teacher or the pupils. Some possible advantage may be argued on the score that such rooms by their ugliness may increase the pupils' love of home, but on the whole they leave something to be desired. The physical needs are seen in a new light. The deadly draught is becoming less of a bugaboo. Unvarying temperatures are now admitted to be enervating. The standard room with its standard amount of steam-dried air, dependent for its circulation upon closed windows, will before long cease to satisfy us. It is no longer considered wise to transfix a child at a desk through hours of instruction. Even the old method allowed him to kick his feet over the bench when he recited. The need of some physical activity to keep the mind alert has begun to be felt. To the requirements just enumerated there is sometimes added the selection and development of a site, and all these possibilities are dependent upon the purchasing power of an appropriation that is usually insufficient in amount.

In some communities, very careful studies have been made to determine questions of location, probable future growth of population, etc., and have resulted in four things:

1. Great saving in time.
2. Considerable economy in cost.
3. Avoidance of bitter and prolonged dispute.
4. A much better educational plant.

After the site is selected, the questions come on the orientation of the various rooms, and the fixing of the location of the building on the lot. The exposure most desired for class rooms is southwest. The accompanying plan for a schoolhouse now under way for the City of Boston shows an arrangement in which all class rooms have sunny exposures, and most of them face southwest.

After proper study of these preliminary matters, the detailed working out of the plans becomes a matter of logical sequence. When the plans have been drawn and the building completed, comes the time that the architect is most likely to fail in his professional service. In moving on to new fields, the completed work of the past is forgotten. This is wrong. An occasional visit to a school building, already completed and in actual use, not only assists the client, but is the only way in which the architect can know how his buildings "wear." The upkeep of a school building requires a large sum, at best. By keeping informed on matters of renewal, painting, etc., the architect can learn to specify the materials that will be most economical in the long run by giving better wear.

In view of all these considerations, it is therefore true, paradox or no paradox, that the most important service of an architect is that part of his advice that comes usually before he is employed, and that part of his inspection that comes after he has been discharged.

Baroque, Justice and Common Sense

PART II

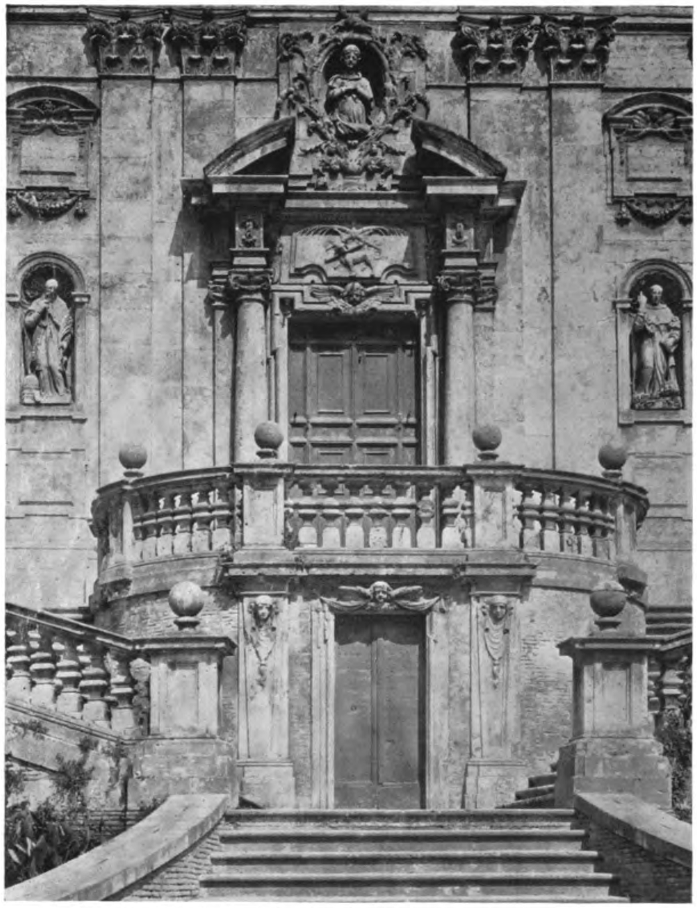
By COSTEN FITZGIBBON

IT would be equally diverting and illuminating to trace the career of each great baroque architect, note his chief performances, and appraise the value which his individual efforts added to the sum total of baroque development. Such a critico-biographical method of pursuing the subject, however, would require a generous sized volume in order to cover thoroughly even a portion of an amazingly prolific period of architectural history, so that notwithstanding the many allurements of intimate insight it would afford, we must here content ourselves with a more condensed body of careful generalizations.

Whether in our researches we follow the detailed plan of investigation just alluded to or whether we survey the field in the more general and impersonal way, we cannot fail to become fully aware of an ever broadening rift between the two main streams of architectural ideals and manners of expression from about the middle of the sixteenth century onward. As the high renaissance merged into the late renaissance one school of architectural thought tended to become more and more academic and to attach increasing emphasis to the value of ancient precedent. Following in the steps of such masters as Bramante, Baldassare Peruzzi, the Sangalli and their compeers, and emulating their ardor for classic research, their successors exercised their genius in an unfaltering quest for purity of form, as they conceived it, and in devising fresh combinations of orthodox classic motifs and methods of composition to fit the specific requirements of their own generation. To this persistent and conscientious endeavor to vitalize the heritage of classic antiquity we owe the noblest works of Palladio, Samichele, Sansovino and the lesser men who followed in their train. No matter what may be one's personal convictions or degree of sympathy towards the attitude of these pre-eminent exponents of classicism, it must be admitted that they displayed no little originality in the manipulation of the resources to which they voluntarily restricted themselves, availing themselves of reasonable interpretative liberty.

The other school of interpretation, while not at all condemning the treasures of the past nor assuming the pose of revolt that deliberately casts tradition and precedent overboard, nevertheless chose to use precedent in its own free and eclectic manner and to employ the "properties" derived from antiquity according to the untrammeled promptings of its own robust and exuberant invention. As previously noted, this movement—the baroque style—which made itself appreciably felt in the latter part of the sixteenth century under the guidance of such men as Giacomo della Porta, Domenico Fontana or Buontalenti, ran a parallel course with the late renaissance school for a time, though ever growing more distinct from it, and

Fontana dell' Acqua Felice, Rome, about 1590
Designed by Domenico Fontana



Detail of Facade, Church of San Domenico e Sisto, Rome
Designed by Vincenzo della Greca

gradually increasing in force eventually won complete ascendancy in the seventeenth century, an era not inappropriately termed the baroque age. The baroque influence continued to be a lively force through part of the eighteenth century, but after its meridian was passed we need not expect to find in it the same vigor and spontaneity it exhibited at an earlier date. It is to the seventeenth century that we must turn for the best and most characteristic examples. During the period of incipient baroque, when the two streams of thought were getting farther and farther apart, the classicists as heirs and guardians of renaissance tradition stood for the integrity of conservative principles; the baroquists were the liberals. It is our present concern to analyze carefully the dominant tendencies of this second or baroque stream of architectural activity, to mark its commonly distinguishing characteristics, to observe the methods and aims of its representative exponents, to point out its concrete achievements in the path of architectural progress, and to indicate certain particulars in respect to which we are today its debtors.

Two external influences gave the baroque trend so much impetus that it is imperative to take cognizance of them. In the first place, the period embraced by the latter part of the sixteenth century and the greater part of the seventeenth witnessed the accumulation of vast wealth and great estates in the hands of the Roman nobles, the holy see, the cardinals and other dignitaries of the church and those who in one way or another were attached to the papal court. It was a conspicuously ample and expansive age, a time of broad conceptions and also of ostentatious and lavish expenditure. Under the grandiose sway of paramount Spanish influence, ecclesiastical and secular dignitaries alike vied one with another in their liberal patronage of architecture and the allied arts. Fortunes were on a scale unprecedented since the days of imperial Rome and the extent of the undertakings conceived by the possessors of these fortunes corresponded with the sizes of the fortunes themselves. It was but natural that architecture should be made to accord with the magnitude of the conceptions it was employed to embody in visible form. In the baroque manner the princely patrons of architecture found an apt instrument for the expression of their ideas of imposing magnificence. Never did any form of architecture more faithfully or more completely reflect the spirit of that age in which it was developed; never did any age more whole heartedly support and foster the growth of an acceptable manifestation of contemporary architecture. Architecture ministered to and encouraged the ambitious plans of its patrons; the schemes devised themselves fed architecture and spurred the imagination of the architects to new flights. Each element of the dual combination nourished the other and we behold a phenomenal display of complementary interaction. Both elements were causes, and both were likewise effects.

The second external factor that contributed impetus to the baroque movement was the counter reformation. The members of the Society of Jesus charged themselves, as one of their special obligations, with the revival of religious zeal and the stamping out of heterodoxy. Their well directed and unremitting labors produced amazing results in reawakening religious consciousness and fervor among the masses. They plainly saw, however, that it was not enough merely to overcome religious indifference and rekindle the smouldering fires of faith; it was necessary by some outward and visible symbol to give the people a permanent reminder of the authority, might, majesty and splendor of the church. The baroque form of architecture was well adapted to this end. The company of St. Ignatius Loyola seized upon it as an opportune instrument, invested with an appropriate appeal to the senses, and forthwith reared the great churches that characterize the era, or refronted old churches with baroque facades. This they did not only in Rome, but throughout Italy, throughout Spain, and in the countries beyond the Alps. Even in Latin America this type of ecclesiastical architecture left its indelible impress. So numerous were these edifices, newly built or refronted, so rapid was their multiplication, and so intimately identified were they with the activities of the Jesuits that baroque architecture has often been styled "Jesuit architecture." The type of church chosen by the Jesuits at the counter reformation continued in favor long afterwards and bore witness to their presence in widely scattered localities.

So much for the two outside forces that served in so great a measure to popularize the baroque mode. So much, likewise, for the spirit informing the style. It now remains to examine somewhat the substance with which that spirit was clothed, that substance which has so frequently been the target for bitter animadversion on the part of unfriendly critics.

If the seventeenth century—the baroque age— was a period of splendid amplitude, it was also a period of license and daring initiative in nearly every phase of life and, consequently, in those forms of art wherein the life of the time found its readiest expression. This being the case, it was inevitable that excesses and indiscretions should occur in current architectural exploits, incidents that baffle any logical attempt at justification. But such incidents, it should be remembered, are only incidents and of a superficial nature that should not affect our mature judgment upon the real character of the great body of architectural production of that period.

Objections to the baroque style, based upon these occasional excesses and absurdities, we need not undertake to answer. It would be idle to do so. Other objections, less captious perhaps, and made with more honest intent, must likewise be left for the individual reader to ponder over as he examines the first hand evidence which the buildings themselves supply. It does not constitute a valid and final condemnation of baroque architecture in general to assert that it was vulgar, bombastic, ostentatious and self-conscious; that it was boisterous, bizarre and disorderly; that it was coarse in its details and affected in its manner of ornament; that it was sensuous and voluptuous and even grossly sensual; that it was immoral in spirit and devised by libertines for libertines; that it was, in short, the work of a degenerate age without manners, morals, or even rudimentary good taste. These, and like cavils, voiced by some whose inaccuracy brings them perilously near the bounds of arid dullness, may be merely noted and allowed to go at that. How much weight is to be attached to them, the reader who conscientiously surveys the field can judge for himself. Let us turn quickly from this negative sort of carping—it is not worthy the name of criticism—and address ourselves to considerations of a more positive and constructive character.

Among the more outstanding positive phenomena to be discerned in a general scrutiny of baroque architecture, five major points challenge our attention. They are so insistent that we cannot escape from them. We find (1) the almost universal

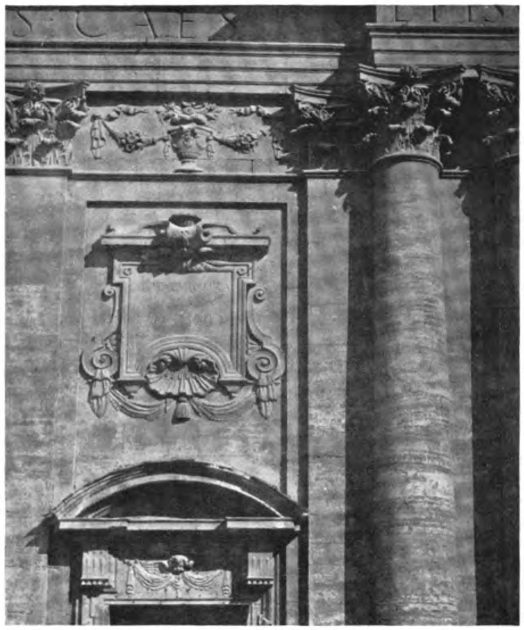
Interior, Church of the Gesu, Rome
One of the best examples of the baroque, and attributed to Vignola

At Left, Santa Maria di Loreto, Rome, Begun in 1507 by Sangallo the Younger; Portal and Lantern by Giovanni del Duca, 1580.
At Right, Santissimo Noma di Maria, Built 1738

prevalence of noble and monumental scale; (2) complete symmetrical conception of comprehensive and connected schemes of composition, in contrast to the more or less fortuitous and piecemeal methods that often obtained at an earlier epoch; (3) the high value attached to the dramatic element and its development to a degree previously undreamed of—at least since the days of the Cæsars; (4) the ingenious elaboration of divers and remarkably effective plan forms, and (5) the undeniable advances made in connection with garden design, with vastly enlarged scope of treatment. It is scarcely too much to say that in the work of the baroque age is to be found the beginning of modern architectural conception, at any rate so far as our larger and more monumental undertakings are concerned.

It would of course be unreasonable and rash to claim that the baroque architects were the first to inaugurate the use of heroic scale—there are too many notable instances of far earlier date—but they unquestionably developed and generalized its use, employing its resources to dignify even their domestic work. In this connection, Martin Shaw Briggs pertinently observes that "the most important aspect of baroque architecture in Italy . . . consists in a power of monumental planning and arrangement which is rather a gift than an exact science. Up to late renaissance times men still lived in crowded alleys within the mediæval city walls. With the dawn of the seventeenth century appears a desire for more space, and notably for sufficient space to enable a building to be properly seen. All the finest *piazze* in Rome date from this period, and in Genoa was laid out the first street where æsthetic considerations were apparent." What was true of the ability of seventeenth century Italian archi-

Detail of Doorway, Santa Maria di Loreto, Rome tects to plan monumentally was likewise true of their close students and admirers, the French architects of the same period, who were profoundly influenced by what was going on in Italy and drew thence the chief essentials of their inspiration. The situations of many of the important buildings evince not only the love and appreciation of a fine position but also a rare genius for making the most of it. Incidentally, in the disposition of such civic adornments as the Spanish Steps in Rome or the Fontana dell' Acqua Felice, we not only have ample evidence of a keen understanding of the value and proper use of heroic scale along with imposing site, but we can also trace the incipiency of coherent town planning.



Detail of Facade, Santa Maria in Vallicella, Rome
Designed by Martino Lunghi the Elder

Closely allied with the thorough understanding and habitual use of heroic scale was the devising of symmetrical and comprehensive compositions, often of very considerable extent, whether in city or country. Individual units, instead of having their individuality emphasized, were subordinated to an all-embracing scheme of design, thus securing an appreciable gain in breadth and spaciousness of aspect. Without entering into the causes back of this particular development of baroque architecture, it will be sufficient to call attention to the impressive and harmonious *ensembles* thus produced, to note that the cue thus given in Italy was promptly taken up and followed in France, with what distinguished outcome under the liberal patronage of Louis XIV we very well know, and to point out the singular inconsistency of those who willingly admit their deep indebtedness to Le Notre, Le Brun or Mansart while, in the very same breath, they revile the "accursed" Bernini and Borromini with all their unholy baroque crew.

The stress laid by its authors upon the third distinguishing characteristic of baroque architecture —its dramatic quality—brings us at once to a bone of contention. In a large number of cases the dramatic quality attained was the result of deliberately striving for effect, a procedure which critics,

At Left, Santa Maria di Monte Santo, Rome, 1662, Designed by Carlo Rainaldi. At the Right, Santa Maria dei Miracoli, by Rainaldi; Altered by Carlo Fontana, 1663 and especially unfriendly critics, are wont to brand as illegitimate. Nevertheless, the baroque architects did strive for effect. What is more, they achieved it, and they achieved it in a notable degree, as their works bear eloquent witness. On this same score of striving for effect are based the charges that instead of ornamenting structure, they created structure to carry ornament; that they were untruthful and did not externally express the plan or purpose of a building; that they confused and misapplied ornament, exaggerated the scale of details, and practiced deception in materials; that, in fine, they committed all the seven deadly sins and several more besides.

Now the exaggerations of mouldings and other details, of which the critics complain, were in some measure due to the nature of the coarse grained travertine which was unsuitable for the execution of smaller scaled items. The close grained *pietra serena* of Florence lent itself to more delicate manipulation, but Tuscan baroque architecture lacks the force of Roman. The delight of big, vigorous forms could readily be realized in travertine, and the material itself doubtless encouraged the use of such forms and strong details, over and above the important consideration that they rendered the composition of a building, when seen from a distance, more articulate and impressive in definition. As to the confused and misapplied ornament in the shape of superfluous pillars, entablatures and pediments, it must be admitted that baroque interpretations in this respect did not accord with scholastic usage. At the same time, we should remember that these erstwhile structural features had long since lost their strict structural significance and had really become to a great degree decorative conventions. To the seventeenth century architect, therefore, it seemed quite permissible to introduce a fresh, and what appeared to him a more satisfactory, way of marshaling these conventionalized forms. The "deceptions" in material and the "untruthfulness" of expression were not deceptions. A deception is not a deception unless there be present the intent to deceive. The so-called deceptions were meant merely to please the eye. There was in them no intent to deceive, nor did they deceive anyone.

The foregoing discussion does not pretend to be a vindication of baroque architecture. Its purpose will be achieved if the reader is moved to pursue for himself *in extenso* an investigation of the work of the baroque age; to apply the methods of justice and common sense in formulating his judgments; to admit our present indebtedness to baroque precedents where such admissions are due, and to refrain from a prejudiced blanket condemnation of a great epoch on the strength of the indefensible excesses perpetrated by its most extreme exponents. The baroque movement was not an insincere manifestation got up merely to satisfy a factitious enthusiasm for inordinate display. An intelligent acquaintance with baroque architecture, even though we may not elect to follow its practices to any great extent, is needed as an antidote to the constriction of ideals apparent in certain quarters today.

Stairway and Fountain, Villa Lante

Domestic Architecture of Henry Corwith Dangler, Architect

HOUSES DESIGNED BY DAVID ADLER AND HENRY DANGLER

THE last decade in the growth of American domestic architecture has witnessed a distinct change in the manner with which architects approach their problems, and this together with a public more appreciative of good architecture is the main reason for the great advance in quality this period records. Architects of today are perhaps not producing buildings that may be labeled distinctly American, in fact this was one of the qualities that might be applied to the work at the end of the last century, but it surely had little else to commend it. The work of recent years has been based on a more scholarly study of precedent, confined largely to the English work of the eighteenth century and the simplified version of it found in our own early American buildings. American living conditions, social customs and climatic requirements are more or less unconsciously affecting the American interpretation of earlier precedent, and we are slowly developing different types of architectural expression in domestic work that will eventually be recognized for their distinctive American characteristics. Styles cannot be created by simply wishing for them, and our domestic art will eventually be on a far higher plane because of the restraining influence of precedent which is increasingly in evidence in today's design.

The Late Henry Corwith Dangler

Many architects adopt a definite style and, particularly in domestic work, confine their work to that style. This tends, of course, to producing perfection in the handling of detail and scale, but it has also the possibility of limiting the exercise of imagination with the result that the architecture produced becomes overrefined, academic and lacking in those qualities of charm that come from less restricted efforts. Working in a number of styles with a well grounded familiarity of the basic principles of each develops an eclectic taste which is of the greatest value in producing architecture that has the spirit and charm of the definite period, yet is free from pedantic copying.

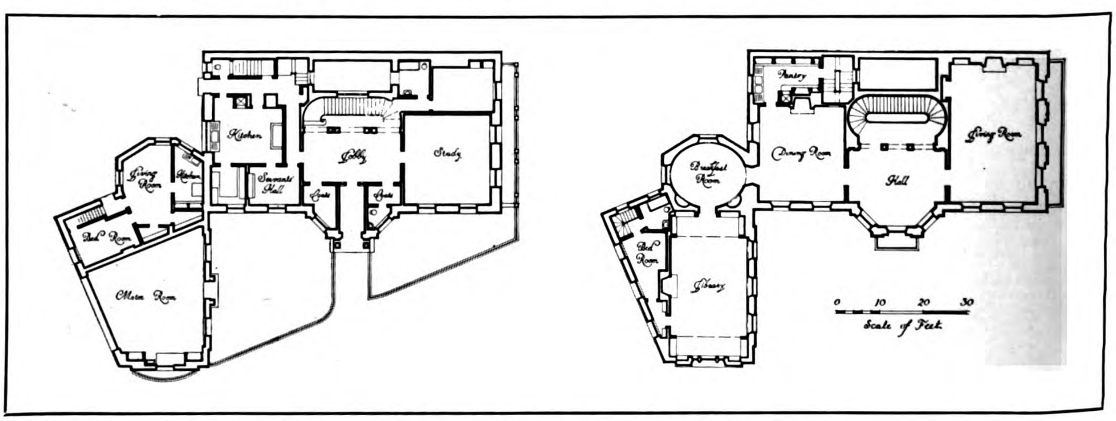
The houses illustrated here present an excellent example of this modern American tendency in house design. These buildings are unmistakably American, yet they present a wide variety of styles and each possesses that individual charm of ensemble and detail that makes us admire the originals of the period. They are all derived from renaissance sources, and thus are based on a common classic tradition, yet in such widely separated versions of the classic as late English Georgian, Louis XV and Italian renaissance.

Group of Houses in Chicago of Mrs. Arthur Ryerson and Messrs. Abram Poole, Henry Dangler and Ambrose Cramer

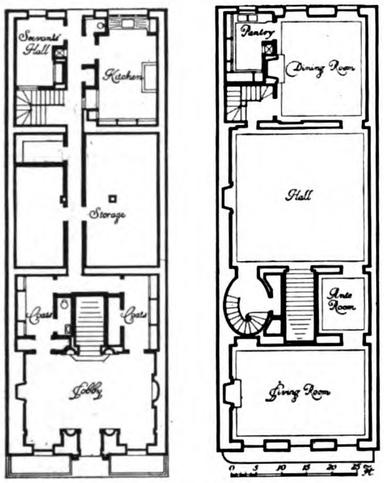
Detail of Main Facade, House of Henry Corwith Dangler, Esq.

Detail of the Ryerson House

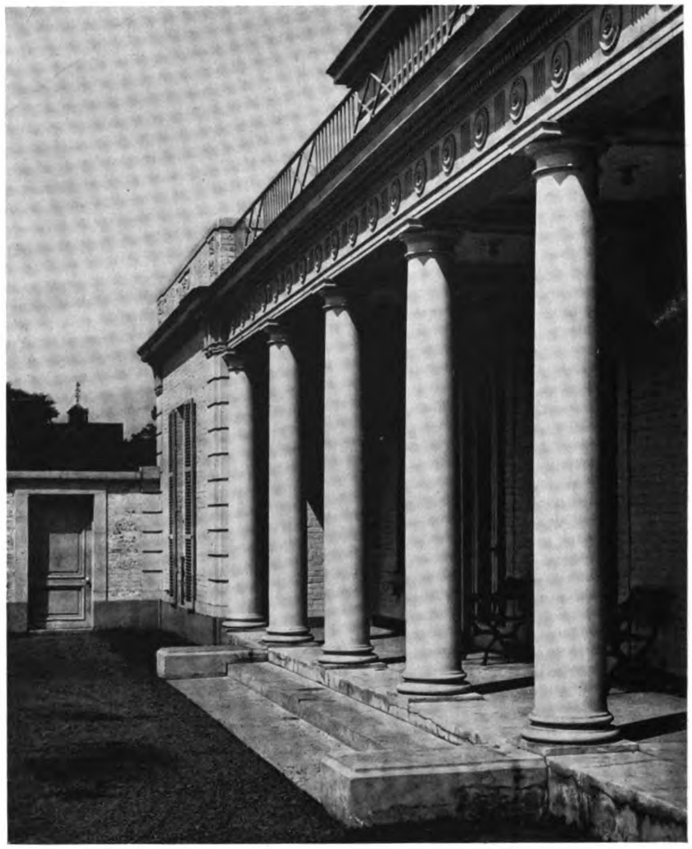
These houses are the product of the office of Henry Corwith Dangler, architect, Chicago, and were designed by David Adler and Henry Dangler. Both designers received the training of the Ecole des Beaux Arts and have been associated since the beginning of their architectural work until the death of Mr. Dangler in 1917. He is remembered for a delightful personality, a keen sense of the beautiful and a great capacity for work. Besides his ability as an architect he possessed a distinct literary gift, satirical and whimsical. The joint work of these designers shows an architectural conception based on a delightful sense of order and proportion; nothing has been left to chance,—character of ornament, composition, scale of mass and detail have all had minute consideration. This thorough study of detail has been made against a background provided by an understanding of the spirit of the styles, and the buildings have a spontaneity of treatment that can be achieved only when the basic principles of a style are known and accepted. It is only the thoroughly grounded student



First and Second Floor Plans, House of Mrs. Arthur Ryerson, Chicago



First and Second Floor Plans
House of Abram Poole, Esq., Chicago



Detail of Forecourt Entrance, House of Benjamin Nields, Esq.

of a style that can safely depart from the letter and preserve the spirit of a past building tradition. Thus is the style made to live again and adequately meet new conditions. This is perhaps most markedly illustrated in the delightful house of Louis XV inspiration for Ralph Poole at Lake Bluff. This has the charm and spontaneity of the wonderful French houses of the period, yet it meets American conditions perfectly, it is admirably suited to its site and in every essential respect is an American house, an excellent example of period adaptation.

Equally characteristic is the handling of the group of four city houses in Chicago. Here special opportunity for the consistent treatment of the major part of a block facade was enjoyed through the co-operation of a group of friends in building adjoining houses. This fact made an architectural treatment in the manner of the late eighteenth century houses of London particularly appropriate, because the restraint and quiet formality of the style have

View of Main Facade on Forecourt, House of Benjamin Nields, Esq., Rye, N. Y.

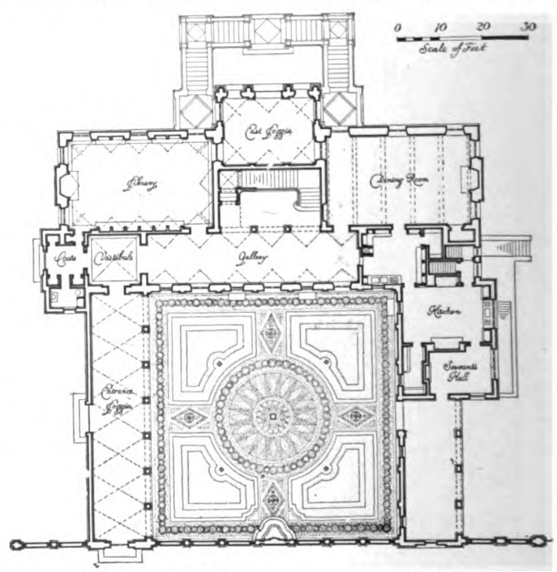
Entrance Loggia, House of Charles Burral Pike, Esq., Lake Forest, Ill.

an opportunity in the larger mass to be appreciated to a greater extent than when compelled to compete for attention with adjoining buildings of more insistent and larger scaled parts.

In these houses we see in both exterior and interior treatment the influence of the style developed by Robert Adam and his brother. To them we are indebted for an original and delightfully domestic manner of handling classic detail that is as eminently suited to use today as when it was originally conceived. They have bequeathed to us a series of models of doorways, fanlights, mantels and ceilings that cannot be improved upon for their purposes. But here again the designers of these Chicago houses have impressed their own individuality of treatment in the facades and interiors. The spirit is distinctly Adam but there are directness and simplicity in their handling of composition and detail that produce a spontaneity of conception far removed from careful reproduction.

There are four houses in the group, similar in materials and style but with considerable variation in size. The exterior materials are dark red brick laid in Flemish bond with black headers and light colored mortar joints; the trim is light colored stone; sash and frames are painted cream, shutters green, iron balconies and fences black. The entrance doors are mahogany. An interesting detail of the houses is a community heating plant which is owned and operated jointly; each owner paid the initial cost in proportion to the size of his house, and the expense of operation is charged proportionally according to the amount of radiation in each house.

The plans are arranged to give prominence and a formal treatment to the second floors. There is likewise an agreeable sense of spaciousness even in the houses covering but a single lot. This is especially true in the case of the house of Abram Poole. Entrance is directly into a large hall with an interesting and restrained Adam treatment of decoration. The walls are painted light green, the floor is light toned terrazzo with marble border, and the room is completed with an interesting series of niches and a simple grouping of furniture of particularly graceful design. The wide stairway between walls, directly opposite the entrance, leads to the main hall in the center of the house which is given unusually ample proportions because of the employment of overhead lighting. This room is severely classic and suggests the dignity and architectural character of the early Georgian. The floor is black terrazzo with inlaid brass bands; the walls are paneled and painted in two tones of gray. The doors are mahogany with carved mouldings. The furnishings are selected from early French, Italian and English periods and



Main Floor Plan, House of Charles Burral Pike, Esq.

Garden Facade, House of Ralph H. Poole, Esq.

and a carved overmantel, worked from pear wood. The paneling is painted a dull green with ornamented members in gold. Furniture and hangings are well chosen to accord in character with the architectural background.

The country houses designed by Messrs. Adler and Dangler are of no less distinction than their city houses. None of the houses illustrated is large, yet they have been successful in imparting to them unusual garden settings, charming vistas and spacious suites of rooms that are ordinarily achieved only in houses of far greater area. The Charles Burral Pike house at Lake Forest shows well the imaginative quality that underlies their work. It is an ingenious grouping of an Italian paved court with a house of modest dimensions that gives an effect of great space. The lot on which it is located is shallow and borders Lake Michigan. The court with solid walls toward the road was designed to afford privacy. The sunken garden at the rear was the foundation of a former house, through which a cut was made

complement the architectural feeling of the room admirably. The dining room is especially bright and interesting in its color treatment. The walls are light green with wainscot and trim painted cream color; a gilded moulding outlines all the features of the room. The mantel is of Adam inspiration in white and Siena marble in contrast.

Two interiors are illustrated from Mrs. Arthur Ryerson's house, the largest of the group. The living room is in Georgian character, the detail and ornament reduced in scale to accord with the room size. The walls are paneled and painted a mellow green, and the decorative recesses for books are fitted with metal grilles. The dining room is extremely simple in its decorative treatment. The walls have large recessed panels formed in the plaster and are painted in biscuit color with the ornament of cornice and mantel and panel mouldings in a lighter tone.

The Charles Garfield King house, also in Chicago, is larger than those in the group but it indicates the same restraint in design. The exterior has a facing of Indiana limestone on the first story with dark brownish red brick above. The iron fence and balconies are painted dark green. The plan indicates generous sized rooms and the ceiling of the principal floor is high to contribute to the spaciousness. The excellent scale and dignity of the rooms on this floor may be noted in the view of the main hall. This room has a black terrazzo floor with brass inlay and walls painted a light green color, contrasted with the cream tone of the cornice and trim. The living room is a well studied interior based on English rooms of the period of Wren. The walls have the typical heavy moulded panels

Detail of Entrance Facade on Forecourt
House of Ralph H. Poole, Esq., Lake Bluff, Ill.

Stair Hall in House of Ralph H. Poole, Esq., Lake Bluff, Ill.

extending it to the lake. The walls of the house are of brick coated with a very thin plaster wash; the trim is Indiana limestone and the roof of pinkish colored tiles. The interiors are patterned after the simple Italian manner with sand finished plaster walls and walnut woodwork, unstained and oiled. The floors in the rooms illustrated are of black terrazzo.

The Louis XV house at Lake Bluff was designed to give emphasis to long horizontal lines because of its position on a ridge of land. The exterior is plaster with cast cement trimmings; the roof is covered with gray slate, and ironwork is painted black. The interiors are decorated and furnished consistently with the exterior and indicate the satisfactory qualities to be gained from a restrained use of Louis XV motifs and details. The library is a small room paneled in natural gum; the music room is partially paneled, the woodwork painted yellow with green lines, the rest of the walls being covered with old yellow damask.

Two interiors from the house of Joseph M. Cudahy at Lake Forest are also shown. These are suggestive of Louis XVI and are excellent examples of the modern handling of this very finished period. The hall is built around a series of old French grisaille paintings with blue borders which are set in the paneling. The floor is black terrazzo and the base marble. The morning room has particular charm with the suggestion of the Empire style appearing in some of the furniture. The walls are painted cream and the floor is laid with hexagonal red tiles.

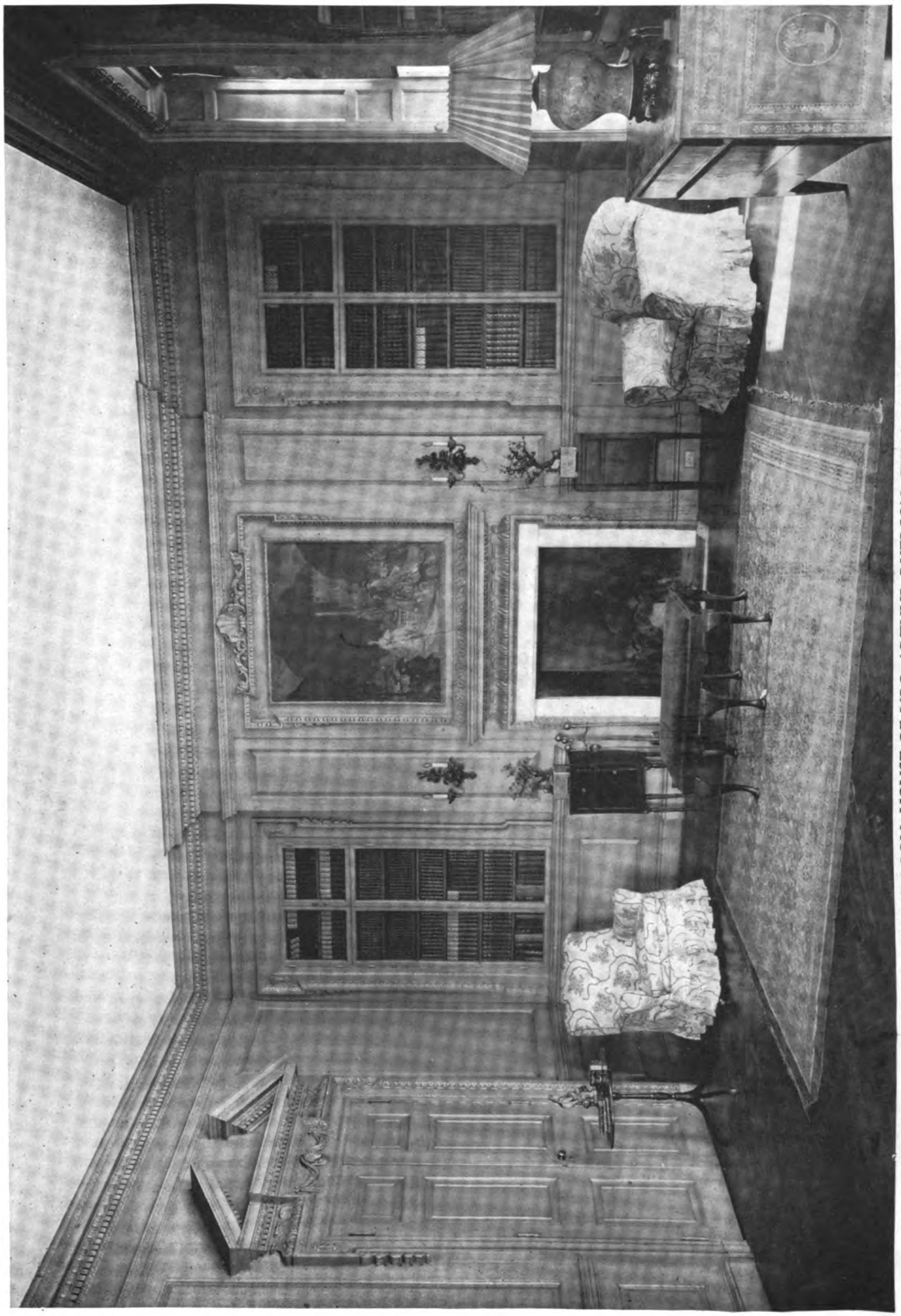
In all of these houses the interior design and the decoration and painting of walls have been a part of the architectural service, and in many cases the designers have suggested the schemes for furnishing.

Dining Room in House of Mrs. Arthur Ryerson, Chicago

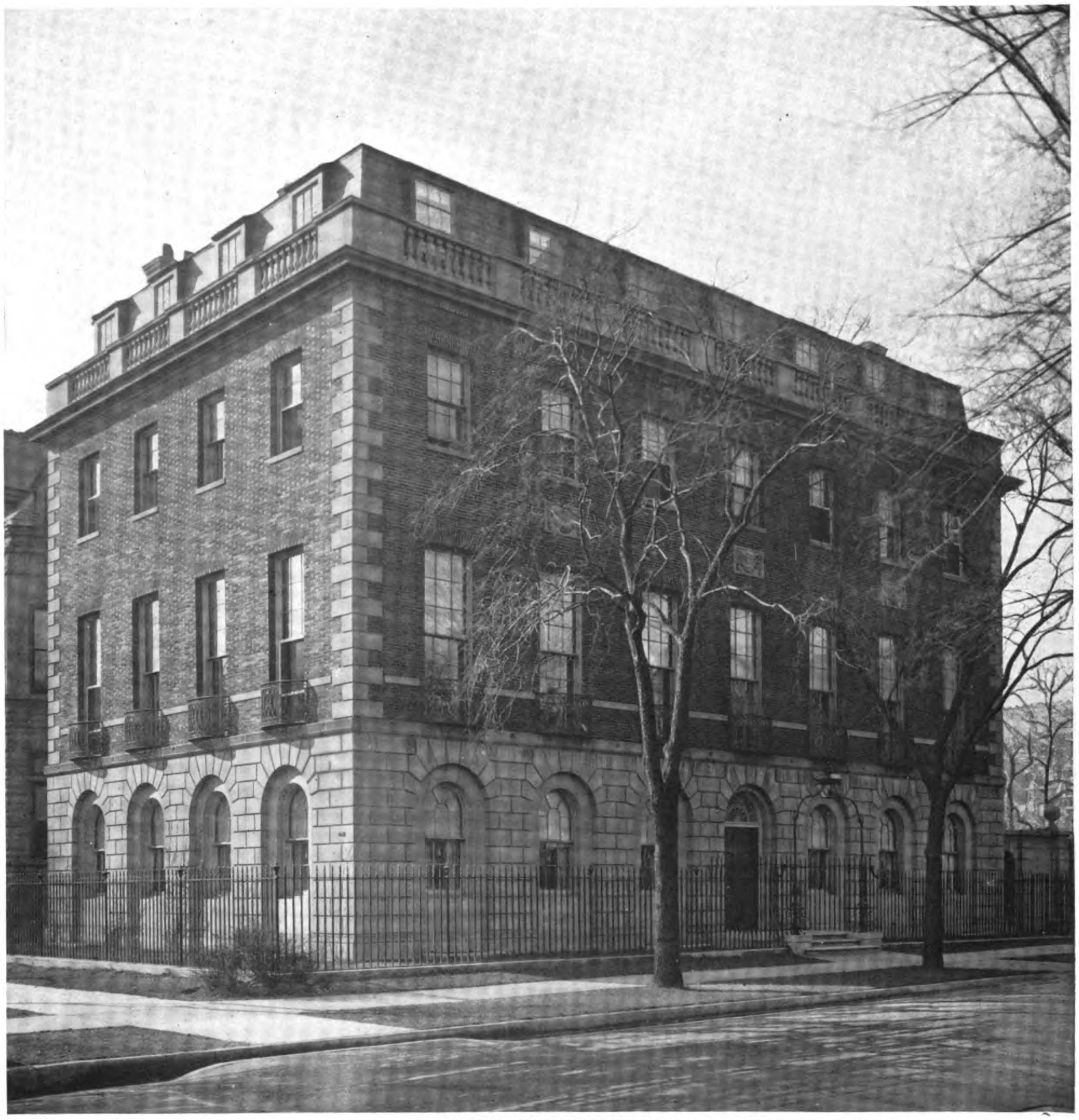
DETAIL OF ENTRANCE

HOUSE OF ABRAM POOLE, ESQ., CHICAGO, ILL.

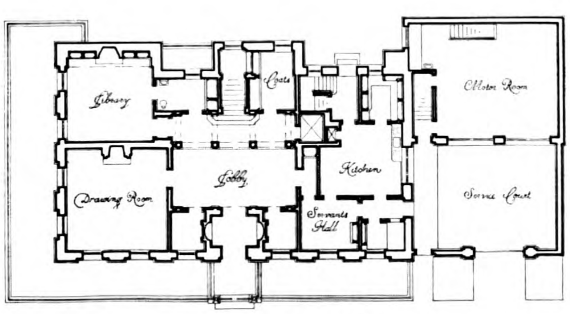
HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER



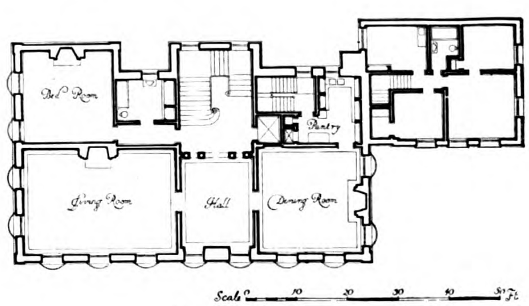
LIVING ROOM, HOUSE OF MRS. ARTHUR RYERSON, CHICAGO, ILL.
HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER



GENERAL EXTERIOR VIEW



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF CHARLES G. KING, ESQ., CHICAGO, ILL.

HENRY CORWITH DANGLER, ARCHITECT

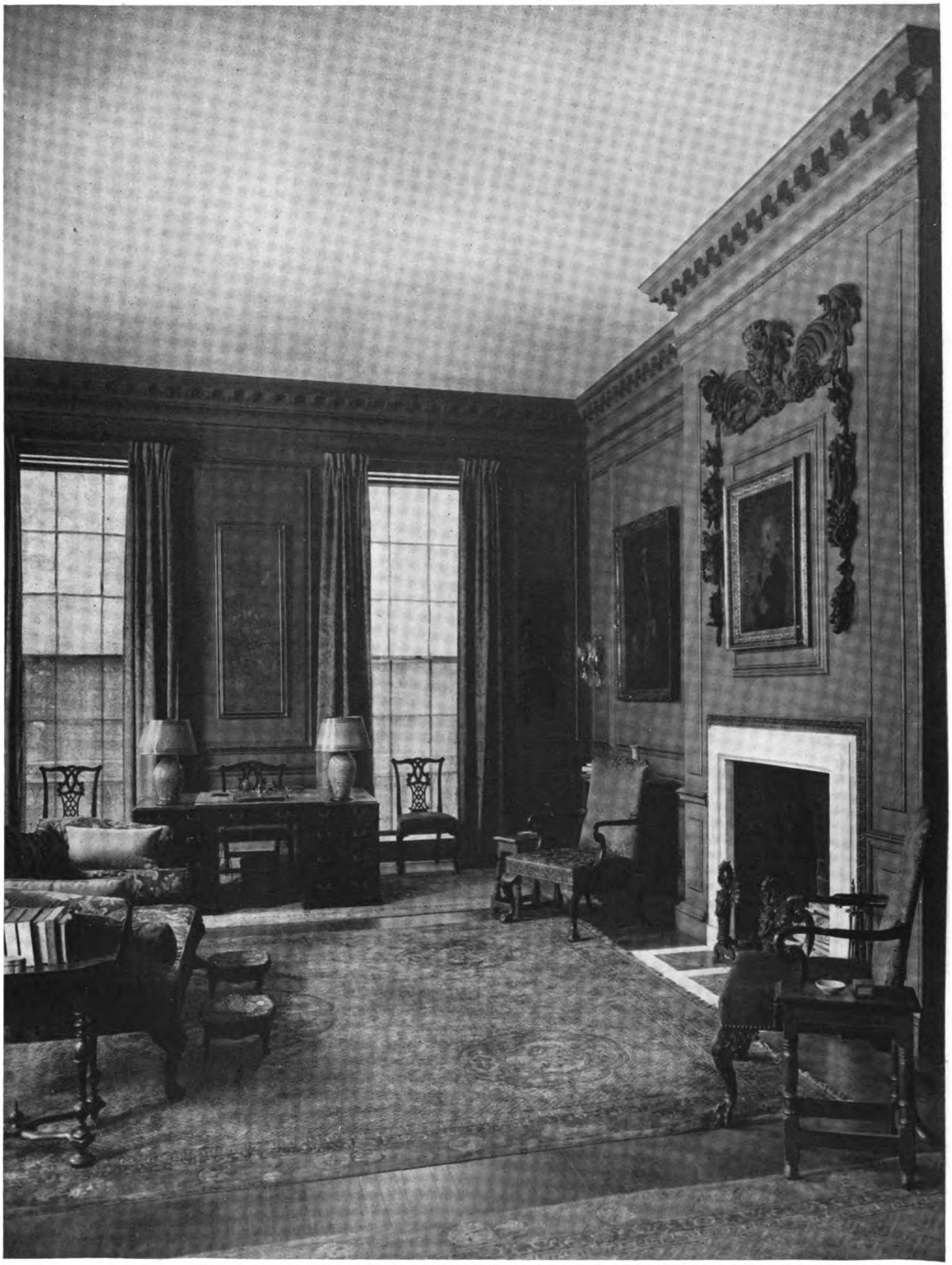
DESIGNED BY DAVID ADLER AND HENRY DANGLER

MAIN HALL LOOKING FROM STAIRWAY

HOUSE OF CHARLES G. KING, ESQ., CHICAGO, ILL.

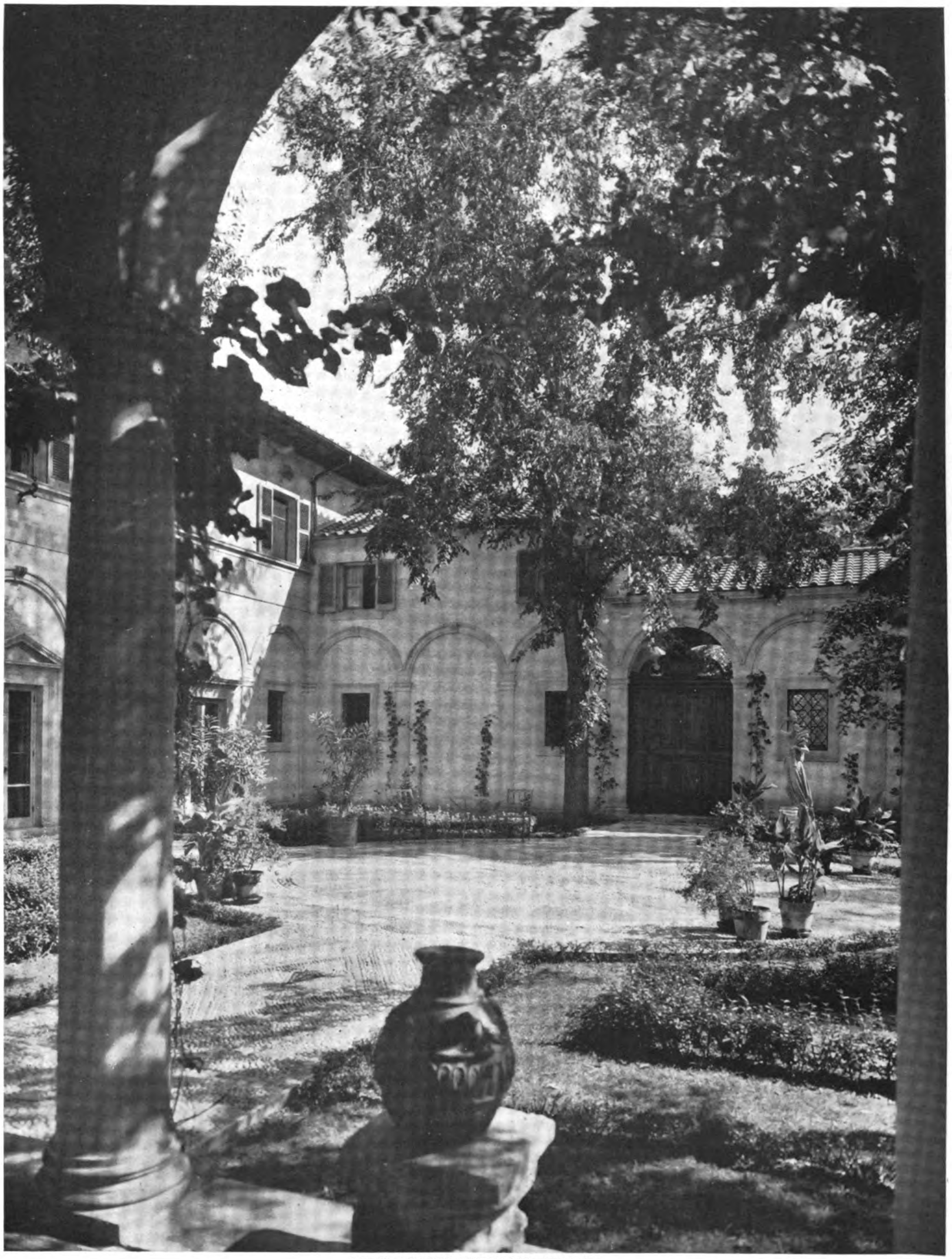
HENRY CORWITH DANGLER, ARCHITECT

DESIGNED BY DAVID ADLER AND HENRY DANGLER



LIVING ROOM, HOUSE OF CHARLES G. KING, ESQ., CHICAGO, ILL.

HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER

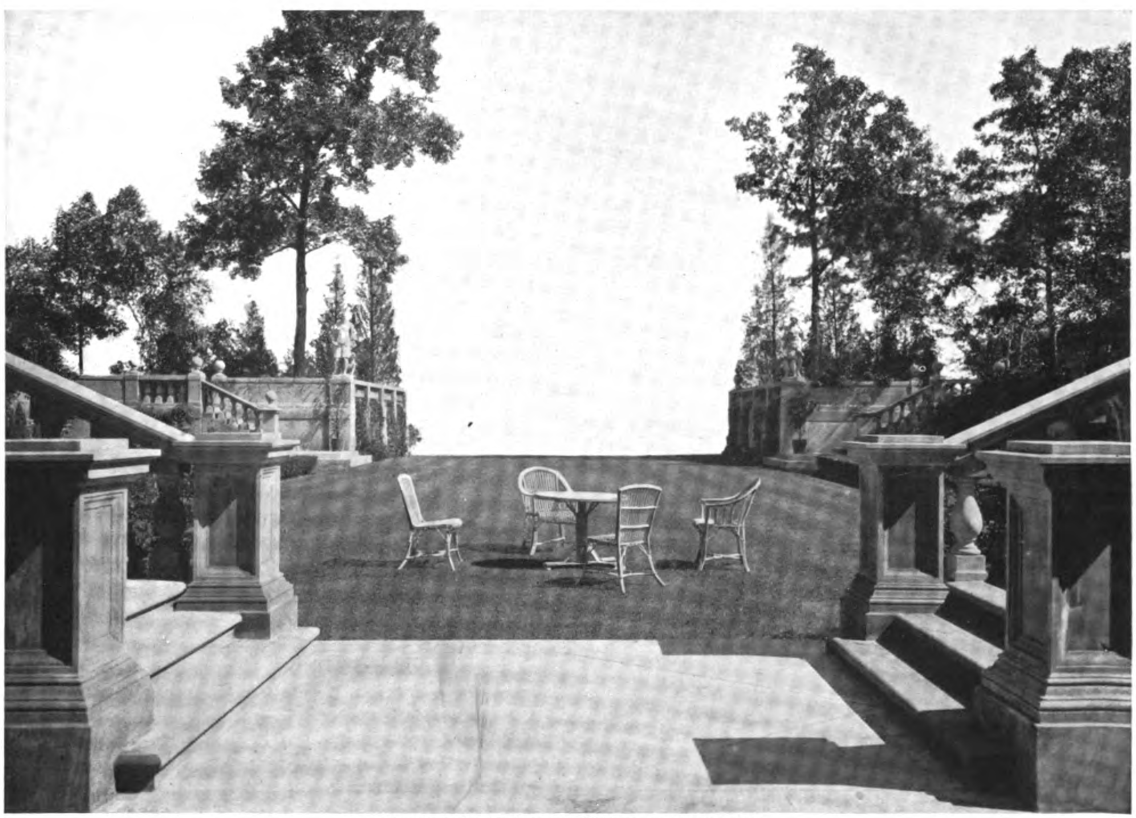


VIEW ACROSS ENTRANCE COURT

HOUSE OF CHARLES BURRAL PIKE, ESQ., LAKE FOREST, ILL.

HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER

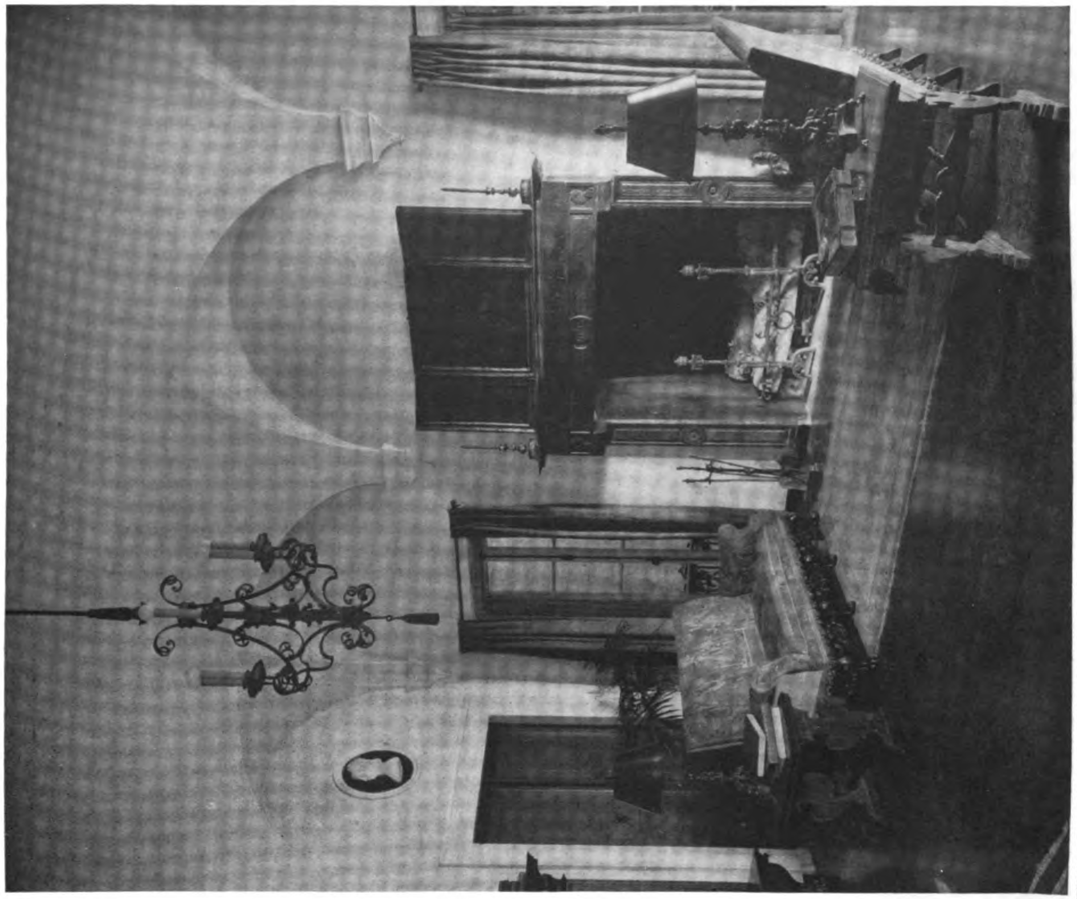
VIEW FROM ROAD

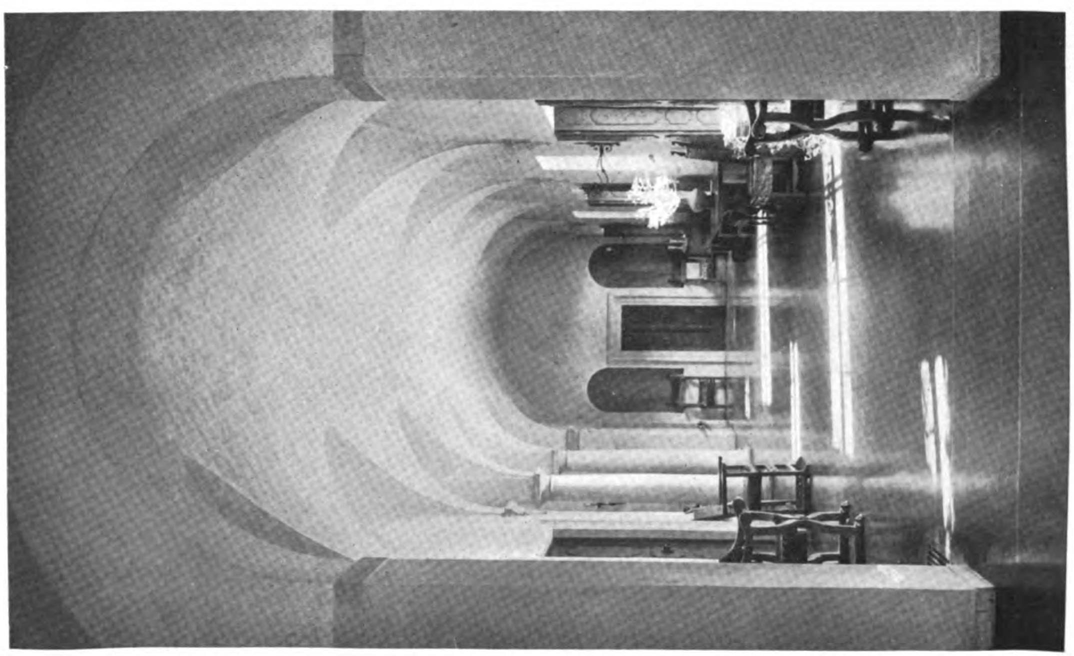


VIEW OF GARDEN LOOKING TOWARD LAKE

HOUSE OF CHARLES BURRAL PIKE, ESQ., LAKE FOREST, ILL.

HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER





INTERIOR VIEWS OF GALLERY AND LIVING ROOM

HOUSE OF CHARLES BURRAL PIKE, ESQ., LAKE FOREST, ILL.

HENRY CORWITH DANGLER, ARCHITECT

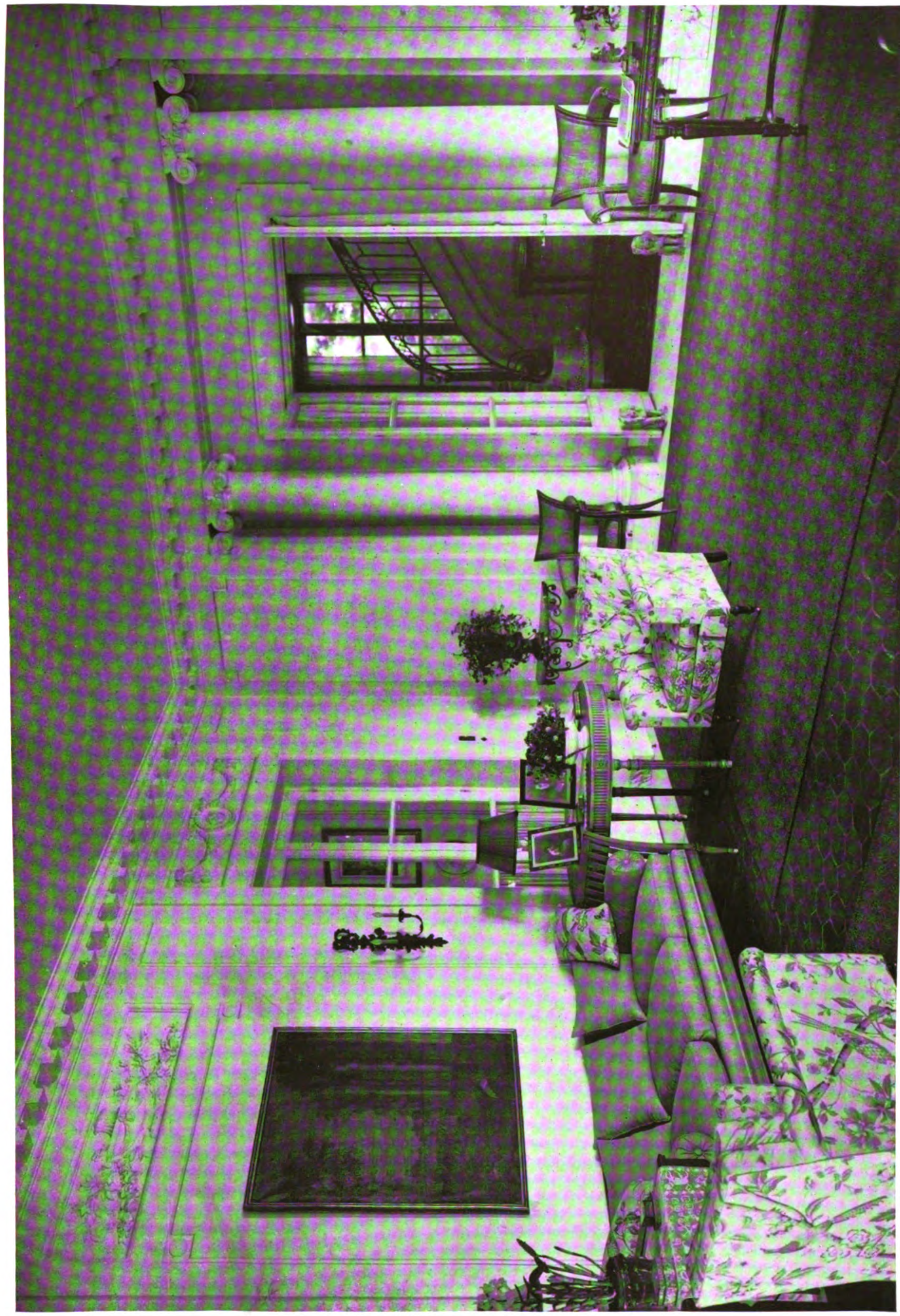
DESIGNED BY DAVID ADLER AND HENRY DANGLER

HOUSE OF RALPH H. POOLE, ESQ., LAKE BLUFF, ILL.
HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER

DETAIL VIEWS OF LIBRARY AND MUSIC ROOM
HOUSE OF RALPH H. POOLE, ESQ., LAKE BLUFF, ILL.
HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER

HALL, HOUSE OF JOSEPH M. CUDAHY, ESQ., LAKE FOREST, ILL.

HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER



GARDEN ROOM, HOUSE OF JOSEPH M. CUDAHY, ESQ., LAKE FOREST, ILL.
HENRY CORWITH DANGLER, ARCHITECT
DESIGNED BY DAVID ADLER AND HENRY DANGLER

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

1922 Should Prove a Good Year for Architects

> **EVERY ARCHITECT SHOULD READ**
> this article which presents an accurate analysis of conditions affecting the building industry as we enter the period of spring activity. In addition to a review of general business conditions in the field, there is presented an analysis of a recent decree of the Department of Justice which removes any limitation of production on the part of building trades labor and should go far to eliminating unfair practices which have heretofore restricted labor output and forced unequitable conditions upon the building investor and employer. The facts which are given in this article constitute information which will be of direct benefit to clients who at this time are considering investment in new buildings.

THE time has now arrived when it may be definitely predicted that the trend of each of the various economic forces which affects the volume of work in architectural offices is in the right direction to insure activity beginning early this year. Another significant fact is that within the past few weeks a considerable spirit of optimism has been developing among architects. In many offices certain long-delayed building projects are proceeding now, and the attitude of investors in this field promises a large volume of work for architects within the near future. Toward the end of last December the writer visited a number of cities throughout the East and Middle West for the purpose of discussing general conditions with architects. Early in March the same territory was covered again and he was frankly amazed at the change from discouragement to optimism. Many of the offices which were slack three months ago are quite busy now and no dissenting report was found regarding the encouraging outlook.

In regard to the improvement in general business conditions, it seems to be the consensus of opinion on the part of authorities in the world of business and finance that we have turned the corner and that by the fall of 1922 this country will have entered a season of mild prosperity, to be followed by several good business years. As this fact becomes more and more evident it is apparent that the confidence of building investors is being restored and that the volume of building construction will be increased through preparations for greater business activity.

A study of the chart shown on the first page of the Service Section of this issue of THE FORUM indicates that building costs have become sufficiently stabilized to encourage investors. It is also important to note that the first two months of 1922 show a volume of prospective building in the form of plans filed which is more than half again greater than in the similar period for 1921. Starting, therefore, with this sound foundation of improved general business conditions, we may analyze in some detail the factors which directly affect the volume of building and particularly the volume of work which will pass through the architectural offices of this country during the period immediately ahead.

ACTIVE TYPES OF BUILDING PROJECTS. THE FORUM Survey of Prospective Building Activity for 1922 (described in November, 1921 issue) has indicated an unusual amount of planning for schools, hospitals, churches and other institutional buildings; public and semi-public structures; residential buildings, particularly of the apartment house and apartment hotel type; hotels in smaller cities and towns, and automotive buildings, including public garages and sales buildings. While industrial structures will not contribute as large a quota of new construction as in the past, it may be noted that of the volume of industrial construction to be carried out a larger percentage than ever before will pass through architects' offices. This is in view of the demand for a better class of buildings to be constructed by conservative industrial organizations. There will be little industrial expansion of the mushroom growth type, which has characterized the past four or five years, because general prices have been forced down to a point where the industrial field offers no unusual speculative inducements.

The year 1922 will probably be marked by a great reduction in the number of building alterations in larger cities. The reduced cost of new construction tends to discourage extensive alterations and to encourage improvements of a permanent nature in the business districts. In our larger cities architects may expect, therefore, a certain volume of business in the form of department store extensions and improvements, new office buildings of medium size, warehouses and water front improvements and general building activity in every section of any city which has recently been opened up by new transportation facilities.

BUILDING FINANCE FOR 1922. One of the important controlling elements, which also shows encouraging signs at the present time, is that of building finance. A canvass of conditions among the more important loaning institutions indicates that larger sums are available for building loan and mortgage financing than at any time since early in the war period. This condition fundamentally reflects the return of public confidence in the building field as an outlet for investment funds. Those financial organizations which make a specialty of the sale of mortgage investment bonds report an ample supply of funds. In fact, in the larger cities many such institutions are actively advertising mortgage money and are seeking good mortgage investments, having more money than they are able to place.

The entrance of the trend line of building cost into the zone of stabilization is reflected by increased confidence on the part of loaning institutions, and loans are being made on a more liberal basis of appraisal than during the past year. Naturally, every point of decrease in the cost of building construction is to the advantage of the investor and the speculative builder in the reduction of necessary equity for new construction projects. During the period of high building costs appraisals for mortgage purposes were maintained on a very conservative basis, making full allowance for the depreciation in reproduction value of buildings. This has meant that in the past two or three years it was necessary for the building investor to provide an unusually large percentage of his cost as equity.

With the decline in construction costs, however, there has been such a marked decrease in the ratio of necessary equity to total land and building cost that the first healthy signs of speculative building activity have developed, particularly in the various classes of buildings which constitute dwellings. Of these the projects which have been of chief interest to architects are groups of dwellings, apartment houses and apartment hotels. The fact that a heavy buying movement will be uncovered with an additional decrease and an easing up of the mortgage market has already been indicated by what happened in New York when the two factors of decreased cost of building and tax-exemption on new buildings emerged into activity in the late summer and fall of 1921.

A study of building activity in New York gives an unusual opportunity to dissect the development of a building boom and to determine at what point the architect benefits as the volume of construction increases. In New York after the passage of the tax-exemption measure there were at first signs of activity only in the inexpensive residential class where tax-exemption encouraged a number of rent-sick individuals to own homes regardless of the prospective decrease in construction costs. During this period a few speculative builders, encouraged by the absorption of a large proportion of existent housing by the buying public at exorbitant prices, proceeded to build on the assumption that a market would be found regardless of cost. Unfortunately, the buying public did not respond very strongly to new dwellings made available on that basis, largely due to the fact that having already seen a steep decline in general prices, a veritable "buyers' strike" developed in the housing field. Such builders were left high and dry as the tide of cost receded rapidly during the spring and summer of 1921.

