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Some London Housing Developments

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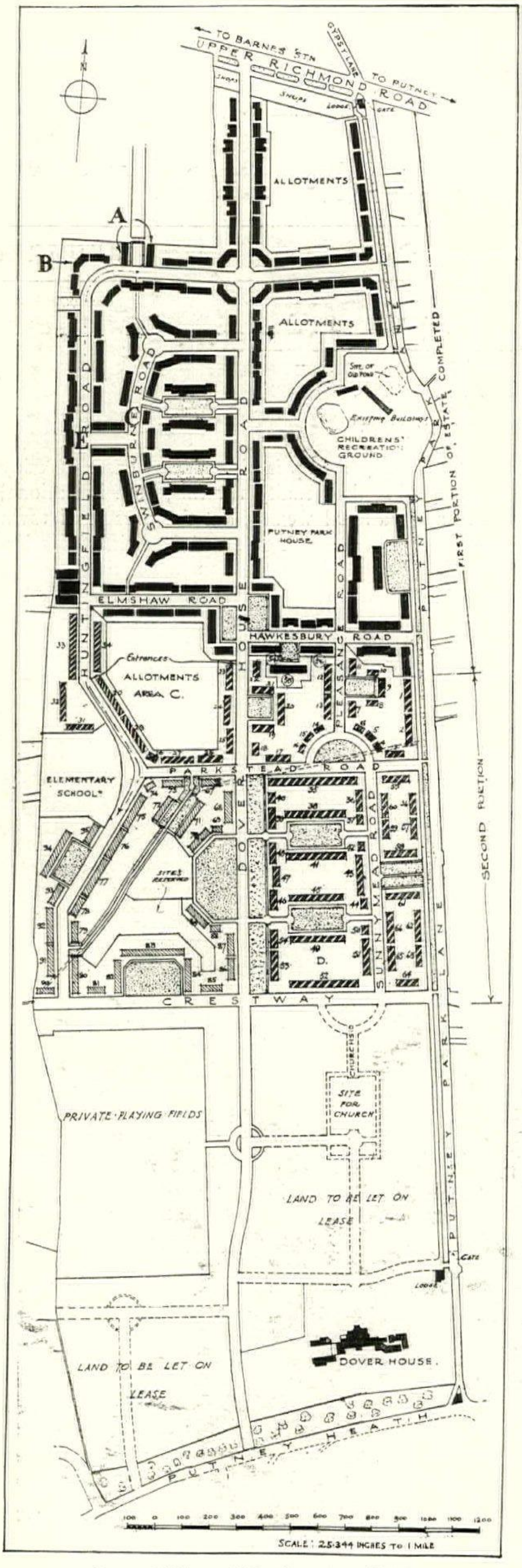
IT may be said that now in England we have definitely emerged from a period in which all considerations for town planning were for the time ignored. For it is a fallacy to think that town planning is a new activity. History reveals it as one of the very earliest of the arts and sciences, and the country is rich in evidence of careful forethought having been expended upon the development of many of its oldest towns. Notable periods of town planning activity occurred in the reign of Edward I in the twelfth century, and again the eighteenth century, which gave us the West End of London as we know it today. During the nineteenth century, however, the country was swept by the forces of the industrial revolution; old towns developed and new ones grew up in thoughtless haste. Today we are paying the penalty for this, both in national health and national wealth, but the pursuit of town planning has once more emerged from its obscurity. A study of it leads to the conclusion that no one aspect of the town can be considered by itself, but that all urban problems are intimately connected with one another. As Professor Abercrombie, one of England's foremost town planning experts, has somewhere pointed out, mistakes in the past have often occurred through the isolation and concentration on one particular aspect of the matter. It may be a concentration of subject or locality; thus the question of housing may be considered independently of its relation to such matters as traffic or

Cottage Close, Huntingfield Road, Roehampton Estate (A on Plan)
G. Topham Forrest, Architect

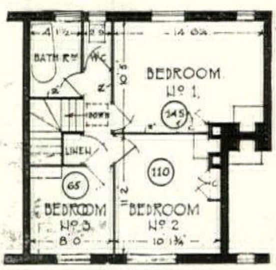


General Plan of Roehampton Estate

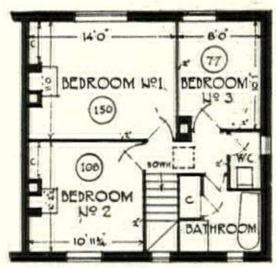
open spaces, or a small area may be considered independently of its relation to the surrounding area. Both these methods lead ultimately to disaster, and this is one of the most important doctrines which the modern town planning movement has brought to acceptance.

The question of housing in London is particularly complicated. There is not only the necessity of providing enormous additional accommodation, but there is also the equally urgent necessity of dealing with unhealthy and overcrowded areas. And here again, whereas in many other towns when it is not possible to re-house the whole population of an unhealthy area on the same site owing to overcrowding, it is often possible to house the surplus population on the outskirts of the town where land may be available; in London this cannot be done, since many classes of workers, such as dock laborers, market porters, and the like, must be moderately near their work. The outskirts of most towns are within walking distances of their centers, but in London this distance may well be eight miles. Thus, although this article deals mainly with two housing schemes of the London County Council, it must be borne in mind that these schemes form part of a vastly complex whole, nothing less indeed than the future development, in all its manifold aspects, of London.

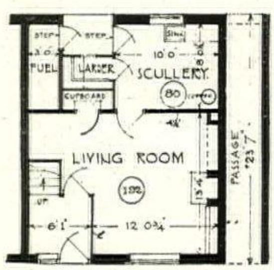
The housing program of the London County Council was formulated in June, 1919, seven months after the armistice, and it included the provision, within five years from January, 1920, of 29,000 new dwellings, exclusive of those to be erected on the cleared sites of unsanitary areas. This in itself, at five persons per house, is sufficient to accommodate a good-sized town's inhabitants. The estimated capital expenditure to be incurred in the acquisition



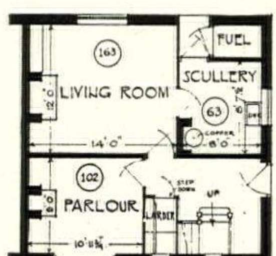
Second Floor Plan



Second Floor Plan

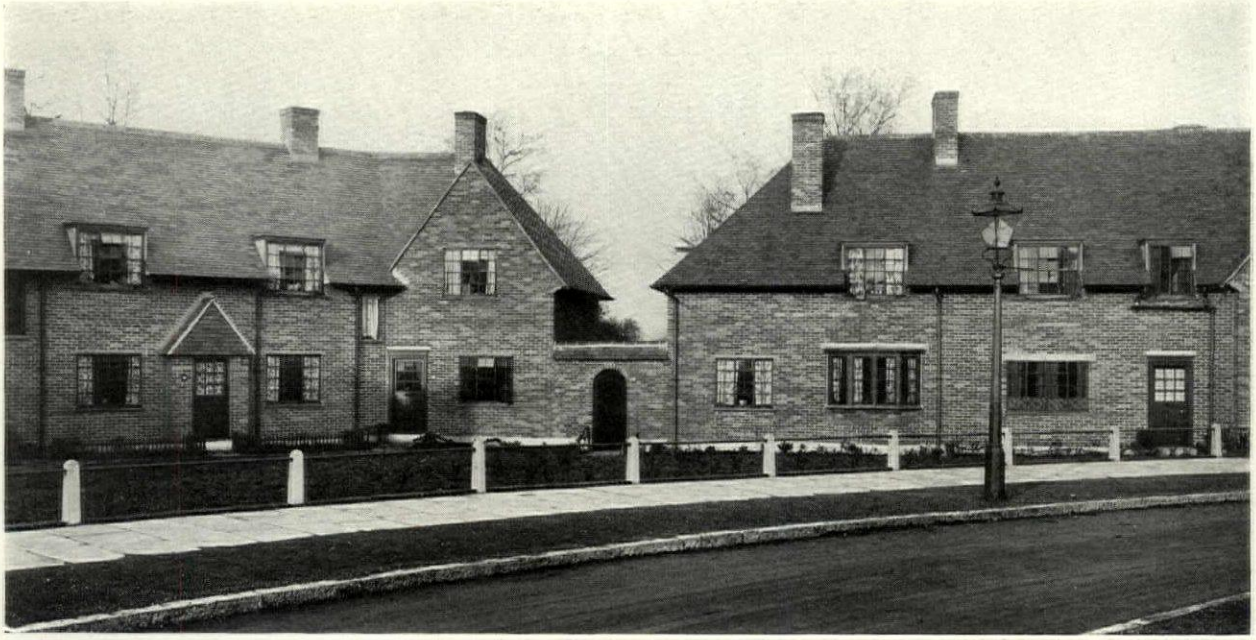


First Floor Plan
Four-Room House
S. or E. or W. Aspects
Area: 399 Feet



First Floor Plan
Five-Room House
N. or E. or W. Aspects
Area: 475 Feet

Typical Houses in Roehampton Estate



Group Houses in Bend of Huntingfield Road, Roehampton Estate (B on Plan)
G. Topham Forrest, Architect

of the sites, their layout and the erection thereon of the cottages, was approximately £24,000,000. About 2,000 of the houses were to be erected on partially developed sites, the remainder on the new estates at Roehampton, Bellingham and Becontree. Before the work could be begun it was necessary to make adequate arrangements for dealing with the difficulties arising through shortages of labor and materials. It was estimated, for example, that 700,000,000 bricks would be required in the course of the five years, and 300,000 tons of cement. The total average daily requirement of material was 4,000 tons. These are big figures and may convey some idea of the magnitude of the task. Yet despite all these and other difficulties the first of the new post-war houses were finished on February 7, 1920,

View Looking North on Swinburne Road, Roehampton Estate (C on Plan)
G. Topham Forrest, Architect

Cottages on Huntingfield Road, Roehampton Estate (E on Plan)
G. Topham Forrest, Architect

and since that date, up to the beginning of this year, dwellings have been completed at an average rate of seven per working day.

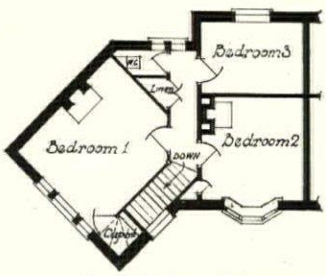
The Bellingham Estate has 2,090 dwellings and is one of the largest state-aided housing schemes in the country approved by the Minister of Health under the Housing and Town Planning, etc., Act, 1919. The area comprises 252 acres, and it was purchased by the council at a cost of about £200 per acre. The actual housing site consists of 176.5 acres, the remainder of the land being utilized for market gardens, and for houses not of the working class type.

Modern ideas as to the requirements of a housing estate have undergone a change during the last few years, and it is now realized that it is the duty of the housing authority to provide not only houses but facilities for various amenities and activities. Of the 176.5 acres, therefore, only 107 are actually taken up by cottage building sites and minor open spaces, the remainder being devoted, in addition to roads, to allotment gardens, tennis courts, open spaces, school, church and shop and public building sites. Provision is made for 220 allotments, 26 tennis courts, and two schools, each for 1,024 pupils.

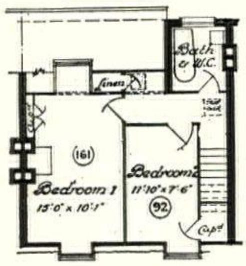
The housing site is triangular in shape, the layout being logically concentrated on a central green around which are grouped the most important public buildings. The accommodations vary from two-roomed flats to five-roomed houses; all are provided with bathrooms and hot water systems. The houses are constructed with 11-inch external cavity walls, internal walls of coke-breeze (cinder) concrete, wood floors and roofs covered with Welsh slates, English tiles, and French interlocking tiles.

The Roehampton Estate is perhaps one of the most charming in the country. It is very much smaller than the Bellingham Estate, and as yet only the first section has been finished, although work on the second has now been begun. Despite the variety in treatment there is a sense of unity in the scheme and a welcome suggestion of openness. The estate is 147 acres in extent, of which 94 have been reserved as a housing area, including also sites for schools, shops, and open spaces for public uses.

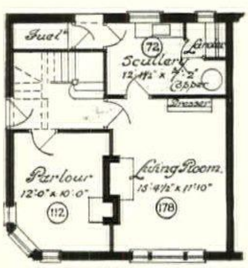
Second Floor Plan



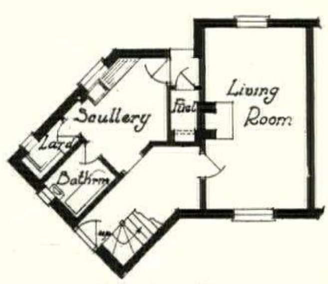
Second Floor Plan



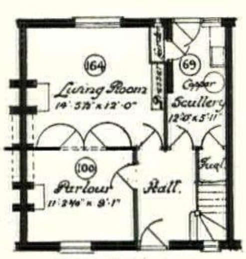
Second Floor Plan



First Floor Plan
Five-Room End House
South Aspect
Area: 505 Feet



First Floor Plan
Four-Room End House
Area: 444 Feet



First Floor Plan
Four-Room House
North Aspect
Area: 445 Feet

Typical Houses in Bellingham Estate

The first portion of the estate, which has now been developed, comprises 624 cottages and "maisonettes," the cottages having from three to five rooms and the "maisonettes" two and three rooms. The first school, which will ultimately accommodate 996 boys and girls, is in course of erection. This is an elementary school. There will eventually be a secondary school for which a site of five acres is reserved.

