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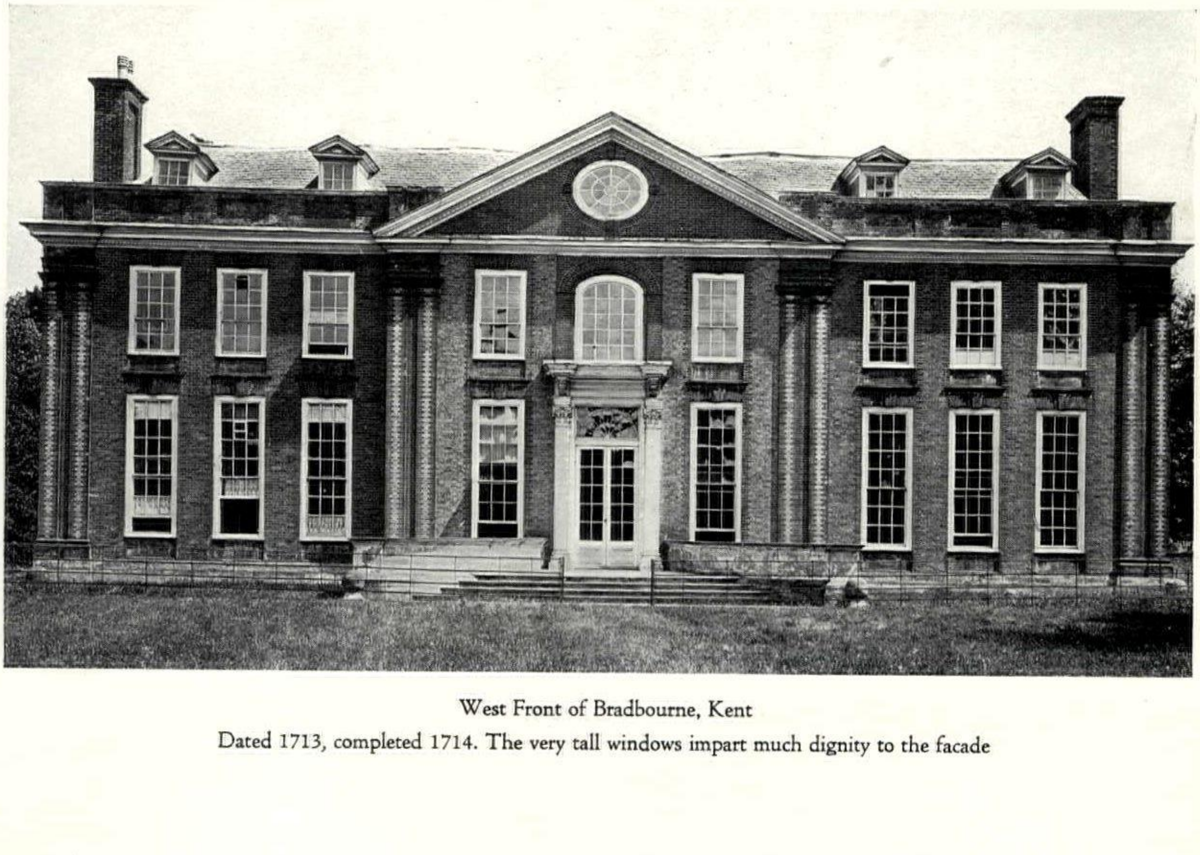
Characteristics of Georgian Brickwork in England

By NATHANIEL LLOYD, O. B. E.

PROBABLY no architect ever fully realized the potentialities of brick as did Sir Christopher Wren, but it is only natural that so great a designer should appreciate so varied and adaptable a building material. Sir Edwin Lutyens once remarked to me that renaissance should be spelled with a W—Wrenaissance,—so much does English architecture owe to him. Wren used brick in conjunction with stone, with painted wood, and by itself—brick moulded, cut, rubbed and carved. Hampton Court's east and south fronts are examples of the first combination; Morden College, Blackheath, of the second, and Christ's Hospital (now destroyed) of the use of brick alone. The example set by Wren was followed by others in early Georgian times, but during the reign of George II house design generally, and brickwork with it, deteriorated. It seems as if his influence died away in course of time, and there was no outstanding genius to succeed him. Under these circumstances it is not surprising that we should find houses of the early part of the reign of George I very similar to those erected during the lifetime of Queen Anne.

Bradbourne is a typical example, built of pinkish red stocks which are mottled gray, mauve, green and buff in varying intensity, with dressing of bright red rubbers. It is a fine instance of what can be achieved by a happy combination of colors. The walling brick measure $8\frac{5}{8}$ x $4\frac{1}{8}$ x $2\frac{3}{8}$, and four courses rise 11 inches, so the joints are approximately $\frac{3}{8}$-inch thick. The red dressing is of soft brick 8 x $3\frac{7}{8}$ x $2\frac{3}{16}$, and four courses rise $9\frac{1}{4}$ inches, consequently they do not bond with the walling brick—a not uncommon occurrence in eighteenth century work. The illustration is of the west front, each of the three divisions of which is flanked by coupled pilasters. The very tall windows are characteristic of the period and give great dignity to the



West Front of Bradbourne, Kent

Dated 1713, completed 1714. The very tall windows impart much dignity to the facade elevations of different facades.

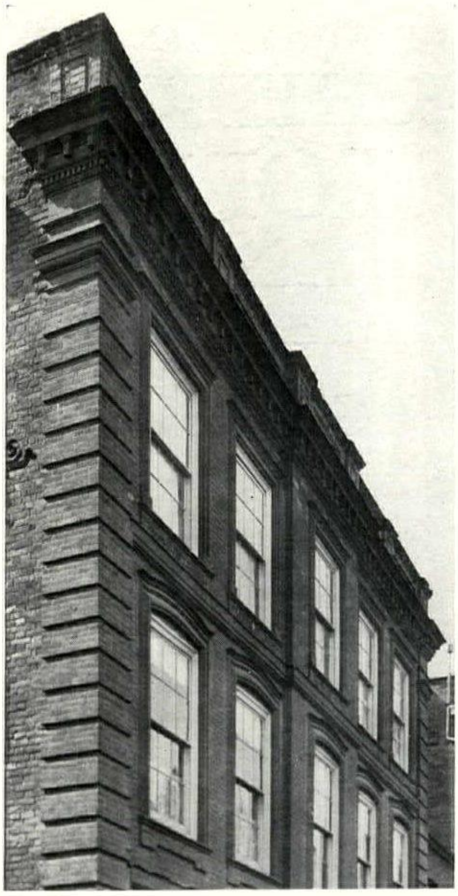
The detail illustration from the south front shows the variety of the brickwork, elliptical windows and a sham niche. Some brick have a considerable growth of gray lichens on them, which enhances the variety of surface and color. The house has a fine staircase, and the details throughout are so good as to be worthy of Wren himself. Unfortunately, the designer is not known.

Wilmer House, Farnham, illustrated by an angle view, has remarkably fine cut and moulded brickwork. The window architrave mouldings are unusual. The whole of this front is carried out in red brick. There are houses in other neighboring towns differing from this, but of similarly good workmanship. They were built within a few years of each other, and it is possible that they were all constructed by one company of workmen who traveled from place to place for the purpose.

Fitzwilliam Hall, in Cambridge, is an entirely brick-built house. The illustration shows the greater roughness of the walling brick compared with the brighter dressing. The *guttæ* to the window apron pieces are a not uncommon feature and, as usual, are carved out of soft brick.

Dedham contains a house where the rich, bright, cherry color of the dressing forms a strong contrast with the grayer walling brick, and the white painted work of the niche order and of the doorway does its part in producing an exceptionally gay effect, with which a green door and iron railings form a pleasing contrast.

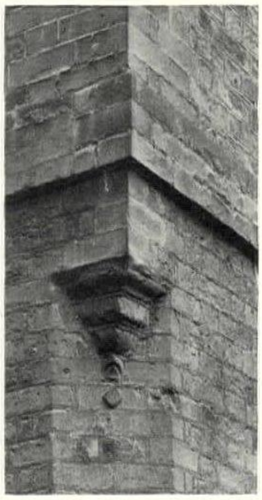
Church House is a typical country-built Georgian structure. The walling brick are gray-yellowish-pink and measure 9½ x 4½ x 2¼. Four courses rise 11 inches, so the joints are approximately ½-inch thick—about the limit for joints in Georgian work which were more often ¼- to ⅜-inch thick. The dressing



Wilmer House, Farnham, 1718
Angle view showing projections and cut brickwork. Cornice details and window architraves are notable

Brickwork Detail, South Front of Bradbourne
Walling brick are pinkish-red stocks, mottled gray, mauve, green and buff; dressing of bright red rubbers
Note the cut soffit of center arch

is of bright red rubbers. The pilaster shafts project 2 inches from the wall face. Their capitals, of cut brick and tiles, are well proportioned and are connected with the cornice by a short length of architrave and frieze, including one triglyph of the order. The only stone used is the coping of the parapet. The *regulæ guttæ* are carved out of a brick laid with invisible joints. The same treatment, where it was necessary to avoid dividing members by thick joints, made it impossible always to bond the courses of the pilasters with those of the wall. The three courses, only one of which is moulded, form the string, tying together features which without it might appear scattered. The woodwork of the sash windows of both floors is set back 1 inch from the wall face. One sometimes finds in houses of this period that this setting back is greater at upper floors. At Rye and at Winchelsea, both a few miles distant from Beckley, are good houses where the ground floor window frames are practically flush with the wall face and those of first floor are set back an inch. This must have been done entirely for effect, possibly with a view to avoiding producing an impression that the upper windows were falling outwards.

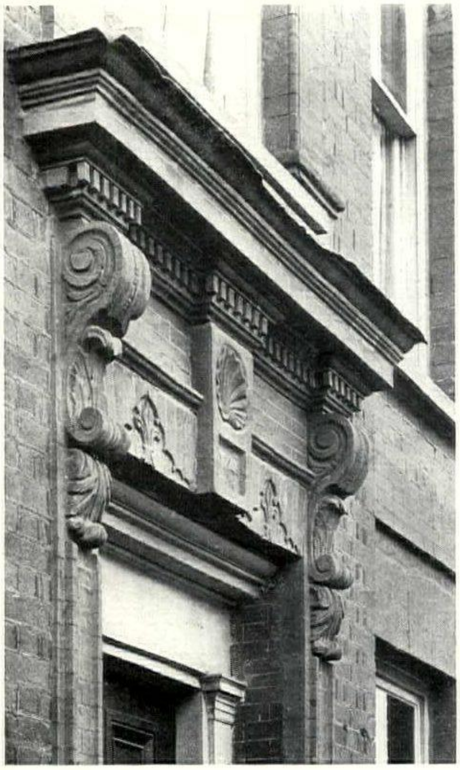

Brick Corbel from Gray's Inn, 1759

The elliptical arch of the middle window is an interesting piece of gauged brickwork. The curve of the semi-ellipse is good. Instead of the *voussoirs* being normals, the *intrados* and *extrados* have been divided each into an equal number of parts. No. 1 of the *intrados* has then been joined with No. 1 of the *extrados;* No. 2 with No. 2, and so on. The result is agreeable and not so weak looking as might have been supposed. The construction of the key of this arch must have been an arduous task for the workmen; indeed, close examination shows that this was so. It is built up of red rubbers, with invisible joints. Each impost is cut from one brick. Another short length of frieze, the width of the key, is taken up to the cornice which breaks around it as over the pilasters. The result is to form a central feature, giving variety and character to the elevation. The doorway is severely rectangular, and probably the designer had this in mind when he introduced elliptical and segmental window arches.


House at Arundel, Sussex, *circa* 1780
Center portion of gray headers with red brick quoins. Wings all of red brick
Note effective handling of brick in the cornice

No. 39 West street in Farnham is a good example of the use of red brick with white painted woodwork. The doorway is of unusual design, well proportioned, and with the handsome frieze and cornice confers a very distinctive air upon the elevation. Farnham is rich in houses having this type of frieze. The treatment of the strings (which are not alike) and of the moulded brickwork of the central windows is happy, particularly the manner in which the string with two moulded members is swept over the first floor window.

This house at Cullompton has a bow window, a detail which has been so often mishandled in modern work that an eighteenth century illustration of this popular feature may be of interest. The bows with the classic doorway and simple cornice produce without any elaboration one of those eminently satisfactory results so characteristic of Georgian work.



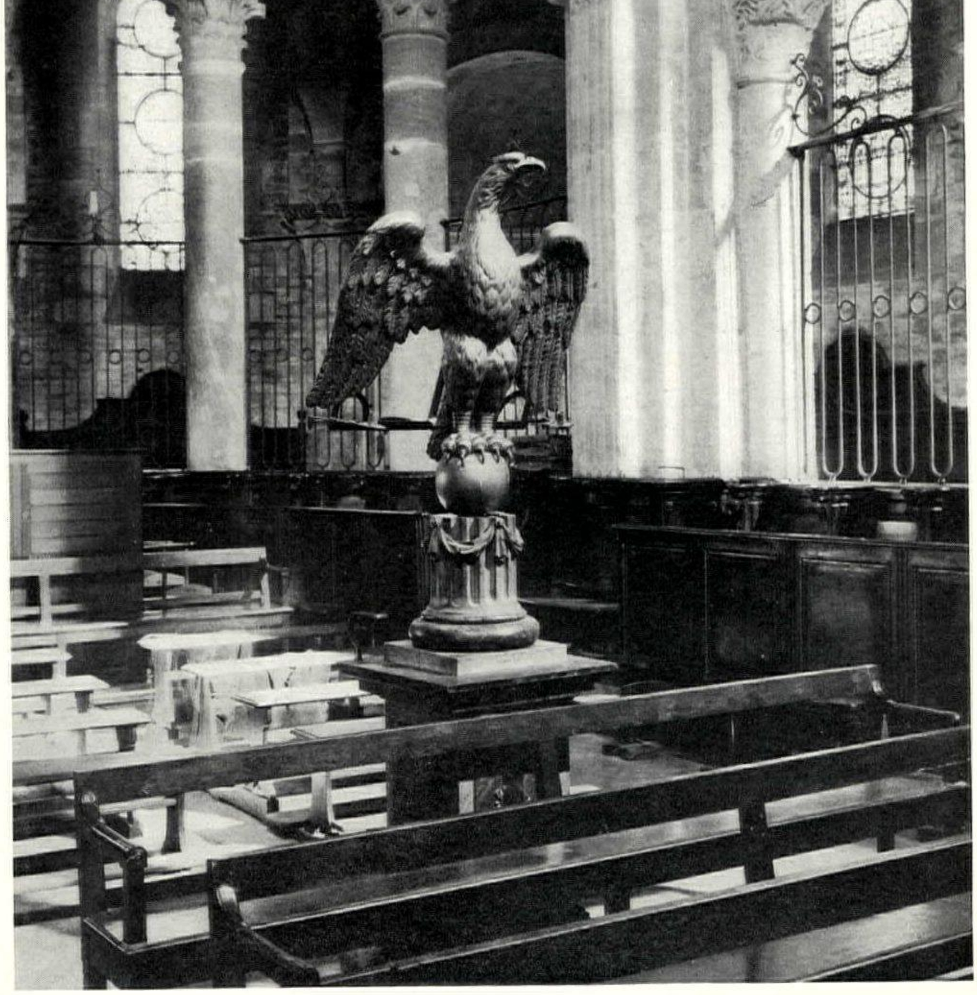
Detail of Gauged and Carved Brick Doorway at Farnham

Lansdowne House shows one form of a great variety of treatment of what may be called the five-window type of Georgian house. Sometimes the center window was surmounted by a pediment; in other examples we find the center portion, embracing three windows, breaking forward and the cornice over this carried up as a pediment. Often the result was not well proportioned, the center being too large for the elevation. In this house the proportions are excellent, and all components are combined successfully. It only requires that the door should be painted dark green or brown for suitable contrast.

The house at Arundel

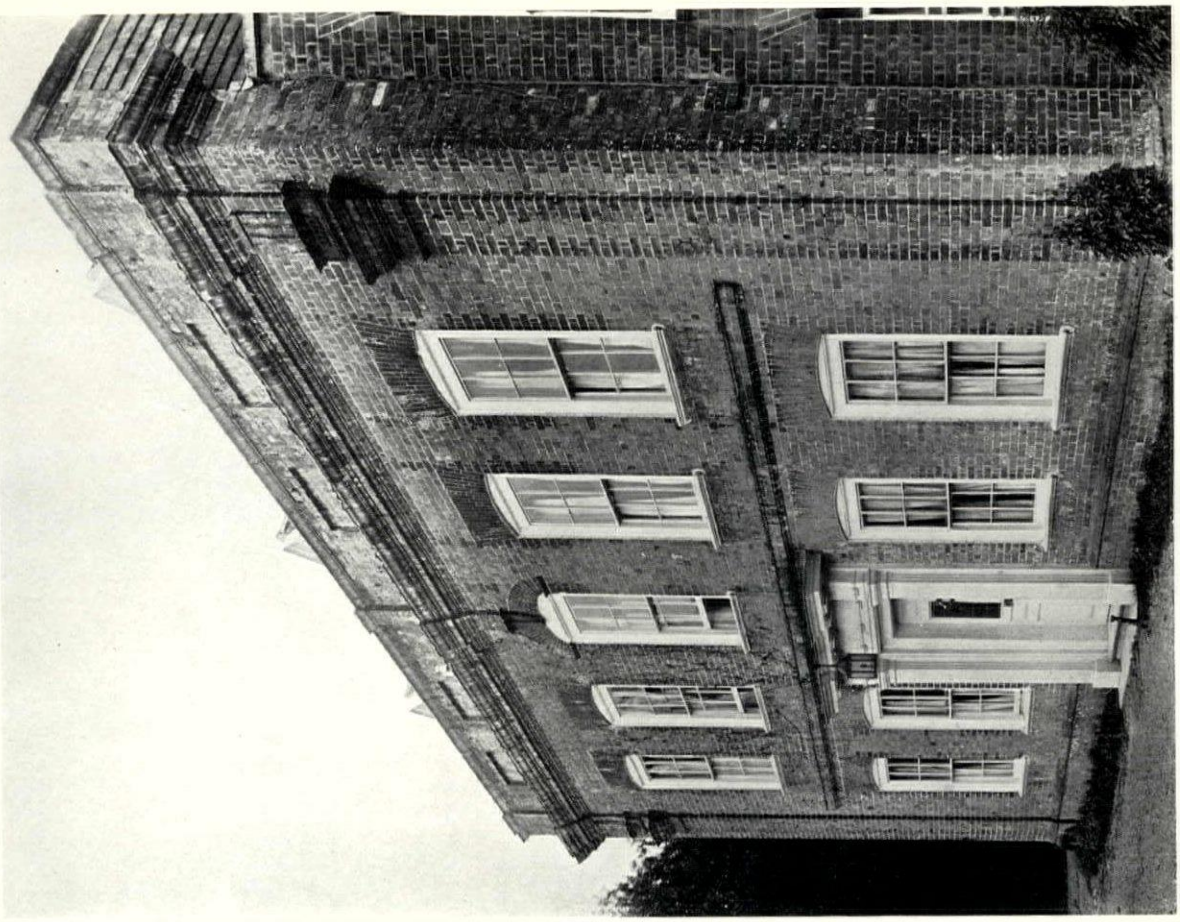
Fitzwilliam Hall, Cambridge, Dated 1727

A typical street elevation of Georgian times, showing contrast of texture and color in walling and dressing brick

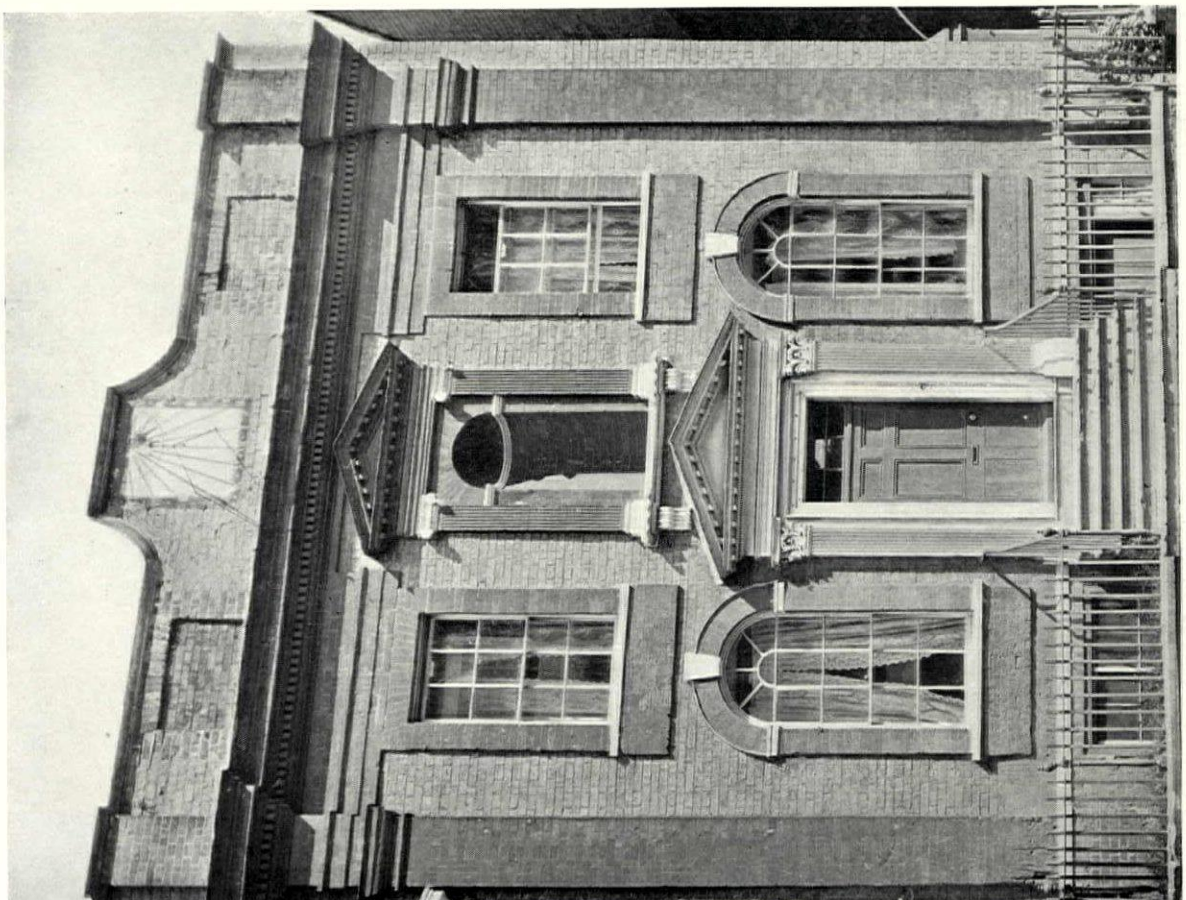


LECTERN, NOTRE DAME CHURCH
BEAUNE, FRANCE

FROM PHOTOGRAPH BY G. DOLBY



CHURCH HOUSE, BECKLEY, SUSSEX, DATED 1744
Typical country-built house; yellowish-pink walling brick, mottled gray with bright red dressing



HOUSE AT DEDHAM, ESSEX, *circa* 1732
Bright cherry red dressing, gray walling brick, white woodwork, green door and iron railing produce brilliant color effect

LANSDOWNE HOUSE, ALTON, HANTS

An excellent example of the five-window type of Georgian house facade. The proportions of vertical divisions are extremely good. The upper wood panels of the door have unfortunately been removed; the effect of the facade would be improved if the door were painted green

House at Cullompton, Devon, *circa* 1780
Simple and suitable bow windows in brick

projection are not felt to be scanty. The plain string course of three slightly projecting courses is another of those details which cost little and are worth much.

Rustication of doorways and windows, with gauged arches but often without any moulded bricks being used, was another device which proved exceedingly effective. Modern work in such situations and also for quoins at the principal angles of a house is often quite spoiled by excessive depth of the drifting or channels. In the old work this seldom exceeded 1 inch, even for three-story buildings. Sometimes also one finds a thinner brick course introduced to reduce the rise. The window at Petersham is a good example of this Georgian treatment.

One does not find so much ingenious corbeling in the eighteenth century as in earlier work, but that on the chamfered angle of a building at the entrance to South Square, Gray's Inn, illustrated herewith, is a good specimen of bricklayer's ingenuity.

It must not be supposed that these remarks and the illustrations relating to them exhaust the subject of Georgian brickwork, which has especial importance at the present time in view of the revival of interest in architecture of this period and of the

shows use of the diaperwork patterns so skillfully handled by Tudor brickbuilders but long gone out of fashion, lingering only in the use of gray vitrified headers built in Flemish bond with red stretchers. These produced a checkered effect, sometimes used over a whole elevation, generally as a local embellishment as for panels. Patterns had given way to a selection of harmonious color combinations for wallings and dressing. A variation of this treatment was to build a whole division of an elevation in gray headers—heading bond—with red brick quoins. The center of this little house is treated in this manner. Bricks burned with wood fuel produce flared headers of softer grays than can be obtained by coal fuel, the headers from which are more vitrified and consequently less sympathetic in tone.