On the other hand, toward the base of this sharp decline in costs (see chart on first page of Service Section) a wave of speculative building developed. At this time the type of speculative builder who entered the field was bent on cutting corners in every possible manner. Among other items which were often cut out on a basis of false economy were architects' fees. This phase of the development of building activity introduced into New York a large volume of inferior and poorly designed construction, particularly in the apartment house and moderate cost residential field. From the speculative builder's viewpoint, because of the unusual pressure for housing, this activity was fairly successful. It was still possible to get high rents in these new buildings and to sell them to investors at high prices based on rent rolls which promised excellent investment returns. The fact is, however, that this class of construction will suffer heavily at a later period when the housing shortage is less acute, because the public will then be given an opportunity to select living quarters rather than be forced to take the first vacant apartment or house which may be available. This will bring into competition the better designed and better constructed buildings which are now proceeding under construction or are in various stages of planning. Undoubtedly, the flimsy and poorly designed buildings of the earlier period of 1921 will suffer in valuation and there will probably be a considerable money loss for investors who attempted to capitalize the housing shortage and to provide living quarters of minimum value at maximum cost to the tenant.

In the fall and winter of 1921, however, a different class of speculative buildings has been entering the residential field. This class includes a large number of carefully designed apartment buildings in which some thought has been given to architectural planning and to a better type of building construction. Here the valuable effect of architectural planning is quite noticeable and the ultimate comparison of the buildings built from good architectural plans with those constructed on the basis of false economy earlier in the year will be one of the best arguments yet presented to the investing public as to the value of architectural services.

The development of these various stages of residential building in New York may be applied generally throughout the country. As costs have come down a wave of cheap speculative building has been and is sweeping the country, particularly in connection with housing and community utility buildings. We may note, however, that already in some of the western cities a reaction has commenced in favor of the architect and that the secondary wave of building activity, reflected in plans filed in January and February, calls for better built and better designed structures than in the primary wave which developed in the late summer of 1921.

The result of this reaction has undoubtedly been felt by loaning institutions. We believe that thoughtful consideration on the part of such organizations is now being given to the importance of efficient planning and good design as affecting buildings which constitute collateral for loans. In other words, it looks very much to us as though architecture during the next few years will be a much more important factor in building loan appraisals than ever in the past. *The architect himself can do much to bring about this desirable condition, first,* by making more careful study of building finance as affecting the districts in which he works, and, *second,* by developing a closer contact with loaning institutions in order better to determine their requirements and thus render a more complete service to clients.

The architect has much information which would be of benefit to any loaning institution, and it is certain that a more comprehensive knowledge of the attitude and requirements of loaning institutions would be of great benefit to the architect and consequently to his client. This fact is proved when one learns that not one out of 20 building and permanent mortgage loans is made by leading loaning institutions of this country without their suggesting and insisting upon changes in the plans submitted!

The Building Investor's Viewpoint. The prospective building investor has naturally been considerably bewildered by the unusual fluctuations in building costs and demand. When the period of general deflation began about two years ago, the public watched with interest as prices dropped rapidly in various classes of necessities and luxuries. It was but a natural assumption that there would be a considerable decline in the cost of building. This decline took place until late in the fall of 1921 when building cost developed some aspects of stabilization. It has been difficult, however, for the building investor to realize that a period of stabilization is setting in and that by building within the near future he will not be risking a further great depreciation in replacement values. Gradually, however, this realization is developing and the building investor is gaining confidence which will probably be expressed in an increasing volume of work in architectural offices.

The ironing out of labor difficulties, as explained in later paragraphs in this article, together with the encouraging attitude of loaning interests, is having much to do with the return of confidence on the part of the building investor. It must be remembered, however, that in making his investment he will look to the architect for a comprehensive type of service. He will insist as never before that his building be thoroughly efficient in plan and that it shall be built on a minimum cost basis but without sacrificing too greatly the quality of materials and equipment.

As never before, the building investor will appreciate the co-operation of the architect in the introduction of expert service for special problems connected with the building. Thus in the design of office buildings and other investment types, the viewpoint of the building manager who is to be responsible for maintenance and renting should be sought eagerly by the architect before final plans are completed. Unless through some unusual combination of circumstances he may have had extensive experience in building management, there is no architect today who can design a commercial building that could not be improved by valuable suggestions from an efficient building manager. *Millions of dollars have been wasted in buildings throughout this country during past years because those who are responsible for design and equipment have not been brought in contact during the period of planning with those who are responsible for maintenance and income.* It is a significant fact that there is scarcely an office building in the United States in which the manager would not make drastic changes in plan and equipment if he were able to do so.

What does this mean from the investor's viewpoint? It means that whenever an architect may have cause to introduce a specialist in connection with some phase of planning and equipment, he will gain and merit the appreciation of his client. In fact this is the kind of service that he will rapidly learn to expect from his architect—a service reflecting a deeper appreciation of the owner's business viewpoint and the financial success of his project.

Again, in the construction of his building, he will appreciate buying skill which may be shown by the architect. In other sections of The Forum we have already called attention to the fact that in this period of keen competition between general and sub-contractors and in the material market, there is open to the architect an opportunity for skillful buying such as he has never known before. It is quite surprising how much can be cut from the cost of a building today by carefully combing the field for sub-contract bids and by willingness to change specifications to meet opportunities for saving which may be suggested by contractors or salesmen of building materials, devices and equipment. The architect who studies the building field carefully today, who welcomes the salesman as a friend and ally rather than receiving him grudgingly as a time-consuming pest, who studies the ways and demands of the speculative building field, and who becomes better acquainted with bankers and loaning institutions, is the architect who will reap his reward in the years of activity to come because he will look at every project which comes into his office through the eyes of the building investor who may be his client. In this way only can he render true service and develop a sound reputation among building investors in his locality.

An interesting substantiation of this viewpoint has recently been given by Leonard P. Ayres, Vice-president of the Cleveland Trust Company, in an address before the annual meeting of the Associated General Contractors. (In the Service Section of this issue of THE FORUM will be found a complete analysis by Colonel Ayres of the extraordinary future of the construction industry.) In the course of his address he makes these interesting remarks:

"For business men in this period of competition are going to demand value; they are going to shop when they make their purchases in construction, just as they are in every other commodity. *That man, who can hand over to them a larger inherent worth for the investment, is the man who is going to reap his reward in this competitive period that is upon us*—a period, I think, in which that man is going to succeed and those firms are going to survive that practice this sort of foresight that we have been talking about, that are able to exercise a wise thrift, that can increase the efficiency of the management of their concerns and, most of all, that know or get to know the fundamental facts about their business, that have the ability and the will to substitute facts for guesses and knowledge for opinions and evidence for speculation.

"For that man or firm, in the construction industry, a very hopeful future exists. And, gentlemen, that is what I think about the construction industry in 1922 from a banker's viewpoint!"

SPECULATIVE BUILDING AND ARCHITECTURAL SERVICE. We have already referred to the increasing use of architectural service by speculative builders in the second stage of the building boom in New York and vicinity. An examination of conditions in the speculative building field in other large cities throughout the East and Middle West shows an increasing amount of speculative work under design through architectural offices. One of the principal reasons for this condition is that speculative building ventures are now being undertaken by a more conservative and more businesslike class of investors who realize that their buildings must be designed to meet the keen competition which will follow in later years.

In order to make his service of value to the speculative builder, the architect must be in a position to make an exact study of rental and maintenance efficiency. He must also consider seriously the introduction of the element of architectural design through the use of simple forms and through the relation of structural masses and proportions rather than by expensive embellishments. In the field of speculative apartment house construction, it may be noted that within the past few months a number of architects have developed unusually good reputations and large volumes of business through their skill in designing attractive buildings with layouts promising maximum rental returns and minimum overhead costs. If an architect proposes to enter this field he must make a study of building financing, the local rental market and the market for materials and equipment, so that he can offer to the speculative builder efficient plans in which architectural design is not over-emphasized by an increase in cost of construction and which provide rentable areas showing the highest possible market value. He must also keep closely in touch with developments in the field of utility equipment so that he can introduce the maximum number of features which will attract and hold tenants. The same conditions hold true for other types of buildings which may be considered in the class of speculative investments.

CUTTING THE CLAWS OF BUILDING LABOR. One of the most important events which has taken place recently in the construction industry is the agreement made last month between the United States Department of Justice and the International Union of Bricklayers, Masons and Plasterers. As formulated by the Department of Justice, this agreement, which is virtually a decree, contains these provisions:

"1. There is to be no limit to the productive capacity of the individual workman within the working day or any other time.

"2. There is to be no limit upon the right of the employers to purchase their materials wherever and whenever and from whomsoever they may choose, whether these materials be union-made or otherwise.

"3. There is to be no favoritism shown by organized labor toward employer or trade associations, and no discriminations are to be indulged in against the independent employer who may not be a member of such an organization.

"4. The labor organization is not to be used, or permit itself to be used, by material men or contractors or sub-contractors as an instrument for the collection of debts or enforcement of alleged claims."

It is of particular importance to note that this agreement establishes new working rules for approximately 119,000 union workers, and that any member who violates a provision of the decree "will be guilty of contempt and subject to both fine and imprisonment."

While this decree does not insure that all building jobs will proceed on an honest and fair basis, it is evident that it opens up an opportunity for fair minded employers and for employes who wish to give real service, to proceed in harmony without fear of the vicious, undermining influences of crooked labor leaders and lazy workmen. This action is the gratifying outcome of many efforts such as that involved in the Landis decision, and the unearthing of conditions in the New York building field by Samuel Untermyer.

THE TREND OF BUILDING COSTS. A survey of all conditions affecting building costs and a study of the trends of these various factors would indicate that we are facing a period of very gradually declining costs, marked by certain fluctuations effected during periods of unusual demand.

What prospective building owners need now is definite information which will aid them in the realization that a period of stabilization has actually developed in the building industry. The architect is the logical person to convey this information to his client, and it is for this reason that he should be interested to an unusual degree in the economic phases of building construction.

ALSATIAN IRONWORK

A GROUP OF MEASURED DRAWINGS

By HOWARD MOÏSE

THE ironwork of Alsace, while certainly less distinctive and individual than the definitely characterized ironwork of France, Italy or Spain, has nevertheless a distinct character of its own. It is a character derived from the mingling of French and German influences, and no phase of Alsatian architecture records more clearly the long Franco-Teutonic struggle for the domination of the plain of Alsace and the long interaction of French and German traditions on the art of the country. Serving through the centuries as a highway between Germany and the Low Countries on the one hand, and Burgundy and the South on the other, Alsace has inevitably developed art forms which show a mingling of the two currents which met in its cities.

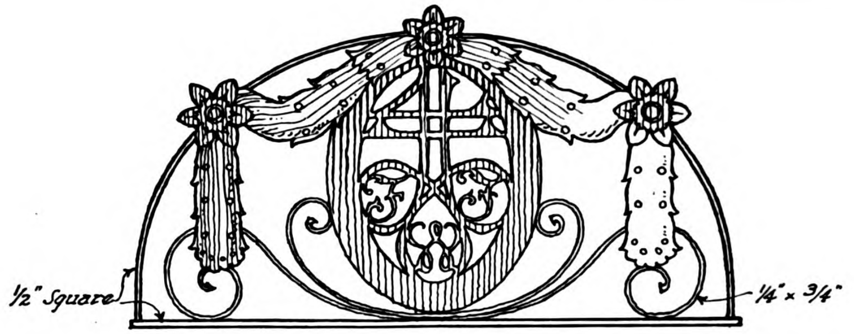
Strasbourg is very rich in ironwork of the eighteenth century which, though essentially French in character, possesses a quality all its own from the handling of the French motives with a certain naive freedom and picturesqueness that is wholly German. The little over-door from a baker's shop is an example in point. Here in the midst of a delicate and charming French motive two gilded lions hold a pretzel in their paws.

Sixteenth and early seventeenth century ironwork are not often met with in the streets, but many interesting examples, such as the cemetery cross, are to be seen in the museums of Strasbourg and Colmar. The explanation of the purpose of the little iron box with a hinged door in the center of the cross is of interest, whether or not it be correct. According to the custodian of the museum its function was to serve as a depository for the cards of visitors to the grave. The emblem suggesting a turtle's back suspended from the seventeenth century sign bracket is also puzzling until one learns that the seven bulges represent mountains, and that the inn before whose door it hung bore the title, "Zu den Sieben Bergen."

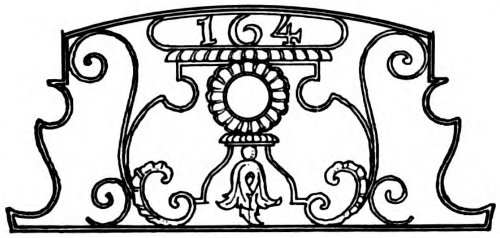
Gothic ironwork is even more rarely met with, but here and there a few late Gothic grilles remain in the transoms over doorways. A favorite pattern is a simple grillage of sixteen squares, the four central squares adorned by a circle from which spring four berries, suggesting a highly simplified laurel wreath.

Almost more interesting than the wrought iron designs, however, are some of the simple metal signs which one finds in the villages and small towns. These are no doubt of fairly recent date, probably early nineteenth century. The wrought iron brackets are of extreme simplicity, but they are often marked by great beauty of line. The sign itself usually consists of a wreath, either round or oval in shape, made up in the round, of little laurel leaves each cut from a separate piece of sheet metal and bound together by metal ribbons at top and bottom. Within the wreath is a flat metal cut-out depicting the name of the inn which usually occurs again in lettering on a ribbon suspended below the wreath. The leaves are painted green, the ribbons gilded, and the cut-out symbol is done either in naturalistic colors or in black and gold.

A Square in Strasbourg Showing the Cathedral

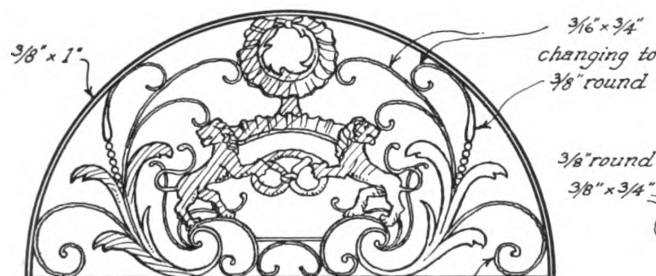


FANLIGHT
Flat Plate 1/16" thick pierced. Swags and Flowers 1/32" repoussé.

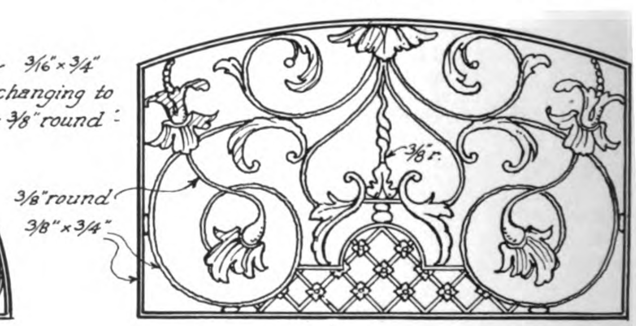


OVERDOOR
3/4" x 5/8" varying to thinner. Leaves & Frill 1/32" repoussé.

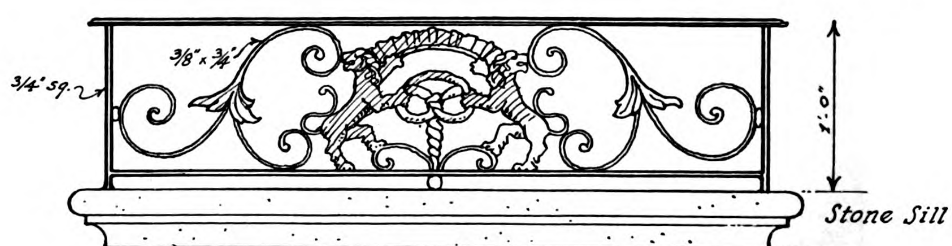
FANLIGHT
3/16" x 5/8" varying to thinner. Moons, leaves, etc. 1/32" repoussé riveted on.



FANLIGHT
From Baker's Shop. In general 3/16" x 3/4". Lions, pretzel, frills, & leaves 1/32" thick repoussé.



OVERDOOR
About 3/8" on face - 3/64" thick - Rosettes repoussé - Leaves 3/64" thick repoussé.



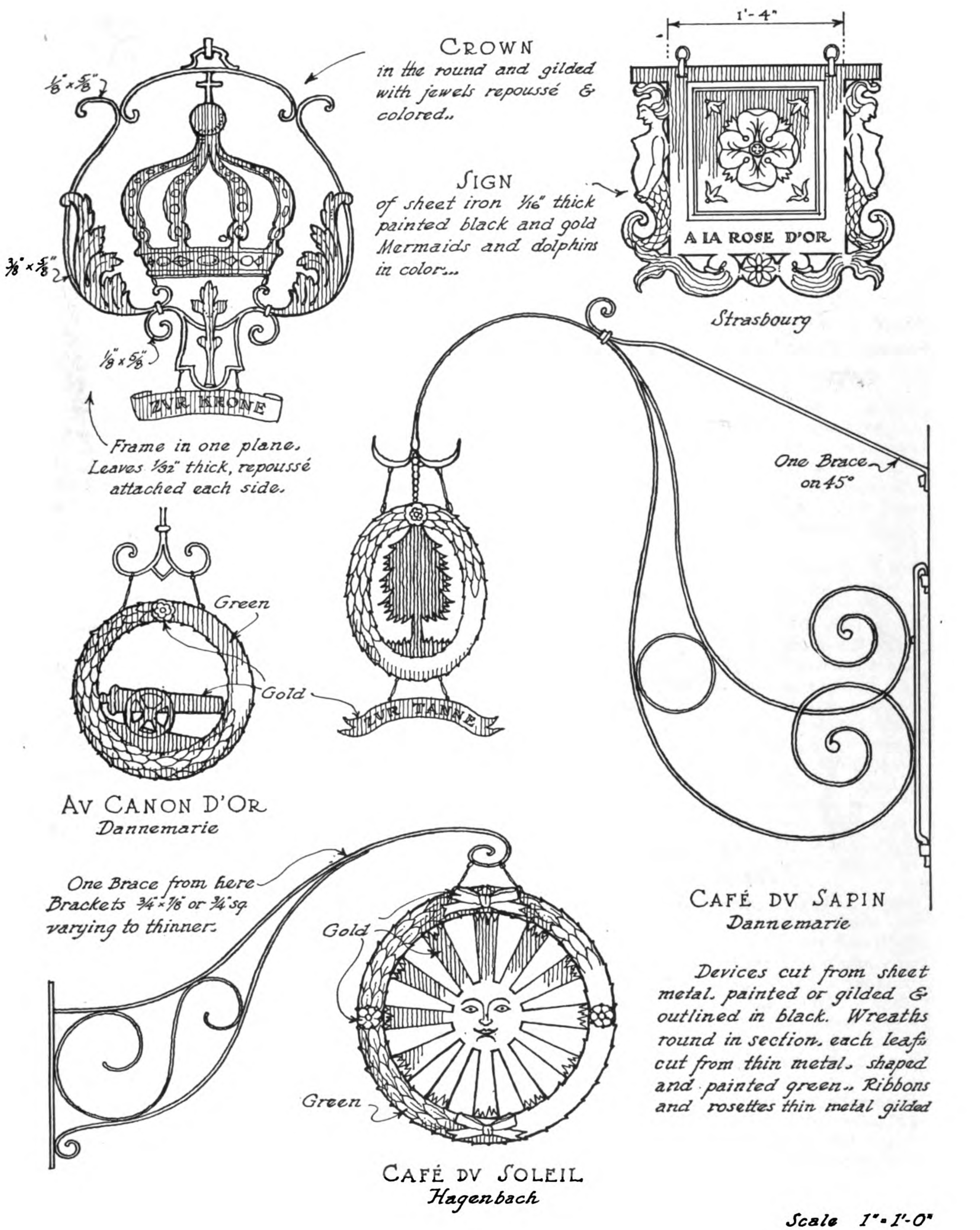
WINDOW GRILL
from Bakers Shop.

Scale 1" = 1'-0"

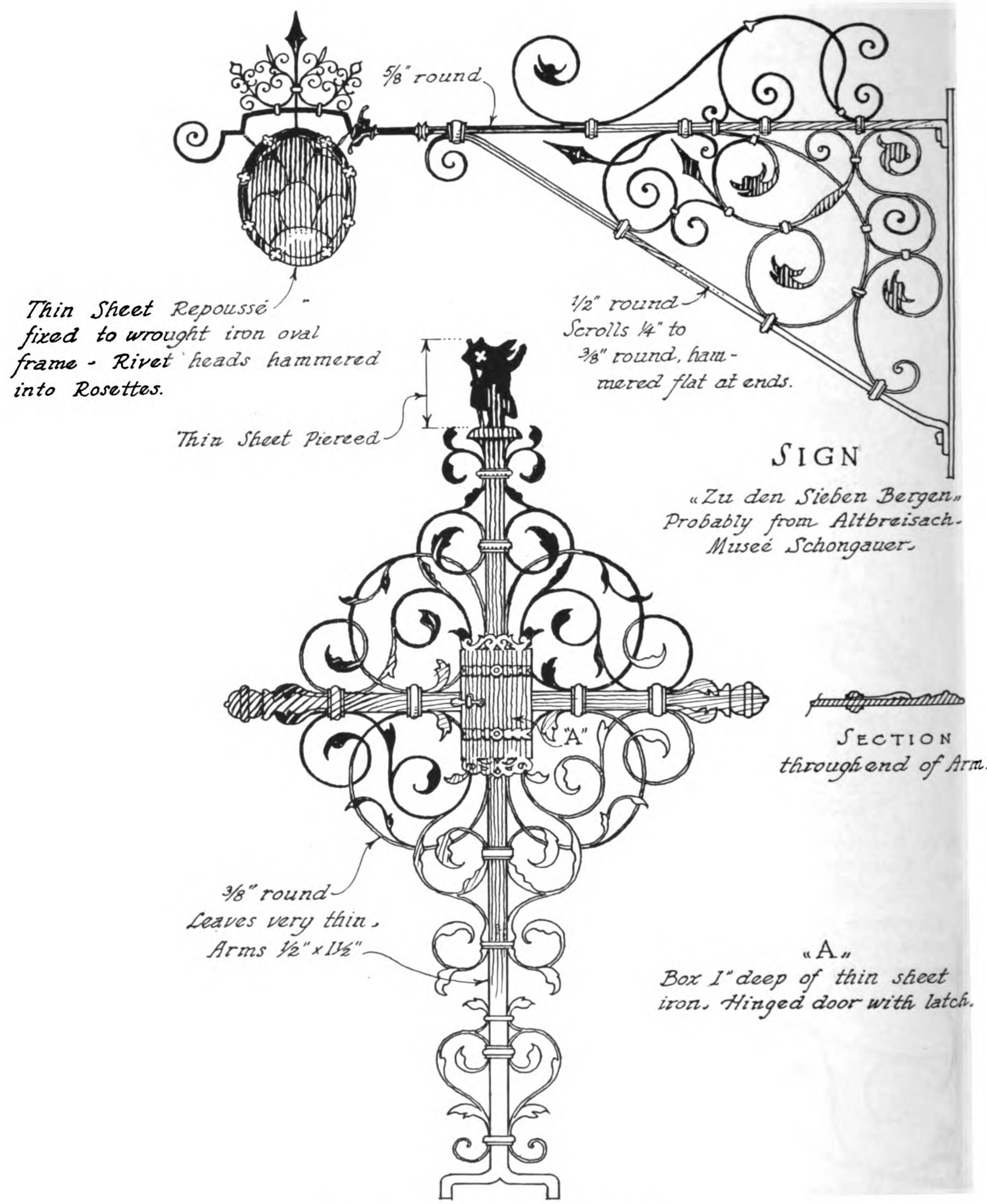
ALSATIAN DETAILS 1922

EIGHTEENTH CENTURY IRONWORK
STRASBOURG ALSACE

MEASURED and DRAWN by HOWARD MOÏSE



ALSATIAN DETAILS 1922	· EIGHTEENTH CENTVRY SIGNS · · ALSACE ·	MEASVRED and DRAWN by HOWARD MOÏSE



· CEMETARY CROSS ·

Musée Schongauer

Scale 1" = 1'-0"

ALSATIAN DETAILS 1922	SEVENTEENTH · CENTVRY · IRONWORK · COLMAR · ALSACE ·	MEASVRED and DRAWN by HOWARD MOÏSE

Electrical Wiring Layouts for Modern Buildings

PART IV

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

IN the preparation of plans and specifications for the electrical equipment of a structure of any kind, the use for which the building is intended must be considered.

Electrical Cooking Apparatus. If cooking with the use of small portable equipment is to be considered, this equipment requiring from 500 to 2,000 watts, a 20-ampere receptacle or heater combination, fitted with pilot lamp and switch, together with a circuit of two No. 10 or 12 wires (depending upon the distance to the panel board) will be ample to take care of the load. If one of the large stationary ranges is to be used, there must be a separate circuit running from the service connection to the range; this should be independent of the lighting feeders, and provision should be made for metering this circuit separately at the meter board. The circuit should terminate at an outlet box or fitting, and conduit should extend from this outlet to the range, when the range is set in position. The larger ranges have a panel board, properly fused, in the body of the range and the circuit should terminate in this panel box, the wires connecting directly to the studs of the main fuses or switches.

The size of copper to use for the operation of the range will depend upon its capacity; the ampere load when every unit is in use should be ascertained, and the copper proportioned to take care of this load. As a rule not less than No. 6 wire should be used on the average household range. The circuit will be of two wires or three wires, depending upon whether a two- or three-wire service supplies the building. The wiring contract will require the circuit to be complete from the service connection to the range outlet, 6 feet being left on the wires to permit the later connection to the range. The contractor setting up the range, as a rule, will make the final connections.

Power Circuits. If the building is large there may be required an electric elevator or a stationary refrigerating plant, as well as the motors for the laundry, referred to elsewhere. If the power service is supplied over separate service lines, the power service should be in all respects separate from the lighting service, the power operating on a two- or three-phase current, while the lighting service operates on a single-phase current. It is seldom, however, that more than one service is used for residence work, both motors and lighting being supplied from the single-phase service.

The small motors used in the kitchen, and portable motors for use elsewhere, may be plugged in the different receptacle outlets and thus operated from the lighting circuits. The stationary motors of from 1- to 5-horse power capacity should have separate circuits in the building. All stationary motor circuits should be metered separately from the lighting circuits, as there is a special rate for motor operation.

On the two-wire system both the motors and lighting will operate at 110 volts. On the three-wire system the lighting will operate at 110 volts and will be connected to balance on both sides of the three-wire system. The motor circuits will, however, operate on 220 volts and will connect across the two outside wires of the three-wire system. At each motor there should be installed an enclosed type safety switch, fused to protect the motor, the conduit and circuit passing through the switch box and terminating at the motor in a fitting of the condulet type. On alternating current circuits a switch alone is required to start motors up to 5-horse power. On direct current circuits each motor requires a starting box or controller in addition to the switch; the starting box is as a rule located at the side of the starting switch.

Where an elevator or refrigerating plant requiring an automatic type of controller is used the electrical contract requires the wires of the circuit to terminate in the switch referred to, and all connections from the switch to the automatic controller and motor are made under the contract for the equipment. Where the equipment just described is used, there should be a drop cord outlet located near the machine, this connected from the lighting circuit.

Panel Boards. The panel boards or cutouts will be of the two-wire or three-wire type, depending upon the service. If the two-wire service is supplied the panel will be equipped with two-bus bars and two-wire branch circuits; these panels are known as the "two-wire main and two-wire branch"; a typical two-wire panel is shown in Fig. 1. This panel is of the plug fuse type, without switches in mains or in branch circuits.

If the three-wire service is supplied the panels will have three-bus bars and two-wire branch circuits. The voltage between the neutral and either outside bus will be 110 volts, while the voltage between the two outside bus bars will be 220 volts. These panels are known as "three-wire main and two-wire branch." Fig. 2 shows a typical panel of this type; this panel is equipped with both switches and fuses in the branch circuits. The panels may be made with fuses only in the branch circuits or with fuses and switches in the branch circuits, and also in the mains and with either knife blade, push button or snap switches or with plug or N. E. Code fuses.

In residence wiring the panels are usually installed in the basement and it is seldom that other than the fused type of panel similar to that shown in Fig. 1 is required. If it is desired to control the branch circuits from the panel, then switches should be added to the branch circuits as in Fig. 3.

If a certain section of the building is controlled from any one panel, and it is desired to cut the entire service to that section out at will, then there should be added a fused main switch on the panel, this connecting directly with the bus bars. If the panels are located in conspicuous places and it is desired to control the branch circuits from the panels, then panels of the safety type are used. (See Fig. 3.) These panels have the fuse plugs in separate compartments and are fitted with push button switches; all exposed copper is under lock and inexperienced persons may operate the switches without danger of being shocked.

Panel boards may be made up with porcelain cutouts installed in steel cabinets, the bus connections being made with the proper sized wire. These "made up" panels, however, cost nearly as much as the standard slate fuse panel, require more room and in the long run are not as satisfactory. Branch circuit fuses on 110-volt work may be of either the N. E. Code or the plug type; the plug fuses are less expensive to replace, but are more unsightly when used in connection with open panel boards. Plug fuses are not used above 30-ampere capacity.

Panel boards should be installed in steel cabinets, either of the flush or surface type; each cabinet should be fitted with hinged door and lock; a gutter space should be partitioned off on all sides of the panel, the circuit wires concealed in this gutter and passing through holes in the partitions for connection to the fuses. Each circuit should be numbered and a schedule posted on the inside of the door, showing the outlets controlled by the circuits for convenience of operation.

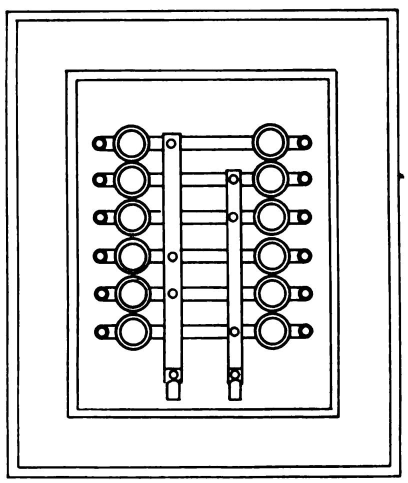


Fig. 1. Two-wire Panel Board

The system, when finished, becomes a network of wires, the current feeding in over the "service wires" to the "service switch" and from the "service switch" (through the meters) over the "feeder wires" to the "panel boards," and over the branch circuits from the panel boards to all lighting outlets. Each branch circuit from the panel boards to the outlets is composed of two No. 14 wires, these circuits carrying not more than from 6 to 10 amperes. Each branch circuit is fused with a 6- or 10-ampere fuse.

The sizes of the feeder circuit are determined by

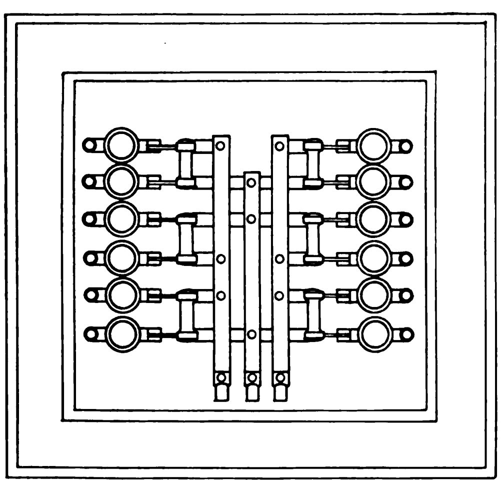


Fig. 2. Three-wire Panel Board

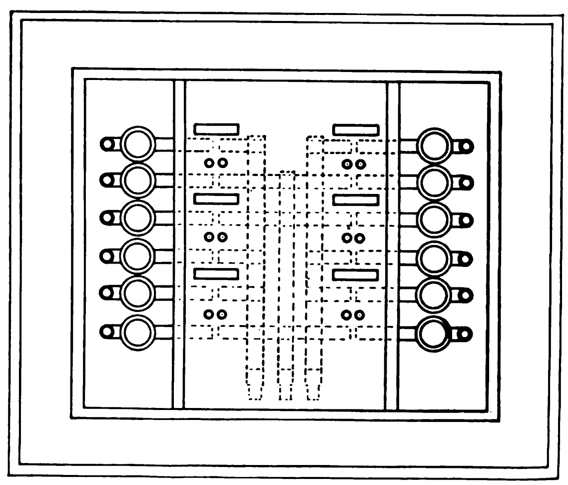


Fig. 3. Safety Type Panel Board

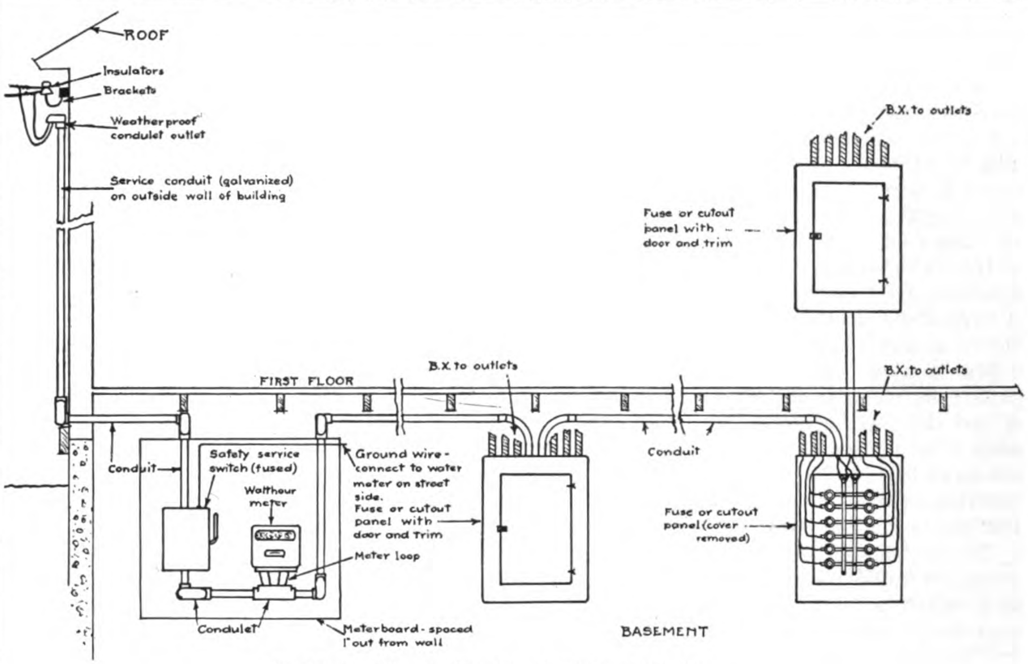


DIAGRAM OF OVERHEAD SERVICE SHOWING THREE PANELS CONNECTED ON ONE FEEDER LINE

Fig. 4

the ampere load required by the total number of panels connected to the feeder (the ampere load depends upon the wattage required by the outlets) and wire of the proper carrying capacity selected. The feeder circuits are protected by fuses at the service switch. The service wires from the "service switch" to the lines of the service company must be of the total capacity of all the feeders in the building.

Service Connections. The service switch and meter board must be located in the basement, at a short distance from the point where the wires enter the building. The service switch must not be located on stairs or in a place where it is likely to be disturbed, but it must be accessible for the replacement of fuses and the reading of the meters. In some instances the exact location of the service switch is determined by the local inspector. If the building is located in a city where underground service is furnished, then the service to the building will be underground from the nearest manhole of the system. If overhead service is general, the service to the building may be overhead from the nearest pole to the building, or underground cable may be used from the nearest pole to the building.

With overhead service the wires pass from the nearest pole to brackets on the building. This work is done without charge by the service company. The wiring contract requires a conduit with weatherproof head on the outside of the building, the wires passing through this conduit and terminating in the service switch. (See Fig. 1 in March issue.) If underground service is desired, a conduit may be run from the nearest pole down and underground to the building, terminating in a junction box on the inside of the basement wall (Fig. 2 in March issue). Conduit must continue from the junction box to the service switch, and rubber covered lead sheathed wires must be run in the conduit from the junction box to the pole.

If desired, "steel tape armored cable" may be run from the junction box to the pole in place of the wires in conduit; this cable is protected by a lead sheath over the insulation, two tapings of steel and two coverings of jute impregnated with waterproof compound; it is merely dropped into a trench and covered, but it should be protected with iron pipe where it passes from the ground and up the pole. The service wires should be protected by a pothead at the point on the pole where they connect with the line wires.

It is the custom for the service company to bring its wires to a point at the edge of the consumer's property, and if the building is near the street and no poles are required set on the property, the company will swing its wires from the pole to the brackets on the building without cost. If the distance from the street is so great that poles are required set on the property, then the cost of the connections from the street to the building must be paid by the consumer; or if underground service is required, the consumer must bear all expense of this service from the pole to the service switch.

The size of the service wires will depend upon the load; no service wires, however, smaller than No. 6 B. & S. gauge should be used. The meter and service board should be of wood, securely battened and fastened to the wall. It should be painted with two coats of asphaltum or other suitable paint as soon as installed. The service switch should be of the safety type, with fused switch installed in steel cabinet and operated from an outside handle. The wires of the service terminate in the fuse studs of the switch. Where not more than 10 or 12 circuits are used on the panel board, and the average length of the circuits does not exceed 60 feet, the panel service switch and meter are generally mounted on the service board. (See Fig. 2 in March issue.) Fittings of the condulet type are used, the meter installed with all wires under iron, and the B.X. wires or conduits are carried directly from the panel board to the outlets.

For small installations there are several "metering service switches" obtainable where the meter and service switch are combined in one box or cabinet. The installation however would be the same as indicated in Fig. 2 except that the meter and service switch would be combined. Where the average length of the branch circuits is more than 80 feet, or where there are a great number of circuits installed, it is advisable to make use of two or more panel boards, each board feeding a certain section of the building. The panels may be located in the basement or on the different floors. They should each be set approximately at the center of the distribution of the circuits they control. Where the building is in several sections, it is generally advisable to provide a panel board for each section of the building.

With the use of a number of panel boards, the meters and service switch are located at the point of entrance and the feeder circuits run in conduits from the service switch to the panels, either singly or connecting them in group as indicated in Fig. 4.

If a large electric range or motors are to be used, requiring separate feeder circuits from the service board, a meter as switch for the control of each circuit would be installed on the service board in addition to that shown in Fig. 3. Where motors are required for elevator and refrigerating service, as well as for use in the laundry, it is avisable to run one feeder circuit from the service board to a central point, terminating the feeder in a steel cabinet containing branch cutouts, and to run separate sub-feeders from the cabinet to the different motors and equipment, each sub-feeder to be fused in the cabinet to protect the circuit.

Bell Circuits. The wiring contract should include all wiring for electric bells. In smaller houses but two bells are required, one ringing from the front and one from the rear door, the bells as a rule being located in the kitchen. The bells should be of different tones. Batteries should be in the basement; three or four dry cells are required. As the bell circuits require from four to eight volts, the wires may be run in second class construction without protection; if so installed however, they should be secured to the timbers with insulated staples and they should not be run near steam piping.

In buildings of first class construction, conduits must be used; if possible, however, conduits or flexible tubing should be used for the bell circuits in any class of construction, so that in the event of trouble the wires may be withdrawn and replaced without disturbing the walls and finish; it is also advisable to use No. 18 rubber-covered wire for all bell circuits, rather than moisture-proof or annunciator wire, formerly used for this work. If the wires are installed without protection, porcelain tubes should be set in the walls at the points where the wires pass from the walls to the bells and push buttons; wires should not be permitted to come in contact with plaster. With the use of conduit, a standard outlet box should be set at each outlet, the cover to be adapted to the type of bell or button used. Flexible tubing is simply brought out of the wall and into the back of the bell or button.

The batteries may be set either on a small shelf or in a wood or steel cabinet; with the batteries in a central location the conduit may be run from the cabinet to the bell, location wires of both circuits to be run in the one conduit, separate conduits then being run from the cabinet to each button, the wires drawn in and all splices made in the cabinet. If batteries are not desired, a bell ringing transformer may be installed; this should be set at a point near the lighting panel, and connections made with the lighting circuit through 3-ampere fuses. All connections from the panel to the primary side of the transformer should be made in conduits and in accordance with the rules governing the installation of the lighting circuits.

Where a more extensive bell system is required, an annunciator is used, this being located in the kitchen or at the servants' station, with push buttons at each door, under table in dining room, in bathrooms, halls and in the bedrooms. At times a second system is required with annunciator in maids' corridor, this connected with separate buttons in the different bedrooms. If signals are to be answered from two points, as from the kitchen section and from the servants' corridor also, two annunciators are used, these being duplicates and connected in multiple, so that any call is registered on both annunciators. The resetting button may be mounted on the frame of the annunciator, or the circuit may be extended and the button mounted in any desired location. The type and capacity of the battery will be the same, regardless of the number of stations.

Some Facts on Warm Air Heating

PART II

By L. A. BRISSETTE

IN laying out a heating plant of any character, whether for warm air heating or steam, the architect should first calculate the amount of heating required for the various rooms. This is represented by square feet in radiation or by register sizes in hot air installations. In the latter system, if the furnace and the heating conductors are proportioned properly for the various rooms, it is possible scientifically to calculate the exact amount of coal to be burned per square foot, as well as the number of B. t. u. required to heat the rooms, but since the architect's plans are usually not intended to confine the contractor or the heating engineer to the strict limitations indicated, but are merely a guide on which a comparative figure may be based, it is not always desirable that these items be figured to the accurate limit.

In the heating specifications a clause should be inserted to the effect that "the sizes of registers, pipes and furnaces are minimum sizes and must not be reduced but may be increased by the contractor if, in his judgment, it may be necessary in order to enable him to guarantee to heat all the rooms to 70° in zero weather." This will be found to protect the owner's interests as effectually as though the architect carried his calculations to the last decimal point from scientific analysis. There are short-cut tables which may be obtained from the various manufacturers of the heating units or from various text books which are of value to architects, and which can always be used in determining the sizes of the various registers, pipes, etc.

Figs. 1 and 2 show an installation in which the heating company which furnished the heat producer were also the engineers on the work, and it may therefore be taken as an example to show the correct proportions of the various parts of the system from the heating engineers' standpoint.

In the March issue the basement plan of this same residence was reproduced. This plan shows a typical arrangement of the heater and pipes with the basic idea of equalized runs. Figs. 3 and 4 show two tables indicating different methods of calculating the area of pipes and the amount of register surface required. One, as will be noted, refers to the air change. The other refers to the exposed wall and glazed surfaces. A careful analysis will show only slight variations in the calculations, whichever method be adopted. It is always advisable for the architect to approximate the sizes of pipes and registers before sending plans out to be figured, and these tables will be found of great assistance in the work.

Another thing which must be considered with proper care by the architect in installing a hot air heating system in a house is the position of the registers. In a previous article it was noted that the registers, from the standpoint of housekeeping, should be in the walls, and in this position they are no less efficient from the heating engineer's standpoint than they are in the floor. Some people prefer floor registers; some people prefer wall registers, so that the matter of choice enters largely into the determination of this particular question; but one thing which cannot be left to choice is their position in relation to exposed walls.

In steam or hot water heating the radiators are placed near the windows or under windows or ex-

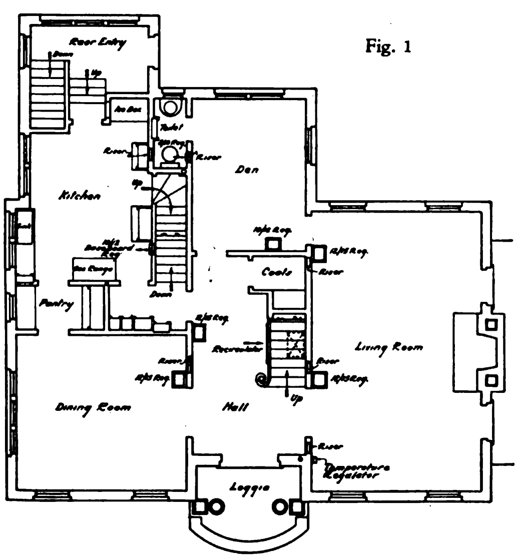


Fig. 1

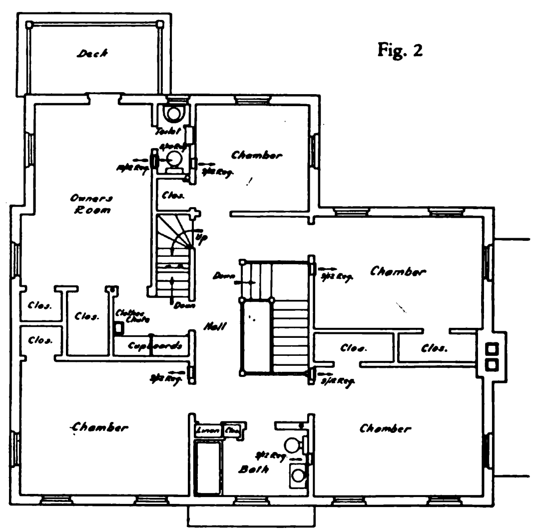


Fig. 2

posed walls, while in a hot air heating arrangement the registers should be placed, not under the windows but on the *opposite* side of the room, the theory being that as the warm air rises to the ceiling, it travels across all the exposed wall surface where it is chilled and thence drops to the floor on account of its increased weight. Thus a positive circulation is established which helps to draw the warm air into the room and more effectually heat all parts of the room. The warm air register located directly under a window, for example, would be in a very disadvantageous position because of the current of cold air coming down the wall and down the surface of the glass, having a tendency to form a cold blanket directly over the register surface. Under these conditions sufficient pressure must be applied to the warm air column to enable it to force its way through this blanket.

The installation of the pipes, in connection with the hot air heating system, is deserving of considerable thought and attention. Where these pipes are concealed in partitions it is desirable to see that they are so arranged and constructed as to minimize the heat losses and also to serve as a protection against the possibility of the spread of fire through these pipes. Fire cannot originate in or be caused by the hot air furnace itself, but with the pipe openings carried up through the partitions, there is a natural chimney formed which might easily carry flames from one part of the building to another provided the pipes were not made sufficiently tight at the joints.

In addition to the tight and rigid construction of the pipes it is quite essential that either a layer of asbestos paper or some other insulating medium be placed over the outside of the pipes or that an additional pipe be run enclosing the heater pipe. This double pipe construction forms a dead air space outside of the heat conductor which, in itself, is good insulation. Where these pipes pass through floors, the edges of the floors and the timbers should be protected by a metal or asbestos covering, and wherever the pipes pass through a partition or through studding, a similar metal or asbestos sleeve should be provided as additional fire protection.

Many times the pipes in the basement are extended from the heater to meet the rising lines without having the proper supports. In the case of long runs, supports should be provided at intervals of not over 5 feet so that the pipes may be rigidly secured to the timbers overhead. This will prevent the sagging of the pipes and consequent opening of joints with attendant heat loss.

No heating system is complete, where hot air is the medium employed, without establishing a complete recirculation system. In Fig. 1 the recirculation register shown at the side of the stairs is installed in order to facilitate the circulation of air and also to prevent cold drafts down the stairs. In very mild weather, all of the air entering the furnace may be taken from out of doors. In colder weather, the outdoor opening may be tightly closed and all of the air taken through the recirculation register. This is a more convenient and more economical method of heating in cold weather than taking the entire air supply from out of doors, and inasmuch as the opening and closing of outer doors and the leakage around windows and doors always provide a certain amount of fresh air in the house, there need be no concern about using the air over and over again.

In more recent years the general public has become much more intelligent as to the advantages of the hot air type of heating, and it is only fair to assume that before long the unjust criticisms which have been applied to this system of heating will be entirely done away with and then we will no longer hear the complaints about dust, gas and cold rooms when a hot air system is mentioned, because these are not due to the hot air system itself but to shortcomings in the other portions of the construction work, which the architect must see are properly carried out.

Room	Size	Cubic Contents	Changes Per Hour	Air Velocity	Square Inches	10% Fric. Res.	Total Sq. In.	Diameter Pipe Used	Area Sq. In.
First Floor									
Living Room	15 x25 x8½	3188	6	250	184	18	202	12" 10"	191
Dining Room	14 x15 x8½	1785	5	250	86	9	95	12"	113
Den	10 x14 x8½	1190	5	250	58	6	64	10"	78
Kitchen	12 x14 x8½	1428	5	250	68.5	6.8	75	10"	78
Halls, 1st&2nd	10 x18 x17	3060	4	250	115	12	127	12"	113
Second Floor									
N.E. Chamber	12 x15 x8½	1530	4	275	53	5	58	9"	63
N.W. "	12 x15 x8½	1530	4	275	53	5	58	9"	63
S.W. "	10 x15 x8½	1275	4	275	45	5	50	9"	63
South "	10 x10 x 8½	850	4	275	30	3	33	8	50
S.E. "	12 x16 x8½	1632	4	275	57.6	5.8	63	10"	78
Toilet	3 x 6 x8½	153	4	275	5.3	.5	6	10"	75
Bath	6 x10 x8½	510	5	275	22	2	24	8"	80

2–18 x 26 Cold Air Ducts = 936 Sq. In. Total Sq. In. Pipe Area 940

Fig. 3

Room	Size	Cubic Contents	Sq. Ft. Exposed Wall	Sq. Ft. Glass Surface	Square Inches	Add for Exposure	Total Sq. In.	Diameter Pipe Used	Area Sq. In.
First Floor		1%	10%	100%					
Living Room	15 x25x8½	3188	366	102	171	N. & W. 10%	188	12" 10"	191
Dining Room	14 x15x8½	1785	187	60	97	North 10%	107	12"	113
Den	10 x14 x8½	1190	117	45	69	West 10%	76	10"	78
Kitchen	12 x14x8½	1428	181	40	72	Cold Entry 10%	79	10"	78
Halls, 1st & 2nd	10 x18 x17	3060	37	48	83	North 10%	91	12"	113
Second Floor		Deduct 10%							
N.E. Chamber	12 x15 x8½	1530	200	30	65	North 0	65	9"	63
N.W. "	12 x15 x8½	1530	200	30	65	N. & W. 0	65	9"	63
S.W. "	10 x15 x8½	1275	183	30	61	West 0	61	9"	63
South "	10 x10 x8½	850	150	20	44	South −10%	40	8"	50
S.E. "	12 x16 x8½	1632	200	38	74	S. & E. −10%	67	10"	78
Toilet	3 x 6 x 8½	153	20	6	10	South −10%	9	10"	
Bath	6 x10 x 8½	510	75	10	23	North 0	23	8"	50

Total Sq. In. Pipe Area 940

Fig. 4

Tenement House Planning

SOME NOTES ON CONDITIONS IN NEW YORK AS INDICATED BY THE RECENT COMPETITION FOR MODEL TENEMENTS

TENEMENT houses are largely built by the speculative builder, and their planning is stereotyped because the builder has no incentive to plan any better than legal requirements demand. Conditions surrounding the financing and sale of tenements are also such that good architectural service is not properly appraised; in fact it may act as a penalty. As a consequence, architects of good training who enter this field do so at a sacrifice.

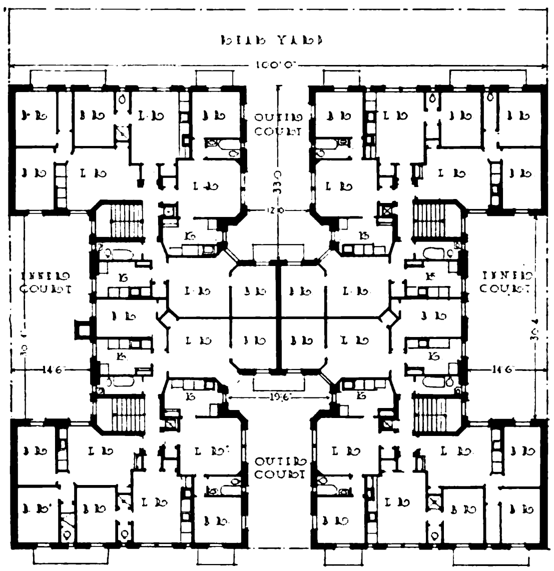
In speculative building of any type, the attitude of loaning institutions is of paramount importance. The builder is chiefly concerned with limiting the amount of his equity, and if an architect can help him do this he is eager to employ the architect. On the other hand, if the speculative builder can take his stock plans and get equal recognition by loaning institutions he sees no particular reason why he should employ an architect. This loss of employment to the architect in the general scheme of things is of little moment, but the loss to the public in being deprived of the buildings which conditions should make possible for the architect to create is of the greatest importance. With the realization of this there has recently been held in New York a competition for a tenement house that has particular interest because it serves to emphasize many of the basic fundamentals of the whole subject of housing for both the poor and those of moderate incomes. The Trustees of the Phelps Stokes Fund defrayed the expenses of the competition and have offered to supply, as an investment, the funds necessary to construct the winning design.

The competition was held with the hope of stimulating the development of better and more economical types of tenement houses and of securing preferential consideration and higher building loans, based primarily on the superiority and economy of design and construction rather than on actual cost. Specific objects sought were plans combining convenience of arrangement with privacy, good light and ventilation, cheerful outlook and as great a concentration of light and air spaces as possible. Preference was to be given, when other things were equal, to such plans as insured the development of these qualities to a still higher degree when the units were combined in block form.

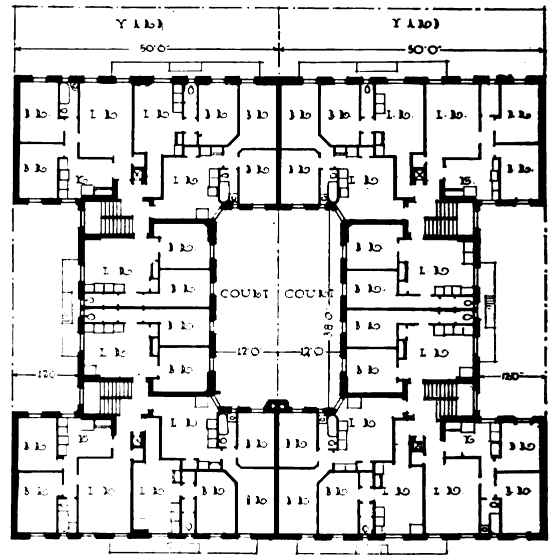
In addition to these general qualities, several definite requirements were made a part of the program. Briefly, these were that a clear rentable area of not less than 56 per cent of the area of the lot should be provided and that 24 rooms should be arranged in the 50-foot unit and 48 in the 100-foot unit, exclusive of baths, that the apartments should consist of suites of 2, 3 and 4 rooms in the ratio of approximately 30 per cent each of 2- and 4-room apartments and 40 per cent of 3-room apartments. Each apartment was to have a bathroom. If the designer elected to incorporate sink, wash tubs, gas range and refrigerator in the living room and group them in such a way as to make possible shutting them off from the room by a curtain or light doors, and if the area of the living room with this strip shut off equaled at least the minimum area required by the tenement house law, 46 rooms were considered the equivalent of 48. This requirement of 48 rooms per floor placed the designing of a model plan on the same basis as actually holds in practice today, and permitted the competitors no opportunity for the use of their inventive genius except in the cutting up into rooms of the space that actually had to be built upon to produce this number of rooms of fixed sizes and which practically demands that 70 per cent of the lot be covered by the building.

The plans that were awarded the prizes are probably as good a group of three plans as could be devised to meet these specific conditions. It is an interesting fact that the plan awarded first prize differs only in slight degree from that awarded first prize in a similar competition held 20 years ago and on the results of which the present tenement house law was formed. The devices that have been adopted in these 20 years have all tended toward the squeezing of more people into smaller spaces and it is a natural question to ask if this is the basis on which we can really improve housing conditions. The problem has always been, and is now, how can we secure the maximum net return from a building that can be fitted to a given plot of land. On high valued land this has always seemed to mean congested living quarters. This condition was accepted in this competition and no opportunity was allowed for disproving it.

A few demonstrations have been made within recent years on land of moderate cost ($20,000 for a 100 x 100-foot plot, for example) that a building covering but 60 per cent of the lot will return an equal or better rate of interest than one covering 70 per cent, assuming the same unit rate of rent per room. Andrew J. Thomas, architect, of New York, has perhaps given more study to tenement house planning from this viewpoint than any other architect and he claims in block developments to be able to place a building containing 42 rooms on a plot 100 x 100 feet and produce the same percentage return on the investment as a building containing 48 rooms, putting the area thus saved into courts which will provide better light and ventilation. Mr. Thomas in fact goes still further with this theory: he claims that a building containing 36 rooms and covering a total area of 5500 square feet



First Prize Plan, Sibley & Fetherston, Architects



Second Prize Plan, Frank J. Shefcik, Architect

can be placed on a 100 x 100-foot plot of any value, which would be proportionate to 46 rooms per floor and give the same percentage return.

We illustrate one of Mr. Thomas' plans and give an analysis worked out by Frederick L. Ackerman of its area, cost and income compared with the same items of the first prize plan. The Thomas plan follows the general scheme of one he submitted in the preliminary competition except that it has 42 rooms to a floor instead of 46 as required in the competition. This plan in a block development would provide side courts, making a 12-foot opening between the buildings. It is here used in comparison with the prize design, since when its two isolated units are reversed in position we have a form which compares with that of the prize design but with this important difference—the courts extend through from front to rear. The area of the Thomas plan is 5988 square feet per floor of 42 rooms. Comparing it with the prize plan and assuming a cost of $40,000 for the land, 35 cents per cubic foot for cost of construction and the average rental per room $8 per month, the building to be considered a 6-story walk-up, 70 feet high, we have:

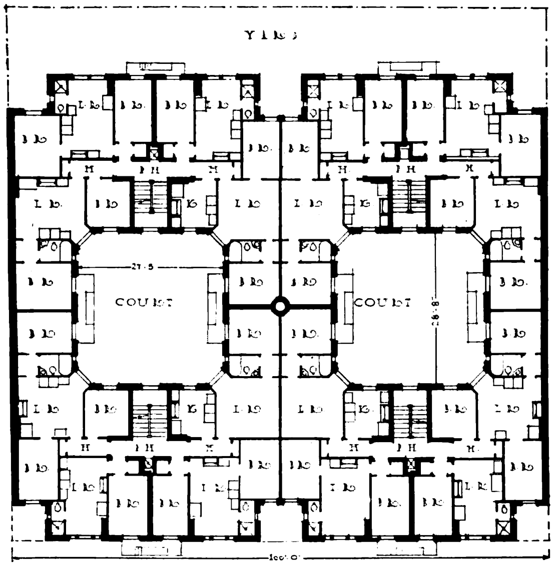
Prize plan, land and building	$207,359
Thomas "	186,706
Difference	$20,653

The Thomas plan contains four less rooms than the prize plan which would reduce the rental income by $2,304 per year. With this reduction the figures are:

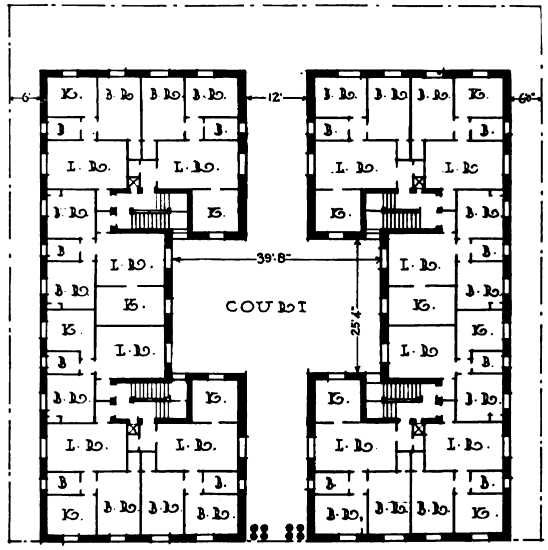
	Prize plan, land and building	Gross income	Per cent
	$207,359	$26,496	12.7
Thomas "	186,706	24,192	12.9

In addition to the savings which these figures seem to demonstrate clearly, the simple shape of the enclosing walls and the less complicated partitioning of space within the building should provide a further advantage in cost of construction to the Thomas plan which would be reflected in the rate of income. The disposition of the space not occupied by building constitutes an important part of the plan problem. In a block development it is quite generally admitted that the arrangement of the Thomas plan which provides for through ventilation is more desirable than that of the first prize plan where at no point would there be a through sweep of air from front to rear.

In considering the two plans for a single inside 100-foot lot, criticism has been directed to the narrow side courts of the Thomas plan which are, however, in full compliance with the tenement house law. Concentration of court space is held to be desirable and in fact was mentioned as a specific object in the program for the preliminary competition. It would seem that the light and air derived from the central court of the Thomas plan and serving more than half the building are greater in volume than that from a similar gross area divided into four courts as in the case of the first prize plan. While 6-foot side courts would provide a free passage for air, they would not adequately light the rooms facing on them, but a condemnation of these courts cannot be made with the consideration of this one point. If this building were to be so located that a solid wall existed on the party line, these side courts would be inadequate, but building in New York is governed by the zoning law and a tenement cannot be built adjoining a factory, warehouse or other building which would be likely to be built up solid to the party line. Another tenement would most likely be the adjoining building, and in order to take light from that side it would have to be set back 6 feet, giving a 12-foot court between the buildings, or if it were so planned that an interior court were arranged



Third Prize Plan, John Tompkins, Architect



Plan Based on One Submitted by Andrew J. Thomas, Architect

with an opening on the lot line, this court would have to be 12 feet wide, giving between the buildings a court with a total width of 18 feet and openings to it from the front and rear 6 feet wide.

Assuming the most unfavorable conditions under which the side courts would function, it may be noted that the plan is arranged to have the less important rooms take their light and air from the side courts. The important rooms are grouped about the large central court from which they secure an abundance of light and air which permeate the whole apartment, and by having positive circulation through all courts and a concentration of space in the center, a real cross ventilation through all apartments can be counted upon.

In spite of the evident physical advantages of this open type of plan, a paradox is uncovered when we consider it from the viewpoint of financing. The average loaning institution today appraises new property on a basis of land valuation plus the value of the new building according to its character and the number of cubic feet contained — in other words, the skill of the architect in creating a plan providing greater rental efficiency in the building is not given sufficient consideration. An examination of these two types of plan shows several logical reasons why, other things being equal, a building covering the smaller portion of the given area and costing less money to build should be considered better collateral by a loaning institution. It is true that this is principally a consideration of plan, but when an analysis of the plan shows more desirable rooms from the viewpoint of light, ventilation and size, it is evident that during periods of rental competition between landlords,—in other words when there is no housing shortage, — the more desirable property will remain fully rented and will constitute a better real estate investment.

While there are a few loaning institutions which make a serious analysis of the plans of a building, there are far too many such institutions which do not give proper recognition to efficiency in plan and consequently undervalue the right kind of architectural service. The power to correct this condition lies largely in the hands of the architectural profession. The architect must learn to work more closely with loaning institutions.

Perhaps the recognition of more effective planning of buildings by our loaning institutions is slow because the establishment of a precedent of this nature entails a retroactive effect on collateral values of existing buildings. In other words, the recognition of efficient planning would tend to decrease the equity necessary for the construction of new apartment houses and housing of other types and would place in the market a class of property which offers more inducement to the investor in that he can obtain the same income through the investment of a smaller amount of money. Naturally, the establishment of values of this nature would have a tendency to force down the valuation of existing buildings in the same neighborhood to a relative ratio as between income and selling price. The only answer to this phase of the problem is that the shrinkage in value thus effected would probably not be of sufficient volume actually to endanger any investments of loaning institutions, nor would anyone suffer except those who have attempted to profiteer.

In considering the building up of the congested residential sections of American cities, a decision must be made as to whether the purpose in planning is to house as many families as possible on every city lot or to provide buildings in which better living conditions are really established and which offer better realty values from the investment viewpoint. Somewhere a halt must be called in the constant effort to concentrate domestic life within small spaces.

EDITORIAL COMMENT

ARCHITECTS AND TRADES UNIONS

IF proof is wanted of the damaging effect of current trades union practices upon the activity of the building industry, the example of San Francisco may be cited. Fortunately the present picture is favorable and one from which we can take encouragement because it illustrates what happens when the misdirected activities of unionism cease.

For 25 years San Francisco has been the citadel of trades unionism; every important industry has operated under the closed shop principle and the unions' power extended itself even beyond industrial affairs and into city and state politics. The most aggressive of these unions were in the building trades. Following the most intolerable and chaotic conditions in 1920, an arbitration board rendered a decision in March, 1921, involving a 7½ per cent wage reduction. In spite of previous agreement to abide by the award, the unions stopped all work. The American plan of employment was adopted in June and an organization called the Industrial Association of San Francisco became sponsor for the plan and arranged for the employment of men and the establishment of a permanent wage board to insure to all concerned a square deal.

To perfect a system of employment built upon the wreck of the former system has required time. The building public is now satisfied that this has been done and that the oppressive and uneconomic restrictions which added unnecessary cost to building have been removed. The figures for the construction work begun in San Francisco in January of this year show the amazing sum of $5,528,978, an increase of 170 per cent over the monthly average for the last two years and an increase of 222 per cent above the monthly construction at the beginning of the American plan of employment. A portion of this building program is undoubtedly the accumulation of work held up over several past months and will not be duplicated in later months. It proves, however, that there is a limit to public endurance and that the trades unions are their own worst enemies when they force acceptance of rules and conditions designed to benefit themselves solely.

The difficulties between employers and employes in the building trades are gradually coming to be looked upon as matters that concern the public, yet there is as yet no medium through which the public may be represented in the settlement. Contractors certainly have no particular interest in opposing the demands of labor, except as their opportunity for doing business is interfered with; as long as their costs can be passed along to the owner, the contractors have no need to worry—in fact their course is easier to pander to the unions. It is not until the limit of the public patience is reached that a break comes, and then we realize the need of some check.

There is a steadily growing feeling that some movement should be instituted by architects that will provide an opportunity for the expression of impartial views and for representation of the owner, or in other words, the building public, and there seem to be many logical reasons why this should be done. In the first place, the architect is the agent of the owner and he is paid to protect his interests. The architect must protect him against unscrupulous contracting methods involving substitution of materials and careless construction. This means accurate specifications and thorough supervision. Just as important for the architect to consider are the conditions under which the contractor works; if he is hampered by destructive union rules that place a premium on inefficiency and contribute to higher costs by the rejection of any materials the union may designate, it is the duty of the architect to use any legitimate means to stop these abuses. A single architect or scattered groups cannot of course hope to combat evils so firmly intrenched as those that have been fostered by the unions over a period of years. Even so, no harm can come from the attempt and there are many possibilities of good in bringing architects' influence to bear on local conditions, because all elements will get a better idea of the reasons behind the various claims. The union man is too close to his own problem; he does not see it in broad perspective in conjunction with general economics. It is understandable that he should see a pecuniary advantage to himself in restricting output and placing territorial restrictions on semi-finished products. They are comparable to the adoption of a high tariff at the demands of manufacturers. This is, however, no defense of union principles and it is not our intention to discuss here the necessity or merits of either case.

Unions are unquestionably necessary and they will exist in one form or another; the important thing to prevent is an abuse of their power, exercised through scheming and unscrupulous leaders and business agents who have no higher object than maintaining their own advantageous positions. These execrable conditions are gradually eliminated by the action of economic forces, but they are in the same measure created again by different economic conditions, and much hatred and suffering are engendered in the process.

Certainly there must be a more rational way of meeting these difficulties, and architects should give serious thought to the manner in which they can contribute to the general welfare.

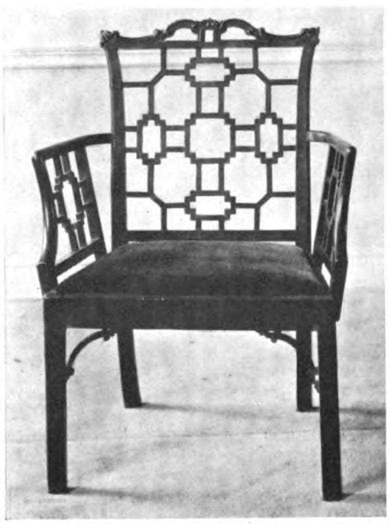
DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

Gray, Brown and Blue Lampas Similar in Weave to Damask with Additional Color

Gallery Table with Fret Rail, Pagoda Pedestal and Dragon Foot

Velours de Gene in Black Ground and Colors with Pattern only in Pile



Arm Chair with Geometric Diaper in Back and Cresting in Georgian Spirit

Modern Wall Paper Based on Traditions of 1750

Antique Chair with Sinkage of Frets and Typical Leg Brackets at Seat Rail

Sofa with Tapestry Covering in the Chinese Taste, Legs and Stretchers Carry Frets Inspired by the Orient but Verging on Gothic

EXAMPLES OF "CHINOISERIE" MOTIFS IN GEORGIAN DECORATION

Furniture by Courtesy of W. & J. Sloane

Chinoiserie in English Decoration

By WALTER F. WHEELER

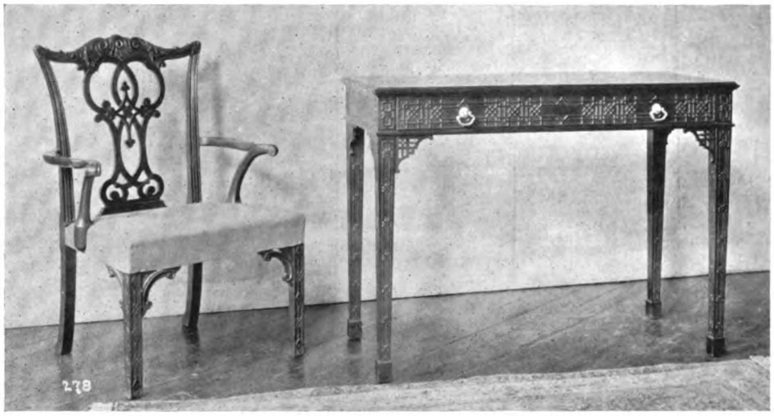
Lacquer Decoration on Chair of Early Georgian Tendencies

THE rather formal dignity of the eighteenth century English styles is sometimes in need of a note of lightness and gaiety to afford contrast to paneled walls, classic detail and more or less architectural furniture, and this need is supplied by that use of oriental motifs which the Georgian architects summed up in the general term "Chinoiserie." This admirable use of airy brightness in decoration came into England originally, like so much of what made interesting the houses of the eighteenth century, by the way of Holland, and the term designated the use of Far Eastern motifs not only upon fabrics and wall coverings of different kinds but also as ornament for furniture, and as painted decoration galore upon furniture, glass and other materials, decoration used in every conceivable way—scenes of Chinese life showing bridges and boats, or else of Chinamen, fantastically dressed and ascending impossible staircases of frailest pagodas.