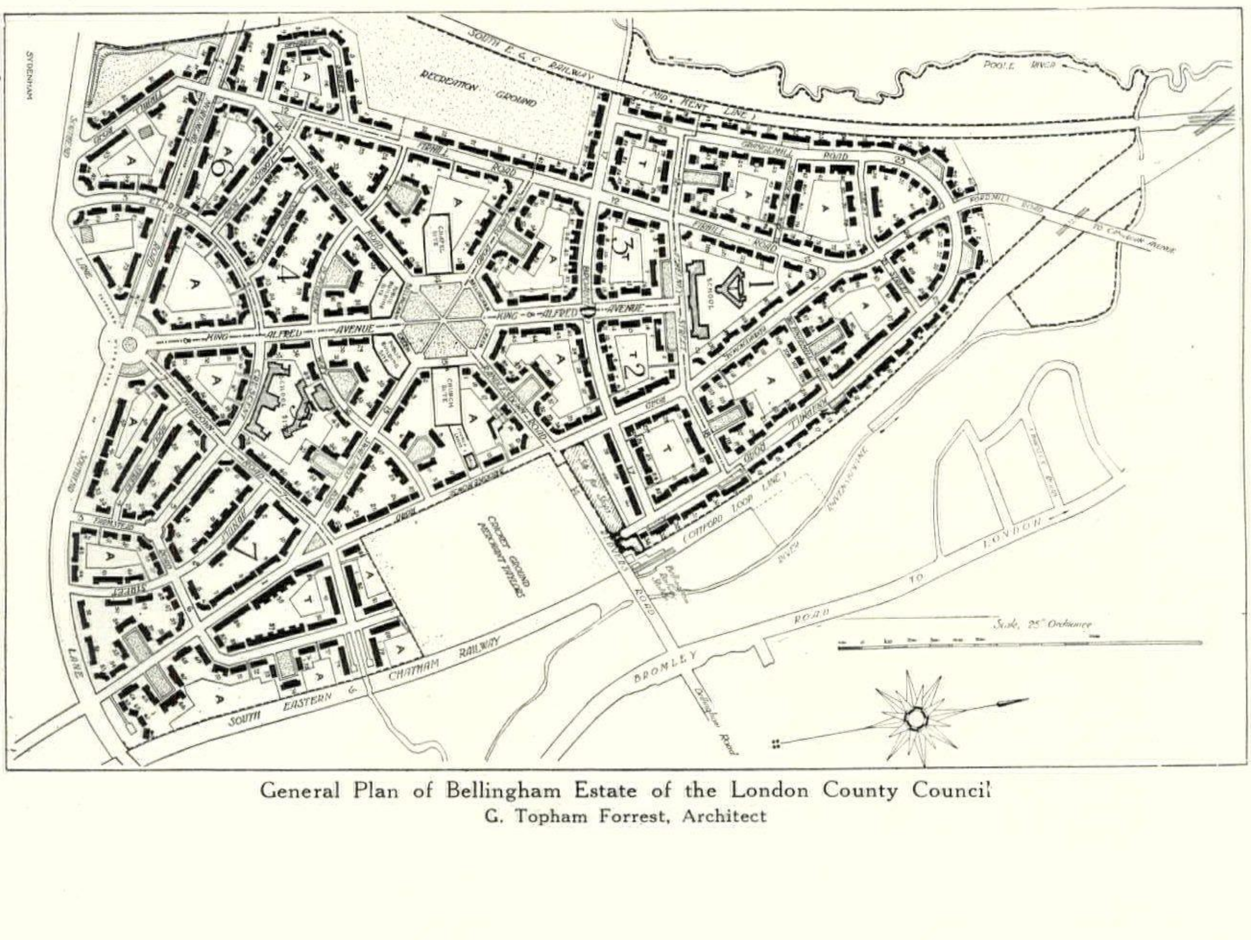
The Roehampton Estate contains many fine old trees, and the layout has been arranged so as to take the fullest advan-

View East on Broadmead, Bellingham Estate (D on Plan)
G. Topham Forrest, Architect

tage of these and other natural features. The roads are laid out in accordance with modern ideas, rather than on the old system which insisted upon a 40-foot road irrespective of whether such width was actually required or not. Although a distance of at least 70 feet is maintained between houses, the carriage way itself is now designed in accordance with the amount of traffic it is likely to have to accommodate. This gives opportunity for variety in the grouping of the houses, and courts, closes, *cul-de-sacs,* and such arrangements become possible. Vistas are achieved and often closed by some modest architectural feature, such as a well designed doorway or gable or some especially designed building.

As for the houses themselves, they rely upon good proportions, good materials properly handled, care of detail, and thoughtful grouping. For the most part they are quite plain, the plan dictating the form, and economy ruling as it were throughout, but they are always good architecturally.

A few facts concerning the cost of these houses may be of interest, and these paragraphs are taken from the auditor's report of the Bellingham Estate. They suggest the economy exercised.



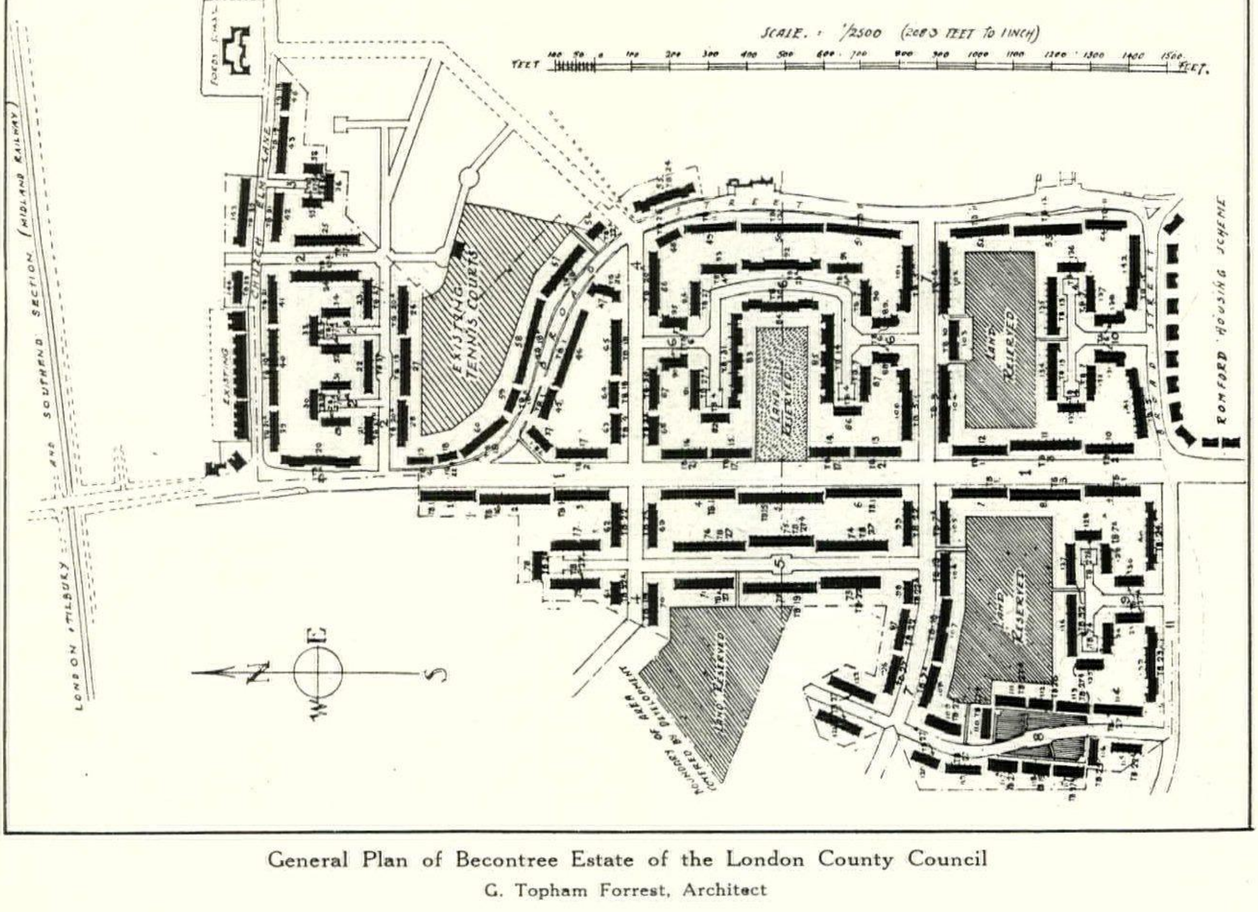
General Plan of Bellingham Estate of the London County Council
G. Topham Forrest, Architect

"The eventual cost of the dwellings is not readily ascertainable; the stocktakings and valuations have been carried out on the two anniversaries of the order to commence the undertaking (October 23, 1920), and these afford some basis for computation of the houses already erected; the approximate average cost per house may be taken at £900, excluding expenditure on purchase of site, construction of roads and sewers, and also establishment charges met through the central office.

"This figure must be taken as subject to revision when the contract is completed, and it should be noted that the cost of building has fallen since this figure was calculated and that houses are now being constructed at a lower cost than in the year under review."

The Roehampton Estate is more recent, consequently the cost is considerably reduced. Since 1920 there has been a steady fall in building costs, and the average cost of the 168 houses, comprising those of three and four rooms is £378, exclusive of roads and land.

These and similar estates represent, indeed, the most significant contribution to architecture of the day. Here and there may arise a few individual buildings of outstanding merit, but in these estates is seen the determination of the mass of the people to live in healthier and more beautiful surroundings, and its recognition on the part of the government. Although from about 1910 serious attempts were made to improve housing conditions and to introduce a new and more comfortable type of home for the working classes, the war period marks the real dividing line between the old and the new order. It unquestionably redounds to the credit of municipalities and local authorities that they should have succeeded where private enterprise undoubtedly failed. For although, in the past, the number of houses may have been more adequate than it is today, the quality was certainly infinitely inferior. A contrast between the dismally monotonous districts which grew up at the end of the last and the beginning of this century, with their endless repetition of a single type of house, designed and placed without consideration of aspect, and where it was thought that all essential shortcomings were compensated for by the reckless application of utterly meretricious ornament, with one of these estates, with their comfortable and dignified houses will show the immensity of the advance. And in this matter, if London has not actually led the way she has marched with the van, and, moreover, her difficulties, as has been shown, are far more complex than those of any other city. Among those to whom praise is due none perhaps deserves it more than the Council's Architect, G. Topham Forrest, F.R.I.B.A., who is responsible, not only for these schemes, but also for all clearance and re-housing work.



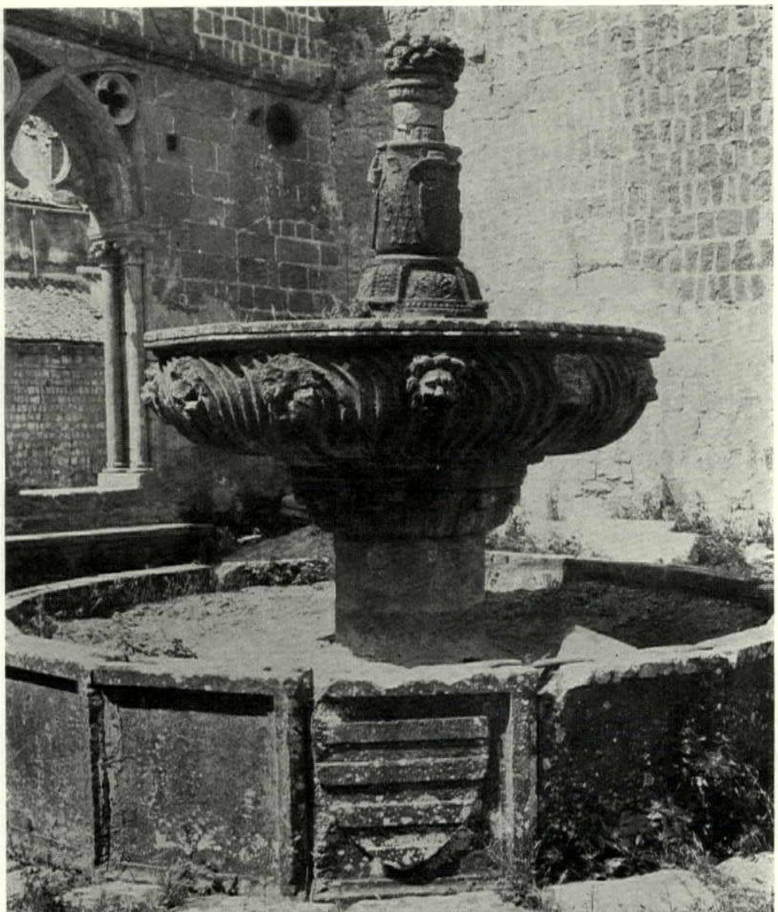
General Plan of Becontree Estate of the London County Council