The corbel table forming the cornice of this house is one of many simple projections used in this way. Sometimes the alternate bricks, which project in this house, were set back an inch from the wall face. In other instances this course was built in "dog-tooth dentils"—chevron fashion; indeed there were many ingenious variations current, which could not have been easily and economically executed in any material other than brick. One effect of using such a corbel table is that eaves having little

No. 39 West Street, Farnham, *circa* 1750
An effective combination of deep red brick and white painted woodwork
Excellent Georgian wood detail in doorway and cornice

right use of brick as a building material. The taste for the smooth, box-like brick is dying out, for architects have already made up their minds that better texture is necessary. If, therefore, one were to emphasize one element in Georgian brickwork as particularly worthy of attention at the present time, I think it would be its variety of color. This is obtained in two ways: (1) by harmonious association of quiet colored walling brick with bright red dressing brick, and (2) by obtaining variety of color in the individual brick by what the brickmaker calls "mottling." This is not a speckled effect, but consists of a surface change of color over a large area. Properly done, the effect is most satisfactory, and it possesses the additional recommendation of not increasing the cost of production. The brick for dressings to be used with these mottled brick should be bright and even in coloring. If well chosen, I do not know any more quietly effective result obtainable in the whole field of architecture.

Modern building conditions favor use of brick, for in many parts of the world the forests are disappearing, which means that lumber commands excessive prices, and in some localities stone suitable for building is not found. Brick, however, is manufactured widely, and the increased demand is leading manufacturers to a study of the old brickwork of Europe and to emulation of the excellent brick there made, while architects are turning anew to the use of brick, and in many instances are using the material for securing results which would do honor to architects of an earlier age. As already suggested, excellent effects are to be had by use of brick alone, provided sufficient variety is secured.

Rusticated Window at Petersham, Surrey, *circa* 1740

An effective treatment for which moulded brick are not essential. The channels should not exceed one inch in depth

The Curved Stairway

By MOTT B. SCHMIDT, A. I. A.

IF the fireplace is the heart of a room, the stairway is the heart of a house, and in the development of the Anglo-Saxon dwelling the design and construction of the staircase have faithfully mirrored the changing customs, styles and habits of the people.

The stair demonstrates to a remarkable degree the interesting manner in which all the industrial arts have marked the progress of the history of civilization. In the sudden transition from the style of Louis XVI to that of the directoire and the empire one may read with startling exactness the story of the French revolution, and if some of the other changes in style are less easily defined, because more gradually or subtly conceived, even the most casual examination is more than amply rewarded.

Surely it does not take much imagination to picture, before the massive iron-studded oak portals of sixteenth century Florence, the swashbuckling gentleman who with one blow of a mighty fist could playfully rend into splinters the rosewood and mahogany panels of eighteenth century London, and while it may seem a far cry from the polished treads of Portman square to the simple steps that supported the hob-nailed boots of our earlier colonial settlers, the search for an appreciation of what we believe to be beautiful is one of the things that makes living different from merely existing, and with each stair comes a special opportunity to weave a little romance into our practical age, instead of only a question of how many risers we need for headroom.

The sixteenth century in Europe saw the wane of ecclesiastical architecture and the development of the castle, hall, or other semi-domestic building where the stairs were enclosed between walls of solid masonry. Straight, wide steps were used for access to the principal rooms, with small, curved stairways for occasional use. These early curved stairs were almost always of stone, the risers radiating from a continuous newel. Stairs of this type were often placed in piers of solid masonry, and at other times to avoid cutting into the principal rooms they were allowed to project as towers from the faces of the exterior walls. As these structures grew in height, with increased need of communication between various floors, small curved stairways became more numerous. There were often many of them in the same building, in consequence of which the projecting stair tower became a feature of English, as

A formal treatment of a curved stairway with the iron railing set on a closed string

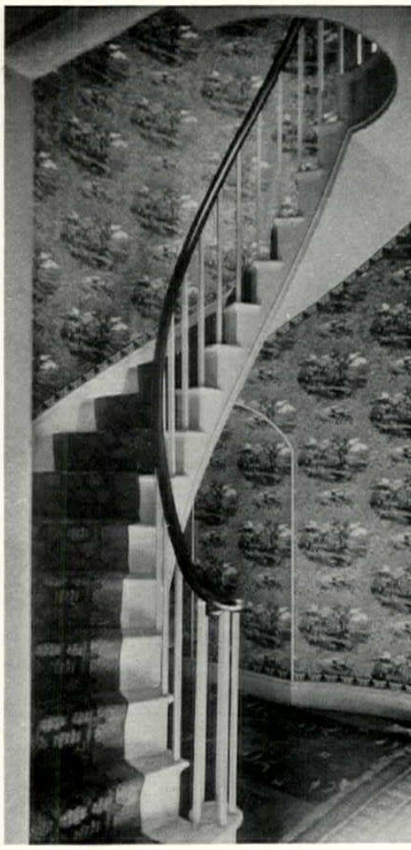
House of Robert S. Brewster, Esq., Mt. Kisco, N. Y.

Delano & Aldrich, Architects

well as of various types of French, domestic architecture.

The use of wood for stairways eliminated the necessity for the vaulted stairs of stone, and in Elizabethan and Jacobean England stairways were built almost entirely in straight runs with square landings. It was not until the seventeenth century in England and France, after the stair hall had become a distinct architectural feature, that use of the curved stairway in its modern form began.

Soon after the rise to favor of the separate baluster in wood or stone, handrails and balustrades of iron in both wrought and cast forms began to be used. The stairs themselves were constructed of either stone or wood, and this choice of material, with the accompanying advance in craftsmanship, gave great opportunity for increased possibilities in both design and construction. The still existing eighteenth century stairways of France and England tell with mute eloquence that this opportunity was not often lost!

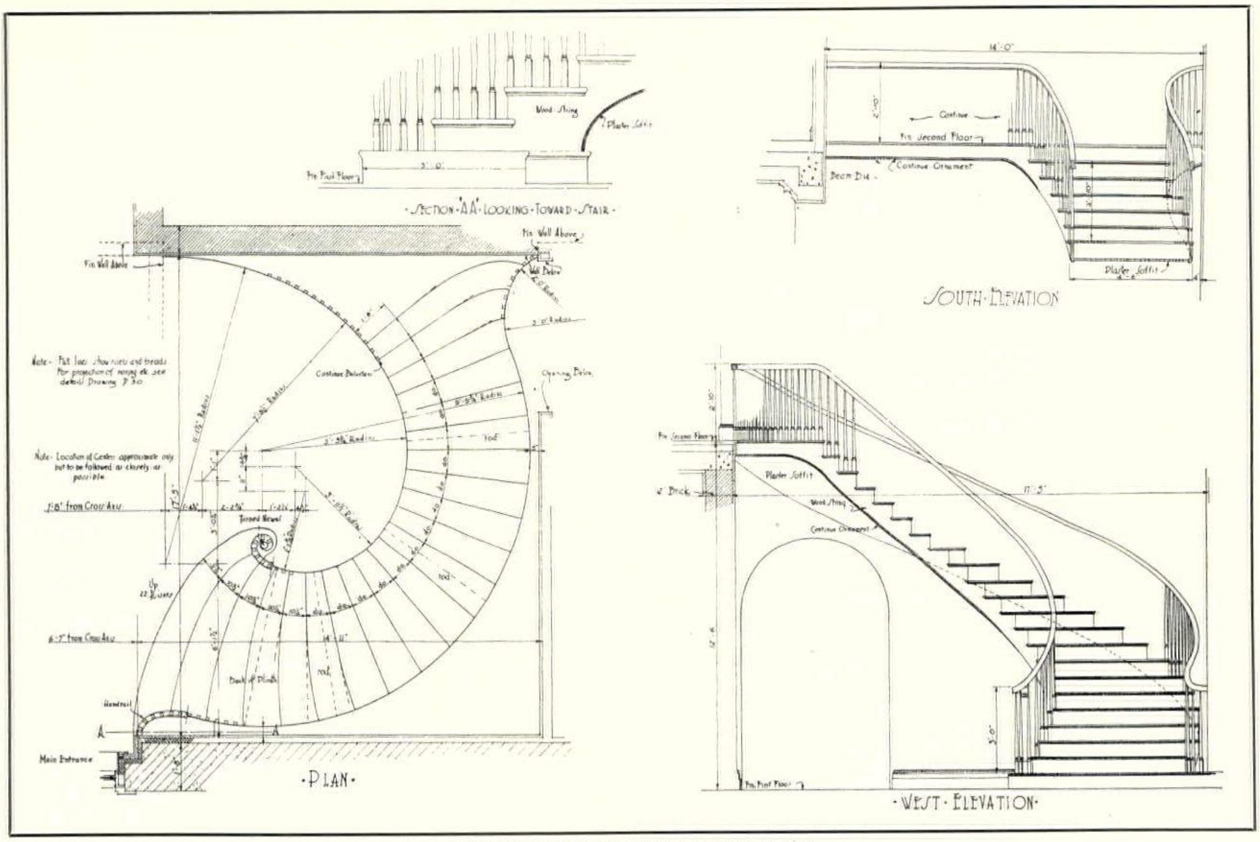


Steep Curved Stairway in Dana House
Orford, N. H., *circa* 1810

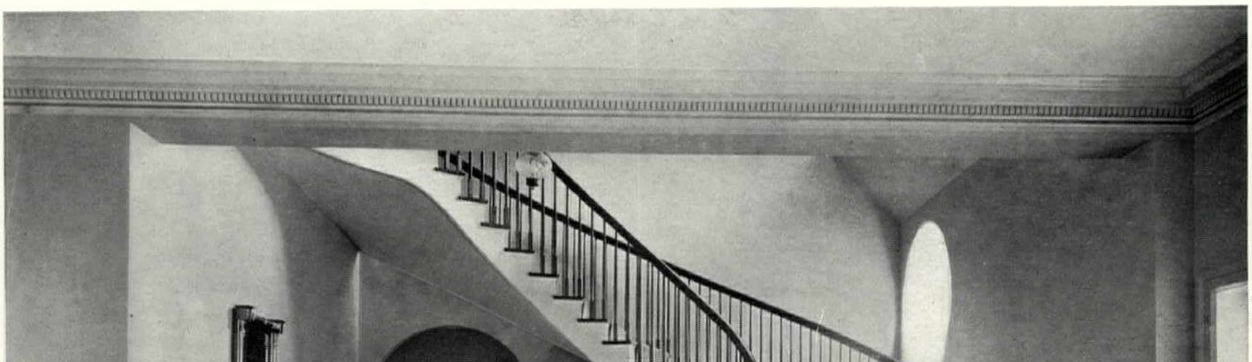
The early American stairways were built largely of wood. We know well the simple turned and tapered balusters, placed solidly on their sturdy pine treads, in the tiny hallway of some old New England farmhouse, and the gracious southern stairways of alternately turned and twisted and fluted balusters, reminiscent of Georgian England, with only the treads and handrails of the precious mahogany that had to be imported.

But whether the treads are wide and the risers low, or whether the stair is steep and spiral, with the treads so narrow that the risers must be cut out for the toes of the children, as they rush pell-mell up into the cobwebbed mysteries of the attic, every curved stairway seems to possess in some degree a domestic quality that is excuse enough for it to continue to wind its way gracefully aloft.

Modern Curved Stairway Based on Late Eighteenth Century Model
Derby & Robinson, Architects



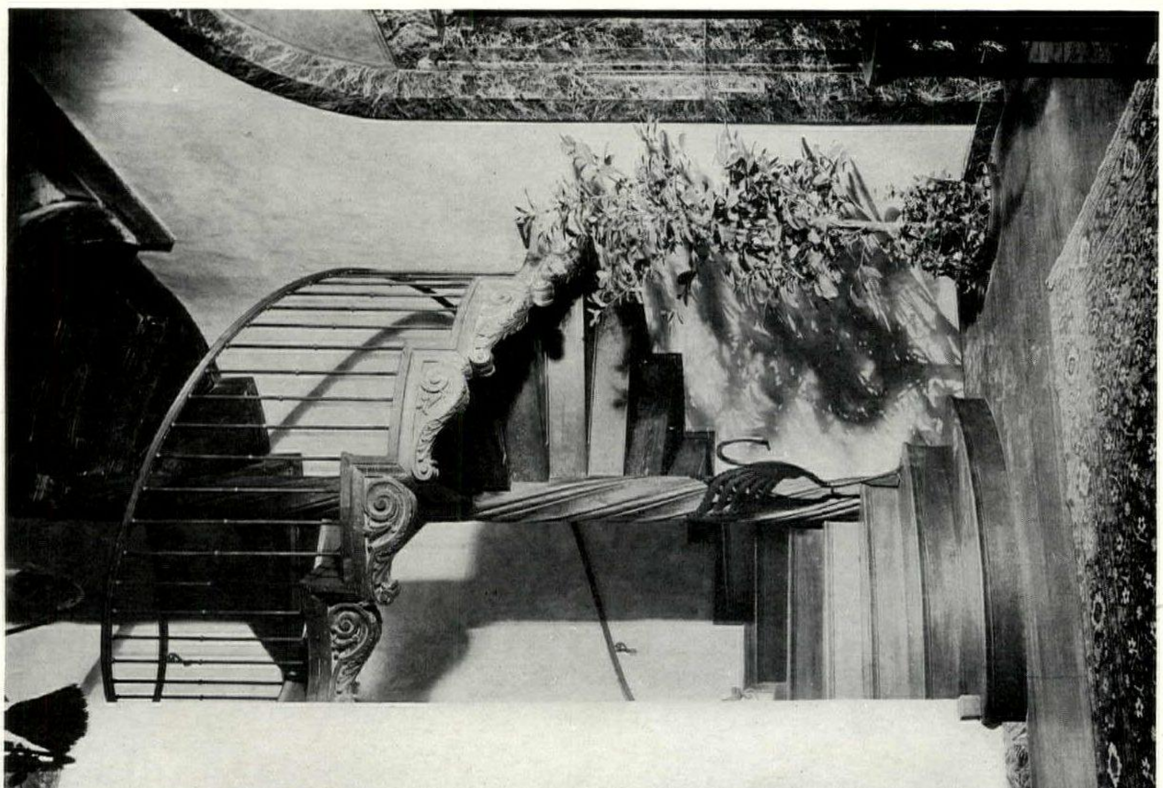
DETAILS OF PLAN AND ELEVATIONS



CURVED STAIRCASE OF WOOD CONSTRUCTION

HOUSE OF G. HERMANN KINNICUTT, ESQ., FAR HILLS, N. J.

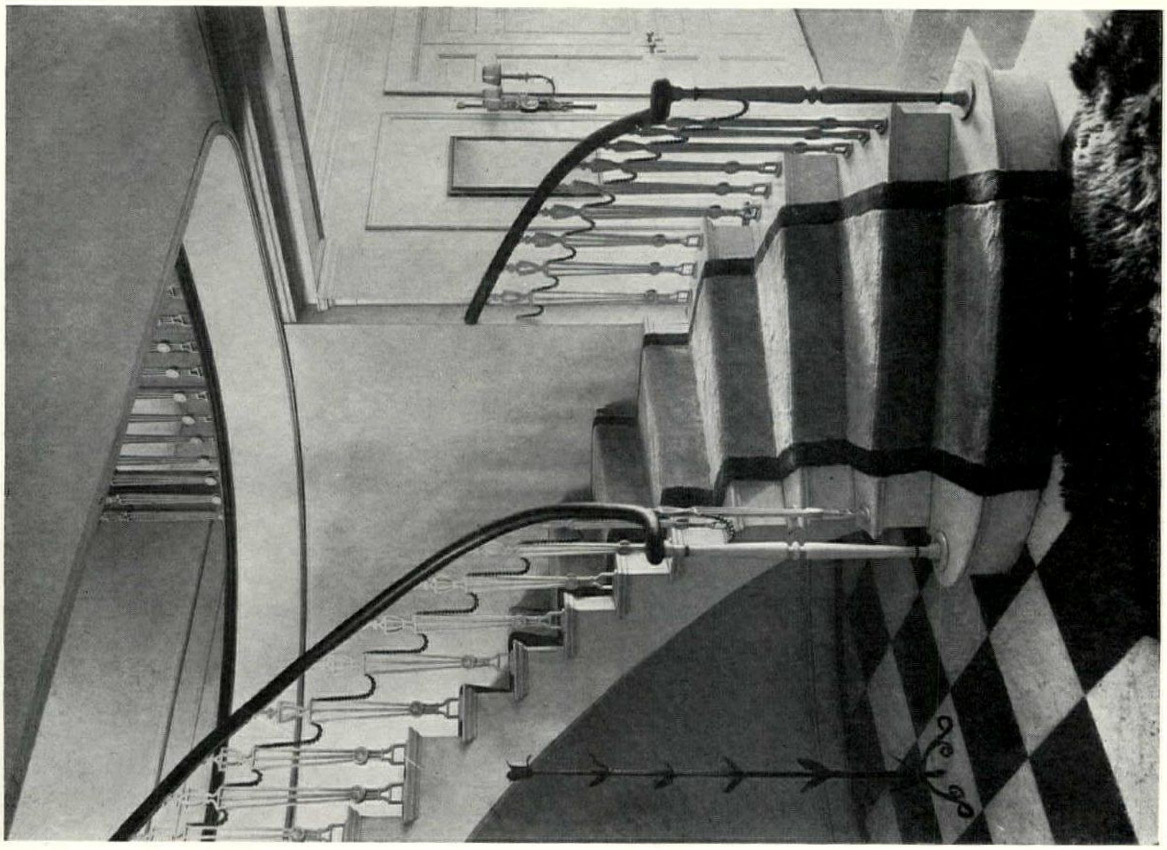
CROSS & CROSS, ARCHITECTS



An informal stairway with continuous center newel; construction of wood with iron balustrade

HOUSE OF CHARLES E. MITCHELL, ESQ., NEW YORK

WALKER & GILLETTE, ARCHITECTS

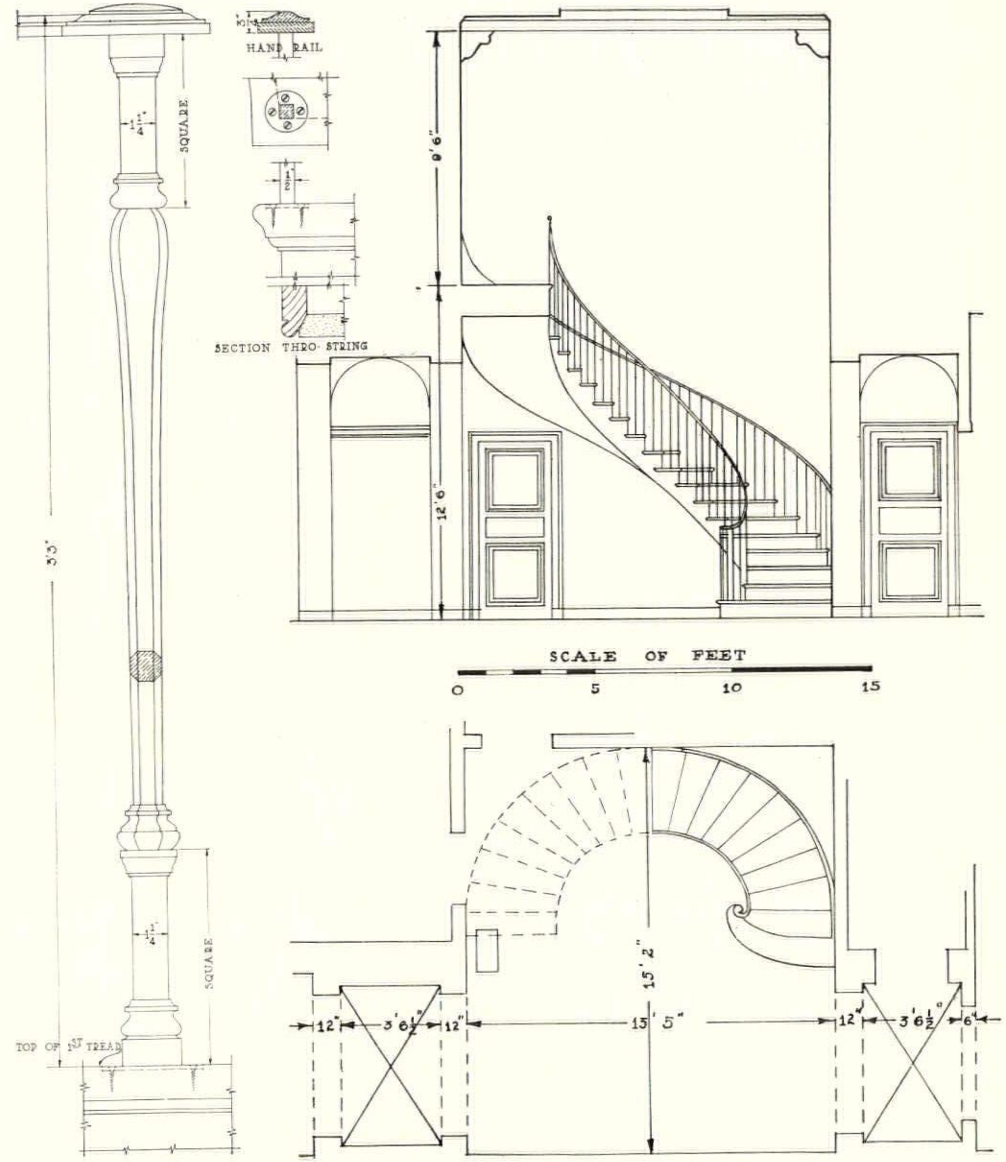


Curved stairway projecting from wall; balusters of delicate cast iron; handrail black velvet covered

HOUSE OF ALBERT K. WAMPOLE, ESQ., GUILFORD, MD.

MOTT B. SCHMIDT, ARCHITECT

FREE-STANDING CURVED STAIRWAY IN A SQUARE WELL

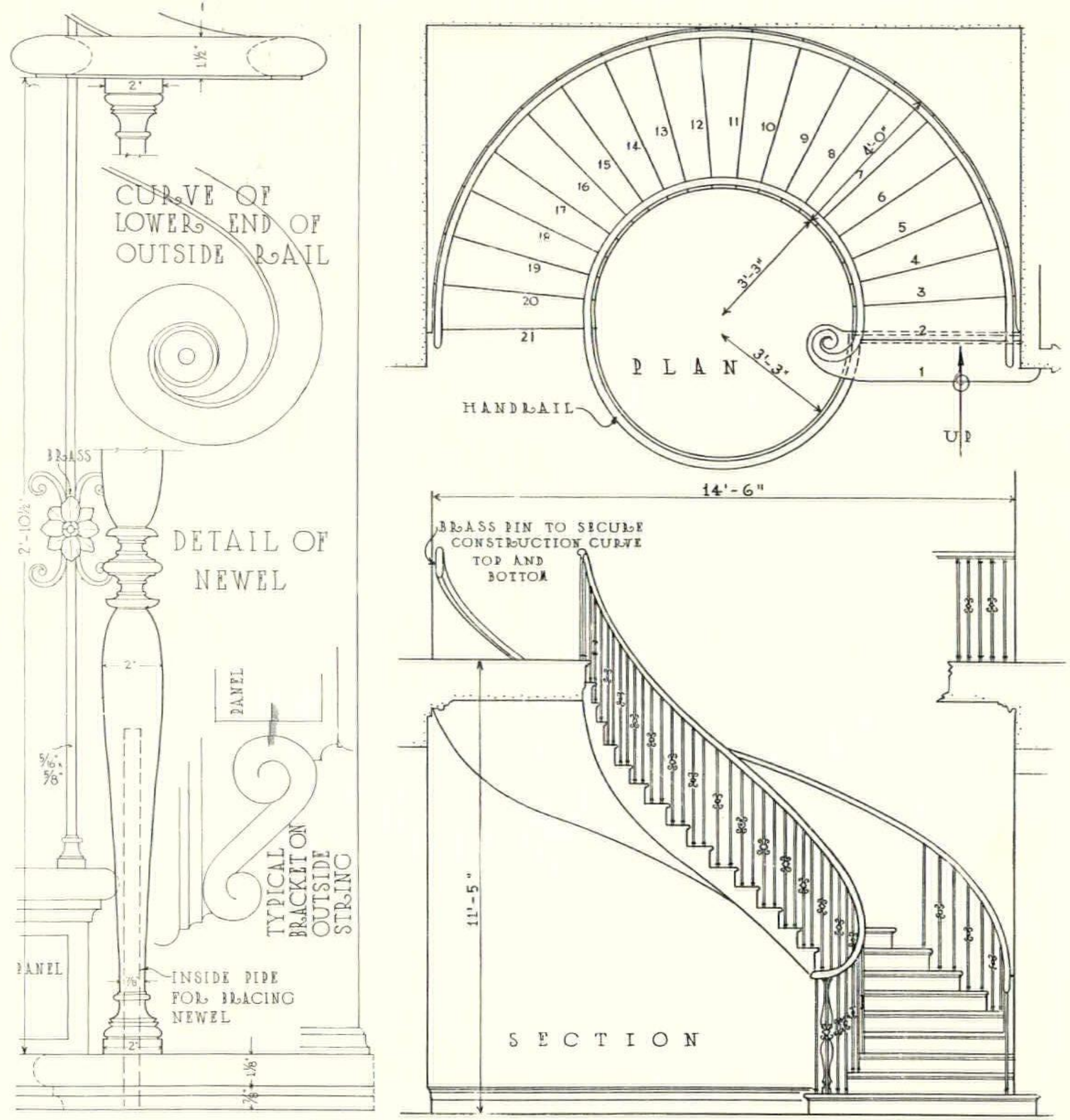


PLAN, ELEVATION AND DETAILS OF BALUSTRADE

HOUSE OF GRENVILLE T. EMMET, ESQ., NEW YORK

MOTT B. SCHMIDT, ARCHITECT

CURVED STAIRWAY IN A SQUARE WELL



PLAN, ELEVATION AND DETAILS OF BALUSTRADE

HOUSE OF ROBERT L. BACON, ESQ., WESTBURY, N. Y.