The Dutch East India Company had introduced lacquer and "china" into the marts of Europe and a fund of decorative motifs were immediately suggested to English designers for their merchandise. The Chinese have ever been ready with facile brush to suit their exports to a people who would not readily understand the depths of their symbolism, and after the cabinet makers' adaptation of the wispy pagoda of tea cups to the backs of chairs, slight resemblance is borne to the structures of Cathay. The feeling of the orient, however, is sustained, and if it were not for the simultaneous influence of the French rocaille and the mingling of these styles, many flighty conceptions of this time would be spared for the simplicity of line.

Sir William Chambers, then architect to George III, was chiefly instrumental in correcting the excesses into which the style was being carried

Drawing Room in New York House Where the Forms of the Chinese Taste Are Distinguishable in Side Chairs, Sofa and Secretary of the Late Georgian Period
Harry Allan Jacobs, Architect



Highly Ornamental though Formal Character of Chinese Chippendale Pieces
Courtesy, Irving & Casson — A. H. Davenport Co.

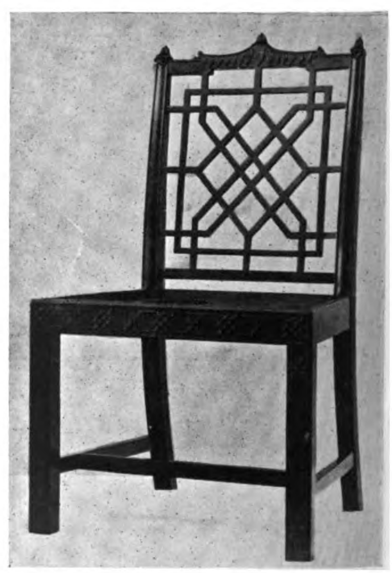
manship admitted into the cabinets of the curious, so may Chinese buildings be sometimes allowed a place among compositions of a nobler kind." So he added to his designs "furniture taken from some models as appear to me most beautiful and reasonable. Some are pretty, and may be useful to our cabinet makers."

The spread of the Chinese fashion in England owed much to Chippendale who often varied his handling of oriental motifs with a subtle use of Gothic and rocaille.

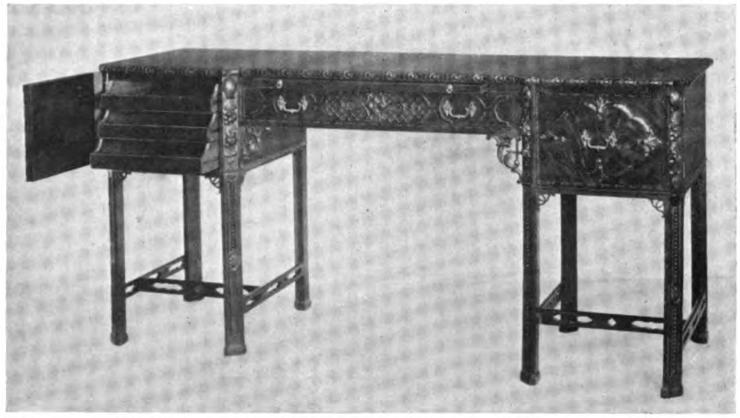
and in bringing into favor the better forms of the exotic types of minor building and of decoration with which his journeys to China had made him familiar. Chambers himself apparently refused to take English use of the Chinese style very seriously, properly regarding it as merely giving a whimsical humor to the setting of English life when he wrote: "These are the toys of architecture, and just as toys are sometimes on account of their oddity, prettiness or neatness of work-

This popular cabinet maker was possessed of a keen sense of what constituted "good business," and with a fashion set by the court and growing in vogue daily, what more advantageous to a maker of furniture than to cater to an insistent demand? So Chippendale applied himself with enthusiasm to the "development" of the Chinese, displaying a marvelous cleverness in adapting Chinese pagodas, mandarins, dragons and bells as ornament to furniture of Georgian design, the result made gayer and more fantastic by the use of gold and much color. He was particularly successful with his cabinets, sometimes standing and sometimes hung upon walls, popular for displaying the pottery and porcelain which it was the fashion of the day to collect, and these cabinets abounded in pagodas, fringed

Rice Paper Panels in the Manner of Early Screen Painting for Georgian Decoration
Private Dining Room, Colony Club, New York
Delano & Aldrich, Architects



Side Chair in which Simple Right Angle and Diagonal Lines Give the Eastern Feeling
Courtesy, Irving & Casson — A. H. Davenport Co.



Georgian Desk Table with French Dominance of Chinese Principles. Length, 62 inches

Courtesy, Nahon Co.

about with tiny bells, or sometimes crowned with pediments, broken or complete, in which the classic forms were modified by considerable use of Chinese frets or other ornament.

Chairs, settees and tables in the Chinese manner were characterized by square legs and fancifully pierced stretchers, ingenious employment of frets and much Chinese geometrical pattern introduced in chairbacks and used to fill the areas within the arms of armchairs. Notably prominent in the handling of surfaces is the imposing of angular running ornament in narrow sinkages, and for members in underframing the design is usually pierced, as such members are thin flat strips, vertical in section. A typical adjunct on legged pieces is the knee or bracket used at the internal angle of leg and rail which is characteristic of oriental forms. On simple straight legs, a frequently occurring treatment is the bellied sinkage between two beads or what some recognize as Chinese reeds. Among the eastern forms there is a general lapse into other decorative schools with which the users were far more familiar, and the traceries of Gothic and scrolls of Louis XV are distinguished in connection with the patterns of the Chinese.

Numerous pieces of furniture in this style which are shown in the pattern books which were published by Chippendale and his contemporaries are extreme in taste, but very few such pieces are now in existence; perhaps these designs were but whimsical conceits and were never actually carried out. Most of the furniture executed and extant shows the handling of the style considerably modified and restrained, and while losing none of its rich variety and quaint beauty it conformed to the generally accepted standards of proportion and grace which characterized other eighteenth century furniture. English traditions generally held innovations to a straight course.

Diaper Pattern in Back with Square Underframing Marks the Usual Chair

Courtesy, Irving & Casson — A. H. Davenport Co.

Association of Lacquer Finish with Pre-Georgian Periods was Partly Responsible for the Fostering of Oriental Design in Chippendale's Time

"Chinoiseries" with the Dignity to Withstand Refinement in Other Pieces in Sitting Room of New York House. Harry Creighton Ingalls, Architect

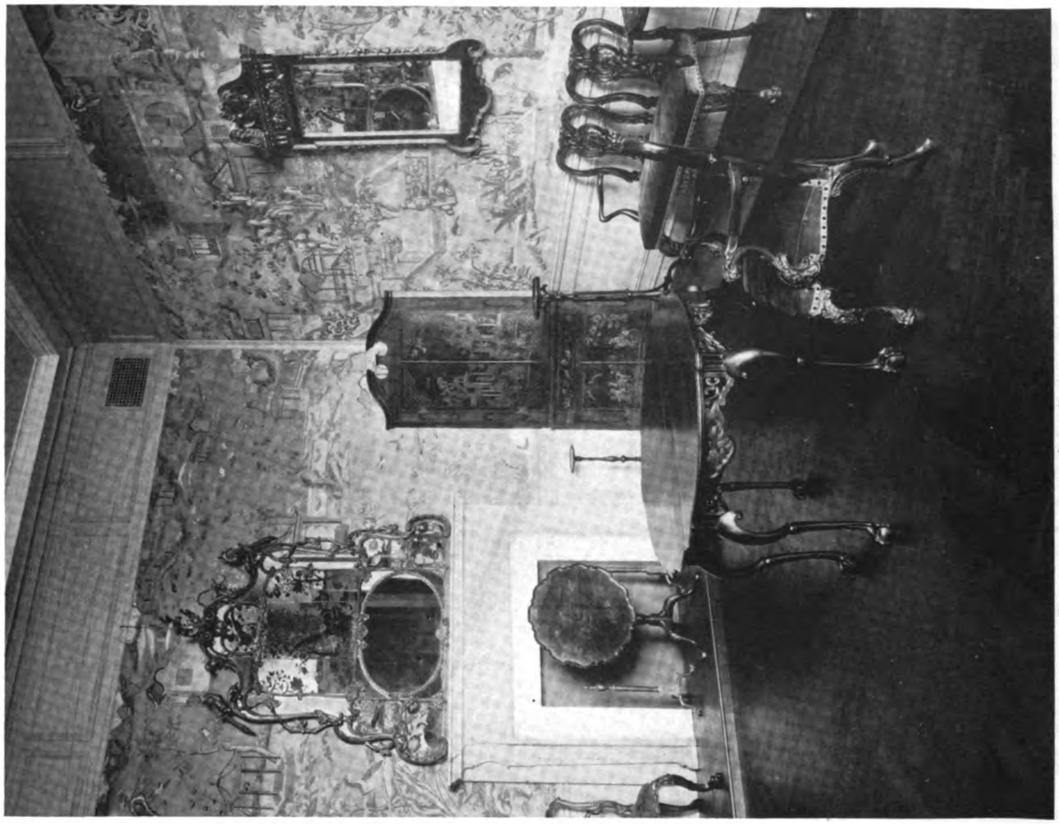
In the designing of his mirrors Chippendale went to the extreme in the use of motifs—the glass surfaces crossed by numerous fancifully designed strands of ornament and the frames ornamented with long-beaked birds, rockwork and dripping water, Chinese figures of every conceivable sort, temples, and entire scenes from Æsop's Fables given a Chinese setting—all this used on mirrors and overmantels carved from pine and thickly gilded, with certain parts highly burnished. Notwithstanding all this excess in ornament Chippendale's mirrors possessed fine form as a whole—he never lost sight of the essential lightness and grace. His chairs he described as "very proper for a lady's dressing room," while in his book he refers to the Chinese manner as "the most useful of any other"—which perhaps meant "most profitable."

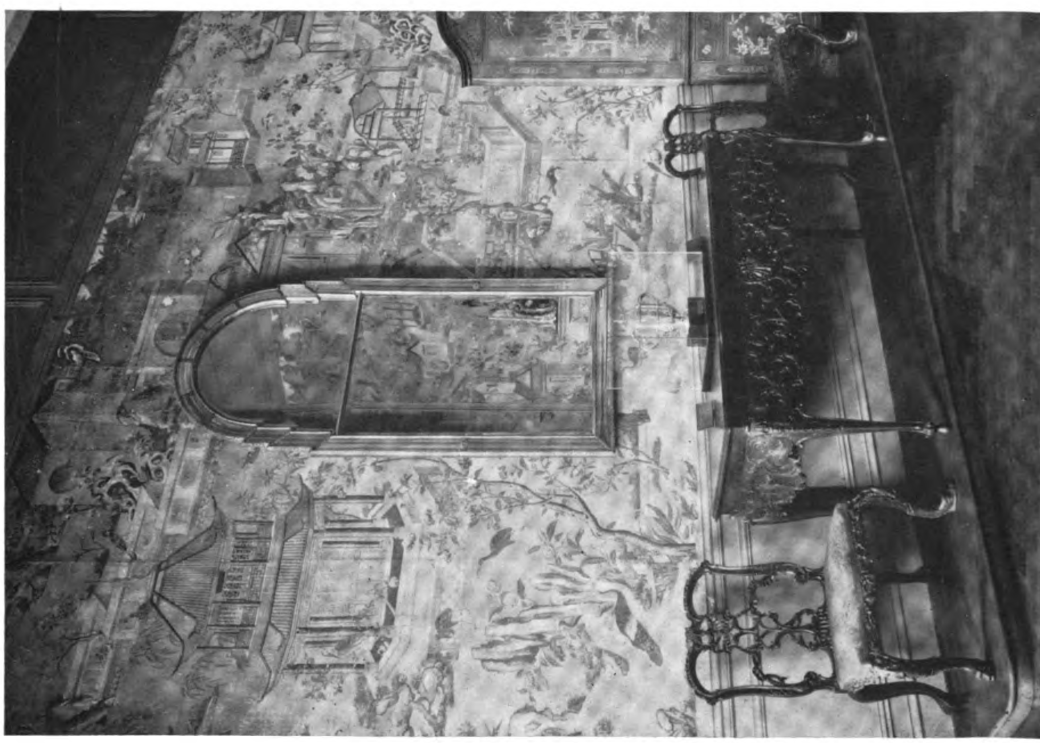
During the late Georgian period, dominated by Adam, the following of the Chinese waned perceptibly. His taste had been formed by a study of antiquity at its very source, and such obvious frivolities as "Chinoiserie" met with but slight sympathy from him. It is said that Adam used the Chinese style but once—in a mirror frame where he placed mandarins holding classic garlands at the top and Chinese bells among Italian arabesque work about the frame.

Along with the "Chinoiserie" made popular by the English court the eighteenth century saw a certain use of the "singeries" style in England, this delightful whimsicality going far beyond even the Chinese in extravagance and showing monkeys playing the rôles of horsemen and sportsmen, giving lawn fêtes and engaged in most of the occupations which concern human beings, all this being given a background of tropical scenery.

Damask in Delicately Colored Stripes with Pattern of Black Threads
Width shown 25 ins.

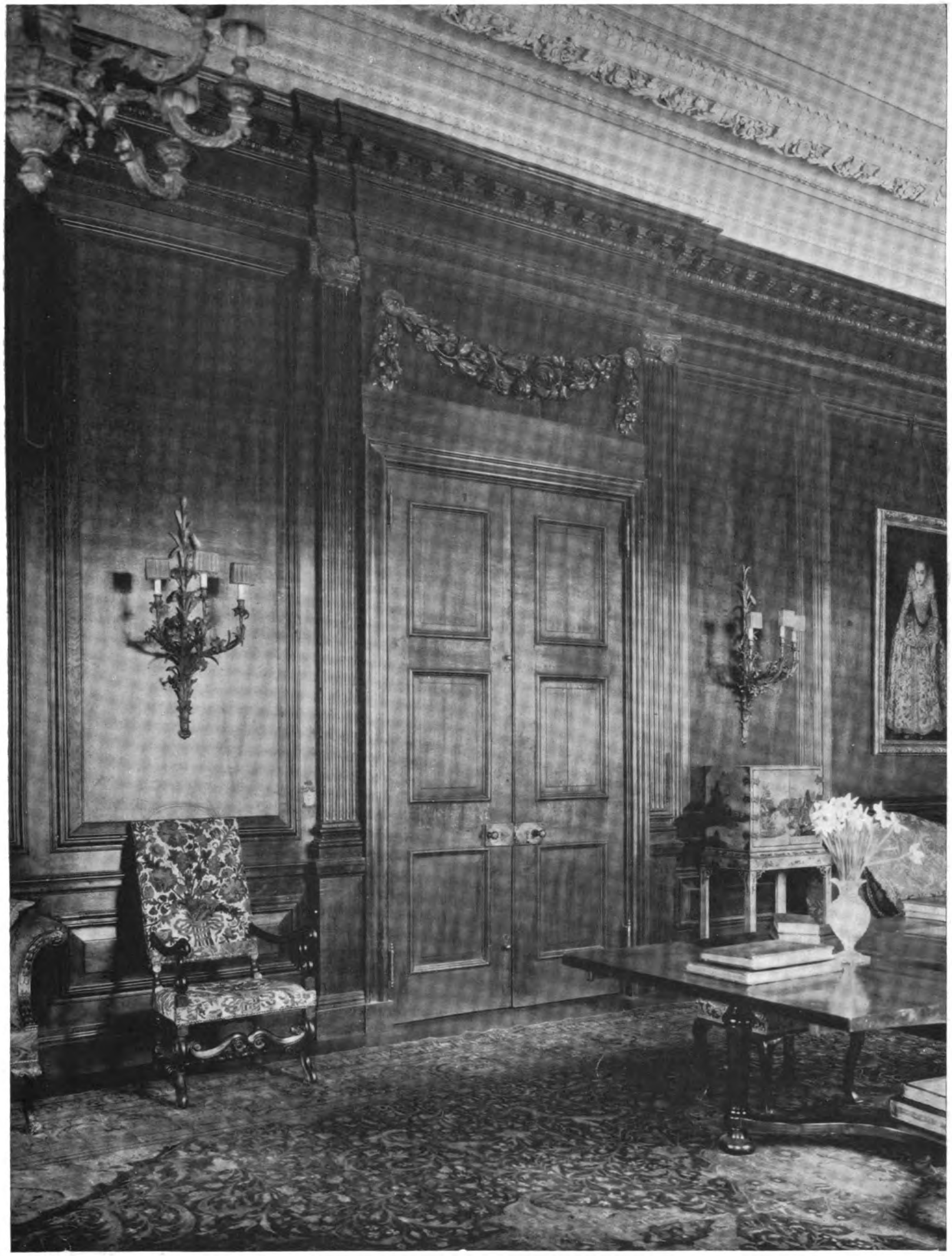
The Present-day Use of Chinese Motifs Shows a More Faithful Copy of Original Forms. This Room has Yellow Walls, Jade Carpet, Flame Taffeta Hangings and Ebony Furniture
Chamberlin Dodds, Decorator





THE CHINESE CHIPPENDALE ROOM
METROPOLITAN MUSEUM OF ART, NEW YORK

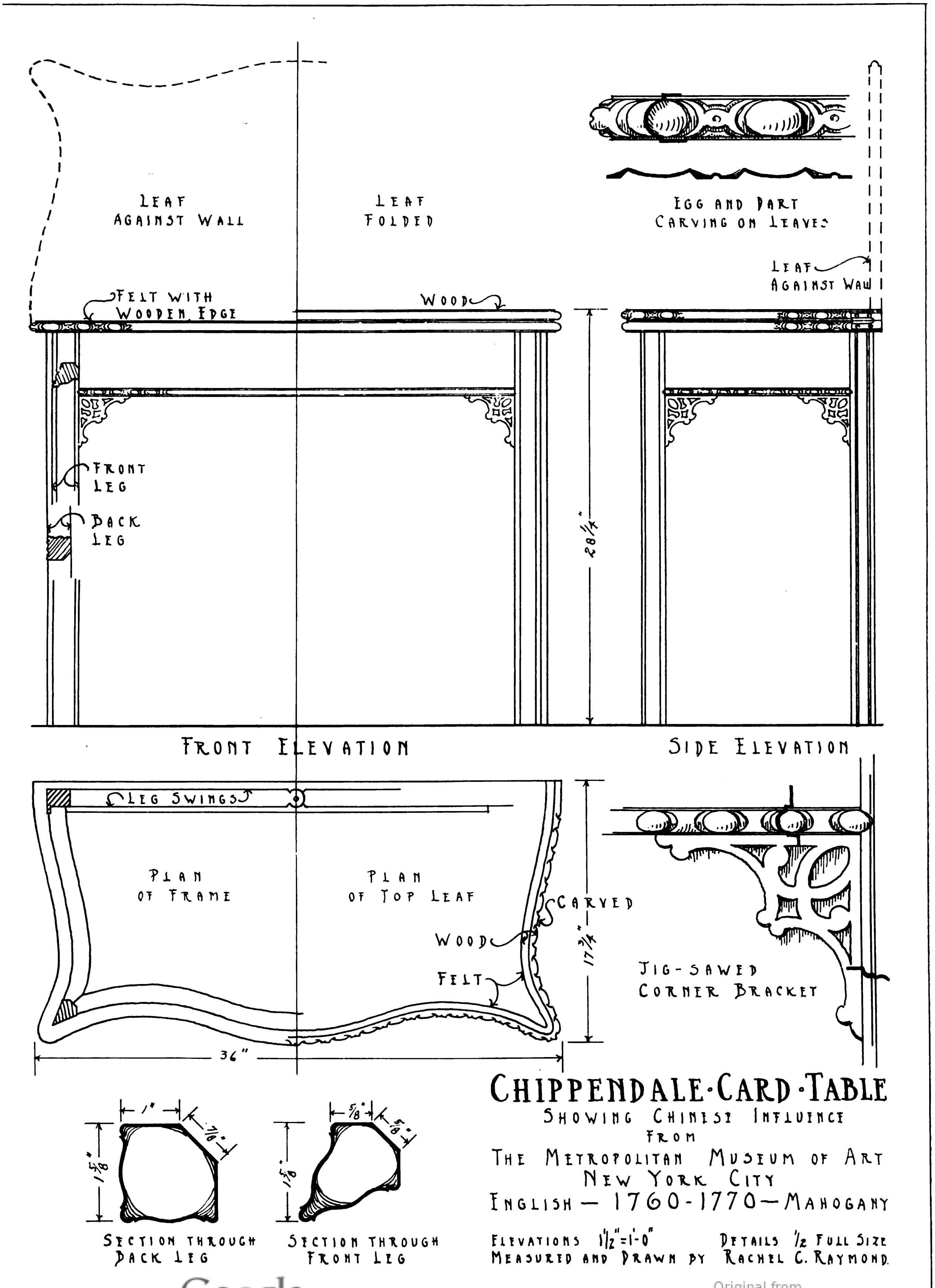
Characteristic Chinese wall paper with green ground from old English house as background for collection of richly carved late Chippendale originals. Wall paper panels are 9 ft. high



DETAIL OF LIVING ROOM DOORWAY, HOUSE OF HENRY P. DAVISON, NEW YORK

WALKER & GILLETTE, ARCHITECTS LENYGON & MORANT, DECORATORS

Large scaled oak paneling of pre-Georgian character affording excellent background for English furniture of various related periods


LEAF AGAINST WALL
LEAF FOLDED
EGG AND DART CARVING ON LEAVES
LEAF AGAINST WALL
FELT WITH WOODEN EDGE
WOOD
FRONT LEG
BACK LEG
28 1/4"
FRONT ELEVATION
SIDE ELEVATION
LEG SWINGS
PLAN OF FRAME
PLAN OF TOP LEAF
CARVED
WOOD
FELT
17 3/4"
36"
JIG-SAWED CORNER BRACKET
1"
7/16"
1 5/8"
5/8"
5/16"
1 5/8"
SECTION THROUGH BACK LEG
SECTION THROUGH FRONT LEG
CHIPPENDALE·CARD·TABLE
SHOWING CHINESE INFLUENCE
FROM
THE METROPOLITAN MUSEUM OF ART
NEW YORK CITY
ENGLISH — 1760-1770 — MAHOGANY
ELEVATIONS 1 1/2"=1'-0"
DETAILS 1/2 FULL SIZE
MEASURED AND DRAWN BY RACHEL C. RAYMOND.

This quaintest of all conceits reached England not from Holland but from France, the painters, Jean Francois Clermont and Jean Pillemont both worked in England, and the use of this type of decoration—chiefly in the form of paintings upon ceilings or panels—possesses a certain charm.

The vogue of the Chinese has frequently been revived since its beginning in the eighteenth century, and the style affords to architects and decorators today the same opportunities for introducing variety and delicacy which it did two centuries ago. The use of the style offers boundless opportunities for the introduction of superbly rich colors such as buff, yellow, orange, the deep shade sometimes called "cinnabar red" and various subtle shades of green. These colors may be used in the painting of woodwork and carried further in wall coverings and window and door draperies.

Brocade in Galaxy of Color Picturing Birds and Foliage of Eastern Genera. Width, 29 ins.

Wall papers in the Chinese taste are being made in numerous different types—rich and gorgeous in a riot of such colors as would create a suitable background for furniture of walnut or mahogany, or in neutral grays or browns, or else so designed that the entire wall spaces of a room may form one continuous picture of Chinese character which in itself would constitute decoration of a high order. Painted woodwork and wall papers which are printed in bright colors are often "toned" and tied together by glazing both wood and paper with a thin varnish mixture which brings something of the mellowed appearance of old Chinese screens. When all-over wall decorations are desired the Chinese patterned wall papers offer a useful expedient, and to a limited extent in small rooms of intimate character architectural use of Chinese pierced fretwork on friezes and dado caps gives a distinct note of quaintness. Fabrics offer added opportunities for the introduction of high notes of decoration, and it is doubtful if at any period the markets have so abounded in textiles of cotton, linen, silk or other materials, bearing patterns so rich and distinctive. These fabrics are full of the splendor of the East.

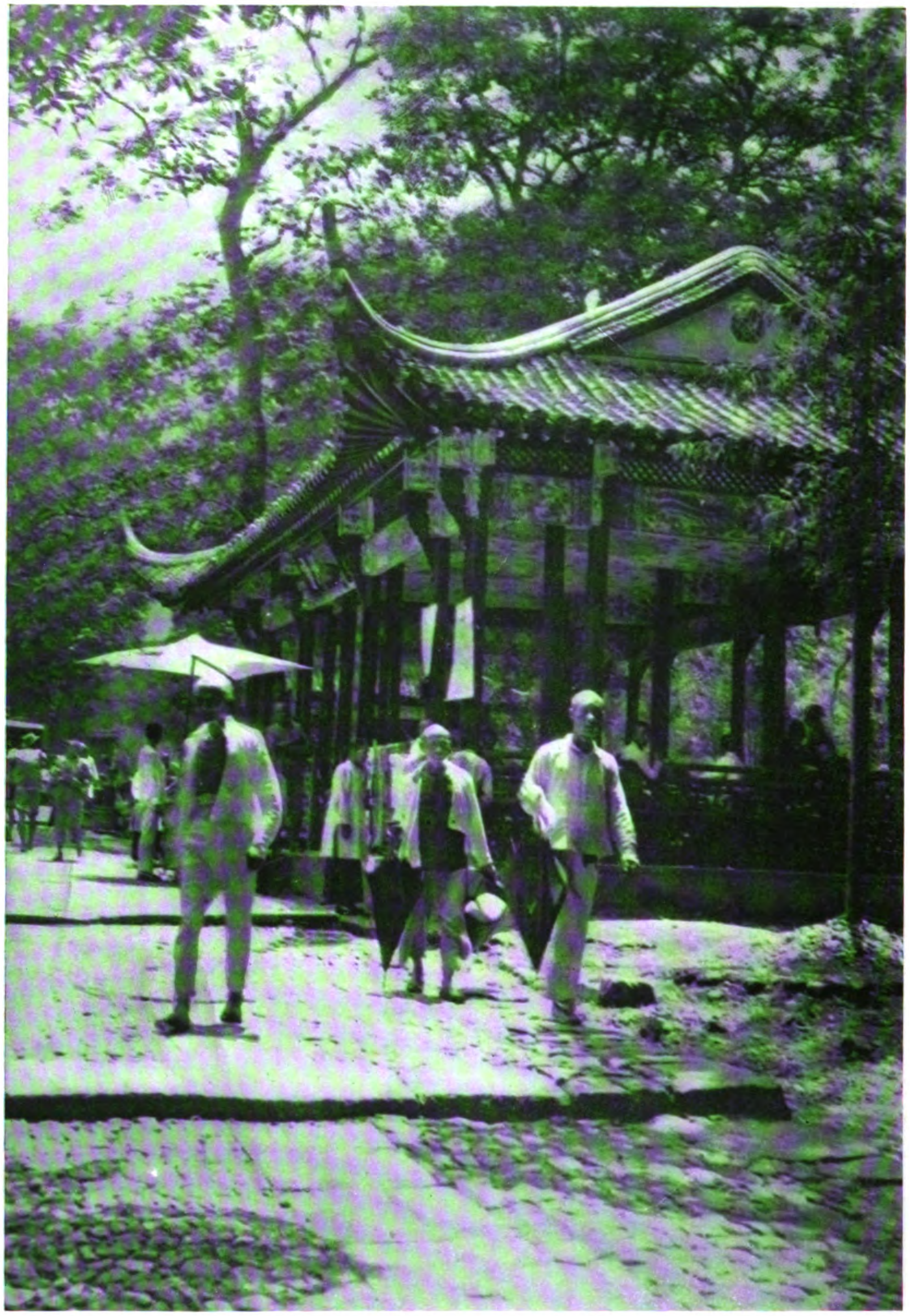
The occasional use of furniture embodying Chinese motifs creates another note of quaintness. Its choice undeniably has its legitimate and special function. Entire rooms thus furnished would be generally unwise, but when used within the bounds of good taste the style holds forth many delightful possibilities which can be attained in no other way.

Wall Paper Showing Temples and Bridge in Rococo Setting

Chippendale Card Table from the Metropolitan Museum of Art, Shown by Measured Drawing on Previous Page

Design Typical of "Chinoiserie" Papers

Wall Papers, Courtesy, W. H. S. Lloyd Co.



REST HOUSE ON THE ROAD TO A HILLSIDE TEMPLE, NEAR HANGCHOW

Vermilion columns and beams of brilliant green, blue, red, yellow and gold support a roof of neutral gray tile for the shelter of wayfarers. Painted symbolism and religious admonitions add to the decoration.

Photographed by Edwin L. Howard

The
ARCHITECTURAL FORUM

VOLUME XXXVI | MAY 1922 | NUMBER 5

The Architect's Agreements with the Owner

PART I. ESTABLISHMENT OF BUSINESS UNDERSTANDING REGARDING SERVICE AND METHOD OF PAYMENT

By C. STANLEY TAYLOR

NOT A LEGAL TREATISE!

IT is not the purpose of this article to express in dry legal terms or in difficult phraseology opinions on the legality of the contractual relationship between the architect and his client.

It is a direct businesslike discussion of a subject which the architect usually approaches with hesitation and a certain laxity which often brings unfortunate misunderstandings and direct financial loss.

We believe that the value of proper legal service is not thoroughly appreciated by the architectural profession and that a few simple legal precautions at the beginning of the relationship between the architect and his client will constitute a valuable form of insurance which will be appreciated by both parties. This article will be concluded in the June issue.

WITHIN the past few weeks there have been received in the editorial offices of THE ARCHITECTURAL FORUM several letters asking advice in cases where misunderstandings have arisen between architects and their clients in regard to certain phases of the business arrangements made on specific projects.

These misunderstandings, which threaten to develop into legal procedure, have been the result of failure to establish proper agreements covering such specific questions as these:

1. In case the architect is retained to design a building on which the owner has already given a specific cost limitation, what is the legal position of the architect if it is found that the cost runs considerably over this figure when bids are taken?
2. How much of his fee can the architect collect in case a building project is abandoned?
3. What is the architect's position in the matter of collecting his fees if construction is unreasonably delayed?
4. What is the architect's position when a building project is transferred from a promoter to another owner?

These typical questions serve to indicate that in actual practice such difficulties may easily arise, even with good faith on the part of both parties in the transaction. It is evident, therefore, that this subject is one worthy of serious consideration by every architect, and the purpose of this article is to present the more usual points of disagreement and suggested methods of avoiding any possibility of such disagreement by establishing a thorough understanding in advance between the architect and his client.

In order to present this information in the most practical form, the subject has been discussed personally and through correspondence with a number of leading architects who have willingly cooperated by providing us with descriptions of such methods as may have proven valuable to them in creating proper business relationships with clients. William Law Bowman, attorney of New York City, who has contributed extensively to the columns of THE FORUM on legal subjects and whose legal opinions are quoted liberally in the Hand-Book of Architectural Practice (American Institute of Architects), has also provided some valuable points for this discussion.

As explained in several of the letters which we have received on this subject, the discussion of fees and methods of payment is usually somewhat embarrassing to the architect to an extent that he often fails to provide properly for his own protection. This embarrassment is natural and is in fact common to all professional practice, but in view of the unpleasant conditions which may arise as a result of neglecting this important business phase, there can be no question but that an improvement of practice in this respect is in order.

There are various ways in which the architect may approach this subject. Some of them may prove awkward and irritating to the client, particularly if the various legal requirements are too greatly stressed. On the other hand, it is possible to present this matter gracefully and from the viewpoint of mutual protection so that no owner will hesitate to enter into the proposed agreements.

In general there seem to be three methods of meeting this situation:

1. Determining amount and time of payment by verbal agreement with the owner.
2. Establishing contractual relationship in letter form.
3. By the use of a properly executed contract between the architect and the owner.

Little comment is necessary as to the advisability of basing agreements between the owner and the architect solely upon verbal understandings. This relationship has no legal status and while it is very pleasant to do business on this basis, it is not fair to either party and constitutes a prolific source of disputation and litigation.

The establishment of a proper business understanding through the form of a letter from the architect to the owner and the acceptance of this letter by the owner seems to be the more graceful form of practice. About one-half of the architects with whom this question has been discussed use this method. As a matter of interest we present herewith a suggested form for such a letter:

"Dear Sir:

"We hereby offer our professional services as architects to prepare all the necessary plans, specifications and details required to enable a contractor to erect a residence upon your property at and to superintend the erection. Naturally we will follow your desires and requirements in the preparation of these documents (and with the understanding that our estimate for the building shall not exceed $————).

"Our compensation for the above mentioned services will be ——% of the completed cost of the work and, as is usual, partial payments will be due and payable as follows: Upon completion of the preliminary studies, one-fifth of the entire fee; upon completion of specifications and general working drawings sufficient for bidding or filing purposes, two-fifths of the entire fee; the remainder to be paid in equal monthly installments on the last day of each month during construction until fully paid, the amount of such installments to be determined by the estimated length of time which the work is to take. Until the actual completed cost is known all payments shall be based first, upon the original estimated cost of the work; second, upon the actual estimated cost when same is received and contractor accepted; and all partial payments made are on account of the entire fee as finally determined.

"Should this offer of professional services upon our part be acceptable to you, kindly sign your name upon the line under the word 'accepted' and return to us and oblige.

"Thanking you for this opportunity of serving you which we know will be mutually beneficial, we are,

" Respectfully yours,

ACCEPTED:

————————————"

It will be noted that this letter specifies the amount of payment and the time of payment and that without the use of legal forms an actual contract has been created. Another form is:

"Dear Sir:

"This letter constitutes an agreement between yourself and (architects' own name) by which we agree to furnish architects' services for your proposed (type and location of building).

"For full architects' services on this building our charge will be ——% of the cost of the building, payable in accordance with the terms and conditions of the accompanying Schedule of Charges of the American Institute of Architects, with the following exceptions:

(Note here any exceptions which may be made by special agreement between the architect and owner.)

"If this agreement is acceptable to you, kindly sign and return a copy of this letter."

There has also been brought to our attention an unusually good method which is a compromise between the letter and contract methods of establishing the proper service agreement. In this instance, the architect has prepared a brief printed form of acceptance in which the commission is acknowledged and a statement is made as to the per cent to be charged for the executed work. A special clause is inserted under the heading, "Payment for Services," which gives the specific time of payments and per diem charges for the time of individuals of the architect's organization. A specific clause is also introduced stating that in case of abandonment or suspension of the work, a specific charge of ——% is made for preliminary sketches, plans and specifications and an additional percentage where full sized details have been made. Appended to this printed agreement are several explanatory paragraphs of which the following are of particular interest as they bear upon points which often develop subjects for disagreement:

"Estimates of cost given the owner by the Architect are approximate only, and not guaranteed. Where actual bids exceed the estimate, the Architect will, without extra charge, revise the drawings and specifications to reduce the cost. Should the Owner suspend or abandon the project, the Architect is to be paid as outlined above for services rendered.

"Where the bids do not exceed the estimate and the Owner subsequently reduces his requirements, the Architect's charges shall be based on the plans and specifications prepared according to the Owner's original instructions and the revisions in plans and specifications will be charged for at cost.

"Where the Owner wishes changes in the plans and specifications after completion of the same, the Architect will make these at actual cost to him, of such revisions.

"Where the Owner furnishes part of the materials or labor entering into the construction of the building, or where old materials are used, the Architect will base his percentage upon estimated cost of equivalent new materials and the work if done by a responsible contractor.

"Superintendence: The Architect's supervision, as distinguished from the continuous personal superintendence of a Clerk of the Works, or a Superintendent of Construction, includes such general inspection of the work by the Architect or his deputy as is possible through periodical visits, the interpretation of drawings and specifications, general directing of the work, and keeping in touch with it sufficiently to enable him to issue the contractor's certificates for payment when due. On important work, for closer inspection and in order to insure systematic cooperation among the contractors and the most rapid progress, a Clerk of the Works under the direction of the Architect is to be employed by the Owner. In no event does the Architect assume responsibility for the work of the contractor or guarantee contractor's work."

In regard to the use of this printed form of agreement the architect makes the following comment:

"We ask the client in an accompanying letter to raise any questions that occur to him. Very few, however, are raised and altogether we find this method of apprising the owner more satisfactory than any form of contract, which latter he is always skeptical about signing, without the careful scrutiny of an Attorney."

Another architect has prepared a series of brief printed documents which constitute an outline of his professional practice and schedule of charges. A different document is used for each class of work done in the office. In these documents exact methods of determining amount and time of payments, together with other conditions affecting the agreement, are set forth. This document is not signed but is of an explanatory nature and accompanies a brief letter accepting the commission, with the request for acknowledgment.

These letter forms of agreement offer a particularly valuable method of developing relationships on the types of architectural work which are more personal than commercial. In connection with residential work and certain forms of institutional work, it is highly desirable that the business phase of the understanding between the owner and architect be not unduly stressed. It is of equal importance, however, that more than a verbal arrangement shall be made, not only as a matter of legal protection but in order that the basis of remuneration shall be thoroughly understood. Here the architect must use his own discretion and there will undoubtedly arise instances where he prefers to make no attempt at establishing other than a verbal understanding. This is his own risk and while it may be good policy, it is not good business. There are many instances where dissatisfied clients have been created because of a lack of definite understanding during preliminary stages of the work as to the amount of the architect's fee and the time of payments. Experience has shown it to be far better that this matter is disposed of in one straightforward conference with the owner than to have it later the subject of a number of awkward and embarrassing discussions.

In connection with projects of larger size and perhaps a more commercial nature (particularly projects which are in stages of promotion and financing), it is quite important that the architect be protected through the form of a contract.

We learn from a number of architects who handle a large volume of work of this nature that it is their custom to have individual contracts drawn by attorneys and that in many instances the client insists upon a contract for service as drawn by his own attorney. Other architects have successfully employed standard forms of contracts which have been drawn up to meet the conditions of their own organization and business methods. The American Institute of Architects has developed standard forms of contract between the owner and the architect which may be obtained in quantity.

In order to demonstrate a typical brief contract form, we present herewith a contract which has been drawn up specially for the purposes of this article. This is the most simple form of contract which can be established and may be amended to suit the needs of the particular situation.

"AGREEMENT made this day of 1922 by and between owner and architect:

WITNESSETH—in consideration of the mutual covenants hereinafter set forth:—

1. The architect agrees to prepare all the necessary preliminary studies and other drawings and details necessary to enable a contractor to erect a building for the owner at site with an estimated but not guaranteed cost of $——— and to superintend the erection and to perform all other usual architectural work necessary for the erection and completion of the building in question.

2. The owner agrees to employ the architect for the hereinbefore specified professional services set forth in the first paragraph and to pay him therefor the sum of———% upon the total cost of the completed work, and further agrees to make partial payments as follows: Upon completion of the preliminary studies, one-fifth of the entire fee; upon completion of specifications and general working drawings sufficient for bidding or filing purposes, two-fifths of the entire fee; the remainder to be paid in equal monthly installments on the last day of each month during construction until fully paid, the amount of such installments to be determined by the estimated length of time which the work is to take. Until the actual completed cost is known all payments shall be based first, upon the original estimated cost of the work; second, upon the actual estimated cost when same is received and contractor accepted; and all partial payments made are on account of the entire fee as finally determined.

3. Drawings, details and specifications as instruments of service are agreed to be the property of the architect.

IN WITNESS WHEREOF the parties hereto have set their hands and seals the day and year hereinbefore set forth.

____

____________________"

The best possible advice that we can extend to every architect is that he will find it greatly to his advantage to retain legal service regularly. This does not constitute a great expense and is really a form of insurance which will serve not only to prevent direct financial loss but in many instances will guarantee better client relationships because of the consequent avoidance of those points of disagreement which may arise unexpectedly and without any knowing breach of good faith.

The services of an attorney from the architect's viewpoint are of value not only in establishing proper client relationships but in connection with the letting of contracts and sub-contracts and other business responsibilities which develop in connection with architectural practice. We can cite many instances where the architect, as agent for the owner, has made serious business blunders which would have been avoided through good legal advice. Perhaps one-half of the misunderstandings which arise between the architect and the owner would be eliminated if the advice of a good lawyer had been asked and *followed* at times when agreements involving financial liability were being made.

In regard to the direct contractual relationship with the client, there are certain points which we have already indicated as of particular importance. In order to show methods which have been successfully employed to meet these conditions, we have selected specific clauses at random from a number of good contract forms. Several of these will be quoted in later paragraphs.

One of the most common sources of misunderstanding and dispute between the owner and the architect is to be found in the subject of the estimated cost of a proposed building. Ordinarily, the client sets some approximate cost limit as the amount which he is willing to expend for a new building. It is the objective of the architect, therefore, to design a building which will come within this cost. Many architects do not realize that by legal requirements, unless otherwise specified, the building must come within or reasonably near to the proposed cost, if the architect is to be legally entitled to collect any fee whatsoever.

William Law Bowman has clearly defined this situation in articles presented through THE ARCHITECTURAL FORUM several years ago. We quote from one of these articles as follows:

"Probably the most usual and popular condition attached to an architect's employment is the condition that he shall give his employer a building which shall cost within a certain fixed sum. On account of the fact that the architect's remuneration is some percentage of the actual cost of construction, the general public immediately assume that which sometimes is a fact, that the architect tries to make a building cost as much as possible to increase his compensation. The law as regards employment by others than municipal or governmental bodies is well settled, that where the owner stipulates that the plans and specifications shall be for a building not to cost over a specified amount, the architect must draw the plans and specifications for a building to cost reasonably near that amount, otherwise he fails to live up to his contract and cannot recover for his services. For example, (1) it has been held that an employment to prepare plans for a house to cost $100,000 where the contractor's estimate, including architect's fee and superintendence, was $107,500, and also (2) in another case where the plans were to be within $50,000 and the estimate was $52,500, and in (3) a further case where the plans were not to exceed $2,500 and the estimate was $3,100, that in each case there was a substantial performance and the architect could recover his compensation for such plans and specifications. The following are cases where recovery was not permitted, namely, (a) where the contract called for a building to cost $4,300 and the lowest bid was $7,000; (b) where the cost was to be $18,000 and the lowest contract offer was $35,000; and (c) where the cost was not to exceed $4,500 and the estimate was $8,000."

Certainly, as an architect is rendering professional service it is not fair to ask him to guarantee prices, but where the owner has set a cost limit there is a very serious legal question involved if the architect, in designing the building, does not bring the cost reasonably near to the limit set, or if he has not some definite form of release from this condition. A typical form of such release is:

"It is understood that the Architect is not a contractor and therefore cannot guarantee the cost of the work and that his services are strictly professional, being confined entirely to an expression of opinion as to cost of the work based on past experience."

Other important points include the method of determining the amount of payment for service and the times at which the various amounts which make up this fee are due and payable. Following are quotations from various contract forms and letters:

"For the compensation of————per centum of the total cost we propose to at once proceed to furnish the preliminary studies, and afterward general, complete and sufficient drawings, specifications and details, satisfactory to you, and furnish general superintendence of the building operations in connection with the erection of————for said———— on the property on————set aside for that purpose.

Upon the following terms of payment, TO WIT:
Of the total compensation above named there shall be paid TWO-TENTHS (2/10) when the preliminary studies shall have been made; and

THREE-TENTHS (3/10) additional when the general drawings and specifications shall have been made; and

TWO-TENTHS (2/10) additional when details shall have been made and the plans ready for the letting of contracts; and

The remainder from time to time after construction shall have begun in proportionate amounts as work shall have been accomplished. The amount of our compensation is to be calculated upon the total cost of the building, including stationary and detachable fixtures. No rebate will be made from this amount on account of any material or labor purchased or contracts made by you individually."

Following is another method:

"Our fees for the above services will be six (6%) per cent of the entire cost of the building (determined from the contract prices), including the survey, borings if required, fixed or detached furnishings designed or installed under our superintendence, mechanical, electrical, sanitary and other equipment for which we supply drawings, specifications or superintendence.

"When the working drawings and specifications have been prepared, the sum of three (3%) per cent of the estimated cost of the building shall be paid to us on account of services rendered, provided, however, that if the preparation of plans extends over a period of more than two months, payments on account shall be made to us from time to time, such payment to be approximately proportioned to the progress of work on the plans. After contracts are let payments of three (3%) per cent of the amount of the certificates issued to the contractor or contractors shall be made at the respective times such certificates are issued, and the remainder of the six (6%), if there be any, at the issuance of the final certificate; it being understood that the total of our fees shall be six (6%) per cent of the total final cost, as above stated."

Another method of dividing payments on the percentage fee basis is:

"The Owner shall make payments to the Architect upon account of and in final settlement of his fee at successive stages of the work as follows:

(a) For the Preliminary Drawings, one and one-fifth per cent (1⅕%) of the estimated cost of the work. The estimated cost of the building as contemplated in the Preliminary Drawings shall as a basis for this portion of Architect's fee be temporarily established at $————.

(b) Upon the execution of any contract for work upon the building, two and two-fifths per cent (2⅖%) of the contract price; but if the letting of the contract or contracts for the said work be delayed through no fault of the Architect for sixty (60) calendar days after the completion of the working drawings and specifications, then this percentage shall be paid to the Architect upon the lowest bid for said work; and in the absence of such bid then upon an accurate estimate of the cost of said work based upon the then prevailing market price.

(c) Upon the amount of each certificate for payment under any contract for work upon the building, duly certified by the Architect, plus the retained percentage, two and two-fifths per cent (2⅖%).

(d) Upon the completion of the work and the fulfillment of the requirements, the Owner will pay the Architect any balance remaining due hereunder, all previous payments being considered as payments on account."

Following is a special provision for the amount and method of payment where the fee is on a cost plus basis:

"(a) The Owner agrees to pay the Architect for the performance of the above services the net cost to him of his own time and that of his assistants and employes, plus a fee equal to————per cent (——%) of such cost, which fee shall include all other costs, overhead and profit, it being understood and agreed that the total sum above specified for cost and fee shall not exceed————per cent (——%) of the total construction cost of the work for which services are performed.

"(b) Whether the work is executed or whether its execution be suspended or abandoned in part or in whole, payments to the Architect are to be made monthly, covering the services performed, in accordance with statements rendered by the Architect on or about the tenth day of each month, which statements shall include the cost of work done during the preceding month plus a proportionate amount of the fee—it being agreed, however, that at the time of completion of drawings, specifications and scale details, ready for awarding contracts, the total payments to the architect shall not exceed ————per cent (——%) of the reasonable estimated cost, and, should the total cost plus fee exceed the maximum amount as herein stipulated, all such excess shall be borne by the Architect."

Study of Construction in Architectural Education

By CHARLES W. KILLAM

THE editor has asked me to comment upon the report on the teaching of construction in the Ecole des Beaux-Arts presented by Professor Edouard Arnaud to the Franco-British Association of Architects and published in the *Journal of the Royal Institute of British Architects* of January 14, 1922; also to discuss any points of interest to a Professor of Architectural Construction in the paper by Thomas E. Collcutt, Past President R. I. B. A., entitled "A Plea for a Broader Conception of Architectural Education," published in the same number of the *Journal*.

Professor Arnaud describes his method, adopted last year, for teaching practical building methods in the Ecole. His course presupposes a knowledge of the materials of construction and the methods of joining wood, iron and stone. He exhibits some six or seven thousand lantern slides illustrating the construction of buildings from excavation to decoration. The students are not expected to take notes in the lectures, as they are supplied with a set of notes giving the complete text and all the illustrations, but they are required to submit note-book sketches, made between lectures. They are given, in particular, a set of 90 questions which will be asked at the examination, these questions covering the fundamental operations. They are required to produce a final constructional design demanding two and a half months of "assiduous" work. This work is in addition to the mathematical analysis of the theory of construction taught in other courses, and is likely to give pause to the enthusiastic young American who hopes to go to the Ecole to get rid of mathematics and construction and to concentrate on design. The large number of lantern slides makes the course sound hurried. Schools in this country use some slides, photographic enlargements, blackboard sketches and working drawings, and conduct trips to buildings and works, and are now considering the use of moving pictures to illustrate methods of preparing and putting together building materials.

The same number of the *Journal* has a report of the paper by Mr. Collcutt on "A Plea for a Broader Conception of Architectural Education," with discussion thereof by several members. Mr. Collcutt is critical of architectural education in England. He presents these constructive suggestions—to weed out students adjudged unfitted to the profession after a probationary period; to reduce the number of problems dealing with large buildings; for students to omit some studies (not named) but to study Greek literature, to visit the Acropolis, and to study Doric flutings. The paper was long and discursive, but it brought forth discussion which may be worth considering. He suggests, in the first place, that no student should be finally accepted in an architectural school unless he can show, after two years' probation, that he has a peculiar native aptitude or tendency to architecture above any other calling. Mr. Collcutt probably uses "architecture" in the same narrow way that some graduates of the Ecole do; that is, as including only design in its narrow sense, although —like many critics of architectural education—he does not define. Architecture differs from painting, sculpture, poetry or the drama in that it is not a purely personal creative art, all the work of which must be carried out by the individual artist. It is a many sided profession and it has room in it for the artist, the planner, the draftsman, the colorist, the decorator, the constructor and the business man. A student should not be kept out of the profession because, at 18, he appears to lack one or more of these gifts.

Mr. Collcutt would have the students' aptitude ascertained by a body of examiners independent of the schools. Instructors in architectural schools know far more than outsiders about the personality of the students, which will be so important in their future careers, and they know that personality cannot be judged by a written examination or by a competition in design. They know very well, moreover, that no school record is a sufficient basis for a decision as to whether a boy of 18 or 20 is fitted to be an architect. Their knowledge of the later lives of their graduates makes them hesitate to claim omniscience or the gift of prophecy. Not all successful architects were geniuses at 18.

Mr. Collcutt specifies that the examination to determine the student's aptitude should be confined to architecture and that "steel beams and perspective coloring" should not be considered. He complains that architecture as a fine art seems to be a secondary consideration in the schools, and is much troubled because the schools teach the design of "steel beams," and at the same time he complains of a graduate who entered his office and displayed no "practical" knowledge. He does not define "practical" and he does not tell what he expects from the schools, but he does make it clear that he does not want the student to know about "steel beams" or "perspective coloring" or "geometrical drawing." One can only guess that he wants the student to be familiar with the details of construction, with brickwork, joinery, window frames and roof covering, for instance; that he wants him to be familiar with the trades rather than with the sciences. Every professor of construction knows how easy it would be to teach these more or less ephemeral and ever-varying details, and how the students think they are getting something valuable when they note down a lot of detailed dimensions, or detail a window frame, or draw a thousand rivet heads on a plate girder; but the professor also knows that the schools have no business to waste their time on such details. Mr. Collcutt thinks that because an architect with considerable practice is not likely to design his own steel beams, therefore a student should not waste time learning the method. There are probably ten small offices, where the architect must himself do or know all about every part of the work, to one large office, where specialists can be hired; and architectural schools must not train assistants for large offices only. Mr. Collcutt is over-troubled by the problem of the design of a steel beam. It is not an insuperable problem for the kind of mentality needed to be a successful practitioner, although it may trouble the long-haired designer who is fit only to be kept cooped up in an office without knowledge or interest in the ways in which his ideas must be executed. Mr. Collcutt does not appreciate the value of the by-products in the teaching of architectural construction. The theory of construction, properly taught, fits the student not only to actually design the relatively simple structural work of the great majority of ordinary buildings, to consult intelligently with engineers, to supervise construction with judgment and authority, but to do his "architecture" more reasonably because he will have some idea of how a building is put together. He will also gain a qualitative sense of construction, even if he never actually performs a computation.

The teaching of design and drawing develops only one side of the student's nature—the most important side, it is true, but not the only side. An architect is not a mere painter whose finished work is an idea transferred to canvas by his own hand. An architect's idea is useful only when built by the help of many men and of many sciences and trades; he must conform to countless conditions of locations and laws, and use many methods and materials. It takes a many-sided man or organization to weld all of these elements together into a successful building. The student must therefore be grounded in fundamental principles and habits applicable to the many sides of his future work, and the teaching of construction helps.

The study of building construction demands continual use of the imagination in visualizing the problem, and continual use of judgment in evaluating the elements which affect it. The young student is a very inexperienced person. It is difficult for him to visualize in three dimensions; in fact it is difficult for him to visualize at all at first. A constructor cannot limit himself to two dimensions; he must think in three dimensions; the design of a beam, the collection of loads on a column or truss, the design of a reinforced column footing, are impossible without thinking in three dimensions. Many problems in computation of stresses require either diagrams to make the problem clear or the ability to visualize the problem without the diagrams. This latter ability is valuable because it can be applied to so many other problems of the profession. By occasionally working out the structure of one of his problems in design, the student gains far more than the ability to design a beam—he gains a sense of the real forms that he is dealing with. To the experienced architect it is second nature to bear in mind the important structural elements when he is planning, but it is not second nature to the young student. When a student is required to frame the floors and roof of his design he begins to appreciate from his own observation that the second floor plan has something to do with the first, that the side elevation is related to the front, that both cross-sections of a large room are of interest, and that the roof ought to fit on top. It takes the whole staff of a school to start him in appreciating these things, and the professor of construction helps.

Students can be taught to overcome the fear of simple mathematics, of which some of them are proud because they think it proves them better designers. The professor of construction can call the student's attention to reasonable requirements as to precision, when to bother about three places of decimals, and when to approximate; when to subordinate unimportant factors and to look out for the important ones. He can thus learn to concentrate on essentials and that is a valuable ability in all of the work of the profession. Most designers think that construction is an exact science and that mathematics will give the right result. The student can be taught that many parts of construction cannot be reduced to an exact science, that much depends upon intelligent assumptions based on judgment, experience with work as actually put together by fallible men with imperfect materials and subject to all the attacks of the elements. This necessity for considering these apparently outside elements in his construction problems may lead him to wider observation of the elements which will affect his planning and design problems.

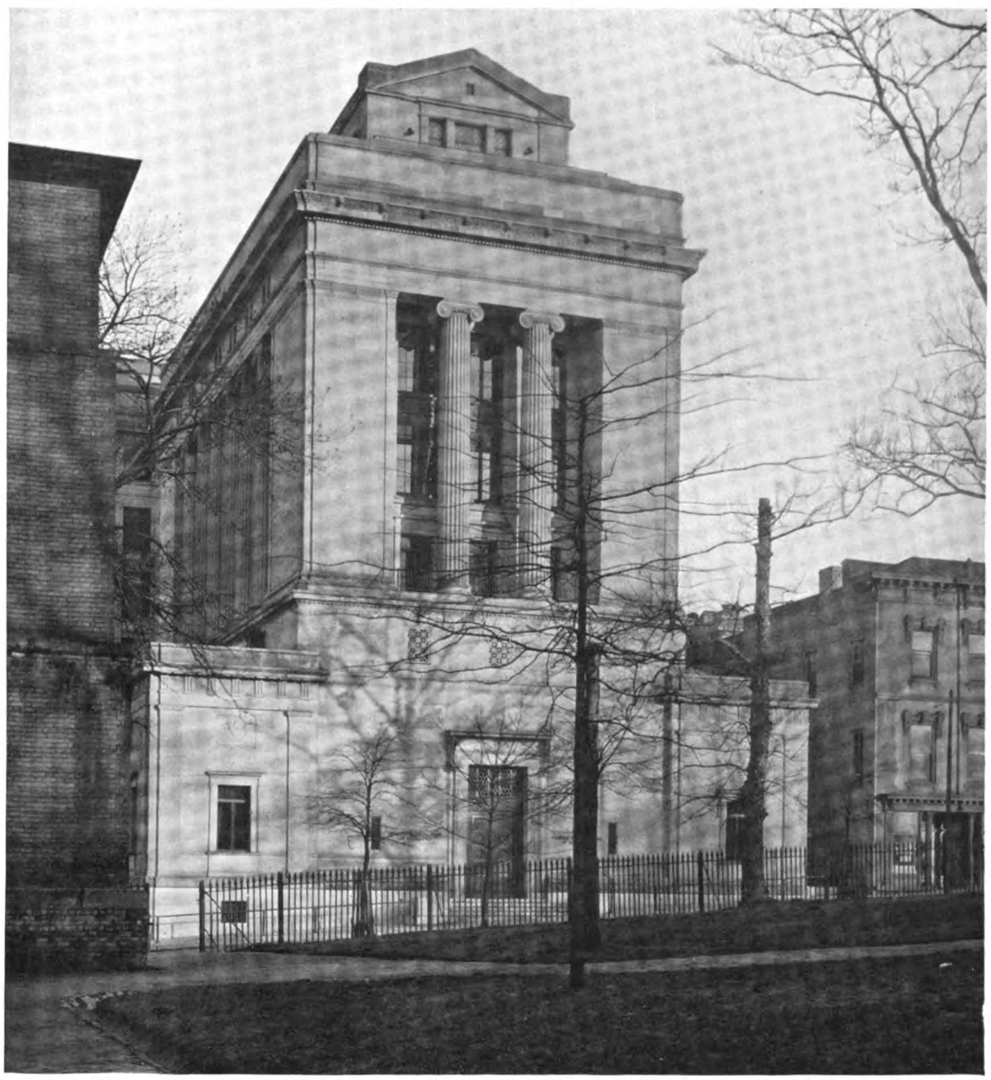
It is a part of the work of the professor of construction to inculcate some of the habits of mind which will help an architect to attack the many different kinds of problems which he must solve, to teach the habit of reasoning from cause to effect, to suggest habits of neat and orderly presentation of ideas by drawings, oral statement, written words or numeric work. Questions in examinations can be so arranged and the answers so criticized that students will learn the value of an orderly statement and the value of the ability to express themselves in clear English. Not all building laws or specifications are perfect in these respects. Many of these principles and habits are emphasized very little in the ordinary criticism in a design course, but as long as architecture is an art, a profession, a science and a business, they are invaluable principles and habits.

The Federal Reserve Bank of Richmond

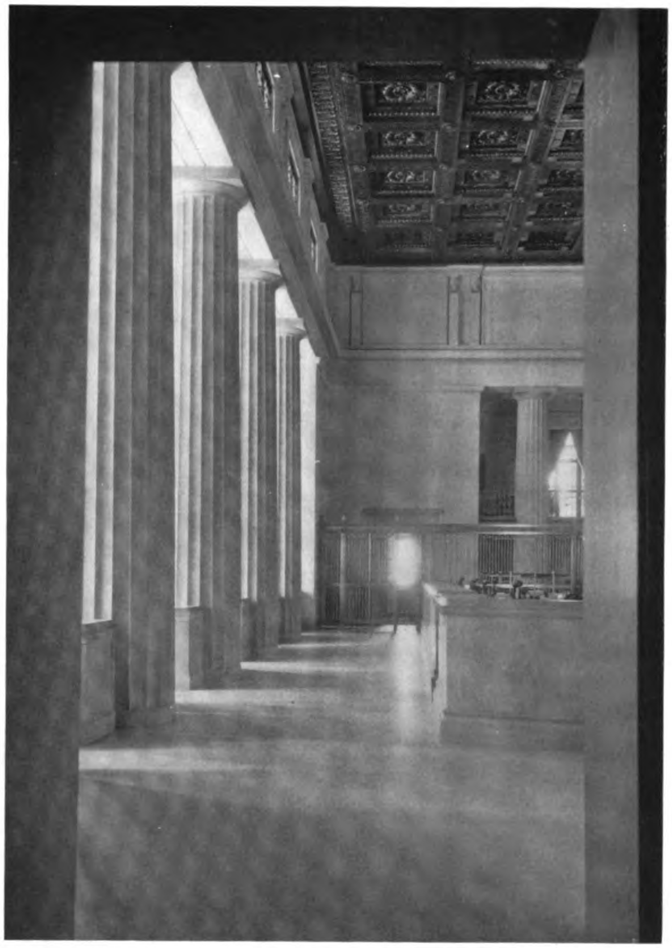
SILL, BUCKLER & FENHAGEN, ARCHITECTS

THE Federal Reserve Banks constitute the most important building activity of architectural character undertaken by the Government in several years. The commissions have been placed in the hands of private architects, selected either by competition or direct appointment because of previous experience with bank planning. A consulting architect, or in the case of competitions a professional adviser, was named who devoted detailed study to the special problem of the Reserve Bank before any actual work was undertaken, proving a valuable link between the Federal Reserve Board and the architects. These are ideal conditions for the design and construction of Federal buildings and it is hoped the results will merit their general adoption for government work.

The Federal Reserve Bank of Richmond was one of the first buildings to be completed. The design was selected early in 1917 from eight designs submitted in competition by as many architectural firms, the Jury of Award consisting of three members of the Building Committee in addition to Burt L. Fenner of New York and Thomas J. D. Fuller of Washington. Their second choice was the design submitted by Carneal & Johnston of Richmond, and the third that of Parker, Thomas & Rice of



General View of Principal Facade



Main Banking Room Seen from Elevator Lobby

facade, topped by a broad band of carved ornament, offsets the slope of the site and forms a base. Upon this foundation is placed the building proper, the lower story of which extends across the full width of the property, above which and smaller in area rise the upper stories, surrounded by the Ionic colonnade which in turn supports the massive entablature and cornice. This simple, dignified structure is of Indiana limestone in a pleasant and uniform color of grayish buff.

Since the functions of a Federal Reserve Bank differ considerably from those of the usual bank, involving relations with other banks and not with individual depositors, the arrangement of its quarters differs accordingly. As one enters the banking room the absence of the customary screen and partitioned offices on the banking floor is immediately noticed, and the visitor is impressed with the sense of openness and ample space. Offices of the bank's officials and their assistants are placed back of the columns, separated by low marble rails, and in the "island" at the center of the room. Many new practical methods of handling routine work have been originated for this bank and its equipment includes every improvement known to bank designers. Fireproof safes have been installed under desks throughout the different departments, thus eliminating the necessity and loss of time in transporting records.

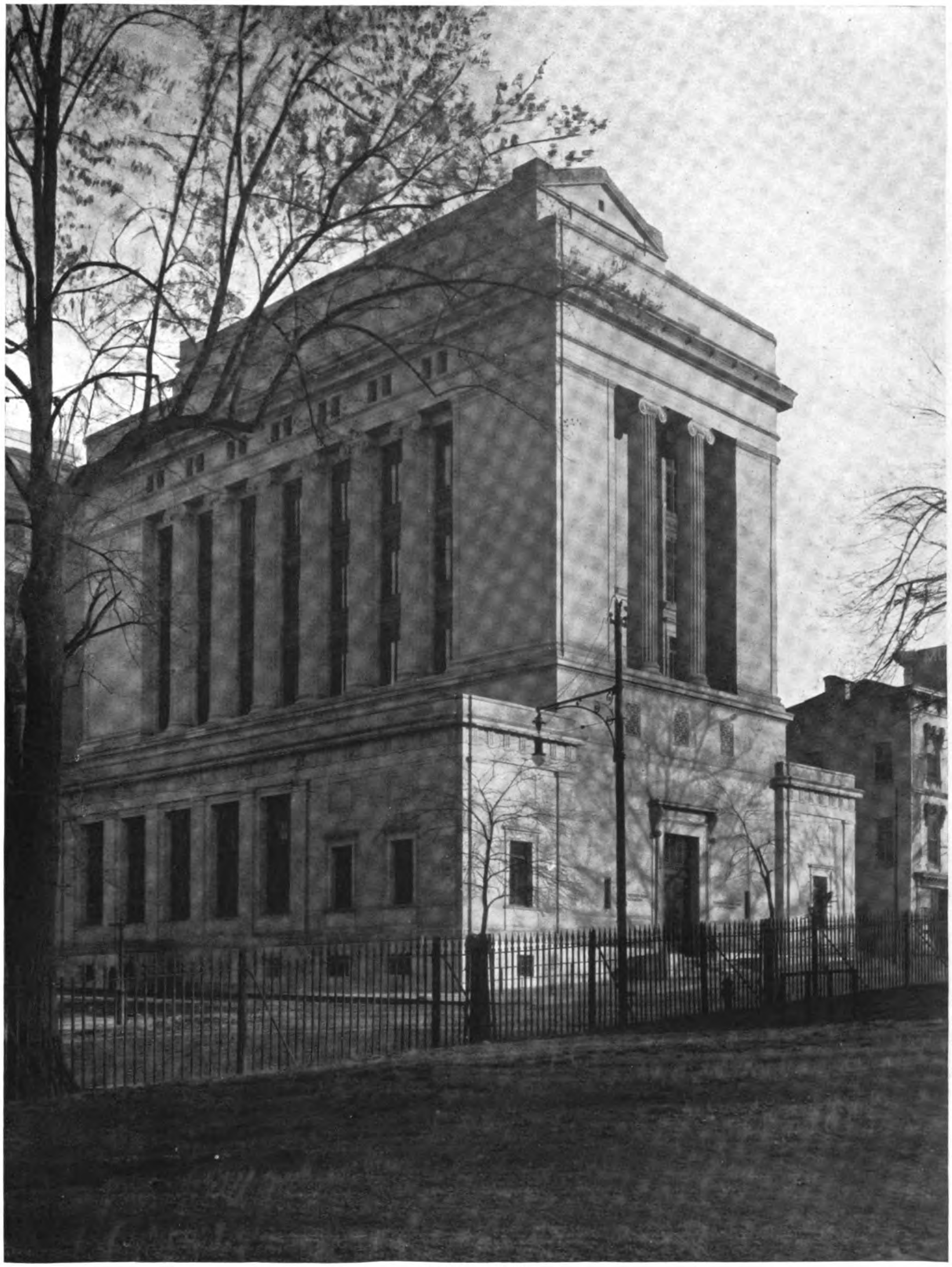
Baltimore and Boston. The entry of the United States into the world war prevented the beginning of operations until June, 1919.

The exterior of the structure is a direct expression of the plan from which it was developed—a free adaptation of Greek precedent, more suggestive possibly of the great mausoleum at Helicarnassus than of any other single structure. In general it recalls this structure in the placing of its colonnade of massive Ionic columns above a high and simple base. It was thought desirable that no portion of the space given up to offices should be more than 25 feet from direct light; this meant that unless areas of working space were to be broken by light courts it was imperative that the upper part of the structure should not exceed 50 feet in width. The main banking room on the ground floor occupies all the space which the building plot made available, but the demands of light requirement were maintained by the introduction of clerestory windows for the central space and additional windows for the projecting side aisles.

A granite plinth of decreasing height on the main

In the Money Department, money counters have been provided with specially designed desks with open-work metal tops, where all the money being counted is in plain view at all times, and it may be locked so when the counter is absent. All money while in transit from one department to another is transported in locked steel buses. To facilitate the quick dispatch of papers, records, etc., from one department to another on different floors, pneumatic tubes have been installed. An arrangement has been provided by which the front door of the building can be instantly locked.

The vaults were designed to be proof against attack by the most skilled burglars or by mob violence. The vault is three stories high, and the lowest story is 52 feet long by 26 feet wide. The upper floor is on a level with the basement floor of the building, and the bottom floor extends a considerable depth below the sub-basement. They are connected by a stairway and automatic lift. In all working quarters special care has been taken to reduce noise by the use of cork tile flooring and a sound absorbing tile for the ceilings.