G. Topham Forrest, Architect

ITALIAN RENAISSANCE DETAILS

A SERIES OF MEASURED DRAWINGS

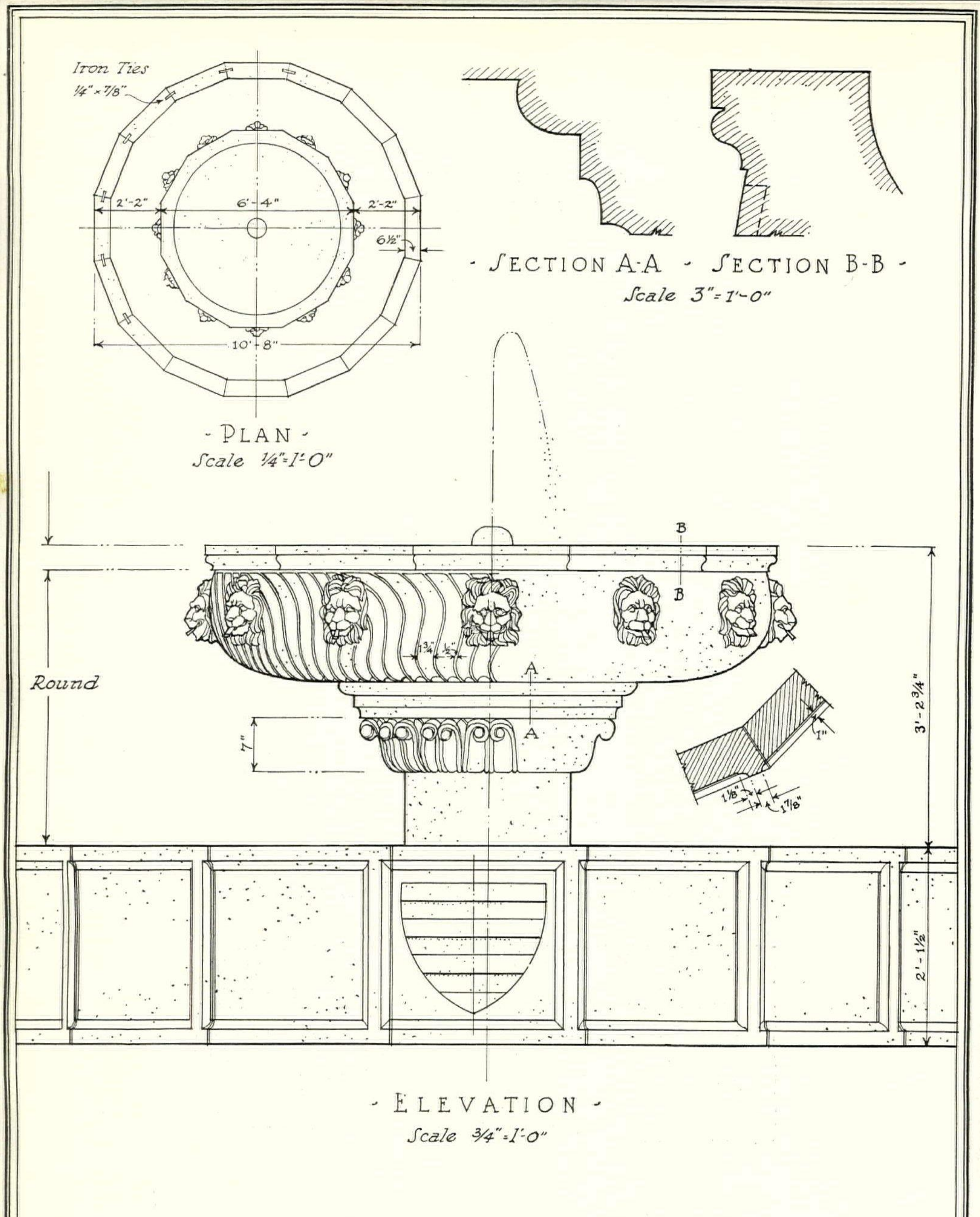
By HOWARD MOÏSE



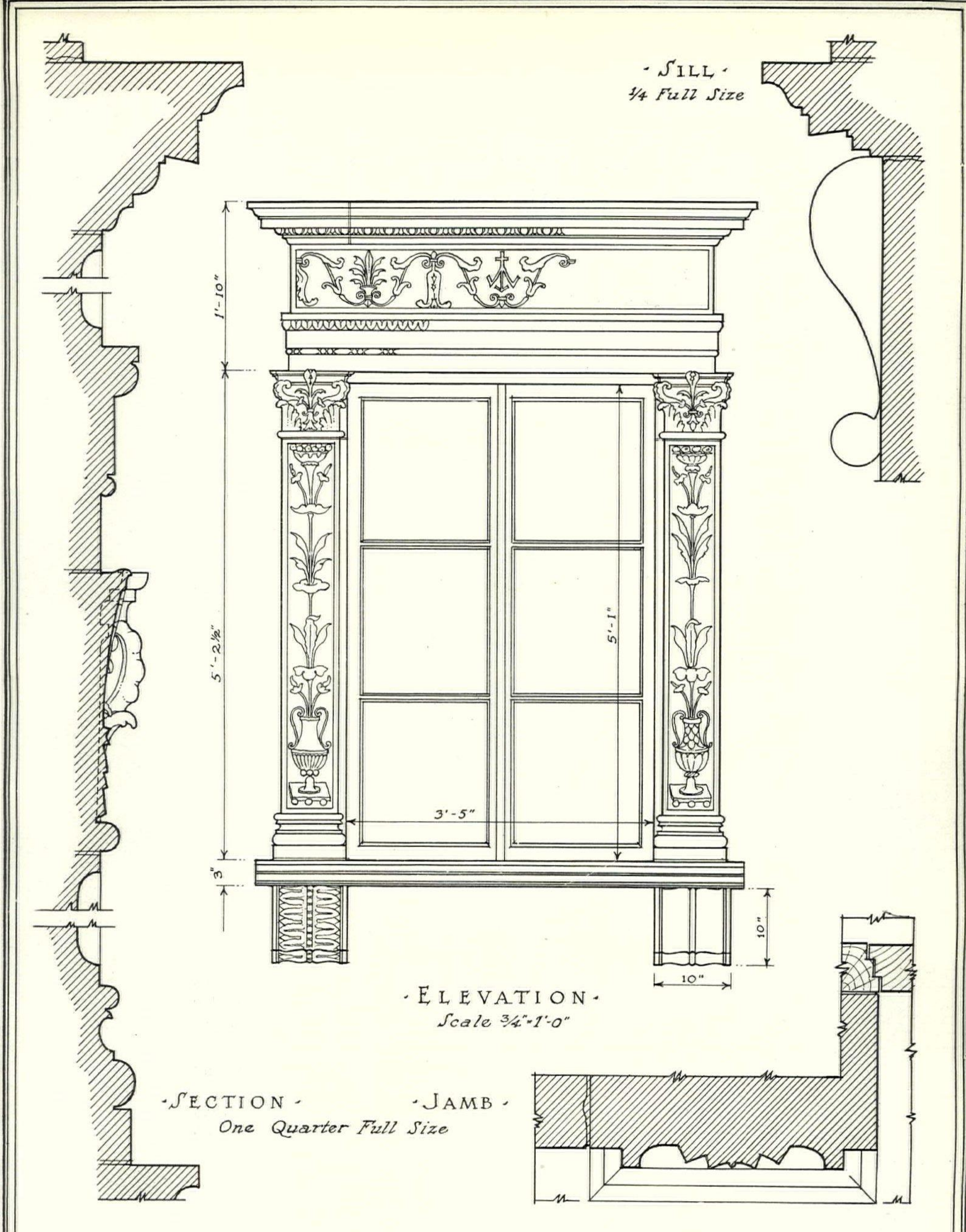
EARLY RENAISSANCE FOUNTAIN, PALAZZO DEI PAPI, VITERBO

IF closely analyzed, it will often be found that the excellence of Italian architecture is due in large measure to restraint in design, which provides simple ornament of fairly vigorous scale used in connection with plain but well textured surfaces to afford contrast.

The success which follows such wise use of ornament may be judged from this fountain which stands in the courtyard of one of the old palaces at Viterbo, a town which still possesses many buildings of the early renaissance period. Like most of the old Italian fountains it consists of a basin which rests upon a pedestal, forming the fountain proper. This is surrounded by a larger basin, resting upon the ground, into which the overflow falls. The rim of the upper basin develops a 12-sided edge, while the lower basin is 16-sided, the angles thus formed adding a note of simplicity and strength which would have been wanting had the basins been circular. The ornament of the upper basin consists of a series of 12 lion masks and the simple capital of the supporting pedestal or shaft, while the sole ornament of the lower basin are the graceful proportions of the 16 panels of which it is formed.



ITALIAN DETAILS 1923	- MEDIEVAL FOVNTAIN - - PALAZZO dei PAPI ∞ VITERBO -	MEASVRED and DRAWN by HOWARD MOÏSE



ITALIAN DETAILS 1923

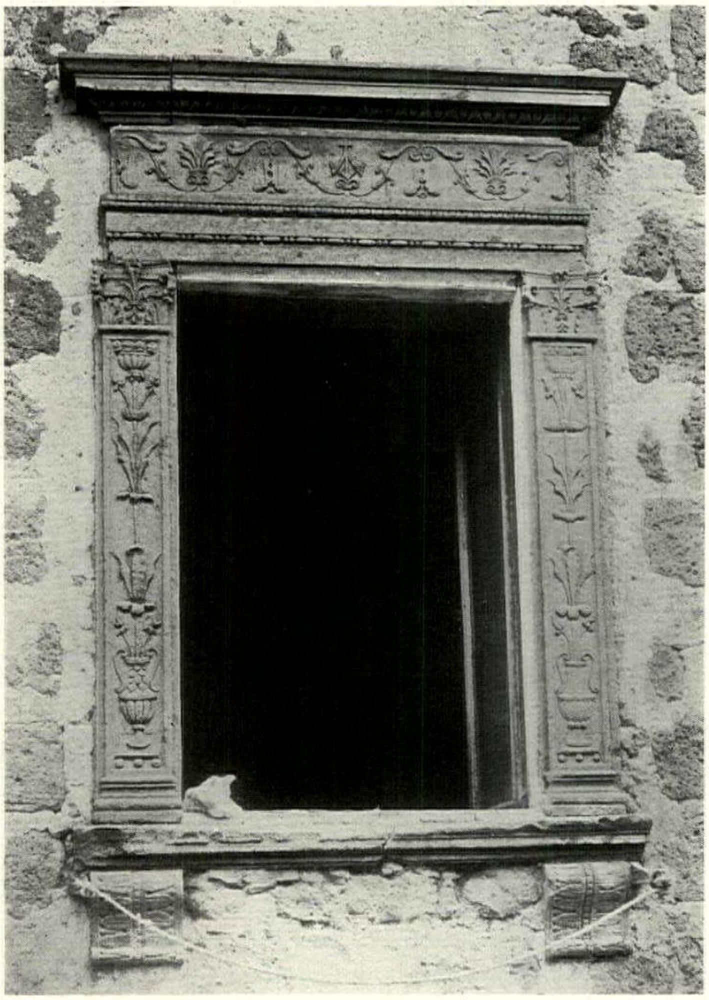
· RENAISSANCE · WINDOW ·
· TOSCANELLA ·

MEASVRED and DRAWN by HOWARD MOÏSE

ITALIAN RENAISSANCE DETAILS

A SERIES OF MEASURED DRAWINGS

By HOWARD MOÏSE



RENAISSANCE WINDOW, TOSCANELLA

DESIGNS of windows and doors while important in architecture of any type are particularly so with the Italian and Spanish styles, in which the use of ornament is largely concentrated about them, the wall areas being plain to afford contrast.

This window design is typical of the treatment of windows in Italy during the renaissance period. It possesses the usual pilasters which support an entablature, the whole resting upon the sill which is supported by two gracefully modeled corbels. While slightly more ornamented than such windows frequently are, the ornament is so well distributed that there is no crowding, and the decorated parts are everywhere given sufficient contrast by plain surfaces. Like many of the details being presented upon these pages this window design is well adapted for modern use, and since its ornament is wholly in low relief and without undercutting it could be easily reproduced in terra cotta or concrete.

ENGINEERING DEPARTMENT

Charles A. Whittemore, *Associate Editor*

The Medical Arts Building, Dallas

By W. J. KNIGHT, *Consulting Engineer*

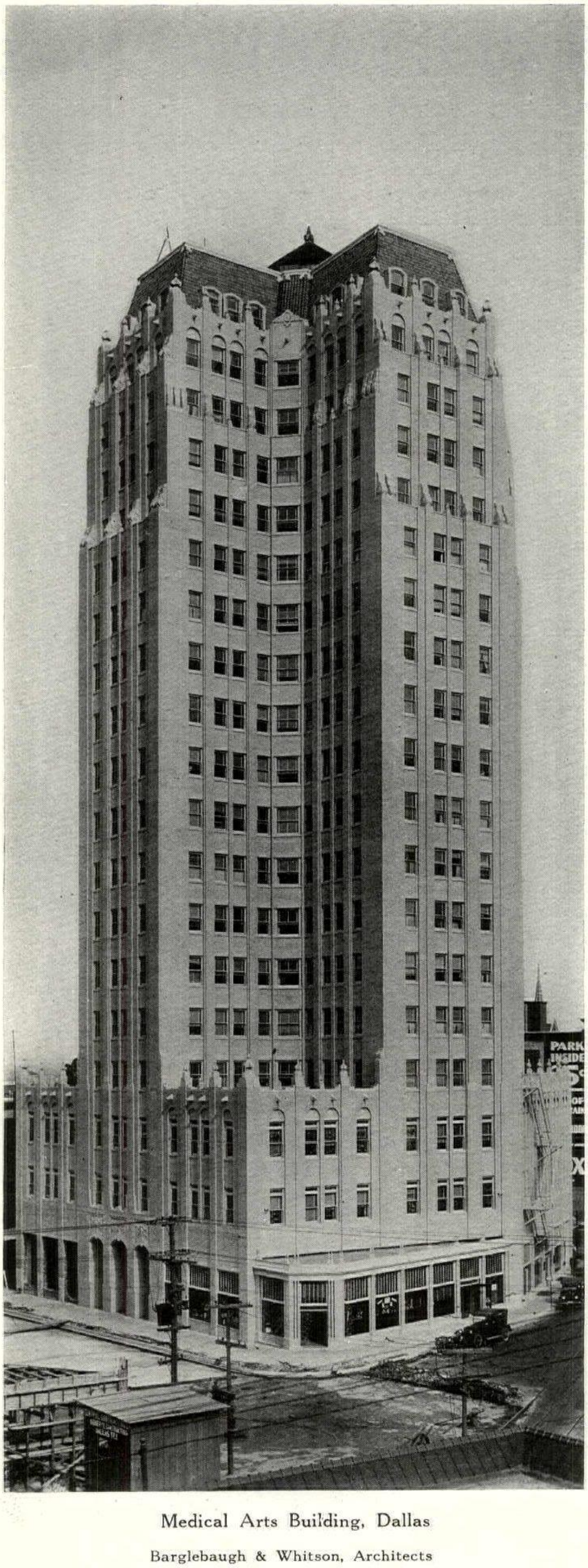
THE structural frame of the Medical Arts Building is an unusual adaptation of reinforced concrete without the presence of structural steel in any form. The building located at the corner of Pacific avenue and Masten street, embodies many features of design and arrangement that are unique in the annals of building construction. The erection of the building was planned for the distinct purpose of bringing all the elements of the medical profession under one roof, in order to eliminate the objectionable discrimination which landlords of commercial office buildings are likely to exercise against doctors and dentists. The objection to the intimate association, during the hours of business activity, of healthy persons with those who are afflicted has occasioned a widespread determination on the part of the medical profession to assemble its members in buildings that are designed and equipped to supply individual needs and to render more efficient service.

The building, 19 stories high, besides possessing the distinction of being the tallest reinforced concrete building on record, is also of unprecedented size for the exclusive housing of members of the medical profession. The first floor is occupied by a spacious drug store and an establishment supplying medical and scientific instruments. A large concrete vault is located on the first floor for the convenience of tenants who desire to store their valuables. All dental offices in the building are located so as to receive north light, while the eye, ear, nose and throat specialists have been allotted space facing the west. The X-ray rooms are enclosed by partitions lined with lead or zinc alloys to prevent "strays" from penetrating to adjoining rooms with possible injury to occupants. Each office group has a reception room and individual treatment rooms for the use of doctors who are to practice in the suite. Compressed air, gas, electricity and water have been provided in offices and lavatories in conformity with the demands of each practitioner. Lunch rooms, a modern physicians' library, and an auditorium arranged specifically for doctors and dentists also serve to emphasize the attention given to insure perfect harmony in appointments, unexcelled comfort and the most competent service. Each of the upper floors above the third consists mainly of four suites, one occupying each wing of the building, with wide halls between, and all service parts in the center.

The exterior of the building is faced with cream colored impervious brick, smooth in texture and backed with 8 x 12 x 12 hollow tile. All ornamental detail of entrances, copings, pilaster cappings, sills, etc., consists of terra cotta and cast cement. The exterior bases and base pedestals are Tennessee marble with hone finish. A mansard roof, covered with green semi-glazed Spanish tile of variegated shades, crowns the building. The first three floors occupy the entire irregular shaped lot and above the third the floors assume the shape of a cross, 111 feet, 6 inches each way to give increased light and air, with window openings along the three faces of each wing. Each wing of the cross is 39 feet, 6 inches by 36 feet, 4½ inches, with a total height of 255 feet from basement floor to the top of mansard roof. In the planning of the four wings it was desired to avoid the use of any interior columns. This condition presented the solution of a problem in long span design that would contribute materially to the lateral stiffness of the structure while acting as a unit to resist the effects of high winds, so prevalent in this section of the country, as well as to function in the normal manner when sustaining the live and dead loads of the building.

The floor construction (Fig. 1) consisting of reinforced concrete ribs or joists 5 inches wide by 22 inches deep and 3 feet, 11 inches center to center, extending in two directions, was selected for all typical floors to fulfill the manifold requirements of the design. The top slab over joists is 2½ inches thick and reinforced with two layers of triangular mesh laid in two directions. The central joists at right angles to the axis of the squares on the typical floors, are reinforced with two 1-inch round rods, one straight with hooks at each end and the other bent up near the supports, and those parallel to the axis (See Section, Fig. II) are reinforced with two 1⅛-inch round rods anchored and bent similar to rods of the joists running at right angles to the axis of the squares. The rods in all non-continuous ends of slabs and beams were hooked to furnish additional rigidity to the structure, regardless of whether theoretical calculations for bond demanded their use. The squares or rectangles formed by the two-way joists were made identical for each consecutive floor to permit of repeated use of the wood form units, thus reducing construction costs.