JOHN RUSSELL POPE, ARCHITECT

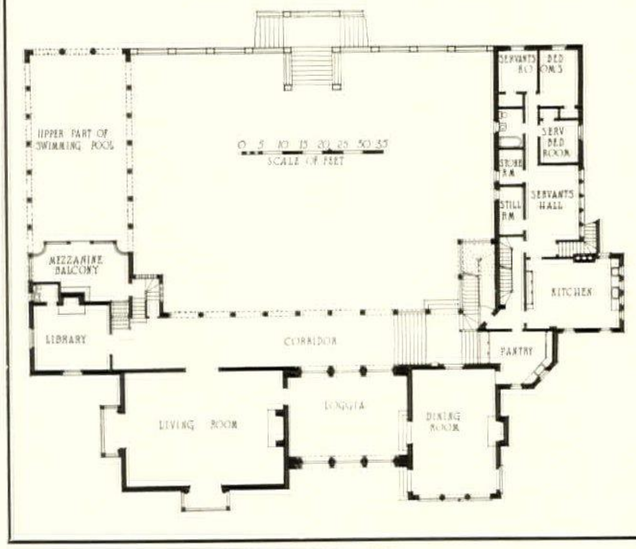
Photos by F E Geisler

DETAIL OF COURT FRONT

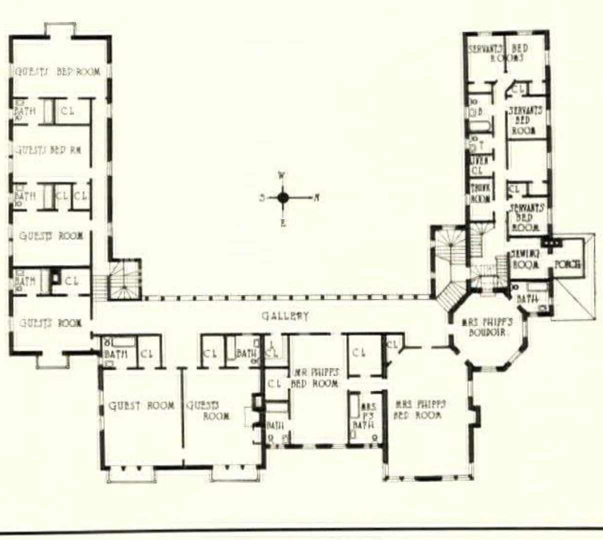
HOUSE OF J. S. PHIPPS, ESQ., PALM BEACH, FLA.

ADDISON MIZNER, ARCHITECT

GENERAL VIEW OF ENTRANCE FRONT



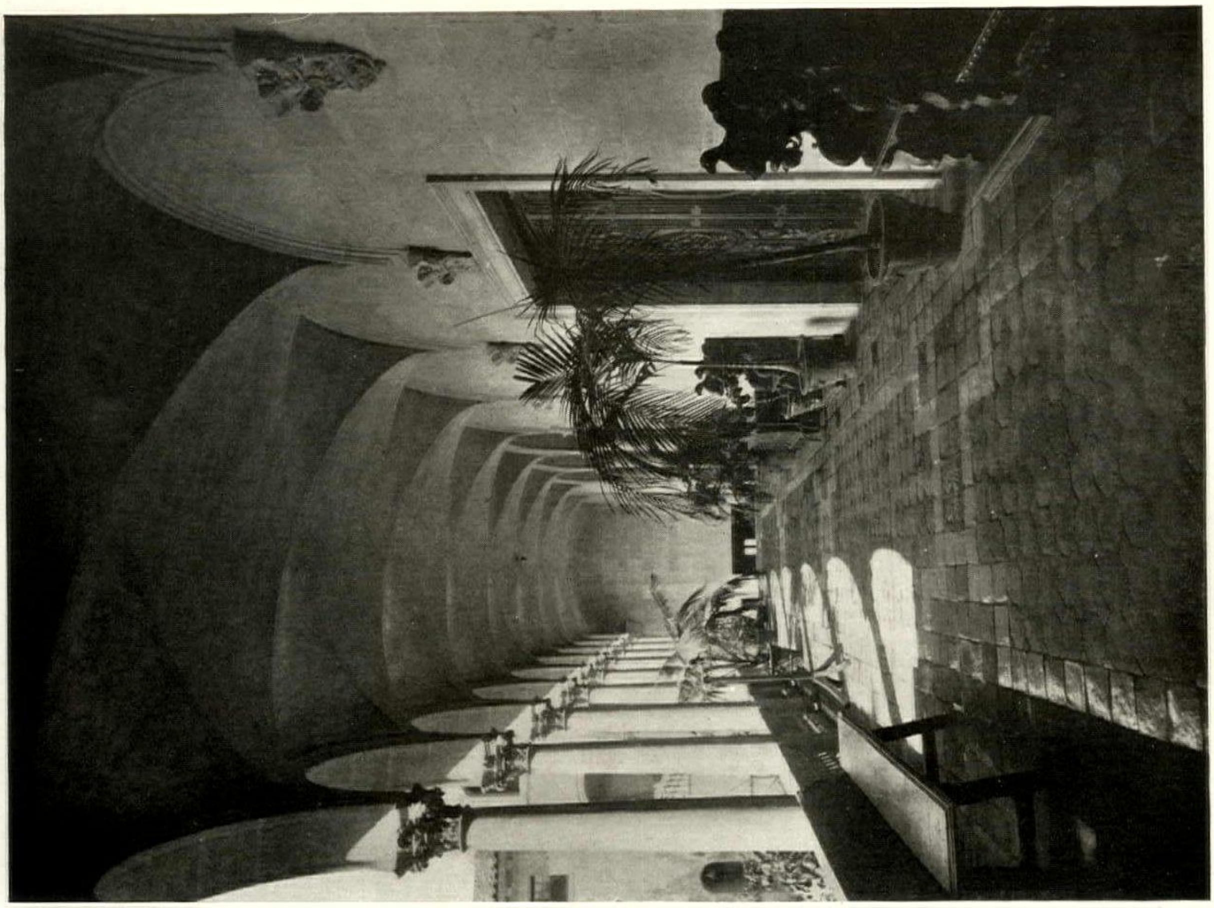
FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF J. S. PHIPPS, ESQ., PALM BEACH, FLA.

ADDISON MIZNER, ARCHITECT



FIRST FLOOR ARCADE

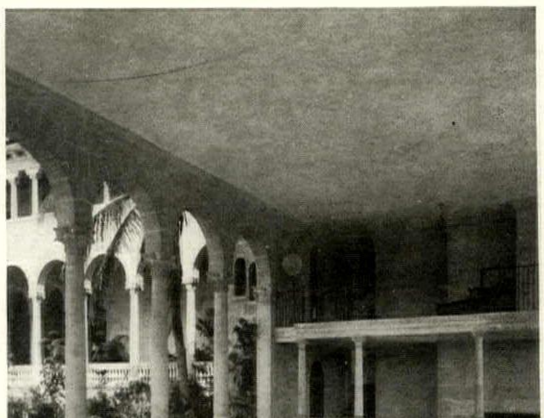
VIEW ACROSS COURT

HOUSE OF J. S. PHIPPS, ESQ., PALM BEACH, FLA.

ADDISON MIZNER, ARCHITECT

VIEW IN LOGGIA

EXTERIOR STAIRCASE FROM ARCADE

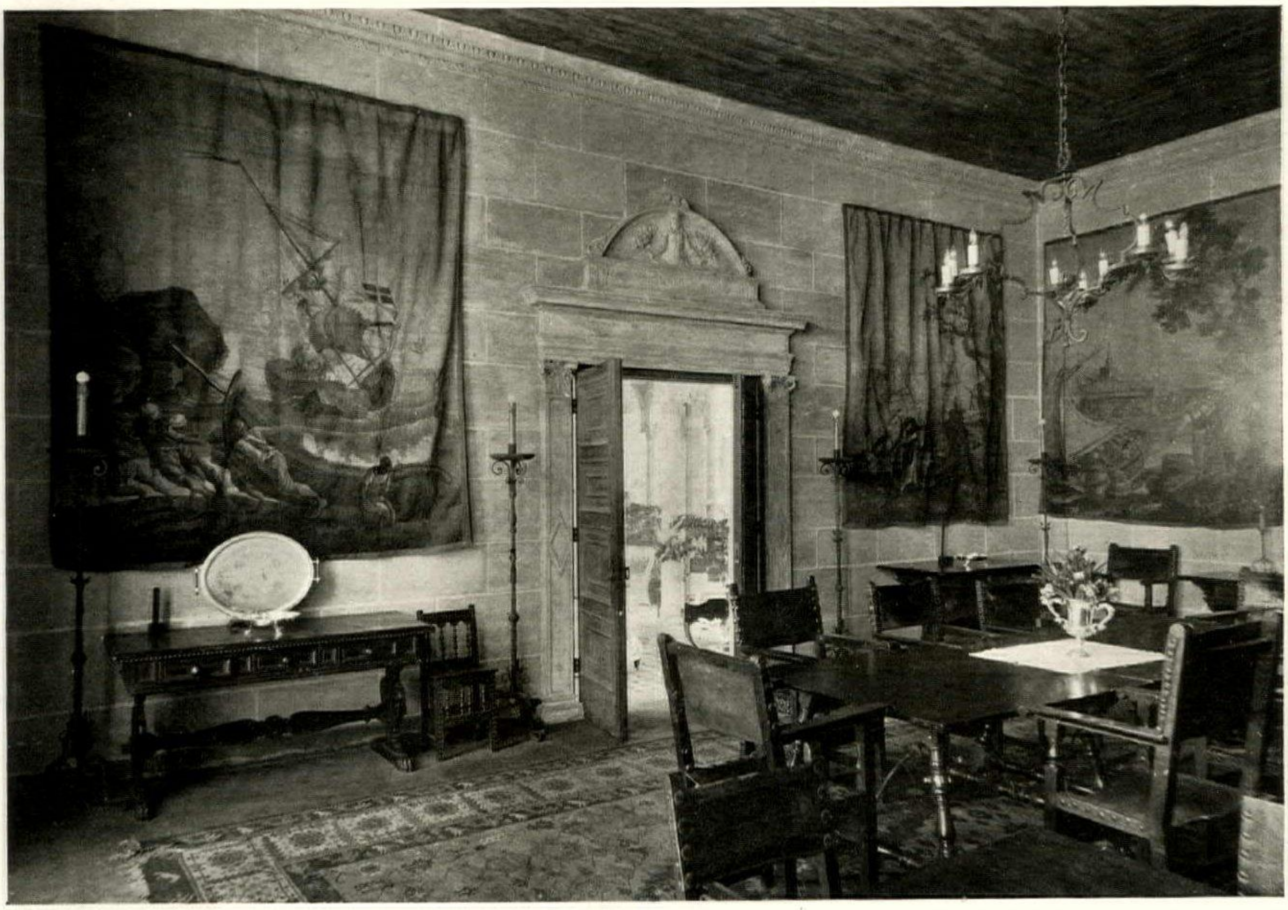


SWIMMING POOL

HOUSE OF J. S. PHIPPS, ESQ., PALM BEACH, FLA.

ADDISON MIZNER, ARCHITECT

LIVING ROOM

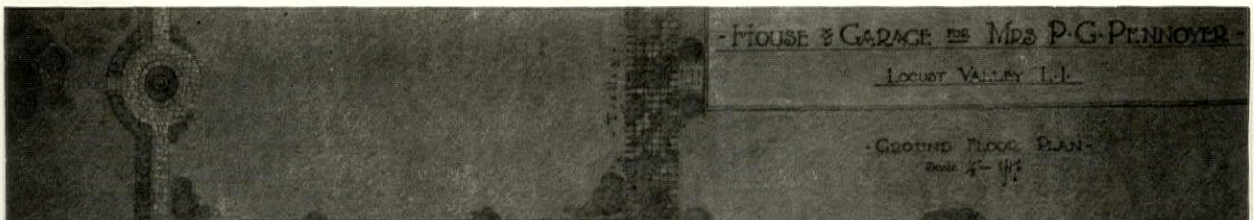


DINING ROOM

HOUSE OF J. S. PHIPPS, ESQ., PALM BEACH, FLA.

ADDISON MIZNER, ARCHITECT

GENERAL EXTERIOR OF "ROUND BUSH"



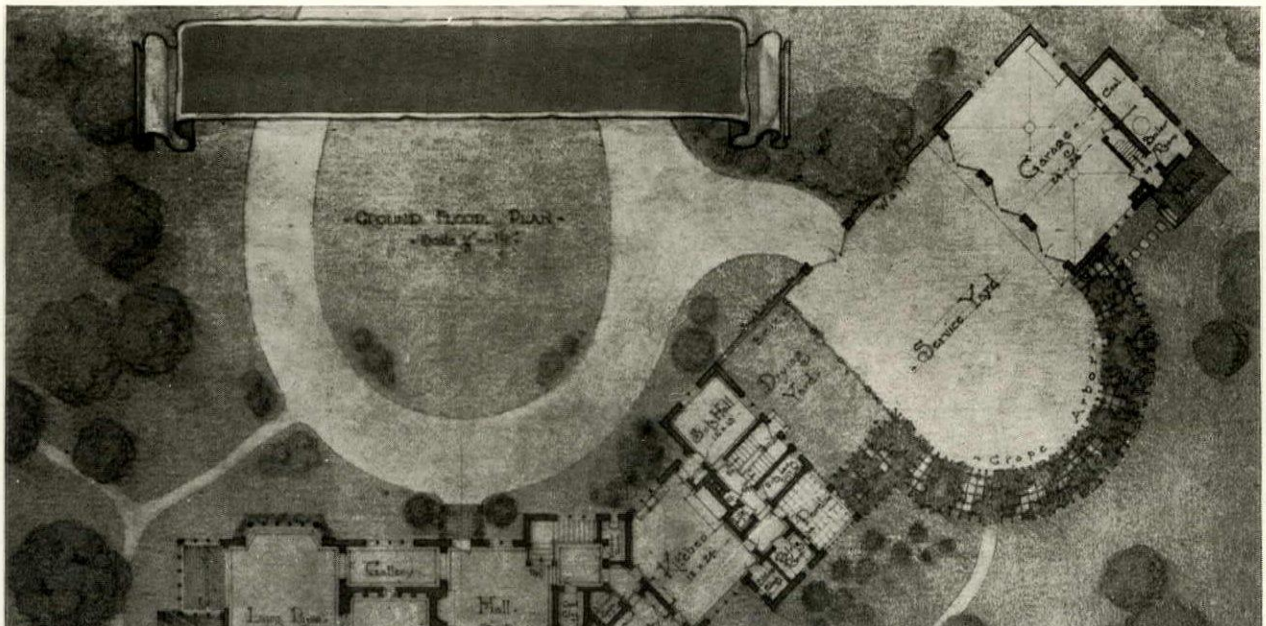
Photos by G. H. VanAnda

FLOOR PLANS OF "ROUND BUSH"

TWO HOUSES AT LOCUST VALLEY, N. Y.

GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

GENERAL EXTERIOR OF "APPLE TREES"



FLOOR PLANS OF "APPLE TREES"

TWO HOUSES AT LOCUST VALLEY, N. Y

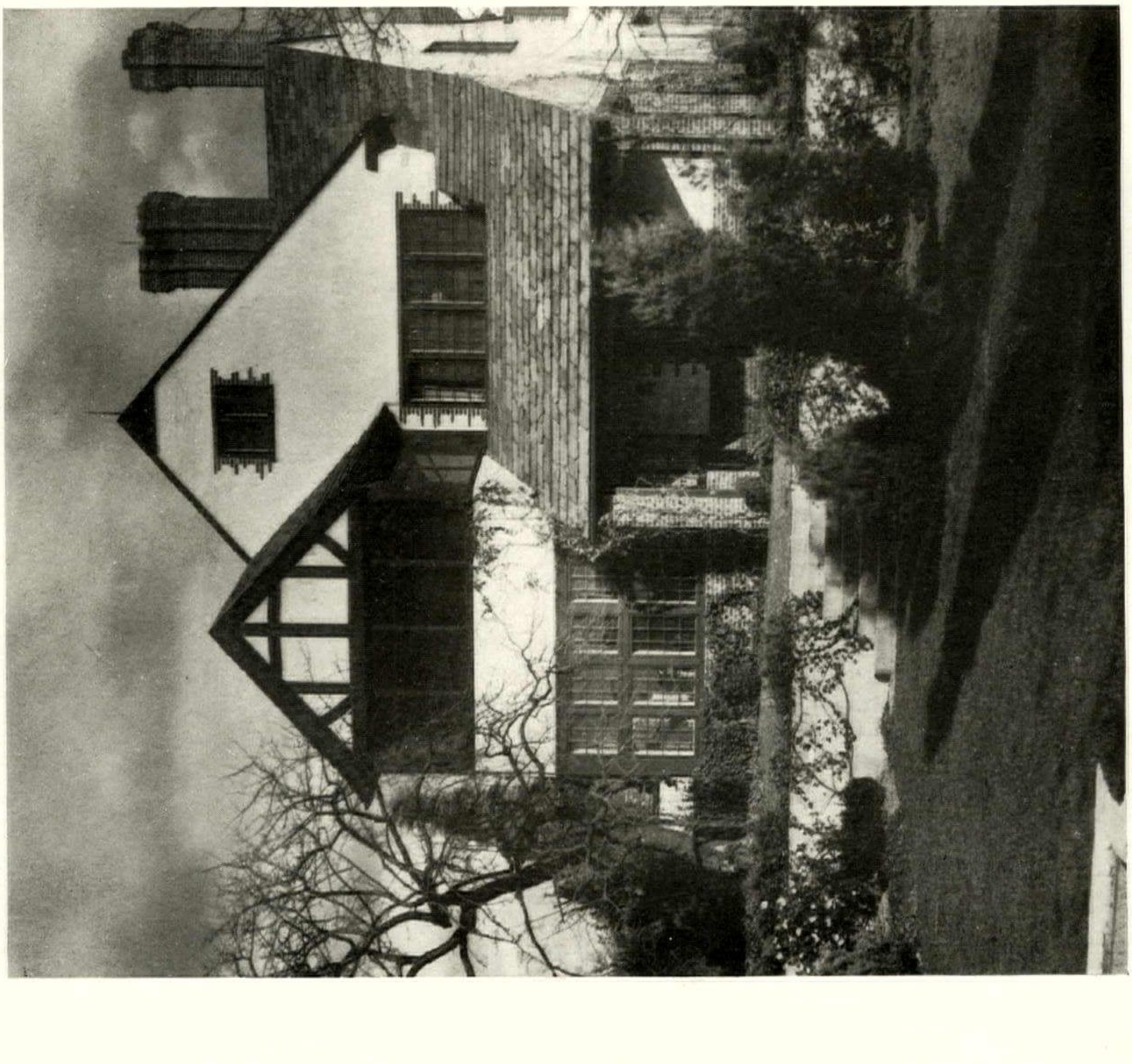
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

ENTRANCE FRONT OF "APPLE TREES" FROM DRIVEWAY

TWO HOUSES AT LOCUST VALLEY, N. Y.

GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

ENTRANCE FRONT OF "ROUND BUSH"



GARDEN END OF "APPLE TREES"

TWO HOUSES AT LOCUST VALLEY, N. Y.

GOODWIN, BULLARD & WOOLSEY, ARCHITECTS

BUSINESS & FINANCE

C. Stanley Taylor, *Editor*

Business Factors in Architectural Practice

III. THE FINANCING OF HOTEL AND APARTMENT BUILDINGS

Editor's Note: The purpose of this article is to analyze and classify the various sources, forms and conditions affecting the provision of mortgage and equity money covering the cost of land and building operations. Apartment and hotel buildings are considered jointly because of the similarity of practically all phases of financing such operations.

IN considering the financial aspects of any speculative or investment building operation, it may be generally assumed that the primary objective of all financing activity is to obtain the land and completed building with the smallest possible cash investment as equity. Money invested in apartment and hotel building operations is primarily for the purpose of developing a speculative profit on the sale of the building, or to provide an investment which will pay a comparatively high percentage on the principal. This investment is made on the basis of the rental-earning capacity of the building, and it is obvious that with the net income as a fixed quantity any decrease in the amount of equity investment required will bring a proportionate increase in the percentage of the net earnings. The basic consideration, therefore, becomes a comparison between the cost of obtaining financial assistance in the form of mortgage loans and other credit extensions as against the increased earning power of the net investment. If money can be borrowed at 6 per cent and used to earn a considerably higher percentage, it is obviously good business and also serves to decrease the amount of money it requires on a straight investment basis. We may, therefore, define the basic financing objective of hotel and apartment building operations as being to obtain the most liberal possible financial aid at the lowest cost consistent with its speculative and investment earning power.

Considered from a practical viewpoint, the architect can aid materially in assisting the owner to attain this objective by designing a building which will appeal to tenants and offer strong competition with other buildings of similar type in the locality. He may also introduce the practical factors of plan economy and efficiency, provide every possible foot of rentable space at the lowest possible cost consistent with quality. The architect may also present in the form of sketch plans and outline specifications a visualization of the completed project which will bear importantly on mortgage loan decisions and preliminary appraisal valuations. With this thought in mind consideration may be given to the various elements of financing with which the architect who designs such building projects should be familiar.

The building and permanent first mortgage is the form most generally used in these and other types of building operations. No detail description of this method is necessary, but it is well to note that normal channels for such loans are savings banks, life insurance companies, trust companies, estates, and often through attorneys who make loans for clients. Under the conditions of present building costs the average amount of mortgage money payable on this basis approximates 50 per cent of the cost of the appraised valuation of land and building, which will usually average enough to provide close to 60 per cent of the actual cost of the operation. The costs of obtaining this money average from 1 to 5 per cent, depending on the customary charges of the loaning institution and whether or not the loan is obtained through the services of a mortgage broker. If a mortgage is obtained directly from a savings bank or similar institutions the cost does not usually run over 1 per cent of the principal. Brokerage charges add from 1 to 2 per cent, and other fees may be introduced under individual considerations.

A second form under which more liberal loans are usually available introduces the element of amortization. In an ordinary type of first mortgage financing the entire principal becomes due in a definite period of three, five or more years. The amortization feature involves the reduction or paying off of the principal in stated annual amounts. In this field there are a number of companies making a specific business of providing mortgage loans by the sale of bonds through the public or by other forms of investment securities which provide the necessary money to be loaned on first mortgage under an amortization plan. From these companies it is usually possible to obtain more liberal assistance in the form of first mortgage loans than is ordinarily available through regular channels. The loan is usually made on a basis which calls for the repayment of principal at the rate of 10 per cent per year for a period of ten years, which means that after the first year or two the principal is reduced to a most conservative basis. Again, it is evident that organizations specializing in mortgage loans can and do maintain expert appraisal departments capable of analyzing plans and conditions and suggesting changes if necessary which serve to safeguard the entire investment and render a collateral more sound than it might be under casual appraisal for a lower ratio of mortgage financing. Through these specialized channels it becomes possible to develop many building operations which normally could not be undertaken because of the lack of sufficient capital, and the opinion of such mortgage loaning companies as to the investment qualifications of a specific building project is of considerable value as a test of its soundness.

In addition to the two general forms of first mortgage loans already described there are occasional methods introduced such as the direct sale of mortgage bonds to the investing public. This has been tried with fair success by building owners in structures in some of the larger cities, but general experience shows that the cost of direct mortgage bond sale to the public is prohibitive for the individual, and usually this cost is greatly underestimated. The only successful mortgage companies are those which have over a period of years maintained extensive sales machinery, with consistent offerings to the investing public where confidence has been established through the years of safe handling of the public's money in this investment field.

Another interesting service which has been casually employed for many years and which recently has become more extended in larger cities consists of purchasing any piece of land on which an owner is desirous of building, providing him with the necessary building loan, and allowing the land with a profit to be subordinated to a permanent first mortgage obtained after the building is completed.

Second Mortgage Financing

Practically all speculative and investment building operations carry second mortgage financing where it is obtainable. There are at least four generally used methods of arranging a second mortgage loan. The first of these is an arrangement with the land owner at the time of its purchase to subordinate it to the building loan and the permanent first mortgage, giving him a second mortgage for a definite period of years or payable under amortization arrangement. This method of purchasing land is introduced for the purpose of reducing the amount of the original investment, and it is customary to pay somewhat more for the land under this arrangement than if it were an outright cash purchase. If sufficient cash is available it is always more satisfactory to purchase the building site for cash and to present it free and clear under actual ownership when application is made for building and permanent mortgage loan. The method of subordinating the land cost is used extensively, however, because it makes possible many transactions through the provision of this additional element of credit which often represents 15 to 20 per cent of the total cost of the transaction.

A second method is simply borrowing on a straight second mortgage basis. This type of loan is usually expensive in first costs as the second mortgage market demands anywhere from 10 to 18 per cent discount in addition to short term and often amortization features. The second mortgagee will insist that the first mortgage be conservative, usually not over a 50 per cent net valuation, and the loan obtainable usually totals about 15 per cent, so that in this manner up to 70 per cent of the cost of land and building may be obtained on a credit basis, which, if the land has been purchased outright, usually provides enough cash for the entire cost of building construction.

There are several modified forms of obtaining second mortgage financing or its equivalent. One interesting method, when money is needed at the termination of building construction to pay off final costs, is that of borrowing against rentals. In this type of transaction an assignment of the rentals or a proportion of the rentals is made to cover the amount borrowed. Another method is to arrange with the building contractor and with others who provide service (as described in the preceding article in this series) to take part of their profits in the form of deferred payments, constituting the second mortgage claim against the property.

The sources of obtaining second mortgage money cannot be so definitely known as in the case of first mortgage money. There are practically no mortgage institutions primarily developed to deal in second mortgage loans. This money is usually obtainable through individuals who specialize in making loans of this nature, and through attorneys or brokers whose clients make this type of investment because of its more attractive percentage of return.