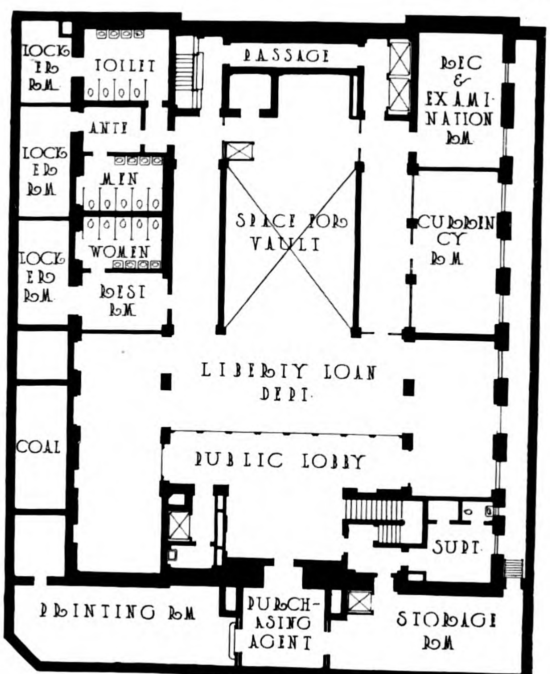


GENERAL VIEW

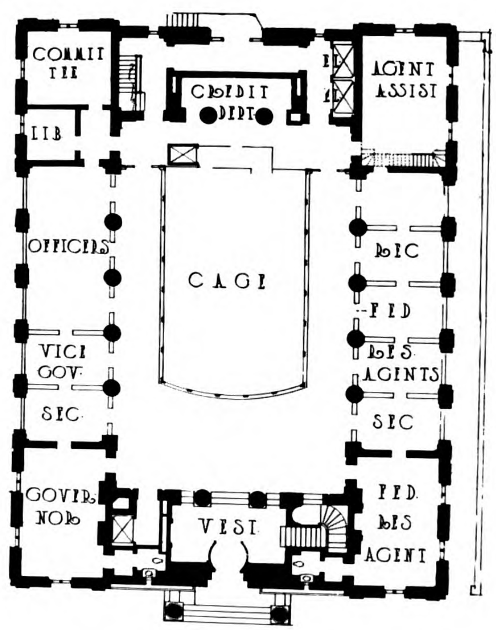
FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS

VIEW OF LOWER STORIES



BASEMENT FLOOR PLAN

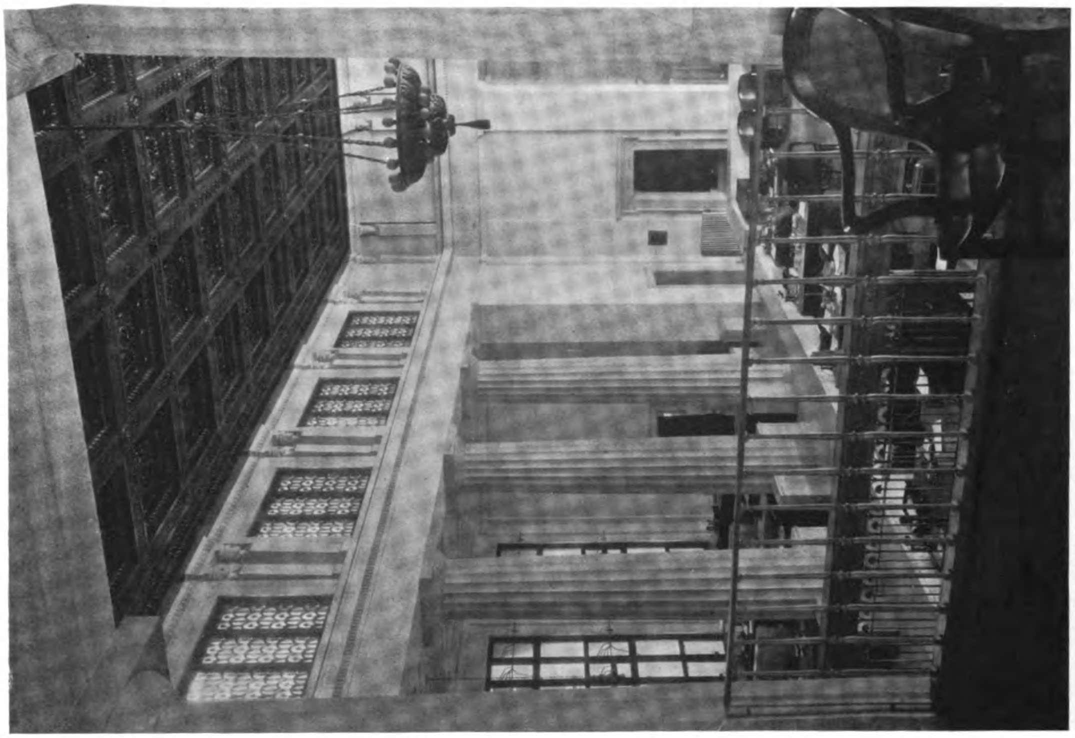


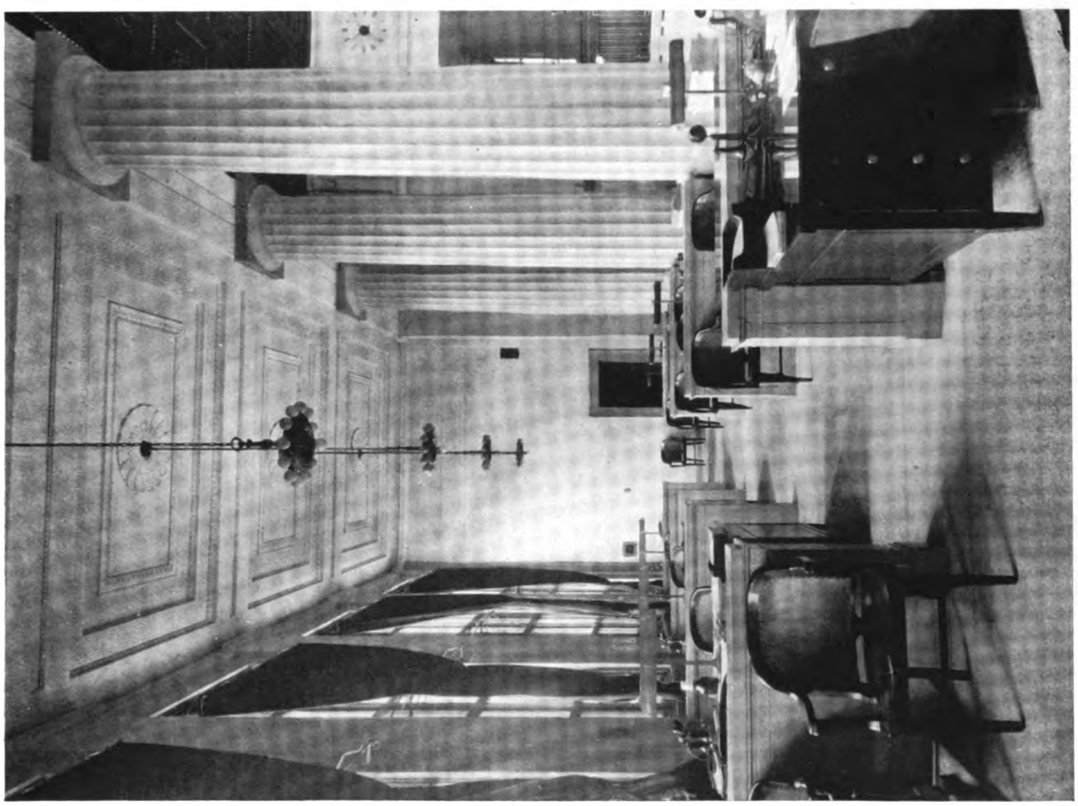
SCALE 0 5 10 15 20 25 30 35 40 45 50 55 FEET

FIRST FLOOR PLAN

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS

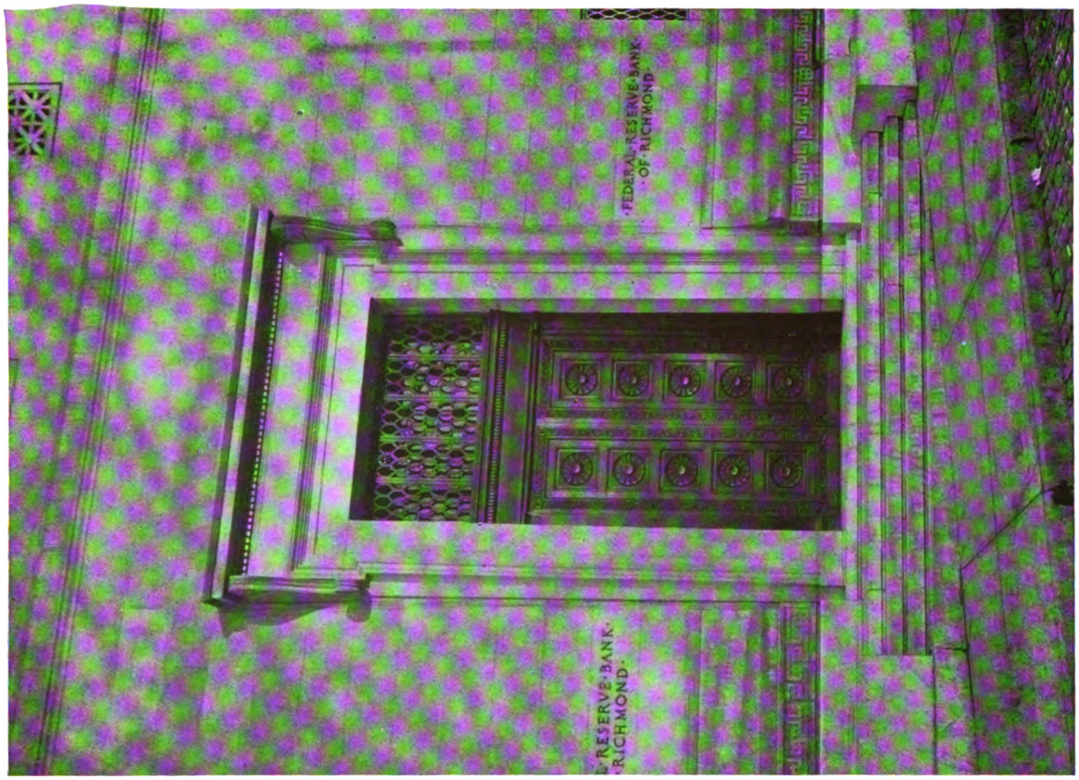




OFFICERS' SPACE AND BANKING ROOM FROM MEZZANINE

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS



MAIN ENTRANCE DOORWAY

GOVERNOR'S ROOM

FEDERAL RESERVE BANK, RICHMOND, VA.

SILL, BUCKLER & FENHAGEN, ARCHITECTS

Concrete Construction

I. HISTORY AND USES

By WALTER W. CLIFFORD, *of Clifford & Roeblad, Engineers*

SOME years before Cato's sinister aphorism concerning Carthage had been carried out, the Carthagenians built a 70-mile aqueduct with hydraulic cement. This construction included many arches, some of which are still standing and are perhaps the oldest existing structures of concrete, although there are evidences of the use of hydraulic cement by the Egyptians nearly 2000 years earlier.

The Romans used concrete to a considerable extent. The dome of the Pantheon with its diameter of 142 feet is one of the best known examples of their work. These early hydraulic cements were of course compounded by nature, unaided by well equipped laboratories. After Rome's glory had become history, the use of cement and concrete ceased for many years. In 1756 one John Smeaton rediscovered the hydraulic properties of argillaceous limestone, and his cement was used in the construction of the Eddystone lighthouse. Natural cement was manufactured in England and France from the beginning of the nineteenth century. In the United States it was first manufactured by Canvass White near Fayetteville, N. Y., in 1818, and was used in building the Erie Canal.

Portland cement was patented in England in 1824 by Joseph Aspden, a brick mason of Leeds. The name is taken from the island of Portland because of a real or fancied resemblance of the limestone there quarried to concrete made from the new cement. England was the first leader in the production of Portland cement; Germany then took the lead which was later wrested from her by the United States. The first Portland cement to be manufactured in the United States was made by David O. Saylor of Copley, Pa., in 1871. Just before the world war the United States' production of Portland cement was 93 million barrels, Germany's 42 million and Great Britain's about 17 million. Cement manufacture fell off in all countries during the war, but the United States is practically back to prewar production and its relative standing is probably about the same as before the war.

All these early examples of concrete work are without reinforcement. To Joseph Monier is ordinarily given credit for the invention of reinforced concrete. He was a gardener and, being anxious to cut down the thickness and weight of his ornamental flower pots, conceived the idea of introducing a wire mesh into the concrete to take care of the stress caused by the growing roots. He patented his idea and afterwards extended its use to pipes and reservoirs. Previous to the time of Monier's patent M. Lambot built a small boat with a 1½-inch concrete shell reinforced with wire netting. This was exhibited at the Paris Exposition in 1855. Lambot, however, made no further use of his idea, which he apparently never considered as anything but a novelty. The wartime use of concrete for ships, however, lends interest to the record of the first concrete boat built two generations earlier.

Reinforced concrete developed very slowly for many years after Monier's taking his patent. A building in New York State designed by W. A. Ward in 1875 and the Leland Stanford Jr. Museum built by Ransome in 1890 were the earliest all-

© *Underwood & Underwood, N. Y.*

The Dome of the Pantheon, Rome, Is a Famous Example of Roman Concrete Construction

concrete buildings in this country, although at that time concrete was becoming a serious competitor of steel grillages for foundation work.

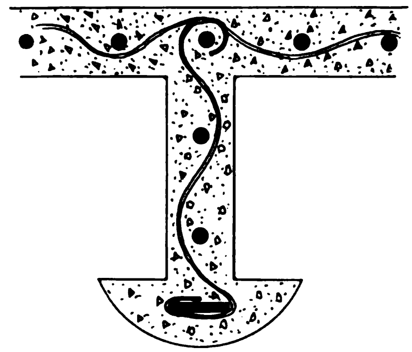


Fig. 1

The early history of reinforced concrete is largely a history of patented reinforcing floor "systems." The underlying reason for most of the systems was simply the necessity of having something a little different from the other fellow in order to avoid paying him royalty. The early systems had to do with both the shape of the reinforcement and its disposition in the floor. Nearly every geometrical shape excepting the circle was used for rod cross-sections. The rolled structural shapes were naturally carried from the old form of construction to the new, and angles and I-beams were largely used. Diminutive I-sections were then used, as were rods with a Latin cross for a section.

The *Engineering News* for September 8, 1888, has an article on concrete design. It is illustrated with a drawing for a cast-in-place cornice reinforced with round rods—a very modern appearing sketch excepting for the absence of stirrups. The text of the article is mainly concerned with the superiority of Mr. Ransome's twisted square bar over Mr. Hyatt's flat bar. The principal argument against the latter was the expense of punching holes for the cross wires needed for bond. Mr. Hyatt was, by the way, one of the pioneers in concrete work as well as being a noted citizen. He published a treatise on concrete in 1877 and was granted one of the earliest patents in this country for concrete construction. In his patent claim he outlined the purpose of reinforcement as used today and mentioned the advantage of a rolled deformed bar which he proposed to manufacture. Flats were much used in the early days because of their greater bond surface for a given cross-section. They were usually set on edge but were sometimes laid flat in beams and bent into parabolas to follow the lines of maximum tensile stresses.

An interesting example of the use of systems long since passed is the Cottancin System shown in Fig. 1. The excrescence below the slab was called a "spinal stiffener." These stiffeners were not laid out like a modern beam system. Æsthetic considerations weighed equally with structural requirements, for a text book, printed a score or more years ago, says that these spinal stiffeners crossed each other at various angles and that "wonderfully graceful and artistic effects are thus obtained." Patented systems in concrete construction are not entirely a thing of the past. They continue down to the present, but they are now used in only a small part of the total concrete construction.

The use of concrete in any quantity commenced in this country with the beginning of the present century, and even in these two decades changes in both theory and practice have been great, as can be readily observed by looking over any 20-year old book on concrete. Twenty years ago concrete was mixed very dry; as one old book says, "It must not show any moisture after continued tamping." Spading was unknown, the concrete being pounded and tamped the way backfill should be—and is not—in street trenches. Mechanical mixers were somewhat of a novelty and were not considered by everyone as equal to good hand mixing. Design also was different. Theories were well worked out, but the parabolic distribution of stress on the compression side of beams was used instead of the straight line distribution. Formulæ were long and cumbersome. As one writer aptly expressed it, judging from the formula the moment arm of the T-beam "looked as fearsome and was as long as the famous arm of the law."

It was considered necessary in those days to anchor the ends of all rods mechanically—usually with plates and nuts. It is related of the contractor's resourcefulness, on one of Boston's early concrete buildings, that when he ran short of the 6-inch square steel plates which the plans called for on the ends of the rods, he had similar wooden pieces painted black and went right on with the pouring of the concrete. It is presumed that he did not consider it necessary to trouble the inspector over so small a matter.

The general trend of changes in concrete work, as we come down to the present time, has been simplification. This has been true of both design and construction. Simplification has not come in the form of standardization, as with structural steel, and after reviewing the early history of concrete and reading of the many who viewed with dismay the introduction of the dangerous fad of the use of concrete, one is particularly reluctant to make any prediction. Nevertheless, it seems very doubtful if concrete construction usage will ever become a matter of selection and use of standard sections. This is partly because of the extent of field rather than factory manufacture and partly because it is the ready adaptability of concrete to any size or shape which makes it useful in such a variety of ways and places today.

Foundations were the first structural parts in which concrete was largely used. Once it was demonstrated that concrete could take the loads, the simplicity of its use for pile capping as compared with the use of granite levelers was obvious. The danger of corrosion in the use of iron or steel made the use of concrete in place of steel grillages increasingly common until at the present time concrete footings are used almost universally. At first they were un-reinforced and stepped like a natural stone foundation. Reinforced footings followed closely upon the introduction of concrete floors. The use of reinforced footings is purely a matter of economy. Where the bearing area is large enough to require a stepped footing, the introduction of reinforcing will usually effect a saving in concrete and excavation which will more than offset the cost of steel.

Concrete piles are of comparatively recent origin, but the availability of an indestructible pile is of immense advantage in many cases. Large single concrete piles of the caisson type are sometimes built to carry the load down to a satisfactory bearing soil, and are used with great economy in certain places. They are particularly adapted to Boston's soil conditions. Concrete foundations naturally suggest concrete walls to go on them, and concrete is largely used for all types of substructure walls, rubble stone for small houses being its only competitor. It is of course also used for retaining walls.

Concrete floors came into being because of the realization that exposed iron and steel construction was far from fireproof. Terra cotta fireproofing for structural steel was later developed, but the lesser cost of concrete under most conditions has brought about its continued rapid development. Even with steel framing, concrete is often used for slabs, the only alternative for a fireproof floor being terra cotta arches. Concrete floors are used as reinforced slabs, not as arches, and commonly with concrete beams. Floors resting on the ground are universally of concrete.

Concrete beams follow naturally from concrete slabs. They are heavier than bare steel beams or steel fireproofed with terra cotta and they often require more depth. In fireproof construction, however, the depth of a concrete beam includes the depth of the slab, while with steel beams the entire beam is below the slab unless slab continuity is to be sacrificed. Excepting for very long spans and light loads, concrete beams are less expensive than steel beams. The use of concrete for grade beams and strap beams for cantilevered foundations is a natural development. Concrete columns started as substitutes for brick and granite piers. With the development of concrete they are available and practical for factory and warehouse buildings up to about 10 stories, and they are also being used in schoolhouses and similar buildings for three or four stories.

Concrete soon became increasingly popular for sidewalks. With the advent of self-propelled vehicles, it was found that the best water-bound macadam roads were unable to stand the tractive power of the driving wheels. This resulted first in tar-bound macadam roads of various types, and then in concrete roads. The latter are becoming increasingly popular and at present their construction is using a considerable part of our cement production.

But besides the use of concrete in large buildings, there is a great field for its use in small dwellings and on farms. The cement companies have very properly been calling our attention to these uses of concrete for many years. In smaller residences concrete is used as a matter of course for basement and cellar floors, and almost as much for foundations and walls. The concrete wall can be thinner than the masonry wall and can be made waterproof. A concrete first floor makes a frame house practically fireproof. In many cities a cement plaster on metal lath over the heater is a minimum fireproofing requirement. Concrete firestops in metal lath baskets between studs at floor levels also greatly lessen the fire risk at a small cost. Concrete slabs are useful for loggia floors and for hearths. The latter may sometimes be cantilevered out from the chimney if it is of sufficient size. This makes a self-contained support for a fireplace, entirely independent of framing.

On the outside of the house there is of course stucco with its wide use for finish and concrete for the various walks, drives, retaining walls and steps, not to speak of pools and garden furniture. Exterior steps and walls can be made as unobtrusive as wood or granite, or with the plasticity of the concrete and variety of easily obtainable aggregates can be fitted into the decoration.

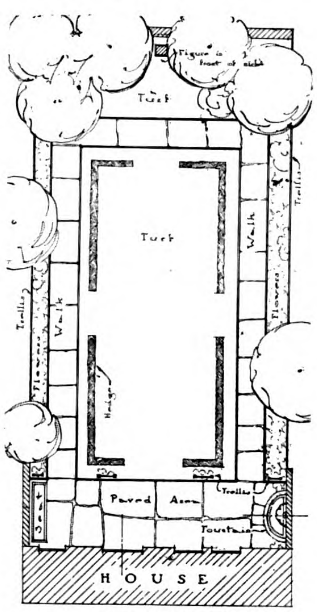
In farm groups the uses for concrete are almost limitless. Concrete walks and alleys connecting the various buildings are a luxury in some places but a necessity in other places where winter or rainy season brings heavy mud. Exterior concrete platforms are used for wash floors for cars and other vehicles, and concrete feeding platforms are sanitary and save the feed from being trampled into the mud.

Water and feeding troughs, cisterns, elevated water tanks, silos, and perhaps with the present trend of time we may add fuel oil tanks, are all satisfactorily made of concrete. In barns and stables two requirements make for the use of concrete—first, the advantage of permanent fireproof construction, and second, the need for cleanliness. This construction has the further advantage of being ratproof. There are also the uses of concrete for miscellaneous minor buildings,—garages, corn cribs, milk and pump houses, root cellars and ice-houses.

Since every architect must use concrete at some time, he needs a good idea of its manufacture and use, and unless he has both the interest and time to become quite familiar with constantly improving practice he needs to know where he can get dependable advice on his larger work. Concerning concrete work it may be said that the country as a whole follows Pope's injunction—"Be not the first by whom the new is tried, nor yet the last to lay the old aside." The east is not the first to try the new and the west is not the last to discard the old.

A Small City Garden

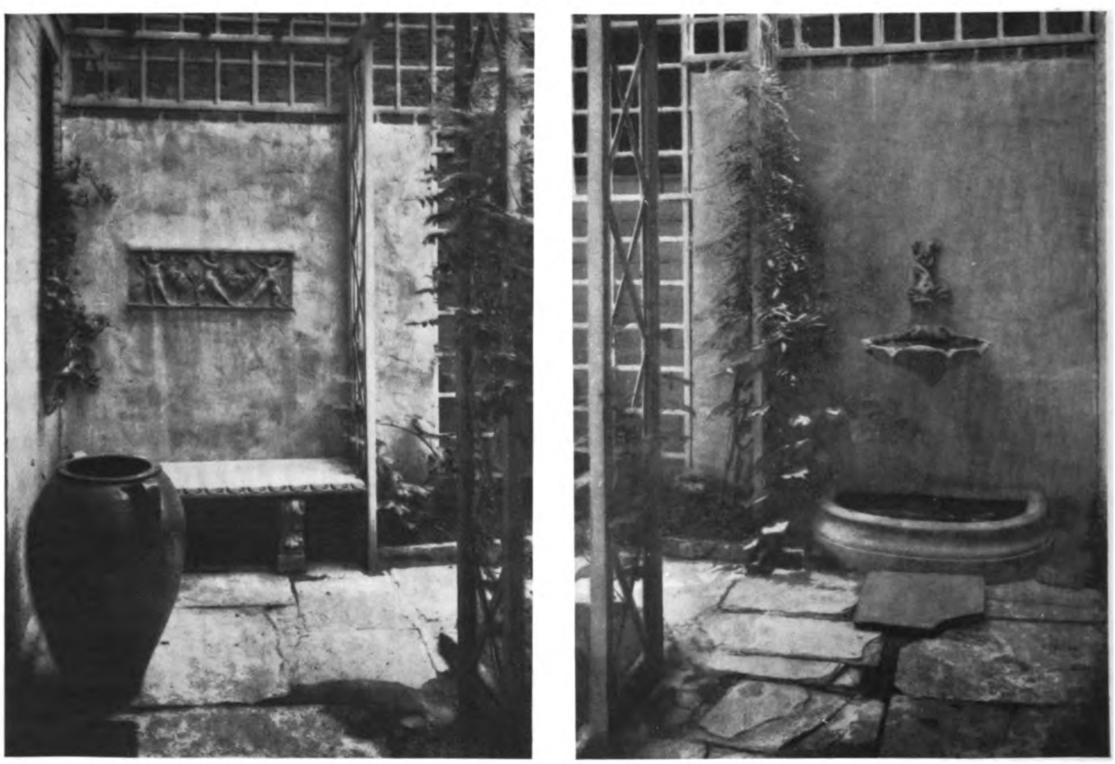
AT REAR OF OFFICE OF RUTH DEAN, LANDSCAPE ARCHITECT, NEW YORK



Garden Plan

Detail at End of Garden

WITH the popularity of remodeled old city houses for modern residences there has come an appreciation of the garden possibilities of their rear yards. These individual spaces are, of course, comparatively small because the width seldom exceeds 25 feet and the depth probably twice that figure. Luxuriant and heavy foliage is not possible because of restricted sunlight, nor is it desirable; these spaces are best considered after the manner of the small inner courts of old Spanish and Italian houses in which simple architectural and sculptural forms contribute as much of the garden feeling as the flowers and shrubs. The accompanying illustrations show a simple and interesting treatment at the rear of Miss Dean's office in New York.



Opposite Ends of Terrace against Building

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Elevator Installation

PART I

By HERBERT M. GARRIOTT, ARCHITECT

ELEVATOR installation in the modern building project of any magnitude presents a problem varied and complicated enough to delight the technical heart of any trained engineer. To the architect in many cases this problem is entirely one for the engineer's solution, and the necessary spaces and structural provisions for an efficient installation are neglected and at times totally ignored on preliminary sketches and the resulting drawings; but the architect, general contractor and elevator contractor will work to a disadvantage, and complications are sure to develop unless full particulars and details of elevator shafts are decided upon and furnished each interested party well in advance.

In laying out an elevator installation one of the first things to be determined, of course, is the speed and the load. Under the generally accepted regulations passenger cars are figured at the rate of 75 lbs. live load per sq. ft., while cars to carry freight are figured at a capacity determined by the purposes for which they are to be used. The speed of the car determines to a certain extent the size of the machine, and when arranging for the overhead work this, of course, must be taken into consideration.

If the machine is to be mounted over the hoistway, the slow-speed car, that is up to 200 ft. a minute, can usually be accommodated within the limits of the hoistway, although this is not always possible. With a high-speed car the penthouse to enclose the machine must be considerably larger than the hoistway. It is therefore imperative that the layout of the elevator work be determined before the final framing plans are drawn, so that provisions may be made at the proper time to care for the increased size as well as the increased loads of the overhead construction.

In figuring the beams to carry the machine, the loads are usually doubled "for shock." That is, if the car drops freely and comes to rest on the quick action of the safeties, the shock on the overhead beams is not only the shock of the car but also of the counter-weight, so that the beams must be figured not only sufficiently heavy to carry the load of the car and the counter-weight but must be doubled on account of the additional impact.

Frequently elevators are installed in such a manner that the lowest stop level of the car is not the lowest portion of the building. If, for any reason, the space below the hoistway is to be used other than for the machinery of the elevator proposed, it is absolutely necessary, as well as a code requirement, that the bottom of the shaft be designed and framed so that there will be no possibility of the car dropping through and injuring occupants of the space below.

As an illustration of the effect of the falling car, one accident which came to the writer's attention may be worth mentioning. The car fell through three stories and came to rest on some old-fashioned, obsolete type bumpers which were carried across an

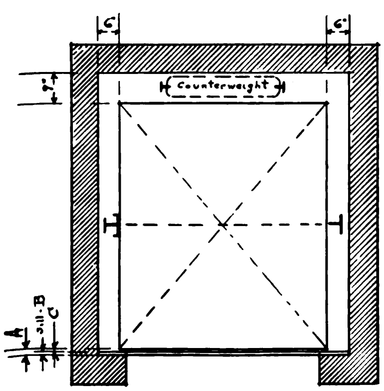


Fig. 1

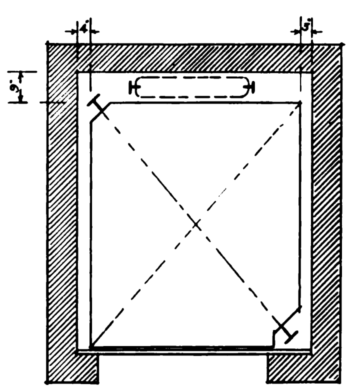


Fig. 2

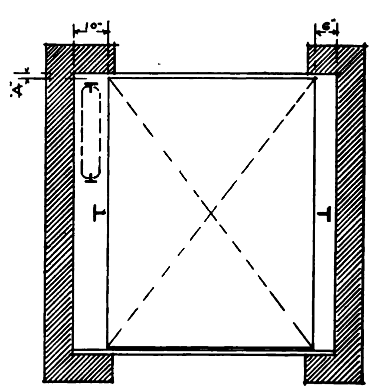


Fig. 3

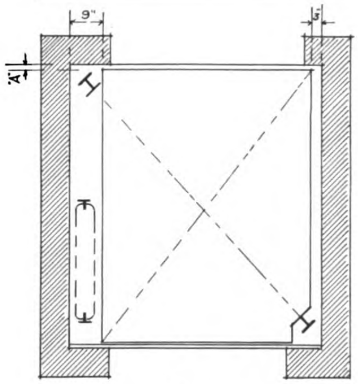


Fig. 4

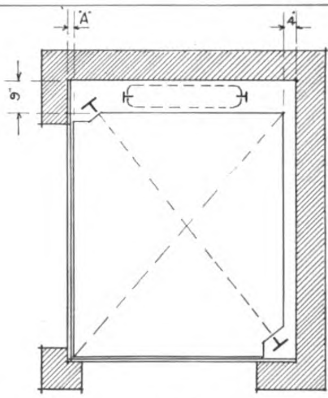


Fig. 5

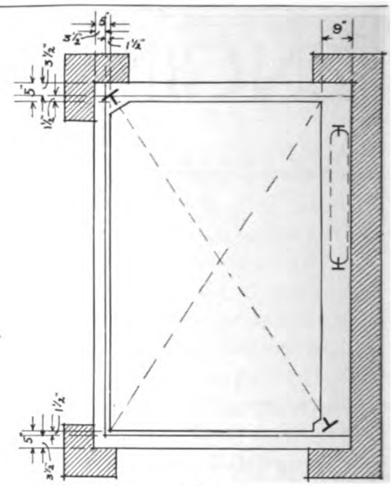


Fig. 6

8 ft. hoistway on 4 x 4 angle irons, and the result of the dropping of the car, as far as equipment was concerned, was to shear off two bolts and bend the angle iron so that the level of the bumpers was approximately 4 ins. below the normal level.

Engineers have not yet evolved a right method of calculating the impact stress due to a free falling car, as many elements enter into this consideration, but architects and engineers must be prepared in their layouts to reinforce the lower portion of the elevator shaft sufficiently to give protection to the space below.

TYPE	A	B	C
PASSENGER	1½"	½"	1"
PUSH-BTN.	4"	3"	1"
FREIGHT	5"	3½"	1½"

CLEARANCES AT CAR OPENING

The elevator contractor should be furnished special ¾ in. scale sketches showing general conditions existing in and around the elevator shafts. From these sketches, drawings showing the general arrangement of the elevator installation can be made by this contractor, to be in turn checked and approved by the architect. Copies of these drawings, after approval, should then be furnished each contractor having to do with the installation.

Pit and Shaft. The pit in connection with the shaft is of prime consideration. In the majority of cases, with the exception of traction drive elevators, a depth of pit of at least 3 ft. 6 ins. from lowest stop to bottom of pit should be allowed. For a traction drive installation a depth of 6 ft. and at times for the high speed type (400 f. p. m. or over) a depth of at least 7 ft. 6 ins. is necessary. Where the basement is the lowest stop it will obviously be necessary to carry the shaft pit into a sub-basement or to provide a special depression below the floor. Footings for columns and foundations in connection with the shaft should be kept below the bottom of the shaft pit in order that the finished lines of the shaft may be uninterrupted.

The waterproofing of pits and of machine rooms, where they are built in connection with the pits, is a very important consideration. There are various approved ways of waterproofing this type of construction, and no doubt each individual architect has his preference. It should be remembered that it is very necessary that machine rooms be quite dry, and whatever system of waterproofing is used it should be carried under all machine foundations.

There are many considerations which should enter into the exact dimensions and the detailing and constructing of the elevator shaft. Some structural characteristics may require that the corner post type of installation be used, or in other cases the side post type may be more practical. Specific clearance space is required by most building codes between

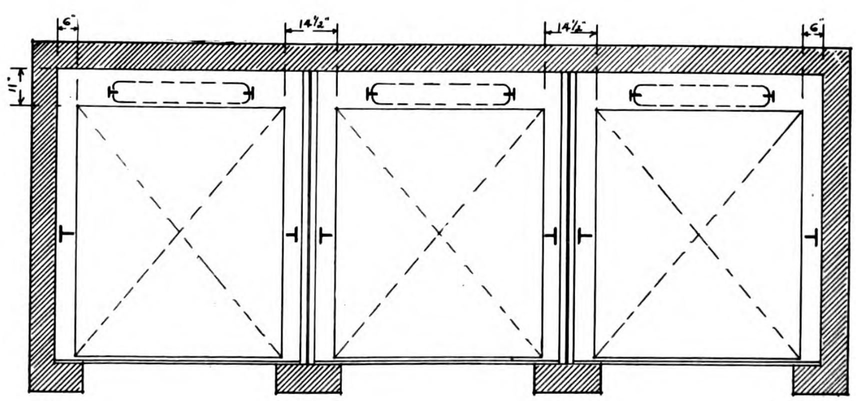


Fig. 7

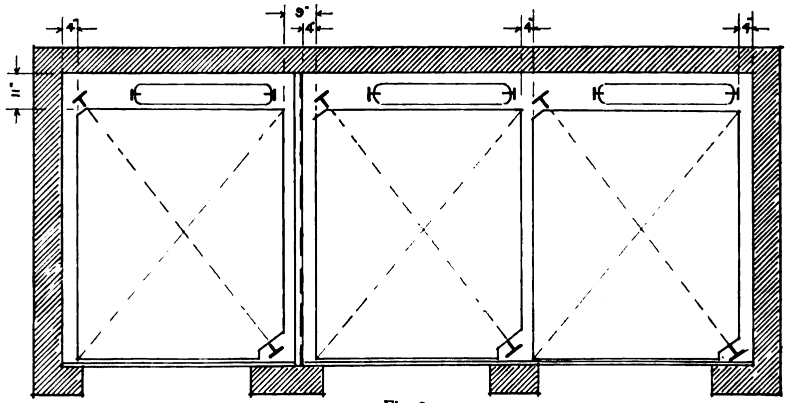


Fig. 8

sides of car and walls of shaft and between floor saddle and floor of car ("A," Figs. 3 and 4).

There is a possibility of there being doors on more than one side of the shaft, and this condition may determine the location of counter-weights. Figs. 1 to 9 illustrate different types of shafts, posts and openings and the required clearance dimensions in each case. Figs. 1 and 2 illustrate typical examples of installation with elevator openings in one side of shaft only. Where the width of shaft is limited it is possible to save some 4 ins. of width by using the corner post installation. It will be noted, however, that when the corner posts are used the widths of car and shaft openings are more restricted and the door is not on car center.

Figs. 3 and 4 show arrangements for doors on opposite sides and the same remarks pertaining to width of shaft just made will apply. The use of doors on opposite sides for passenger service requires of course two automatic door locks at each stop and equipment which will allow the operation of either door by the operator without leaving his post. In Fig. 5 is illustrated the most logical use for the corner post installation — a shaft where doors on adjacent sides are necessary. It is easily seen that in this case the use of side posts is impossible.

Fig. 6 shows an exceptional installation where openings are required on three sides. This type of shaft construction is sometimes found in freight elevators, but very seldom in passenger elevator installations. Figs. 7 and 8 show a usual method of installing a bank of cars, Fig. 7 showing the side post and Fig. 8 the corner post type. As in Figs. 1 and 2, the only advantage of the corner post installation is a saving of space in width of shaft. Fig. 9 illustrates a more approved method of construction for a bank of two or more cars and represents quite a saving in width of shaft.

Guide posts must in every instance be securely anchored at regular intervals to avoid deflection, caused by vibration and impact due to car stops. In the detail drawings of shafts to be turned over to contractors all fireproofing and plastering in the shafts should be shown and exact thicknesses marked.

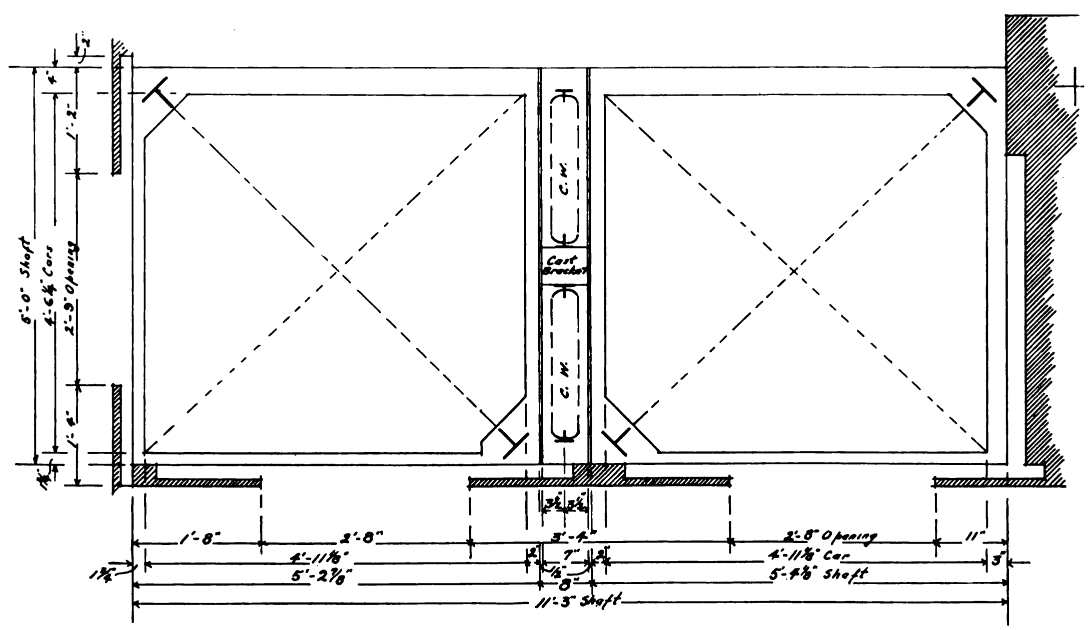


Fig. 9

Elevator Machine Rooms. With the hydraulic elevator type the machine room should be located under the shaft at the lowest level, or at least directly connected with the bottom of the shaft. The hydraulic geared type is very little used of recent years, and the remarkable development of the electric type of installation has left but a very limited field for even the hydraulic plunger elevator. The mechanical equipment in connection with the hydraulic plunger elevator consists of a plunger operating within a cylinder which is protected below the surface by an iron casing. The plunger, which at its top carries the elevator car, is controlled by water pressure within the cylinder. In connection with this water pressure system is a pumping unit, excepting very rarely where the system is operated by pressure from mains. This equipment may ordinarily be provided for below the elevator shaft.

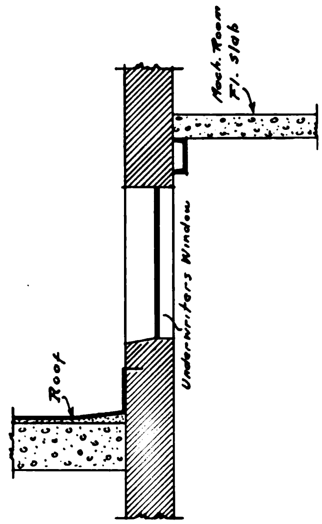


Fig. 10

Electric drum type or traction drive machines may be located either in the basement, directly over the shaft or on any of the intermediate floors. It would seem, as a matter of space economy, good practice to locate the machine room over the shaft, in a bulkhead or penthouse. In this case the floor of the machine room should be a solid concrete slab with small openings or slots, only large enough to permit unobstructed passage for the cables. With this arrangement direct outside light and ventilation must be provided in the shaft under machine room floor slab, somewhat as shown in Fig. 10, unless the shaft is located on outside wall. Shaft windows must be approved fire underwriters' windows with fusible link.

Another point in favor of the overshaft machine room is the ease of lighting when it is thus located. The overshaft location is much freer from the accumulation of dust and dirt, machines are more easily accessible for repair and maintenance, and a length of cable equal to the full travel of the car is saved.

Types of Elevators

Hydraulic Elevators. The geared type hydraulic elevator is practically obsolete. The plunger type hydraulic is used principally at present in a limited field, where rises and loads are such that the available water pressure will permit of plungers of small section with a resultant small water consumption and cost.

Electric Elevators. The remarkable development of the electric type elevator after its introduction in 1889, the more recent improvements in motors, controllers and mechanical parts, and particularly the development to something near perfection of the electric gearless traction type have made this type by far the most desirable installation for the modern building. The attainable speed with smooth, positive operation has greatly added to the favor accorded this type by engineers of today. It has another great advantage in that the machine and all mechanical equipment can be located over the shaft. This means the saving of space in the basement, which is often quite valuable. With the gearless traction type no cables are wound up, since the movement of the car is accomplished through the traction between sheave drums and one set of cables connecting at one end with the car and at the other with the counter-weight; hence the width of drum or driving sheave and the size of machine for a given capacity remain at a minimum.

In this type of elevator a slow speed motor is directly connected with the driving sheave and break pulley by a shaft which assures a minimum loss of power due to friction.

Elevator Controls. The different methods of controlling elevator car travel are hand rope, lever and hand wheel, electric switch and push button. Hand rope control is applicable only to slow-speed freight elevators. Lever and hand wheel control require more space allowance in the elevator shaft than the electric switch control and are obsolete.

The mechanical parts of the electric switch control are placed inside the car so that no additional shaft space is needed. The switch handle automatically resumes the neutral position if released when in operation. The movement of the switch handle from the neutral position energizes various magnet coils on the controller, and these magnets complete circuits which control direction and speed of the car and the operation of the motor and brakes.

The push-button type of control is entirely automatic in operation, and if properly installed is safeguarded against any mishap. In the elevator car is located a series of push-buttons, each button marked with the number of the floor to which its manipulation will dispatch the car. When the particular floor designated is reached, the car is stopped by the automatic operation of the electric magnets which open or close the circuits operating the machine and brakes. On each floor also, near the shaft door, is located a push-button which automatically calls the car to that particular floor in the same manner as the operation of the buttons in the car. The system is so automatically safeguarded that the car cannot be operated until *all* of the shaft doors are closed and *locked*, and no shaft door can be opened until the car is stationary and before it.

In addition to the floor buttons in the car is an emergency button which stops the car instantly.

Electrical Wiring Layouts for Modern Buildings

PART V

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

IN planning the wiring layout, provision should be made for telephone service, and where the building is large, local telephones should be considered in addition to the instruments of the telephone company.

Provision for Telephones. In sections where overhead telephone distribution is used, and where the building is so situated that the telephone lines may be carried direct from the pole on the street to the building, the telephone company usually makes the installation, without charge to the customer. In this case the wire passes from the pole to a bracket on the building, generally at a point 20 or more feet above the ground, thence down the outside of the building on cleats, and through the wall into the basement, where a protective arrestor is installed at the point of entrance. The wire is then run exposed, passing up through the floors and connecting with the instruments.

Any number of telephones may be installed in this way, as the wires are exposed and are simply stapled to the walls and to the ceiling of the basement. While this construction is less expensive than conduit wiring, it is unsightly and the wires are not protected from mechanical injury. Again, where the wire passes down from the bracket on the outside of the house, it may be easily cut by anyone contemplating mischief. It is therefore advisable to provide for a ½-inch conduit on the outside of the building for the telephone wire, the conduit passing through the basement wall in an elbow, or with a condulet fitting, a weatherproof head to be used on the conduit, at the bracket. This protects the telephone service wire from injury or mischief.

Where underground telephone service is used, a conduit is required from the property line to the building. The telephone company will provide conduit from the nearest manhole to the property line and will connect with the conduit on the property. It is sometimes advisable to get a price from the telephone company for the installation of the conduit on the property, and to include this price in the contract as an allowance, so that the telephone company may make the complete installation to the building.

In planning new work, however, it is well to provide a conduit raceway for the telephone wires, particularly when there are several instruments to be used. It is further advisable to run an underground conduit from the house to the nearest telephone pole and thus do away with the necessity of any overhead wires connecting with the building. With this system, a connecting cabinet, approximately 12 by 4 and fitted with hinged door and lock, is located in the basement at the point where the service enters, the underground conduit terminating in this cabinet. From the cabinet one or more conduits should run to the telephone outlets, using ½-inch conduit for one circuit and ¾-inch conduit for two circuits. The telephone outlets should consist of the standard 4-inch outlet boxes, fitted switch type covers, set flush with the wall. For wall instruments set the outlets 4 feet 6 inches above the floor; for desk instruments set the outlets approximately 18 inches above the floor, so that the ringer may be mounted over the outlet, the cord leading to the instrument. As there is likely to be considerable distance between outlets on residence work, it is well to insist that the conduits be fished as soon as installed, that a cord be drawn into the conduits, and each conduit plugged at the outlet. It is well, also, to require each outlet to be covered with a blank switch plate, this being removed when the wires are installed by the telephone company.

Local Telephones. In larger residences local telephones are commonly used, and the wiring plans should include all local equipment. The local or house telephones are independent in every way of the outside service. The instruments are located in servants' corridor or rooms, the butler's station, the kitchen, laundry, garage or stable, and in the corridors on each floor or in masters' rooms.

With but two or three local telephones to be considered, the single-point instruments for common talking and selective ringing may be used. With six or eight instruments, however, this system is objectionable, as but two can talk at one time, and anyone lifting a receiver can "listen in." With six or eight instruments the intercommunicating system is favored. This gives selective ringing and talking, and several may talk without interference. The instruments are made in both the surface and the flush types, and with the long or watch-case receiver.

On the intercommunicating instruments there is one button for each station, so that a ten-station telephone would be fitted with a ten-button plate. With this system one wire is used with each station plus four additional wires; thus with a ten-station equipment, a 14-wire cable will connect each instrument, and the connecting conduit must be large enough to take cable.

The conduits for these telephones must be continuous from instrument to instrument (see Fig. 1), and the splices should be made in a terminal block provided for these connections. A conduit from the nearest outlet should be run to the basement to provide for the battery. Dry cells are used as a rule, and these may be mounted on a shelf or in a small cabinet.

There are two battery circuits, one for talking and one for ringing. If desired, the ringing circuit may be from a bell-ringing transformer, but a battery (usually of two or three cells) must be used on the talking circuit.

Standard cotton-covered telephone wire made up in cable form, and the whole surrounded by a substantial braid, is used on these systems. Where the cable is run underground to garage or to outbuildings, however, it should be sheathed with lead in addition to the braid.

Protective Circuits. Burglar alarm equipment, while used extensively in factory buildings, lofts, etc., is seldom used on residence work other than in isolated districts. On isolated residence work, however, it is well to consider the use of alarm equipment, particularly with reference to the stable and garage. The wiring of alarm equipment is the same as that required for bell circuits, and current is generally derived from a battery located in the basement, or through bell-ringing transformers. The system may be of the closed circuit type (where the opening of the circuit or breaking of any wire will set off the alarm), or of the open circuit type where the contact is closed to sound the alarm. For residence work the open circuit system is to be preferred.

In general, the system consists of switches or spring contacts installed at all points to be protected, as at the doors, windows, etc., an outlet being located at these points, and equipped with a spring contact, which is held open when the door or window is closed, and which closes and sounds the alarm as soon as the door or window is opened. The two wires of the circuit connect to all outlets, so that the closing of any one of the contacts will set off the gong. One gong or a number may be used so that help may be called from different points.

A master switch of the cylinder lock type is installed in a convenient place by which the circuit may be opened. Thus, during the day, the system is inoperative by the use of this switch, and in use as soon as the switch is closed. When it is desired to locate immediately the point of alarm, an annunciator is connected in with the system, so that the target shows up on the annunciator locating the point of disturbance.

Where alarm wires are carried to the garage or other outbuildings, the wires should be lead-sheathed and should be installed underground, as overhead wires could easily be tampered with. Standard protective devices for the alarm system include transom springs for transoms or for swinging windows, single- and double-window springs, shade springs which operate the alarm in the event of the shade being raised, door trips, floor springs for installation in front of furniture or safes, burglar alarm matting, and traps with which a cord is stretched across a corridor or path, the cord releasing a spring contact when disturbed.

The equipment is made for either momentary or continuous ringing, so that the alarm will continue to sound even if the door or window, etc., is immediately closed. The annunciators and gongs may be located at two or more points, working together, and any number of switches may be installed where desired to permit of local control of different buildings. Lock switches of the cylinder mortise type may be installed at certain doors and connected in the alarm circuit, so that persons with the proper keys may enter the building without sounding the alarm.

It is to be preferred that the wiring be installed in conduit or in armored wire. If expense is to be considered, however, rubber-covered wire may be drawn into stud constructions. Outlet boxes for all types of equipment are available and these are set at points permitting the switches and spring contacts to be mortised in door and window frames or elsewhere. Where the runs are long it is advisable to use No. 14 wire, and the circuits should be installed with soldered joints.

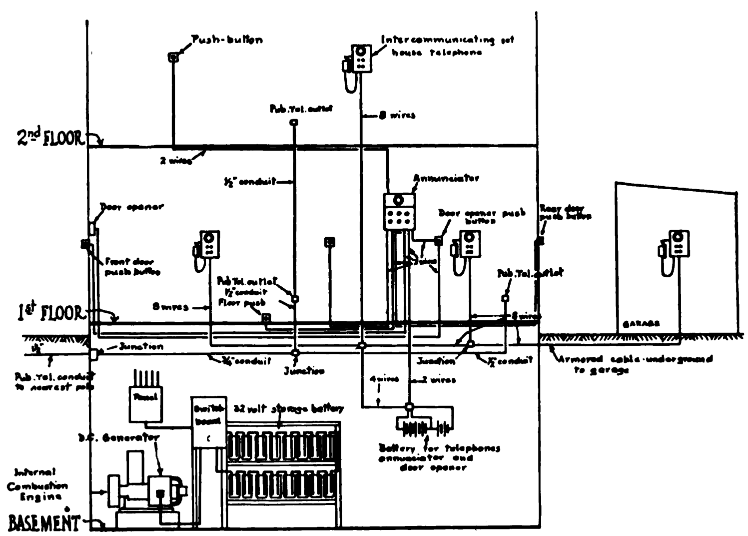


Fig. 1. Diagram Showing Installation of House Bell and Telephone Equipment with Local Generating Plant and Storage Battery

Door Openers. These openers are wired and connected up in the same manner as the bells and signals, the opener mortised in the jamb of the door and taking the place of the lock; or, if desired, the opener may be located above the lock. The openers may be operated from battery (four cells) or from a bell-ringing transformer. Wire should be not less than No. 16 rubber-covered wire. Any number of buttons may be installed in convenient places to operate one or more openers. Openers are, as a rule, used on entrance doors and yard gates.

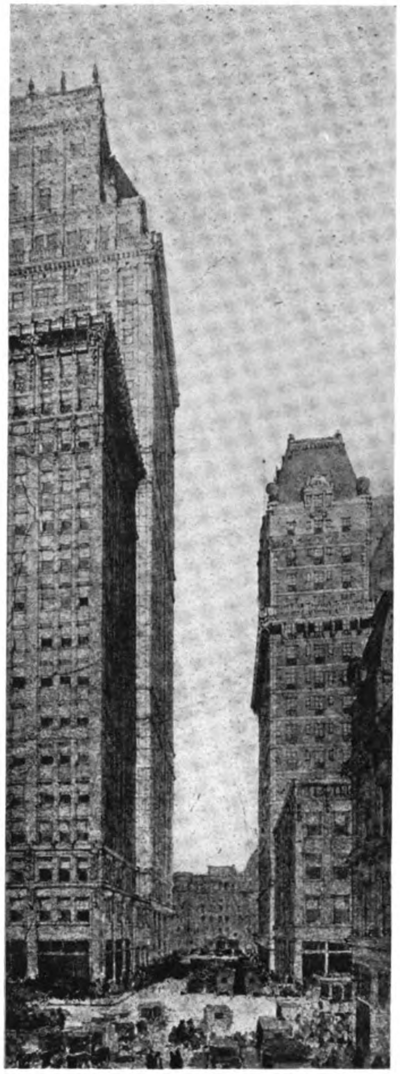
A Record of Architectural Achievement In the State of Texas

By RALPH H. BRYAN
Pres. of the Dallas Architectural Club

IT has not been so very many years ago that the mention of the name of Texas brought before the mind's eye of the average Easterner a conventional picture. In this picture the Texas citizen appeared as a "cow person" who enjoyed eating tobacco; the typical Texas metropolis was portrayed as a wide place in the road, entirely surrounded by saloons, and in a hazy sort of way, Davy Crockett, water melons, Texas rangers and longhorns were very likely to be included. As for the architecture of Texas, aside from that state's splendid, ruined missions, the words "architecture" and "Texas" were simply not used together.

However real such a picture may have been in years gone by, it lacks greatly in likeness to the Texas of today. In this last generation the southwest has awakened to a realization of her own natural and commercial resources, with the result that she is enjoying a steady, healthy growth and perhaps even more than her share of prosperity, and with this prosperity and progress there has come, among other things, an appreciation of, and an earnest desire to create, better things in architecture.

Excepting for the missions of Texas, in the neighborhood generally of San Antonio, and the few though nevertheless inspiring examples of southern colonial, seemingly centered in Austin, the southwest has no early architecture to which it can turn for study or precedent, and unfortunately these examples, as few and as scattered as they are, have not had the care and preservation of which they are deserving. The first real era in which architecture was known and practiced, as such, came to the southwest with the period of "red sandstone Romanesque" in the eighties. Of this style there are still, perhaps unfortunately, abundant examples throughout Texas though they are gradually giving way in the growth of the towns and cities to better things. Since that period there has been steady progress forward in both the quantity and quality of architectural work.



View down Akard Street, Dallas
Water Color Sketch by Dudley S. Green
Southwestern Life and Magnolia Buildings on the left
Adolphus Hotel on the right

The city of Dallas—second in population among Texas cities, but first in any number of more important ways, as its Chamber of Commerce admits—presents a record of progress which is typical of the progress of the southwest as a whole. Dallas' first big step forward in an architectural way came in 1898 with the erection of the Linz Building, a 7-story, fireproof office structure. This was followed in 1901 by the completion of the Wilson Building, a similar structure of 9 stories, and when in 1908 the 15-story, steel skeleton, fireproof Prætorian Building, the "first skyscraper in Texas," was completed, Dallas was on its way to its present position as, to quote the Chamber of Commerce, "the skyscraper center of the southwest, with 58 buildings 6 to 24 stories in height either completed or under construction."

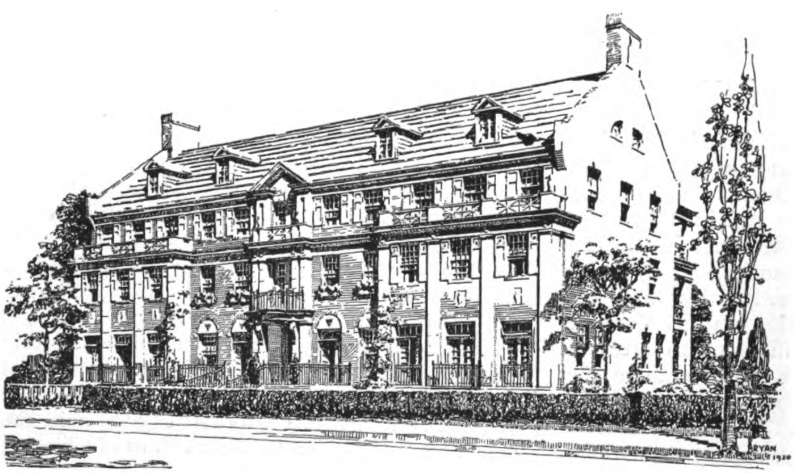
Immediately following the armistice Texas enjoyed her full share of the nation-wide, post-war construction activity, San Antonio, Fort Worth, Houston, El Paso and Waco all having building programs that closely parallel that of Dallas. Texas has probably felt less than any other state the depression that has existed for the past several months in many parts of the country. Part of this may be attributed to the fact that several of the larger cities, Dallas included, have put the policy of the open shop into practice with the result that labor troubles to retard construction work have been almost negligible.

It is unquestionably true that credit for certain of Dallas' best architectural works goes outside of Texas, as for example that landmark of Dallas, the Adolphus Hotel by T. P. Barnett of St. Louis, the Union Terminal Station by Jarvis Hunt of Chicago, and the Forest Avenue High School by Wm. B. Ittner of St. Louis, and although much of the nota-

First Methodist Episcopal Church, South, Dallas
Herbert M. Greene Company, Architects

ble work which is now being done in Texas is due entirely to Texas architects there are several instances in which local architects have worked in collaboration with those from elsewhere, proof of the good spirit in which local firms co-operate with architects from the large cities outside the state to obtain good architecture, and proof also that architects have a higher regard for architecture than for their own personal advancement.

An instance of such co-operation is the Magnolia Building, in Dallas, which is perhaps the most important single architectural achievement of Texas, the work of Alfred C. Bossom of New York in association with Lang & Witchell of Dallas. When completed this structure will be 29 stories in height, towering above the already inspiring skyline of Dallas. Two of the largest ecclesiastical buildings in the entire southwest, now in course of erection, are entirely the work of Texas architects, the First M. E. Church, South, in Dallas of which the Herbert M. Greene Co. are architects, and the First Baptist Church at Houston, designed by C. D. Hill & Co. The museum designed for the Houston Art League is the work of William Ward Watkin. The Scottish Rite Cathedral at San Antonio, the dignified exterior of which suggests the purpose for which the structure is intended, is also the work of the Herbert M. Greene Co., and the recent addition to the Jefferson Hotel in Dallas is the work of Lang & Witchell who were the architects of the original Jefferson, while notable among recent



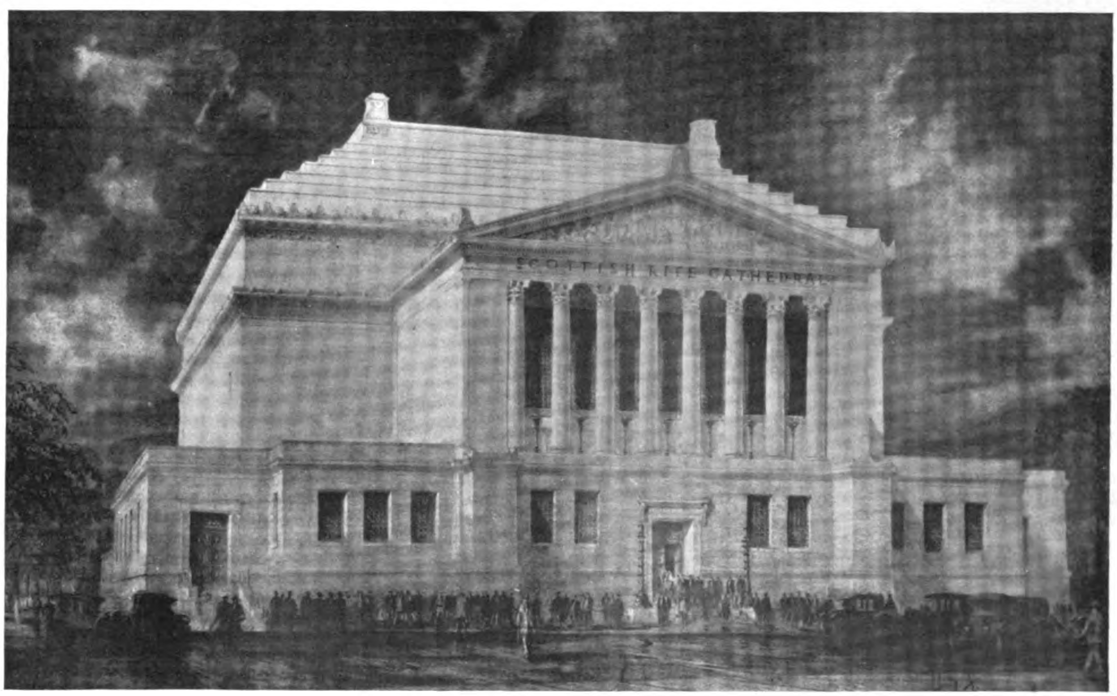
Girls' Home for the Y. W. C. A., Dallas
Herbert M. Greene Company, Architects

Magnolia Building, Dallas
Alfred C. Bossóm, Architect
Lang & Witchell, Associated

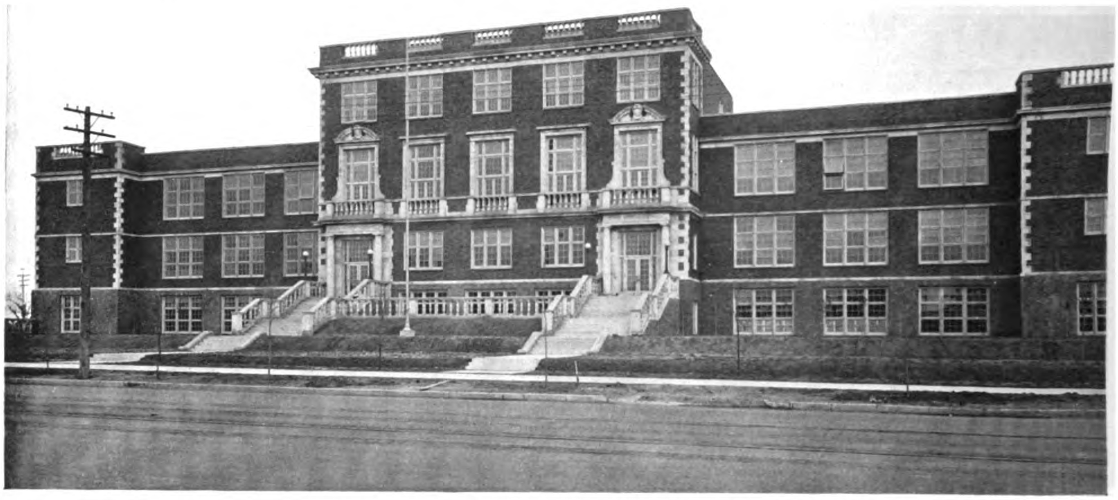
Texas office structures is the Waggoner Building in Fort Worth by Sanguinet & Staats.

The buildings mentioned are only a few examples of the architectural work typifying the spirit of this section of the country. There are other individuals and other firms whose names are linked with the architectural progress of the southwest, men whose vigorous pursuit of all that is for good in their profession is more and more emphatically calling the attention of the country to the results which they are accomplishing. The opportunity which an increasing volume of work affords to the architects of Texas was well brought out in the recent exhibition of the Dallas Architectural Club, which, it may be observed in passing, was unique in that it was the first architectural exhibition of any magnitude ever held in

Waggoner Building, Fort Worth
Sanguinet & Staats, Architects



Scottish Rite Cathedral, San Antonio
Herbert M. Greene Company, Architects

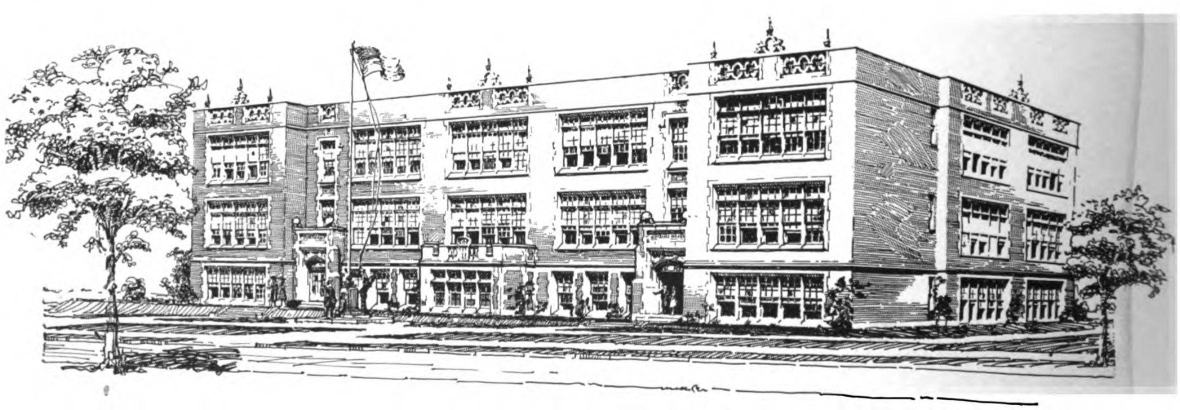


Forest Avenue High School, Dallas
Wm. B. Ittner, Architect

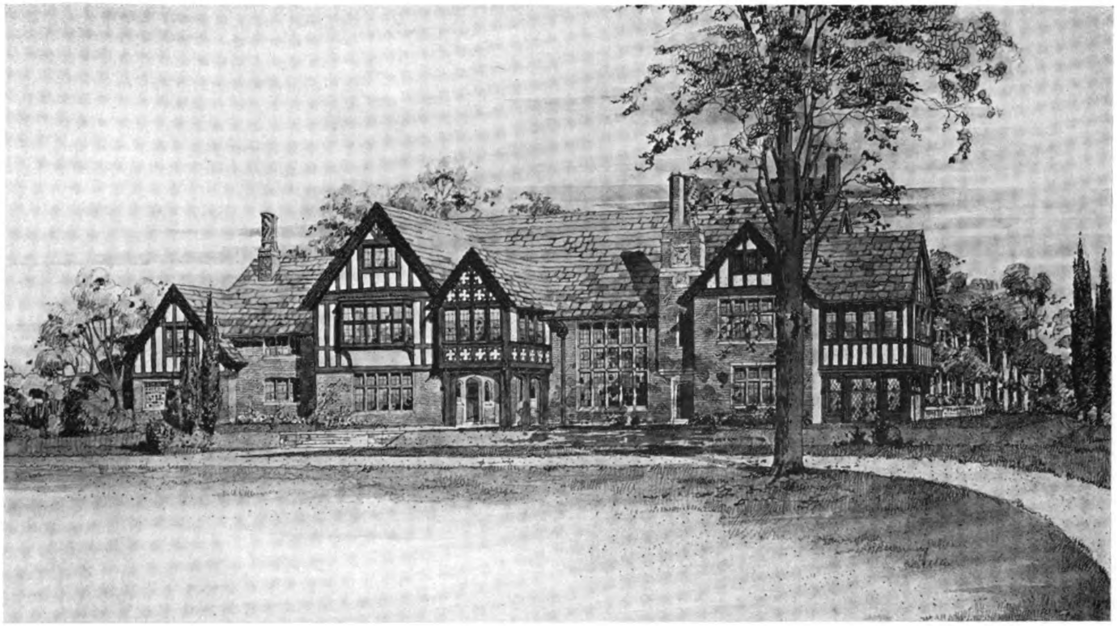
Texas, and in that it included only work in which architects of the state have been engaged. It was an inspiring exhibition and proved that the future architectural advancement of Texas is in competent hands.

There has long been a feeling in this state that the members of the profession in the east look upon "architecture as she is practiced" in Texas in a patronizing sort of way. The east has had centuries in which to build up her record of architectural achievement of which she and the whole country are so justly proud; so Texas, despite her youth, has no excuses to make for her progress. Perhaps it is in some measure due to this feeling that the profession in the southwest is making such efforts to work for all that is good in architecture, and perhaps one of the reasons for this article is the desire to bring about a keener appreciation of the fact that all through this section there are men who are giving the best there is in them for the betterment of the profession.