The first floor, which consists of flat slab con-

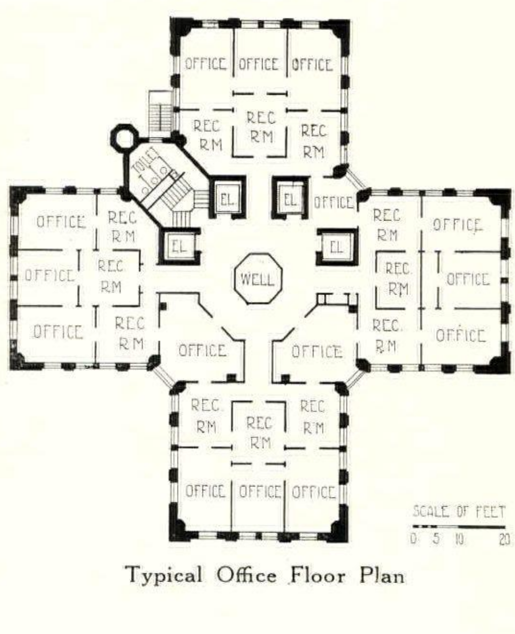


Medical Arts Building, Dallas

Barglebaugh & Whitson, Architects
W. J. Knight & Co., Engineers

struction of unequal spans, is designed for a live load of 150 pounds per square foot, having for its supports additional auxiliary intermediate columns extending from the basement floor and terminating at the first floor level. The typical floors are designed for these superimposed and dead loads: partitions, 20 pounds; ceiling and plaster, 10 pounds; cement finish, 9 pounds; live load, 50 pounds; dead load of floor, 82 pounds; total, 171 pounds per square foot dead and live loads. The flat portion of mansard roof is designed for a live load of 30 pounds, plus the dead load. The sloping portion of mansard roof is designed for a live or wind load of 30 pounds, in addition to the dead load of slab and tile covering. Members supporting elevators and tanks are designed according to the service requirements placed upon them.

The reinforced concrete walls enclosing the four elevator shafts are 12 inches thick from the basement to twelfth floor inclusive, and 8 inches thick above the twelfth floor level. The reinforcement for these walls consists of multiple individual stayed column units about 16 inches by 10 inches, with longitudinal ⅝-inch round rods extending from the basement to sixth floor and ½-inch round longitudinal rods above the sixth (Fig. III.). The elevator walls were designed to serve as columns for the support of their respective loads from floors above, and also as stiffeners to aid in resisting the overturning action of high winds. The reinforcement of each wall face in each story was designed so as to permit the iron workers to do all assembling on the ground, and later to hoist the units into place. The stays at each corner of elevator enclosure walls



Typical Office Floor Plan

were secured in position after the individual wall units had been hoisted and wired in place to dowels extending above each floor.

The outside corner columns in the typical stories (Fig. IV) are designed to support the greatest dead, live and wind loads of any columns in the building. In the first story these columns are 56 inches by 56 inches, with reinforcement consisting of twenty-five 1⅛-inch round longitudinals and 9/16-inch round spirals with pitch 2 inches center to center and designed for a combined load of 2,580,000 pounds, of which 180,000 is due to direct stress from wind. Fortunately, the position of these columns, located as they are in the corners of each wing, did not preclude the use of sizes dictated by consistent design.

All foundation piers of columns (Fig. V) rest on hard, solid rock. After the foundation of each pier had been excavated and leveled off, borings were made at the center to a depth of 5 feet to make certain that solid rock existed at least to this depth without the presence of air pockets. The foundation piers are tapered on four sides from the first floor level to 1 foot below basement floor; and the areas of bases proportioned so that the assumption of 18 tons per square foot was satisfied and not exceeded in any instance. The distribution of loads from basement columns into the piers is accomplished by extending the basement column reinforcement, including spirals, into the piers and terminating them at a point where the sectional area of piers not reinforced resulted in giving a maximum compression of 500 pounds per square inch.

Some difficulty was encountered in the design of exterior columns where offsets in the upper stories were necessary to harmonize with the architectural exterior. Fig. VI on the next page shows typical examples of offsets in one of these columns, which at the fifteenth story supports a total load of 499,000 pounds. This load is transferred by means of vertical shear in the fourteenth story column to the column in the story beneath. This action is made obligatory by the lateral resistance offered by the fourteenth and fifteenth floors and the convergence of spandrels at this point, which prevent any bending in the fourteenth story due to eccentric load above. The fourteenth story column is 31 inches by 60 inches, embodying two cores, each being reinforced with ¼-inch round spirals, 2 inches pitch and 27 inches diameter. One core contains ten ⅝-inch round longitudinals and the other five ¾-inch and five ⅞-inch rounds. The two cores are tied together with ½-inch round stirrups placed in pairs to form bands 12 inches center to center.

The exterior face of these columns was assumed to be subjected

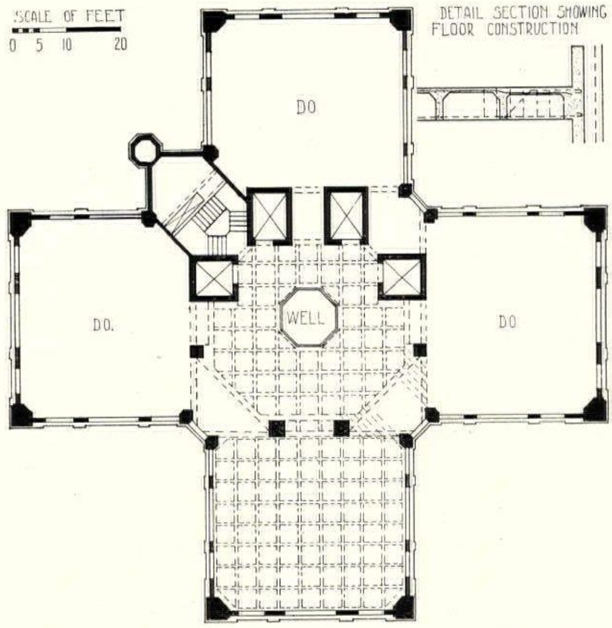


Fig. I. Typical Floor Framing. Inset, Fig. II

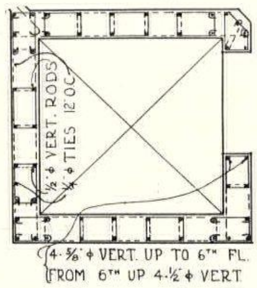


Fig. III. Detail Plan of Elevator Enclosure Above

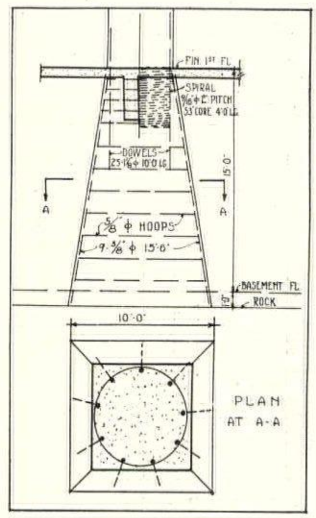


Fig. V. Detail of Column Footing at Right

Progress View of Typical Floor Showing Underside of Concrete Floor Construction

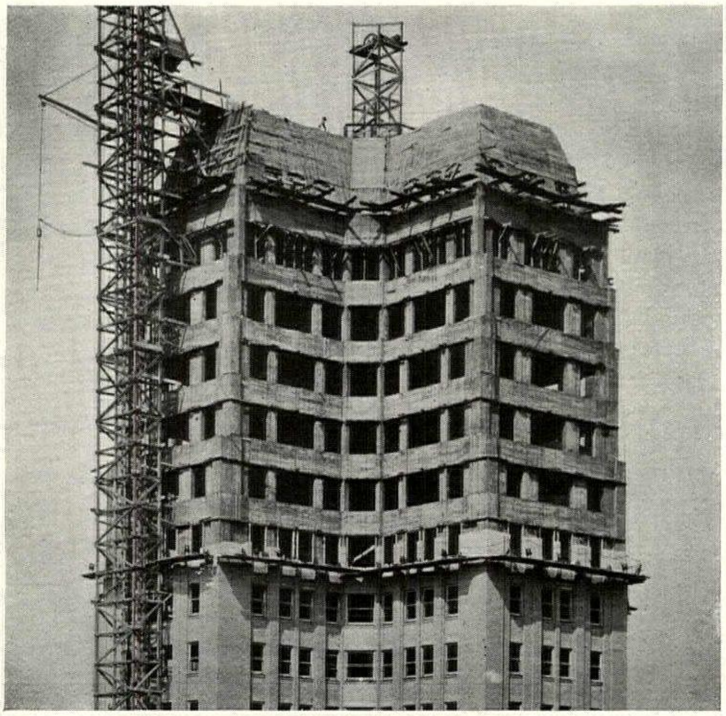


Fig. IV. Progress View Showing Relative Sizes of Corner and Intermediate Columns

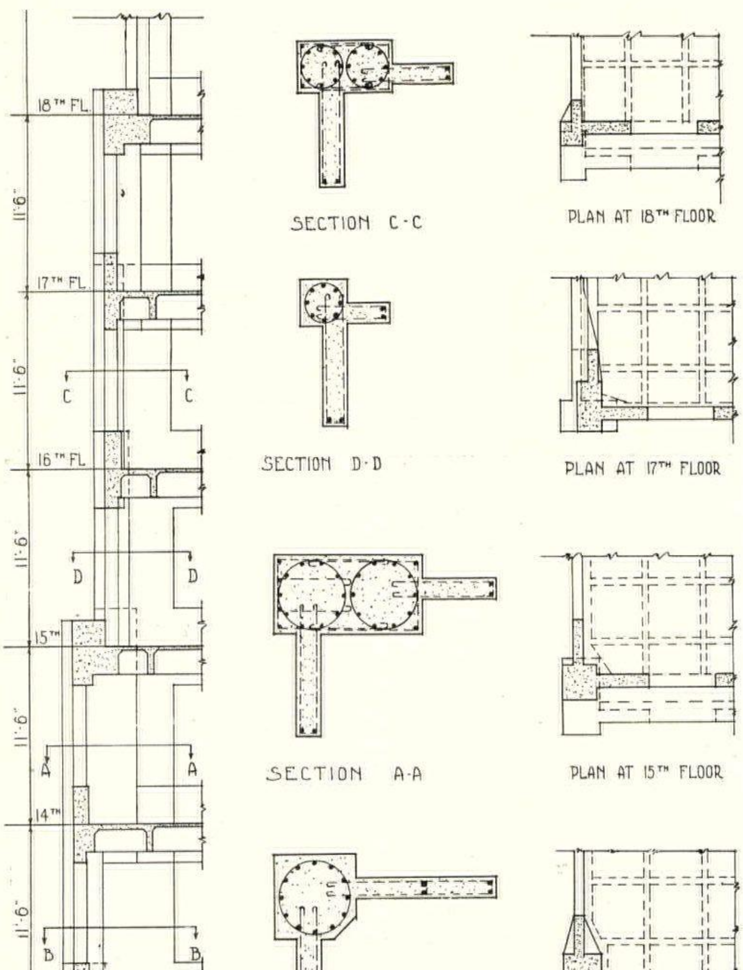


Fig. VI. Details of Offsets in a Typical Exterior Column

to tensile stress due to bending and, therefore, is reinforced with four 1-inch rounds hooked at the upper ends near horizontal face of offset. In the design of this offset a third precaution was exercised to insure absolutely a rigid section. The end of spandrel beam bearing in the column at fourteenth floor level is flared out at a point beginning 2 feet, 6⅜ inches from the face of column in fourteenth story, so that the sectional area would furnish sufficient area in shear to sustain a portion of the load from column in fourteenth story. The design of offsets required a great amount of study and theoretical, practical and common sense maneuvering before arriving at a solution that was considered applicable to such unusual conditions of design.

The spandrel beams throughout the building are unusual in size. Spandrels at the outer faces of wings are 12 by 60 inches (Fig. VII) and are designed for a maximum moment of 546,000 foot pounds or 6,552,000 inch pounds, being the combination of moments from the dead and live loads of floor, concentrated pier loads, and wind load. The maximum moment at the fifth floor produced by the wind at the column face is 330,000 foot pounds (Fig. VIII). This wind moment was assumed for all such spandrels of typical floors for the reason that as the wind moment lessens for each succeeding floor above, the column sizes also decrease in size, resulting in an increase in span length and consequently an increase of positive moment. The difference found in the combination of all moments, both negative and positive, was not sufficient to warrant any variation in the design.

Due to the narrow compression flanges of inverted spandrel beams, it was deemed necessary to use two intermediate struts 12 inches by 4 feet, 2 inches, extending continuously from the fourth floor to the attic floor. These struts together with stirrups serve as stiffeners to avoid any lateral movement of the compression flanges which have a width in proportion to clear span of 1/30.42 at the fourth floor and 1/35.6 at the attic floor.

All component parts of the structure were consistently designed for a wind pressure of 20 pounds per square foot without considering any deduction in the unit stresses in the concrete and steel resulting therefrom. An exact elastic analysis of stresses due to wind loading of rigid frame buildings, being impossible in practice, approximate methods based on certain arbitrary assumptions are used. The four principal methods in current use, it may be said, are workable. Professor W. H. Burr in this connection is credited with the very plausible statement: "So long as the stresses found by one legitimate method of analysis are provided for, the stability of the structure is assured." This statement may be consoling to some engineers who persist in disregarding common sense applications in connection with the use of exhaustive theories.

The method known as the "cantilever method" was employed in the determination of all wind stresses in the building. It is somewhat comforting to the writer to know, in view of contradictory theories, that the wind stresses of the 36-story Equitable Building of New York were determined according to this method, and that the structure still stands.

The distance from floor to floor of all stories from the fourth to and including the eighteenth and attic is 11 feet, 6 inches. To describe more specifically the method applied, the fifth story of columns 7 and 8 (exterior corners) will be considered. The horizontal wind load of each story above and including the fifth is equal to 11.5 x 17.33 x 20=4,000 pounds. At the attic the wind load is equal to 28.75 x 17.33 x 20=9,950 pounds.

The total moment from wind above the fifth floor about the line of inflection of the fifth story column is:

4,000 pounds x 971.75 ft.=3,887,000 foot pounds.
9,950 pounds x 155.25 ft.=1,544,738 foot pounds.
5,431,738 foot pounds

Assuming the average distance center to center between columns 7 and 8 as equal to 36 feet, we have the equation for direct stress in columns 7 and 8: (18X x 18)+(18X x 18)=5,431,738; X=8,380. The direct stress in fifth story column is: 18X=18 x 8,380, X=150,840 pounds.

The total horizontal shear in fifth story for columns 7 and 8 is the sum of the wind loads above, or 62,000 pounds. In the fourth story the total horizontal shear is 66,000 pounds. (Fig. IX). The shear taken by any column in any story is proportional to the total horizontal shear in the same story.

Referring to Fig. IX, the difference between the direct stresses in the fourth and fifth story columns, *i.e.,* (171,360—150,840)=20,520 pounds is taken up as a shear in the spandrel beam between corner columns. The moment of the shear to hold the joint in equilibrium is

Mo.=20,520 pounds x 18=369,360 foot pounds.

The bending moment for the fourth story column, having a leverage equal to the difference between the story height and the depth of spandrel beam divided by two, *i.e.,* 11 ft. 6 in—5 ft. 0 in.