Mortgage Applications and Appraisals

It is a fact which has often been demonstrated that on a large building project the method of presenting a mortgage application has a decided effect on the ultimate decision. By this it is not meant that elaborate plans and perspective must be presented, but that the mortgage application should be accompanied by sufficient data to make easy a thorough visualization of the completed project both physically and in detail of operation costs, rental income and property valuations. It is particularly important that a good architectural presentation be made, especially at this time, when it is a recognized fact that all new buildings will ultimately be forced into competition as the supply approximately equals the demand for rentable space in the different classifications.

When appraisals are to be made covering proposed building projects, the only intangible element in the mind of the appraiser is the character of the proposed new structure. Assuming that the purpose and location of the building are satisfactory, the only question lies in the efficiency of the building itself and its consequent earning capacity. A good perspective and clearly drawn floor plans aid materially in this consideration. These plans should be developed so that they will meet the test of the building manager's opinion, and in a manner which provides a logical basis for establishing favorable figures of rental income and all possible net profit.

A mortgage application accompanied by data which makes it easy to understand the entire project is almost invariably acted upon more quickly and more liberally than where it is necessary to spend considerable time in analysis. The application for a mortgage loan must be accompanied by specific information regarding the purpose and anticipated earning capacity of the building, which will include a schedule of rents and operative income. In establishing the factors of operating expense a clear division should be made between the costs of maintenance, upkeep and repair. Maintenance includes all direct operating expenses; upkeep includes items of expenditure for purposes of preventing deterioration; repair includes cost of actual replacements or reconditioning of worn or broken structural parts or equipment.

An important element of consideration as affecting building investments and mortgage appraisals is the factor of depreciation which in itself is divisible into two classes—physical depreciation and depreciation of value due to a change in local conditions. Since the establishment of the income tax, in which depreciation and obsolescence are officially recognized, this subject is of particular importance and should be carefully considered in analyzing the financial problems affecting any investment building project. It is quite necessary to realize that the valuable life or period of existence of a building is limited according to the type of construction, and that in some manner a sinking fund must be established to write off the original investment in accordance with this logical period of life.

Some very interesting studies of this question have been made by Richard M. Hurd, author of "Principles of City Land Values," and by Reginald P. Bolton, author of "Building for Profit." Mr. Hurd, in his analysis of the duration of life of buildings of certain types, draws his proportions in accordance with the cheapness or excellence of their general construction. This tabulation presents briefly Mr. Hurd's conclusions on this question. In this table will be found the estimated terms of useful life of various types of buildings, together with the rates and terms of proposed sinking funds which would serve to return the original investment.

Construction	Occupancy	Term of life in Years	Rate of Fund Proposed in Per cent	Term of Sinking Fund at 3 per cent in years
Cheap frame	Tenements	10–15	10–5	9–16
Cheap frame	Residences	25–30	3–2	23–31
Better class frame	Residences	50–75	2–1	31–47
Cheap brick	Tenements	25–30	3–2	23–31
Cheap brick	Residences	35–50	2–1	31–47
Cheap brick	Office buildings	25–30	3–2	23–31
Better class brick	Residences	50–75	1½–1	37–47
Good brick or stone	Office buildings	75–100	1	47

Mr. Bolton analyzes this question in a very thorough manner and one which makes it possible to establish the physical depreciation of the value of practically any building. His system of appraising the probable life of a building is to recognize that the elements involved in the building construction are more or less durable, and that the component parts of the building bear to each other a relative term of durable life. He assigns maximum longevity to the most durable elements of the combination of materials which make up the structure, weights these proportions with the relative cost, and deduces a tabulation of relative life of component parts of buildings. This interesting tabulation may be found in his book "Building for Profit," and it is interesting to present an actual example of the method of ascertaining the mean life of any building by applying these deductions. Here is an example of this application to a steel-frame office building, in which he assigns the life of 66 years to the most durable parts (foundations, steel framing, masonry, fireproof doors, etc.). In this tabulation the relative life of other components is given, together with an interesting division of costs relative to the total cost of the building:

Material	Life relative to 66 years	Cost relative to total cost of bldg.	Life times cost
Foundations	100%	5.3%	530.0
Steel framing	100	7.6	760.0
Masonry	100	33.7	3370.0
Fireproof floors	100	2.0	200.0
Ornamental iron	73	6.3	459.9
Heating	50	3.3	165.0
Plumbing	50	1.5	75.0
Electric wiring	50	2.0	100.0
Partitions	70	1.2	84.0
Joinery	70	3.4	238.0
Fixtures (plumbing)	29	12.6	365.4
Roofing (tile)	59	2.0	118.0
Plastering	54	3.8	205.2
Marble	54	9.6	518.4
Elevator	30	3.1	93.0
Hardware	37	0.5	18.5
Glass	14	1.3	18.2
Paint	10	0.8	8.0
Totals	...	100.	7327,6

Mean $\frac{7327.6}{100}=73.276$ per cent of 66 years, or a mean life of 48.36 years.

Under this system or from general records it is possible to deduce the approximate useful life of a building for appraisal purposes. This result must of course be tempered by a consideration of the economic life of the building, or in other words its probable utility value under the changing conditions of the community. There is no given method of measuring this situation, but it is evident that it must be recognized in planning by eliminating extravagant and unnecessary expenditures and by providing a certain flexibility of plan so that the building is not limited to a specific use but may be altered for other purposes.

These conditions of the plan have a very definite effect in appraisals for mortgage loaning purposes. This is why it is difficult to borrow on special building types, such as storage warehouses, studio buildings and similar structures designed for a single purpose only. The experience of many hotels during the past few years, where it has been found necessary to relieve overhead cost by introducing stores, has shown the importance of providing in the plans for such changes, and the importance of making the general first floor level at the same elevation as the street level in order that such alterations can be made cheaply. In many large hotels today it is impossible to make store alterations because of the difference in elevations, placing of columns and other structural limitations. If proper provision has been made for expansion and changing conditions, this fact contributes strongly to the investment and collateral value of the building.

On a basis of observation, Mr. Bolton records these average periods of economic existence of buildings:

Type of Building	Life in Years
"Taxpayer"	12–15
Hotels	15–18
Apartment houses	18–21
Store buildings	21–25
Tenements and flats	25–27
Office and business buildings	27–32
Lofts and factories	33–37
Residences	37–44
Banks and institutions	44–50

The Trend Toward Quality Building

An element of rapidly growing importance in connection with the mortgage financing of buildings is the growing recognition by loaning interests of the fact that values must not only be established but maintained. This result can only be obtained by eliminating the economic waste directly chargeable to inefficient planning of large buildings and use of inferior building materials, workmanship and equipment.

This is the trend toward quality building which is impossible without the service of good architects. As we analyze the vast majority of large buildings constructed prior to 1915, the shortsightedness of false economy becomes obvious and may be measured in terms of inefficiency of purpose, coupled with an abnormally high factor of depreciation. In many instances the first mistake on the part of prospective building owners has been their failure to appreciate the value of good architectural and engineering services in the preparation of plans and specifications for investment and institutional buildings. The result has been the development of inefficient and wastefully planned buildings, affecting adversely earning power, real estate valuations, and facilities for administration.

The second element of false economy on the part of owners, a fault common to many building operators, has been the introduction of the element of cheapness in order to limit the original building investment. Architects have often experienced this condition and chafed under its burden. The owner's insistence upon the purchasing of cheaper materials and equipment, his preference for low bid contracts and sub-contractors, or his attempt to buy plans and specifications at cut rates in all cases have contributed to induce economic waste and failure of building projects.

The architect if given free rein (or perhaps full confidence would be a better term) is desirous of rendering service which will insure, in addition to attractiveness of design, an efficiently planned building, well constructed of good materials and equipped for long life utility as a satisfactory investment.

Owing to the complexity of the modern large building the preparation of plans and specifications requires not only broad knowledge and unusual skill on the part of the architect but a vast amount of detail work for which he rarely receives credit. It follows naturally that this work cannot be well done on a cut rate basis, nor can it be done by inexperienced architects. Experience has shown that an ample fee for architectural and engineering service represents the most valuable form of building investment insurance,—but the application of this principle may be carried further and applied to the element of structural depreciation and high maintenance costs. It is an interesting fact that many of our large buildings today are constructed with exteriors which are good for a century, but with interiors and mechanical equipment for a logical life of not over 20 years This is due to the use of inferior materials and equipment.

It is logical to inquire at this point why such inconsistency of practice and judgment has not long ago resulted in a pronounced attitude of building investors in favor of the architect, the good building contractor, and manufacturers of the better qualities of building materials and equipment Two factors have influenced this situation,—first, the comparatively short period of years in which we have had an opportunity to study the performance of large buildings from the viewpoint of investment and depreciation, and, second, the absolute good fortune of building investors involved in the artificial increase in building values due to the sudden high trend of construction costs since 1915. This increase in cost of construction has by reason of comparative values greatly enhanced the value of old buildings, saving many from mortgage foreclosure and providing high investment returns where nothing but losses faced the owners previous to prevalence of this unexpected condition.

Bankers and heads of other mortgage loaning interests are rapidly realizing this condition, and are in fact constituting the greatest power of benefit to architects, good building contractors and manufacturers of dependable materials and equipment. Mortgage loaning interests are readjusting their appraisal interests and carrying out analytical studies of building plans, construction and materials. As never before, insistence is being placed on efficient planning, represented by good architectural and engineering service. The demand for long term building finance is being met by requirements of good construction which will insure the maintenance of intrinsic values. Bankers are realizing that within a few years the competition of the real estate market will be the competition of good buildings against poor buildings, and that their collateral must be safeguarded.

FRENCH RENAISSANCE DETAILS

A SERIES OF MEASURED DRAWINGS

By F. NELSON BREED

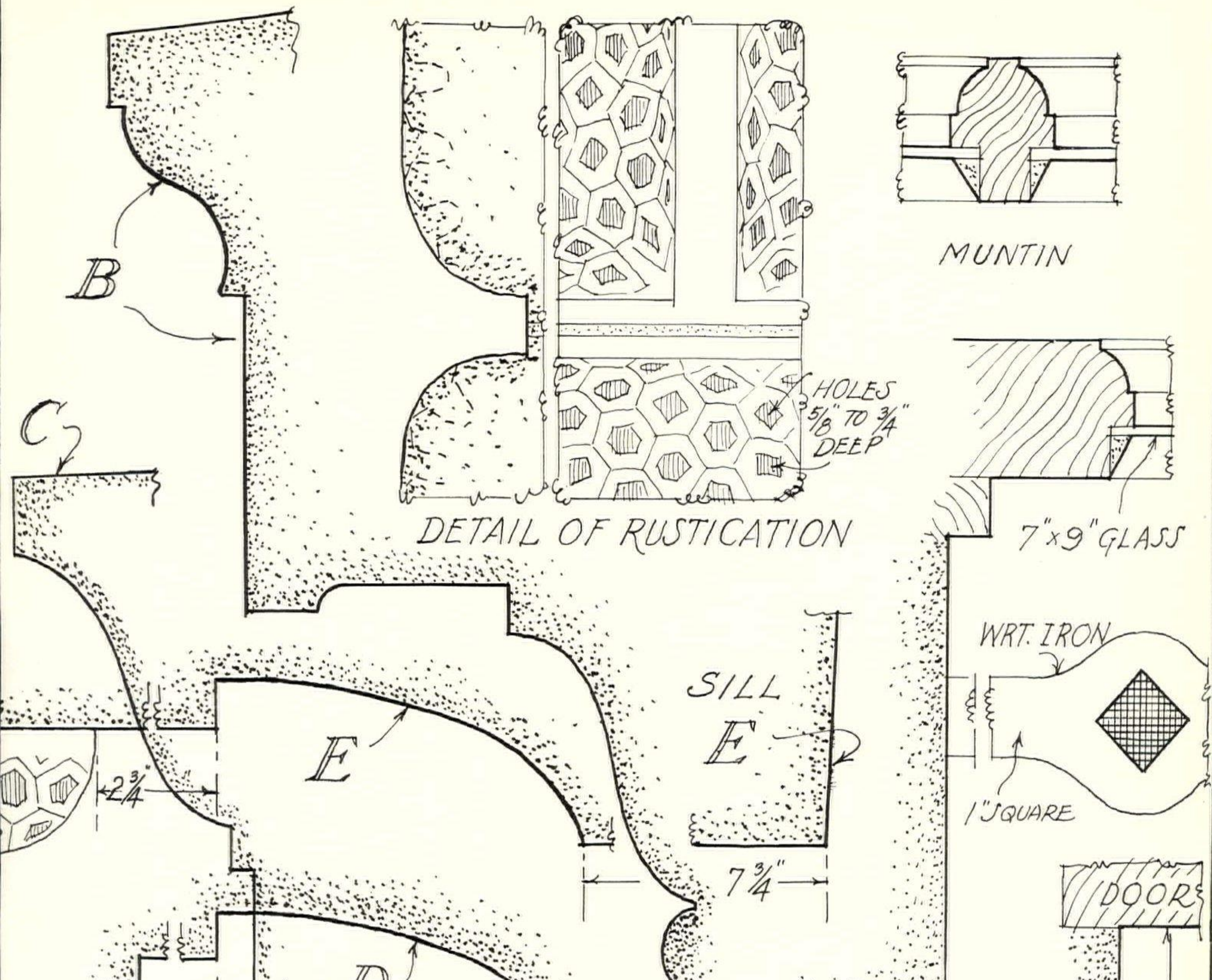
CENTRAL MOTIF
MUSEE CARNAVALET, PARIS

THE main entrance of this structure, one of the best buildings of its period of the French renaissance, and which at present contains some of the historical collections of the city of Paris, is part of the original structure built under the direction of Pierre Lescot as architect and Jean Goujon as sculptor. The ornament of the tympanum above the doorway, which includes the arms of the Carnavalet family, was installed shortly after 1578, and if not the work of Germain Pilon at least belongs to the school of that master. The figure of "Abundance" which adorns the keystone is by Goujon; the lions upon the panels at either side are also part of the original work, though they were formerly used within the building and were placed in their present position by Mansart during extensive alterations to the building during the seventeenth century.

The structure owes much of its present pleasing appearance to the passing of time and the rainstorms of centuries which have aged and mellowed the yellowish limestone, and to the fact that the greater part of the stonework is pierced by many small holes which aid in giving texture and play of light and shadow. The scale of the building is pleasing, as it is more human and far less grand and impressive than much French and Italian work, and yet sufficiently ample to be generous and dignified. The persistence of the name "Hotel de Sevigne" is probably due to the fact that Mme. de Sevigne occupied the building as a tenant in 1677.

THE MATERIAL IS LIMESTONE

FRENCH DETAILS 1923	CENTRAL MOTIF MUSÉE CARNAVALET ANCIEN HOTEL DE SEVIGNY PARIS, FRANCE.	MEASURED AND DRAWN BY F. N. BREED



DETAILS
ONE HALF FULL SIZE

FRENCH DETAILS 1923	CENTRAL MOTIF MUSÉE CARNAVALET ANCIEN HOTEL DE SEVIGNY PARIS, FRANCE.	MEASURED AND DRAWN BY F. N. BREED-

Plate Description

House of J. S. Phipps, Esq., Palm Beach, Fla. Plates 49–53. For this beautiful structure the architect, Addison Mizner, has used sandstone of a rich yellow which adds particular interest to a building designed in a restrained and highly refined version of the Spanish renaissance. The low pitched roofs, placed upon several slightly different levels, and the floors of loggias and even of certain rooms are of handmade tile produced in Florida, both the glazed and the unglazed ranging from pink, through different shades of brown, to black. The house is furnished with tapestries and other carefully selected Spanish and Italian antiques which have been arranged under the architect's direction.

Two Houses at Locust Valley, N. Y. Plates 54–57. For these buildings, designed in what is often called the "modern English" style, the architects, Goodwin, Bullard & Woolsey, have used a combination of brick and stucco. Brick is used for building the walls up to the window sills of the lower floors and also about the jambs, and for the chimneys, and the roofs are of slate laid with random weatherings. The stucco has been permitted to retain its natural color, and the exterior woodwork has been stained weathered oak. The interior woodwork and plaster walls are painted, and the floors throughout are of wood which has been stained and waxed. Heating is supplied by steam, a modulation system being used. Landscaping of the grounds of both houses has been done under the direction of the architects, and is of a naturalistic character, and the planting is of a simple nature.

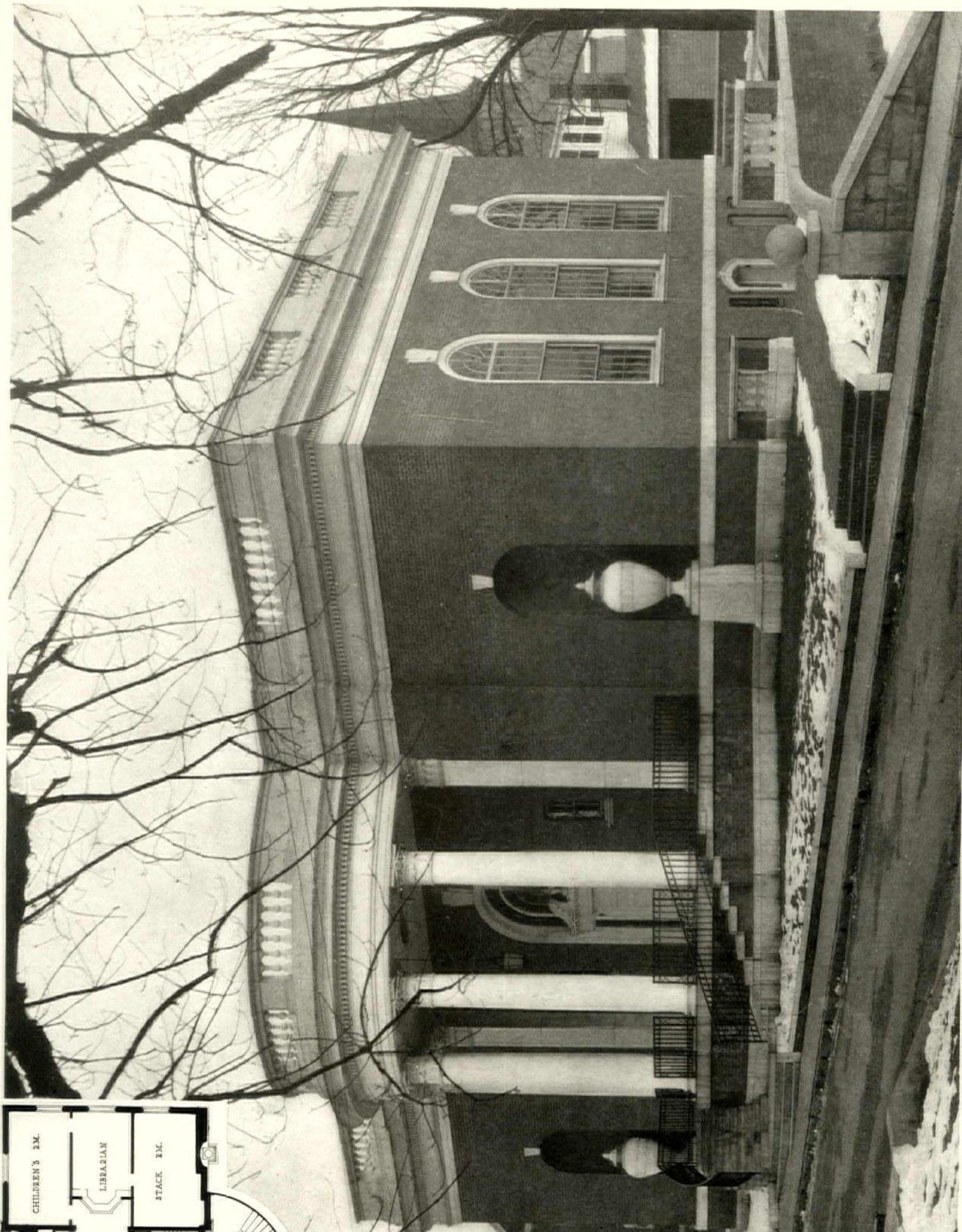
Charlottesville Library, Charlottesville, Va. Plates 58–60. Considerable responsibility is assumed by an architect who undertakes the designing of an important structure for a town which is already rich in architecture and historical associations, and Charlottesville contains many excellent examples of architecture in addition to being dominated by the University of Virginia and the historic buildings designed by Thomas Jefferson, and restored and amplified, following a disastrous fire, by McKim, Mead & White. With these beautiful structures the Charlottesville Library, designed by Walter D. Blair, is in accord, and is placed upon a corner plot, the differences in grade which the site involves being cared for by retaining walls of the brick and marble of which the library itself is built. The monolithic columns at the semi-circular portico, the steps, string courses, balusters and keystones are of marble, while the cornice which is of wood has been detailed to the scale of stone. Railings about the portico are of iron painted black, and the roof of the building is of tar and gravel.

Walls and woodwork throughout have been painted in colors which agree with the character of the structure; floors are of cork with borders and bases of black and gold marble, excepting in the entrance hall where the floor is entirely of marble. The stackroom is arranged for the accommodation of about 20,000 volumes. Heating is by vapor equipment, and the cost of the building, excluding lighting fixtures and furnishings, was 51½ cents per cubic foot in July, 1919, when the contract was let. It was desired, in fitting up the library, to avoid the cold institutional appearance possessed by most public libraries, and considerable color has been introduced in chair coverings of tapestry, linen or damask, and in lampshades, while added interest is given by many gifts of furniture and objects of art.

Public Library, Kennebunk, Me. Plate 61. An interesting example is here given of a library building intended to serve the needs of a growing New England town. In the selection of an architectural type, the architects, Hutchins & French, have made use of a form which is historically identified with all New England, and which lends itself well for use in a building which by its very nature seems to demand a treatment which is somewhat formal and balanced as to design and plan, and which, moreover, can be well worked out in materials which are not of prohibitive cost.

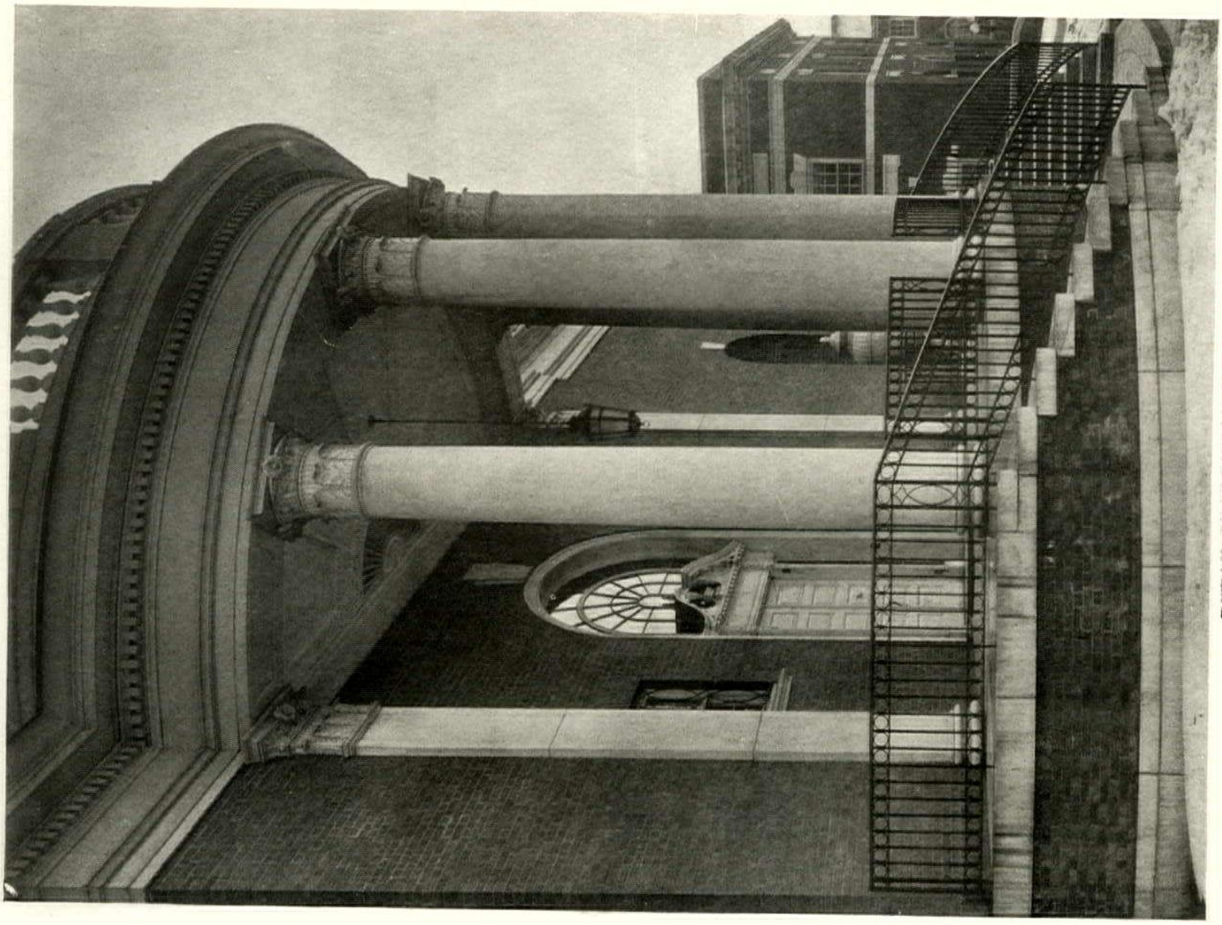
The foundations, up to the ground level, are of concrete, while the walls are of waterstruck brick laid in Flemish bond. The horizontal courses in the walls, the lintels at the windows, and the blocks used at certain places to complete the necessary balance of design are of stone, but the columns which support the entrance portico, the trim about the main doorway and the Palladian windows, and the cornice which extends around the building are of wood painted white. The roofs are covered with slate. Walls of the reading room are paneled in oak; the trim of the delivery room is painted, and the floors throughout are of oak. The stackroom is fitted with wooden shelves, and heat is provided by hot water equipment. The contract was let in 1906, and the cost per cubic foot was 30 cents.