DALLAS FEDERAL RESERVE BANK. The building which houses the Dallas branch of the Federal Reserve Bank, one of the most notable additions to the city's architecture, is the work of Graham, Anderson, Probst & White. The exterior exhibits a successful adaptation of classic design to the requirements of a modern business structure and has been worked out in Indiana limestone. The entrance to the building is within a recess in the main facade, the heavy columns which separate this recess from the street upholding the entablature



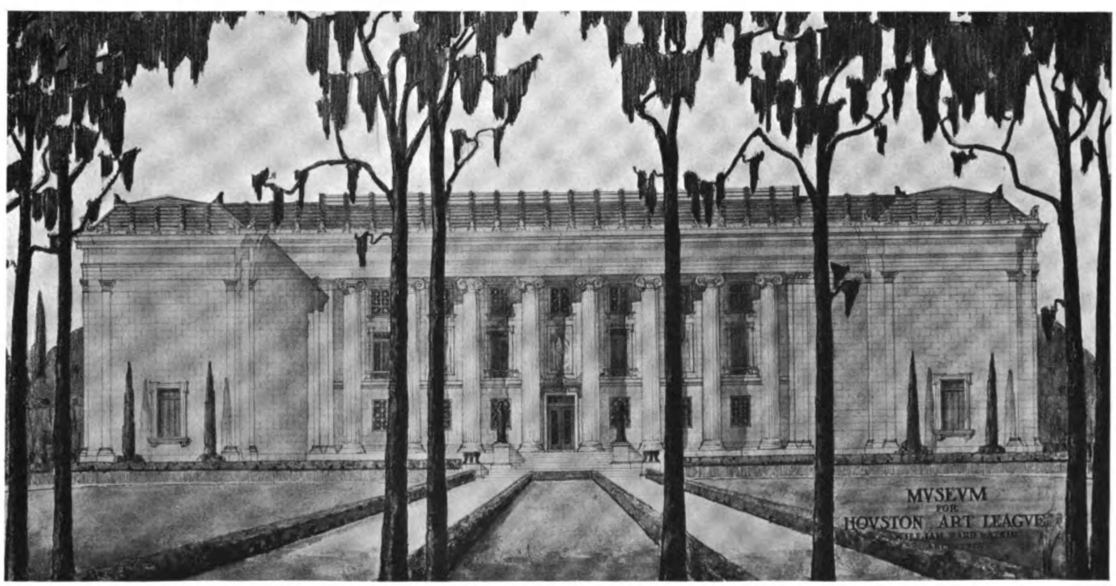
Junius Heights Grade School, Dallas
Herbert M. Greene Company, Architects



House for A. E. Parker, Esq., Dallas
Anton F. Korn, Architect

which extends around the structure between the third and fourth stories, while just above the entrance and resting upon the entablature are placed a heavy cartouche and carved eagles which relieve the severity of the facade.

Although it is situated on a corner, the area of the building makes necessary a light court which extends through all the stories above the ground floor, the cages of the tellers being grouped at the center of this floor and lighted from a skylight in the lighting court. An elevator close to the main entrance of the building gives access to the bank's working quarters in the upper stories, but the greater part of this ground floor is occupied by the necessary public spaces and the offices of the Governor, the Federal Reserve Agent and the other officials of the bank and their secretaries. At the rear of the building there is a truck enclosure into which currency trucks may drive, being locked in while they are being loaded or unloaded, and a lift from this



Museum for the Houston Art League, Houston
Wm. Ward Watkin, Architect

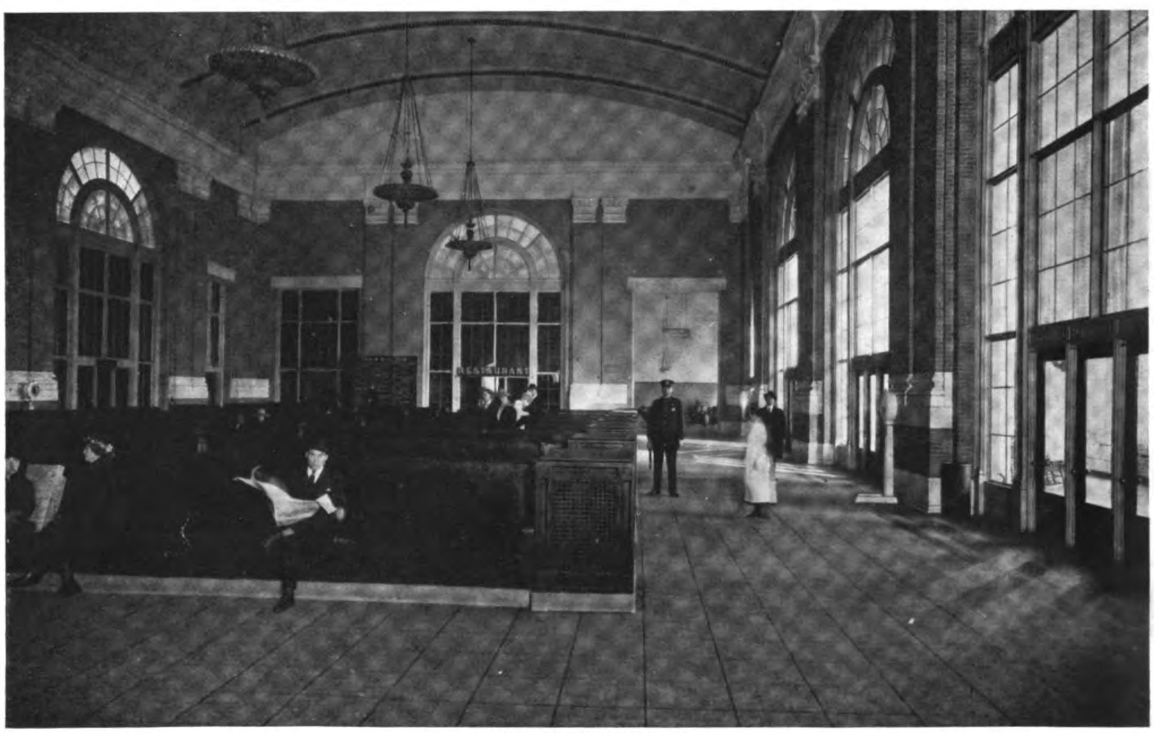
Jefferson Hotel, Dallas
Lang & Witchell, Architects

entrance communicates directly with the great vaults. To afford all possible safety these vaults are placed in the basement and at the center of the bank's area; but one entrance leads to the vault's entrance and but one to the inner enclosure, and opening from the outer enclosure are numerous small offices or cages for the counting of currency or checking up of deliveries. From the inner enclosure a spiral stairway leads to the tellers' cages upon the main floor above.

The floor plans included here show an arrangement of all the various departments required in a branch of the Federal Reserve Bank. The second floor is in effect a mezzanine since it extends about the four sides of the main banking room, the greater part of which is the equivalent of two stories in height. Upon this floor, which is reached both by elevator and stairway from the ground floor, are the offices of the auditing department, the credit, loan and discount departments and special storage spaces for their use. Above the main floor there are the incoming and outgoing transit departments, coupon rooms and conference rooms, while a particularly well lighted space is occupied by the bookkeepers. To the stenographic corps there has been assigned a well lighted corner space upon the fourth floor since it has been found that the clicking of a large number of typewriters interferes with the business of a bank if they are used in those parts of the building to which the public has access, and yet they must be near at hand.

The "Dallas Canyon," Looking East on Main Street
Showing the principal high buildings erected in recent years

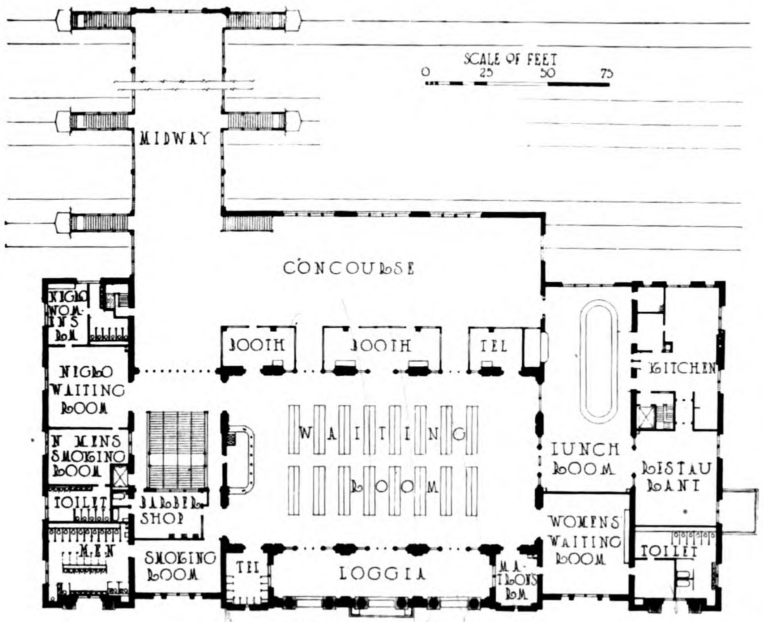
GENERAL VIEW



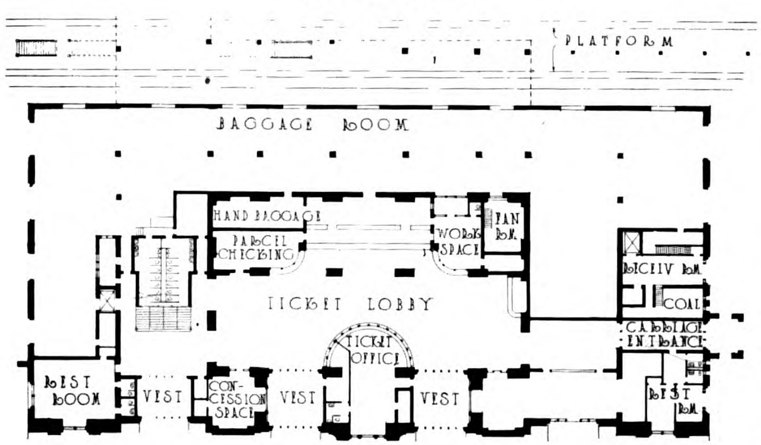
MAIN WAITING ROOM

UNION TERMINAL STATION, DALLAS, TEXAS

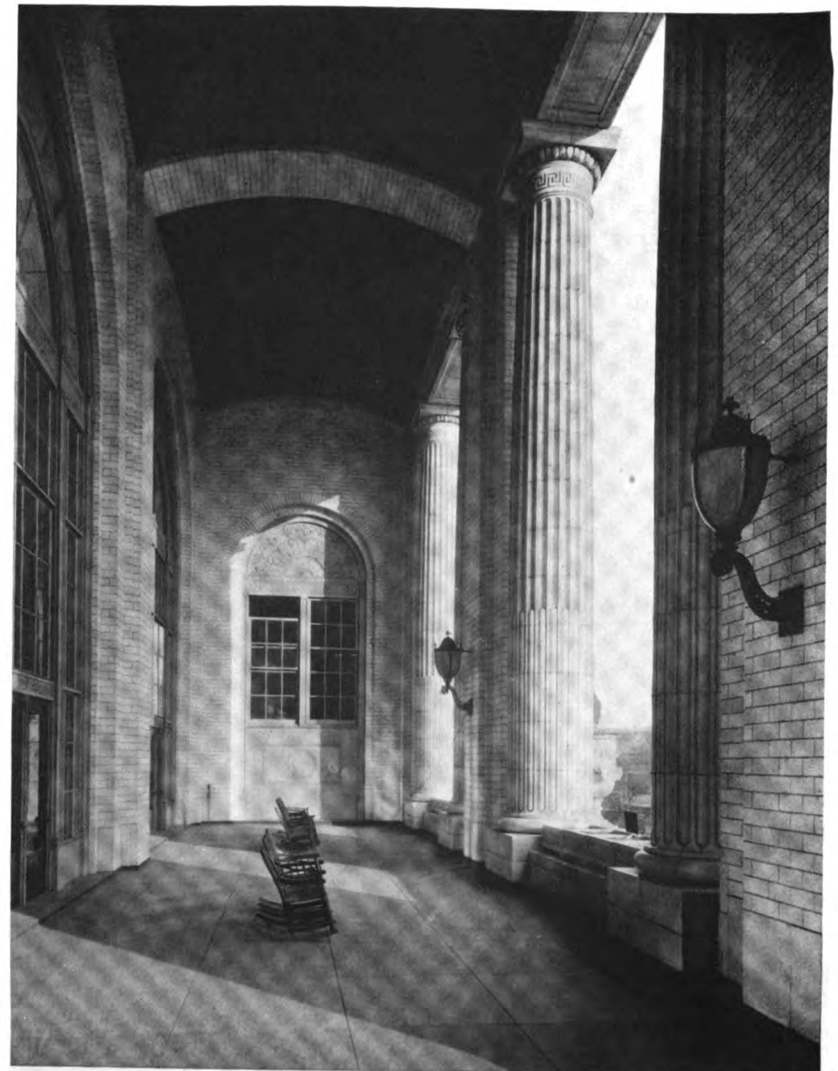
JARVIS HUNT, ARCHITECT



SECOND FLOOR PLAN



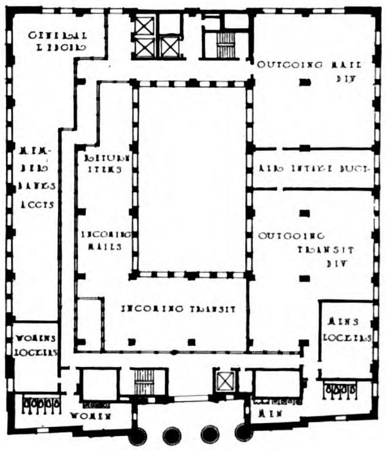
FIRST FLOOR PLAN



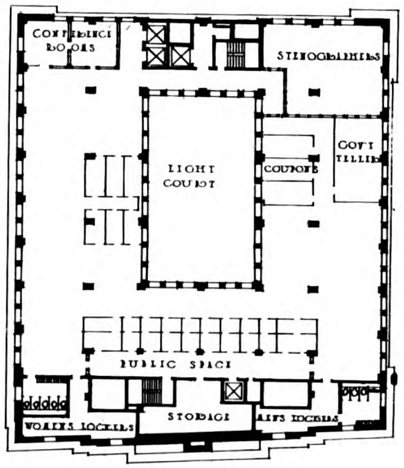
WAITING ROOM LOGGIA

UNION TERMINAL STATION, DALLAS, TEXAS

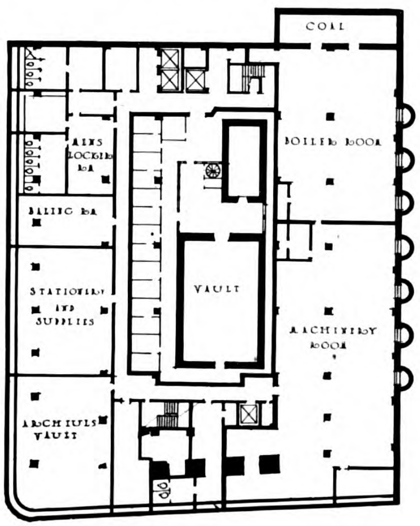
JARVIS HUNT, ARCHITECT



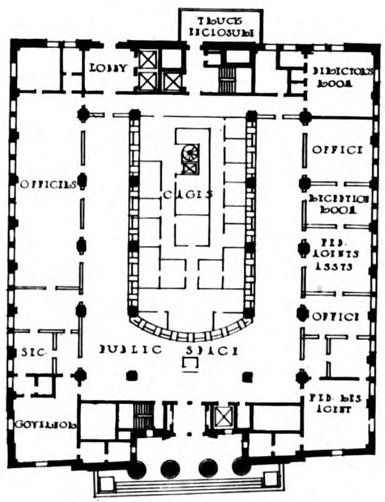
THIRD FLOOR PLAN



FOURTH FLOOR PLAN



BASEMENT FLOOR PLAN



SCALE 0 20 40 60 FEET

FIRST FLOOR PLAN

MAIN FACADE

FEDERAL RESERVE BANK, DALLAS, TEXAS

GRAHAM, ANDERSON, PROBST & WHITE, ARCHITECTS

The Regent Theater, Brighton, England

ROBERT ATKINSON, F.R.I.B.A., ARCHITECT

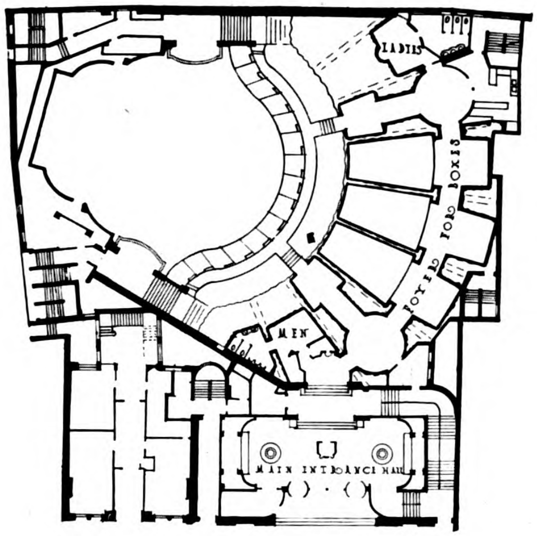
THE rapidly increasing popularity of motion pictures, which has made their production one of the greatest of industries, has been the cause of many interesting developments in buildings intended for their exhibition. The modern cinema or motion picture theater differs in certain respects, in function as well as in plan, from the usual theater devoted to the drama which is generally intended for the production of regular theatrical performances which last for several hours— all the time during which patrons are in the building; the cinema theater, on the contrary, caters to an audience which comes and goes at will, and the management of such a house realizes the possibilities held forth by restaurants, tea rooms and rooms for dancing and other forms of diversion for patrons who have wearied of the cinema itself.

Brighton is the English equivalent of Atlantic City—a seashore town in the south of England and not too far from London to make it popular, and at Brighton there is presented every possible form of amusement apt to interest visitors in a holiday mood. The Regent Theater at Brighton, therefore, has been planned with a view to making it literally the last word in cinema houses, and it represents the outcome of years of effort to improve and develop the cinema theaters owned by a great firm of producers.

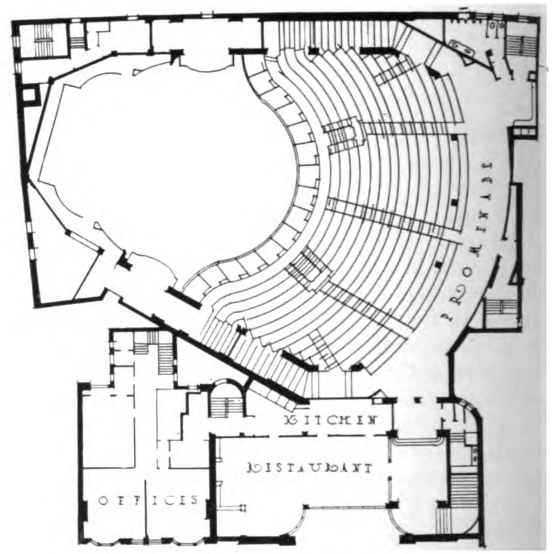
The site upon which the theater is built presented difficulties calculated to tax the ingenuity of its architect, for it is sufficiently near to a corner to afford frontages on both streets without actually including the corner, added to which disadvantage these two streets were upon radically different grades—difficulties which skillful planning has not only overcome but even turned to good

Exit to Foyer from Orchestra Aisle

Stucco, Marble and Polychrome Terra Cotta Are the Materials of the Facade



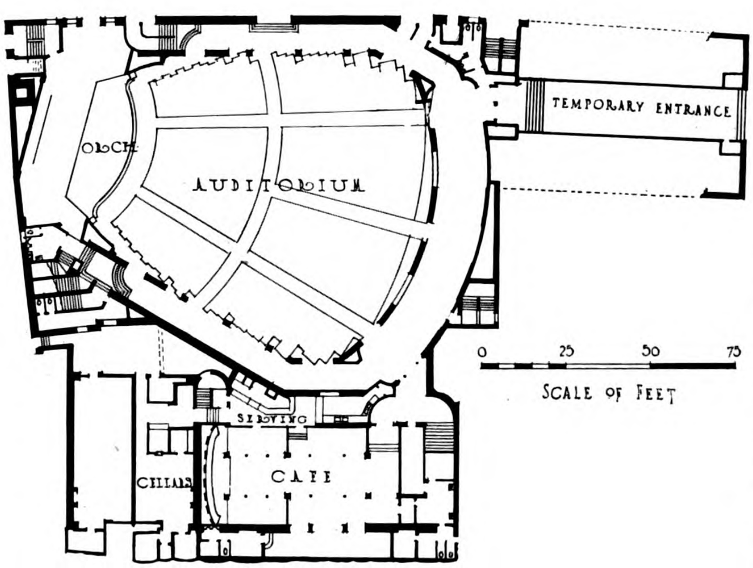
Entrance and Lower Balcony Plan



Upper Balcony Plan

account. The facades of the theater have been worked out in colored marbles and terra cotta which give to the exterior an appearance of festive gaiety which accords well with its purpose. Following in general the traditions of the treatment of cinema theaters it is planned with a deep recess which is set within a facade of marble paneled with broad strips of red marble. Della Robbia panels and plaques in blue, white and green decorate the architrave of black marble which defines the entrance recess.

The lower seating level is reached from the minor thoroughfare; upon this level is also placed (directly beneath the main entrance) the "Ship Cafe," which opens directly from the auditorium foyer which extends around this lower floor. This interesting restaurant is planned as a free rendering of the ward room of an eighteenth century ship of the three-decker type, in all the color of the original. Its decoration suggests the highly colored models of Elizabethan and Stuart ships which are seen in some of the English museums. Its windowed forecastle with the lion and the unicorn is correctly raked to the lines of the ship, and its heavily timbered red ceiling and wall posts painted and toned to a rich blue-green, its thin uprights of Venetian red and its gold and orange panels recall the romance of the days when the foundations were being laid of Great Britain's might upon the sea. The "Ship Cafe" is original in conception, homelike in the luxurious ease of its equipment, and warm and cheerful in its color.



Orchestra Floor Plan

The principal entrance, placed upon a higher level, leads to the upper floor or gallery of the theater proper which is arranged in the usual sloping fashion with a row of boxes or "loges" occupying the space nearest the stage. It is interesting to note that this cinema theater includes the usual boxes at the sides of the proscenium arch, although the present tendency in America is to omit them in the interest of the increased seating capacity which their omission would make possible. Owing to the form as well as the character of the building plot, the auditorium has been given a fan-shape, with each of 3,000 seats having an unob-

VIEW OF BALCONY AND UPPER PART OF THEATER

DETAIL OF PROSCENIUM AND STAGE

REGENT THEATER, BRIGHTON, ENGLAND

ROBERT ATKINSON, ARCHITECT

View of Box and Orchestra Foyers from Stage

structed view of the entire stage at all times.

Color is not often sufficiently employed in theaters of any kind, and yet nowhere more than in buildings devoted to public amusement is it so necessary to create the atmosphere of lightness and gaiety which the wise use of color gives. The auditorium of the Regent Theater affords a striking illustration of the value of mural decoration in a place of public amusement. In addition to the use of rich mural painting by Lawrence Preston about the proscenium arch the box foyer contains a series of "Columbine" panels by Walpole Champneys and three large allegorical paintings representing the "Spirit of the Carnival" by Walter Bayes, paintings subdued in color to agree with the architect's general scheme of color, but gay and fantastic and admirably adapted to the purpose which they serve, executed with a delicacy of touch, a subtle imagination and a mastery of color. When fully lighted the interior of the theater presents an appearance of great warmth, comfort and brilliance, the prevailing color being a rich orange upon which are panels in rich and contrasting colors which lead up to the increased richness of the decoration about the proscenium arch.

Directly above the main entrance to the theater and opening from the balcony foyer is what is known as the "Regent Restaurant," arranged in the manner of the Italian renaissance of the sixteenth century and lighted from the large windows within the recess of the facade. The ceiling is richly coffered, colored and gilded and the walls are covered with plain saffron colored hangings. The kitchens and pantries which serve the "Regent Restaurant" above the main lobby, and the "Ship Cafe" directly beneath the same lobby, are placed in the upper story of the building, connected with the restaurant floors by dumb waiters. The entire roof of the theater is arranged as a Winter Garden, commanding a view of the English Channel with the French coast plainly visible on clear days. This Winter Garden is arranged to seat over 1,000 persons, is provided with a spring floor for dancing and is adorned with pergolas, trellises and fountains.

The Regent Theater presents certain interesting details of engineering and involved calculations for girders to support a Winter Garden of 90-foot span, and the planning of enormous cantilevers to support the upper seating floor; the installation of a plenum heating and ventilating system, which meant forcing 100,000 cubic feet of warm air per minute into the structure, and with extraction ducts planned to direct the sound waves from the orchestra to the recesses of the auditorium.

Regent Restaurant on Balcony Promenade Level

Overlook Colony

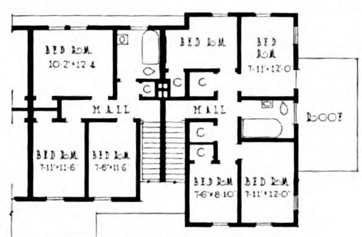
A HOUSING DEVELOPMENT AT CLAYMONT, DELAWARE

COFFIN & COFFIN, ARCHITECTS; JOHN NOLEN, LANDSCAPE ARCHITECT

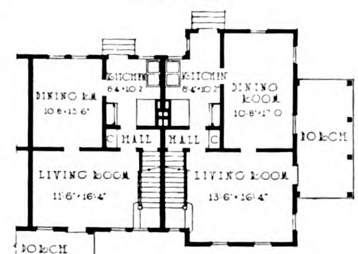
THE building of a town is a project that has an instant and attractive appeal to the architect. With a given plot of ground having interesting contours, wooded portions and possibly a stream or small body of water, the opportunity for play of the imagination is great. The problem of design, however, is no simple task; the pitfalls are many, and surprisingly disappointing results may occur in vistas, grouping, color, massing, scale and other important factors that cannot be readily foreseen in the single plane of a drawing. Town planning and housing involve many angles that are not encountered in the design of a single building, however complicated. It is, furthermore, a comparatively new service that architects are called upon to give; town planning in this country, particularly in connection with large groups of houses, was little thought of before attention was so forcefully directed to housing by war conditions.

It is perhaps not surprising that of the many developments created during the war, under both government and private auspices, it is only the occasional instance where success in all the elements of town planning is found. There is first required a spirit of intelligent co-operation between town planner and architect; one cannot dominate; concessions must be made by each with the final use and appearance of the completed village constantly in view. A real difficulty in many cases is the handling of very small individual units of building imposed by the general preference of Americans for individual, single-family houses. Because of economic conditions they must be made as small as possible, which hampers the architect not alone in the design of the individual house but in obtaining satisfactory grouping, because of the usual absence of any large masses.

The housing development of Overlook Colony, the property of the General Chemical Company at Claymont, Delaware, has many unusual points of interest about it that make it an excellent example of modern



Second Floor Plan

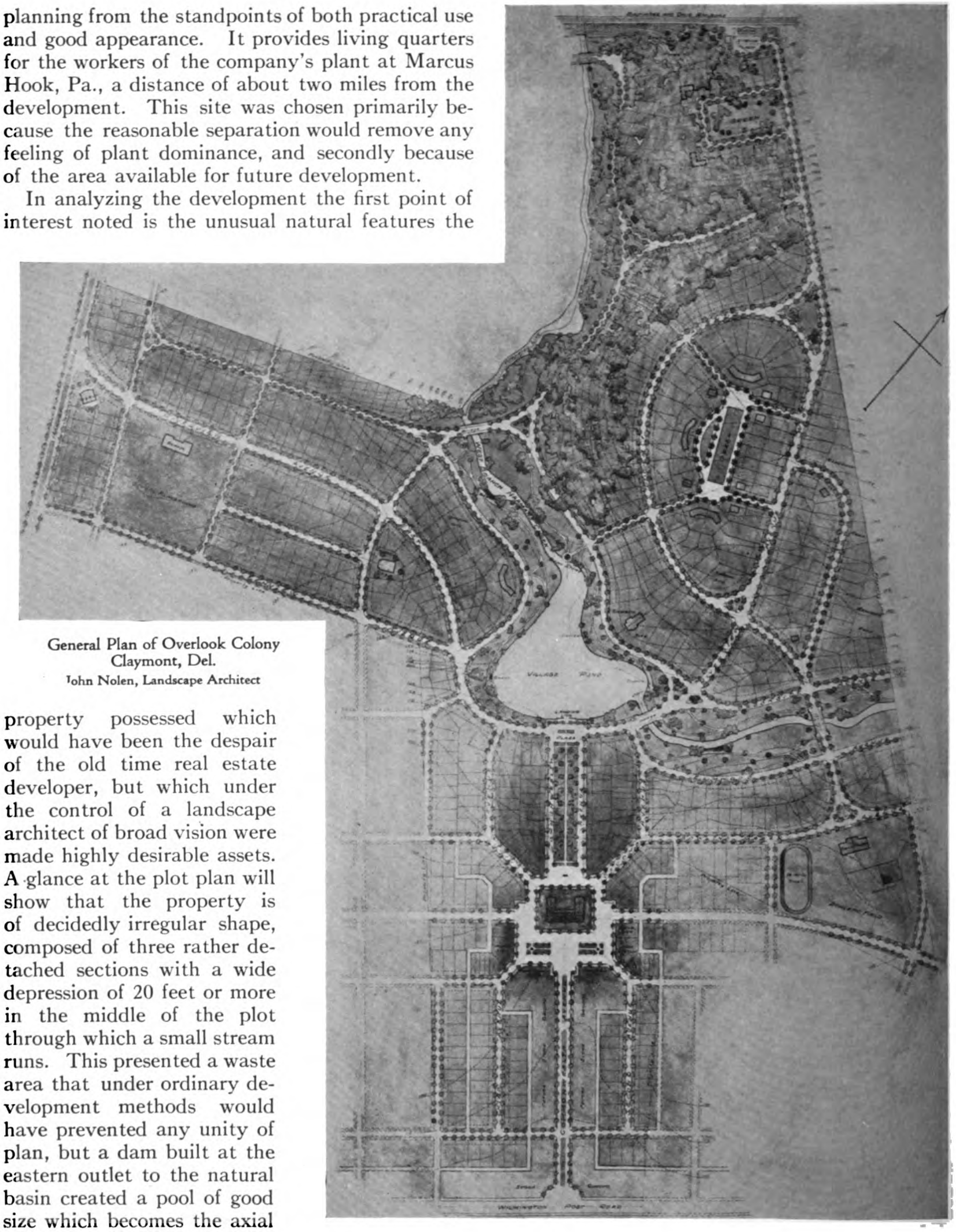


First Floor Plan

Inside and End Houses of Group Below

An Attractive Turn in the Road with a Group of Four Six-Room Houses at the Right planning from the standpoints of both practical use and good appearance. It provides living quarters for the workers of the company's plant at Marcus Hook, Pa., a distance of about two miles from the development. This site was chosen primarily because the reasonable separation would remove any feeling of plant dominance, and secondly because of the area available for future development.

In analyzing the development the first point of interest noted is the unusual natural features the property possessed which would have been the despair of the old time real estate developer, but which under the control of a landscape architect of broad vision were made highly desirable assets. A glance at the plot plan will show that the property is of decidedly irregular shape, composed of three rather detached sections with a wide depression of 20 feet or more in the middle of the plot through which a small stream runs. This presented a waste area that under ordinary development methods would have prevented any unity of plan, but a dam built at the eastern outlet to the natural basin created a pool of good size which becomes the axial feature of the scheme; the roads skirt the stream and pond with the grassy slopes of the water side left free of buildings, thereby providing park space attractive in itself and accessible from all portions of the village. This community feature was furthermore obtained at the minimum of cost and without the sacrifice of any land that might have been profitably devoted to building sites. It is an excellent example of the transformation of a seemingly serious handicap into a community asset.

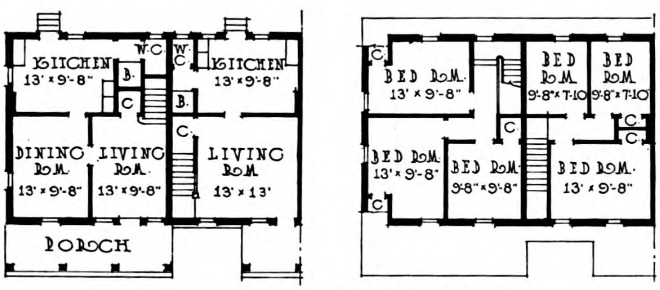


General Plan of Overlook Colony
Claymont, Del.
John Nolen, Landscape Architect

The topography of the land determined the character of lot divisions, the layout of streets and to a large extent the house types. The southern portion is comparatively level and has been arranged with straight streets with diagonal roads leading to the central square and developed in block fashion with attached houses. The other portions are of more irregular contour and in parts are quite thickly wooded; the roads have been made to conform to the natural site conditions, and this area of more picturesque appearance has been reserved for single and semi-detached houses of larger sizes than those in the row development. The adoption of the attached house in blocks is a distinct architectural asset because of the greater unity afforded; it was chosen particularly, however, for its success in meeting local conditions; the people in this vicinity are accustomed to living in the row type of house such as is found in Wilmington and Philadelphia and it is therefore preferred by them; from the standpoint of cost it is likewise desirable because it is economical in regard to construction, use of land and improvements, besides being easier to heat and costing less to maintain.

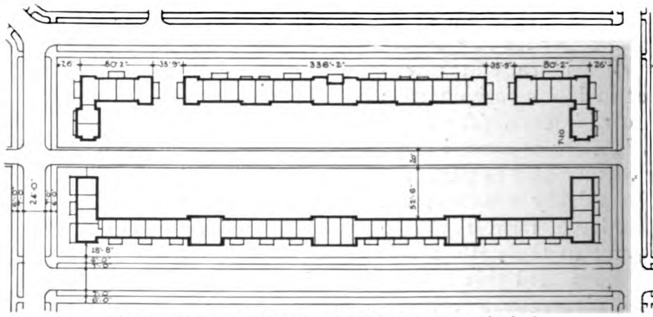
View at Intersection of Streets Showing Continuation of Houses

These houses were all built during the war period and a number of types of construction were used, due chiefly to the exigencies of building during that time. There are 196 dwellings, a community garage, a boarding house, and a community building which contains an auditorium, stores and office and apartment for the superintendent. Monolithic concrete construction was used for 75 of the houses. Ordinarily stone or gravel would have been employed as the coarse aggregate in the



First and Second Floor Plans of Typical Five-Room Houses

View of One-Half Block Facade of Five-Room Houses with Above Plan
Coffin & Coffin, Architects



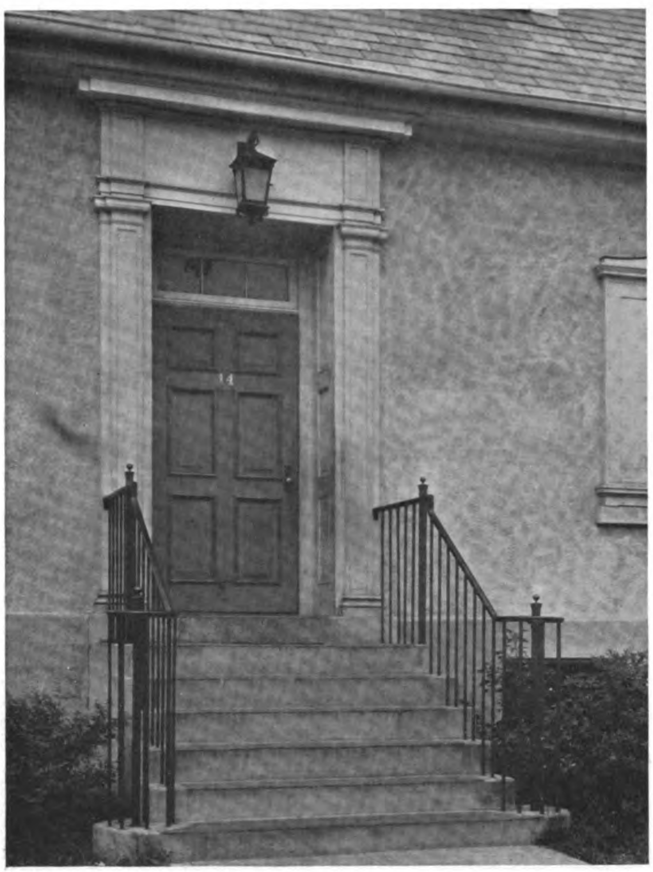
Arrangement of Houses and Alley in a Typical Block

concrete, but due to difficulties involved in transportation the architects were obliged to turn to the use of soft coal cinders, a waste material at the company's factory, but which after sufficient testing was found to possess the requisite tensile and compression strength and low sulphuric acid content. The use of this material, enforced by circumstances, as so often happens, proved to be highly successful and offered advantages that would not have been present had the architects been unhampered at the beginning. The cinder aggregate made the concrete more porous than the ordinary variety, which eliminated the use of nailing blocks; the builders, therefore, merely nailed the interior furring strips directly to the concrete. On the exterior but one coat of stucco was applied and due to the porosity of the concrete perfect adhesion was secured. In addition to the 75 houses of concrete construction, 52 were fabricated of light pressed steel and then covered with stucco on metal lath, back plastered, the rest of the houses being of brick, hollow tile or frame construction.

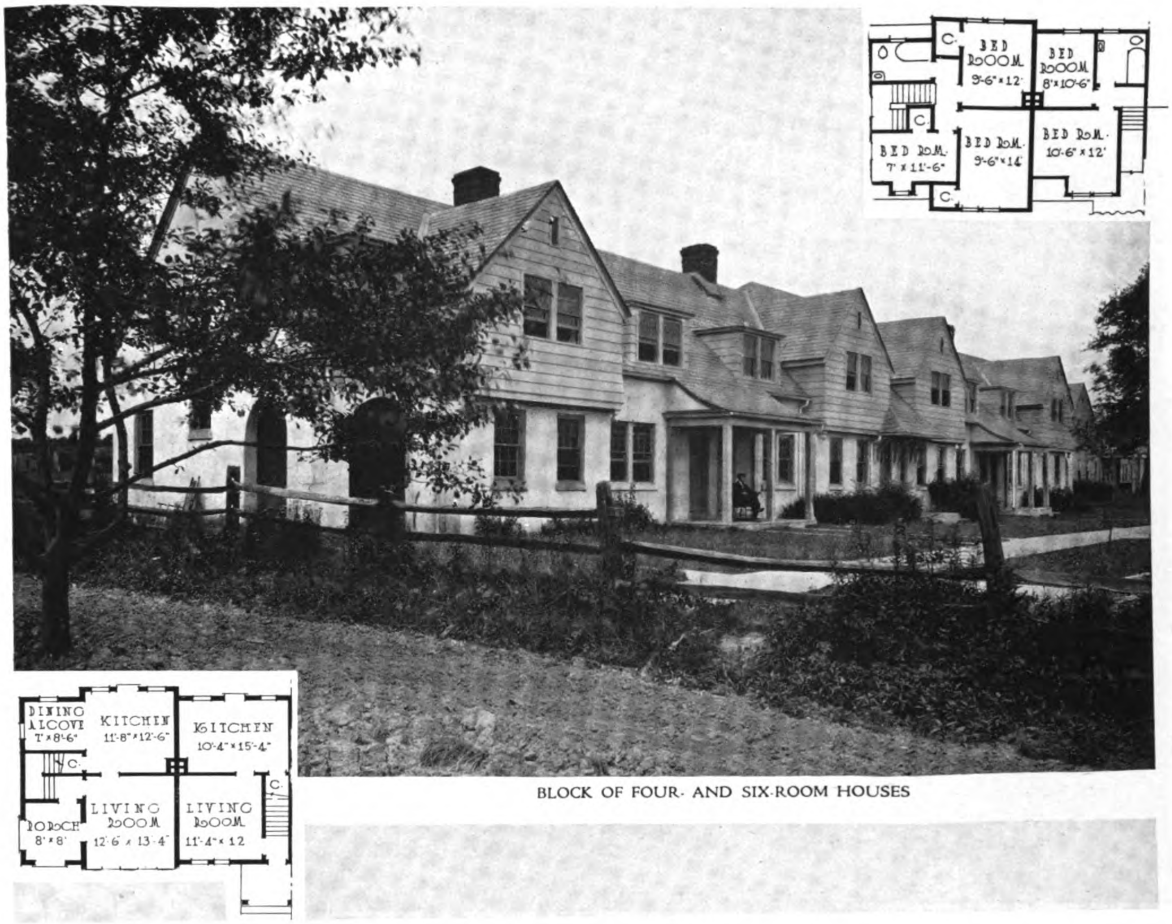
In size these houses vary from four to seven rooms; all are provided with modern bathrooms and are heated by either hot air furnaces or by steam from a central heating plant. The larger houses were planned so that the stairs run parallel with the rake of the roof which enabled the architects without any loss of space to form the dormer windows and, therefore, secure the low appearance which is the distinctive feature of the houses and particularly appropriate to their location.

In planning Overlook Colony the architects have thought it wise to adhere to no one definite architectural style, feeling that such a development if carried out in one particular type would lack the spontaneity which affords an element of such interest in many small towns which have developed naturally.

The variety and interest of the buildings in Overlook Colony are due in a large measure to the moderate but pleasing use of color in the building materials. Most of the stuccoed houses are finished with a mixture of white cement and yellow sand, which gives rather a warm effect, and differences were obtained by several surface finishes. The stucco over the cinder concrete houses was applied in one coat in a very rough manner, showing the sweep of the trowel, and it proved more effective than the three-coat work where a smoother effect was secured. The horizontal siding of the wood houses was painted white with a small amount of yellow ochre added to counteract the cold blue-white of most newly painted woodwork. The vertical siding covered with battens is cypress and was stained a silver gray, which gives the appearance of wood which has weathered naturally and combines satisfactorily with the light toned stucco below. Trim on the houses entirely of stucco or brick is of varied colors—light brown, cream and light green predominating. The roofs throughout the colony are of slate, chiefly a fading sea green Vermont slate, although some houses are roofed with Vermont purple, others with Pennsylvania black and many with all three.



Detail of Entrance to Community Building
Coffin & Coffin, Architects



BLOCK OF FOUR- AND SIX-ROOM HOUSES

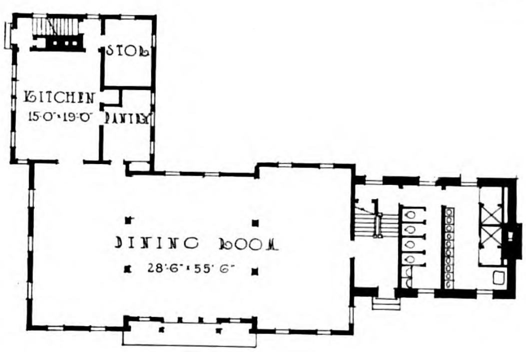
BLOCK OF FOUR-ROOM HOUSES

HOUSING DEVELOPMENT, GENERAL CHEMICAL COMPANY, CLAYMONT, DELAWARE

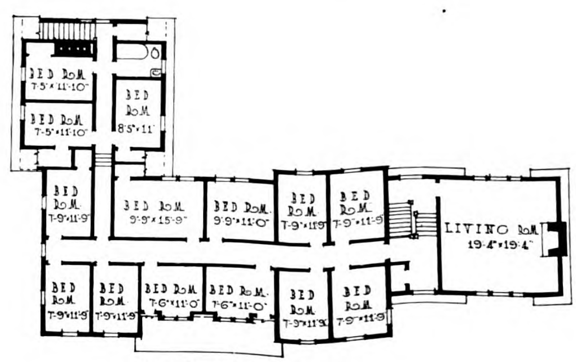
COFFIN & COFFIN, ARCHITECTS JOHN NOLEN, LANDSCAPE ARCHITECT

COMMUNITY BUILDING

BOARDING HOUSE



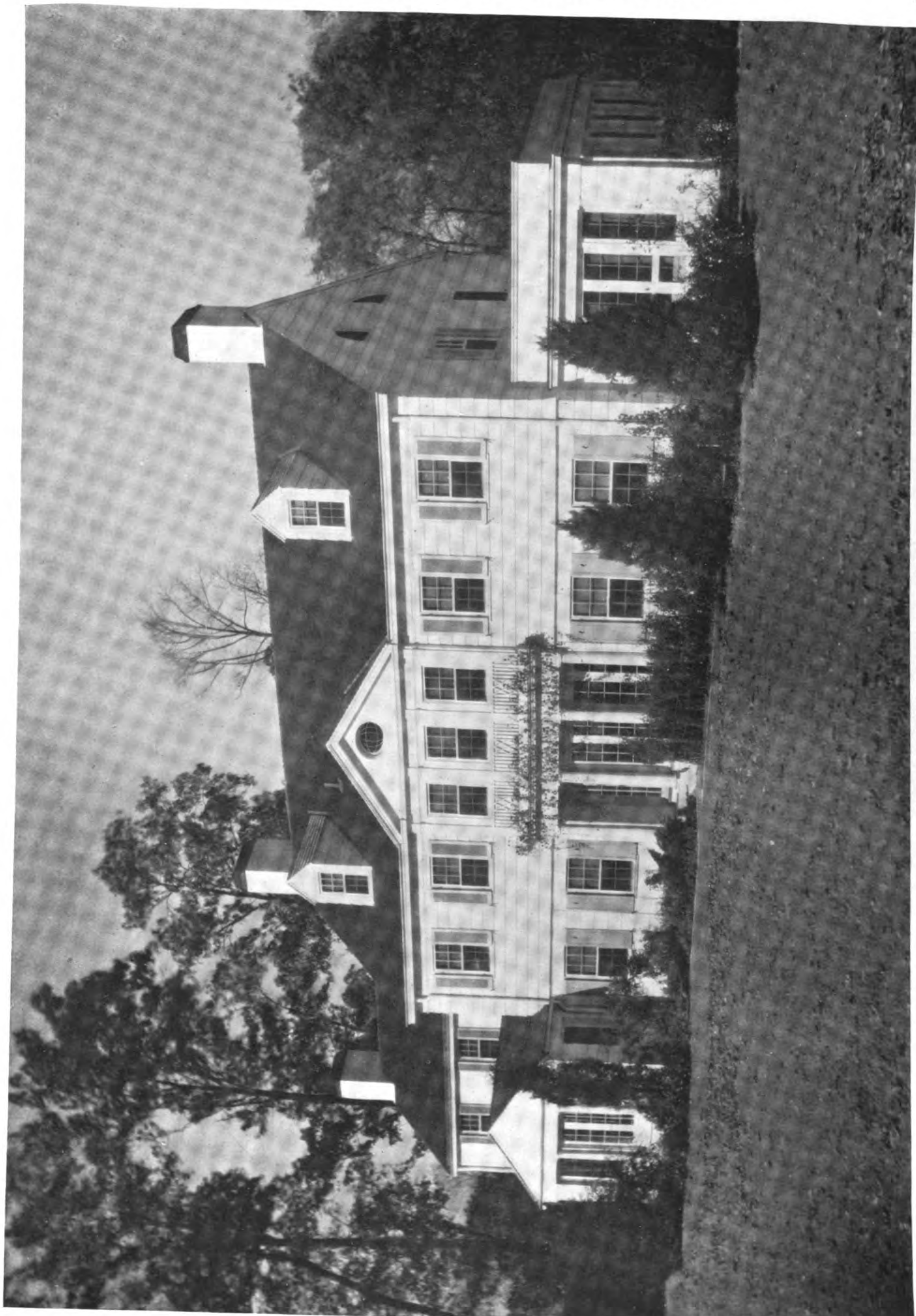
FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSING DEVELOPMENT, GENERAL CHEMICAL COMPANY, CLAYMONT, DELAWARE

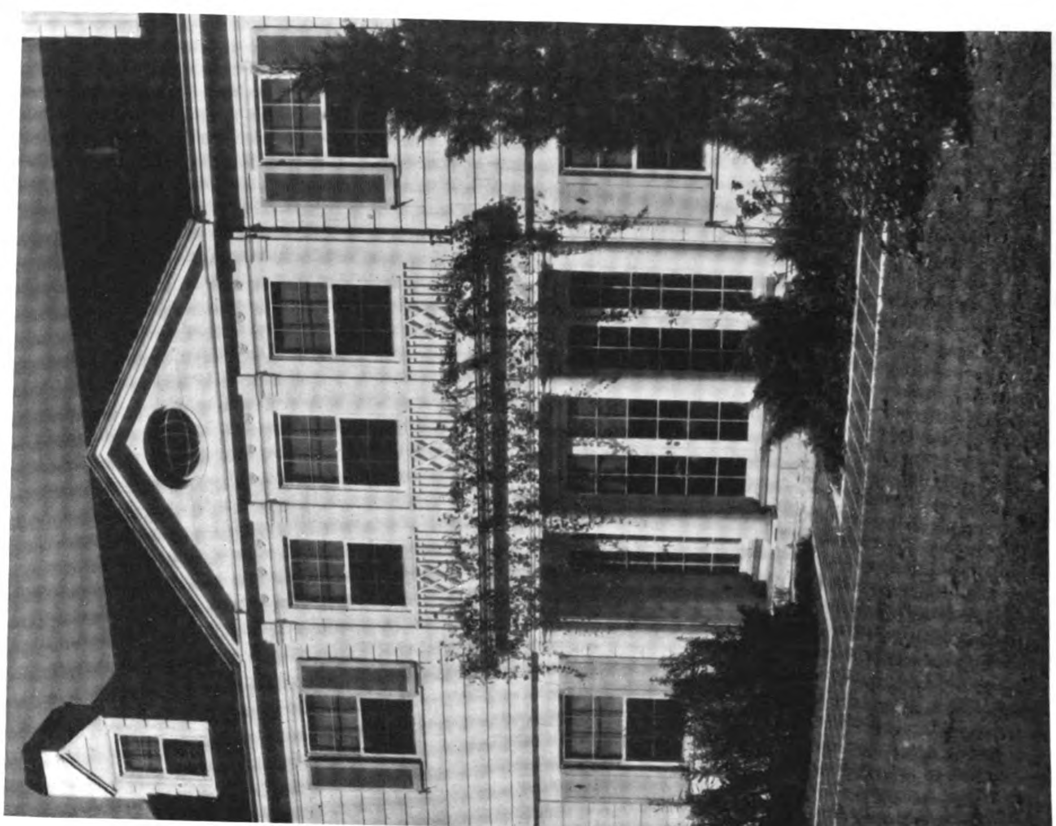
COFFIN & COFFIN, ARCHITECTS JOHN NOLEN, LANDSCAPE ARCHITECT



GENERAL VIEW OF GARDEN FRONT

HOUSE OF JAMES R. VAN DYCK, ESQ., HACKENSACK, N. J.

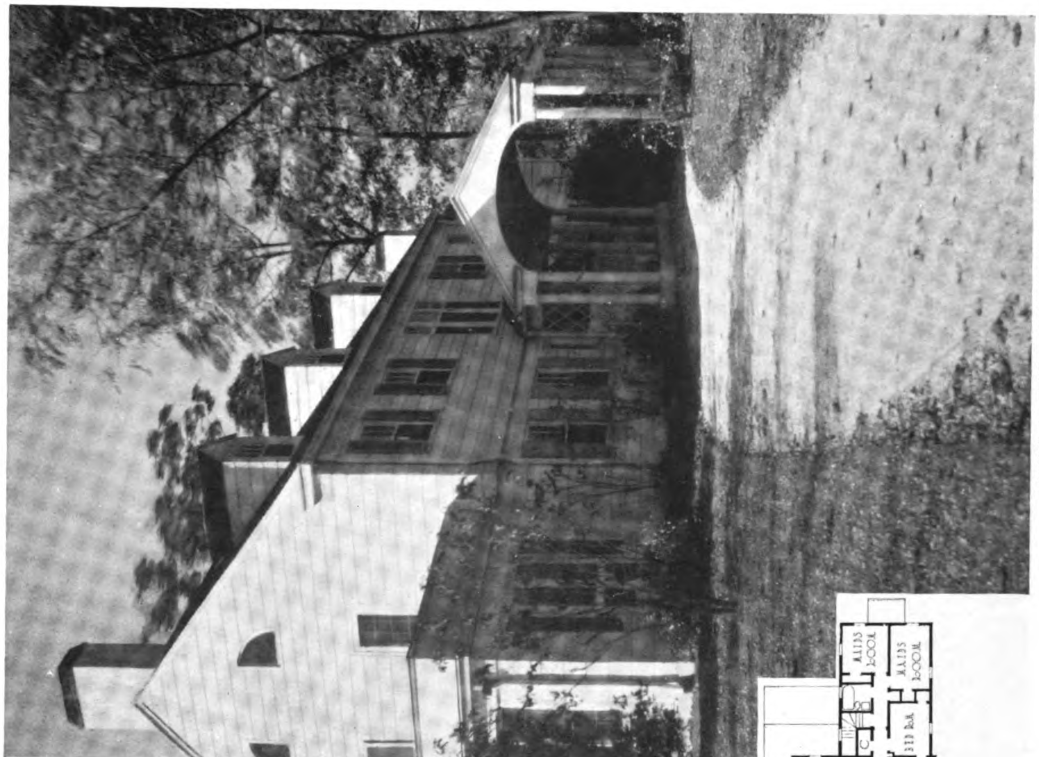
AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS



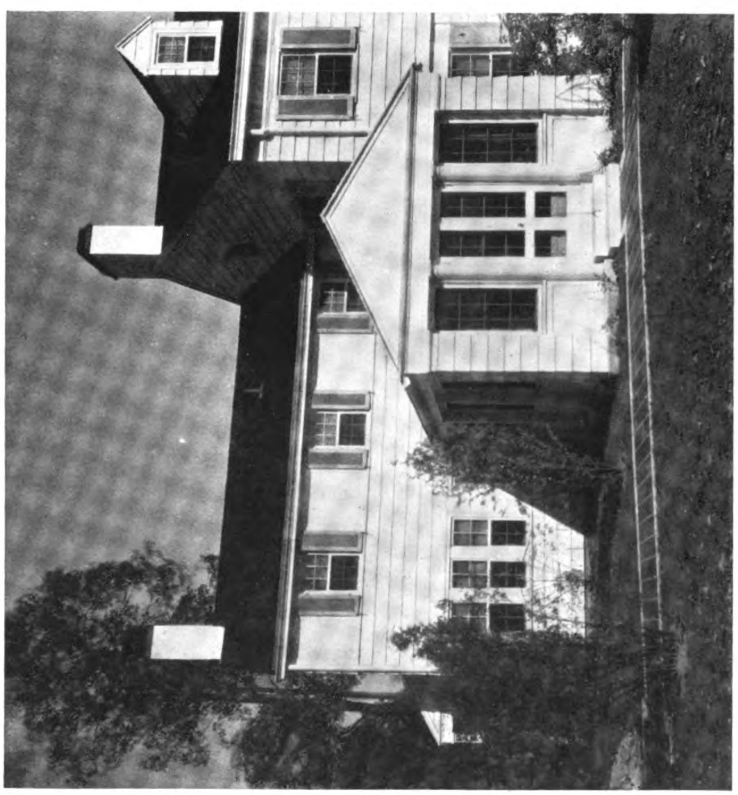
TWO DETAILS OF GARDEN FRONT

HOUSE OF JAMES R. VAN DYCK, ESQ., HACKENSACK, N. J.

AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

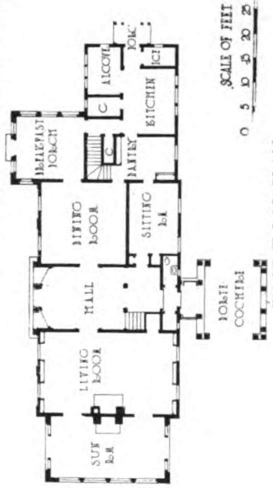


VIEW OF ENTRANCE FRONT FROM DRIVE



BREAKFAST PORCH AND SERVICE WING

SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF JAMES R. VAN DYCK, ESQ., HACKENSACK, N. J.

AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

GARDEN FRONT

ENTRANCE FRONT

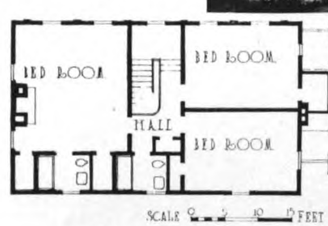
HOUSE OF CHARLES C. WORTH, ESQ., HACKENSACK, N. J.

AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS


SIDE VIEW


DOORWAY

FIRST FLOOR PLAN



SECOND FLOOR PLAN

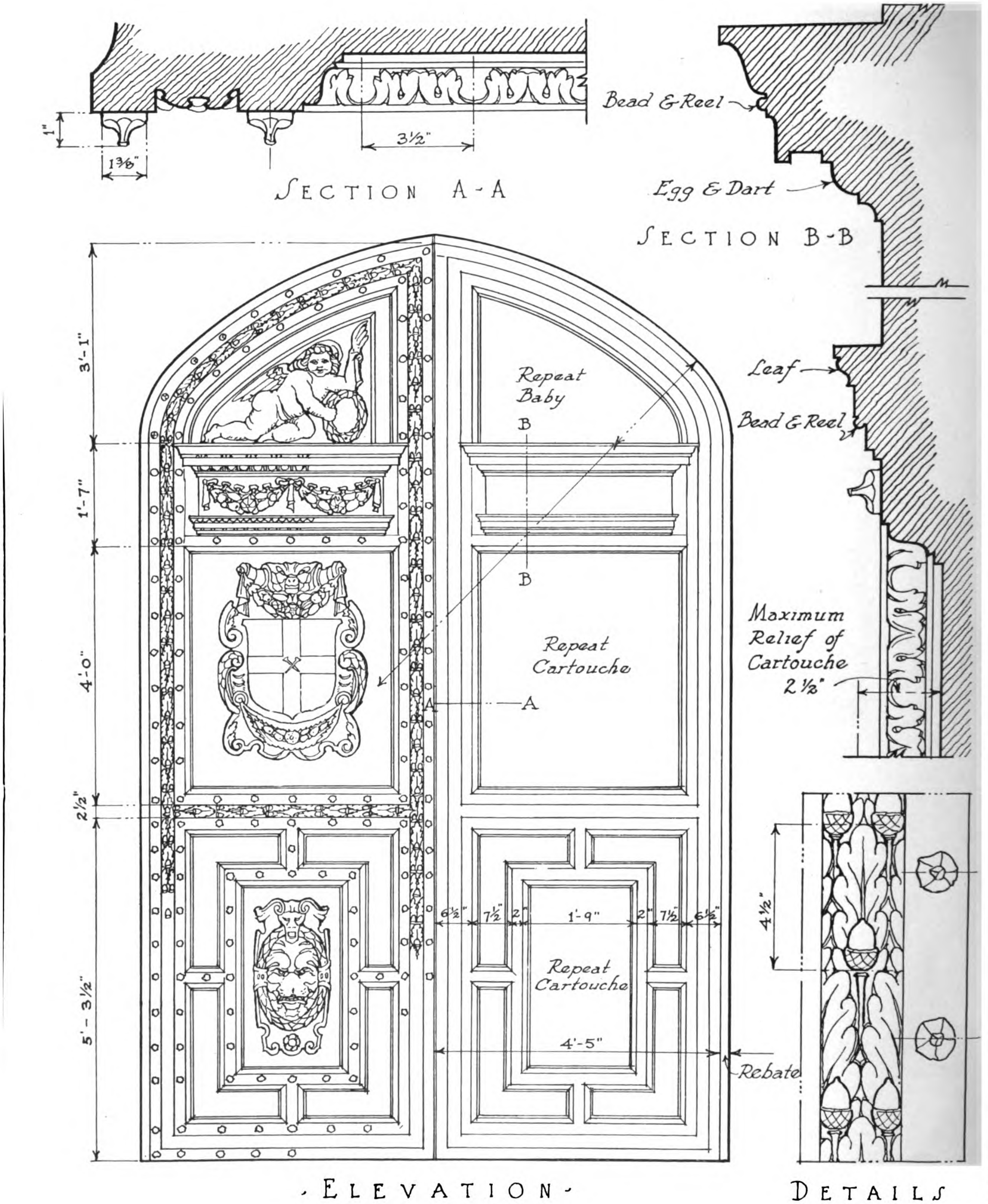
HOUSE OF CHARLES C. WORTH, ESQ., HACKENSACK, N. J.
AYMAR EMBURY II AND LEWIS E. WELSH, ASSOCIATE ARCHITECTS

ENGLISH RENAISSANCE DETAILS

TWO MEASURED DRAWINGS BY HOWARD MOÏSE

OAK DOORS, CHRISTCHURCH GATE
CANTERBURY

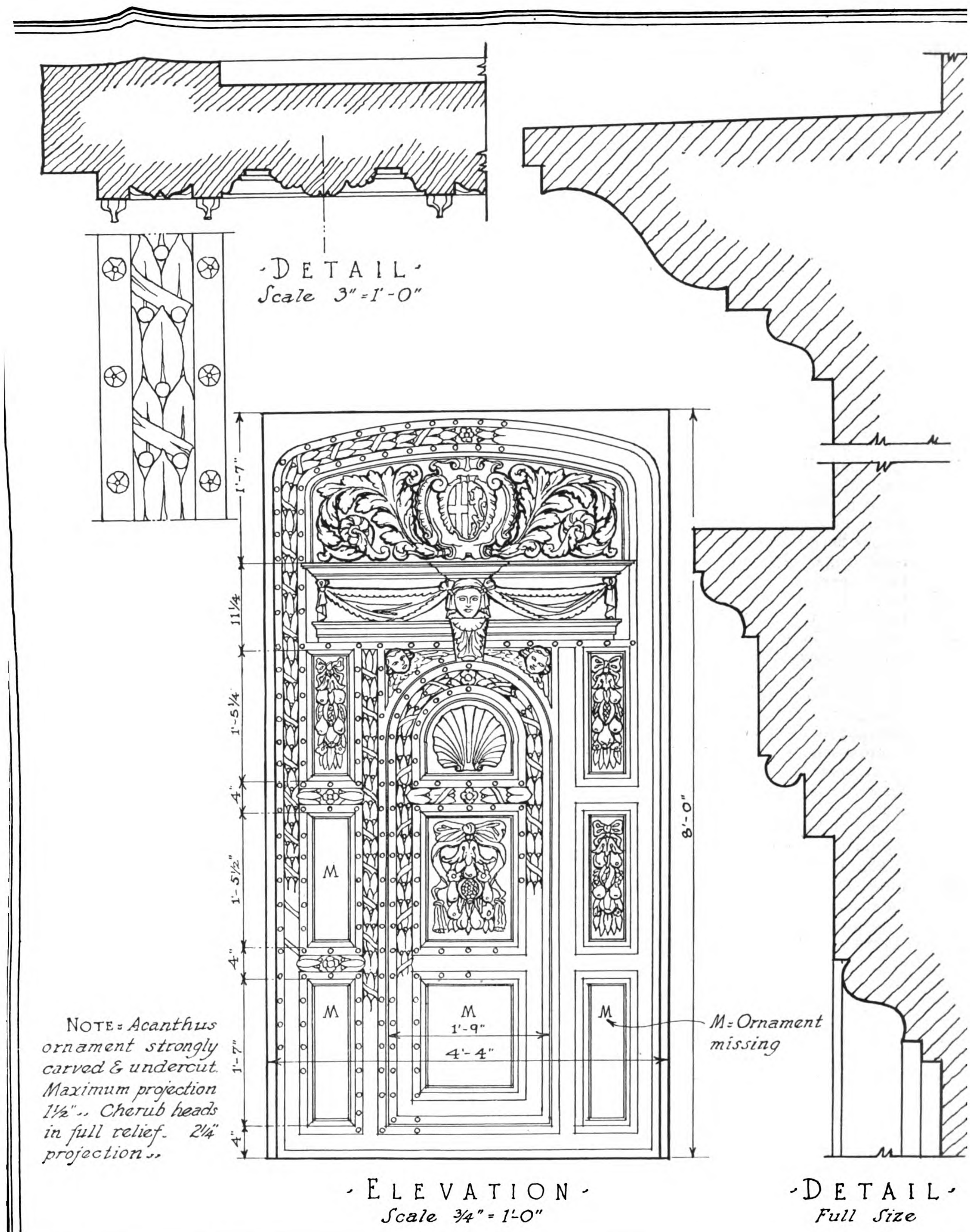
CHRISTCHURCH GATE, the principal entrance to the precincts of Canterbury Cathedral, is a stone gate tower erected by Prior Goldstone in 1517. It is late Perpendicular in style and pierced in its lower story by two Tudor arches which are closed by oak doors of the period of the Renaissance. The doors are similar in character and were probably executed at the same time, but the smaller door has an earlier quality—a certain naiveté—in its design which makes it distinctly the more interesting of the two. The carving is robust in scale and treatment, the relief of the ornament in some of the panels being as high as 2½ inches. It is in this boldness in the relief of the carving that the chief interest of the larger door lies. The effect is very rich and the scale of the detail is admirably suited to the material and the general design.



·ELEVATION·
Scale ½" = 1'-0"

DETAILS
Scale 3" = 1'-0"

ENGLISH DETAILS 1922	·GREAT·OAK·DOORS· ·CHRIST CHURCH GATE·CANTERBURY·	MEASURED and DRAWN by HOWARD MOÏSE



ENGLISH DETAILS 1922

·OAK·DOOR·
·CHRIST CHURCH GATE·CANTERBURY·

MEASURED and DRAWN by HOWARD MOISE

EDITORIAL COMMENT

ARCHITECTS' POSITION QUESTIONED

FEW building failures have attracted so much and continued attention to themselves as the Knickerbocker Theater disaster in Washington. The profession of architecture has received its full share of criticism in the affair, and in some quarters the occasion has been seized upon to render some of the periodical condemnation that architects must endure. The building was designed by an architect, and the architectural profession is certainly big enough to meet any just criticism resulting therefrom; it is, however, absurd to condemn architects generally because of an isolated failure to provide adequate service, no matter how serious the consequences of the failure were. This building seems to have had the services of a varied lot of so-called experts, in the truly modern way—but, as is far too often the case with modern building, the controlling and uppermost factor was to cut cost. The architect from traditional association is looked upon as the man in control of the operation and the one on whom final responsibility rests. Yet we learn that the architect's fee was less than that considered necessary by representative architects and by the American Institute of Architects to insure adequate service to the owner. The architect too was influenced by the competitive spirit to reduce the cost of his service to a point which made it impossible for him to give the supervision that should be insisted upon if he is to be held in the position of final authority.

The *Engineering News-Record* in its issue of March 30 takes the occasion to ask a few pertinent questions of the profession:

> Ultimately a single brain and conscience, the personality of one man, stands back of any structure and guarantees its safety. The architect is that man in the case of buildings. Does he, in fact, assume and fully discharge this responsibility, or is it merely a matter of form? That is the outstanding query resulting from the Knickerbocker disaster, and it is squarely up to the architectural profession to answer it. If the architect's creative responsibility, and the associated guarantee of adequate construction, is a mere historic form, without substance, it is time that the facts were known to all the world and time that other means to guard public safety be provided. If the responsibility is still regarded as real, it is time that steps were taken to make it real. The point at issue is a condition such as is found in the Knickerbocker case—and such conditions, it must be admitted, are far from uncommon—where the architect gives careful attention to the externals, the appearance of his structure, but depends for the vital matter of making the structure safe upon an interested party, namely, a sub-contractor, without even an attempt to check the result. If the responsibility for the safety of a building may be thus divided and farmed out, what is left of the personal and competent answerability of the architect for his structure?

In the first place the *Engineering News-Record* takes an isolated example and on the strength of it makes an insinuation that it is typical of the profession which, of course, is no more fair than would be a similar condemnation of all general contractors.

The architect has a real function to perform, and furthermore one that can be performed best only by the architect. It is singular that so many interests connected with the building industry are so anxious to displace the architect; we are not so kind as to consider this manifestation all in the interests of the client; the position held by the architect is indeed an enviable one, and dominated by commercial ideals one that could be made very profitable. It is quite to the advantage of owners and building investors that the architect retain his traditional position, yet it would seem that he has before him a real job to defend his right to it.

The main difficulty is that many architects are not so well aware of the strategic value of their position as some of their critics. They have permitted steadily lower values to be placed on architectural service till the prospective builder considers the obtaining of plans one of his simplest problems; they can be had from the contractor, or with such keen competition among those eager to serve him the owner can name his own price and generally find a man who calls himself an architect ready to take the job.

There is the real difficulty; other factors that may be pointed out are simply effects of this cause. The architect who has a proper regard for his profession will not prostitute it by affecting to provide a service which any honest man knows cannot be given on an economic basis except for fair pay.

Registration has been suggested as a remedy; it may be effective in disqualifying those who are incompetent, but with the passion of our law makers for "safe legislation" the others will be permitted to continue their careers, possibly lacking the prestige of a title. Registration will not compel a man to demand remuneration comparable with the services expected of him, and the competent can reduce the amount of inspection just as readily as the incompetent if he is forced to make ends meet.

The profession is not without obligation in the matter of improving the quality of architectural service. Legal restrictions will help, but in our opinion the object can best be accomplished by every architect who has the welfare of his profession at heart, extending aid through his professional societies to those who are classed as members of the profession from the public point of view, and inspiring in them respect for their calling which is all that is needed to justify the propriety and good business of the architect's traditional position.

DECORATION *and* FURNITURE

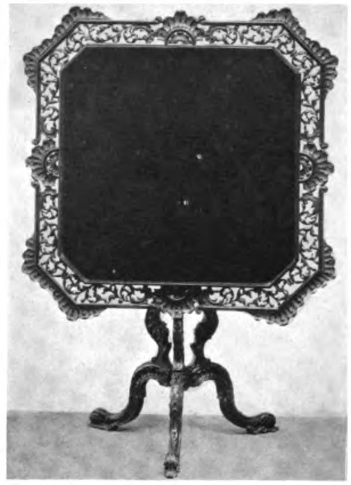
A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

Selected Group of Furniture in Chippendale Style

With Adaptations of French Motifs

Detail of Chair Back in Chippendale's French Style with Bow Top

Chair Backs, Courtesy of Irving & Casson—A. H. Davenport Co.