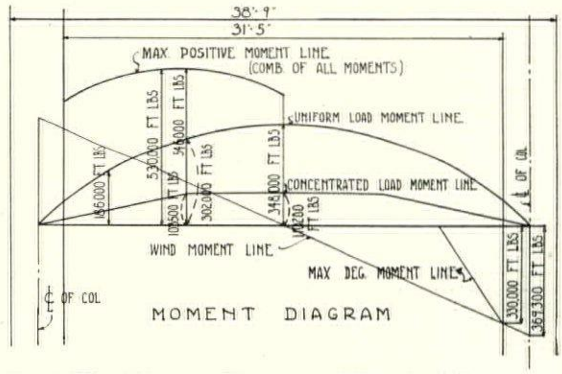


Fig. VIII. Moment Diagram of Spandrel Beam

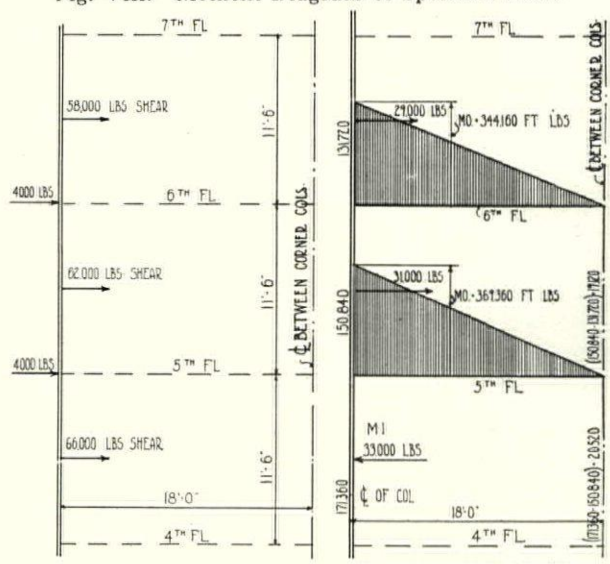


Fig. IX. Shears and Moments, Fourth and Fifth Floors

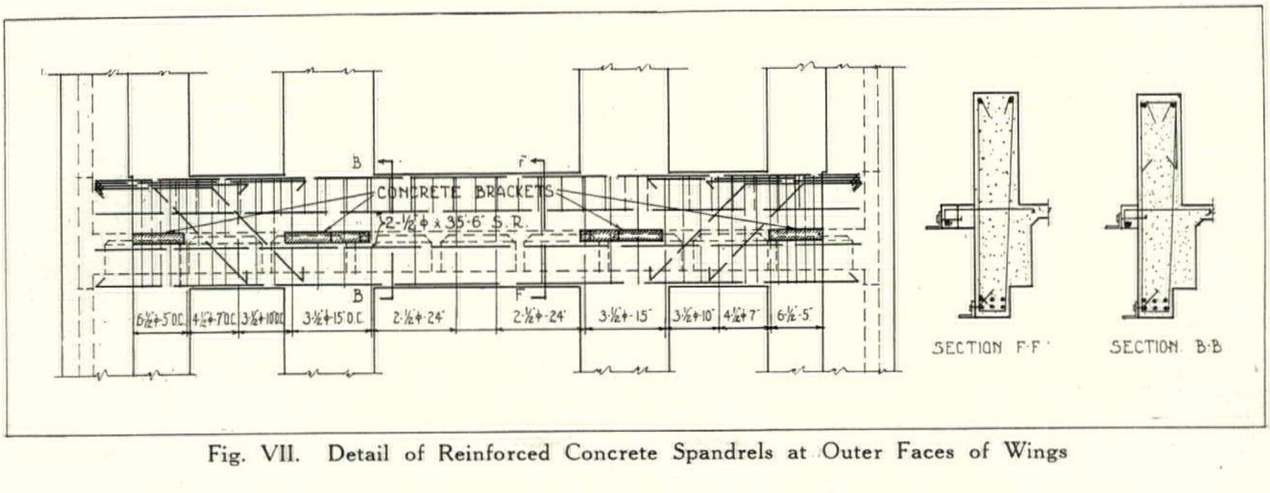


Fig. VII. Detail of Reinforced Concrete Spandrels at Outer Faces of Wings

= 6 ft. 6 in. ÷ 2 = 3 ft. 3 in.

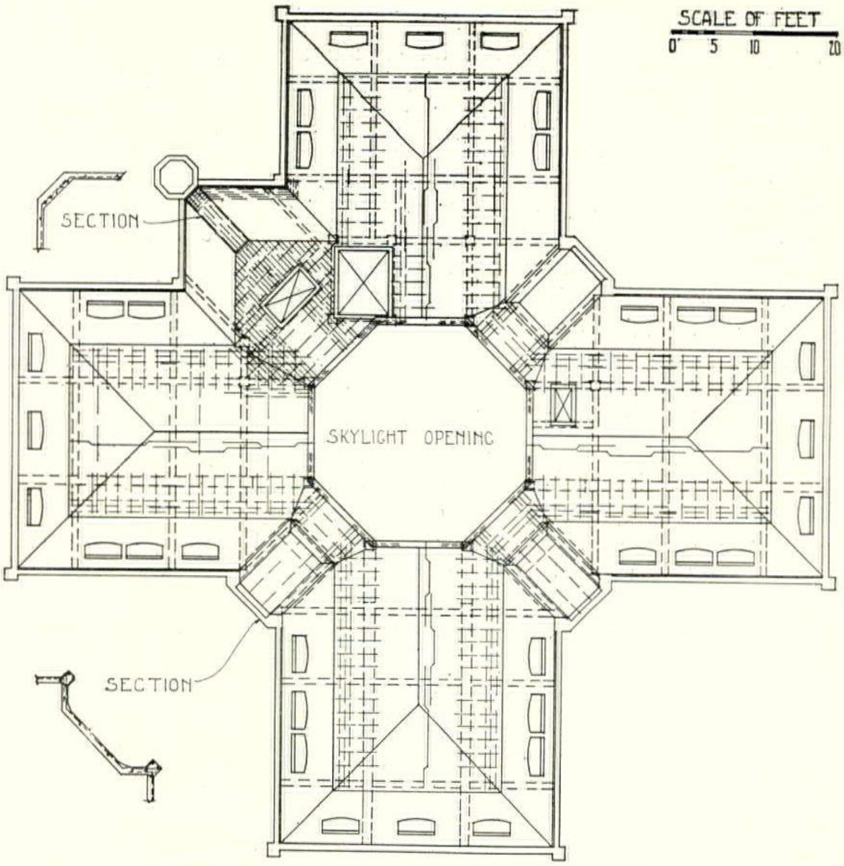
M1 = 33,000 x 3.25 feet = 107,250 foot pounds.

In like manner for spandrel at sixth floor:

Mo—19,120 pounds x 18 feet=344,160 foot pounds.

The mansard roof framing is composed principally of rigid frames and cantilever beams. From the ends of beams are suspended the loads of tank floor and two house tanks 6 feet in diameter by 18 feet long. The moment and shear diagrams indicate the forces for which the members are designed.

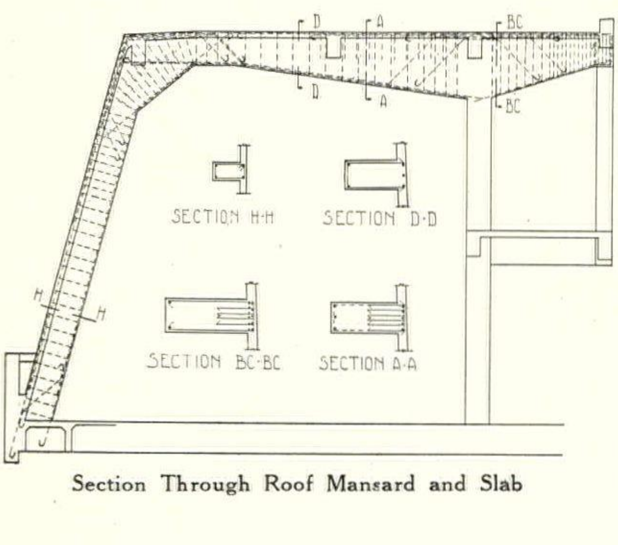
Calculations for rigid frames of the roof were based on more logical, practical, and conservative assumptions than those recommended by theories applicable to this form of construction. It will be interesting for readers to refer to the several excellent tests made at the University of Illinois, in 1918, of rigidly connected reinforced concrete frames. The assumed principle of continuity and the effective rigidity of joints as applied to the design of reinforced concrete frames, are somewhat inconsistent with the actual results determined by these tests. Discrepancies ran as high as 50 per cent.



Roof Framing Plan of Medical Arts Building

The design of rigid frames is another case where the engineer must visualize as well as theorize, and if the theories applied do not appear logical to the experienced mind, reasoning along common sense lines in conjunction with theory will inevitably give results far more consistent and intelligible.

In the design of any important structure where precedent is wanting, the engineer is frequently confronted with problems that require an application of common sense as well as technical knowledge in about equal proportions. Not infrequently the writer has computed the stresses in some member or arrangement of members by the use of formulæ too extensive to be really intelligible, and then, in the final analysis, subjected the theoretical findings to inordinate "abuse" through the injection of practical common sense, that the mind might be rendered composed and the structure stable. This understanding of the science of engineering may not be universally admitted, for in most instances it may be deemed preferable to enshroud the science with profound mystery, that others of lesser lights might acquire a deeper reverence for things apparently incomprehensible.



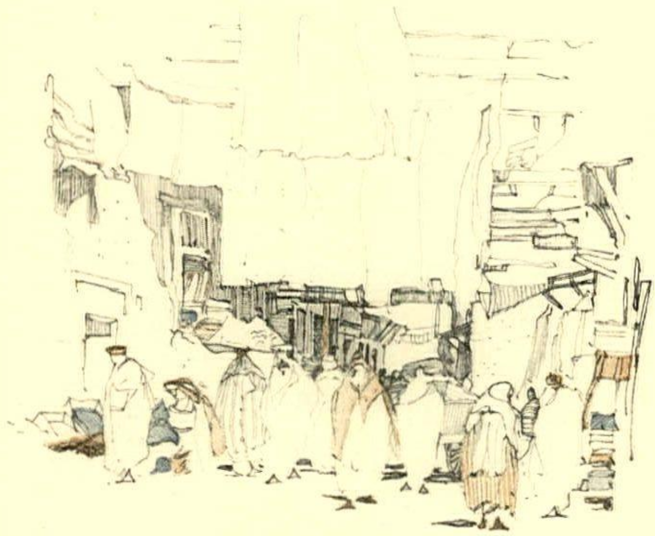
Section Through Roof Mansard and Slab

The Medical Arts Building presented very unusual wind problems. Unless one could visualize the effects of high winds acting on the vertical face of the building, any one of the several methods devised for computing approximate wind stresses would be of little service to a designer who possessed a knowledge of these theories without imagination. Even engineering requires an infinite amount of imagination, in degree proportional to that of the architect. The latter imagines and visualizes for the sake of convenience and beauty, while the former traces in his mind's eye the actions and resultant stresses in structural members under given loads. To the experienced engineer the various stresses in a member form impressions as intense and realistic as the artist's conception of his subject prior to its realization on the canvas.

A Group of Pencil Sketches in Northern Africa

By LOUIS C. ROSENBERG

These sketches indicate the character of the fascinating Mohammedan cities of northern Africa, with their teeming crowds contributing in their costumes color notes that contrast with the whitewashed stucco over sun-baked bricks of the walls. Brilliant color is sensed everywhere; the costumes are sometimes of pure white, others of brown or brown and white stripes; red tile in the roofs, gray blue in the deep window reveals to reduce the sun glare; an occasional warm toned marble column salvaged from Greek or Roman days, and most brilliant of all, the street markets with fruits, grains and green stuffs massed against the walls—all combine in a veritable riot of color. The illustrations herewith are the same size as the original drawings.



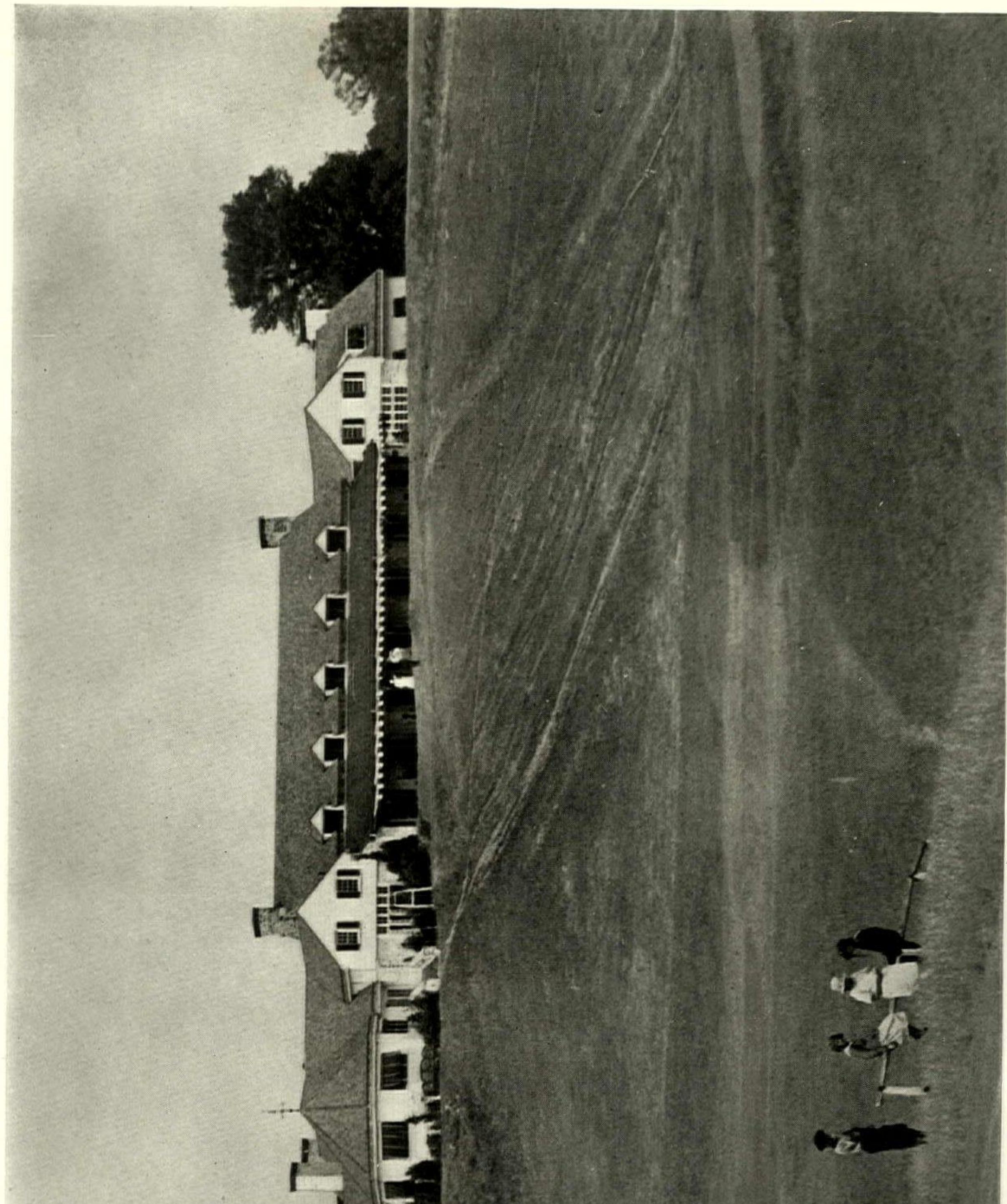
TUNIS.
SOUK EL GRANA.