Theta Delta Chi Fraternity House, Amherst, Mass. Plates 62–64. The home of Theta Delta Chi is one of the more recent of quite a number of fraternity houses which the architects, Putnam & Cox, have built at Amherst College, structures which by reason of their number, their size, their excellent architecture, and their being placed near the campus add considerably to the interest of a college town. For this building the architects have employed used brick which possesses character while costing about half of what would have been paid for new brick. The very simple exterior trim is of wood painted white, and shutters are painted green; foundations are of concrete, and the roofs are covered with slate. Use has been made of wood studding and metal lathing; the floors are of mill construction; heating is by steam, and for the trim of the interior fir and pine have been employed. The cost of the structure was 60 cents per cubic foot in November, 1920, when the contract was placed.

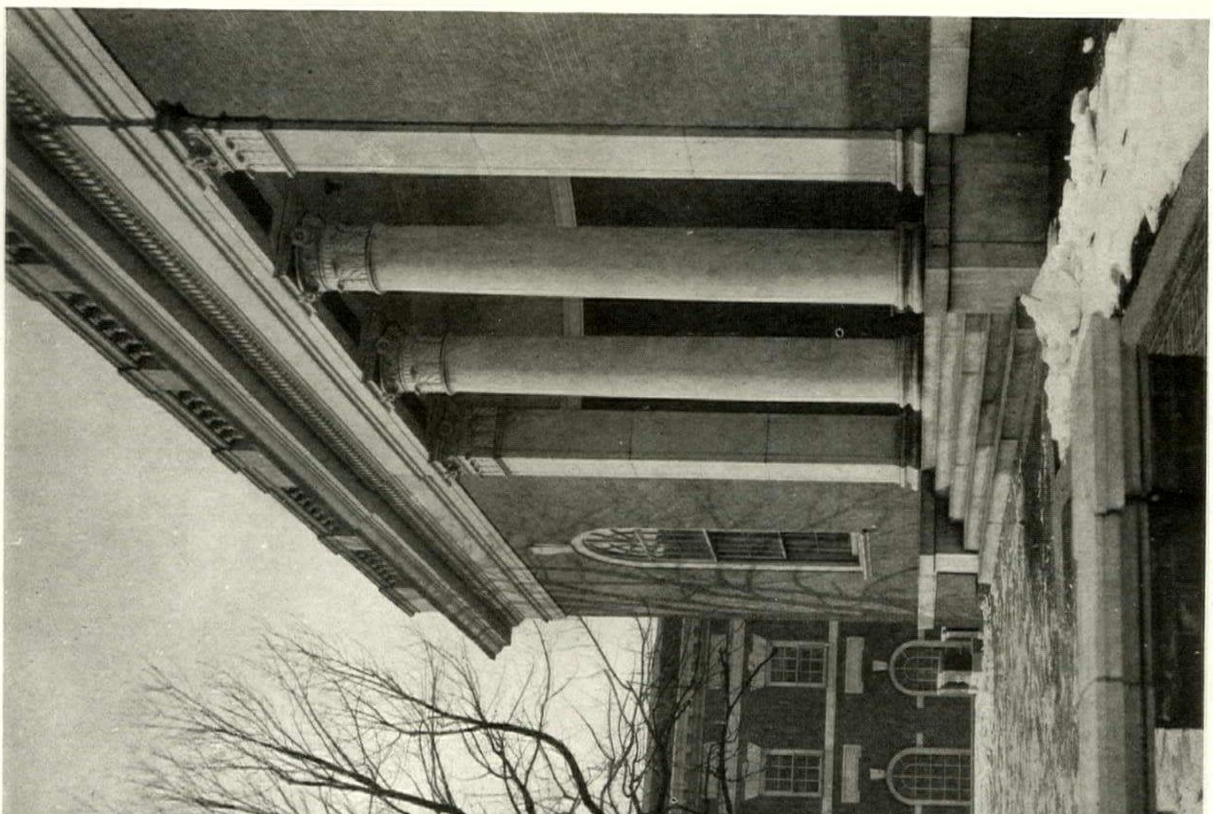


GENERAL EXTERIOR AND FLOOR PLAN
CHARLOTTESVILLE LIBRARY, CHARLOTTESVILLE, VA.
WALTER D BLAIR, ARCHITECT

Photos by Tebbs Architectural Photographic Co.



DETAIL OF FRONT PORTICO



DETAIL OF REAR LOGGIA

CHARLOTTESVILLE LIBRARY, CHARLOTTESVILLE, VA.

WALTER D BLAIR, ARCHITECT

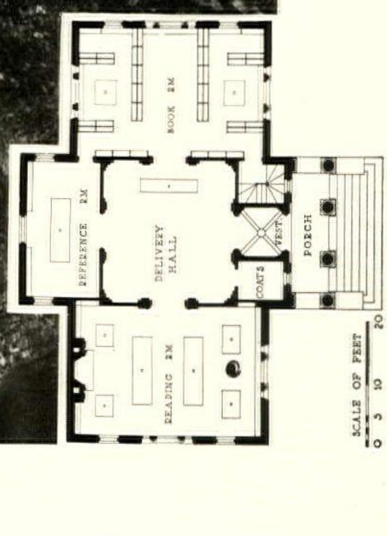
READING ROOM

DELIVERY ROOM

CHARLOTTESVILLE LIBRARY, CHARLOTTESVILLE, VA.

WALTER D BLAIR, ARCHITECT

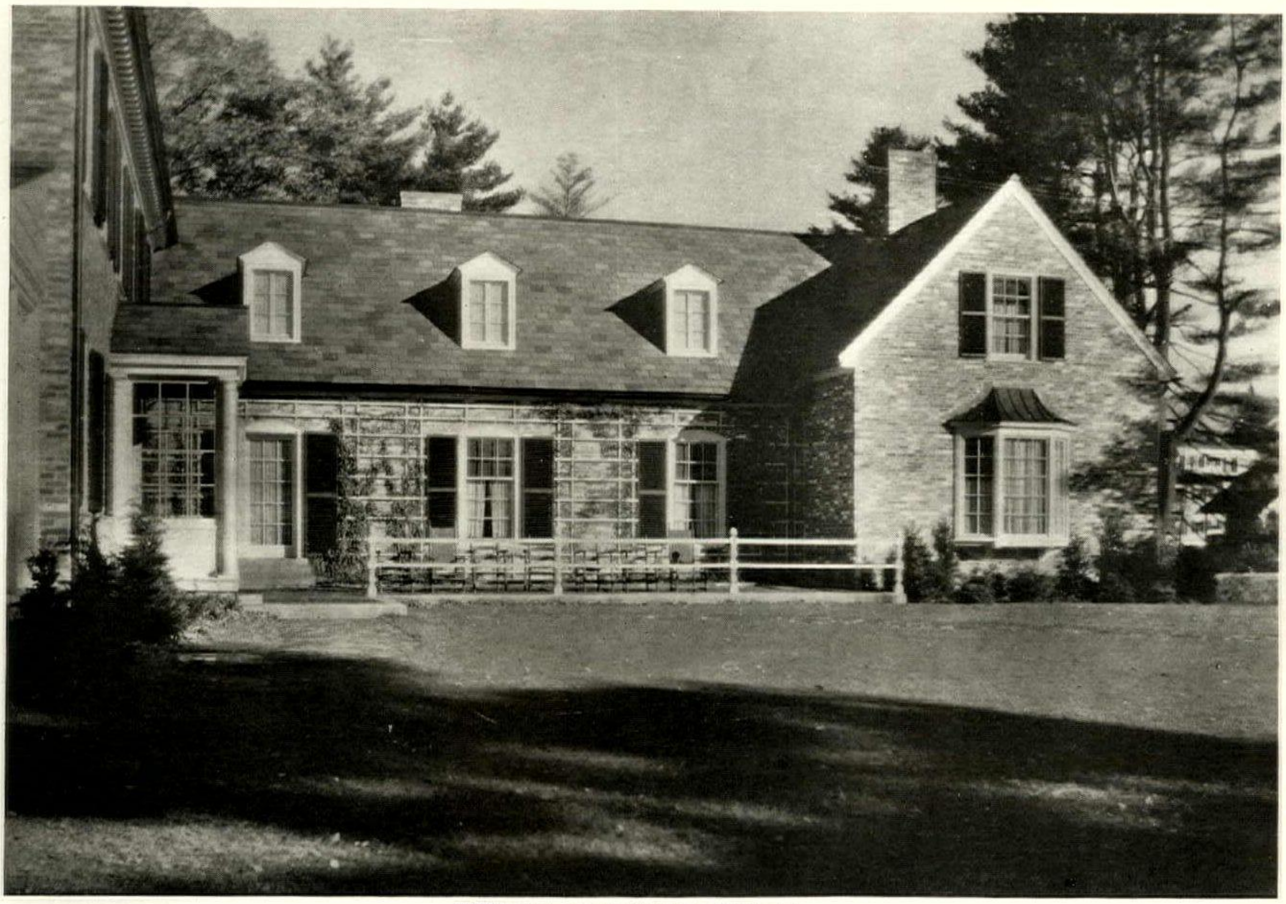
Photo by Paul J Weber



GENERAL EXTERIOR AND FLOOR PLAN

PUBLIC LIBRARY, KENNEBUNK, ME.

HUTCHINS & FRENCH ARCHITECTS



EXTERIOR OF LIVING ROOM WING

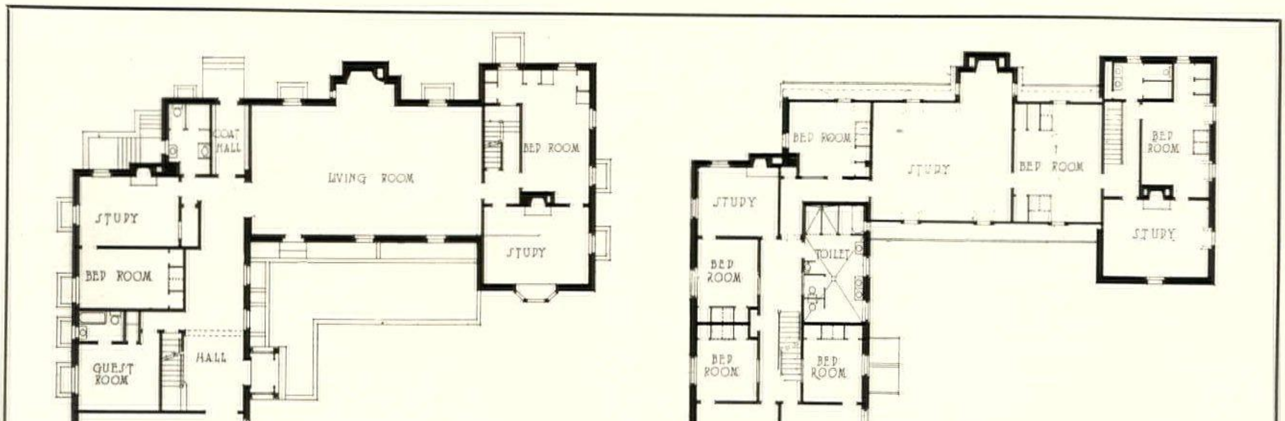
Photos by Paul J. Weber

GENERAL EXTERIOR VIEW

THETA DELTA CHI FRATERNITY HOUSE, AMHERST COLLEGE, AMHERST, MASS.

PUTNAM & COX, ARCHITECTS

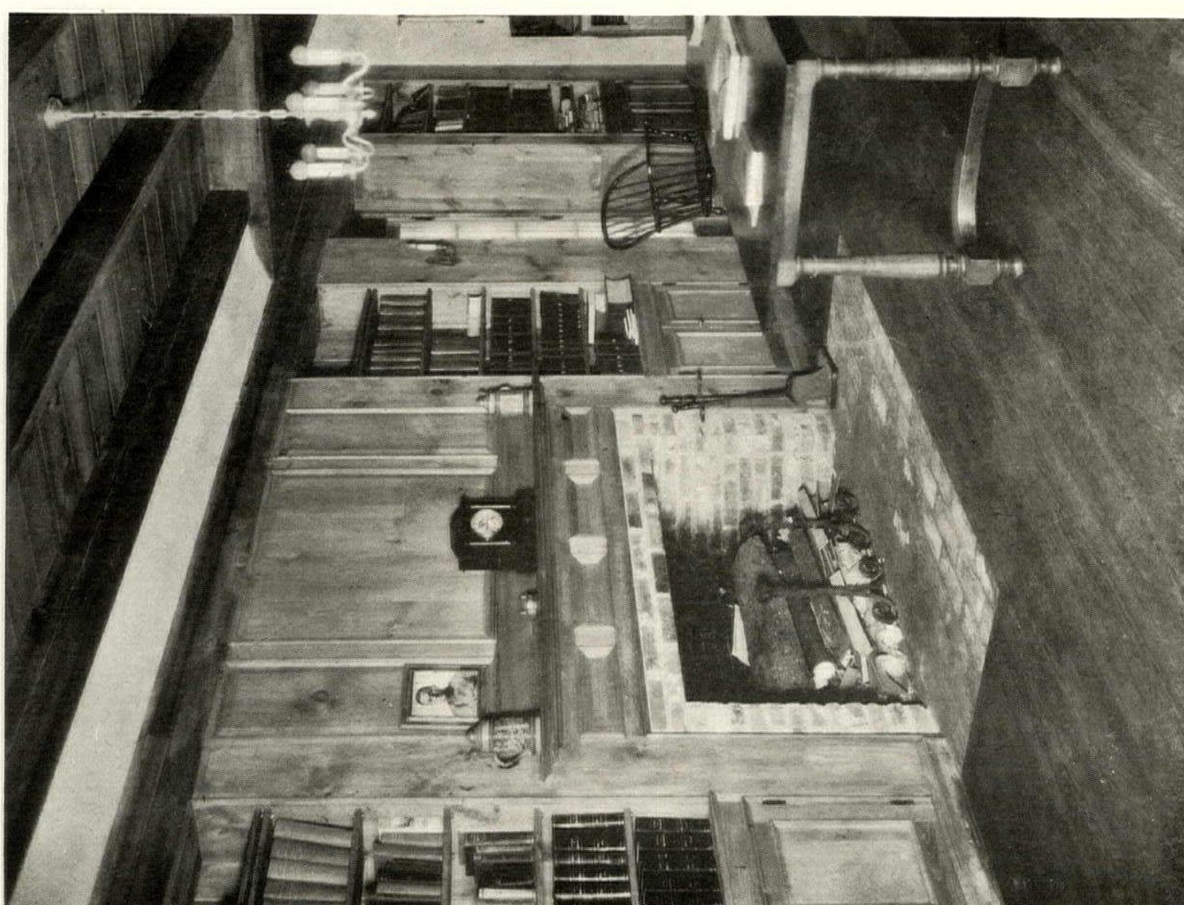
GENERAL VIEW FROM THE STREET



FIRST FLOOR PLAN SECOND FLOOR PLAN

THETA DELTA CHI FRATERNITY HOUSE, AMHERST COLLEGE, AMHERST, MASS.

PUTNAM & COX, ARCHITECTS



LIBRARY FIREPLACE

LIVING ROOM FIREPLACE

THETA DELTA CHI FRATERNITY HOUSE, AMHERST COLLEGE, AMHERST, MASS

PUTNAM & COX, ARCHITECTS

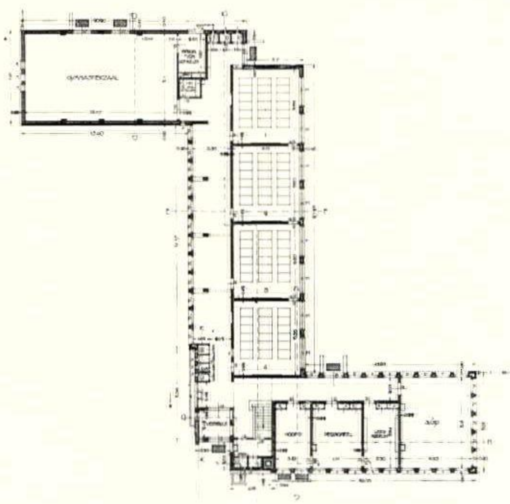
Some Buildings in a Dutch Housing Community

W. M. DUDOK, *Architect*

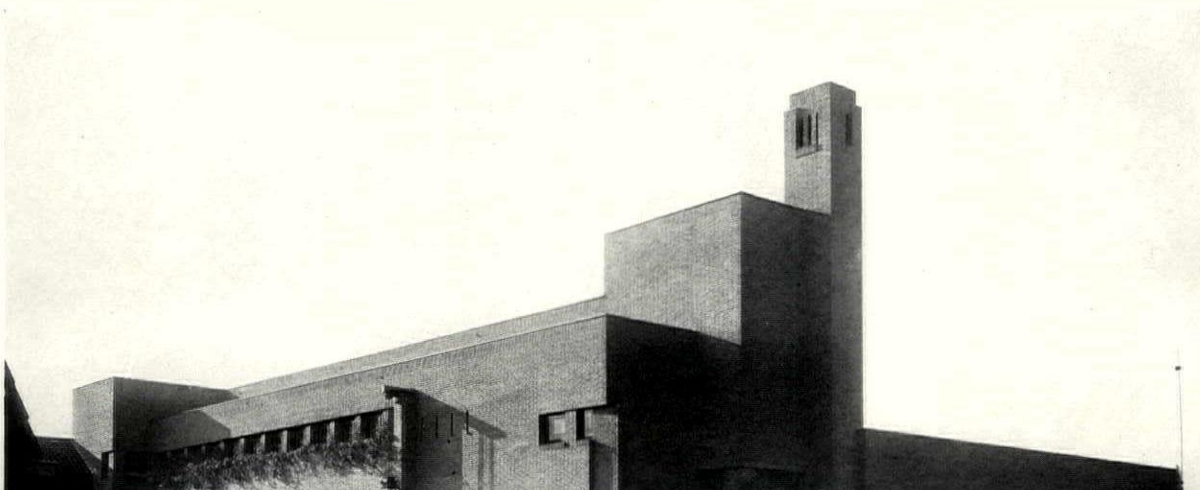
DOMESTIC architecture offers an opportunity for an expression of character more definite than is possible in buildings of most other types; for that reason it is valuable as illustrating the tendencies of modern building as it is being developed in different countries, and in THE FORUM for April there were contained illustrations of a number of Dutch villages of an industrial nature, developed under direction of government agencies or co-operative housing associations, which suggest certain of the tendencies which are guiding architectural development in Holland.

Building in any country is likely to take a form directed partly by tradition and partly by present-day conditions and limitations, which generally means limitations as to cost. Holland has always boasted a strongly marked type of architecture, particularly in its domestic phases, and these illustrations of Dutch villages showed adherence to the spirit of Dutch tradition while considerable departure is noted as to the letter. Thus we have the lowness and friendly intimacy of the old Dutch houses, set at different distances from the street and often with tiny gardens about the doorways; the buildings themselves preserve the traditional grouping of doors and windows, but the character of the brickwork is different,—good as the modern work is,—and steeply pitched roofs (one of the chief characteristics of the older Dutch cities) when used at all must justify themselves by affording sufficiently increased living space within. Gone are the days, even in Holland, when high pitched roofs and "stepped" gables could be used without thought of their utility and purely for the sheer beauty and interest which they brought!

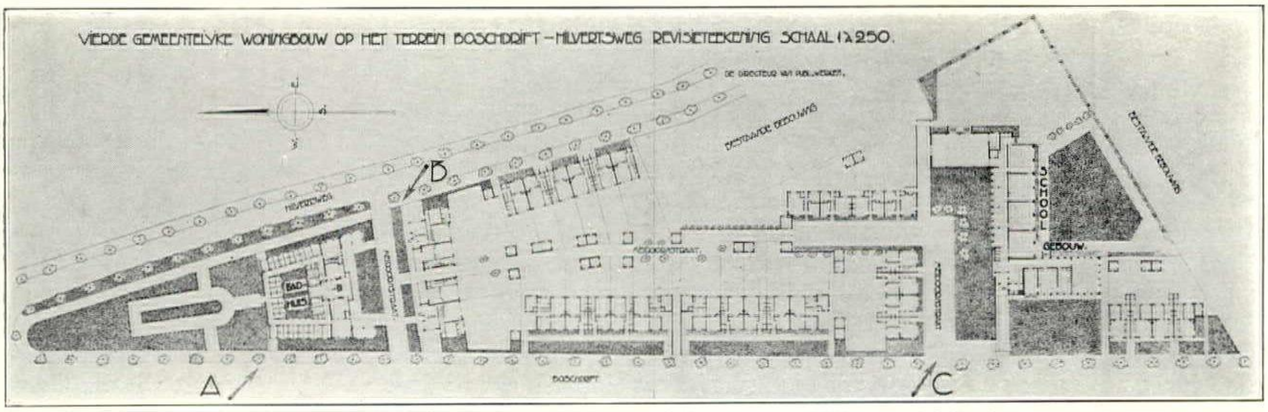
Equally expressive of this change in the character of Dutch building are the structures, two schools and a bathhouse, illustrated here,—buildings which because of their sizes and their functions aid in studying this development. Hilversum, where they are built, is a suburb of Amsterdam, largely occupied by workers in industrial plants, and the city has carried out an extensive building program, of



First Floor Plan of School Shown Below
The second floor has four class rooms in the middle section



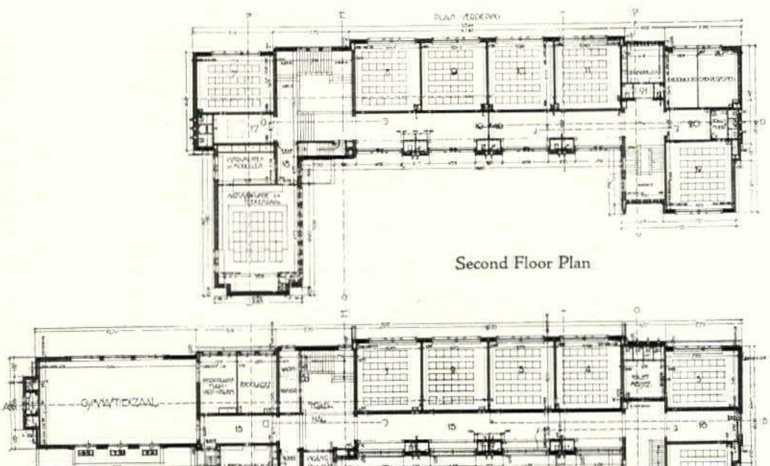
Exterior view of primary school from point (C) on plot plan shown on page 236
School in Community Group at Hilversum, Holland



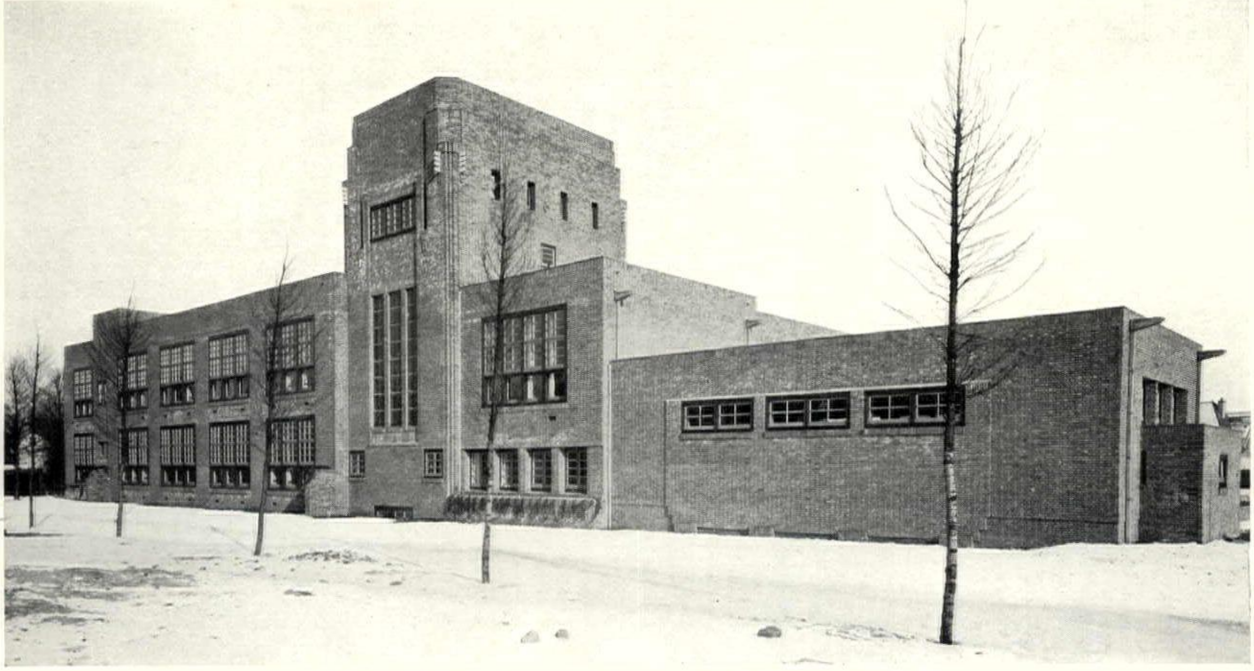
Plot Plan of Small Housing and Educational Community at Hilversum, Holland

which the bathhouse and the schools constitute an important part. The illustrations of the buildings themselves suggest many of the characteristics of modern Dutch building. Travelers in Holland sometimes think that present-day Dutch building occupies, in a sense, a position midway between that of Germany and that of England, by both of which it is strongly influenced. Dutch architecture lacks the brutality, brusqueness and intense modernism which one so often sees in Germany—building of an extreme and often uncouth radicalism, the last word in architectural vagary, which may be superficially pleasing for a time by reason of its novelty, but which palls upon more extended acquaintance. This does not mean that Dutch architecture has not been somewhat contaminated by German influence, and as was suggested in THE FORUM for April, the extreme modernists "seem to be straining to make brick and mortar do things for which they are unfit, —to make them curve, billow and cascade,—as if it weren't bad enough to run after street cars oneself without going home at night to a house which appears to be doing the same thing!" Most Dutch work is of a more restrained character, but the Dutch have not yet caught quite the spirit of simplicity and dignity which fills so much of the recent English work, even of the work done under stress of the war and post war periods.