An Example of Large Tripod Table with Elaborately Carved and Pierced Border

Courtesy of Somma Shop,

Particularly Graceful French Type Ribbon Chair Back with Broken Scroll Top

Courtesy of New York Galleries

A Modern Arm Chair Based on English Version of French Louis XV Style. The Arms Retain English Note

An Original English Chair of Great Refinement in Line and Detail, Closely Following Louis XV Design

Courtesy of Wm. Baumgarten & Co.

Excellent Example of an Original Chippendale Piece Showing His Handling of Small French Bureau

Courtesy of Wm. Baumgarten & Co.

This Piece Exhibits the Characteristic Rich Carving of the Period. Wooden Tops Generally Distinguish English Bureaus from the French, Who Preferred Marble

French Influence on Furniture of Chippendale School

By ROBERT L. AMES

THE enthusiasm with which the architects of the Georgian period followed the principles of the great Palladio in designing their stately, well balanced interiors did not prevent their favoring considerable flexibility in the designing of furniture. The heritage of English design which they found at hand they elaborated and refined, and to this heritage there were added motifs adapted from Gothic, Chinese and French sources. The use of Gothic ornament was something of a cult, affected by but few and quickly abandoned as being manifestly unsuited to English use; the adaptation of Chinese motifs was far wider as applied to furniture, and its use for other accessories has lasted until today; the French, however, was destined to exert a stronger influence than either upon English furniture. The period called for luxury, and English royalty and nobility had as a powerful object lesson the splendor of the French court, where the magnificence of Versailles demanded furniture and other accessories which taxed the ingenuity of even the French designers.

Details of Two English Chair Legs Showing Motifs Derived from the French

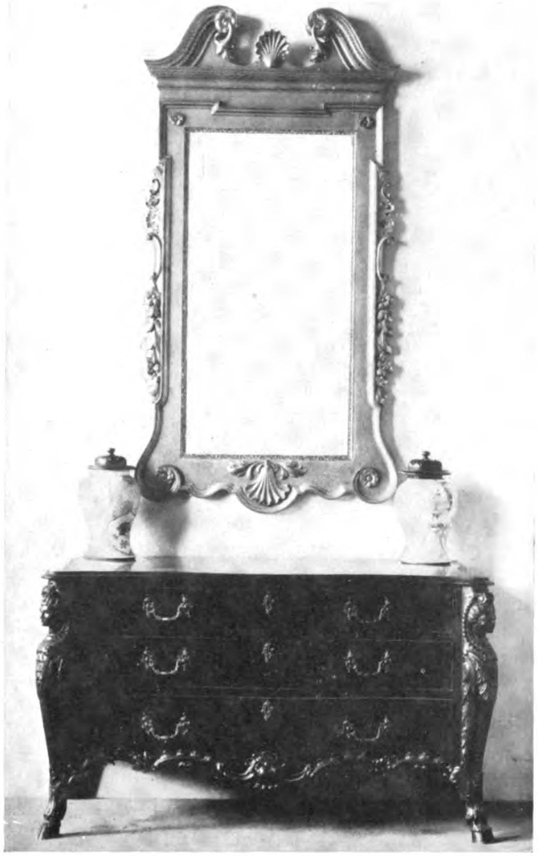
Toward the middle of the eighteenth century the English following of French fashions in dress, furniture, ornament and gardening amounted to a mania, and the English cabinet makers, of whom Chippendale was the most eminent, supplied the demand for furniture in the French taste with an Anglicized version of fashions which prevailed across the channel, in which the spirit of luxury was preserved while considerable modification was made in the form, the chief point of difference being the omission of ormolu mounts, the lack being supplied by the English cabinet makers in the wide use of carving.

Chippendale's vogue was the result of his being possessed of unusual business acumen and considerable skill as a designer and craftsman; the one enabled him to appreciate and cater to the fashion of the times and the other to satisfy the demand with furniture which would also increase his prestige as a cabinet maker. His following of French design was particularly marked in his chairs, sofas, commodes and mirror frames and in his girandoles or candle brackets. While his designs show that he followed and adapted the styles of both Louis XIV and Louis XV, his dependence was less upon the heavy, massive manner of the earlier reign and far more evident in his lavish use of rococo. English furniture makers even before the time of Chippendale had lightened the heaviness of the vase-shaped splat of the Queen Anne chair, but now the chair was given the utmost delicacy and grace, and in the more pronounced following of the French the splats were carved

Modern Reproduction of English Ribbon Back Chair in French Style
Courtesy of Irving & Casson—A. H. Davenport Co.

Side Table in Chippendale Style with Restrained French Detail
Cooper-Williams, Inc., Decorators

An Original Chair in Chippendale's French Style from Metropolitan Museum



A Mahogany English Commode Showing Excellent Type Rococo Ornament at Base

Courtesy of W. & J. Sloane

out with designs of fluttering knots of ribbon, the same motif, or some other detail equally graceful, being carved out upon the narrow framework about the seat and continued down the slender cabriole legs which terminated in scroll feet, the entire chair possessing an almost feminine delicacy, made practical only by Chippendale's skill as a cabinet maker in giving it the necessary structural strength. Chippendale's chairs illustrate more fully than his other furniture the extent of his indebtedness to French design. To the form of the seat itself he sometimes gave a slightly serpentine front, and two added details are his use of upholstery upon the arms of his armchairs and the design of the arm itself which was given a graceful, sinuous curve, following Louis XV forms, often continued in flowing lines into the cabriole leg below.

In his stuffed sofas Chippendale followed the French types almost literally; the backs are given a bow shape or else they consist of single long, convex curves, the ends turning outward in the form of a C-curve above a short cabriole leg. Ordinarily the front would be given four legs, the outline of the seat being given the usual C-curve and adorned with *coquillage*. As a variation to this type of sofa he used a more reserved Louis XIV type with straight, tapering legs attached to a straight front, the austerity of the lines being relieved with festoons of drapery carved from the wood. Chippendale's sofas were often designed with a bolster and pillows at each end and cushions at the back. His sofas as well as his chairs were covered with tapestry, damask, needlework or else with red morocco which he especially recommended for his ribbon-back chairs, upon which he based his chief claim to fame, and these coverings were held in place by brass nails, sometimes in one row and sometimes in two, set closely together, which gave an added suggestion of luxury when mahogany was the wood used. The wide use of the lion mask or of human masks upon the knees of cabriole legs of chairs, and of tables as well, was adapted from the French of Louis XIV.

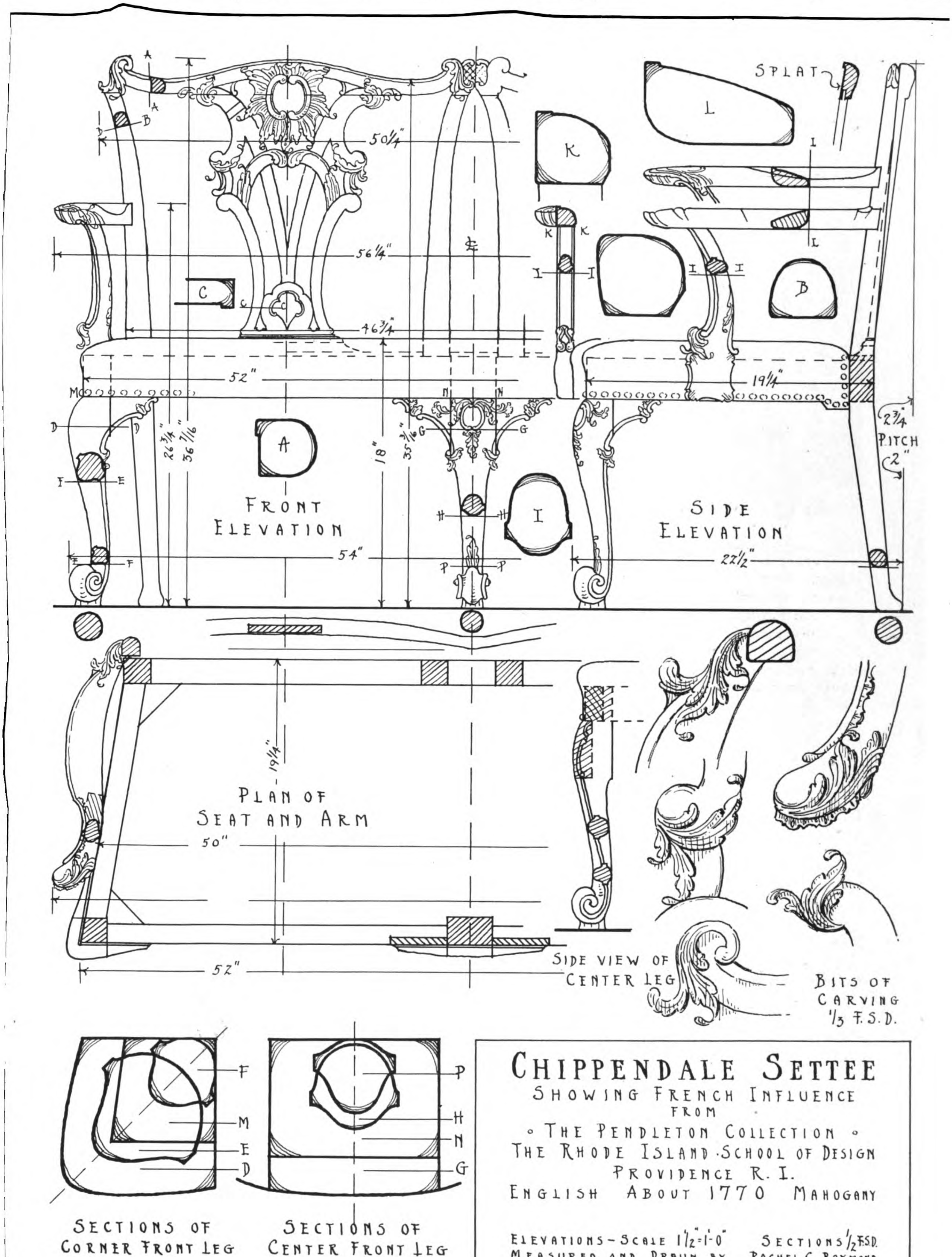
Chippendale was particularly successful with his chests of drawers mounted upon low cabriole legs, which in his book he refers to as "French commode tables." They display *bombé* and other forms of front and are closely patterned after the French

A Sofa in Chippendale Style Showing Typical Mask Carving and Scroll Feet on Legs; Covering in Needlework

Courtesy of Bristol Company

Modern Arm Chair Designed on Restrained French-English Lines

Courtesy of Nahon Co.



CHIPPENDALE SETTEE

SHOWING FRENCH INFLUENCE
FROM
◦ THE PENDLETON COLLECTION ◦
THE RHODE ISLAND SCHOOL OF DESIGN
PROVIDENCE R. I.
ENGLISH ABOUT 1770 MAHOGANY

ELEVATIONS – SCALE 1½"=1'-0" SECTIONS ½ F.S.D.
MEASURED AND DRAWN BY RACHEL C. RAYMOND.

Dining Room with Dignified Arrangement of English 18th Century Furniture. Side Table Modeled on Chippendale's Handling of Louis XIV Motifs. Francis H. Bacon Co., Decorators

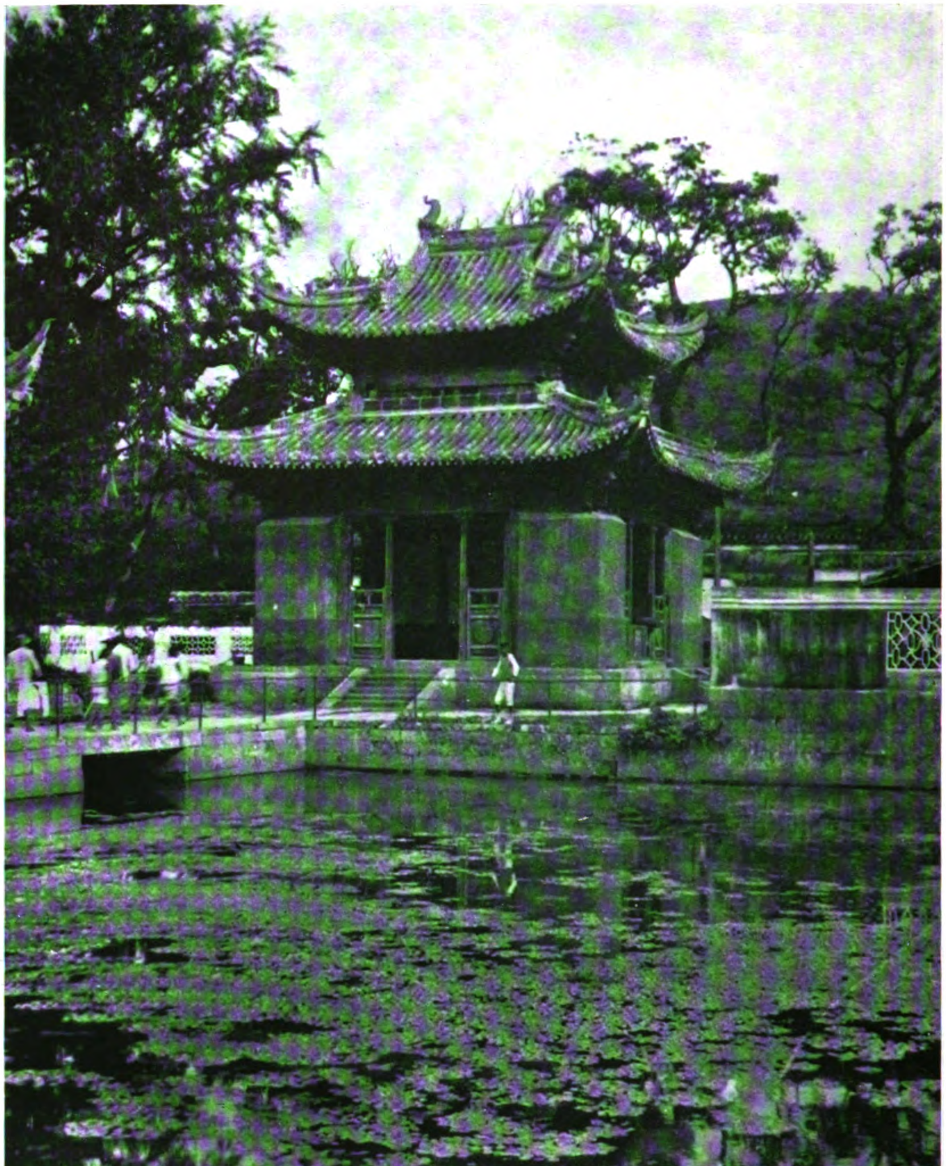
shapes. Sometimes doors were used instead of drawers, which brought a closer conformity to the commode form. His heavier pieces of this kind, while often retaining the swelling or serpentine front, rest upon moulded feet of ogee shape instead of upon cabriole legs, and the corners are canted and carved in pilaster forms. While his work is associated in the popular mind chiefly in connection with the use of mahogany, much of Chippendale's furniture was gilded in the French manner and sometimes painted. The French interior of the period was rich and sumptuous, color being used upon the furniture no less than upon walls, and color was also used in a restrained form upon the furniture which English cabinet makers were adapting from the French.

For his mirrors and girandoles Chippendale adopted the extreme of French *rocaille* motifs, based upon the style popular during the reign of Louis XIV and abounding in use of trophies of war or the chase, ruined columns and musical instruments, redeemed, as his mirrors almost invariably are, by a grace and beauty of form which atone for much excess of ornament. His mirrors and girandoles were carved from pine and heavily gilded, with certain portions burnished. Chippendale's skill in the use of French motifs is especially apparent in his simpler and more restrained designs. Being the foremost furniture maker of his time and patronized by a fashionable clientele during a period when luxury and ostentation were universal, he probably felt the necessity of supplying what conditions demanded, often perhaps against his better judgment.

Someone has said that the three factors which made famous the reign of George II were civil peace, mahogany and Chippendale, and it is certain that neither the first nor the second could have produced the result without the help of the third. Much of his work exhibits a strange *mélange* of motifs wholly unrelated, but fused by his genius for design into a form which is but rarely incoherent. His influence upon furniture making is still strong after almost two centuries, and the type of furniture known by his name seems destined to popularity as long as the furnishing and decoration of houses is practiced.

The usefulness of adaptation from French sources by modern architects and decorators, like use of Chinese motifs, lies in giving greater richness and freedom to Georgian interiors, which are sometimes in need of this modifying influence in preventing stiffness or over-reserve. It supplies a means of adding variety without introducing confusion.

Chippendale Settee Showing French Influence
From the Pendleton Collection, Providence; Measured Drawing on Preceding Page



PAVILION ON THE ISLAND OF PO TO, NEAR SHANGHAI

The sturdy walls are of deep red stucco and the roof covered with old iridescent yellow tile, while the eaves, with their carved bracket forms, are in a bizarre variety of strong colors.

Photographed by Edwin L. Howard

The ARCHITECTURAL FORUM

VOLUME XXXVI | JUNE 1922 | NUMBER 6

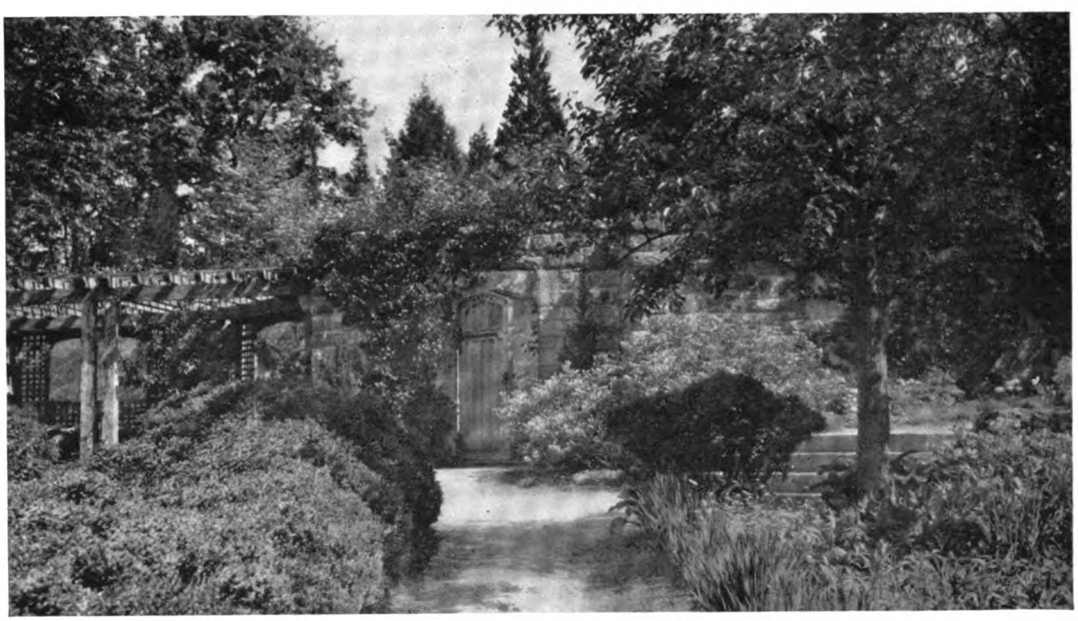
Garden Design

SOME INFLUENCES AND OPPORTUNITIES

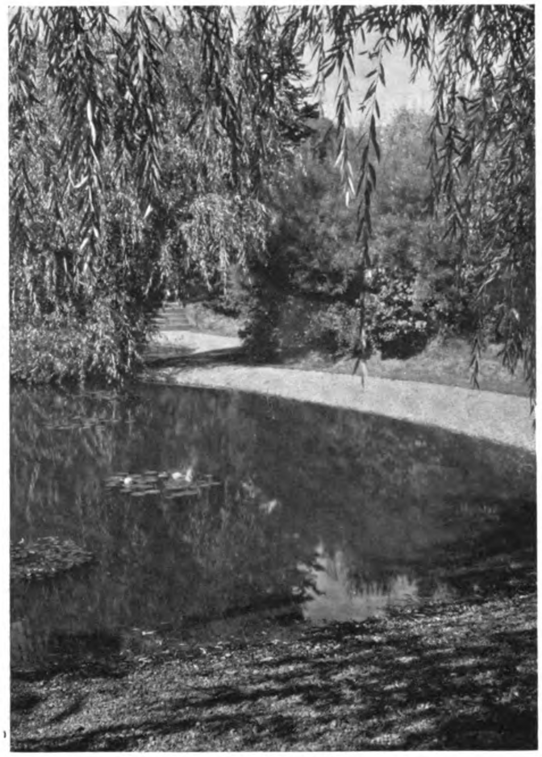
By EDWARD CLARK WHITING, *of Olmsted Brothers, Landscape Architects*

THIS article makes no attempt to cover the whole broad field of garden design. It has little direct relation to public parks or to the larger elements of landscape development, but is merely an attempt to sketch some of the limitations and opportunities which should influence the planner of gardens.—THE EDITOR.

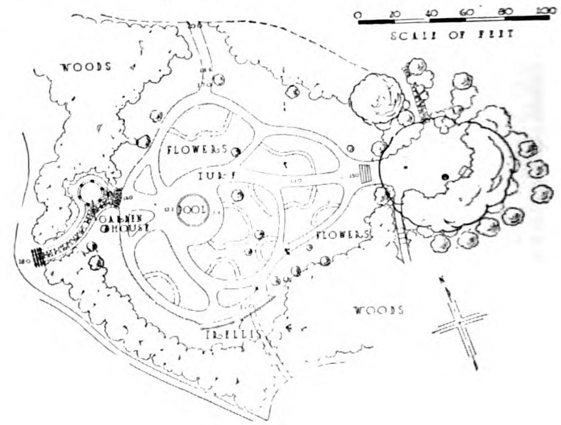
GARDEN design is governed by the same general principles and accepted tenets of composition that apply to every fine art. There must be symmetry or balance; there must be unity; there must be harmony of lines, forms and colors; there may be rhythm; there should be variety, but unlike the tapestry on the museum wall or the "landscape" of Corot, a garden is never a fixed or completed work of art, and it is seldom entirely under the control of the designer. The sun, the clouds, the sky, the enclosing woods and the distant landscape are inevitably parts of the garden composition; living materials, such as flowers, shrubs and trees are the chief mediums of the designer's work—and these are changing from hour to hour, from day to day, from year to year. The garden designer must understand these living qualities of his materials, and he must appreciate the influence of those larger and perhaps more dominating elements of site and environment over which he has comparatively little



That Composite Quality of Light and Form and Color, of Odors and Associations



The Willow Pool
A garden picture of restful beauty and entirely free from architectural control



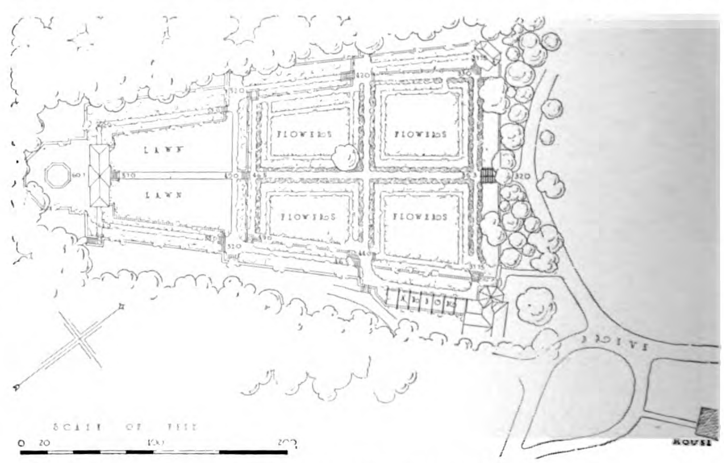
A Free, Informal Garden Plan Suggested Entirely by Environment

control, for it is in both these sorts of conditions that are found the peculiar opportunities of the art.

Financial or other arbitrary restrictions affect the quantity rather than the quality of the work; use and custom are obvious requirements which hardly need elucidation, but the influence of environment is so subtle and varying in the manner and degree of its control that it will bear analysis. For convenience it may be divided into two fields,—the architectural or stylistic influence, usually established by the house, and the influences emanating from the conditions of the site.

If the garden is close to the house, if it is definitely and organically and visibly related to the house, there should be an evident harmony between the two—a harmony of line, form, material and color. And if the house is of a distinctive, well recognized style, the garden should reflect the same historic or geographic precedents. It must be remembered, however, that in the gardens of all times and all places the distinctive style or character has been determined primarily by social habits and customs, by the local conditions of site and by the special plant materials available. And it is for this reason that exotic garden precedents can be followed *only* insofar as they are capable of adaptation to the new conditions of climate, site and social customs. Plant forms and garden ornaments of clearly appropriate character, and the use in both garden and house of architectural details of the same period, together with a certain similarity or sympathy in the units and the scale of the designs are generally sufficient to produce the desired harmony of style or of association. Even under the most exacting conditions of architectural influence the requirements of style are not very restricting. Properly understood, they become little more than a unifying element in the garden design.

The less pronounced the style of the house, the smaller will be its influence upon the style of the garden. Also, the less definite and organic the tie between house and garden, and the more obscure the visible relation between the two, the less influence will the one exert upon the design of the other. But even in the most extreme case of disassociation, a well recognized and pronounced style in the house should be reflected to some extent in the distinctive



Plan of a Garden at Cold Spring Harbor
Entirely independent of the house, but strongly influenced by the dominant conditions of the site

Intricacy in Design, Freedom from Convention in Details, Infinite Harmonies of Form and Color with Lights and Shades — These Enrich a Garden

features of the garden. The importance of this stylistic influence and the extent to which it should be recognized in garden design must in the end depend upon the relative importance or dominance of the house and of such other influences as may be present. There are few cases, however, where it is not worth while to secure some degree of harmony by the use of like or similar elements in the design of both house and garden to bind them in sympathetic relations.

The most frequent, most varied, and usually the most dominating influences in garden design are those of the site. Limitations of a sort, they are at the same time opportunities. They are the opportunities which more than anything else make for the individuality of gardens. Indeed, that garden is very rare which does not show in some degree the influence of the particular place in which it is built.

But what are those conditions of a site which may control or influence a garden? In the first place the available area is often limited in both size and shape, and the garden must be cut to fit. Then there are the ground forms—a flat meadow, a sloping hillside, a rounding hilltop, a valley of gentle slopes or with steep floor and precipitous sides—different in each and every case. Then there are the backgrounds and enclosures—open hillsides, dignified woods of pine or the lighter woods of deciduous growth, individual trees or groups of trees, cliffs, established walls or buildings, in fact any established conditions around the site which must or which may remain to take their parts in the garden scenes. Within the site there may be trees, fully grown and of distinctive character; there may be dignified old box plants and hedges; there may be

Corner of a Garden at Cold Spring Harbor
It is among those gardens conceived in a full and sympathetic understanding of the "genius" of the place that real garden magic is most often found

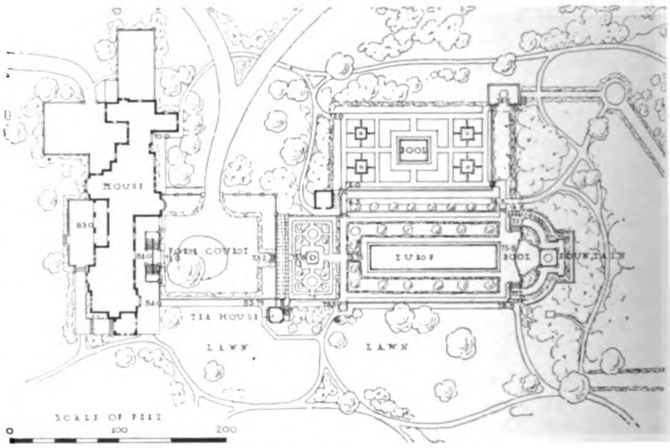
other elements of marked character and association which can be utilized in the garden scheme. Then there are the views of distant landscape, and finally there are the lights and shadows and the subtle atmosphere of established character.

In what manner and to what extent a garden should be influenced by these conditions of the site can hardly be prescribed, but may better be suggested by specific examples. The garden illustrated on plate 95 shows an interesting combination of influences; the architectural details were clearly dictated by the style of the house (Elizabethan), whereas the size and shape of the garden were quite definitely limited by the area available and by the unusually fine trees about it. Impressive as a background, these trees by their size and character clearly dominated the scene, and to avoid conflicts of scale and confusion of interests the flowers, in their intricate details of colors and textures, were placed at either side, while the whole central element of the picture from the house was kept in simple surfaces of turf and water, a foreground for the trees.

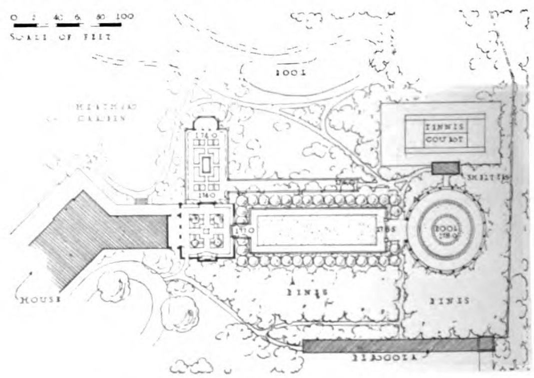
In the ravine garden (plate 93) the relation to the house is obscure, but the house is not far away and its pronounced style—old English Gothic—is reflected in the garden details. The site was a narrow gulch in the edge of the woods and extended from the lawn at the upper end to a terraced vegetable garden at the lower. The straightness of the ravine, a distant glimpse it provided across the city and the fact that it was in a sense a "way" from one part of the grounds to another, suggested a defined axial treatment. The garden is essentially an elaboration of the axis, and needs no other control to give it unity. It melts gradually into the informality of the wooded banks that frame the picture. Water, sunlight and the ever-changing shadows from overhanging trees give it life and atmosphere.

In the garden at Ipswich (plate 94) the strength and dignity of the surrounding woods dictated the simple lines and forms of the garden, and a restrained but well considered use of architectural accents and a careful selection of plant forms have given it distinctive character and interest.

In the garden at Cold Spring Harbor (plan on page 212, illustration on page 213) the old box hedges of a former garden de-



Plan of Garden of J. E. Aldred. House of English Tudor Style

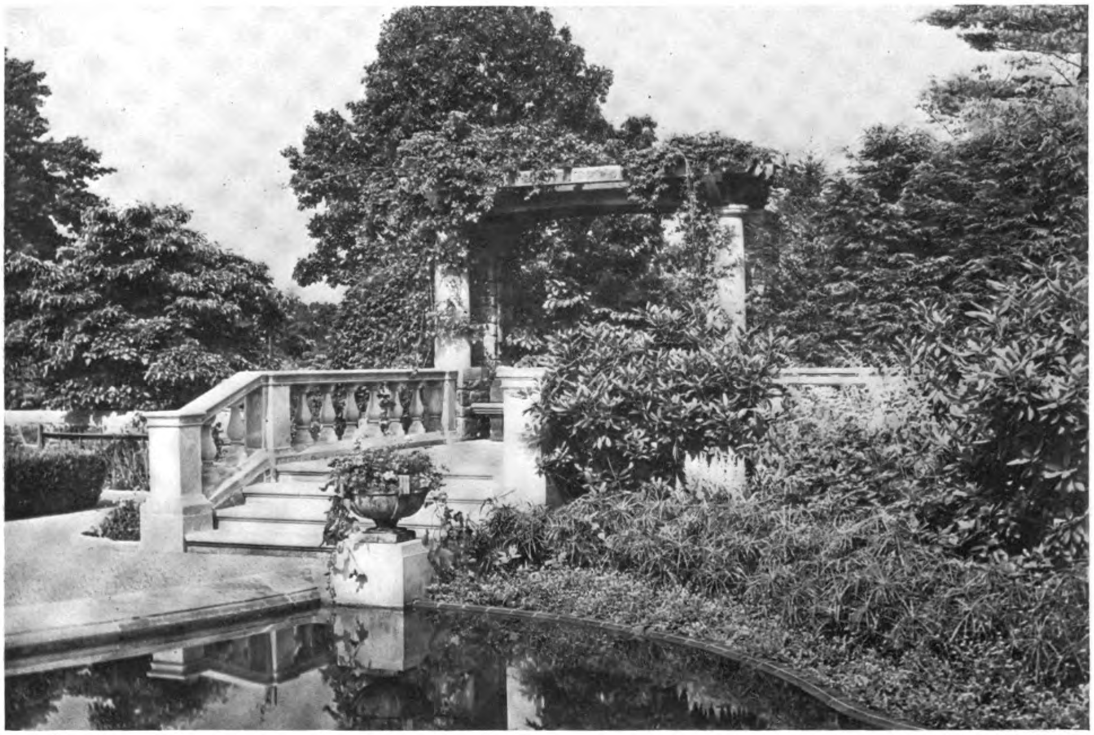


Plan of Garden. House of Free Italian Style

Even under the maximum architectural influence there is unlimited opportunity for variation in the garden plan

The Most Intimate Relation between House and Garden

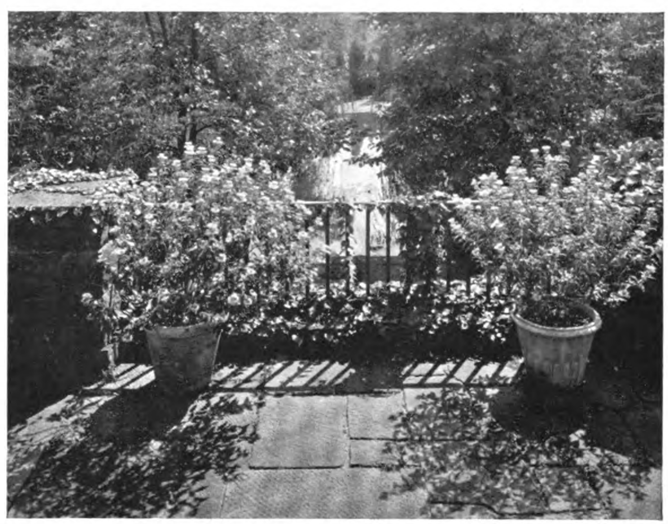
The style of the house is reflected in the architecture, materials and details of the garden, but there is a happy freedom and appropriateness in the planting



Detail in the Garden of J. E. Aldred, Esq.
An interesting composition of quiet water, clean-cut architectural lines and distinctive plant rorms

termined the main axis and cross walks, in fact became the key to the new design. The garden outline and the arrangement of terrace planes were suggested by the form and slope of the valley. Strong enclosing walls give adequate unity to an unconventional and rather free design. A garden planned wholly in response to the topography, the enclosures and the subtle atmosphere of established character, it has distinct individuality and the beauty of fitness.

Every set of conditions presents a different problem, and after all they are problems to be solved in each case by the garden designer according to the light of his personal perceptions and genius. If the site is flat and devoid of striking features, its influence is clearly passive and subordinate, but by its very lack of positive guidance it seems to suggest the more straightforward and balanced design and perhaps the more formal interrelation between house and garden. On the other hand, if the site is a steep ravine, plunging down between protruding cliffs and framed with picturesque woods, its influence on the garden is absolutely dominating. Between these extremes are infinite variations in the character and degree of influence exerted by the site. It is safe to say that the garden which shows no recognition of its environment lacks some element of harmony and fitness; it may even lack that subtle quality which distinguishes the real work of art from the commonplace, for it is among those gardens conceived and built with a full and sympathetic appreciation of the "genius" of the place



Sunlight in the Garden

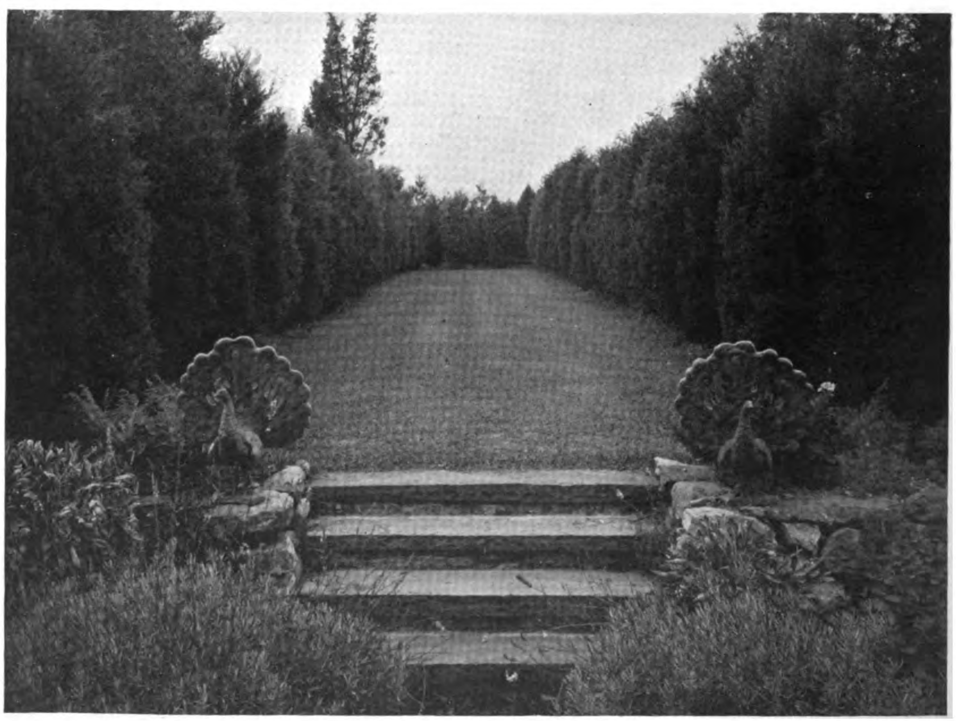
that individuality and the charm of real garden magic are most often found.

In addition to these various influences of environment there are certain opportunities in garden making and certain qualities in the finished garden that will bear emphasis.

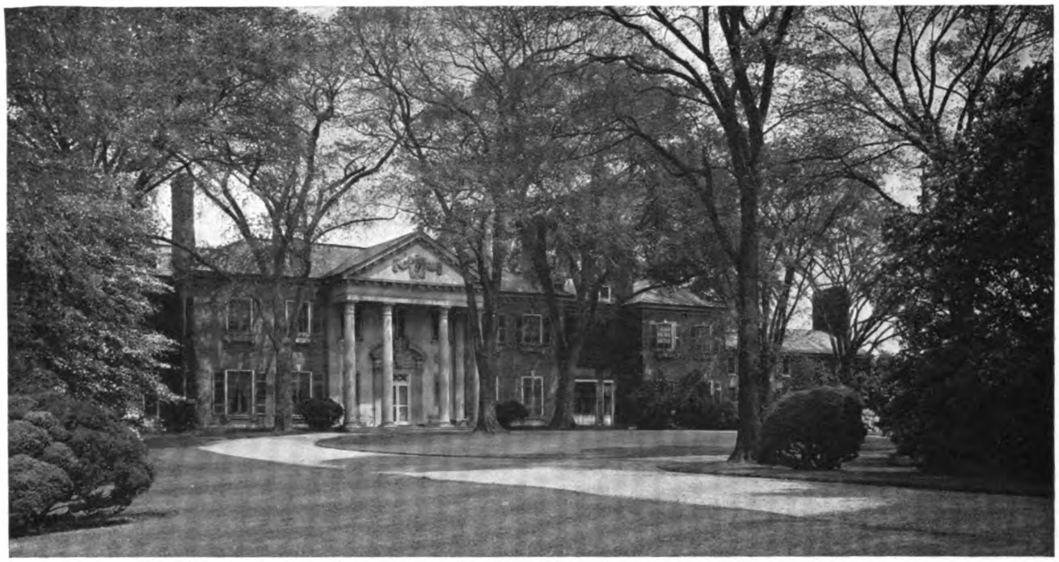
The opportunities for distinction and special interest in the plan of a garden are not always adequately appreciated. There are inexhaustible possibilities of variety not only in the general garden concept but in the just adaptation of parts and in the details of development as well. The plan is the basic skeleton upon which the garden is built, and whether simple or complex, rigidly formal or free, it exerts a distinct control upon the finished work. It places the lines and the accents of the picture. It is not necessary to be original to the point of freakishness, but it is certainly desirable to avoid the stereotyped in garden making as in any fine art. Simplicity is often appropriate and desirable, but when it becomes a screen for paucity of ideas it does not satisfy.

On the other hand, it is possible to over-emphasize the plan as such, for an agreeable pattern does not in itself always assure full measure of garden beauty. A garden of clean-cut lines and rigid forms, obviously planned and controlled in all its parts, but having no more regard for the living qualities of its plants than did the French or Italian gardens of "mosaiculture," may be interesting as a mechanical achievement or "stunt"; it may be fitting under certain special conditions; it may be beautiful as a tapestry or rug is beautiful, but it is not likely to have that artistic merit which is achieved only by the appropriate use of the mediums of expression. The ultimate forms, the textures, the colors and the infinite details and subtle harmonies of the garden pictures are made of *living* materials, and it is in the happy balance and pleasing contrasts of these free growing elements with the rigid elements imposed by man's control that the most satisfying beauty in garden design is attained. It is that quality of life and growth which distinguishes the garden from the static work of art; it is that quality which requires time for its fulfilment, and is marked by a greater and richer beauty year by year. Intricacy in design and variety or freedom from convention in the handling of details stimulate the imagination, enrich the garden and give it a peculiar interest. Every path and nook and corner is an opportunity, and the wealth and variety of plant forms are a generous palette with which to work.

In that garden which is rich in beauty and interest and suggestion, which has achieved a full measure of harmony with its environment, we are almost sure to find the subtle quality which for want of a more definite word we call atmosphere. It is perhaps that quality which tempts the artist to linger and to paint—the true test of success in a garden.



The Cedar Alley
Garden of Nelson Doubleday, Esq., at Oyster Bay



The Manor House, Glen Cove, Long Island — Charles A. Platt, Architect

Planting for Architectural Effect

By RUTH DEAN, LANDSCAPE ARCHITECT

IT is often impossible to say how much of beauty is inherent in the object to which we attribute it, and how much to external circumstances,—how much for instance of a diamond's sparkle is due to the purity of the stone and how much to its contrast with the velvet on which the jeweler displays it; or what portion of a woman's attractiveness is her proper possession and what portion is contributed by the setting she has been clever enough to give herself. In architecture the interplay of building and entourage, of structure and landscape, forms an almost inseparable unit, and our admiration for a good building is unconsciously increased by a pleasing setting, just as our displeasure is spontaneously evoked by one which is poor. Moreover, the effect of bad architecture may be minimized to a great degree by beautiful surroundings, and the effect of good design all but lost by unfortunate landscape. The value of skillful planting is beyond all calculation.

The ways in which planting and architecture interact to produce the result which delights or displeases us are many and somewhat complicated to analyze, but perhaps the first of these is through light and shadow. The house which appears between the trunks of trees, striped and flecked with shadow shapes, has a charm entirely lacking in the house which exposes its four elevations boldly to an unobstructed gaze, and these shadows need to be taken into consideration in the planting just as the shadow cast by the cornice of a building or that made by the depth of the reveals around the windows is taken into account by the architect in detailing his house.

It is even possible to design to some extent in plant shadows as it is in architectural shadows; the plain wall can be given interest and texture, or a dead brick wall can be brought to life by the movement of leaf shadows on its surface or by shafts of sunlight let in through branches. Unbroken sunlight or solid shadow would not have this vivifying effect, because it is the movement of the shadows as well as the contrast between light and dark which produces it. As the high light of a picture is the spot which catches the eye, it is the important or especially well designed part of the house which needs to be thrown into relief by the planting, and conversely the less pleasing or unimportant parts which can be made to recede by the use of foliage shadows.

Frequently with reference to the planting about a house someone remarks, "I do not want trees close to my house; they make it damp and shady." This remark is sure indication that at one time or another its author has lived in a house too closely shrouded by trees—in the dense shade of a horse chestnut or a linden perhaps, or the funereal somberness of Norway spruces; from such an experience it is inevitable that one should generalize about trees near houses, for nothing is less interesting than the deep, heavy shadow cast by the close foliaged type of trees; indeed the actual gloom such

The old oaks create for this house a setting which could not be more picturesquely English nor more perfectly in sympathy with the architecture

House of Allan S. Lehman, Esq., Tarrytown, N. Y.
John Russell Pope, Architect

trees have laid over many a household is apparent in this frequent prejudice against trees near a house. Far different are the gracious, changing shadows of the elm. A tall-arched tree with waving, not too solid, foliage, it is one of the happiest for use near a house. Locust makes a lacy shadow which, together with the stippled shadow of birch, pepperidge or wild cherry, is light and restless, delightful as gay notes in the landscape, but not to be used where repose and dignity are the qualities desired. These are attributes of the long, firm shadows of oaks, or of the majestic shadow of a beech, or of the solid—but not too solid—shadow of a sugar maple.

Shadows and foliage mass are so interdependent that it is hard to say what portion of a given landscape effect is due to shadow and what to character of foliage; these two considerations, namely, type of shadow and mass form of foliage, should go hand in hand in determining what sort of planting the architecture demands—whether it be round, solid mass and consequent shadow, such as that of the maple, beech or linden, or the longer, less heavy shadows that belong to the dignity of oak and elm, or the light dappled quality of birch, hornbeam, ironwood and locust, or the pointed foliage and shadow mass of cedar or arbor vitae.

Out of this consideration of mass grows the question of the scale of the planting in relation to the architecture. Is the low evergreen one is about to plant under the dining room windows going to grow into a tall forest tree, dwarfing the house and obscuring the view? Are the cannas and geraniums around the foundations of the monumental post office adequate, as a means of tying a very handsome building into its surroundings? They may satisfy the caretaker's desire for color, but after all is a red ruffle, however glowing, sufficient decoration around the base of the building? It is not alone the present bulk of the plant one needs to inquire into and consider; flowers will stay flowers and never rise to the point of making the post office look at home in the landscape, but hemlocks and spruces will not remain bushes; presently they will be trees and their bad scale as foundation planting and their effect on the architecture of the house will be apparent.

Of late years the zeal of the nursery trade has somewhat overdone this question of foundation planting; houses are frequently buried in masses of different colored evergreens, inappropriate individually and ugly and ill assorted in mass, with a result which is not only complete ruin to the architectural dignity of the house, but an offense to nature as well. Most of these evergreens are young trees that ought still to be in the nursery cradle, and at no stage of their development is their place in a group of foundation planting. For this purpose we have shrubs and low-growing evergreens, friendly spreading things that, sparingly planted here and there between windows, at each side of a doorway, or at the corners of the house with a few taller growing things in the group to carry the greenness up, tie the house pleasantly into its surroundings.

Planting near the house may be the means of doing the architect a good turn in another way. It may be made to supplement an unsatisfactory architectural mass, by drawing out a too short elevation, lengthening a line, hiding a disappointing wing the proportions of which seemed to be dictated by harsh necessity or an uncomprehending client.

A modern Colonial house which has the right sort of planting to supplement the design of the building

House of Marshall Fry, Esq., Southampton, L. I.
Aymar Embury II, Architect. Planting by the owner

One of the most interesting reactions between architecture and planting is that of the material of the building with the texture of leaves. Evergreens, the foliage of which is in general coarser and more leathery than that of deciduous plants, seem to be most at home near masonry construction; frame buildings, for some reason or other, look best with the bulk of the planting deciduous. Take rhododendrons for example; perhaps it is something of the atmosphere of their native habitat, mountainous, rocky regions and the borders of stony mountain streams carried over to civilization, which makes their coarse waxy leaf seem handsomer near a stone than a frame building; perhaps it is only that wood, being lighter than brick or stone, demands a less heavy-textured planting.

Quite a different point of view from which to consider the relation between architecture and planting is that of style. When an architect comes to the detailing of a building he designs columns, mouldings, brackets, balustrades, which shall be in keeping with the character of his structure; if it is a Georgian house, the detail is quite different from that of a French or Italian house; if it is a Spanish mission building the colonnade which he is apt to use will bear no resemblance to the cloister of a collegiate Gothic structure. But beyond sketching a few tall-pointed trees which purport to be cypresses on a rendering of an Italian house, the possibility of carrying this process of appropriate detailing into the out of doors, to the plant material which surrounds the house, occurs to but few architects. Presumably any architect will have looked over the site where his house is to go before the house is designed, and if his client has no strong predilections which have to be followed, will have recommended a style of architecture which is more or less appropriate to the setting. But that the setting can be heightened in effect, or that it can be spoiled altogether, according as the management of planting detail is skillful or bungling, is something which is usually accorded slight consideration.

The landscape surrounding this house has a Spanish quality, due not more to the California sky than to the skillful use of the right sort of plant material

House of Mrs. E. M. Fowler, Chino, California
Myron Hunt, Architect

One can, of course, draw no such fine distinctions in plant material as can be made in house detail; there are no shrubs about which can be said, "These are Italian renaissance"—no foliage which can be classified as English Tudor; oaks have outlasted many styles of architecture and the pine did not come in with the classic revival. On the other hand, there are certain trees and shrubs which we unconsciously associate with the spacious dignity of an English park, others which bespeak an Italian atmos-

TheTypical New England Farmhouse, with Its Elm Tree and Lilacs

the point to be made is that by a judicious choice of our own trees it is possible to produce a landscape which shall supplement the architecture of the house in feeling as well as in form.

The New England colonial house has a native American setting, easy to obtain if one but studies the old examples. Whoever saw a white clapboard house in Massachusetts, Connecticut, Maine or Rhode Island which did not have its group of lilacs near the corner, or a clump bursting out of the top of an old stone wall, or a row forming a hedge along the road? Where is the yard which does not boast an elm? Whatever else may have been added later, these two things were the first plants to soften the outlines of the New England house, and they have remained through two centuries the keynote of a happy setting for the white house with its green blinds.

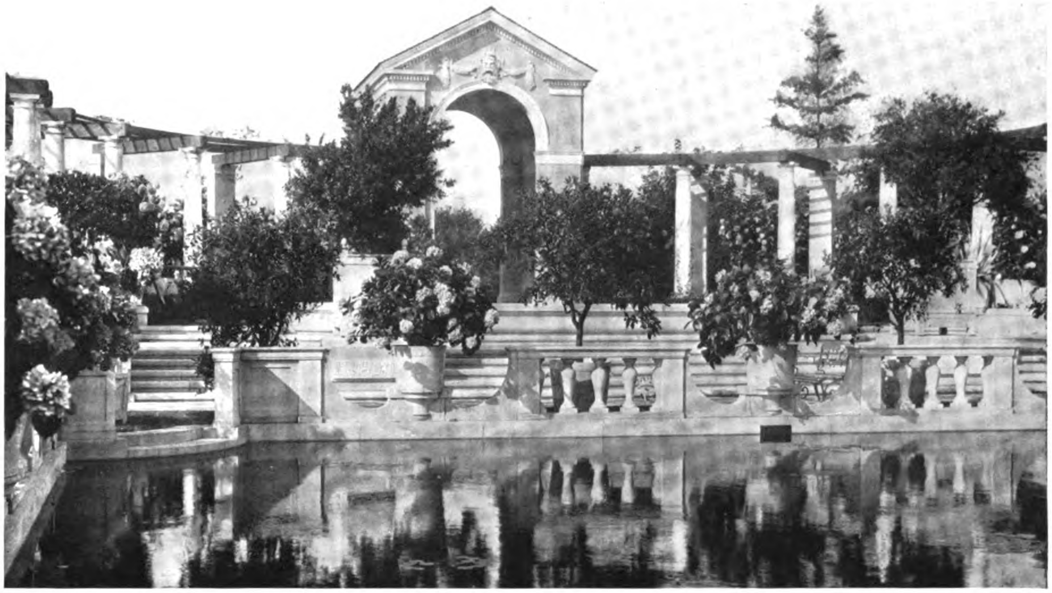
phere, and others which belong to New England colonial. Of course if a Georgian house is to be set down in a piece of desert where the cactus is the only plant that thrives, it will be difficult to create a colonial atmosphere for it; but within the limits imposed, or the possibilities offered by the native vegetation, it is surprising to discover how greatly and in what various ways the character of the house can be heightened.

Let us suppose, for example, that we have to make the landscape for a house of informal English design. English oak, like French wine and Russian leather, is proverbial, and the landscape which immediately springs to mind as being typically English is one with rolling hills wooded with oak—white oak preferably. There is something about a rising stretch of green lawn with a group of white oaks on the rise that bespeaks England at her best. Compare, if you will, this sort of landscape with the stupidity of a lawn planted with coarse, heavy Norway maples—trees recommended as being fast growers and subject to no blight. "Fast growers," they may be, but they are as well monuments to our undignified eagerness for a quick effect, trees without character or quality, which squat heavily on our lawns, a crude green in summer, a faded yellow in the fall, and uninteresting skeletons in winter. The oak on the other hand is noble whatever the season; lustrous leathery leaves of a rich dark green, beautifully disposed on a sturdy frame, glowing red in the fall, hoary and dignified in winter. The Norway maple is only one of a number of nursery pests that have supplanted to a great degree our fine native trees. Holly likewise and hawthorn are essentials of the English landscape, and beech and hornbeam and yew. I do not mean to renounce native materials for exotic plants by any means, but these things all have American counterparts save the yew, and

For Italian houses we have the cedar and the arbor vitae, which alas will not reach the majesty of the cypress, but which are our best substitutes. For the olive groves so characteristic of Italian landscapes we have in our northern latitudes nothing similar, but on the other hand it is quite possible to use fruit trees ornamentally as do the Italians, and the plane and chestnut trees are ours for the planting. Ilex and boxwood we can grow to some extent. The laurel-leaved willow, the foliage of which is quite Italian in feeling, is hardy and there is nothing to prevent our using earthenware pots containing orange and lemon trees that characterize Italian gardens, excepting the trouble of taking them inside in the winter. From Virginia on south we can add the waxy leaves of the magnolia grandiflora to our Italianesque planting, besides Carolina cherry, Euonymous japonica, palms and a host of other things.

It is certainly not for lack of proper plant material that our architecture often wants a sympathetic setting, but rather for its undiscriminating use. Architect and landscape architect working together should be able to realize an appropriate background for any architecture the style of which has been chosen with reasonable reference to its suitability to the type of country in which the building is to stand.

To each of the older sections of the country there belongs a type of architecture which is identified historically with the locality; these types cover a wide range, from the severe colonial of New England to the Spanish and French of Louisiana, and it will be found that for each type there exist trees and plants which are in keeping.



An Italian Garden at Groton, Conn.

GUY LOWELL, ARCHITECT, A. R. SARGENT, LANDSCAPE ARCHITECT

THIS is an Italian garden that really recalls the spirit and beauty of those in Italy because it reproduces, with a fidelity generally impossible in this country, those features that are distinctly characteristic of the best old villa gardens. These features of the Italian garden are:

First. Great skill in design which takes advantage of the rising and falling grades with the accompanying use of terraces and steps connecting the ever-varying levels. If one can get the various elements of architecture and gardening properly combined under the deep blue sky of our New England coast, the garden will have the brilliant, sparkling qualities of the famous Tuscan gardens.

Second. A freedom and richness of planting that are usually almost entirely absent in American gardens because of the attempt to make the symmetrical bay tree and the clipped box take the place

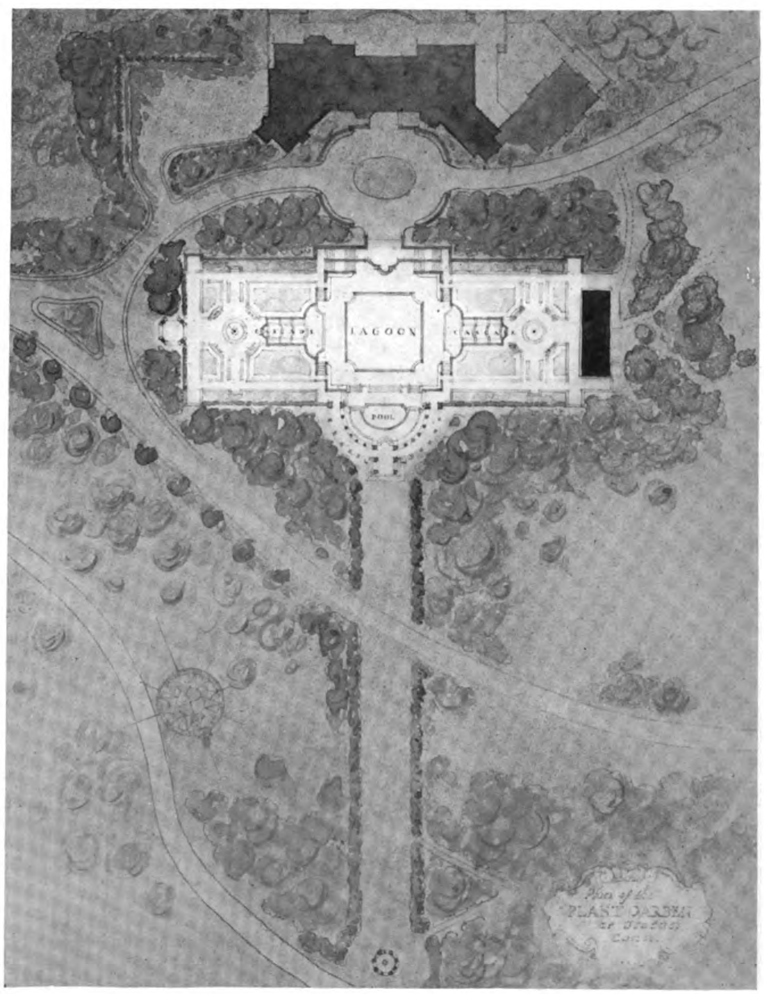
of the freer growing orange tree, pomegranate and oleander. It was in getting together this remarkable and rare assemblage of tub trees, which Mr. Sargent collected and arranged so skillfully, that made possible the feeling that this is a garden truly in the Italian style.

Third. A rush of water, considered necessary for life in the Italian garden. This was possible here, and the effect of all this water in shimmering pool and cool cascade is heightened by the glimpses that one gets of the bay and of Long Island Sound.

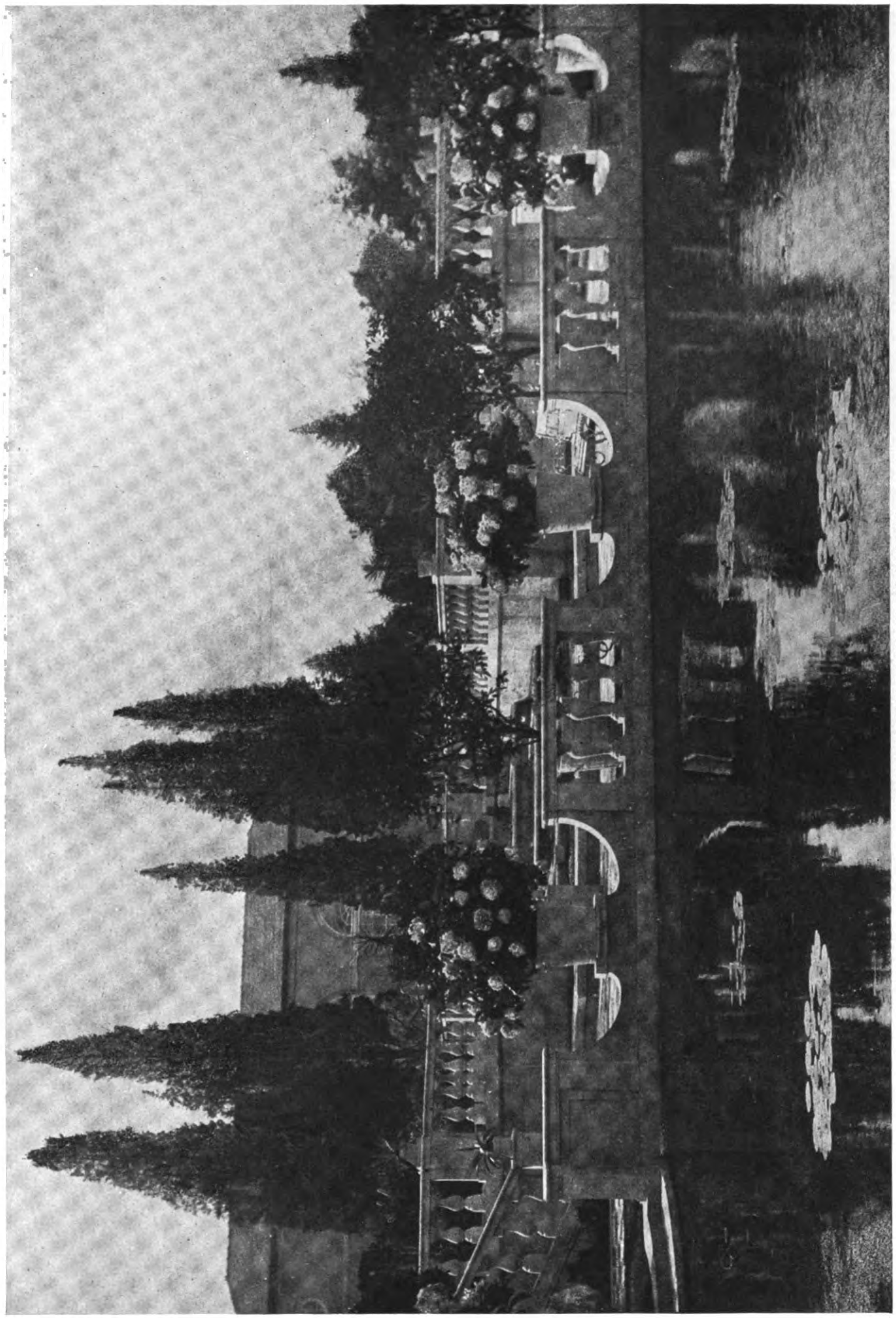
It is not age and crumbling stone and moss-covered marble that make the Italian garden, for in certain of the Tuscan gardens the stonework is as crisp and true as when it was quarried centuries ago. It is the beauty which the architect has known so well how to put into his architectural work and the skillful arrangement of trees and of flowers that the landscape architect has made that give this most charming of American gardens its quality. There are of course some variants from the foreign type. Bright American flowers give color but are subsidiary to the general scheme of design. The orange house, which is considered the necessary adjunct of the garden in the cooler parts of northern Italy, provides not only the necessary winter storehouse here but adds to the picture. The garden sculpture is supplied by two light and graceful fountain figures by the late Bela Pratt, placed at the heads of the cascades on the terraces at either end of the garden.

Fountain Topped with Figure by Bela Pratt

The pink American marble out of which the balustrades, basins, steps and columns are made is more beautiful in color and in texture than the *pietra serena* of Tuscany. The absence of crumbling and forlorn garden ornaments, which seem in this country to be considered a necessary accompaniment of the Italian garden, is to be noted, for there are no antiques used. The search has been for beauty, and character has come with it in the frank utilizing of available domestic materials and planting appropriate to the garden season of this latitude.



Plan of Grounds
Showing Location of Garden
and Approach to House



LAGOON LOOKING TOWARD ORANGERY

GARDEN AT GROTON, CONN.

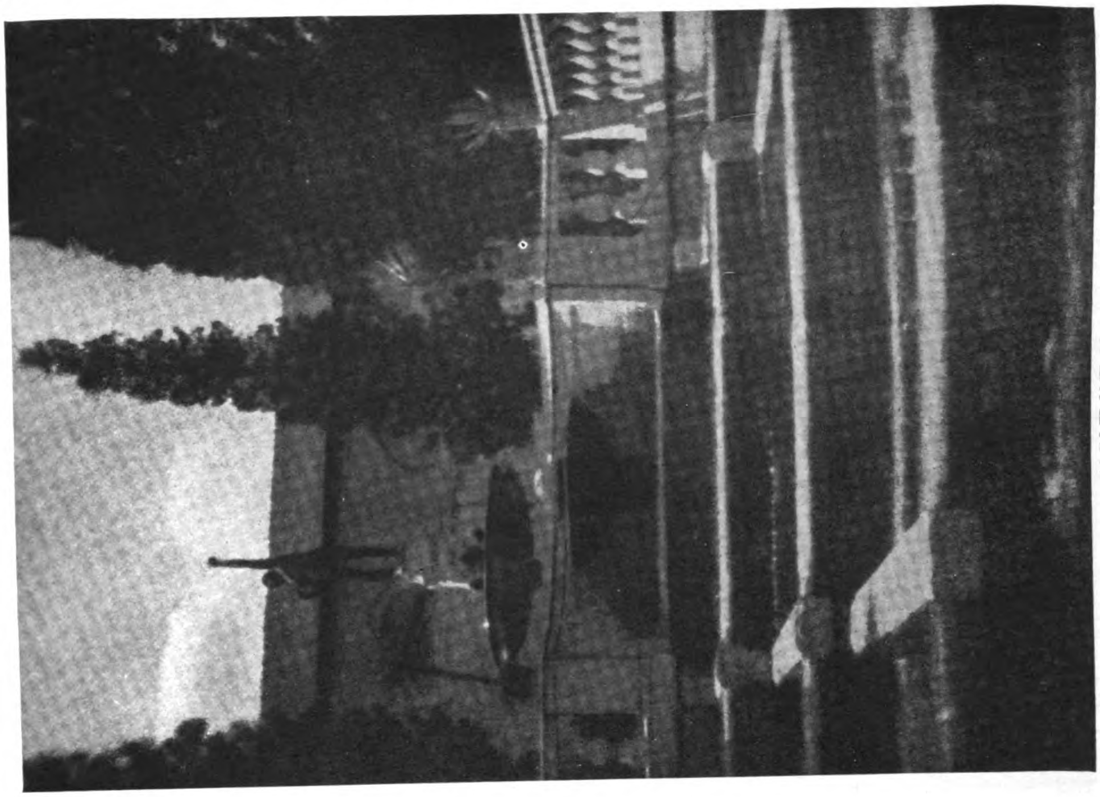
GUY LOWELL AND A. R. SARGENT, ASSOCIATED LANDSCAPE ARCHITECTS

LOWER BASIN OF CASCADE

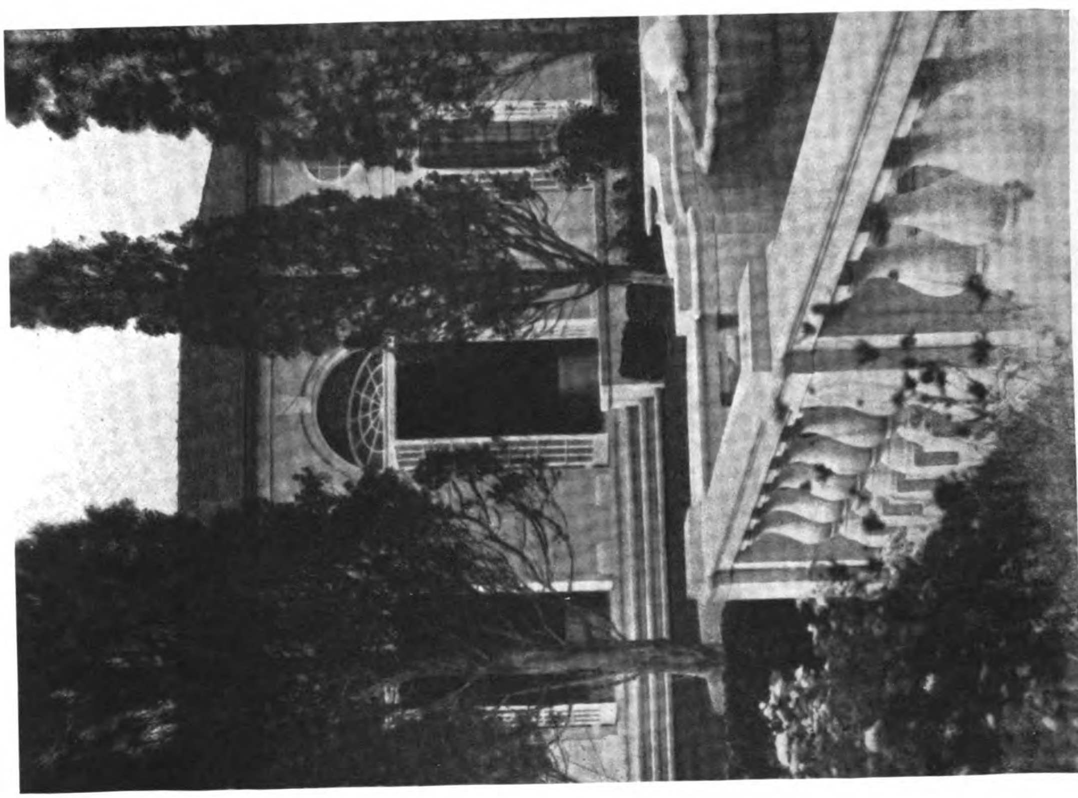
PARRON ON SOUTH SIDE

GARDEN AT GROTON, CONN.