FROM PENCIL DRAWING BY
LOUIS C. ROSENBERG

TUNIS
PORTE DE FRANCE

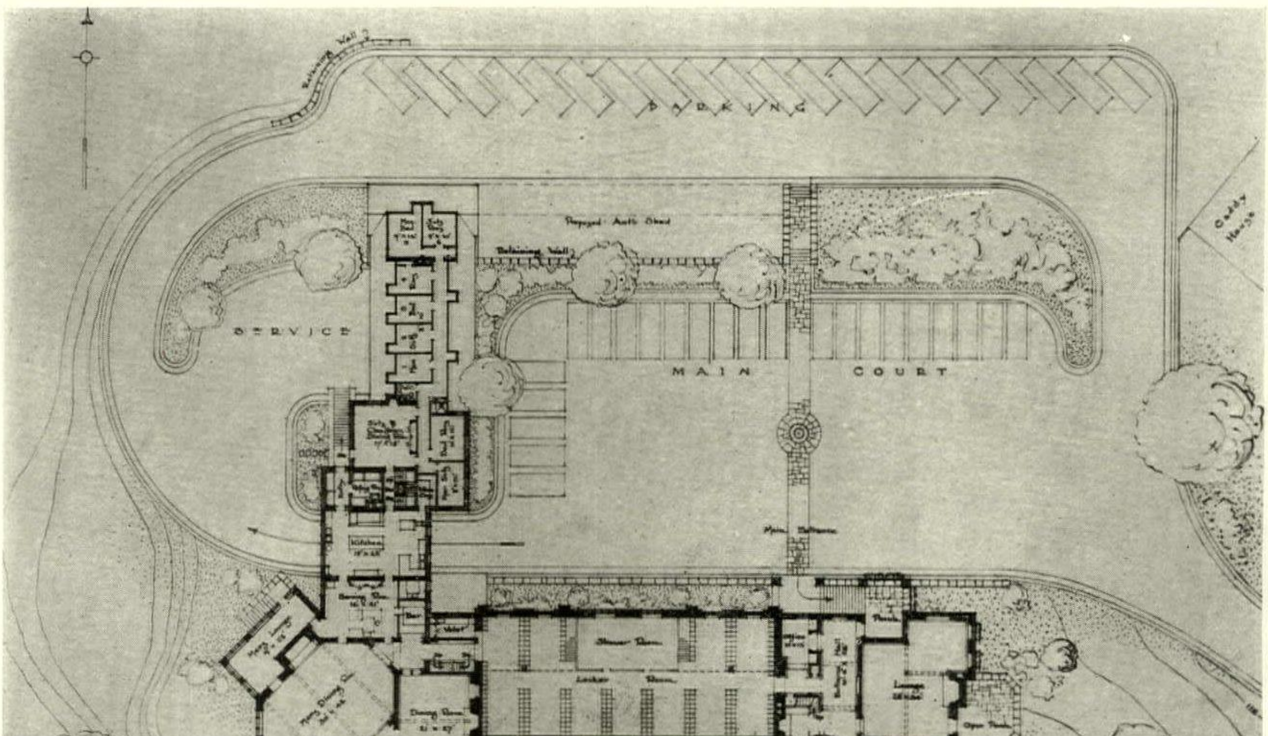
FROM PENCIL DRAWING BY
LOUIS C. ROSENBERG

FROM PENCIL DRAWING BY
LOUIS C. ROSENBERG



VIEW OF SOUTH FRONT OVERLOOKING GOLF COURSE
OAKLAND GOLF CLUB, BAYSIDE, NEW YORK
ROGER H. BULLARD, ARCHITECT

DISTANT EAST VIEW, SHOWING RELATION TO NATURAL GRADES



MAIN FLOOR PLAN

OAKLAND GOLF CLUB, BAYSIDE, NEW YORK

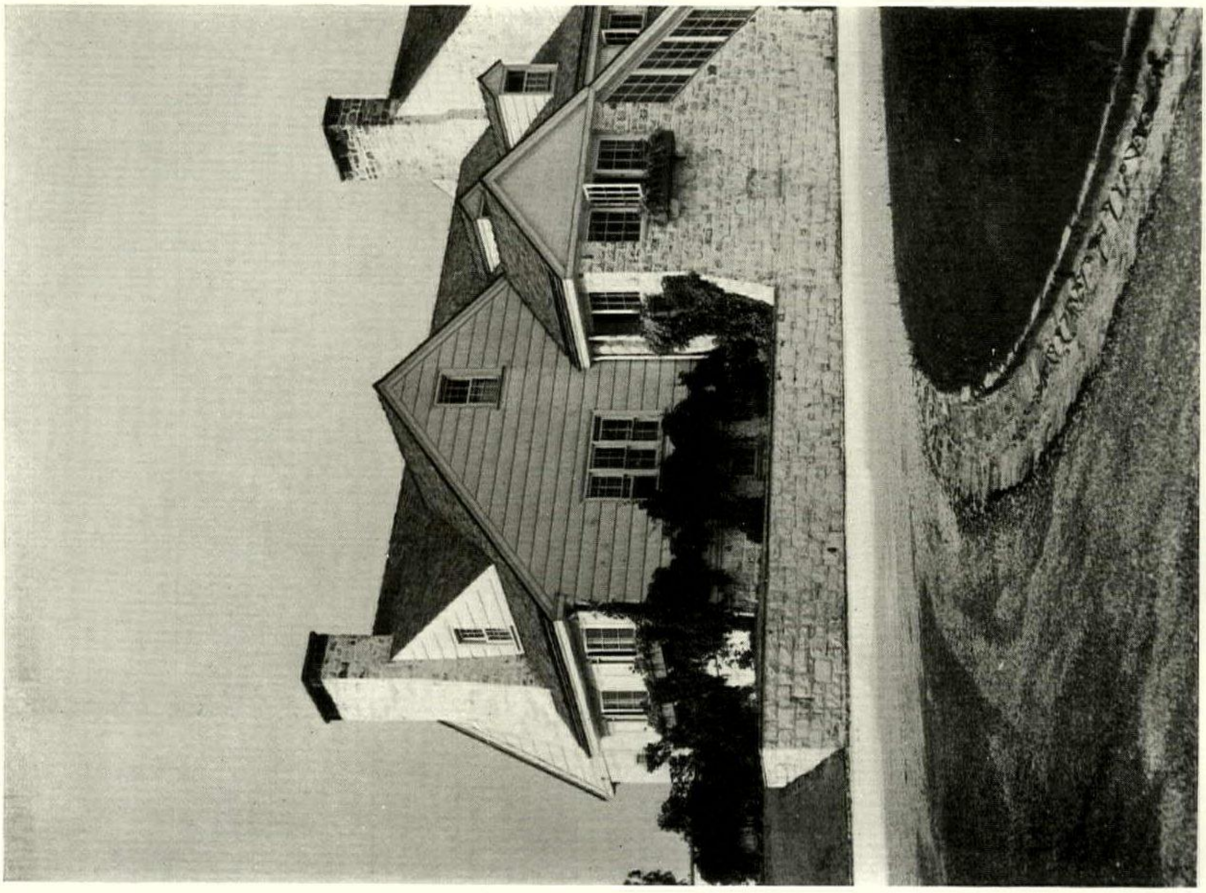
ROGER H. BULLARD, ARCHITECT

SERVICE WING AND UPPER PARKING LEVEL

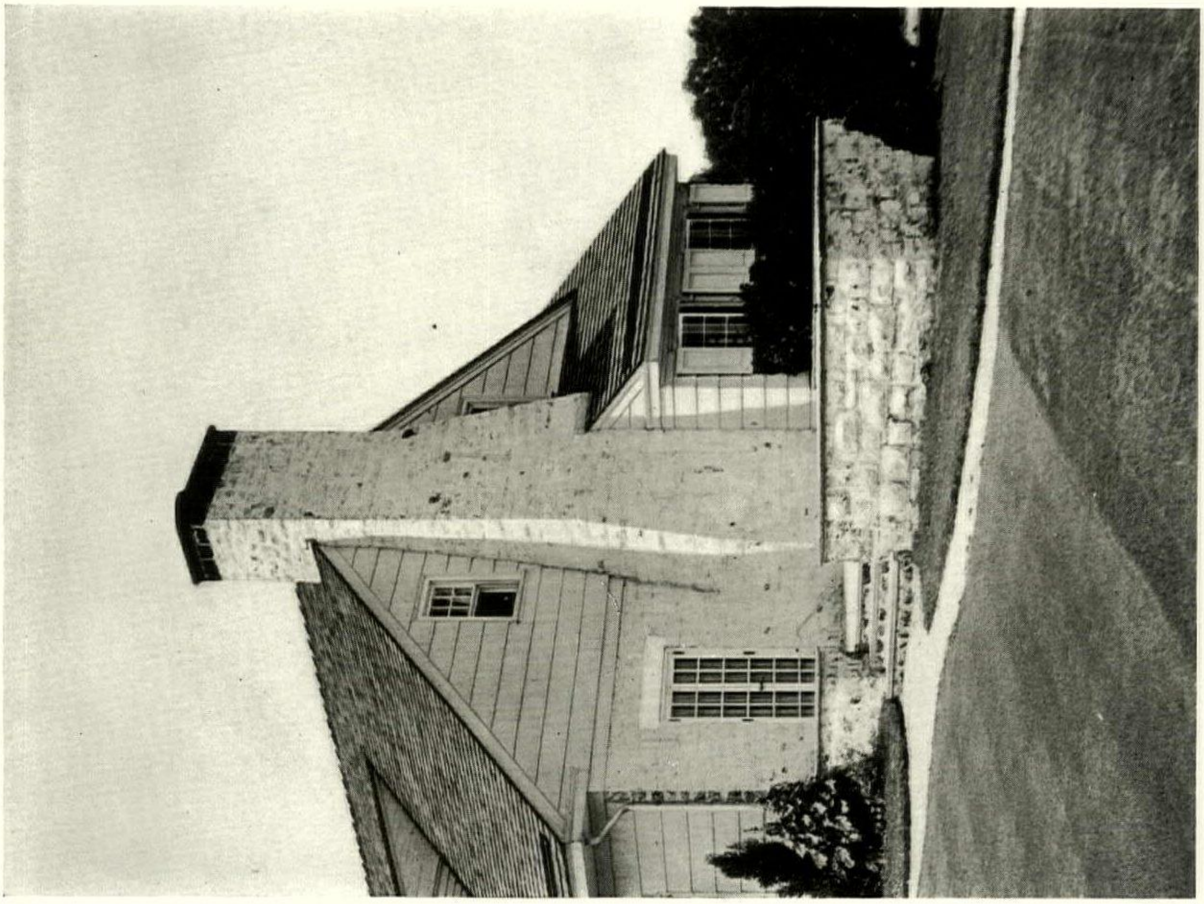
VIEW FROM NORTH, OVERLOOKING PARKING SPACE

OAKLAND GOLF CLUB, BAYSIDE, NEW YORK

ROGER H. BULLARD, ARCHITECT



LOUNGE WING FROM MAIN COURT



LOUNGE WING FROM THE COURSE

OAKLAND GOLF CLUB, BAYSIDE, NEW YORK

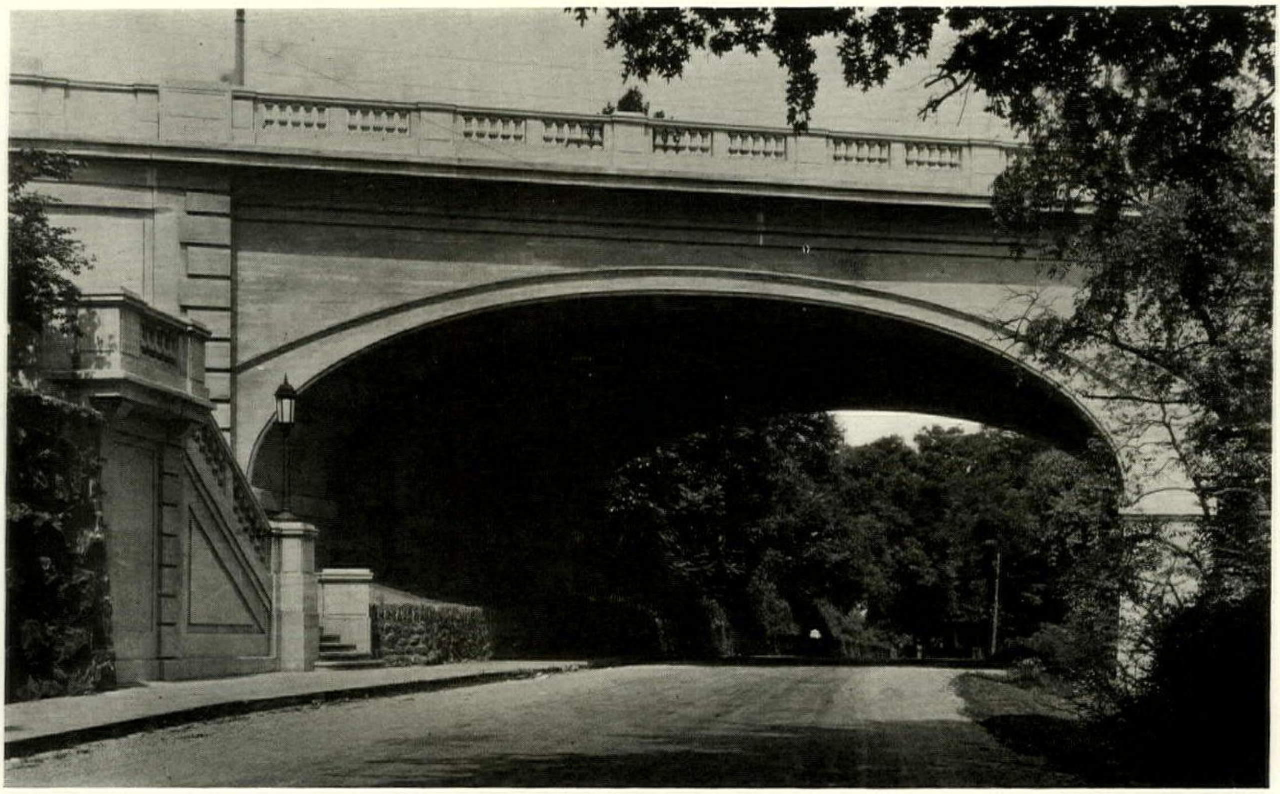
ROGER H. BULLARD, ARCHITECT

GENERAL VIEW OF LOUNGE

LOBBY AND STAIRS TO WOMEN'S LOCKERS

OAKLAND GOLF CLUB, BAYSIDE, NEW YORK

ROGER H. BULLARD, ARCHITECT

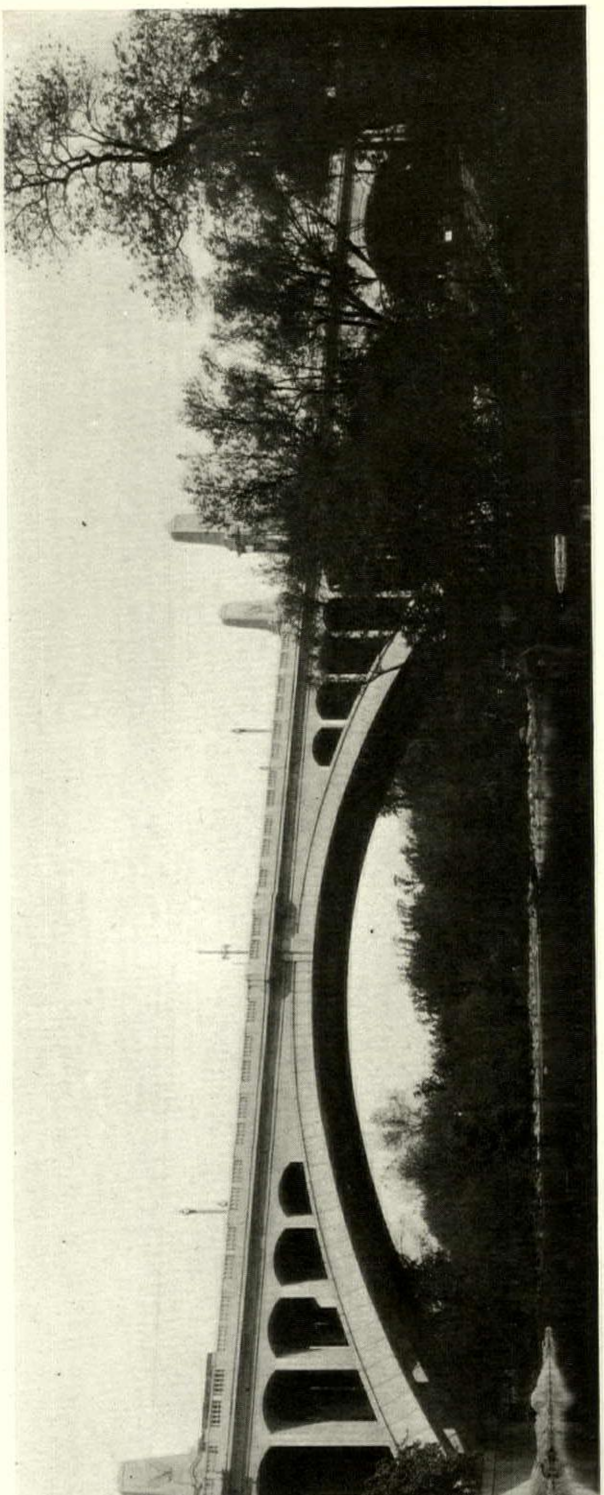


ELLIPTICAL ARCH OVER PARK DRIVE

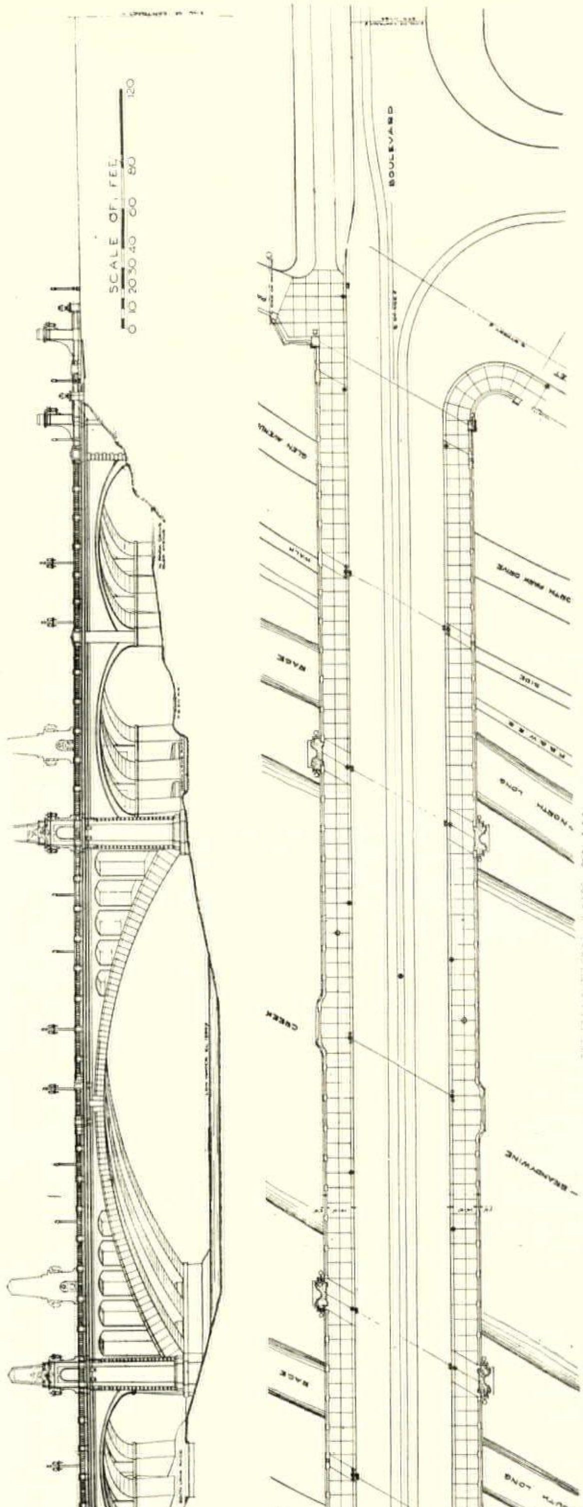
CENTRAL ARCH SPAN

WASHINGTON MEMORIAL BRIDGE, WILMINGTON, DEL.

VANCE W. TORBERT, ARCHITECT; BENJAMIN H. DAVIS, ENGINEER



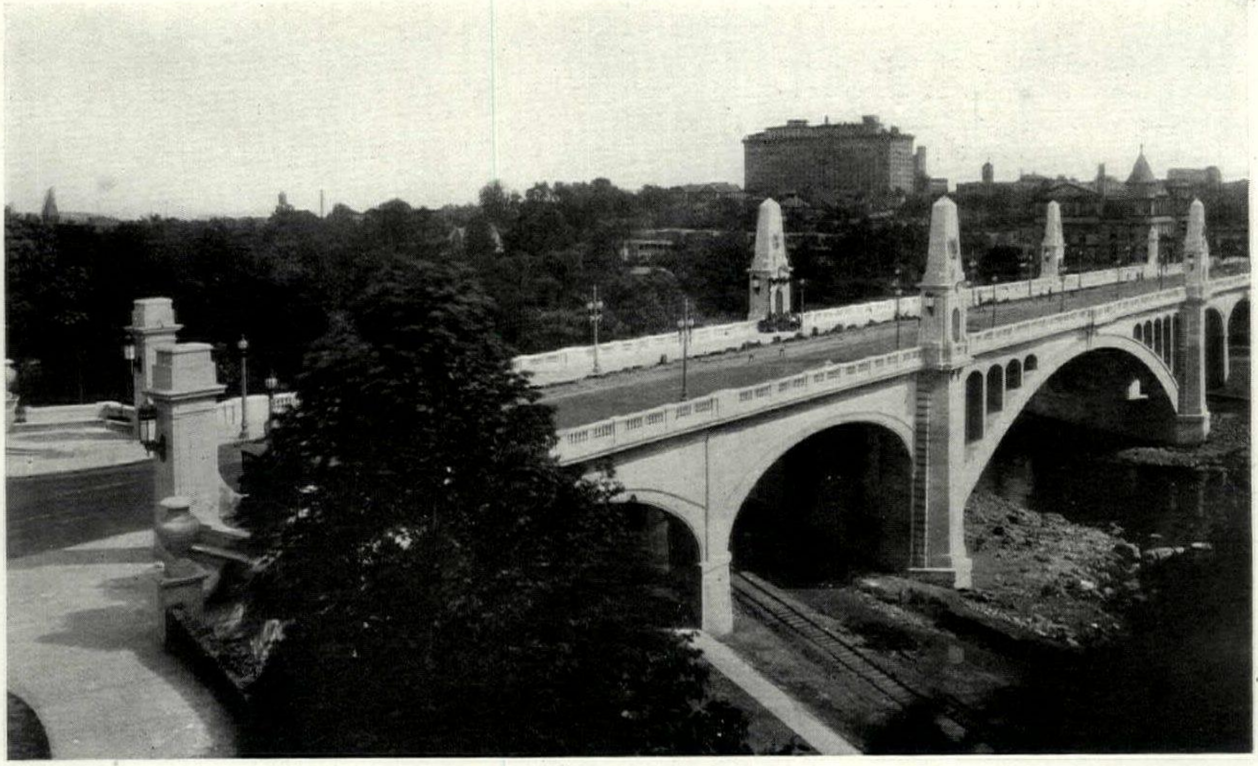
GENERAL VIEW OF RIVER SPAN



ELEVATION AND PLAN

WASHINGTON MEMORIAL BRIDGE, WILMINGTON, DEL.

VANCE W. TORBERT, ARCHITECT; BENJAMIN H. DAVIS, ENGINEER



Washington Memorial Bridge, Wilmington, Delaware

By VANCE W. TORBERT, *Architect*

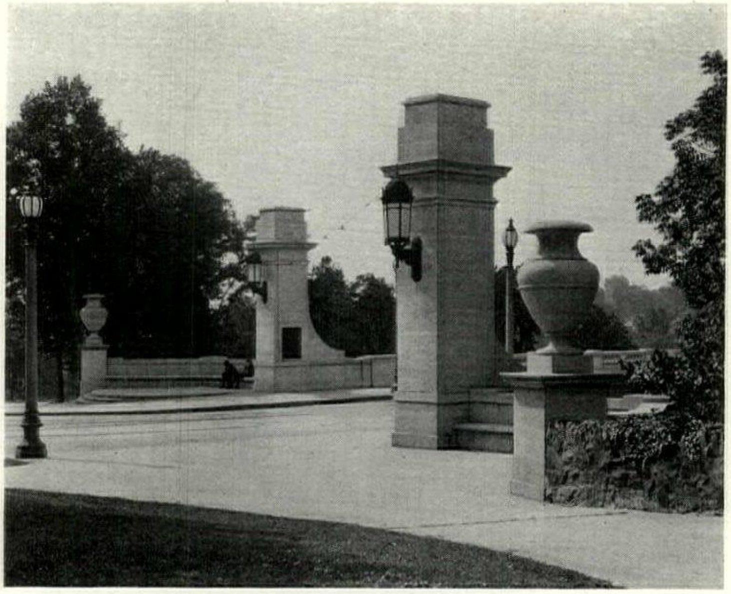
ON Decoration Day, May 30, 1922, a monumental structure, officially named the Washington Memorial Bridge, spanning the historic Brandywine creek and its valley in the city of Wilmington, Del., was formally dedicated as a war memorial. This bridge, in a locality that was the theater of stirring events during the war of the revolution and that is inseparably associated with the name of General Washington, not only commemorates the patriotism of the citizens of the state of Delaware in the revolution and subsequent wars, especially the World War, but also serves to carry the important traffic of the Washington boulevard.