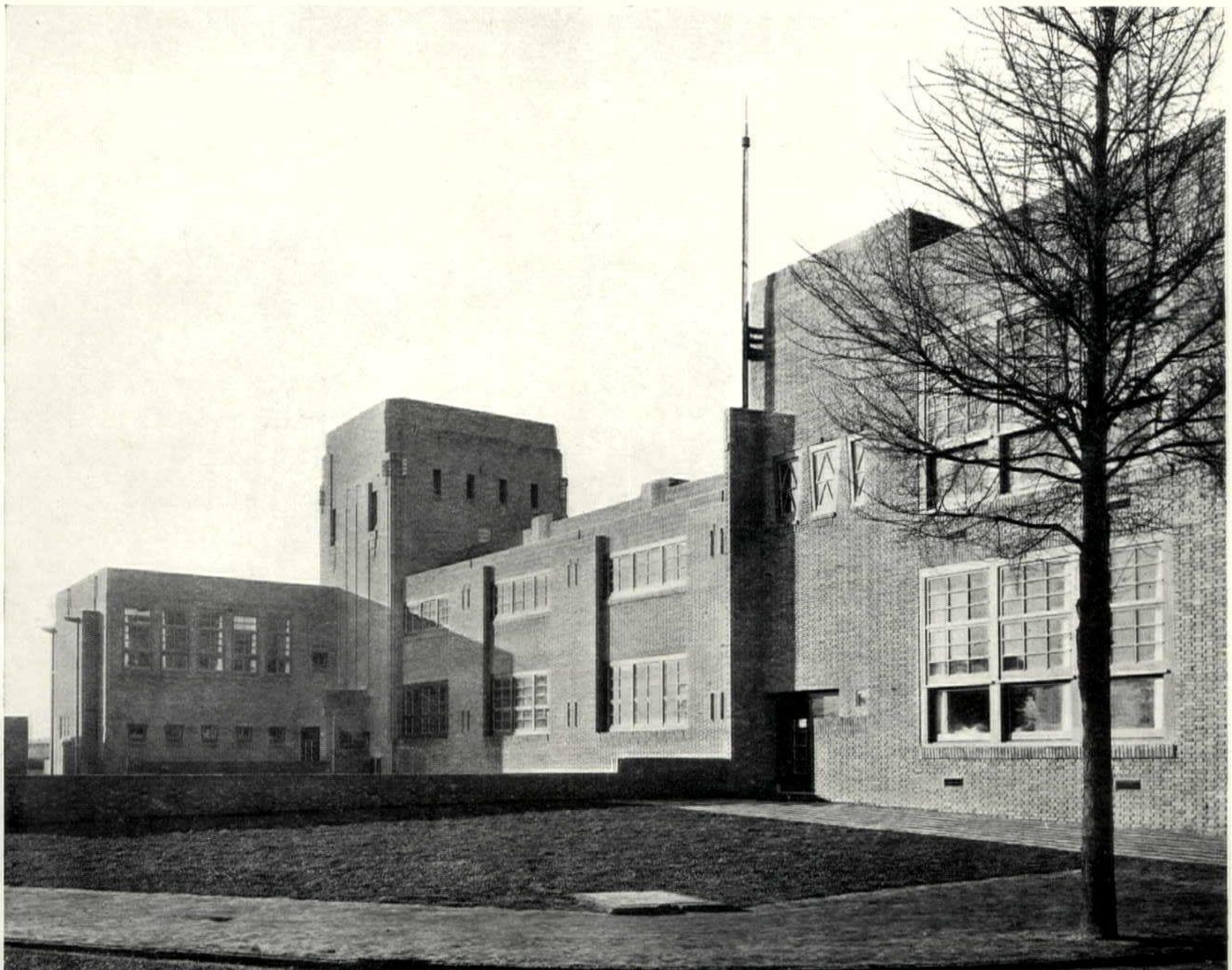
Thoroughly typical of the best modern Dutch work are these buildings by W. M. Dudok, a Dutch architect of well known modernistic tendencies. While entirely modern and frankly an expression of present-day conditions, the structures are thoroughly and essentially Dutch and could hardly be mistaken as belonging to any other country. In Mr. Dudok's opinion "architecture is the art of proportion, proportion in building masses, in the same way as music is the art of proportion of sounds, melodies." He tries "to build in a simple and clear way, making use of the natural means of architecture, to get harmony in the contrasted working of the masses." Mr. Dudok has clothed the buildings with definite expression. At first sight it might seem that in the omission of the pitched roofs there has been an abrupt breaking with Dutch tradition, but a moment's study will show that there have been obtained certain advantages which largely compensate for the loss of the roofs which necessity for economy probably denied. Here the architect has obtained excellent grouping or massing with a certain symmetry or balance, and the result is unity of structure—structure expressed in building. Much of the charm which study of the buildings develops is due to graceful and subtly handled outlines, for the brick walls in several instances recede slightly as they ascend and their thicknesses become less; corners are softened in various ways, one of which is the use of a kind of dentil treatment secured by



Plans of Combination Intermediate and Commercial School, Hilversum, Holland



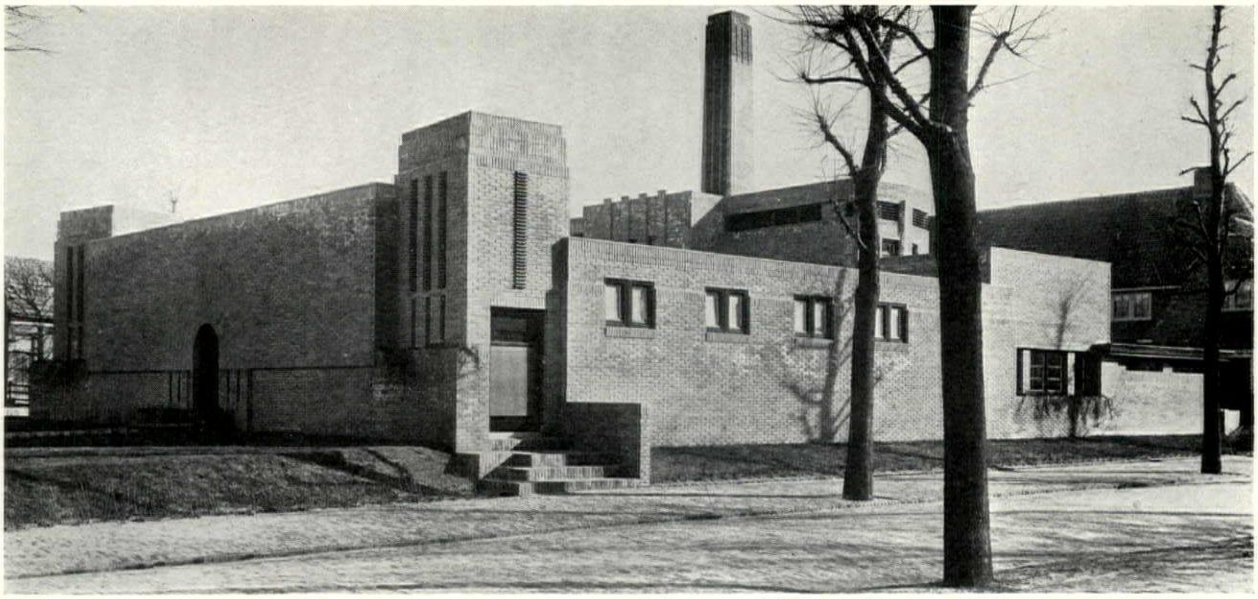
VIEW OF REAR SHOWING GYMNASIUM WING AT RIGHT



VIEW LOOKING INTO FORECOURT SHOWING STAIRHALL TOWER

INTERMEDIATE AND COMMERCIAL SCHOOL, HILVERSUM, HOLLAND

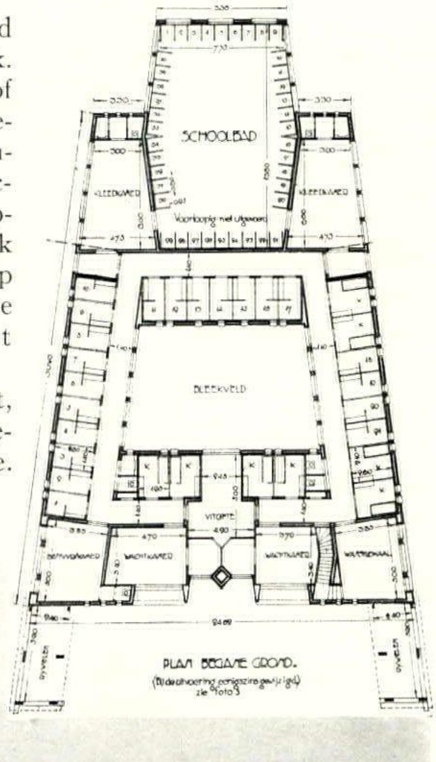
W. M. DUDOK, ARCHITECT

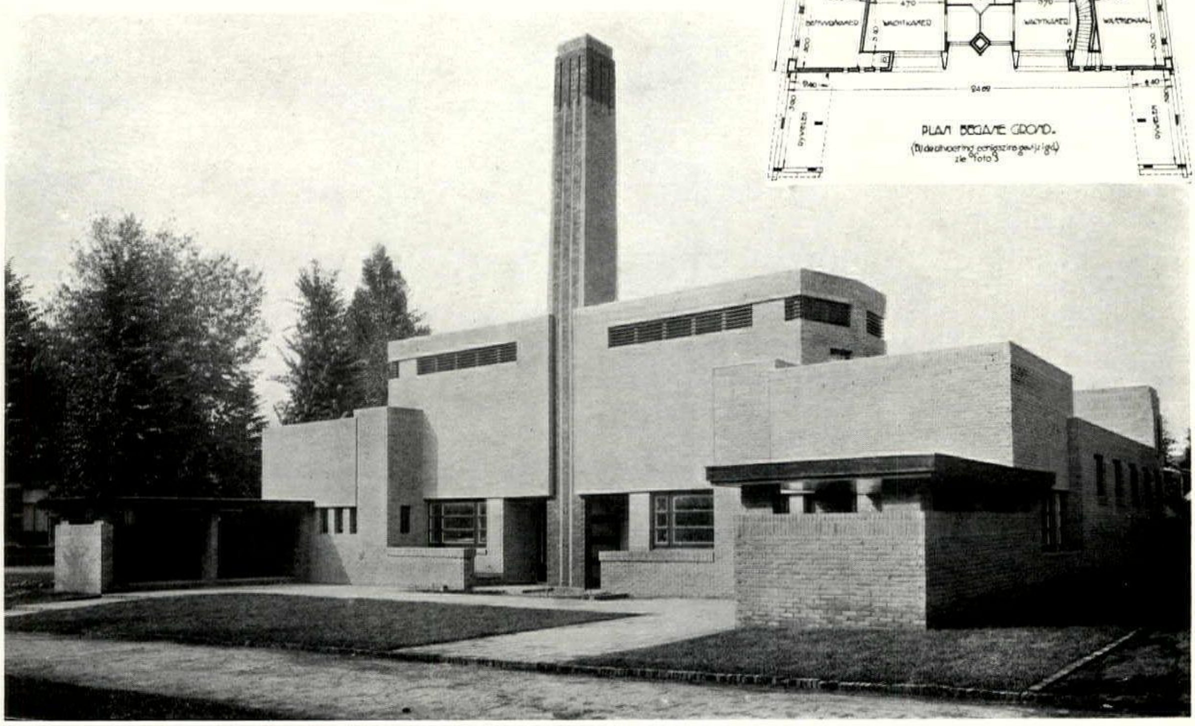


Hilversum Bathhouse from Point (A) on Plot Plan, Page 236. Floor Plan of Completed Building Below

omitting a half brick from each alternate face of the two walls, and use is made at certain corners of small oblique faces cut from brick. Another strikingly effective treatment is that upon the front face of the tall brick chimney of the bathhouse, and the use of what resembles chaneling as the top of the chimney is reached. The softening of outlines is not wholly upon vertical lines, for in these structures, as in many other modern Dutch buildings, use is made of copings and parapets of brick laid on edge, and string courses of brick so laid relieve the monotony of certain walls, or bind into a group certain unrelated windows. The unit in all these buildings is the brick, and ornament as well as structure is secured by different methods of handling the basic unit itself.

These Dutch buildings have grown, as all true architecture must, out of the lives of the people. Good architecture of any age is the result of continuity of tradition modified by the absorption of new life.





View of Bathhouse at Hilversum from Point (B) on Plot Plan, Page 236

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

Fuel Oil

By CHARLES A. WHITTEMORE

DEVELOPMENTS of the past heating season have set the average householder or building manager thinking of a substitute for coal, either bituminous or anthracite.

There is no doubt but that fuel oil to a certain degree can solve the problem satisfactorily in many cases. Also there is no doubt but that a number of people are so thoroughly uninformed on the matter of oil installation that they buy it with some hesitancy. It is a fact, however, that fuel oil can be used equally well in the home and in the large office building with perfect safety. This is evidenced by the fact that the underwriters have hedged the installation about with but few restrictions, and that the state authorities are very lenient in their requirements. This does not in the least degree mean that an installation can be made in a slipshod manner, but it does mean that for the work involved, for the fire hazard attendant upon such an installation, the requirements of either the underwriters or the state authorities are no more rigid than they should be to give perfect safety.

Roughly, there are three general varieties of oil-burning apparatus: (1) gravity feed, (2) the force blower system, and (3) a combination of these two, with a centrifugal burner. In a previous article* the merits from the scientific standpoint of fuel burning and coal were discussed, so that there is no particular need of entering into the engineering phase of it at this point. It may be well, however, to call attention to one or two fundamental facts.

The number of B.t.u. in fuel oil, as compared with the B.t.u. in coal, bulk for bulk or volume for volume, is decidedly in favor of the fuel oil, so that to store up the same number of latent heating units requires a much smaller space for oil than for coal. The storing of the oil, however, is not the only consideration. Fuel oil is a composition of gases and oils which under certain temperatures and climatic conditions will readily give off inflammable gases which, if confined, are explosive. Some provision must therefore be made for taking care of these gases so that there may be no bad effects from the noxious fumes, and the possibility of explosion and other damage be reduced to the minimum. Coal on the other hand is theoretically passive and inert, and only in very rare cases is spontaneous combustion known in anthracite coal bins.

Where soft coal must be used, as has been so frequently done during this past heating season, it is imperative that an opportunity be given to ventilate the soft coal bins, as spontaneous combustion in bituminous coal is a more or less common occurrence and presents a serious condition to be met if a fire starts. Bituminous coal has been known to burn or smoulder for long periods without actual flame, fire or incandescent particles appearing on the surface. If, however, ventilation space be allowed, the gases from the bituminous coal will pass off so that the possibility of spontaneous combustion is very much minimized.

In considering fuel oil there are, therefore, a variety of things which the architect or engineer must have in mind in order to make the installation practical and as nearly ideal as possible. It must be decided, first of all, whether the tank is to be an interior or exterior tank, and also a decision must be made as to whether or not the gravity feed or the force feed system is to be adopted. Some of the large buildings heated by fuel oil have their tanks inside the building, in sub-basements which are not used for other purposes. Other buildings have the fuel tanks located underground but outside the limits of the main walls of the buildings. Such installations have a certain advantage in that all danger from serious defects, which, by the way, is very much over-emphasized, is maintained outside of the limit lines of the building. It is desirable, however, to have the tanks arranged, whether on the interior or exterior, so that they may be examined periodically to determine their condition.

There are in general two types of fuel oil containers:—one, the iron or steel tank, the other, that of concrete. With each of these types there are individual problems involved which require some study. The iron tank should be built to withstand considerable pressure; *i.e.*, the joints should be tested to a safe degree beyond the normal pressure developed by the weight of oil and the possible pressure due to the gas development, provided the vent line is stopped up. It is frequently recommended, therefore, that the pressure to be guarded against should be not less than 500 pounds per square inch. The iron tank should be set in such a way that the feed pipe is readily accessible from the outside so that the shut-off valve to the feed pipe may be controlled from the inside, and so that the supply line valves may be easily reached. It is also extremely desirable that a special or extra valve be located on the exterior of the building at some convenient

*January, 1923

point, properly safeguarded against malicious tampering, and so arranged that in case of an emergency it can easily shut off the entire supply.

It is also necessary that a vent pipe be arranged either in the building construction or carried up in a slot on the outside of the wall to a point located some distance from the ground and with a return bend header with a fine mesh screen so that all of the gases may pass off without difficulty.

The tendency at the present time is to locate the fuel oil storage tank outside the building, below ground and below the frost line. In the majority of cases where the heating system carries a low steam pressure, it is possible to use steam coils in the oil storage tank; therefore this method is used to keep the fuel relatively warm. When the tank is located inside the building on the basement floor, it will be necessary to insulate the tank with concrete walls at least 8 inches thick with 6 inches of sand between the wall and the storage tank and with 12 inches of sand on top. The manner of insulation varies in different localities, and it is advisable to communicate with the insurance broker who is handling the property and obtain from him a set of regulations by which the insurance policy covering the building is written. In locating the storage tank inside the building and below the basement floor, it is necessary that the top side of the fuel oil storage tank be at least 2 feet below the finished basement floor, the basement slab immediately above the storage tank to be at least 9 inches in thickness.

At the present time the storage of fuel oil is becoming a problem for architects, and with the present coal strikes and labor difficulties owners of many buildings and residences are turning to the use of oil as a fuel. In times past there was a hesitancy to turn to use of oil, but as the true conditions of the potential resources of this fuel have become known, the architect is recommending its use without reservation in localities where it can be obtained at a price that will compete with coal.

There are, of course, many details involved in the laying out of an oil burning system, one of the most important being the storage, which will be discussed in this article. As already said, the heat content of oil is greater than that of coal, and less storage space is required, the ratio being about 2 : 3, so that the space for storage of oil will be two-thirds that required to store an equal amount of coal. This makes possible the storage of oil in locations where it would be impossible to store coal.

In practice, reinforced concrete storage tanks have been placed inside of buildings that have already been constructed, as in many cases the basements are so located that it would be impossible to construct a tank of steel, due to the difficulty in getting the material into the basement, or to noise from such a manner of construction.

The concrete oil tank is the only type of tank which should be permitted inside the building. Concrete in itself is not oil-proof. Therefore, in order to prevent the gradual seepage of the contents through the walls of the container the concrete itself must be made oil-proof, or a wrought iron or steel shell provided, around which the concrete shell may be built. Cast iron, on account of its lack of ductility, should never be used in construction of tanks.

Where steel tanks are desired, and it is possible to bring the plates into the basement where the tank is to be constructed, the construction employed is usually that of electric welding. When the storage tank is to be located outside the building and the soil is of such a nature as not to cause any deteriorating effect, a steel tank is generally used. This tank is constructed at the works and shipped directly to the building and set in place. The exterior surfaces of steel tanks should be treated with at least two coats of asphaltum paint. Reports from insurance companies which have investigated steel tanks show that they last from 20 to 30 years, and of course much longer where conditions are ideal.

The designing of fuel oil storage tanks is relatively simple. When the storage tanks are located inside the building, the 1 foot of sand fill on top or the weight of earth above the tank when it is located outside the building and below ground should be taken into consideration.

If the tank is located outside, and below a driveway where an oil delivery truck would pass, the rolling load of this delivery truck should be taken into account. The average truck load of oil weighs approximately 12 tons, the load being distributed 8 tons to the rear wheels and 4 tons to the front wheels. On inside storage, the live load is taken care of to suit the conditions. In buildings where the storage tank is more than 10 feet below grade, the hydrostatic head of oil in the fill pipe should be taken into consideration. This sometimes is greater than the live and dead loads combined.

The pipe through which the tank is filled is usually 8 inches for large building installations and from 2 to 3 inches for tanks of not over 800-gallon capacity. The suction line, which is directly connected with the pump, will vary from 1½ to 3 inches. For the escape of the gases and air in the filling of the storage tank there should be at least a 2-inch vent which will be carried up to a point 12 feet above grade with a return bend as previously described. This vent may be brought to the roof or run inside the building to the required height, and then through the stonework, terminating in a bronze outlet. A return line 1¼ inches in diameter is carried back to the fuel oil storage tank from the main piping system to allow complete circulation of the oil at all times. The registration of the depth of the oil in the storage tank is taken care of by a measuring device which requires a connection of ¼ inch to 1 inch, depending upon the device to be used. A manhole is installed to allow access to the storage tank at any time, in event of clogging of the suction line or cleaning of the storage tank.

In many states where there is a department of fire prevention or a state fire marshal it is necessary to have the layout of the fuel oil burning system approved. It is, however, necessary in all localities where the building is insured by a stock or mutual insurance company to comply with the regulations as established by the National Board of Fire Underwriters, and to submit for their approval proposed layouts of the fuel oil burning system that is to be used. If these regulations are adhered to there will be no change in the rates of the insurance on the building in which the fuel oil burning system is to be installed. In the larger cities architects will find that it is not only necessary to satisfy the state and insurance authorities but also the local authorities.

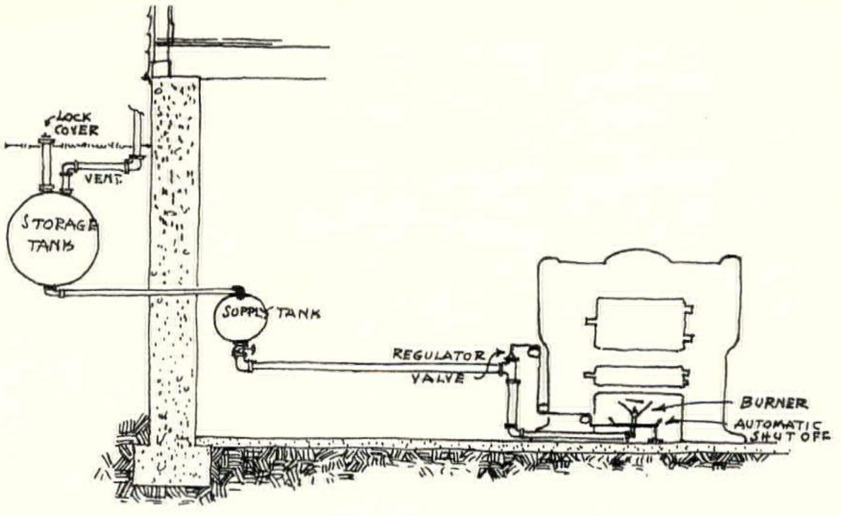


Fig. 2. Gravity Feed System

It is usually advisable to investigate the foundations for storage tanks which are to be located inside of buildings so as to prevent any possible chance, after the tanks have been constructed, of the foundations settling. For tanks located outside of a building, the architect should examine the soil conditions so as to prevent any unequal settlement of the storage tank, especially where the tank is constructed of concrete and waterproofed on the inside. This uneven settlement will of course set up stresses which will cause cracking of the waterproofing and leaking of the oil through the openings.

Fig. 1 shows a typical installation of a force feed system for residential work. In this case, as will be noted, the tank and the fill pipe are located outside of the foundation walls of the building, and the oil is conducted through to the pump or blower in a slot left in the basement floor. It should be remembered that in an installation of this kind the top of the tank should be at least 2 feet below the outside grade to insure satisfactory operation.

In connection with residential installations it is also desirable to consider the gravity feed type. In an installation of this kind, as shown by Fig. 2, the oil tank, containing not over 26 gallons, may be placed inside of the basement wall, but must be removed from the heater at least 10 feet. Unless an outside reservoir of larger capacity is installed it is obvious that the re-filling of a small unit of this type must be very frequent. The 26 gallons of oil contained would, in extreme weather, probably maintain an even temperature in the house for a period of not more than 48 hours. It is customary, therefore, when conditions are right for such an installation (that is, if the heater is located sufficiently below the grade), to have a large tank with an outside fill pipe so located that it will feed by gravity into a smaller tank inside of the building, this feed being controlled by proper valves. Installations of this type are very numerous, and in the majority of cases have given perfect satisfaction. It must be noted, in advising a client on an installation of this type, that temperature control can be applied to this installation as well as to the ordinary coal heating installation. It is necessary, however, in using temperature control with oil of the gravity-feed type, to install a separate bypass control valve, so that the pilot light will always be supplied with the requisite amount of oil in order to keep it burning, but so that the operation of the thermostat will open and close the main valve to such an extent as to permit of a vigorous fire when such is necessary. It should also be noted that with a gravity feed system of this type a pilot is not required.