GUY LOWELL AND A. R. SARGENT, ASSOCIATED LANDSCAPE ARCHITECTS



FOUNTAIN IN FRONT OF ORANGERY



BALUSTRADE AND ORANGERY

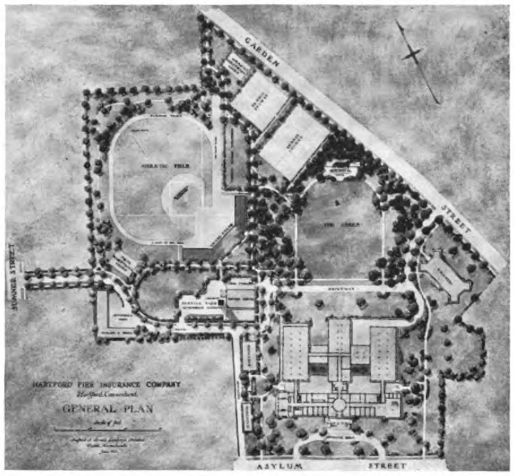
GARDEN AT GROTON, CONN.

GUY LOWELL AND A. R. SARGENT, ASSOCIATED LANDSCAPE ARCHITECTS

The Hartford Fire Insurance Building, Hartford, Conn.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS
SHEFFIELD A. ARNOLD, LANDSCAPE ARCHITECT

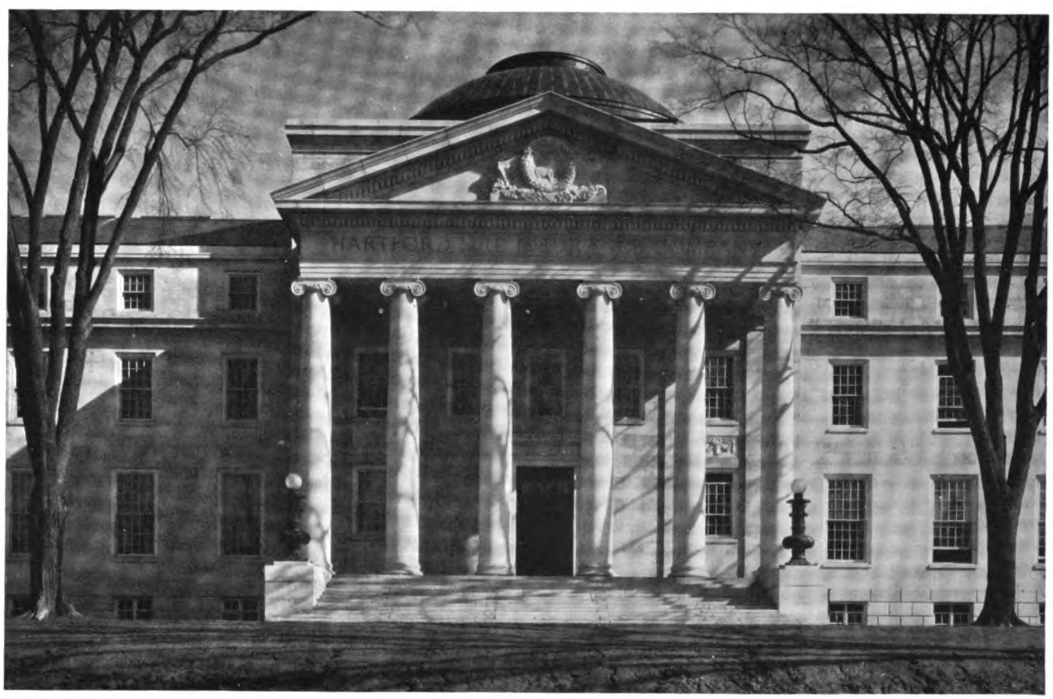
THE part in the success of a building project that an architect may well play in addition to his usual service in the design of the building and supervision of its construction is seen in the instance of the new home office of the Hartford Fire Insurance Company. The vital and creative part of the architect's service lies in his solution of the client's problem, based on the particular requirements the client names. Usually the client approaches the architect with a fairly definite idea of what he thinks is wanted, and in many of these cases that is accepted as the scheme with but slight modifications by the architect. It is questionable if this policy produces the best work. The client is likely to be influenced by what has previously been done, and he is furthermore often prevented from seeing his problem in clear perspective because of being too close to it.



General Plan of Plot Development
Sheffield A. Arnold, Landscape Architect

Hartford is known throughout the country as an insurance center. One of the most pressing problems of the large insurance companies located there is to obtain sufficient help of the type they require. This becomes an important element of consideration in the design of a building, because other things being equal the company that offers the most attractive physical conditions of employment has a direct advantage.

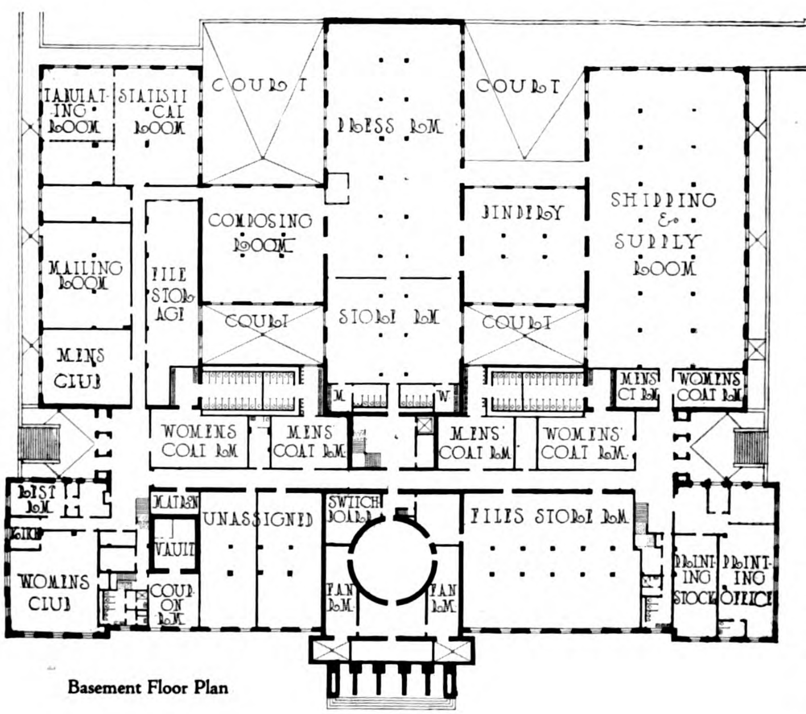
The officers of the company in their preliminaries to building had conceived a tall commercial structure in the center of the city, to be made individual



Elevation View of Entrance Portico

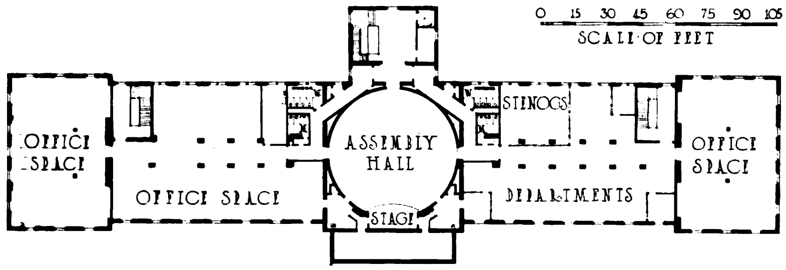
Claims, Inspection and Liability Office on First Floor

and acquire a publicity value through the construction of a tower, much after the manner of the Travelers Insurance Company building. In analyzing their problem Mr. Dodge was convinced that a building of quite different character, located in a less congested section with ample ground space for the provision of athletic and community features, would better meet the conditions. This plan was accepted and a distinctive building has resulted which is a monument to the insurance company and a source of great pleasure to its hundreds of employes. Mr. Dodge was impressed with the fact that this building should differ from the average commercial office building and that every means should be taken to secure a building that would age gracefully and that would increase in value as a business monument as the years went on. His architectural scheme was influenced by that masterly composition of Bulfinch's, the Massachusetts General Hospital in Boston. This building today makes a vivid impression on the visitor, and no small part of this impression results from the exterior materials—granite of fine texture, and marble for carved ornament that acquires with years a surface color similar to the granite. Investigation of the exact stone used in the hospital building disclosed the fact that through lack of production facilities or other causes, the same stone could not be had, but quarries in the same vicinities were able to meet the demand, and the walls of the Hartford building have in all major respects material that will age as beautifully as that in the walls of Bulfinch's famous Boston building.

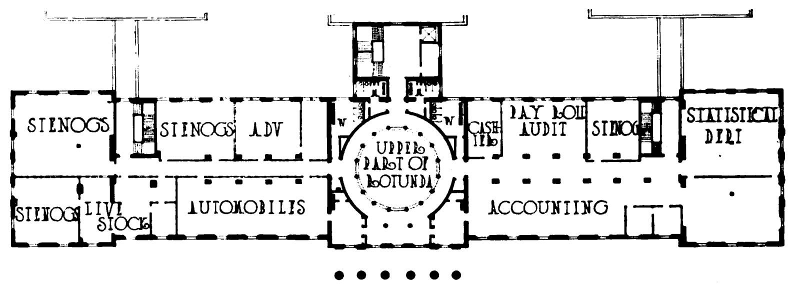


Basement Floor Plan

The building is located on a plot of about 20 acres on Asylum street, formerly the site of the American School for the Deaf. With great space available, the main building has been designed 360 feet long and three stories and basement in height. A portico supported by six monolithic granite columns 33 feet high marks the main entrance, over which is placed a low dome. The pediment bears the coat of arms of the company, with the familiar stag, while the company's name is inscribed upon the entablature. The plan of the structure is E-shaped with a central rotunda running through two stories, the space upon the third floor, under the dome, being occupied by an assembly hall 60 feet in diameter, with stage and anterooms.



Third Floor Plan

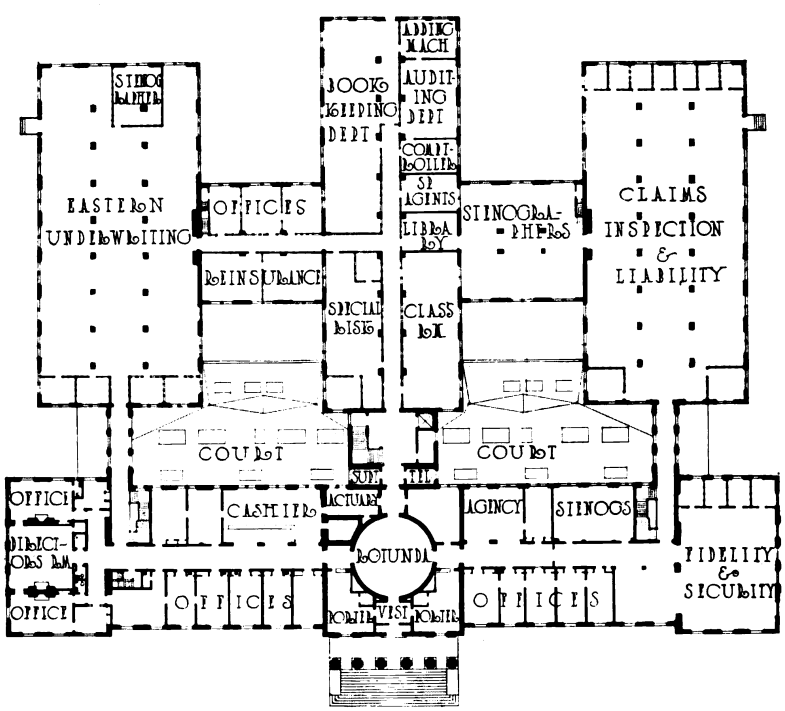


Second Floor Plan

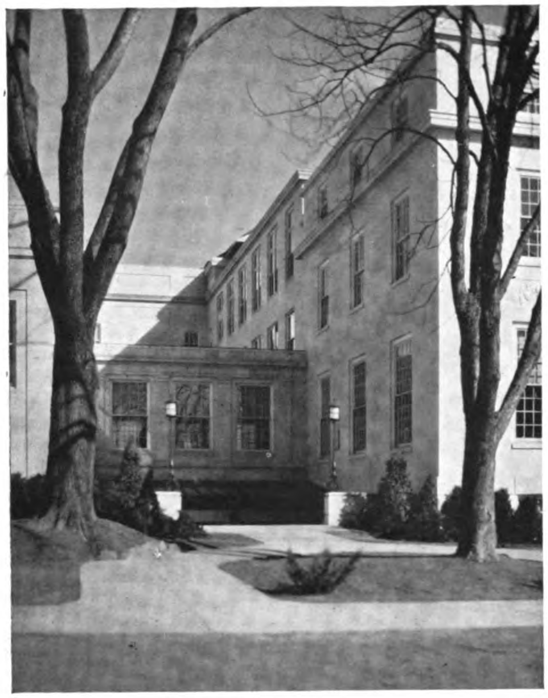
The main entrance is into a vestibule from which open the offices of the porters. Just beyond is the rotunda, the upper story of which is supported upon columns behind which there extends an ambulatory, Hauteville marble being used for the walls and columns of the rotunda and the same marble combined with black Belgian for the floor. Doorways at each side of the rotunda open into the respective quarters of the Hartford Fire Insurance Company and its subsidiary the Hartford Accident and Indemnity Company. The offices of the president and chairman of the board of directors and the directors' room are at the far end of one of these wings and carry out in their design and decoration the dignity suggested by the exterior of the building, the offices of the president and the chairman of the board having chimneypieces and base courses of green Tinos marble, while in the directors' room antique cream marble is used, and the walls are paneled from floor to ceiling, the paneling affording a background for portraits of former officers of the company. The plans of this floor indicate the completeness of their equipment, special attention being drawn to the Eastern underwriting room and the Accident and Indemnity office, each of which is 75 x 100 and 20 feet in height, lighted both from the sides and from sawtooth skylights in the ceiling and floored with linoleum applied to the cement flooring.

A well equipped printery and bindery, complete with composing and press rooms, supply, shipping and delivery departments adequate for the printing of policies and reports, is a feature of the basement. One corner of the basement, reached by its own entrance from the outside, is planned as club rooms for the company's employes. Outdoor provisions for the employes include baseball diamond, five tennis courts, two basketball courts, and a garage with dressing rooms and lockers in the basement.

In a separate power-house building are the boilers which supply steam for heating as well as a refrigerating plant where water is cooled and pumped to various drinking fountains. Fresh air is circulated by four large ventilating blowers at room temperature and automatically regulated by a thermostat. The piping from the power-house to



First Floor Plan



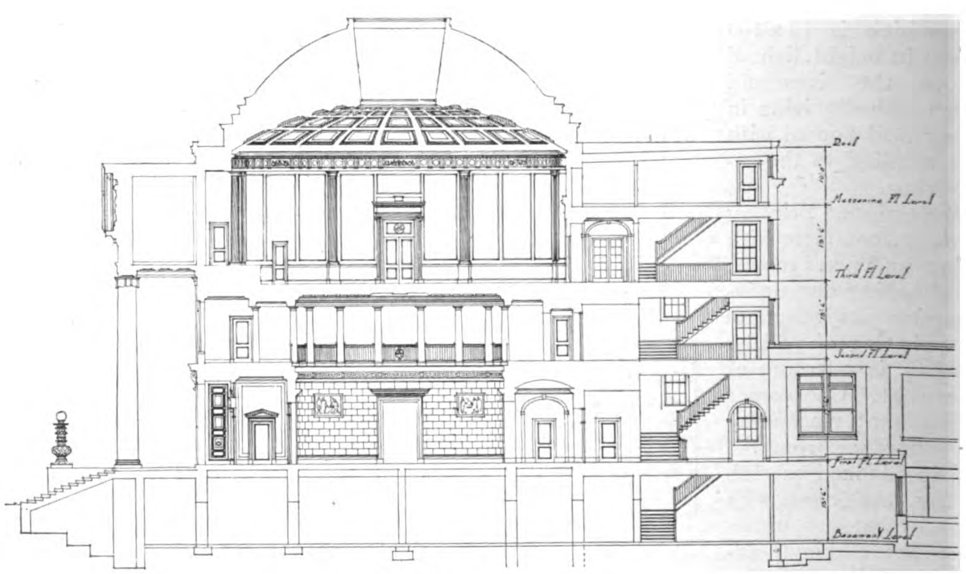
Employes' Basement Entrance

Corridor Looking into Cashiers' Space

the main building runs in a concrete tunnel which is always accessible for inspection and repairs. Mechanical equipment throughout the buildings is arranged, as far as possible, to make all the focal points of possible trouble immediately accessible.

As might be supposed, the buildings of this great insurance company are fireproof throughout; there is nothing to burn, from basement to roof as far as the structure is concerned, and even the desks and filing cabinets are of steel construction.

The unusual nature of the building site demanded a treatment of the grounds in keeping, and the surroundings resemble those of a large and tastefully planned country estate. The most attractive feature of the grounds is the "green" at the rear of the main building on Garden street which is on a direct line with the central axis of the structure, the vista from the building being ended by a pergola.

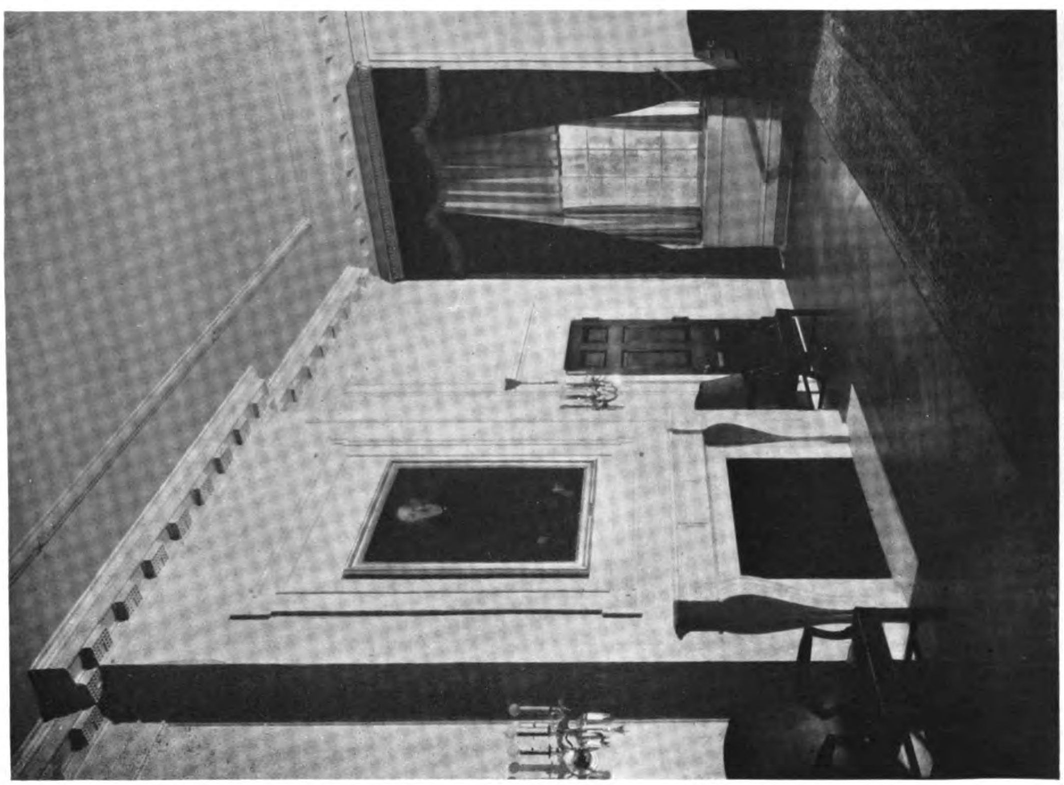


Cross Section through Main Building on Principal Axis

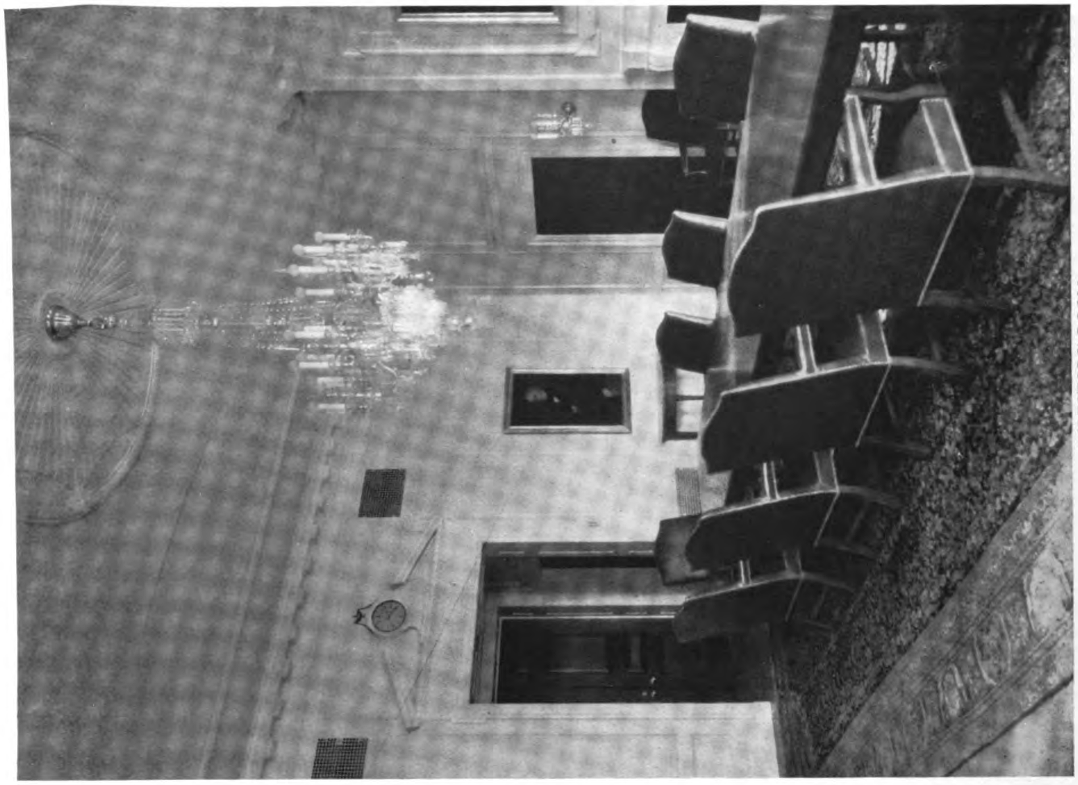
DETAIL OF PORTICO

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.

EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS



PRESIDENT'S ROOM



DIRECTORS' ROOM

HARTFORD FIRE INSURANCE BUILDING, HARTFORD, CONN.
EDWIN SHERRILL DODGE AND PARKER, THOMAS & RICE, ARCHITECTS

BUSINESS & FINANCE

C. Stanley Taylor, *Associate Editor*

The Architect's Agreements With the Owner

PART II. SPECIAL FEATURES OF AGREEMENTS WHICH SHOULD RECEIVE CAREFUL CONSIDERATION

IN the first part of this article published in the May, 1922 issue of THE FORUM, consideration was given to the establishment of a proper business understanding between the architect and his client regarding the scope of service to be rendered and the amount and method of payment.

In this concluding section there are presented several important points on which misunderstanding may arise between the architect and his client. Suggestions are made showing how these questions have been successfully covered in various forms of agreement.

A careful study of the points set forth in this and the preceding part will serve to indicate clearly the important basic considerations which may be expected as part of the problem of client relationship.

THE question of the abandonment or suspension of a proposed building project is one which is of particular interest and importance to the architect. Where a building project is abandoned during any stage of planning, there is often a disagreement between the architect and the owner as to the equitable settlement of the service fee. We present clauses covering this subject, which have been selected from various typical contracts:

If the erection of the building is suspended or abandoned, our compensation for work already finished shall be as follows:

Of total compensation—

Should preliminary studies alone have been made, TWO-TENTHS (2/10);

Should preliminary studies, general drawings and specifications have been made, FIVE-TENTHS (5/10);

Should preliminary studies, general drawings, specifications and details have been made, SEVEN-TENTHS (7/10); and such compensation shall become at once due and payable.

Should the work be abandoned before drawings, specifications and details have progressed sufficiently far to make it possible to take definite bids from contractors so that the cost may be known, commission for partial payment is to be reckoned on an approximate cost of............. Should actual estimates have been received, then the compensation shall be based upon the lowest responsible estimate so received.

Another method is thus indicated:

If the construction or completion of the building should be suspended, abandoned or unreasonably postponed, or if, after paying the architect a sum equal to one and one-fifth per cent (1-1/5%) upon the estimated cost of the work, the owner should for any substantial cause decide to sever his relation with the architect, he may, by resolution, terminate this contract; then in either of the above cases, the owner shall pay the architect such fees, reimbursements and compensations as shall be payable under this agreement for the work done, and such part of any further payment as the work done bears to the whole work required to be done to entitle the architect to such further payment, plus an amount equal to one per cent of the cost or estimated cost of the building, in lieu of any prospective profits, and as liquidated damages for any loss sustained by termination of this contract, and such sums so paid shall be in full discharge and satisfaction of all liability of the owner under this agreement; provided that in the case of a resumption of work to be determined upon, the owner may, by resolution, resume his relations with the architect under this contract, and in such event all payments previously made shall be held to be payments on account of the architect's total fee and compensation.

Another method:

After the work has proceeded on the drawings and it is decided to abandon the erection of the proposed buildings for causes beyond our control, our charges for the work done at the time the project is abandoned will be based on the minimum charges of the American Institute of Architects, as follows:

Upon completion of preliminary studies ONE-FIFTH (1/5) of the entire fee.

Upon completion of specifications and general working drawings, exclusive of details, TWO-FIFTHS (2/5) additional, making a total of THREE-FIFTHS (3/5) of the entire fee. Until an actual bid is received, charges to be based upon the estimated cost of the work.

If after bids are received and it is decided for any reason to delay starting erecting the building for a period exceeding two (2) months, we are to receive two (2%) per cent of the cost of the work as a payment on account and the additional one (1%) per cent to be paid when work is started.

Another question is that of additional charges. Here are selected clauses covering this point:

First clause:

An additional charge shall be made for alterations or additions in plans after the plans have been approved by you; this charge will be valued in proportion to the additional time or services employed This provision shall not apply to any such alterations or additions made necessary by reason of errors, defects or incompleteness in the drawings, specifications and details furnished by us.

Alternative:

When for any reason the owner shall request the architect to make material alterations in or modifications of the working or detail drawings, after the acceptance of the "Preliminary Working Drawings" or request him to prepare studies, drawings or specifications for work not contemplated by the preliminary working drawings, the owner shall reimburse the architect the actual cost of drafting and specification writing plus seventy-five (75%) per cent thereof for general office expenses, commonly called "overhead," and shall pay the architect a fair and reasonable profit for his services in connection therewith.

Alternative:

That, if after a definite scheme for the said building has been approved, the owner makes a decision, which for its proper execution involves extra services and expense for changes in or additions to the drawings, specifications or other documents, or, if the architect is put to further labor or expense by delays caused by the owner or a contractor, or by the delinquency or insolvency of either, or as a result of damage to the construction work by fire or other unforeseen calamities, then such additional extra services and expense shall be paid by the owner at the same rates and the maximum amount therein stipulated shall be increased accordingly.

The question of architectural supervision is one which is at best confusing to the average client. It is not often clearly understood by the client that architectural supervision does not always mean a constant watch set upon contractors and material men to make certain that the required number of coats of paint are actually put on or that the specifications are followed out in exact detail. This can only be expected when a clerk of the works or an architectural superintendent is at all times on the ground—a competent man whose salary is paid by the owner.

Agreements covering this point of supervision should, therefore, be specific and purely understandable. In examining various contracts, we found that the clauses relative to actual supervision were as a rule vague and not clear as to the amount of time which the architect might be expected to employ under the service fee agreed upon. This clause shows how this condition was met in one contract:

We agree to superintend the performance of all labor and the installation of all materials in the construction of said building and see that all labor is properly performed and that all materials conform to contract specifications, and to promptly notify you of any delinquencies in either respect and to perform any duties in respect thereto that may be provided in any contract made by you with any contractor or material man.

We to have authority in construction emergencies to order necessary changes at your expense and with your approval and to stop the progress of any work or order its removal when not in accordance with the contract.

Our representative will make visits to.................................... for the purpose of consultation during the preparation of drawings and for the purpose of letting general contract, and at least....................................visits for the purpose of general superintendence; should it be necessary or deemed advisable by you for us to visit the building more frequently, we will set the sum of............................per day for such additional visits.

The employment of a clerk of the works and of engineers for special services should be clearly understood, together with the fact that their proposed compensation is a direct charge to the owner and not part of the architect's fee. Thus we have clauses similar to the following:

The architect is to nominate the clerk of the works and the engineers for the acoustical work, the heating, ventilating, mechanical and electrical systems of the building, and their proposed compensation having been approved by the owner, the architect is by and with the consent of the owner to appoint them.

As the form of contracts will naturally vary in accordance with the type and size of the proposed building (and the extent of service offered by the architect's organization), we quote a few special clauses which indicate points that from time to time will prove of importance:

Agency and agent liability clause:

In all transactions between yourself and contractors upon the work, we are to act as your agents, and all prices, rebates, charges and commissions procurable by us from any contractor or material man shall insure to your benefit. Our duties and liabilities in this connection are to be those of agents only. The amount of our liability shall in no case exceed the total architect's commission.

Preliminary drawings:

Owing to the requirements for enlarged facilities arising after the approval of the preliminary drawings, certain revisions in the general scheme have been deemed necessary by the owner, and the architect has been, and is engaged, in the completion of what are herein termed "Preliminary Working Drawings." These drawings, at 1/8" scale to the foot, and consisting of plans and sections which will fix more accurately than is possible in the 1/16" scale preliminary drawings and general dimensions, close approximate seating capacities and general layout of interior partitions, are to be submitted within a reasonable time for owner's further approval. It is understood that these preliminary working drawings so approved shall then become the basis upon which the working drawings and specifications shall be formulated by the architect.

The various points brought out in the foregoing discussion are those which constitute the more ordinary sources of disagreement between the architect and his client. It is evident from an analysis of contracts that any unusual condition of service should not be left merely in the form of a verbal agreement but should be reduced to a specific contract clause or a specific paragraph in the letter of agreement. Attorneys who have had considerable experience in connection with litigation covering service claims of architects inform us that it is difficult to get proper recognition or a fair understanding on the part of a jury as to the actual work which the architect does. Invariably this work appears in the form of court exhibits consisting of drawings and specifications. These exhibits do not indicate the great amount of time and experience involved, nor are they impressive when a jury fixes the amount which the architect is entitled to. It is, therefore, apparent that the wise procedure for an architect is to employ legal service for the purpose of avoiding trouble in preference to the forced employment of attorneys to present claims for service fees or to defend the architect in cases where the owner seeks to place upon him liability for damages in the form of excess costs or structural conditions and defects not fairly chargeable to the architect.

It must be realized that the architect accepts a heavy business responsibility when he undertakes to expend the owner's money in the construction and equipment of a building. This is the difference between the professional service of an architect and practically all other forms of professional service—*that the architect actually accepts the responsibility of spending his client's money.* Few other professional services include this feature. For this reason the architect cannot safely assume as a professional attitude that he has no interest in the legal soundness of the contractual relationship into which he enters when he accepts a commission to design and supervise the construction of a building of any type.

The Present Aspects of the Building Situation

PERHAPS at no time in the history of building construction in the United States has there been so much interest displayed on the part of prospective building investors in regard to actual conditions in the building field and the possibilities of the near future. One of the important functions of service which the architect is called upon to render is that of providing general information and advice to his clients in regard to building costs and conditions. This is a condition which is becoming more definite as the architect's position as a giver of service in the economic scale becomes more firmly established. Conversely, it may be said that the security of the architect's position is becoming more and more dependent upon his ability to render service of an advisory business nature as well as to provide building designs of æsthetic and practical merit.

There are certain outstanding features of the building situation today which will have a direct bearing upon the attitude and mind of clients who have not yet fully decided to proceed with building operations. Other facts are pertinent to the architects themselves, as they show an increase of activity in many of the offices throughout the country and form some basis of anticipating future conditions. Perhaps the most interesting basic fact for consideration is that of the unusual building activity which has developed in the months of March, April and May. Referring for a moment to the chart shown on the first page of the Service Section in this issue of The Architectural Forum, it will be seen that there has been an unusual increase in the volume of building construction during the months of March and April. Analyzing this increase of activity it is found that the month of April shows a volume of new construction in the form of contracts let about 20 per cent greater than in March. An increase is shown in all classes of construction excepting industrial building which shows approximately equal activity in two months. The outstanding classes of building construction, where increased interest in activity is indicated, include residential building, which constitutes about 40 per cent of all activity, business buildings, educational buildings, institutional buildings (hospitals, churches, etc.), public buildings and industrial buildings.

At the present time attention is focused principally upon the volume of residential construction. As predicted many months ago, the first definite revival of construction activity has been in classes of buildings to meet residential demand and to provide community facilities for newly developed or growing residential sections. The recent reports of building activity have, therefore, been based to a great extent on activity in the residential field and many architects noting the volume of construction have wondered why their practice has not increased in proportion to this reported building activity. A brief study of the classes of buildings which constitute this volume of residential construction provides an immediate answer to this question. A very large percentage of the volume of new contracts in the residential field is made up of small individual houses, developed from stock plans and through speculative builders in a manner which does not call for much architectural service. Another contribution to this large volume of construction has been through the medium of the speculative construction of multi-family dwellings (built without much thought of architectural service) in connection with a haphazard speculative building program designed to make profit out of the housing shortage situation.

This condition has resulted in the construction of a great many speculative apartment buildings which have sold rapidly to investors on a basis of high rentals and quick profits. This type of construction has been a great drain on the building material stocks of the country, but it has now reached the point where in many parts of the country the shortage of medium-priced apartments and small houses has been met almost to a point of saturation. We have been informed through reliable sources that in the residential district of Chicago on May 1 of this year there were probably ten thousand vacant apartments, and we know that in many districts apartment rentals have dropped fully 25 per cent. We believe that this point is being approached also in New York, and that by the fall of the year there will be much less activity in the building of poorly designed and constructed housing operations. In fact this prediction will probably apply to much of the multi-family housing coming within the scale of moderate rentals.

Just before writing this article we discussed this question with Walter Stabler, Comptroller of the Metropolitan Life Insurance Co., and learned with interest that this organization, which represents the greatest single loaning institution in the United States, is making no more commitments for the financing of medium-grade apartment houses in and around New York.

The Housing Program of the Metropolitan Life Insurance Co.

This discussion would not be complete without some reference to the broadly heralded effort of the Metropolitan Life Insurance Co. toward the stabilization of low-cost, multi-family housing to meet the needs of families requiring apartments on a low rental basis. Some months ago it was proposed that the New York state legislature grant to insurance companies the right to actually build and own apartment buildings and other types of housing for the purpose of assisting in alleviating the housing shortage for New York. The Metropolitan

Life Insurance Co., under the right conditions, agreed to undertake an important part of this program by actually building up to one hundred million dollars' worth of moderate cost apartment buildings.

Authority was recently granted by the state legislature for carrying out this program and interest immediately focused on the final decision of the Metropolitan Life Insurance Co. and the actual program which it might carry out. It was proposed that this operation should represent the building of a large number of low-cost, multi-family buildings in which apartments would rent at an average of $9 per room per month in vicinities where the average rental is $15 per room per month. This great insurance organization, having millions of policy holders among families of moderate income, has already contributed to alleviating the building situation through the medium of loaning millions of dollars monthly on housing projects. Similarly the interest in actually providing a large number of moderate-cost apartments in New York is not as a speculative real estate investment but as a definite attempt to bring down rentals for families which cannot afford to pay the rentals demanded in poorly constructed speculative building operations and under the conditions of rentals which have in many cases been raised disproportionately under the demand of housing shortage.

With this praiseworthy objective in view and having removed any possible legal objections to the operation, we understand that the actual condition of this project today is that the Metropolitan Life Insurance Co. is ready to go ahead with the construction of fifty 32-family houses, built in two operations in the Long Island City and Astoria sections of New York, provided they are able to have structures of this nature so efficiently designed that the contract figures will insure the provision of $9 per room rentals which must provide for the maintenance of the building, pay 6 per cent interest on the investment of the insurance company, and provide 5 per cent per year to amortize this investment. Andrew J. Thomas of New York has been retained as architect to provide the necessary plans which are now about completed. A number of contractors are being asked to bid on the work, and if the Metropolitan Life Insurance Co. can be assured by these plans and figures that the project will meet the requirements outlined, this great operation will proceed immediately.

Undoubtedly, many objectionable types of building operation will be eliminated as rentals become stabilized through the controlling influence of large financial organizations and through such practical contributions to the housing situation as that described. This condition, however, will be of direct benefit to the building construction industry and is already tending to divert activity in the field of better class building construction, a condition greatly to be desired by those interested in economic progress. It is evident that to a certain extent construction activity around New York is to be slowed up temporarily by a shortage of building materials. Brick and lumber prices in the local fields have already shown a tendency to strengthen considerably, and labor conditions are not good.

With all these facts in mind, it will be seen that we have passed the crest of the first wave of building activity represented by speculative development. We are now entering the second and sounder period wherein better types of buildings will be constructed, and there will be much more activity in architectural offices. The great flow of building materials into the speculative phase of this period of activity is to be diverted toward the construction of better types of housing and the provision of a great number of educational and institutional buildings, public buildings and business buildings. We are now constantly receiving reports of a favorable reaction in architects' offices. A number of good projects which have been buried in plan form for several years are being brought to light and made ready for actual construction. The shortage of building materials which is evident at some points will soon be offset by the greatly increased production activity which is to be noted at the plants of many building material manufacturers. The desire and tendency of the average material manufacturer today are not to raise prices under the present reaction but to develop a large volume of sales at prices made as reasonable as possible under the governing conditions of production. It is quite evident that a period of moderate prosperity may be anticipated, not only in the building industry but affecting all commodity markets, provided a definite effort is made to keep down prices and to eliminate the element of profiteering which often intrudes disastrously at the beginning of a period of sound demand.

It is our prediction that the cost of building will, over a long period of years, decline gradually with here and there a brief increase as the volume of activity becomes unusually large. This is a logical prediction and indicates that the average building project may now be undertaken without fear of a too great decrease in reproduction value with the consequent shrinkage of investment and mortgage loan collateral. With the returning interest in the building field as an investment outlet, it is gratifying to know that the financial organizations which constitute channels for a large proportion of such mortgage bond investments by the public are invariably appreciative of the service of architects who have the ability to plan attractive and efficient buildings. Higher standards of design and architectural merit are being set by such loaning institutions than ever before. This fact is highly significant to the architectural profession and should prove the forerunner of an ultimate better understanding on the part of the building public as to the importance of the architect's contribution and responsibility toward both the æsthetic and economic success of the building of the future.

An Estate Development at Rye, New York

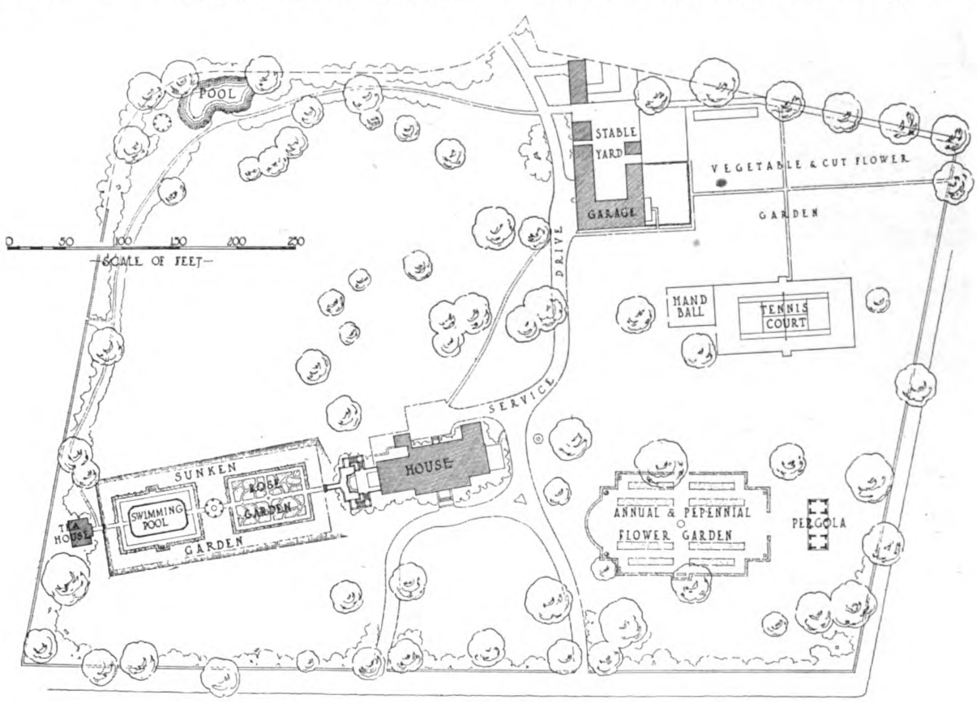
DWIGHT JAMES BAUM, ARCHITECT

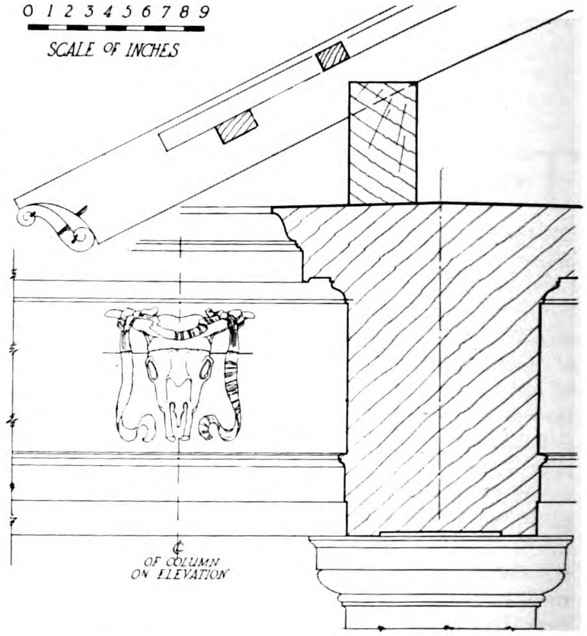
THE art of landscape design and gardening as a complement and ally to architecture is steadily being more appreciated by both architect and cultured layman. In domestic work especially the finest example of architecture is cold and forbidding without the intimate connection with its site and the sense of repose and age that a well considered planting scheme supplies. It is due to the intelligent co-operation of designers in these arts that we owe our large number of beautiful estates, for rarely is a site available that is favored with a natural growth of fine trees and shrubbery masses; the setting must be created quite as much as the architecture.

Antique Vase and Pedestal

A great part of the finished, well balanced appearance of the grounds and gardens of the Richard A. Rowland estate on the Boston post road at Rye, New York, is due to careful and well executed planning and the proper placing of large trees and shrubs rather than to years of natural growth on the site. When the commission was turned over to the architect there was no foliage whatever upon the long road frontage of the estate, none elsewhere on the tract and no trees excepting several large maples and a few pines. All the rest of the planting has been done within the period of a year and a half, including the moving of five maples of large size, sixty large evergreens and shrubbery of every description, the trees and much fully grown shrubbery having been purchased and moved from nearby estates to obtain an immediate effect at a minimum of cost.

In the planning of the grounds of this estate, which embraces ten acres, the natural disposition of the land which was quite low on both sides of the house dictated the principal scheme. At the left of the house as it is approached, and arranged on a prin-

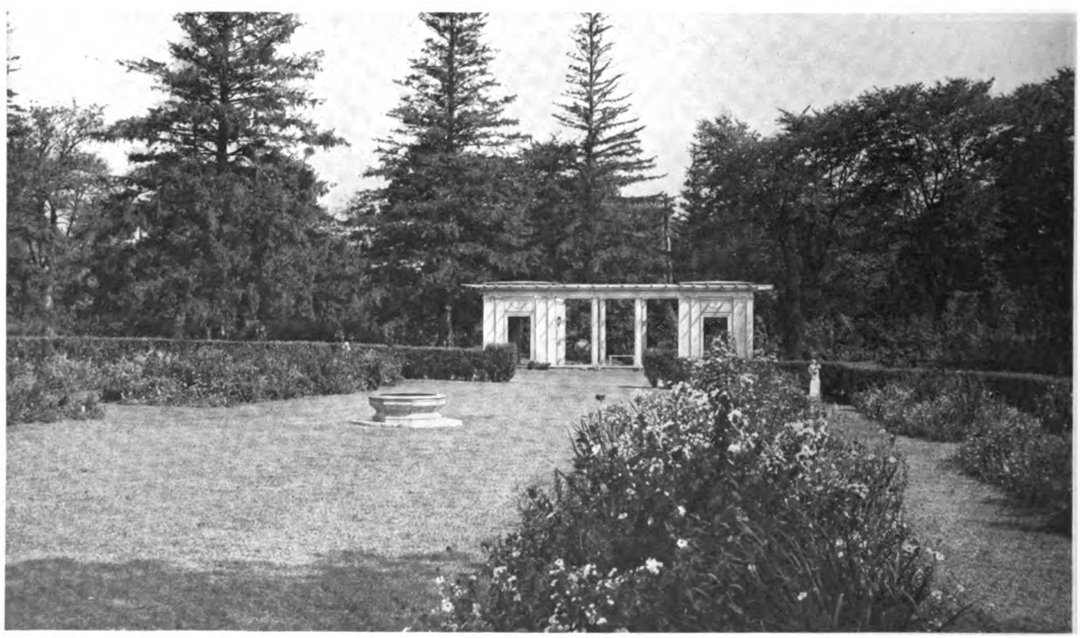




Details of Garden Temple at Center of Sunken Garden

cipal axis of the house, is the sunken garden with swimming pool and rose garden as the main features. This required some excavation and the earth thus obtained was employed to fill the space below and at the right of the house which had been an unattractive swamp. This space was arranged as a large flower garden surrounded by lawns that were carefully graded to secure a rolling surface, much as nature provides. In transforming this site of comparative irregularity, all filling was obtained within the confines of the estate. The whole tract was laid with underground drainage, and all spring and marsh water drained towards the lowest point where a naturalistic pool was built at small expense.

Accessory buildings are placed where they ter-

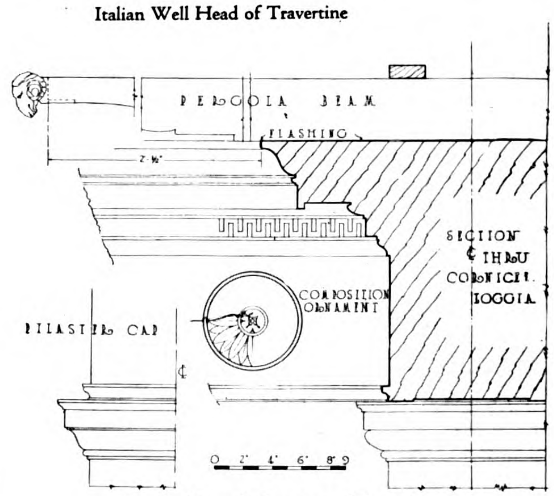


Flower Garden, Looking toward Pergola

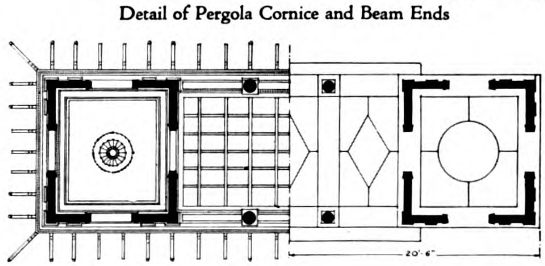
minate important vistas. At the far end of the flower garden and seen through an opening in the enclosing privet hedge is a pergola with a small room at each end which forms a shelter in wet weather and a pleasant place to sit on sunny days. Back of this pergola is set a hedge of French lilacs, 16 feet in height, placed so that at the time of year when they are in bloom their fragrance fills the pergola. The long vista from the opposite side of the house is through the sunken garden with a gazebo or temple at its center, across the swimming pool which is 50 feet in length, lined with blue faience tiles and edged with a granite coping, and closed by a graceful structure upon the axis of the vista, approached by travertine steps and doing service as a tea house. This little building includes two dressing rooms with showers and a machinery room from which the water in the swimming pool is kept in circulation and from which the pool is emptied and filled. From this tea house a walk extends along the edge of the property through a partly wooded section to the naturalistic pool to which, as already explained, the estate is drained of all spring water and excess of rainfall.

The tennis court which is set some dis-

Italian Well Head of Travertine

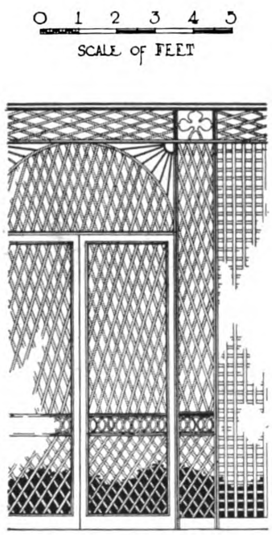


Detail of Pergola Cornice and Beam Ends

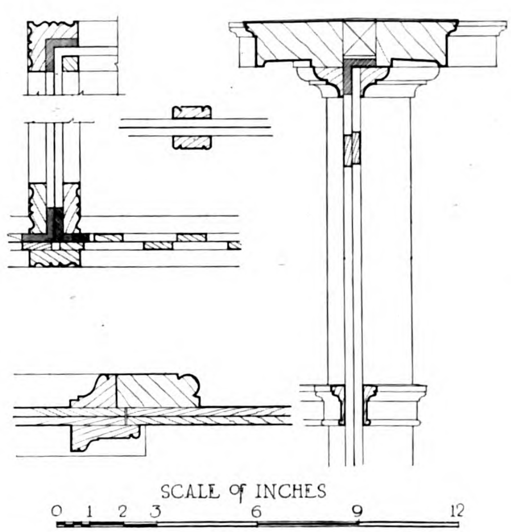


Detail and Plan of Pergola at End of Flower Garden tance back of the flower garden on the right of the house is surrounded by a high screen of lattice work of architectural character; at one end of the tennis court is a smaller court planned for handball, and at each side of the tennis court is a small shelter with stone seats for spectators. About the base of the lattice screen there is a pleasing combination of deciduous and evergreen planting to relieve the rectangular lines of the court enclosure. Throughout the grounds various small features of architectural or decorative interest occur where they are least expected — an Italian well font, several pieces of garden sculpture, partially hidden among trees or shrubbery, and a bird bath at the center of the flower garden. The material in these features shows a texture of appropriate nature for the outdoors, and the robustness of form makes them attractive accessory notes to flowers and massed foliage.

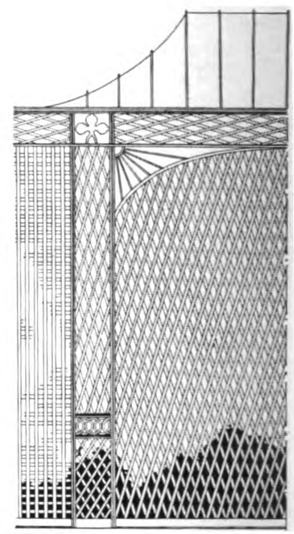
The entire estate is a well considered landscape treatment, in which architecture in classic vein and expansive open gardens are harmoniously combined. From a beginning of unfavorable conditions, a bare and somewhat swampy tract of land has been entirely transformed into the present attractive estate in the remarkably short time of less than a year and a half or about twelve months of actual work. With the more luxuriant growth a few years will bring and the ample scale of the gardens a place of unusual beauty will develop.

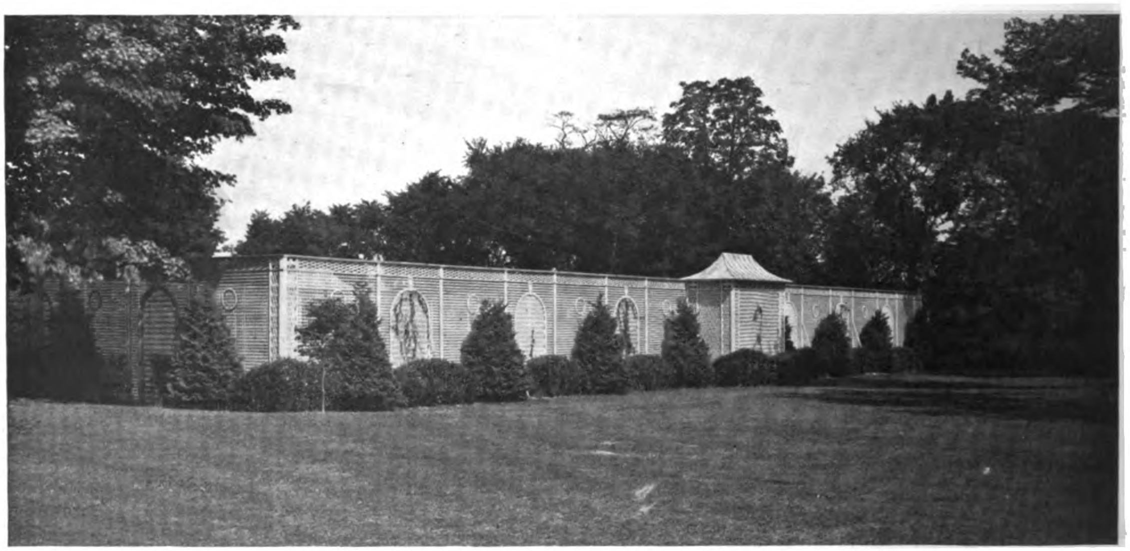


Detail of Doorway



Structural Details of Enclosure


Detail of Shelter

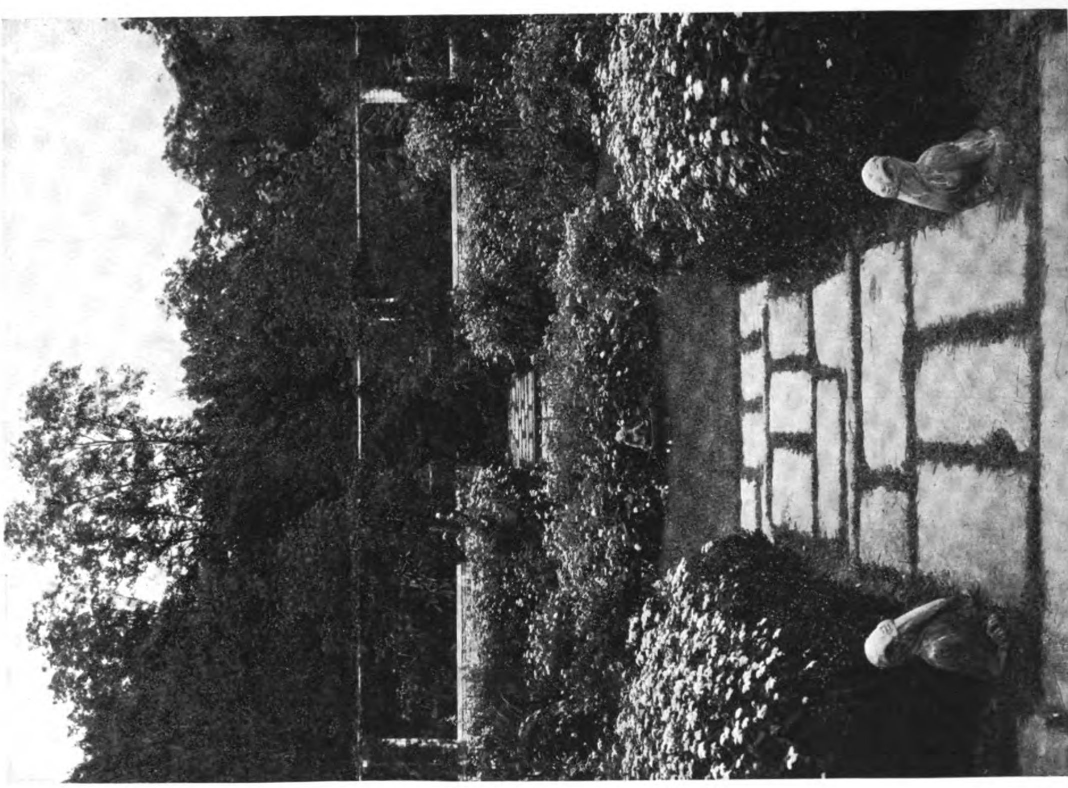

Exterior View of Lattice Tennis Court Enclosure

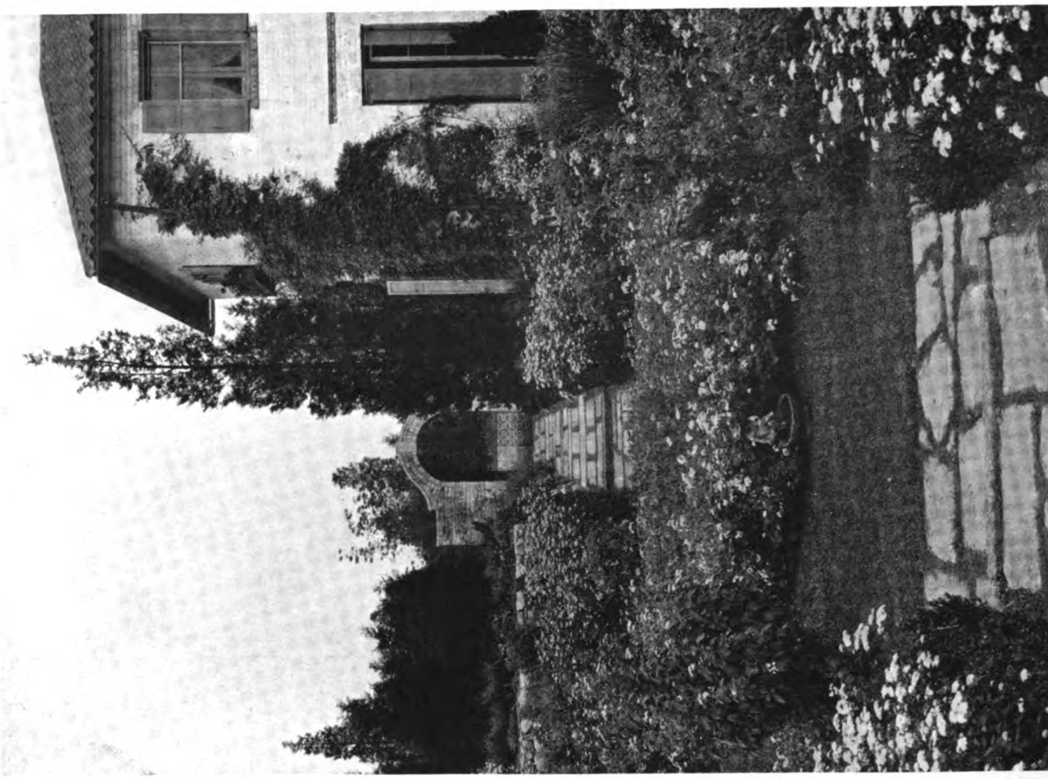
VIEW ON MAIN AXIS OF GARDEN

NELSON DOUBLEDAY GARDEN, OYSTER BAY, L. I.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

A house not rigidly stylistic has a minimum influence on the garden. Although intimately related to the house, there is a happy freedom from convention

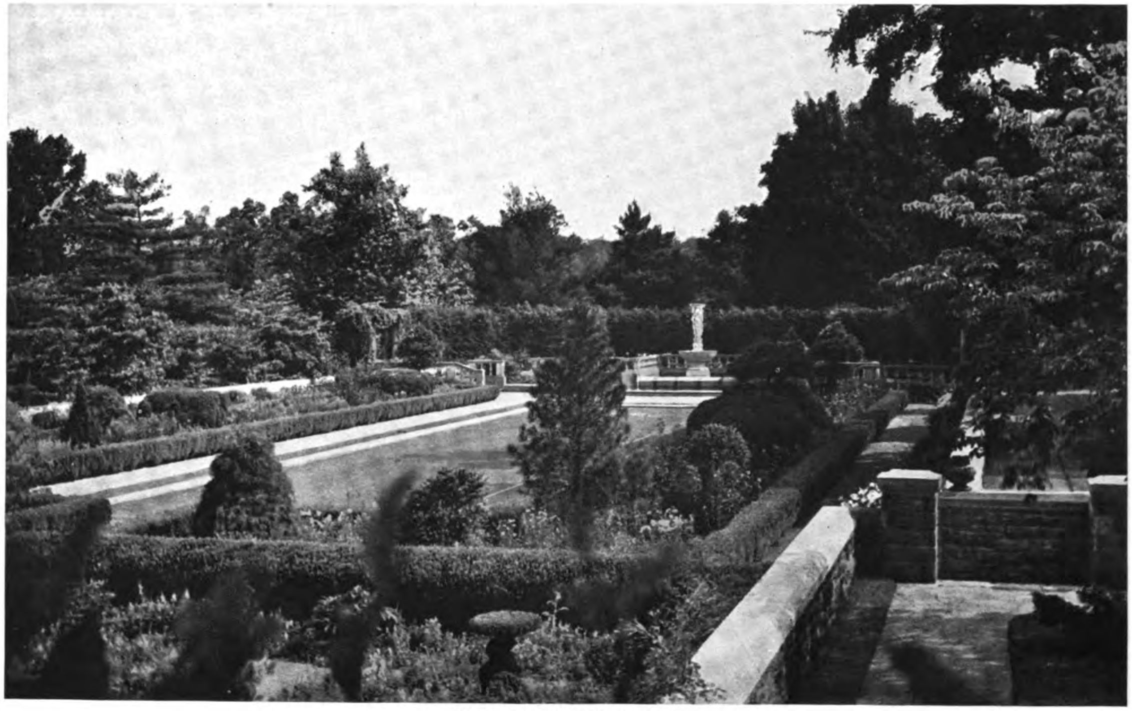




NELSON DOUBLEDAY GARDEN, OYSTER BAY, L. I.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

The simplicity of the flower masses and of the structural lines of the garden are particularly pleasing in their relation to the adjacent woods and as a setting for the house

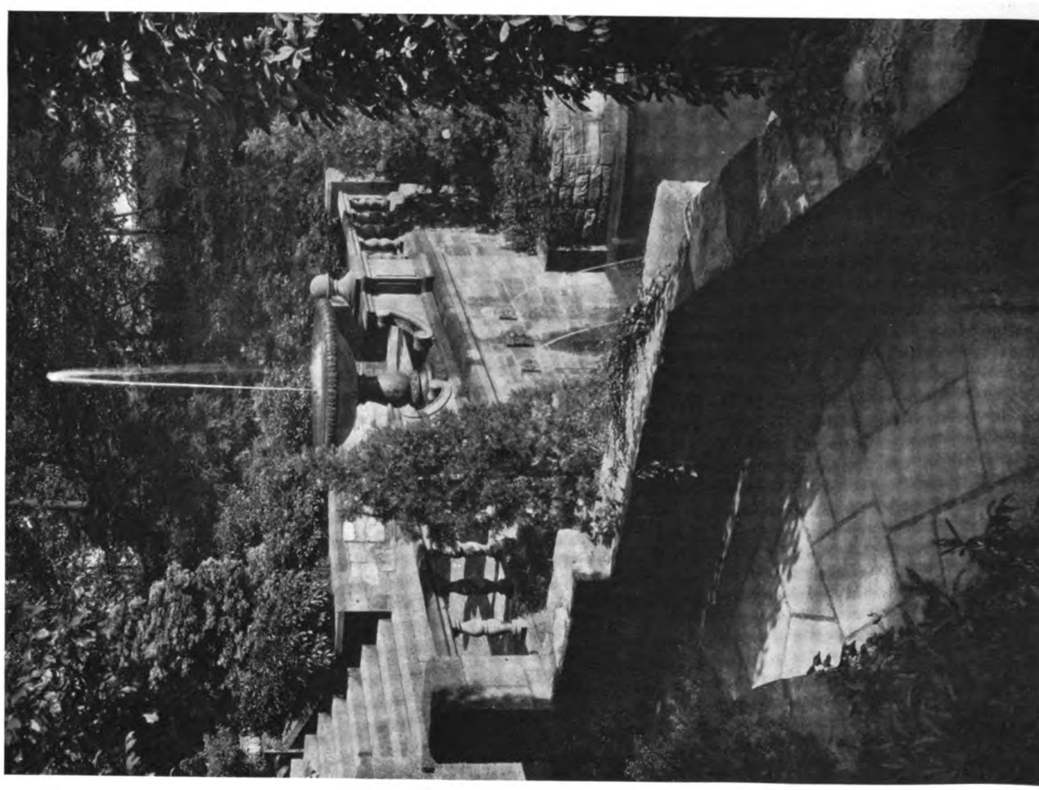


VIEW FROM HOUSE LAWN

J. E. ALDRED GARDEN, LOCUST VALLEY, L. I.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

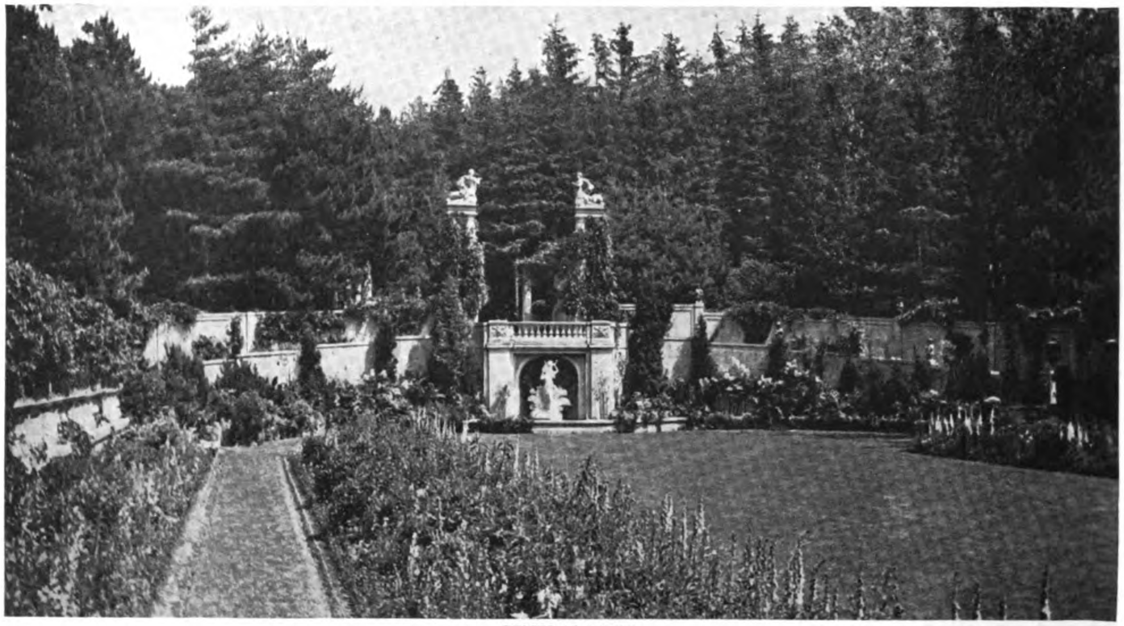
Harmony in character between house and garden may usually be secured merely by the use of appropriate architectural details, garden ornaments and plant forms, and opportunity for variety, interest and distinction is still almost unlimited



GARDEN AT CLEVELAND

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

In a woodland ravine with planting and overhanging trees, it is a striking example of the utilization of opportunities afforded by the site. The intricate lights and shadows contribute largely to its peculiar charm

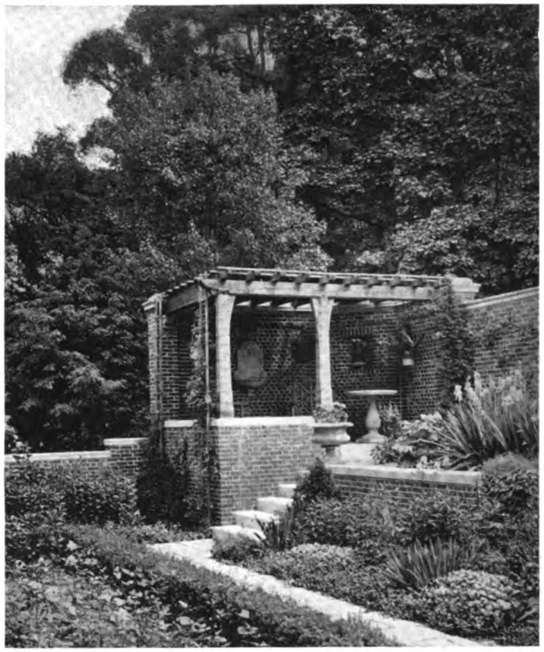


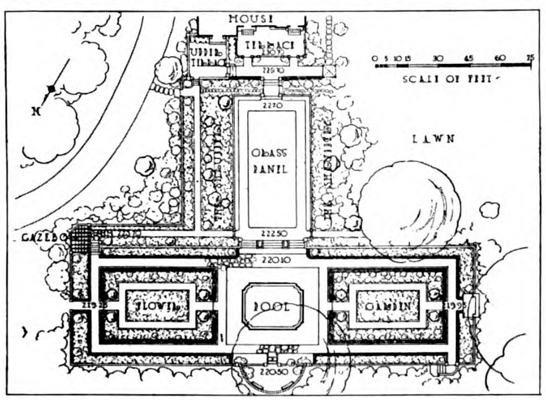
GENERAL VIEW

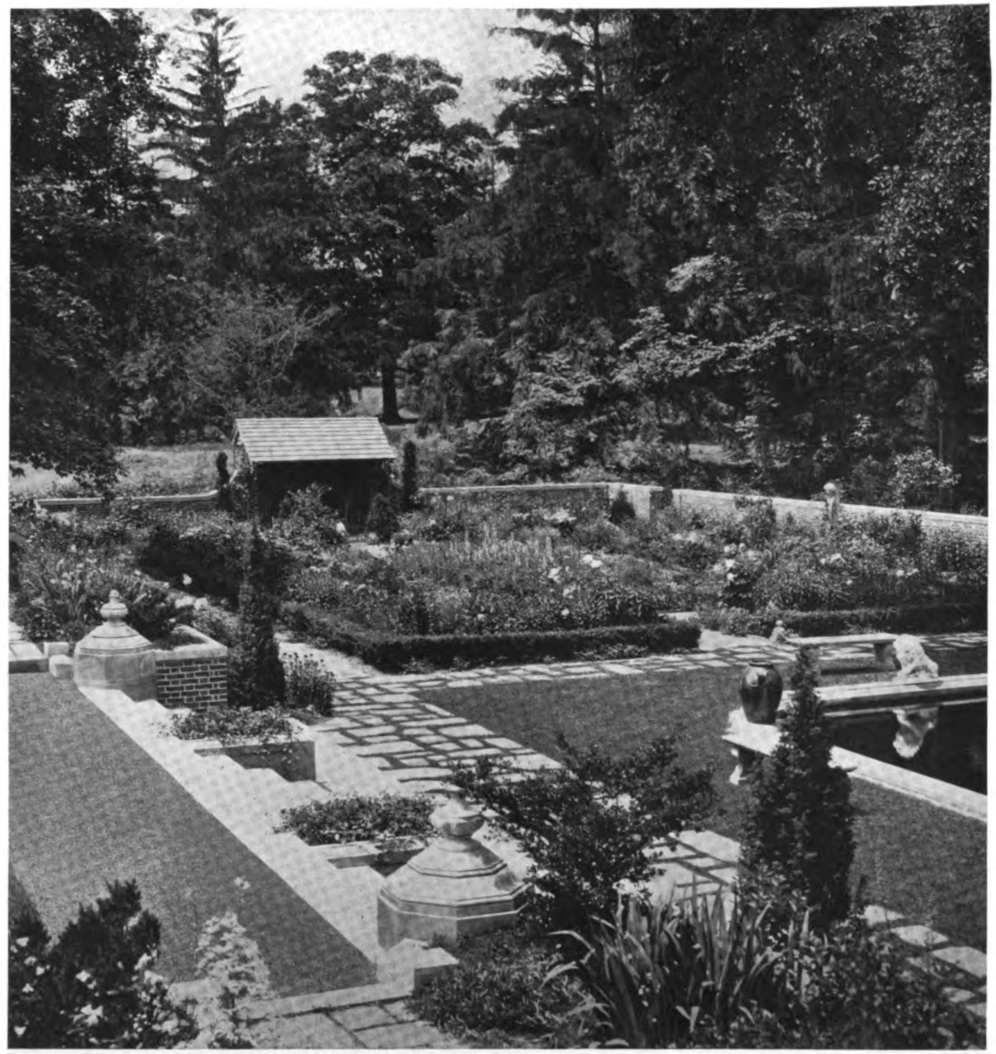
GARDEN AT IPSWICH, MASS.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

The strength and dignity of the pine woods have dictated the simple lines and forms of the garden; restrained use of architectural accents and appropriate plant forms give effective interest







GARDEN OF H. G. LAPHAM, BROOKLINE, MASS.