The natural scenic beauty of the Brandywine creek and its bordering trees and shrubbery at this point led to the designers' conception of a great central arch of masonry as being the most appropriate solution of the problem. A large pool of water just below the site, already formed by a low dam across the rocky bed of the stream, would serve as a perfect reflecting basin for a bridge structure of monumental proportions. Thus, with a long span arch as the central or primary motif, numerous preliminary sketches were made with the secondary or approach arches in proper relation to the canals and park driveways on each side of the Brandywine, resulting in the final design, consisting of a segmental arch for the central span, symmetrically balanced on either side by two elliptical arch spans.

Detail of Bronze World War Memorial Tablet

The bridge is 720 feet long and 72 feet wide, and consists of the five arch spans of reinforced concrete, two of 70 feet, one of 250 feet, and two of 85 feet. Each span consists of three arch ribs, 11 feet, 16 feet, and 11 feet wide respectively and spaced 14 feet apart. The deck of the bridge consists of a 40-foot roadway, with two trolley tracks, two 16-foot sidewalks (including balustrades) and overhangs of 3 feet on each side. The piers of the bridge are on a 30-degree skew to avoid encroaching upon the canal and railroad property, and the large 250-foot arch of 40-foot rise is one of the longest low-rise skew-arch spans in the United States, if not in the world.

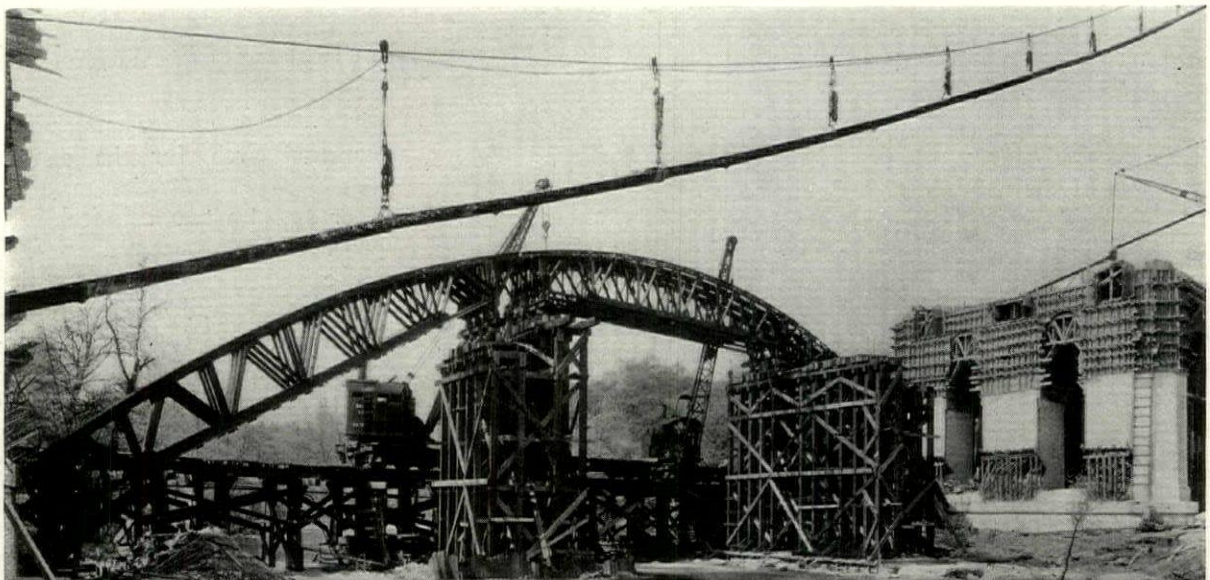
The massive piers that support the large span are triangular at the ends to harmonize with the skew arrangement, and the smaller piers are rhomboidal in section with the outer faces parallel to the bridge. All piers are of the same width as the arch ribs they support. The piers are in separate sections for each rib, the sections being independent for the short spans, but connected by curtain walls to give a more massive monolithic appearance for the channel piers. The spring lines of the large arch were placed at an elevation that would be a slight distance above the highest flood level recorded for the Brandywine at this crossing.