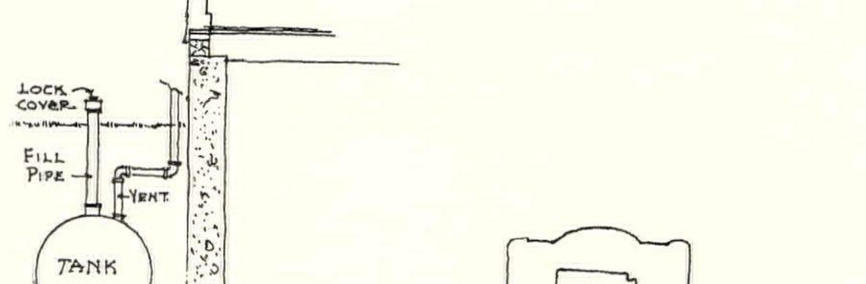


Fig. 1. Small Force Feed System

Fig. 3 shows a typical installation in a large building. In this the tank is located on the outside of the foundation walls,

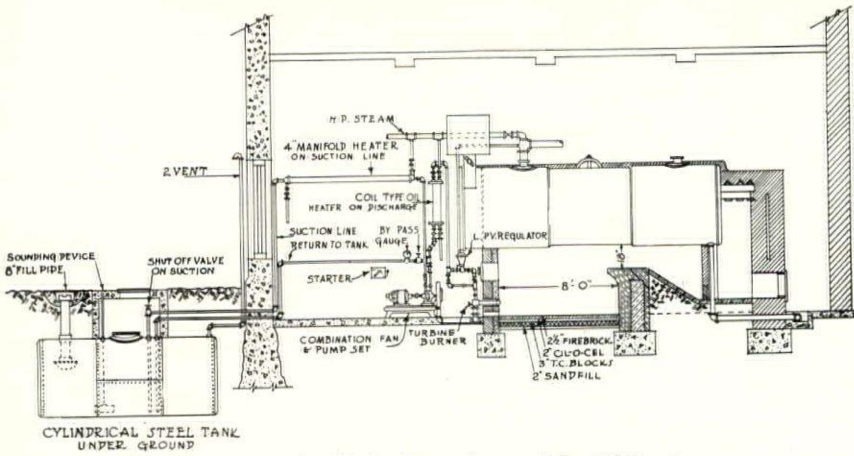


Fig. 4. Details of Boiler Room Arranged for Oil Burning

best results. Fig. 4 shows a boiler installation with an outside underground tank.

The storage tank in the basement of the building embodies the same general characteristics as that shown in Fig. 3 except that the space above the tank should be completely enclosed in the form of a vent chamber and a separate vent be run from this room and be independent of the vent from the tank itself. Also it will probably be necessary in the case of an installation of this kind to have extension valves which can be reached from the outside of oil room directly above tank.

Oil heating has without doubt come to stay, and within the course of a few years there will be improvements made over the present systems, which will minimize some of the present inconveniences, such as pre-heating oil, etc., and also minimizing the carbonizing effect of the oil combustion in the heating chambers.

In a previous article the subject of exhaustion of the world's oil supply was discussed at some length, but this need not concern the architect or engineer who is planning an installation at the present time.

the pipe being carried directly to the pumps, and thence into the system. It should be borne in mind that the average large building installation requires a preliminary heater to heat the oil before it enters the burner, in order to secure greater efficiency. In certain instances the room in which the storage tank is placed is kept to a predetermined temperature. In some cases steam lines are run around the supply pipes as with certain types of instantaneous heaters, so that the oil is always kept in a flowing state.

In other installations, as in Fig. 3, the heater is placed in close proximity to the burners. The oil itself is rather viscous in its characteristics under normal temperature, but when raised to a temperature of say 100° it flows readily, and this condition must be provided at the burners in order to get the

The writer wishes to acknowledge the courtesy of Mr. P. W. Dillingham, through whom some of these illustrations and some of the data have been obtained.

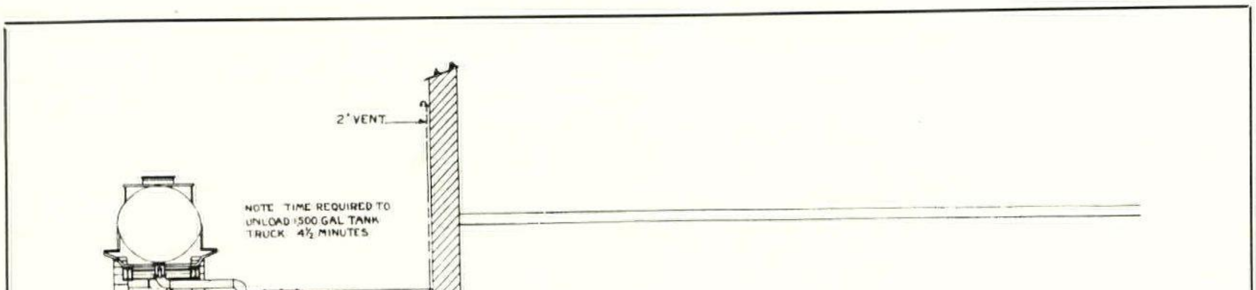


Fig. 3. Details of 250-Horse Power Oil Fired Boiler

The Use of Handbooks

PART II

By E. F. ROCKWOOD, *M. Am. Soc. C. E.*

IN the April number of THE ARCHITECTURAL FORUM some suggestions were given regarding the use by architects and engineers of the handbooks and "pocket companions" issued by certain large lumber associations or steel manufacturers, and to illustrate their usefulness analysis was made of a problem involved in designing the floor of a steel-framed hotel with columns 20 feet apart each way.

For the next problem, design the columns to carry this floor assuming a six-story building (including basement). The quickest way of figuring column loads is shown here. Each column will carry an area of 20 x 20 or 400 square feet. Then:

Location			Total Load
5–R	400 x (40+85)	50,000	
	Wt. of column and fireproofing	2,000	
		52,000	52,000
4–5	Load from column above	52,000	
	400 x 105 (dead load from this floor)	42,000	
	Wt. of column and fireproofing	2,000	
		96,000	
	400 x 50 (floor live load)	20,000	
		116,000	116,000
3–4	Load from column above excepting floor live loads	96,000	
	400 x 105 (dead load from this floor)	42,000	
	Wt. of column and fireproofing	2,500	
		140,500	
	400 x 50 x 2 x 0.75 (reduced floor live loads)	30,000	
		170,500	170,500
2–3	Load from column above excepting floor live loads	140,500	
	400 x 105 (dead load from this floor)	42,000	
	Wt. of column and fireproofing	2,500	
		185,000	
	400 x 50 x 3 x 0.60 (reduced floor live loads)	36,000	
		221,000	221,000
1–2	Load from column above excepting floor live loads	185,000	
	400 x 105 (dead load from this floor)	42,000	
	Wt. of column and fireproofing	3,000	
		230,000	
	400 x 50 x 4 x 0.50 (reduced floor live loads)	40,000	
		270,000	270,000
B–1	Load from column above excepting floor live loads	230,000	
	400 x 125 (dead load from this floor)	50,000	
	Wt. of column and fireproofing	3,000	
		283,000	
	400 x 50 x 4 x 0.45 / 400 x 100 x 1 x 0.45 (reduced floor live loads)	54,000	
		337,000	337,000

The roof live load is carried down with the dead loads, as it should never be reduced. The dead loads are made up by adding to the weight of the floor construction, as taken from the tables, the weight of the roofing, plastering, screed fill, wood flooring, and beams and their fireproofing. Assume next that all stories are 9 feet from top of girder below to bottom of girder above. On page 254 of the "Carnegie" are a number of compression formulæ for steel columns. Most cities having building codes specify which formula to follow. For this problem follow that of New York.

On page 271 of the "Carnegie" is a table for plat and angle columns with 12″ web plates. This table is based on the American Bridge Co. formula for allowable stresses in compression members, but it will give the approximate sizes required by the other formulæ. The load in the lowest story is 337,000 pounds. The girder would probably be framed to the angles rather than to the web of the column. In this case the unsupported length around the web (axis 2-2 in the table on page 271) would be the distance between floor slabs or 10 feet. With this unsupported length a plate and angle column with a 12″ x ½″ web and four 6″ x 4″ x 9/16″ angles would carry 354,000 pounds. Its greatest $\frac{l}{r}$ (length in inches divided by radius of gyration in inches) is 120/2.01 or 46. The corresponding allowable stress from the table on page 254 is 12,530 pounds per square inch. Then 337,000 divided by 12,530 equals 26.9, which is the area in square inches which will be required to carry the load. Reference to the areas of column sections on page 271 shows that the column tentatively selected has this much area. Similarly the other section required will be respectively a 12″ x ⅜″ web with four 6″ x 4″ x ½″ angles, a 12″ x ⅜″ web with four 5″ x 3½″ x 7/16″ angles, a 12″ x ⅜″ web with four 5″ x 3½″ x ⅜″ angles, an 8″-34# H-beam, and a 6″-23.8# H-beam (for these last two see table on page 256). Very often it is cheaper not to change the column sizes in every story but only in alternate stories. This requires more material, but it saves labor in the fabricating shop. In such a case the 12″ x ½″ web with four 6″ x 4″ x 9/16″ angles would be used for the two lower stories, the 12″ x ⅜″ web with four 5″ x 3½″ x 7/16″ angles used for the next two stories, and the 8″-34# H-beam for the two upper stories.

The design of grillage foundations can be found in "Carnegie," and that of reinforced concrete foundations in the Corrugated Bar Co. handbook. The tables in the latter are very simple and require no explanation, but in the design of foundations the question of obtaining uniform settlement is of the utmost importance. Ledge rock, gravel and hardpan will yield but little if any under load, but other soils may yield enough to cause serious trouble. This can only be avoided by using unit pressure of such values that the settlement will be of no importance, and by so proportioning the sizes of the foundations that the settlement of all the foundations will be uniform. If they are proportioned for total live and dead loads, the initial settlement, due to the dead weight of the building before any live load is put on it, will be greater for the exterior than for the interior footings. If they are proportioned for dead load only, the initial settlement will be uniform, but the later addition of the live load will upset this uniformity. What is the maximum load per square foot that the soil can safely carry?* Should the allowable unit pressure on the soil be the same for both exterior and interior foundations? Should the footings sizes be proportioned from total load, dead load only, or some load between the two? If the settlement is not uniform, will there be enough difference in settlement to matter? Because of such complications the designing of foundations of any importance should be done by an expert engineer who can carefully weigh the different factors and design accordingly.

Mention has already been made of allowable stresses and deflections. In the case of concrete, many other stresses than those previously mentioned must be considered, and because our knowledge of concrete has advanced greatly since many of the building codes were written, and because many of them do not go into sufficient detail, the architect who wishes to design reinforced concrete would do well to obtain a copy of the "Report of the Joint Committee." Ten or twelve years ago the Association of Cement Manufacturers, the American Concrete Institute, the American Society of Civil Engineers, the American Society for Testing Materials, and the American Railway Engineering Association, each appointed representatives to serve as a "Joint Committee" on concrete and reinforced concrete. They made a final report about 1916, but several years later another similar committee was appointed to continue and revise the report of the original committee, and this later committee made in 1921 a tentative report. Copies of these reports may be obtained from the American Society of Civil Engineers. A careful study of them will show that the designing of reinforced concrete is a very complicated matter. Even today experts cannot agree upon any method of determining in advance what the strength of any particular mix of concrete will be, and upon the strength depends the allowable stresses to be used in design. But even more complicated are the problems caused by the monolithic character of concrete structures, *e.g.*, a steel beam is framed to a girder by means of connection angles and is designed as a single span supported at both ends on knife edge supports. The connection angles prevent it from bending as freely as it would if it were on knife edge supports and reduce the stresses at the middle of the beam. The tendency of the middle of the beam to deflect causes the upper part of the beam to pull away from the girder at the supports and stresses the rivets in the connection angles. But the whole design is safe. On the other hand, if it were a concrete beam framing into a concrete girder, the pulling away of the beam from the girder would produce a crack in the beam, and this crack would permit the beam to drop. So reinforcement must be provided to prevent this crack. How much must be provided at this and similar points, and how much can that at the center be reduced because of this continuous action? Then, too, in a concrete beam the question of diagonal tension must be studied and provided for, and so must the bond between the concrete and the reinforcement. From a practical standpoint, the problem of stopping points between pourings must also be cared for. For these reasons it is advisable for the average architect to confine his concrete designing to that on solid slabs, given on pages 61-66 inclusive of the Corrugated Bar Co's handbook, and leave to a trained engineer the designing of flat slabs and concrete beams and columns.

In conclusion, emphasis must be laid on the fact that none of the tables mentioned should be used without first studying all explanatory notes relating to them. The tables are correct and will give safe designs if they are correctly used, but no trained engineer would ever use a table unless he knew on just what it was based and just how and when it should be used.

*In the absence of satisfactory tests of the sustaining power of soils, these maximum allowable bearing values may be taken:

Solid ledge rock	100 tons per sq. ft.
Shale and hardpan	10 tons per sq. ft.
Gravel, compact sand and hard, yellow clay	6 tons per sq. ft.
Dry or wet sand of coarse or medium sized grains; hard, blue clay mixed or unmixed with sand; disintegrated ledge rock	5 tons per sq. ft.
Medium stiff or plastic clay mixed or unmixed with sand, or fine grained, dry sand	4 tons per sq. ft.
Fine grained wet sand (confined)	3 tons per sq. ft.
Soft clay protected against lateral displacement	2 tons per sq. ft.

Definitions—(*a*) Solid ledge: Naturally formed rock normally requiring blasting for its removal.

(*b*) Shale: Laminated slate or clay rocks removable by picking.

(*c*) Hardpan: A thoroughly cemented mixture of sand and pebbles or of sand, pebbles and clay, with or without a mixture of boulders and difficult to remove by picking.

(*d*) Gravel: A natural uncemented mixture of coarse or medium grained sand with a substantial amount of pebbles.

(*e*) Sand (compact): Requiring picking for its removal.

(*f*) Sand (loose): Requiring shoveling only.

(*g*) Sand (medium grain): Individual grains readily distinguishable by eye, though not of pronounced size.

(*h*) Sand (fine grained): Individual grains distinguished by eye only with difficulty.

(*i*) Hard clay: Requiring picking for its removal.

(*j*) Disintegrated ledge rock: Residual deposits of decomposed ledge.

(*k*) Medium clay: Stiff and plastic, but capable of being spaded.

(*l*) Soft clay: Putty-like in consistency and changing shape readily under relatively slight pressure.

DECORATION & FURNITURE

The Style of Early American Interiors

By AMELIA MUIR BALDWIN

COUNTRY house interiors of the early American type are fascinating subjects for study, because in their furnishing it is possible to preserve the feeling of the style in so many varying degrees of archæological accuracy.

A modern house may be almost as frugal and spare as the homes of the first settlers. An interior of this sort depends mainly on its architectural features,—the proportions of the low rooms, the frank treatment of exposed beams in the ceiling and the corners of the walls; sheathing used for one wall and white plaster, or a small patterned paper in an old design, on another; the simple framing of the fireplace; the informal, small paned windows. Everywhere there is an absence of sham and pretense, but there is also a very stimulating decorative effect due to contrasts in color and texture and focused ornament relieved by plain surfaces.

The furniture, of native woods,—pine, oak, maple, chestnut and cherry,—may be limited to the plainest of seventeenth century models. The chairs are then of the Windsor, splat back or slat back styles; the tables are gate-legged, tavern or butterfly; and all these pieces may have interesting and varied turnings which delight the eye by their decorative forms. Moreover, they give the room a pleasing sense of space.

Dressers may be filled with collections of old pewter or copper; chests are decorated with crude carving, inlay or jewel work of applied turned pieces, parts of which are picked out in black and red; the wall paper is printed in several shades of the same color or in black on a white ground. The black is particularly good when it is repeated on some of the mouldings of the furniture or by ironwork in andirons and lighting fixtures.

Old iron, pewter or brass sconces may be adapted or reproduced for electric bracket lights. Exceedingly good designs are now easily procurable, small enough to be in scale with the early type of house and its narrow mouldings, or the room may be lighted entirely by candlesticks or lamps connected with base plugs. This latter method gives a more informal effect and leaves the walls unobstructed, keeping their simplicity intact.

Floors may be of wood, either finished or painted, or of stone, brick or slate, with a few rag rugs not filling the space completely. Much of the feeling of this style of room is lost when the floor is entirely covered with rugs.

Curtains may be of handwoven linen, crewel work in not too large a pattern, printed India cottons or English chintzes. The glazed chintzes will emphasize the texture of polished sheathing and furniture, and their colors offer a wide choice in contrast and harmony. A ground of soft tan with a thin meandering design in blues, pinks, violet and greens blends into the colors in the woods of wall and furniture; brighter grounds can be made to harmonize with the colors of the rugs or painted floors. The beauty of old copper may be enhanced by using a similar color for curtains or rugs; the gray of pewter is repeated by gray stone or slate floors. Red tiled or brick floors harmonize with the natural red of cherry.

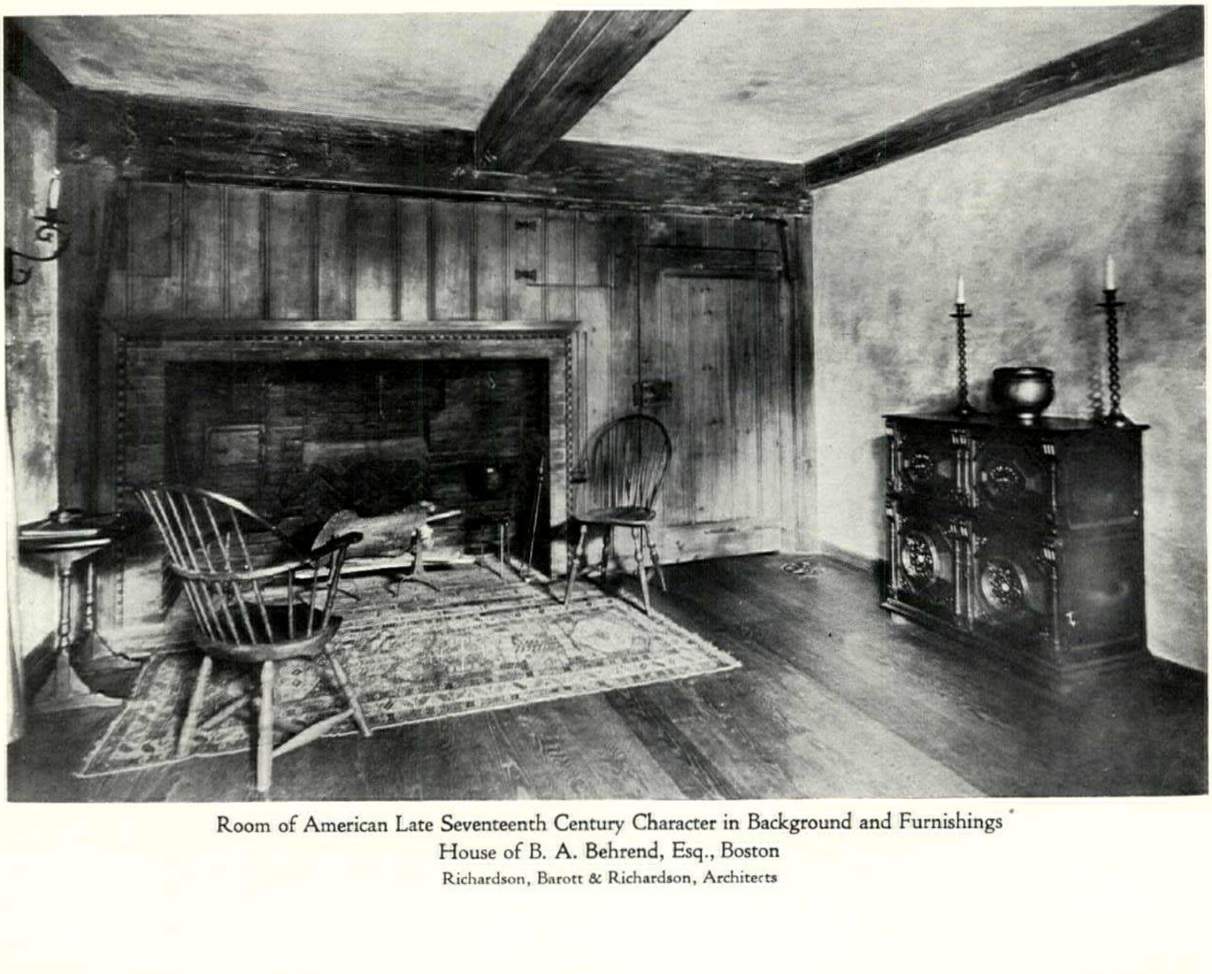
For the wall old portraits are ideal, and they should be framed in narrow black mouldings of low relief. I have had the pleasure of seeing several of these flat dec-

Bannister Back Maple Arm Chair from Metropolitan Museum of Art. American. Late Seventeenth Century orative paintings, of quite large sizes, framed in this way, hanging in the dining room of an old house, and I was impressed by the fact that they did not seem to crowd the small room, but became parts of the walls. Some excellent copies of old portraits, done in the same manner, have recently been made by able painters as commissions from descendants not fortunate enough to belong to the branches of the families which own the originals. This is an idea which might be adopted more generally. Smaller pictures in needle tapestry, stump work, or embroidery are full of interest and quaint charm. The old pieces are difficult to find, but that makes them all the more desirable. Wood engravings are appropriate and contribute another black to the color scheme. The walls need no decoration, however, excepting the structural treatment and emphasis of materials, to which I have referred. The only reason for putting something on the wall should be that it is interesting to look at for itself, as it is not necessary to the design of the room or to the essential feeling of the style.

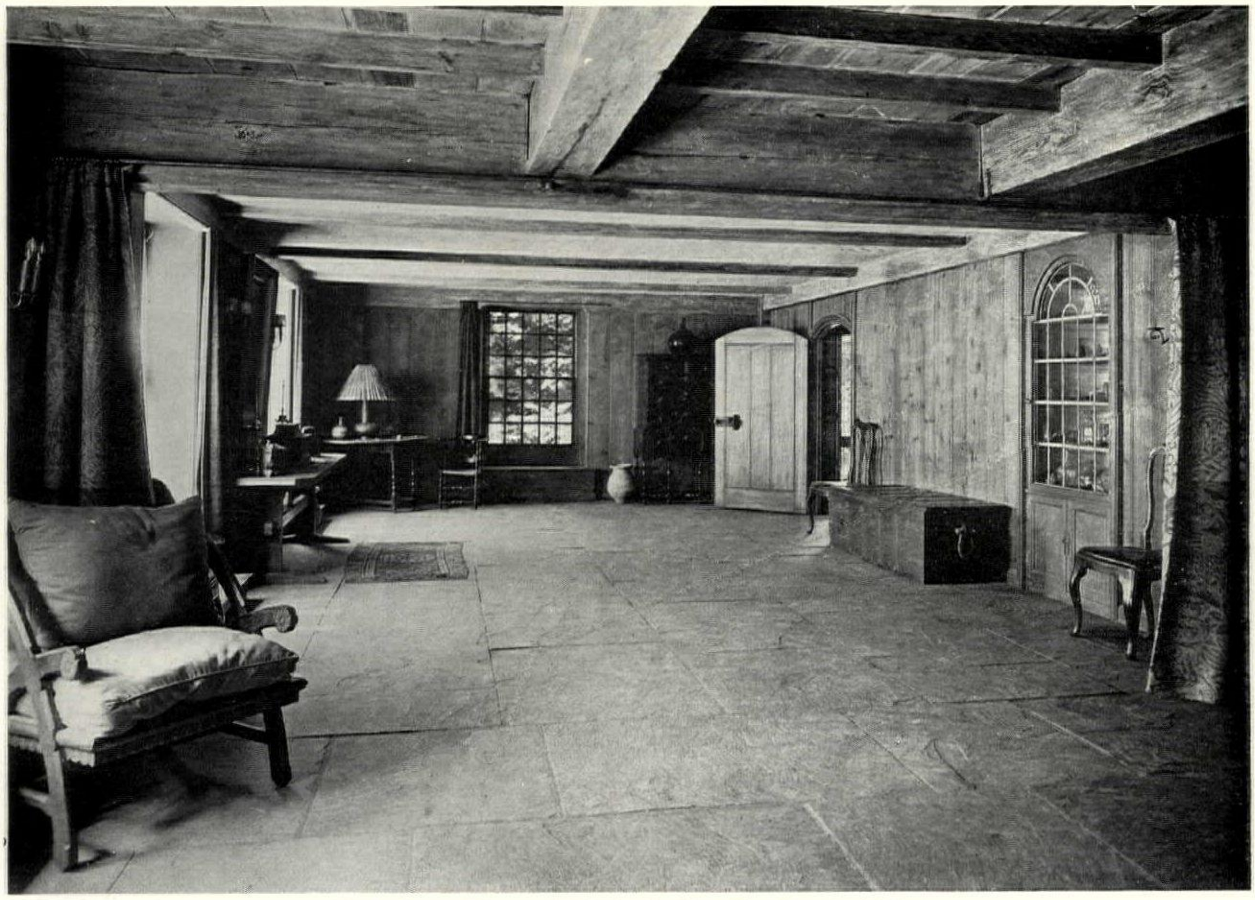
Early American Maple Arm Chair from Metropolitan Museum of Art

A clean-cut quality must be preserved, and it is just as pleasing to the eye as it ever was; but along with plumbing and electricity the modern household demands more comfortable chairs and sofas than those which our ancestors had. Side by side with changes in style the history of furniture is a record of successive improvements in the pieces made to be sat or lain upon. From the chest set against the wall the wainscot chair and settle were developed, and at first the backs and seats were still at right angles; but in the late seventeenth and early eighteenth centuries chairs were achieved whose moulded backs curved both vertically and horizontally in just the right places and on the right degrees to fit the human spine.