OLMSTED BROTHERS, LANDSCAPE ARCHITECTS

A garden strongly influenced in its detail by an Elizabethan house, but clearly governed as to its general plan and conception by conditions,— sloping ground, limited area and fine existing trees

The Building Congress Idea

By WILLIAM STANLEY PARKER

THE Congress of the Building Industry has put into practice an idea hitherto apparently considered impossible of practical application—that employers, labor, material manufacturers and others of the industry can jointly discuss on equal terms matters of common concern.

That this has been demonstrated is due to a group of forward-looking architects who have largely initiated the work; progress is being made and results can now be measured; the movement deserves the active interest of architects, because it offers them for the first time an opportunity to exert impartial and professional influence in an effective manner.

THE EDITOR

ALL those associated with the building industry should take a keen interest in the recently announced formation of the American Construction Council. Its purpose as a conference organization is made clear in the preamble to its proposed by-laws which reads:

With the desire to place the construction industry on a high plane of integrity and efficiency and to correlate the efforts towards betterment made by the existing organization, all the component parts of the industry herewith join in the formation of the American Construction Council, a conference association representative of the whole industry and dedicated to the improvement of the service which the construction industry renders to communities, states and nation.

The underlying idea of this council is that it is a body composed of representatives of all the elements of the industry—architects, engineers, general contractors, sub-contractors, labor, material manufacturers and dealers, financial, bond and insurance organizations, public utility construction departments and representatives of federal, state, county and municipal bureaus or departments concerned with construction. It is clearly not the intention of this new organization to assume controlling direction of any operations in the industry or to relieve any of the existing separate organizations of their natural functions and responsibilities. It is, as the preamble declares, a conference association whose efforts shall be to correlate the efforts of the existing organizations for the betterment of the industry as a whole.

It has been said in newspaper references to this organization that now for the first time this will be done. This is perhaps sufficiently accurate for a newspaper statement, but it is perhaps only fair to point out that it is not literally true. It has also been pointed out or intimated in recent editorial articles in the architectural press that there was a great opportunity for the architectural profession to do something towards correlating the work of the various elements of the industry, the inference being that the architects had not up to this time exerted any influence in such directions. This also does not accurately represent the facts.

It is only fair to say that the first constructive step in the development of the movement which appears to be consummated by the organization of the American Construction Council was taken by the American Institute of Architects in the spring of 1920, just two years ago, when its board of directors reported its belief in the necessity of such a movement and received the authority of the convention to proceed. As a result of this action, a meeting was held in Atlantic City in September, 1920, at which were present representatives of practically all the elements of the industry.

The need of closer coöperation between the different groups in the industry was argued, and the meeting was unanimous that some organization to this effect should be inaugurated. One of the fundamental ideas in the proposed scheme of organization was the primary importance of local groups, working out their own local problems. Any attempt to settle matters nationally by a national committee would be sure to fail of results. It is inconceivable, for instance, that a national committee could solve the problems of seasonal labor for both Boston and Los Angeles, Boston having a very serious problem of this kind, and Los Angeles as a matter of fact having practically no such problem. Similarly, with the fundamental relationships between employer and employe in the industry, there are fundamental local differences, and it would be idle to attempt to lay down any national rules to control such matters.

The movement which was started at that meeting was known as the National Congress of the Building and Construction Industry. The national committee was formed and preliminary meetings held, and preparations for a first national conference started. It was felt, however, that until definite progress had been made in the development of local groups, a national conference would be of no use. For this reason the national movement held itself in abeyance, excepting so far as it concerned itself with an effort to develop local groups.

Building Congress groups were started early in 1921 in New York and in Boston and have been in fairly active operation ever since. The New York group has developed a suggested code of ethics* for the building industry, which is one of the specific matters which the American Construction Council will consider. This code of ethics has been favorably received and acted on in various localities and represents a consensus of opinion in regard to the right relationships and practices that should exist. Like the Golden Rule and the Ten Commandments, if it were not only accepted but conscientiously lived up to, there would be little if any need for further efforts at improvement.

*Published, THE ARCHITECTURAL FORUM, January 1922, page 54, Service Section.

The Boston Congress turned its attention first to the question of seasonal employment in the industry, and after some weeks of discussion issued a brief report on the subject with a chart showing graphically and with approximate accuracy the trend of employment during a typical year in each of the principal trades. Of course issuance of a report does not correct the difficulty, and the problem is one of extreme difficulty. It may well be doubted whether more than a portion of the difficulty can be overcome. In any event, it will need the co-operation of the owners of property, who in the last analysis are the ones who determine when work shall be carried out. If they could be made to realize that they would get a better grade of mechanic and as a result better work in certain months of the year, even if the wage paid to the workman remained the same, they might rearrange a considerable amount of repair work and alterations so that the employment of the mechanics would come to a considerable extent in the low peak periods of employment. The owner, however, is a very difficult element in the industry to approach, as he is much less closely knit in his organizations, and is apt to work on an individualistic basis along lines of practical expediency that his own experience has developed.

The New York Congress also developed during the present year what appears to be a most admirable system of apprenticeship for the building trades. It is based upon the co-operation of the contractor and labor groups in the industry, and by their joint operation of a scheme for the industry as a whole, it seems to be assured of a degree of permanency that has not been a feature of the various independent schemes that have been tried.

Recently in Boston a meeting was held at which this apprenticeship problem was discussed, and the New York scheme explained by the educational adviser of the New York Apprenticeship Committee. Following the meeting the Boston Congress passed a resolution in favor of an apprenticeship system in these terms:

Whereas, an adequate supply of properly skilled mechanics is essential to the proper functioning of the building industry, and

Whereas, in the opinion of the Boston Building Congress such a supply cannot be obtained without an adequate system for the training and employment of apprentices, be it

Resolved, that it is essential to the interests of the building industry in the Boston district that a general system for the training and employment of apprentices be established, and be it further

Resolved, that organized representatives of labor and of contractors in all trades connected with the building industry and other interested groups be sent a copy of this resolution, together with a copy of the New York system by way of suggestion, and that they be urged to co-operate in the establishment of a system for the Boston district.

The point in these various actions that is most significant is that they have all been the result of the co-operation of representatives of all the elements in the industry, from the owner through the intermediate designing and administrative elements to the actual mechanic who places the material on the job. The report on seasonal labor is not an outside analysis of the labor situation by some investigator, but is the result of frequent discussions with a group of labor men, analyzing statistics which they themselves have collected and presented for discussion. The apprenticeship system is not some scheme being proposed by the contractors in an effort to get cheaper labor, or by labor with some hidden possible motive of limiting the number of apprentices that might be employed. It is a scheme to meet the practical needs of the growing industry, presented by contractors and labor men in conjunction with the other elements of the industry,—all being conscious of the fact that without an adequate, properly trained force of mechanics the other elements of the industry cannot function.

These joint discussions have been a new experience for those who have taken part in them, and they have been shown the great possibilities for good that lie in such joint action. Nothing so tends to break down barriers of misunderstanding and suspicion as meeting face to face in a discussion of common problems. The misunderstanding and suspicion that exist in the building industry are its most serious problems, and they can best be solved by just this sort of democratic co-operation, in which no element is superior in importance to any other element, but each is essential to the success of every other.

Recently, active groups of the Congress have been started in the states of Washington and Oregon, and steps toward organization have also been taken in Philadelphia. There have been many isolated examples of co-operation between a few of the elements in the industry for some particular work, such as the classes for the training of mechanics that have been developed in the last year or two in Philadelphia. They will gain in permanence and value when they have become merely one manifestation of general co-operation such as the Building Congress idea involves.

In the opinion of those who are guiding the initial steps of the American Construction Council, one of its first and most important activities should be the stimulation of the organization of similar groups in all the major centers throughout the country. Through the National Council the results of all these various local groups can be made available to all, and the work of each greatly advanced in this way. The industry has long been over-organized in its individual elements, each seeking to foster its own interests, not consciously in opposition to the interests of the other elements, but merely regardless of their interests; but the industry as a whole has been absolutely unorganized—one might almost as well or better say disorganized.

Now at last, and for the first time, it seems that the industry may become conscious of itself as a whole, with the possibility—indeed let us hope the probability—that in so doing each functional element of the industry will be able to recognize more accurately its own relative position in the industry, and act with a broader conception of the interests of the industry as a whole.

Electrical Wiring Layouts for Modern Buildings

PART VI

By NELSON C. ROSS, *Associate Member, A.I.E.E.*

IN drawing the plans for the wiring of a building of any kind there must be careful consideration of all the various forms of service which are to be installed. Each of these forms has different requirements which the architect should take into account.

WATCHMEN'S CLOCK CIRCUITS. These clock stations are desirable on large residence work where a number of outbuildings are to be patrolled. The magneto system is generally used, with a clock in the office or at some central point and with the number of stations required. No battery is used, as each station is a magneto generator, the watchman inserting a crank in the magneto, the turning of which draws down the hammer at the clock, thus registering the number on the dial chart. One wire, common to all stations, and one individual wire are required for the system. These should be run in conduits, ¾-inch conduit as a rule being ample for general work of this kind. No. 16 rubber-covered wire is required.

PROVISION FOR WIRELESS STATION. In providing for the use of radio equipment it is important that the matter of "grounding" be carefully considered, as insurance requirements are strict and must be followed (Fig. 1). The room where the equipment is to be used should preferably be on an upper floor, and standard insulators should be carried through the building wall for the lead in wires, these insulators extending 5 inches on each side of the wall, porcelain tubes not being permitted. If there is a possibility of a sending station, a standard 100-ampere, 600-volt, single pole, double throw ground switch must be used. If a receiving station only is to be considered, the ground switch may be replaced by a short gap, or vacuum type lightning arrestor. The switch or arrestor must be mounted, so that the current-carrying parts are 5 inches from the surface of the building wall, and the ground wire should be not less than No. 4 B. & S. gauge. The switch must always be thrown to ground when the equipment is not in use. The switch is installed on the outside of the house and may be operated by opening a window or by means of an extension rod or toggle extending into the building.

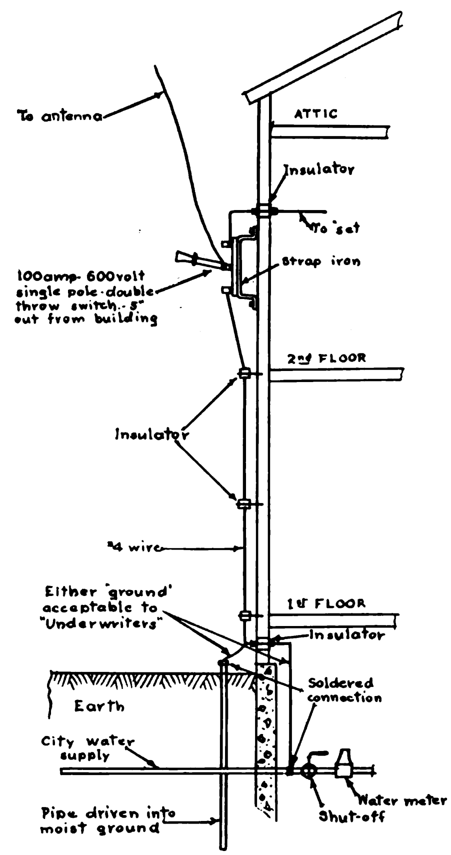


Fig. 1

The insurance requirements are that the ground wire be exposed on the outside of the building, and this wire must not be run in a pipe unless the pipe is bonded to the wire at both ends. The wire may be grounded to a water main or an artificial ground as in Fig. 1.

OLD BUILDINGS. In the wiring layouts covering old buildings, the locations of outlets and general arrangement of circuits would be the same as for new buildings. In the construction, however, we are as a rule compelled to use B. X. armored wire, and the work should be laid out so that there will be as little cutting of the floors and timbers as is possible. If during repairs floors and ceilings are to be torn up, conduits may be used, or B. X. wire clipped into place without reference to the floors and ceilings. Where general repairs are not to be made the floors and baseboards must be pocketed and the wire fished from outlet to outlet (Fig. 2).

Where there is an unfinished attic, the floor boards may be removed and the outlets installed in the ceiling of the floor below, and the circuits dropped in the walls to switches and brackets. Feeder circuits as a rule may be carried up in the space around the chimney to the attic and there distributed to the outlets, the panel box and fuses being in the basement. For bracket outlets and switches on the floor above the basement the wires may pass up into

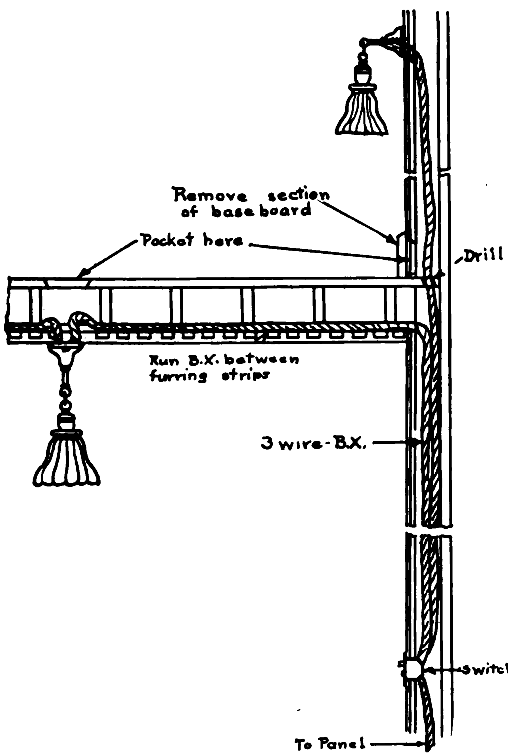


Fig. 2

the walls from the basement. For ceiling outlets on this floor, however, the wires must pass up to the floor above, the baseboard being pocketed on this floor, as well as a pocket being cut in the floor at a point above the outlet, the wire then being fished through the two pockets to the proper outlets. B. X. armored wire is easily fished between timbers, and where care is used may be fished across timbers between furring strips, and between the lath and the bottom of the timbers.

In many cases it is not advisable to pocket floors or to cut baseboards. In such cases the ceiling must be pocketed, sometimes in two or more places, a hole made in the lath, and the hole patched after the wires are in place. Where walls are firestopped with brick, or in the case with many old houses where walls are heavily bridged, it may be necessary to cut through the plaster and to channel the firestopping, etc. to permit the wires to be drawn into place. On outer walls of brick, B. X. wire may be fished between the furring strips. Where, however, the plastering is on the brick without furring, the walls must be channeled to permit the wires to be concealed, or the wires must be run in exposed wiremould or metal mouldings.

Where panel boxes are to be placed on different floors, flexible tubing may be used for mains and risers. Rigid conduits are in nearly all cases used in the basement. Where possible, panel boxes may be located in closets on the different floors and the risers run in rigid conduits exposed, the conduits being painted after installation.

Lighting of Grounds. The lighting of grounds or walks may be cared for on a general circuit controlled from one point, or where there are several buildings, circuits may be run out from each building and controlled by means of local switches (Fig. 3). While overhead lines and iron or finished wooden poles may be used for ground lighting, it is not advisable as the wires being small are likely to give trouble during winter ice storms. Possibly the most satisfactory method of lighting grounds is by means of iron poles and armored cable, the cable laid in a slot or trench 15 inches below the surface and without further protection.

In the cable referred to the wires are insulated with rubber, made up in cable form and sheathed with lead, the lead covered with a serving of tarred jute, two tapings of steel ribbon, and a final serving of jute saturated in tar compound. The cable is finally given a bath of French chalk to absorb excess tar. This cable, which is very flexible, is waterproof and proof against reasonable mechanical injury, is made in all sizes, and can be had in any length. It is less expensive than underground conduit and wire, and is not laid to grade or with pits and splicing boxes. This cable may be run through a hole in the basement wall, and looped from pole to pole, the splices being made at the socket. A single switch may be used, located at a convenient point in the corridor, or where there are a large number of lights to be controlled a solenoid switch may be mounted in the basement and the monitor or push-button switch located in the corridor. All fuses, etc. should be located in the basement, preferably at the point where the armored cables leave the basement.

Proportioning Feeder Cables. It is obvious that the capacity of a feeder cable must be ample to care for the combined loads of all wires served by the feeder, and that the capacity of the service main must be ample to care for the combined loads on all feeders. This does not mean that the cross section of the main must be equal to the combined cross section of all wires in the building, but that the capacity of the feeder or main must be ample to care for the greatest load or demand of the building at any time. In residence work the lengths of mains and feeder cables are such that if the copper is proportioned for the ampere load it will be amply large for all purposes. Each size of wire is allowed a certain current-carrying capacity, by the National Code, as given in the table. The allowable current is the maximum amount that, if continued indefinitely, will not raise the temperature of the wire to a point harmful to the insulation.

In proportioning copper, if there are ten circuits feeding from a panel, each circuit supplying six 100-watt lamps, and all of these lamps may be in use at the same time, the greatest, or peak load, will be ten circuits times six lamps, or sixty 100-watt lamps or 6000 watts; if the feeder circuit is two-wire, 110-volts, the current demanded at the panel will be 6000 divided by 110 volts, or 54.5 amperes. By consulting the table it will be seen that a No. 6 wire is allowed 50 amperes, a No. 5 wire 55 amperes, and a No. 4 wire 70 amperes. As No. 5 wire is not standard, *two No. 4 wires* should be used. Under like conditions, if the voltage were 110–220 volts on the three-wire system, we would divide 6000 watts by 220 volts, which would give a current demand of 27.2 amperes. It will be seen that No. 10 wire is allowed 25 amperes and No. 8 wire 35 amperes, so *three No. 8 wires* are better.

Likewise, if there were three panels in the building, each with 6000 watts connected load, and say an electric range which will demand 10,000 watts at full capacity, the total connected load in the building will be 18,000 watts for the panels and 10,000 watts for the range, or a total of 28,000 watts. Now, 28,000 watts at 110 volts require 254.5 amperes, and at 220 volts require 127.3 amperes. It is not probable, however, that every lamp and the full capacity of the range will be used at the same time, so that if the mains are proportioned for 80 per cent of the connected load, we would require copper for 203.6 amperes on 110-volt, two-wire service and for 101.8 amperes on 110-220-volt, three-wire service, or two No. 0000 wires, or three No. 0 wires respectively, the mains and feeders of course to be fused for their allowable carrying capacity. In determining a percentage of the connected load for which to allow copper, the conditions of operation should be carefully considered and copper should be provided to care for the greatest average load that may be demanded; if there is a question of doubt, it is better to make the wire large than to take chances with too small feeders.

Knife switches and fuses have been standardized in these sizes: 30-ampere, 60-ampere, 100-ampere, 200-ampere, 400-ampere and 600-ampere, and fuse clips are proportioned for these switches: 1-30-ampere, 31-60-ampere, 61-100-ampere, 101-200-ampere, 201-400-ampere and 401-600-ampere.

The fuse cases are of different sizes, and each will fit the clips corresponding to the capacity. Thus, if the load is 65 amperes, we must use a 100-ampere switch, as no 65-ampere switch is made. This switch takes a 100-ampere fuse case, but the fuse wire in the case may be of any value between 61 and 100 amperes. Likewise, if the load is 225 amperes we must use a 400-ampere switch, but may use 225-ampere fuse wire in a 400-ampere fuse case. Thus, if we are to use a No. 4 wire, which is good for a load of 70 amperes, we must use a 100-ampere switch but must use 70-ampere fuses to protect this wire. It is immaterial whether we are using 110-220 volts,—we must in all cases fuse to protect the current-carrying capacity of the wire.

While bare copper wire and wires covered with weatherproof insulation are commonly used for outside circuits and line service, and while wires insulated with varnished cambric are used for circuits that are subjected to high temperatures, the standard rubber-covered wires should be used for all interior work, whether these wires are installed in conduits, mouldings or on cleat construction. The table included here gives the current allowed for the different wires likely to be used.

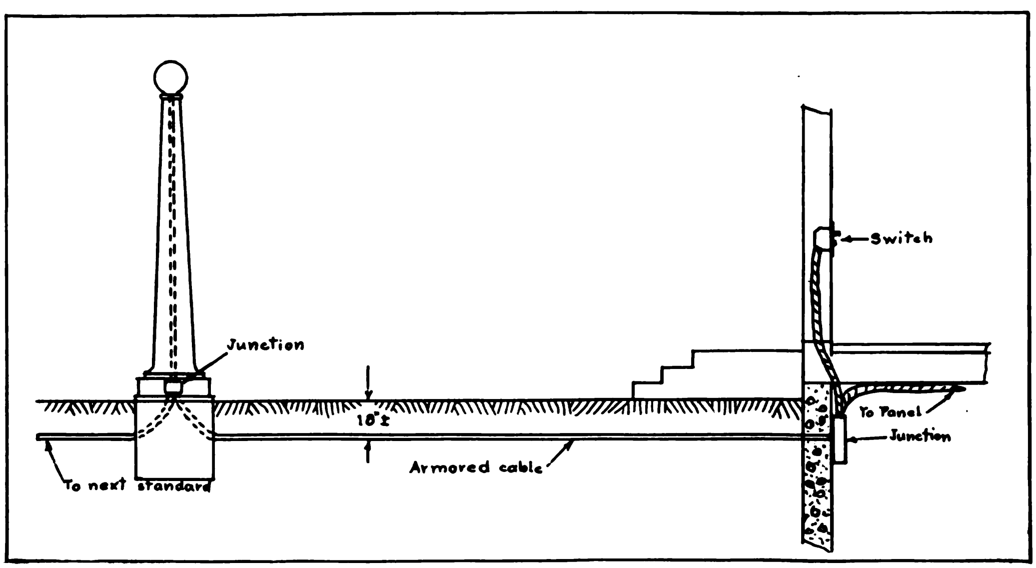


Fig. 3

ALLOWABLE CARRYING CAPACITIES OF WIRES

B. & S. gauge	Diameter of solid wires in mils	Area in circular mils	Rubber insulation amperes
18	40.3	1,624	3
16	50.8	2,583	6
14	64.1	4,107	15
12	80.8	6,530	20
10	101.9	10,380	25
8	128.5	16,510	35
6	162.0	26,250	50
5	181.9	33,100	55
4	204.3	41,740	70
3	229.4	52,630	80
2	257.6	66,370	90
1	289.3	83,690	100
0	325.0	105,500	125
00	364.8.	133,100	150
000	409.6	167,800	175
		200,000	200
0000	460.0	211,600	225
		250,000	250
		300,000	275
		350,000	300
		400,000	325
		500,000	400

ISOLATED RESIDENCE PLANTS. In many locations electric service is not available, or the service lines may be so far away that the cost of the pole line to the building may prove prohibitive. For such conditions the so-called "farm lighting plant" may be used. This equipment, which is furnished by several manufacturers, is nearly automatic in its action, and is not expensive to install or to operate. The plant consists of a small four-cycle, internal combustion engine direct, connected to a direct current generator, a storage battery and a switchboard. The engine uses kerosene and may be located in the basement.

The plants are made in these capacities:

300-watt size, operating at 16 volts, with 80-ampere-hour storage battery. This size is used for lighting only.

600-watt size, operating at 32 volts, with 80- or 160-ampere-hour battery. This set may be used for lighting and for running a motor up to ½ h. p. when the engine is running.

850-watt size, operating at 32 volts, with 160-ampere-hour battery. This set may be used for lighting, operating table cooking equipment and for running ¾ h. p. motor when the engine is running.

1250-watt size, operating at 110 volts, with 160-ampere-hour battery. This set is of capacity to operate two or three flatirons, or table cooking equipment and a motor of 1 h. p. capacity, when engine is running.

2500-watt size, operating at 110 volts, with 160-ampere-hour battery. This set will render all the service just mentioned and will operate motor of 2 h. p. capacity with engine running.

The smaller sized plant is available for use in a camp or small house for lighting only.

The 600-watt and 850-watt plants operate at 32 volts, and are of sufficient capacity to care for a large house or farm, and will run small motors, flat irons and the usual table equipment such as toasters, grills or chafing dishes. This voltage is standardized for these plants and the usual equipment is manufactured to operate on this voltage. In ordering such equipment, however, it is necessary to mention the voltage at which the equipment is to be used.

The 1250-watt and 2500-watt plants will care for nearly any large residence or farm. The plants operate at standard voltage, and any standard equipment may be used on the circuits.

In many cases such a plant is installed as an auxiliary to the regular electric service (where such service is intermittent, due to line trouble, or storms), as with its use, in the event of interrupted service, the plant may be started and render service until the lines are repaired. Where greater capacity is required than is available with one plant, duplicate equipment may be installed and connected to work together.

The wiring layout for the building would be the same, whether the service wire is taken from the service lines or from the small isolated plant. When the plant is used as auxiliary to the outside service, a double throw switch is installed so that the service may be taken from the lines or from the plant at will.

With the use of these plants a large fuel storage is not required, as the engine tank holds sufficient fuel to operate under average conditions from three days to one week, and the tank is refilled as needed. The engine is started by means of a switch or by means of a push-button, so that neither strength nor skill is required to put the plant in operation. When the battery is fully charged the engine automatically stops.

On larger residence work it is customary to locate the plant in a stable or outhouse, the feeder cables running from the plant switchboard to the house and to the different outbuildings, also for the lighting of the grounds. Where possible, the feeder cables should be run underground, either through conduits or by using lead-sheathed, armored cables. Where, however, to save expense, the feeder wires are installed on poles, the wires used should be large enough to bear the usual weight of ice and snow during the winter months; usually nothing smaller than No. 8 wires should be used for overhead lines. All overhead lines should be protected by lightning arrestors, one arrestor being used and connected to each wire, and all arrestors connected to a common ground wire, this to be securely bonded to a water pipe; the ground wire should not be less than No. 6; one set of arrestors is sufficient to protect approximately 2,000 feet of line.

Elevator Installation

PART II

By HUBERT M. GARRIOTT, ARCHITECT

IN connection with elevator installations there is such a multiplicity of problems which confront the architect at the start of the work that it is quite important to keep abreast of the times as to material and methods. In a previous discussion the layout of the hoistway and shaft was considered and some consideration was given to types of elevators. In this discussion we wish to call attention to the types of doors and various accessories to the elevator equipment.

There is no doubt but that one of the most perplexing problems in connection with the elevator layout is the selection and arrangement of the doors. The difference between the size of the opening into the elevator which the plans call for and the actual sizes and development in the finished project is frequently a source of embarrassment to the architect. This is due to one of two things: first, the architects may not have been sufficiently careful in laying out the door openings; second, the car opening may not agree with the construction of the elevator fronts and the underwriters' requirements. A casual observation of elevator fronts and doors in commercial office buildings will show many instances in which the door when opened leaves a wide space between the edge of the jamb and the edge of the car platform (Fig. 1). It is safe to say that every such building carries a penalty charge on the insurance premiums because of such poor construction. In these instances a solid filler should be extended from the car posts to prevent accidents. Some such protective method is required by the insurance companies in order to eliminate the "defect" charge. It is in the interest of every architect and building owner to prevent the existence of this poor form of layout. All that is necessary is to see that the parts "hitch" together and that there are no interstices between.

The openings into the hoistway should be determined at the same time that the general layout of the elevator shaft is decided upon, as the side clearance between the platform and hoistway walls absolutely determines the distance the side jamb of the doors should project beyond these walls, so that when the doors are opened the jamb of the opening and the clearance in the car will be opposite each other (Fig. 2). One can readily see how the corner post type of car will cause a smaller jamb to be constructed than the side post type, due to the difference in clearance. If the plans are first prepared with a side post type of car and then corner post construction is adopted, the fronts will not properly register unless the elevator fronts are changed as well.

The problem of doors is one of a good deal of interest and much importance. Shall the door be a single sliding panel (Figs. 1 and 2) or shall it be a "two-speed, three-part" door (Fig. 3), that is, with one standing panel and two sliding panels, or shall it be "two-speed, two-part" with no standing panel? The type of elevator layout will control to a certain extent the latter method of construction. A two-speed, two-part type (Fig. 4) takes very much more space in the hoistway in order to develop the maximum amount of opening into the car than any other type. With the two-speed, standing panel type, it is obvious that two-thirds of the distance between the jambs may be clear opening and the sliding panels may slide behind the standing panel so that the minimum of hoistway construction is needed to accommodate these doors. On the other hand, the most inexpensive and most

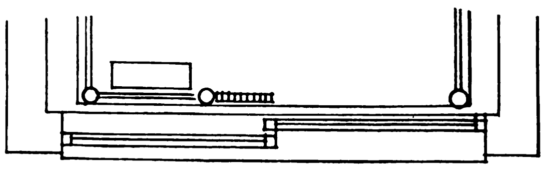


Fig. 1

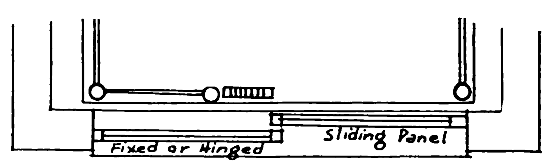


Fig. 2

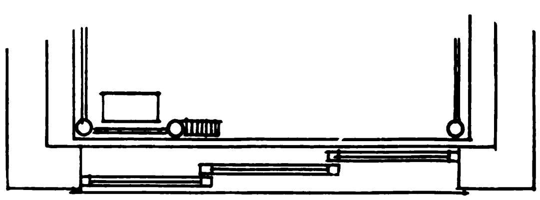


Fig. 3

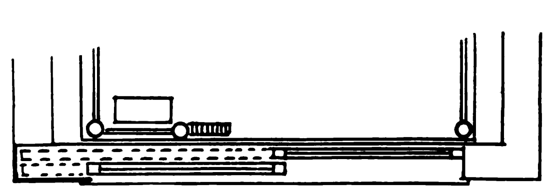


Fig. 4

frequently adopted type is the single slide panel which gives half of the opening. These are easy to construct and meet all the requirements of the normal type car of small capacity. In the modern office buildings, however, where the elevator traffic is large, particularly during rush hours, a two-speed door giving so much more opening into the car will afford greater facilities for handling the crowd.

Where the door adopted is a single sliding panel it is always wise to hinge the standing panel so that the car may develop the maximum opening in case it is used in emergencies for carrying freight or office furniture. With the two-speed doors this same provision is frequently of value.

The designs of door and enclosure necessitate some study. Modern building law requirements are reasonably uniform in calling for a tight enclosure rather than an open grille, such as was so customary when elevators were first used. The theory of fire prevention demands as few open connections between floors of a building as are practicable. As a result the majority of building codes insist that "all vertical openings," meaning stairs as well as elevators, "must be protected by a fireproof enclosure." The most common method of construction adopted to meet these conditions is the use of metal grilles backed up by glass in which wire is embedded. Clear or polished wire glass is always preferable for the doors as it enables the operator to see passengers at the various levels. This is more expensive than the pattern or rough wire glass, but the added cost is more than repaid in the better appearance. Elevator shafts probably never can be made smoke-tight, but a shaft with glazed metal doors will act as a retardant to the spread of fire and will prevent the "mushrooming" of fire from floor to floor.

There are on the market many safety devices which when attached to door or car minimize the possibility of accidents through doors being left open after the car has passed its landing or through carelessness in operation of the car before the door is closed. Probably 90 per cent of the injuries and fatalities in elevators are due to this. As a result, continual research is being conducted to find the ideal solution. A device to be perfect must prevent the opening of any shaftway door when the car is not level or within a few inches of level with the floor at any landing. It must also preclude the possibility of the car's being moved before the door is tightly closed. It must, however, be so arranged that in case of accident the door may be opened from the well side so that passengers may escape.

No elevator should be installed, even in unimportant buildings, without some protective device. There are now door locks which control the current, others which hold the door in place until released by a "trigger" on the car platform, others which by means of an air check open or close the door when the car stops at a landing. All these devices are good for certain installations and each has its appeal and strong adherents. Some of the elevator manufacturers have developed a patented mechanism by means of which a car is automatically leveled with the floor at any landing. The value of this device is at once apparent to those who have observed the carelessness with which some operators stop the car and to those who so frequently hear the "step down" or "step up, please" of the operator. One can readily see that the automatic leveling car cannot be instantaneous and consequently must "slow up" the "car miles per day." In a high building a local elevator would be appreciably longer on each trip than if the operator leveled the car by the switch. No doubt the defects will be overcome, and soon the high speed cars will be controlled at the stops with an accuracy of level not now thought possible.

Signal devices are important. In a multiple installation one can readily see the nearest approaching car. There are those general types, "up" and "down" lights, mechanical pointers and liquid columns. Of these the signal lights are probably the more common, although many of the other types are used. With the electric lights there is probably less mechanical difficulty than with the others, but a special distribution board which is quite complex is required. One part of the signal system which is frequently overlooked is the night bell. There should be in each car a bell which will ring when any button is pressed. This bell system should be controlled by a switch placed in the well near the first floor so that after the general business hours an audible signal may call the operator to the car. Many buildings also have a "call back" system. This consists of a series of buttons, one for each car, so that the starter may call any car from any position back to the street floor.

It is a matter of some debate as to whether the operating switch should be located at the right hand or at the left hand of the operator. There is no set rule, and the location may be changed for special conditions. In a multiple installation, however, each car should have the switch in the same relative position so that the operators may not be confused in changing from one car to another. Some argue that the right hand is more subconsciously controlled and therefore the switch should be at the right; others think that the right hand is more adapted to the opening and closing of the doors, leaving the lesser work for the weaker member. This, however, like many other plans of elevator installation must be determined by the architect or engineer after considering all the phases of the system and the particular needs of the problem at hand.

The ideal elevator installation combines the maximum of safety with the maximum speed in handling passengers, together with quiet operation and the minimum opportunity for carelessness, and at the same time the element of economical operation both as to current consumption and maintenance repairs.

An Informal Garden at Shadowbrook Farm

ESTATE OF MORTON C. NICHOLS, ESQ., GREENWICH, CONN.

PERENNIAL PLANTS APPEAR TO FINE ADVANTAGE AGAINST SHRUBBERY BACKGROUND

ENGLISH LEAD FIGURES FRAME AN OPENING IN SPIREA HEDGE TO LAWN

EDITORIAL COMMENT

FORECASTING CONSTRUCTION COSTS

TIME was when the functions of design and construction were closely linked. The architect worked out his designs with the artisans and craftsmen in the field, and there was a direct bond of sympathy between the man directing the work and those actually engaged in construction. Over the years the work of building has grown increasingly complex; our great modern buildings are made possible through steel construction, elaborate foundations and a veritable maze of mechanical equipment that provides heat, sanitation, light and transportation. This development has resulted in specialization and we have today, therefore, the engineer who is chiefly concerned with construction and installation of equipment and the architect whose work is being increasingly restricted to architectural design. The management of the construction and, to a large extent, the determination of the methods of construction and the supervision of work have passed to the contractor.

An important change has taken place also in the contracting field. At the beginning of the contracting system a general contractor was an expert builder, often qualified with thorough technical knowledge of the major building trades; but this field, too, has been narrowed down by specialization so that we have the general contractor, proficient in but one trade or, as is perhaps more often the case today, with no technical knowledge of any trade but acting solely as a broker.

This system has been responsible for some good in that it has developed individual sub-contractors and groups of workmen who are especially skilled, but offsetting this to a very large degree are many evils. The system primarily creates competition in prices, because the lower the sub-contract price the general contractor can secure, the greater his profit, and the pressure for low bids has resulted in the formation of countless sub-contractors' associations, primarily for protection against the trading of the contractor, but which once organized rapidly degenerate into price-fixing agencies.

This system is a barrier to the architect in his desire to obtain the best type of construction. As a remedy some architects have practiced the direct letting of contracts to the major sub-contractors, but on the whole this has not proved a satisfactory arrangement because there is lack of co-ordination between those trades directed by the architect and those directed by the general contractor, and the logical development of a scheme such as this would be the handling of all the contracts by the architect; but if this is followed, he becomes in fact a general contractor, which duty architects as a whole are not yet ready to accept for professional reasons.

The greatest single difficulty architects experience is their inability to forecast accurately construction costs, and this is natural because by the very nature of modern building conditions they have little opportunity of getting fundamental information regarding building costs. A definite need exists for some method which will enable the architect to be the judge of costs and thus meet the requirements that the public imposes on him because of the traditional position he is held to occupy. Knowledge of costs is likewise necessary from the economic standpoint of the architect himself, because as practice is carried on today thousands of dollars are wasted in the preparation of drawings which are later discarded when bids are taken. Any scheme to eliminate this difficulty must, therefore, be elastic—one that will permit the checking of costs and the design of a building to go along hand in hand. The first remedy might appear to be the addition of an estimating department to the architect's organization, but this again entails a commercial consideration in that the architect will be placed more or less in the position of guaranteeing costs, and this is as yet not conceded to be within the professional limits of the practice of architecture.

A more practical scheme, and one that does not conflict with professional considerations, is a closer working arrangement between the architect and a selected number of the better type of general contractors. This means that the architect must place absolute confidence in the integrity and skill of the contractor, but it should not be difficult to find men of this caliber who will respect the opportunity for co-operation which the architect's attitude makes possible. A close working arrangement such as this will enable the architect to check his costs as his design proceeds; his materials of construction and methods of building will be determined with the limits of cost always in mind; he will be in a position to have a voice in the selection of sub-contractors, and his assurance of getting good workmanship will accordingly be greater. His estimates will present to the client not his own guaranteed costs but those of reputable builders. The greater degree of harmony in construction resulting from such co-operation will also insure more prompt completion of the building—an important consideration to the owner.

The architect, on his side, gives up nothing but the doubtful advantages of competitive bidding, and any merit this system may once have had is overbalanced by the greater good resulting from according the fair dealing, intelligent contractor a professional status which will eventually tend to raise the standards of the entire building industry.

DECORATION *and* FURNITURE

A DEPARTMENT
DEVOTED TO THE VARIED
PROFESSIONAL & DESIGN INTERESTS
WITH SPECIAL REFERENCE TO
AVAILABLE MATERIALS

DRAWING ROOM DESIGNED BY PAUL CHALFIN

ADAPTATION OF THE ITALIAN-LOUIS XV PERIOD

Contrast of color values, harmony of scale and perfect relation between the furniture and the background are rarely realized as in this room. The remarkable contrast of the most elaborate ornamentation to the simple composition of the wall surfaces and the relation of the furniture grouping to the architecture mark this as one of the most brilliant rooms executed in America

Adapting the Eighteenth Century Interior

By HOWARD MAJOR, ARCHITECT

THE architect entrusted with the interior decorations of a house has an opportunity for complete expression; he is enabled to supplement, to contrast, to harmonize his interior architecture with his interior decoration.

It is thoroughly appreciated that however skillfully the facades of the house are designed, the effect lacks charm and atmosphere without the aid of proper planting. Likewise, the carefully handled interior requires the proper furnishing, but this fact most architects apparently overlook. Clients invariably consult the architect upon the landscaping, but unfortunately rarely upon the decoration. Probably the professional instinct of the architect causes him to hesitate soliciting from the client a commission in this field, but having the true interests of the work at heart and a full realization of the results in mind, a decided effort should be made to either execute or supervise the furnishings. The architects of the eighteenth century well understood this important phase of not only arranging, but actually designing the various pieces necessary for a completely furnished home. The well known example of the brothers Adam may be cited, as their designs in furniture and even in silverware are famous.

PLANNING THE INTERIOR. Having emphasized the importance of the architect's executing or supervising the decorations, some suggestions are offered to help to attain a satisfactory result. The earliest sketches of the house must include thought of the decorative scheme. This will counteract the common fault of too much fondness for the facade to the detriment of the interior. Care should be taken to avoid the mistake of planning a facade of one style with an unrelated interior of another. The windows are the common property of both and will be a jarring feature to one or the other. With the early sketches must be determined the general period or related periods of the whole. This determined, the proportions of the various rooms can be intelligently studied, bearing in mind the peculiarities of proportions of the selected period, the location of the chimneypiece, its proportions and scale, and above all the furniture grouping. A vista of the chimneypiece from the hall is a desirable feature, while closely flanking the breast with windows or doors is unwise; daylight directly in the eyes of the group around the fire is uncomfortable, as is also circulation past the group through the doors. Where doors are unavoidable those paneled in wood are preferable to those of glass. A deep projection of the chimney breast is extremely awkward; a breast projecting from two to six inches is of sufficient emphasis, and often the entire elimination of the breast is desirable.

Probably one of the greatest faults in our domestic architecture is the arrangement, the proportions and the scale of the windows, from the viewpoint of the room, and I dare say it is this feature alone that convinces the decorator that our profession has much to learn. Design the window from the inside of the house and adapt the facade to it. In eighteenth century usage, of which this article treats, the window is invariably given a dignity attained by height and vertical proportions. The height of the window dominates the height of the door; this is invariably true excepting possibly in some few farm dwellings. Often it is advisable to place two windows instead of one on the side of the room, that a decorative piece of furniture may claim the axis. The entrance door with well defined vertical proportions should be placed in a commanding position, bearing well in mind the furniture arrangement, and avoiding a wider opening than necessary if scale is to be preserved.

For the sake of balance or design, blind doors may well be used where they are of secondary importance. Never use glass doors in the interior. They are a contradiction of their intended use. The designer must ever bear in mind that an atmosphere of charm and character is essential to a successful room. This is often attained by introducing quaint period discrepancies of proportions or features. Studiously avoid the commonplace, and be ever on the watch for quaint motifs—motifs that have variations from the rules of Vignola and the common practice and that are unusual and effective. Always have in mind scale, and realize the constant tendency towards heaviness and towards detail suitable only for the exterior.

Never, in planning, use a room as means of access to another room. It is impossible to create a feeling of comfort in a room used as a passage.

ARCHITECTURAL BACKGROUND OF THE EIGHTEENTH CENTURY. Throughout the last three quarters of the eighteenth century on the continent, in the British Empire and America, there was a strong similarity of decorative principles, although each country had its individualities. In this century are well defined the dignified, the vertical and the classical motifs. When paneling is used the vertical lines decidedly predominate, and occasionally the corners of the room are eliminated by an arc of paneling connecting the sides and successfully softening the sharp effect of the rectangular room. Further interesting shapes were developed, the most successful of which are those of an elliptical or circular plan, and rooms with segmental ends. Wall surfaces are generally painted, and paneled rooms of hardwood and walls covered with fabrics are also introduced. In this period it is noted that the tapestry, so much in favor in the earlier work, is fast disappearing, being

Living Room Designed by Paul Chalfin

In this eighteenth century Venetian room the grouping of the chairs either side of the commode is unusual and well related to the architecture of this interesting wall with its marbleizing and other quaint features

Probably a one-quarter-inch scale plan of the room is for the architect the most convenient and practical for studying the grouping of furniture. Each piece of furniture, the lamps and the fabrics can be indicated and notations made indicating the character, design and color thereof. This small pencil study can be varied as progress is made upon the selection of the various objects, and it can readily be carried in the pocket to consult when shopping. It will form a nucleus when the various pieces are assembled in the room for a first arrangement, and it is surprising how seldom it greatly varies. Consider carefully the personal element, that is, the probable use of the room and the type of people that will dwell in it. When grouping, as in architecture, avoid hackneyed arrangements. Aim to create comfort, charm and individuality, and try to secure a result that is personal. The major sitting group, naturally near the fireside, comple-

supplanted by mirrors, portraits and highly decorative paintings. The flooring, particularly in France, offers interesting study. Strange to say, very large scale oak strips are used, filled with herringbone or other patterns, and the small alternating black and white squares of marble are much in vogue in the halls and corridors. The chandelier, used with candles and reflected in the mirror, is a feature of decoration, and much thought and skill were expended upon its design. The happy use of crystal combined with delicate metal work gave a lightness and playfulness as a decorative feature hard to surpass. This chandelier created the excuse for the interesting centerpieces of the period upon the otherwise generally plain plastered ceilings.

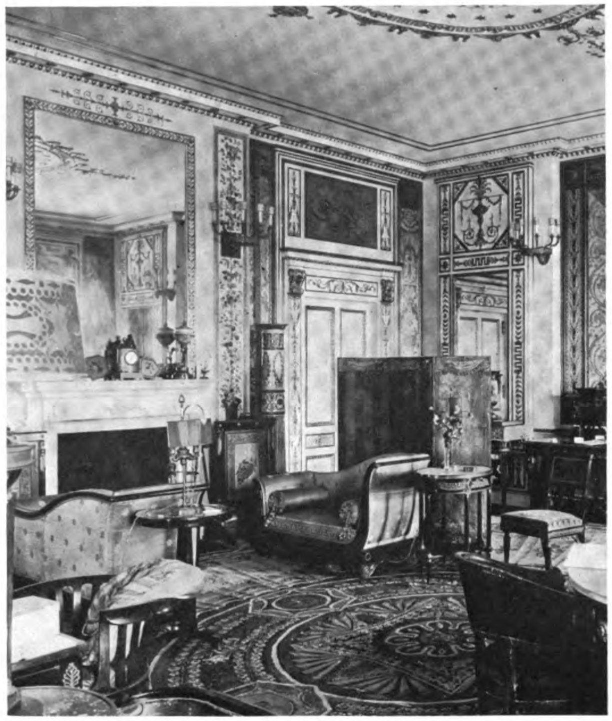
FURNITURE ARRANGEMENT. In well planned living quarters the problem of arrangement reduces itself to the living room or library or both; since the dining room and the sleeping room arrangement is quite obvious, the treatment of the former only shall be considered.

Sitting Room in House of J. A. Burden, Esq.

Delano & Aldrich, Architects

With the introduction of an American empire mantel of black marble, contrasting bare but well proportioned walls, an air of elegant simplicity is produced. The Louis XVI chair and the small projection to the chimney breast also help to attain this effect ments that architectural feature, the chimneypiece. This group, primarily one for conversational purposes, is composed of absolutely comfortable chairs or settees flanked by small tables for reading lamps, ash trays, books, matches and other details making for comfort and convenience. This conversational group can readily be increased by the addition of small side chairs, which have their decorative place elsewhere in the room. The arrangement of objects to be placed against the walls, such as commodes, console tables, settees, etc., is the next detail to be determined. Often these pieces will suggest secondary sitting groups, composed of fewer and possibly smaller chairs than the major group. Next to comfortable lounging pieces, nothing gives more actual comfort, as well as the appearance of comfort, than many small, low tables conveniently placed.

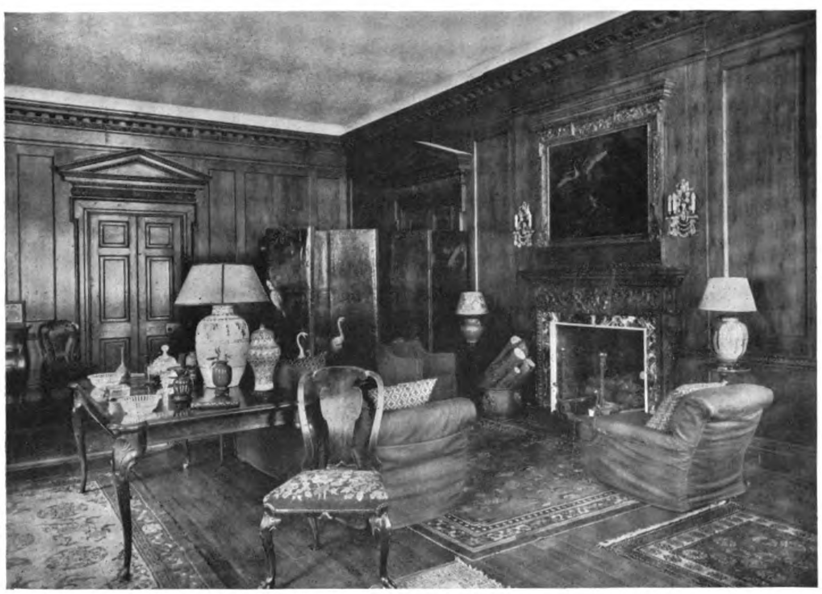
SELECTION OF FURNITURE. Upon the consideration of the furniture the question of the antique *versus* the reproduction immediately arises. The charm, the individuality, the sense of possession of the old can never be attained by the new. The ever increasing intrinsic value of the antique against the decreasing value of the modern seems to answer finally the question. The introduction of a few antiques in the home has often resulted in the making of a collector. Year after year more are going in for this sort of thing, and it is greatly increasing an artistic appreciation and knowledge of taste in our country.



Living Room Designed by Paul Chalfin

In this adaptation of the Italian empire is a well balanced furniture arrangement, directly related to the architecture. Many small tables conveniently placed and the screen tend to create an intimate effect

The period of the architectural background should dominate the period of the furniture. It is often advisable to introduce pieces of other periods that harmonize and are related to soften the set effect of a single period. Rooms executed in the periods of the sixteenth and seventeenth centuries will frequently be greatly improved by the introduction of pieces of considerably later periods. For instance, a chair of the time of Louis XV with its voluptuous curved lines will create a happy freedom of movement and contrast with the heavy, rectangular lines of the earlier period. A chair of the original period with its straight lines placed in the same position would most likely prove awkward and uncomfortable. Needless to say, this



The Living Room of J. A. Burden, Esq.

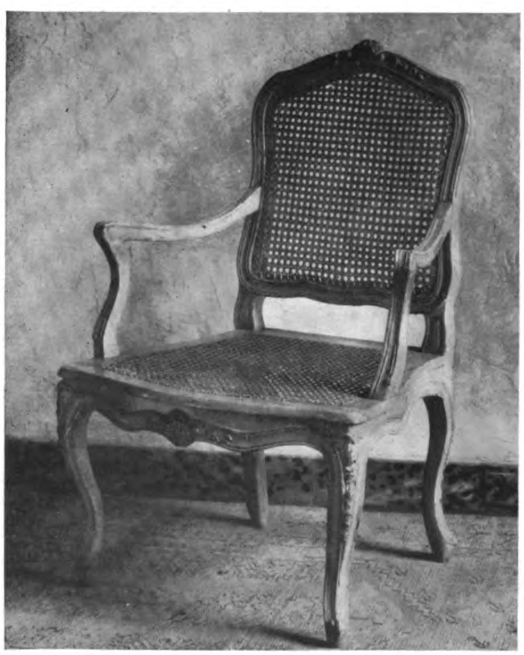
Delano & Aldrich, Architects

An English room of the first half of the 18th century, in pine paneling. The furniture is grouped about the fireside, complementing the chimneypiece, and the comfort of this group is increased by the very small projection of the breast. A few small tables grouped with the upholstered chair or sofa would increase the effect of livableness and comfort

Louis XV chair should not be of gilt covered with satin, but of oak or walnut covered with needlework or velvet, and thus it would be related in material and contrasted in form. Introduce horizontal planes of furniture to contrast with the vertical lines of the walls—commodes and consoles of about uniform height, settees and chairs and tables likewise. This principle explains the low commode as generally more acceptable than the high type of furniture.

For the wall decorations, probably nothing is more characteristic than the built-in mirror over the chimneypiece, and upon other axes of the room. Hung in a formal manner, portraits, architectural landscapes, Venetian scenes and other kindred subjects employed by the eighteenth century artists are very valuable material. Although extremely difficult to arrange, small miniatures intimately grouped are typical and create a delicate and charming touch characteristic of the bygone age.

Again, the smaller pieces should be arranged around the large, and if possible all pieces should be experimented with in the room before arriving at a decision. Pairs of antiques are desirable and excellent for balance. The intrinsic value of the individual piece of a pair is greater than that of a single piece of the same design. The commode, very characteristic of this period, is almost indispensable from a decorative viewpoint and is also useful. Marble tops to furniture are also characteristic and create an air of elegance. At least four side chairs are advisable even in the smaller rooms. Generally they are the only chairs that can be easily and comfortably grouped around a bridge



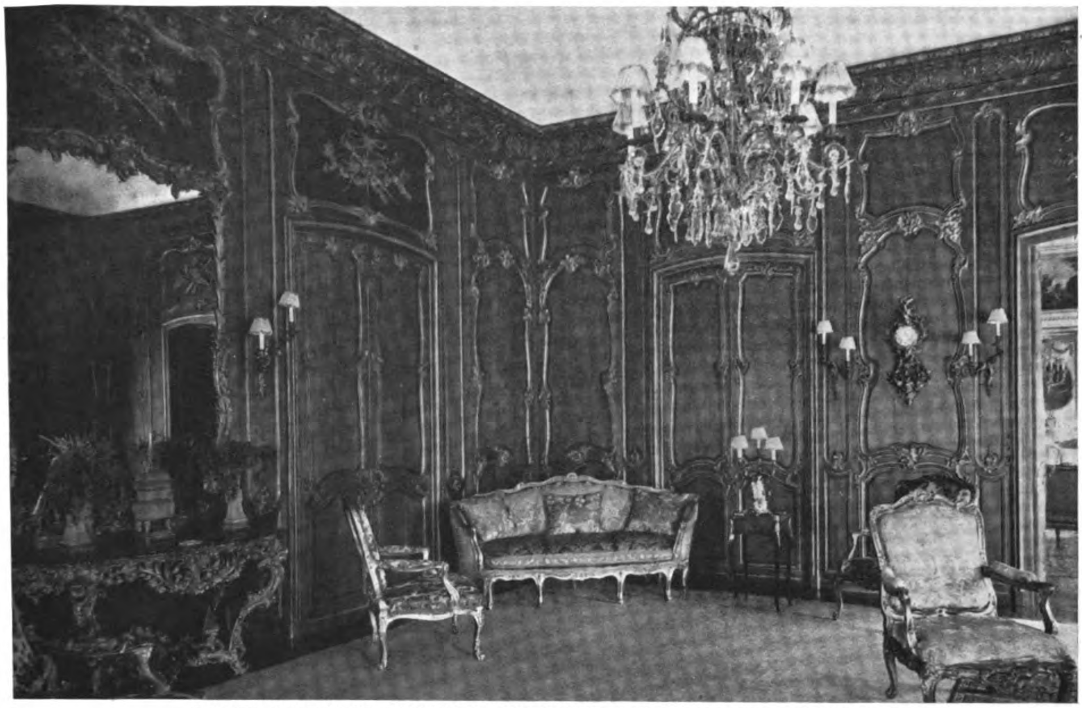
A Painted Louis XV Chair Shown in Measured Detail
Courtesy of Henry Forbes Bigelow, Architect

table, as well as increasing one of the conversational groups. Complete sets of furniture indicate a lack of thought and create a hard, set appearance, void of interest. The large, all-upholstered sofa and chairs as well as the long table are too heavy and cumbersome for the scale of this period. The deep armchair or settee with an interesting exposed wood frame, with good upholstering, is as comfortable and often more so than the heavier all-upholstered pieces.

Color. The problem of color and fabric is least understood by the architect and best comprehended by the decorator by reason of their respective trainings. To equip himself for successful decoration the architect must give to color study and research. I would advise the student to acquire a thorough understanding of the simple theory of color, and in his first commissions to adhere closely to the principles laid down. When these are mastered, he should allow his fancy a free rein, and play his color as humor or inclination dictate and be guided by his instinct or good taste. Full intensity of color may be used successfully in small areas, whereas backgrounds should never be so. However, be not afraid of colored walls, as they produce most interesting rooms, particularly after the abundance of gray walls that greet us everywhere. Few realize that color and its distribution are as typical of the periods as is form, and because of the small number of works which are available it is extremely difficult to acquire a thorough knowledge of the subject. A trip to Europe, studying exclusively at first hand period color, fabrics and furniture, is the surest means of learning this art. If this be impossible, the museums and antique shops offer endless opportunities, and many old rooms in the original color may be studied. When the peculiarities of period color and period application of color are understood they will prove of great value for unusual expression.

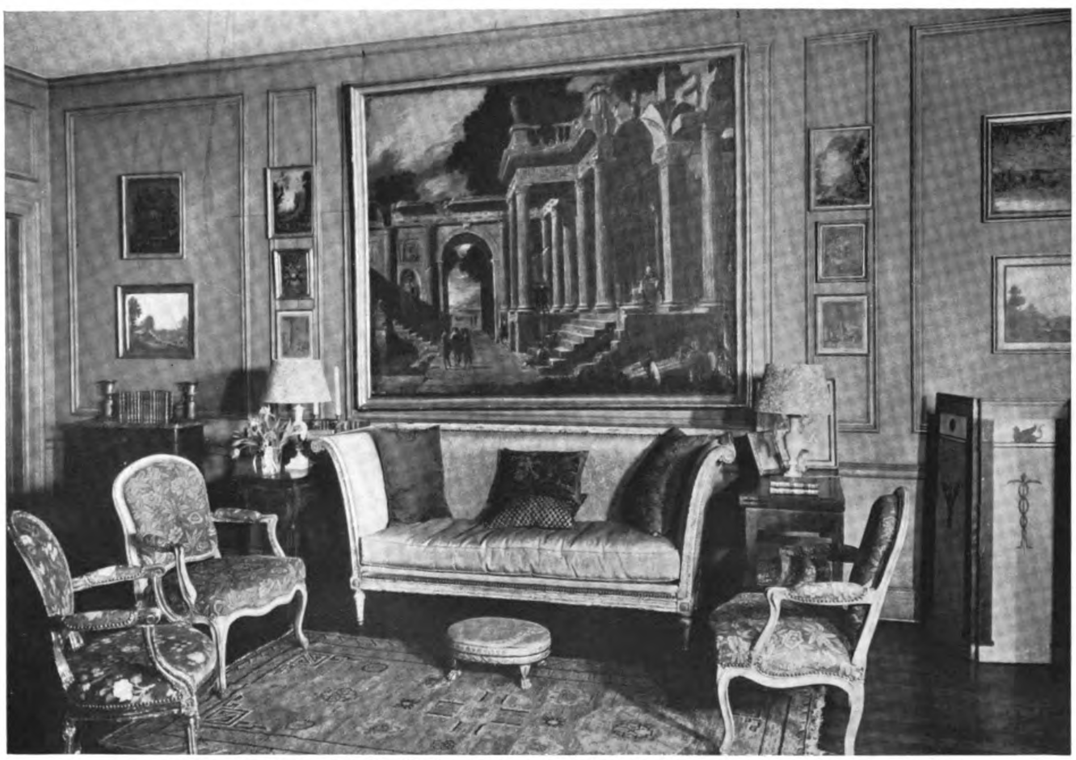
During the eighteenth century the art of marbleizing became very popular and its use created many interesting and highly decorative effects and imaginary marbles. Even in staid little masterpieces such as the Petite Trianon it was common practice to marbleize the wood bases to match the marble of the chimneypieces. In America the floors were frequently painted blue, red or yellow, producing a very interesting and quaint effect.

Bizarre color schemes are apt to make for notoriety—and then the morgue, for only the sane can survive. Color has such enormous variations both in itself and in its possibilities of distribution that a particular color scheme need never become hackneyed. I suppose no color scheme is more commonplace than red and green, but I have never tired of using or living with it. Avoid extreme color schemes that are in vogue, for they are of short life and hence generally mean a discontented client. I recall that several years ago nine out of ten people doing over a room were using black and white. A year or so later those who could afford



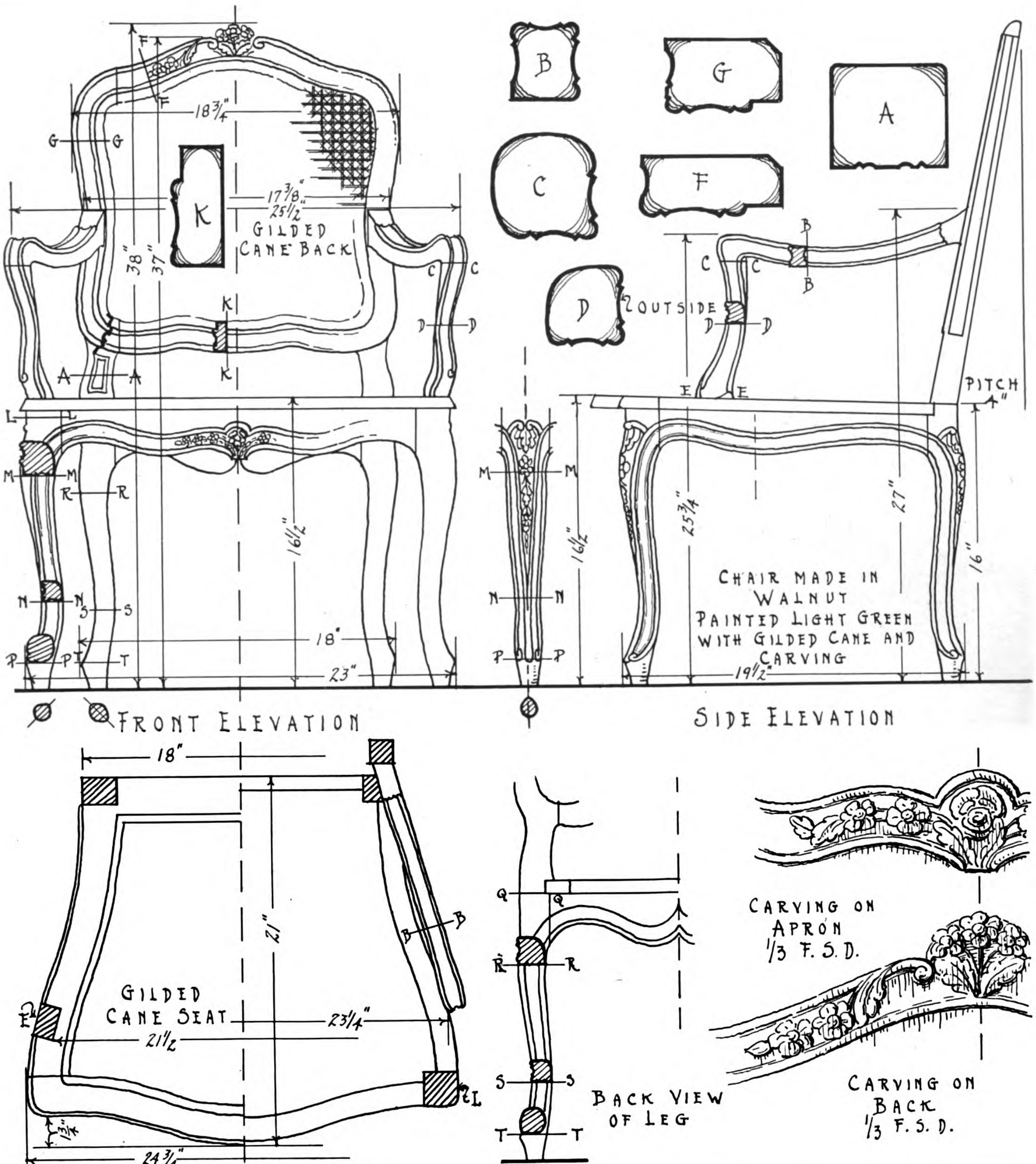
DRAWING ROOM, HOUSE OF OAKLEIGH THORNE, ESQ., NEW YORK

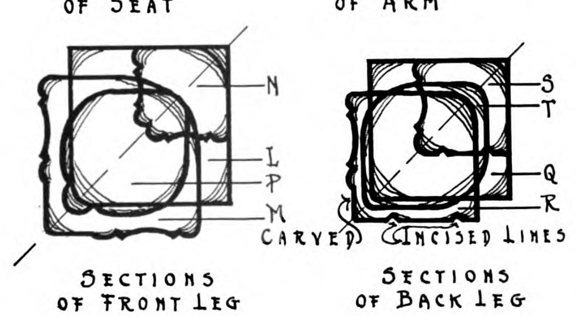
ALBERT JOSEPH BODKER, ARCHITECT



DETAIL OF LIVING ROOM, APARTMENT OF WILLIAM M. ODOM, ESQ., NEW YORK

WILLIAM M. ODOM, DECORATOR





LOUIS XV ARMCHAIR

FROM THE COLLECTION OF
MR. HENRY FORBES BIGELOW
BOSTON MASSACHUSETTS
FRENCH – PAINTED WALNUT – 1770

ELEVATIONS – SCALE 1 1/2" = 1'-0" SECTIONS 1/2 F.S.D.
MEASURED AND DRAWN BY RACHEL C. RAYMOND

Reception Room in House of Oakleigh Thorne, Esq.
Albert Joseph Bodker, Architect
A well handled and characteristic example of Louis XVI paneling. The overdoor paintings enhance the vertical effect of the doorways and the large painting balances the chimneypiece

it were redecorating these same rooms differently.

FABRICS. Other factors of importance besides that of color are to be found in the fabrics. Those of the design, the period and the scale will be understood by the architect, while those of the material and quality of the material will offer a new field for thought and study. Various materials are typical of various periods. The taffetas and satins were much in vogue during the eighteenth century but the rich silk velvets of this century were a characteristic note in the earlier centuries.

The quality of the materials should be the quality of the other decorations. If a few notes of linen or chintz are introduced the appearance of "dressiness" will be eliminated. The scale of the design in the fabric must be in harmony with the size of the room and in harmony with the furniture it is to be used upon. The predominating fabric will likely be used in the window hangings, and other fabrics should be related to it. This hanging is more dignified if it is not reintroduced, although it is advisable to repeat the color elsewhere. A fabric of less importance should be repeated in several places. Contrast adjoining fabrics either in color, design or material.

It is essential that a balance of color be created in the room, and often a most interesting solution is a triangular grouping. For reference and record it is an excellent idea to form a color chart of each room by affixing cuttings of each fabric and color of the painting upon a paper mount. This chart should be carefully filed, as it is likely that the room will require additional materials in subsequent years, and in this case it will prove of great assistance in the selection of added furnishings.

Living Room in House of Egerton Winthrop, Esq., Syosset, Long Island
Delano & Aldrich, Architects
An interesting room of the style of Louis XVI, with chintz wall covering characteristic of the period and relieved by taffeta curtains. The grouping of two windows at the end of the room with space for the commode between is excellent. The furniture is well grouped around the French chimneypiece, with typical mirror over it, and an atmosphere of comfort has been attained