In a strictly period treatment of the early American interior a sofa would appear in the form of a curved back Windsor settle, with possibly a thin pad to soften the wooden seat, or a double chair of the rush seated, slat back style, or for the height of mid-seventeenth century luxury in this country, a long



Room of American Late Seventeenth Century Character in Background and Furnishings
House of B. A. Behrend, Esq., Boston
Richardson, Barott & Richardson, Architects



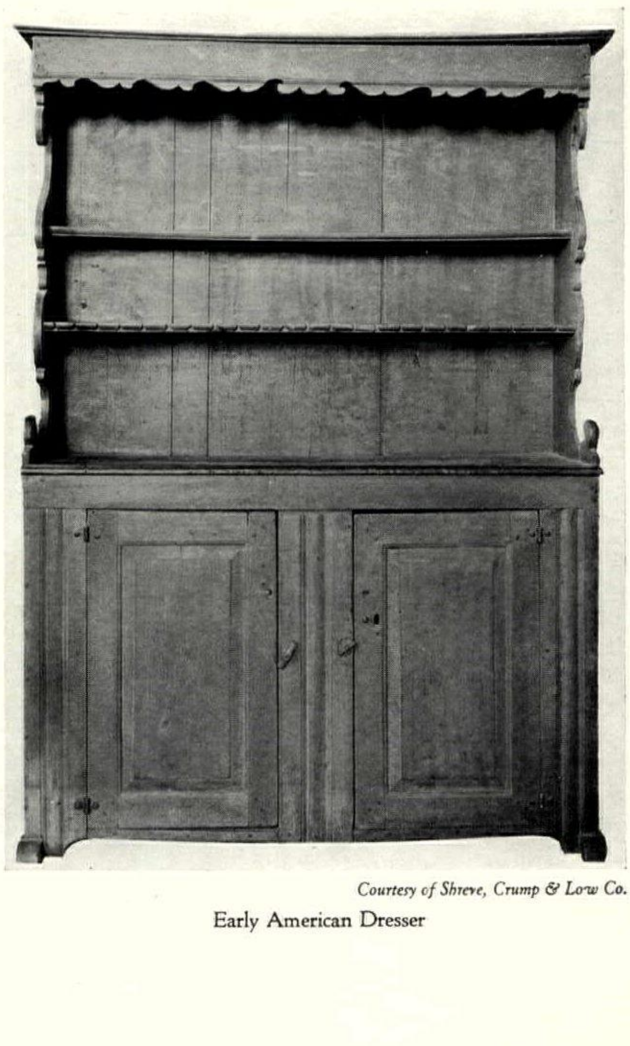
Living Room, House of Philip Richardson, Esq., Brookline, Mass.
Richardson, Barott & Richardson, Architects

Cromwell bench with upholstered seat and back covered in Turkey work or needle tapestry. Going back to English models for the less simple house of this type, a caned walnut Jacobean bench or a high backed William and Mary upholstered sofa could be used.

None of these pieces, however, can compare in comfort with a davenport or feather upholstered sofa, at least one of which will probably have to be introduced into the living room of the modern country house, no matter what its style of architecture is. This is part of the problem of suiting the style to present-day needs, and certainly one of the needs is for relaxation. A house with no upholstered furniture and no books excepting the bible and Pilgrim's Progress is a long way from book lined walls and easy chairs.

The problem is difficult in a very small interior, but in a fair sized room chests and cabinets against the walls, and the side chairs and tables can carry the period feeling so strongly that a few stuffed pieces do not spoil the room. The upholstery should be well tailored, and the davenport covered plain without tuftings. Dowdy, bulging lines are especially bad in a clean-cut room, and good lines harmonize with other good lines through their common excellence, no matter how different their periods.

Feather upholstery is supposed to be quite modern, having been brought to this country from



Courtesy of Shreve, Crump & Low Co.

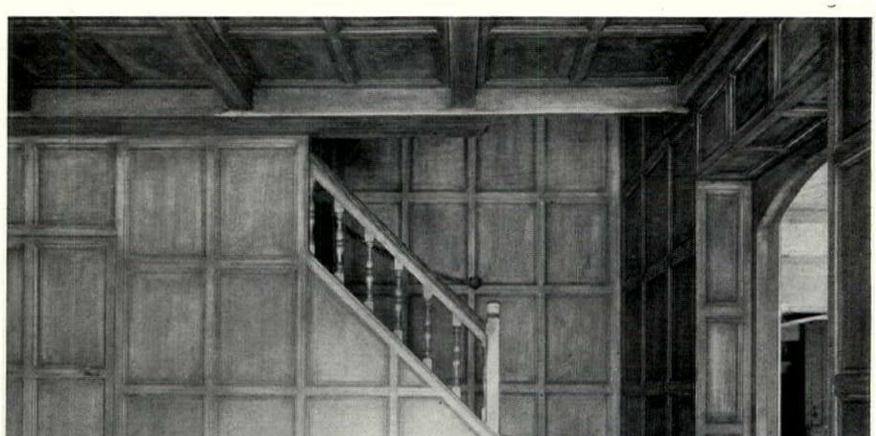
Early American Dresser

Study, House of B. F. W. Russell, Esq., Brookline, Mass.
Little & Russell, Architects
Natural pine walls and oak ceiling beams. Early American maple furniture

example in furnishing a larger house, it is profitable to study not only the early styles in this country, but also the sources from which they sprang in England during the interesting period of transition from Gothic to renaissance.

Walls may be clothed in square Jacobean paneling, as being handsomer than sheathing. One or two fine pieces of furniture, such as a court cupboard or a melon-legged table, will add distinction to the simpler styles already mentioned. "Turkey carpets," often called Ushak rugs now, may be used as they were in seventeenth century England; fur rugs, especially black goat skins, also used at this time, may be adopted for the contrast they give to stone floors, and tapestries may be hung on the walls. The feeling of transition may be emphasized by combining, with discretion of course, furniture of all the periods from Henry VIII to William and Mary. There should be no crowding, however, as the spare feeling is absolutely essential to the style, however rich the furnishings. One tapestry will decorate a room, and handsome furniture needs space and a plain wall for its full effect. Something like this is seen in the rich austerity of Spanish interiors, where plastered walls are contrasted with

England at the time of the World's Fair in Chicago. I do not know at what time the so-called "squab cushion" began to be used in England, but I have seen in a photograph of a Jacobean interior a box sofa, upholstered with loose feather cushions and covered in chintz with a ruffled flounce which reached the floor. It may not have been in the room as originally furnished, but it had the air of belonging there, and it is the style of sofa which I like best for the early type of American house. The straight line of the top of both back and arms is unobtrusive and restful; it looks well either against the wall or away from it, and the flounce has a quaint air of informality. A slip cover with a flounce on the usual davenport will give something of this effect. To enrich the scheme, as for

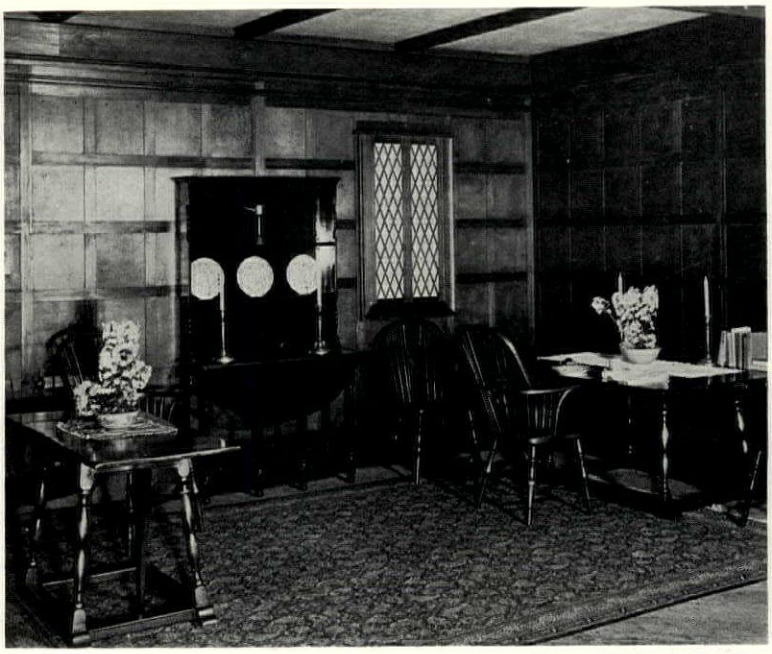


Hall and Staircase, House of Philip Richardson, Esq., Brookline, Mass.
Richardson, Barott & Richardson, Architects

the dark wood of doors and furniture, and the richness of the fabrics used.

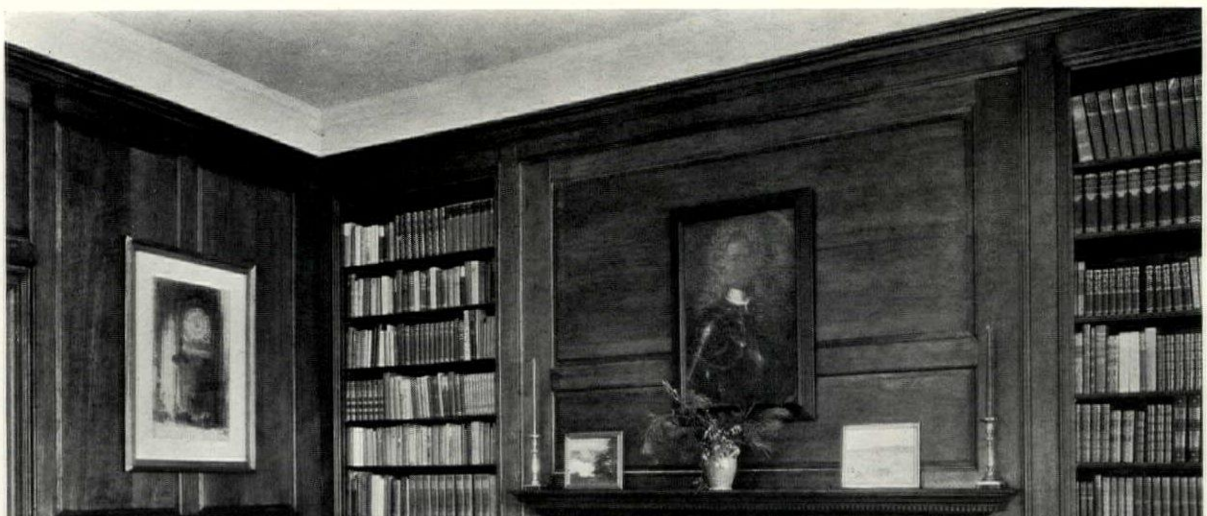
For curtains a plain silk and wool casement cloth in ecru, or a basket weave in blue and green or blue and violet may be used, unlined. There should be but one set of curtains, hung frankly on rings with no heading to cover the rod. The sophistication of French headings or valances and the swathing of the window in two or three sets of curtains would spoil the whole room. Crewel work and chintz curtains must be lined to cover the wrong side of the material, but not interlined, the idea being to keep them as thin as possible so that they do not seem to project into the room. With the decorative Turkey carpets a rough silk and cotton damask in a design of the period for both curtains and furniture may repeat one of the colors of the carpet and the tan of the woodwork. Velvets, although in the feeling of the finer houses of the period, are not suitable for country houses used only in the summer.

Another fabric is very popular now for overmantels and furniture coverings,—a revival of the art of needle tapestry, which had its best period in England during the seventeenth century. When the tapestry looms had been established at Mortlake by James I, the women of England, already skilled with



Courtesy of Erskine-Danforth Corp.

Modern Furniture Designed in Early American Spirit



Library, House of B. F. W. Russell, Esq., Brookline, Mass.

Little & Russell Architects

Pine paneling in character of early eighteenth century with early maple furniture the needle, began to make in large quantities in their homes this sort of imitation of the woven tapestry. Beautiful wall panels in fine stitches have come down to us, American as well as English work, the earlier examples usually illustrating some biblical story and the later panels representing pastoral scenes. Coverings for stools, sofas and chairs, often coarse in texture and suited only for heavy oak furniture, are quite easily procurable, either in the originals or in reproductions, but a great many women of leisure are now doing this work for themselves from copies or adaptations of old designs. There is something rhythmic in the drawing of the threads through the canvas which makes it fascinating to do, and the result often shows much individuality and charm.

Courtesy of Shreve, Crump & Low Co.
American Late Seventeenth Century Chest

For an early American house of the sublimated variety I am now describing, repousse silver may take the place of pewter for the collector; Venetian glass and Delft ware are among the revivals which could be emphasized. A collection of early pine and maple furniture may be restored to such good condition that its surfaces are rich and lustrous, and modern reproductions now on the market give the same effect. A few Spanish pieces may appear in low turned fireside benches, or cabinets or tables. Curiously enough, the slanting line of the legs of Spanish tables occurs also in the simple butterfly tables, and they might be used together in some eclectic interior with pleasing results.

People of individual tastes will find this style of house most congenial, for it lends itself to specialization and the emphasis of preferences; but whatever is done, the contrasts of color and texture, the clean-cut, spare feeling and the informal but frank treatment of spaces and materials must not be lost, for they form the essence of the style.

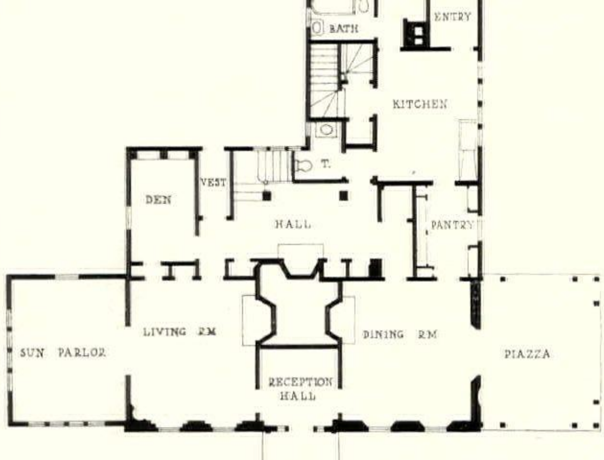
It is not surprising that the early American house is becoming so popular with us now. Its exterior harmonizes with most landscapes in this country; the slant of gabled, pitch or gambrel roofs is repeated in the lines of hills or trees. Traditionally its rooms make a strong appeal to many of us, but their chief interest lies in their flexibility of treatment. As a medium of expression they are more finely attuned to gradations of expression than are the rooms of the later more classical period, which no longer completely satisfy us. We want something either more informal or more richly decorative than what we have had, and in the early American interiors we have a foundation to build on and develop a style distinctive of our own time.

Courtesy of Kensington Manufacturing Co.
A Group of Modern Reproductions of Early American Furniture

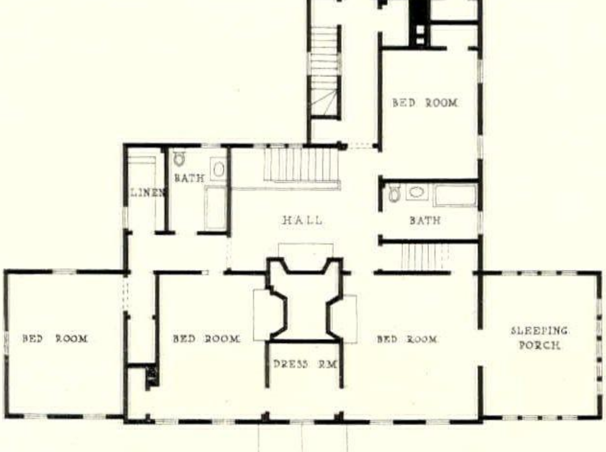
Superintendent's House, Essex County Tuberculosis Hospital, Middleton, Massachusetts

PEARE, QUINER, NEVIN & CHICKERING, ARCHITECTS

FOR this institution it was necessary to combine the acreage of several old farms. Upon one of these estates was an old building which was remodeled for the home of the hospital's superintendent. The structure was enlarged by adding the wings at the ends, the exterior was covered with shingles finished white, and the roof with shingles stained silver gray. The fine old stack chimney was retained, but the original steep, narrow stairway was removed, and a new staircase of colonial design placed in one of the larger rooms where the original fireplace with its crane was restored. The best of the old woodwork was also retained, and both old and new woodwork painted ivory.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

EDITORIAL COMMENT

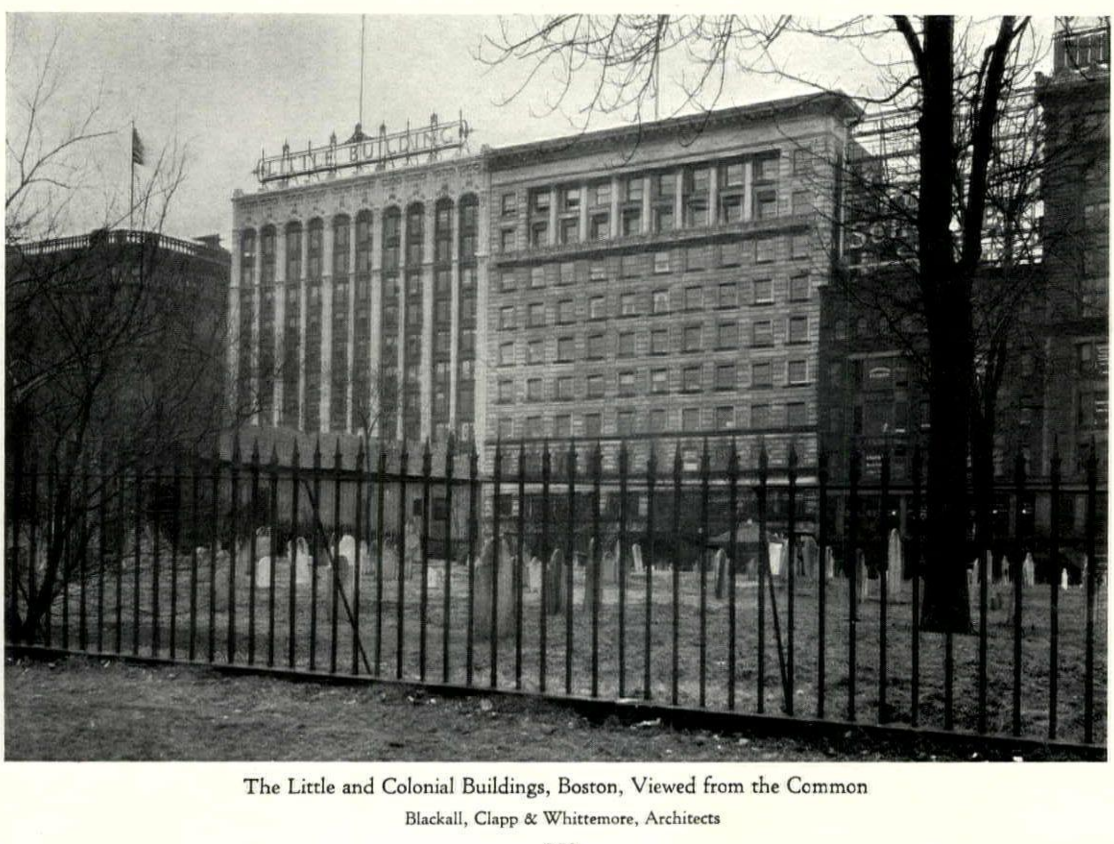
ORDERLY STREET ARCHITECTURE

TO a critic of architecture there is an obvious defect in our urban building that contributes largely to the restless appearance of our streets; it is a defect that can easily be remedied, granting its recognition and co-operation between architect and client. It undoubtedly expresses a trait of Americanism, commendable enough in certain respects, but fatal to orderly architectural development, and it is part of the cult of individualism which prompts architect and client alike to concentrate attention on the design of a single building and ignore its relation to the environment and the effect it will produce in the architectural development of a block facade.

The average American city presents a motley of styles, sizes and heights in the buildings of even one short block. Whether this striving for dominance by every 20- to 50-foot facade is due to the demand of the owner that his building shall be a perpetual advertisement, or to the desire of the architect to give expression to his personal tastes, the result is chaos and is the first thing to be condemned and corrected if we are to have really beautiful and practical cities.

While the blame for this condition is generally placed on the owner, we feel that architects who give sufficient thought to the benefits derived from orderly building could with but little difficulty change the public attitude if that really is the impediment. The standard which should apply in city building is admirably expressed in a newspaper article by Robert Lynd, a distinguished member of the Architecture Club, recently established in London. "The secret of good architecture," he says, "is much the same as the secret of good manners. It is a sort of courtesy in brick and stone—a grace that makes the best of its surroundings, in obedience to a code. It is this courtesy that forbids showiness or freakishness in private houses as in private conduct. It has been said with some wisdom that all good architecture should be monotonous, for a beautiful house will differ from its neighbors no more than a good-mannered man from his. That is to say it should not only be beautiful in itself but beautiful as part of its environment. This is not a check on individuality but only on self-importance. Genius is for the most part a capacity for making an individual use of a monotonous pattern. It required more genius to build a monotonous row of Georgian houses than a restless avenue of Victorian villas."

This standard can in perhaps a lesser degree be applied with profit to commercial structures. That it is worthy of being tried is well shown in this illustration from Boston. Surely no styles could be greater in diversity than classic and Gothic, yet the architects—in this instance the same for both buildings—have produced in these styles individuality in the separate buildings and have secured a satisfactory ensemble through the simple means of carrying the dominant horizontal lines of one building across the facade of the other.



The Little and Colonial Buildings, Boston, Viewed from the Common

Blackall, Clapp & Whittemore, Architects

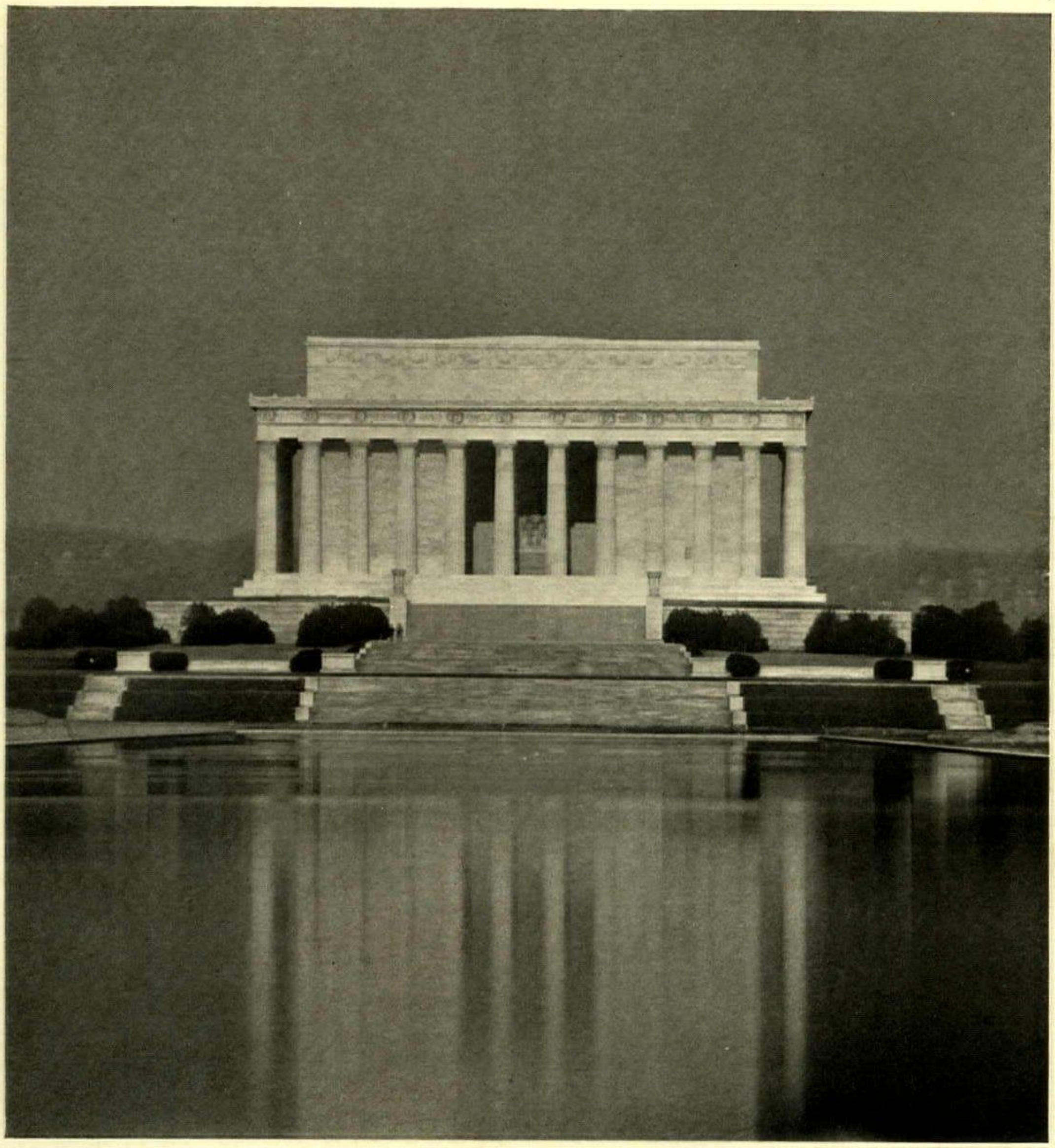


Photo © W. F. Roberts Co., Washington

THE LINCOLN MEMORIAL, WASHINGTON

HENRY BACON, F.A.I.A., ARCHITECT

Mr. Bacon was presented the gold medal of the American Institute of Architects by President Harding at a ceremonial pageant on the steps of the memorial on the evening of May 18, 1923. The immense scale of the building may be appreciated by noting the two figures at the foot of the buttress at the left of the steps.