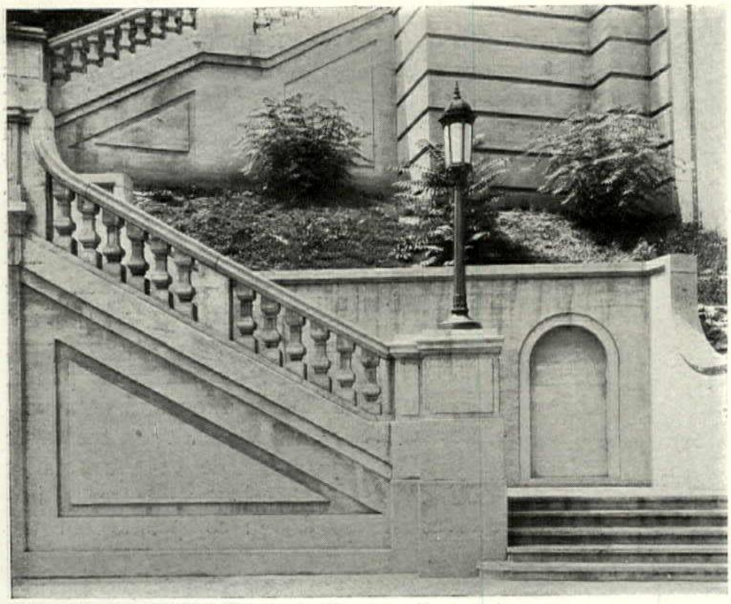
North Approach to Washington Memorial Bridge
Vance W. Torbert, Architect

The arch ribs for each of the 70-foot and 85-foot approach spans, of 15-foot and 18-foot rise respectively, were concreted in wooden forms supported by timber centering. For the large 250-foot arch of the channel span steel centering was used, as this was considered more adaptable for the construction and offering greater security for the support of the long span skew arches. Furthermore, one set of steel centers served successively for each of the three ribs by being lowered slightly and moved laterally into correct position, and the rock bottom of the shallow creek afforded excellent foundations for the two temporary wooden towers erected as intermediate supports for this centering. The steel truss centers were built with curved top chords to which were bolted wooden nailing strips of variable thickness to provide suitable bearing and support for the 4-inch tongue and groove lagging used to form the arch soffits.

The main arch ribs were poured in alternate blocks and keys, each completed in one continuous operation. On account of the structural jointings thus formed, the vertical faces of the arch rings were further subdivided into V-shaped joints as



Steel Centering for Arch Ribs of Central Span
Vance W. Torbert, Architect; Benjamin H. Davis, Engineer



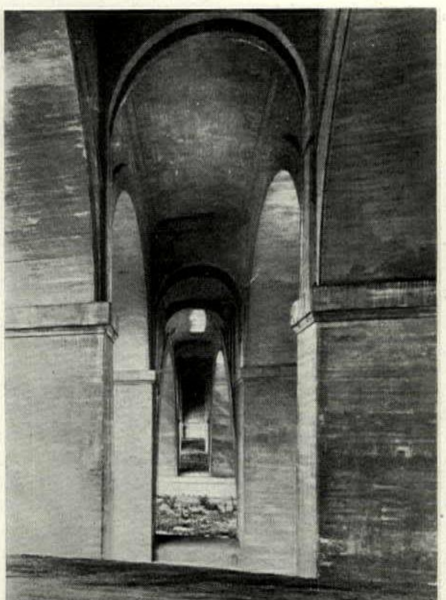
Detail of Steps Leading to South Drive, Washington Memorial Bridge, Wilmington, Del.

voussoirs of graduated width, and terminated at the crowns by projecting keys both inside and outside. This treatment, combined with the cove moulding formed at the extrados, contributes to the architectural effect and introduces appropriate scale.

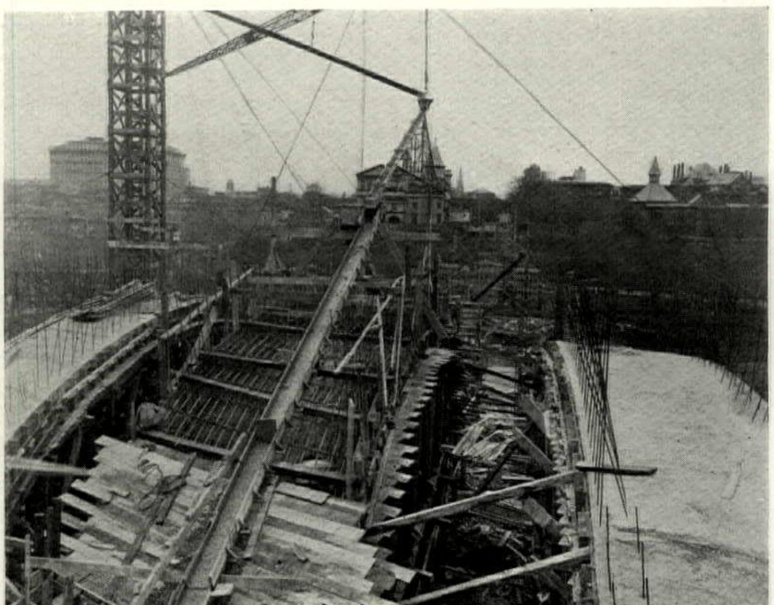
Expansion joints extending across the entire width of the bridge are located at all abutments, piers, and the third points of the large span. The floor slab at these joints was cut through free and clear and supported against bending by adjacent beams for the width of the roadway. The deck of the bridge and the backs of all retaining walls and abutments were waterproofed, and all expansion joints were flashed to prevent leakage to the underside of the structure. On the facades these expansion joints are effectively concealed from view by means of the panels in the abutment walls and the pilasters over the piers.

The three-arch rib construction permitted of a more pleasing treatment of the underside of the bridge by the elimination of the usual beam and girder construction and the use of a curved floor slab arched transversely between the ribs and continuous over the entire width of bridge. Jack arches conceal the expansion joints and serve to relieve the effect in the longitudinal direction. Over each of the arch ribs and immediately under the floor slab there is a continuous gallery, one of which is reserved for high tension electrical conduits, the second for low tension conduits, and the third for gas and water mains. A manhole cover over each gallery near the center of the bridge gives access. Each gallery is ventilated by the provision of small inlet openings between the jack arches at the piers and outlets through gratings at the bottom of the niches on the outsides of the large pylons and at the ends of the bridge in the form of 12-inch pipes carried to and up the small pylons.

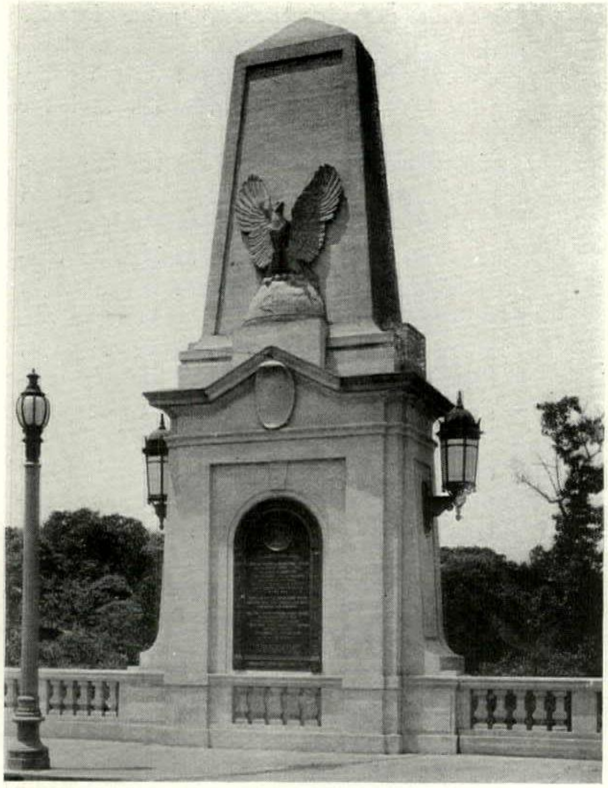
Four large monumental pylons surmount the massive center piers and constitute the main architectural features above the sidewalk level and, furthermore, definitely establish the limits of the long span primary motif and emphasize the monumental character of the whole structure. On these pylons, which are 40 feet in height, the distinctly memorial features are embodied in four ornamental bronze



View Beneath Bridge Between Arch Ribs Showing Jack Arches



Construction View Showing Wood Centering and Reinforcing of Approach Arches



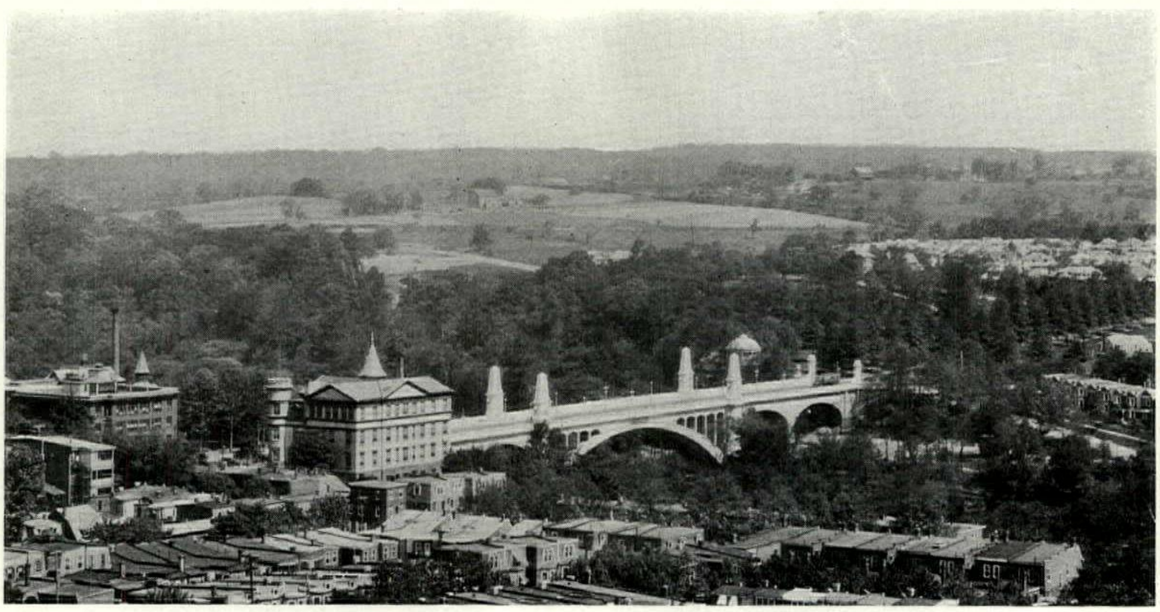
Detail of Monumental Pylon from Roadway, Washington Memorial Bridge

tablets, 9 feet high and 5 feet wide, placed on the inside faces in arched recesses where they can be viewed from both the sidewalks and roadway. The first two of the large tablets commemorate all of the wars of the nation, and the last two tablets commemorate the World War, one having the names of the great battles in which Delaware troops fought, and the other bearing the names of all those service men from the entire state of Delaware who made the supreme sacrifice. On the outer faces of these pylons the arched recesses are repeated in the form of niches which give balance to the design and interesting tones of light and shade in harmonious relation to the arch spans. On both the inside and outside at the cornice pediment is placed a carved shield bearing an ancient warrior's helmet in low relief, and on the obelisk portion above are large carved eagles mounted on spheres of emblematical form and representing that portion of the world where are located the principal nations which were engaged in the conflict of the World War.

Smaller pylons, of harmonious design, command the bridge portals and support bronze name plates, 3 by 4 feet, with official information and data pertaining to the bridge. On each side of the large pylons and on the approach side of the smaller pylons are ornamental bronze bracket lanterns, important features of the design composition of the bridge.

The exposed surfaces of the arch ribs, piers, abutments and spandrel walls are of plain concrete finish, carborundum rubbed. The pylons and balustrades are faced with light granite composite, about 2 inches thick, with a bush-hammered finish. The balusters and top railing of the balustrades, the eagles and spheres, shields, urns and cap stones for the small pylons were pre-cast because of the better execution of the architectural details obtainable than was considered possible with these features being cast in place.

The bridge was designed by and built under the supervision of Vance W. Torbert, architect, of New York, and Benjamin H. Davis, engineer. Alfred I. du Pont was chairman of the Washington Street Bridge Commission, and Frederick W. Carpenter was its local executive officer and consulting engineer. The construction of the bridge was financed by a county bond issue, authorized by state act, and the cost of the bridge was about $800,000.



Distant View of Washington Memorial Bridge, Wilmington, Del.
Vance W. Torbert, Architect; Benjamin H. Davis, Engineer

The Development of Charleston Architecture

PART II. CIVIC BUILDINGS

By SAMUEL LAPHAM, JR., AND ALBERT SIMONS

WHEN we turn to the bibliography of the architecture of the days of the colonies and the early republic, it is surprising to note how much greater a percentage of attention is paid to domestic than to civic architecture. Of course it is the first impulse to turn to that which is the most intimate and can be applied with the least change to the architectural requirements of clients of today, but, from the standpoint of architectural history, the records of the civic and ecclesiastical architecture of that time are ignored for those dealing with domestic architecture. It is true that the largest and most historic civic buildings, such as Faneuil Hall, Boston, and Independence Hall, Philadelphia, maintain their ground, but the minor public structures are rarely given their just due in the many monographs issued.

Nevertheless, it should be remembered that in these minor civic or semi-civic buildings there are records of immense importance; records of the tastes and inclinations of a community as a whole; records that should be studied as representative of the true group-reaction toward any architectural movement. An individual, although influenced by the prevailing fashion of the time, could and did put his own individuality into his house, if he so desired. When it came to community action, however, no person could solely impose his taste on a building, because he was no longer the only one to pass on the project. Therefore, the minor public buildings represent what the community (or at least the guiding spirits of the community) thought was appropriate in the matter of the architectural expression that a building, designed for a certain definite use, should have in order to fulfill its purpose. It is to buildings of this type that we must turn to find what a community thought was proper to represent them, their societies or their functions of government to the outside world. More than this, we learn also of the more creative side of the architects of those days—of how they solved their problems of design when faced with new conditions requiring larger vision and greater skill. We know what they accomplished in the domestic field, as it is on that work that their fame so securely rests. Here is another field in which to determine their ability and genius. And it will be by this civic architecture, in conjunction with ecclesiastical architecture, that our civilization will be judged in the future, for domestic architecture is the quickest to change and the first to fall by the action of time. Nine-tenths of our records of the architecture of past civilizations are of civic or sacred buildings. They are the most protected against change by the idea of sovereignty or sanctity that surrounds them—and so it will be with both our forefathers' and our own work, when future ages come to judge it centuries hence.

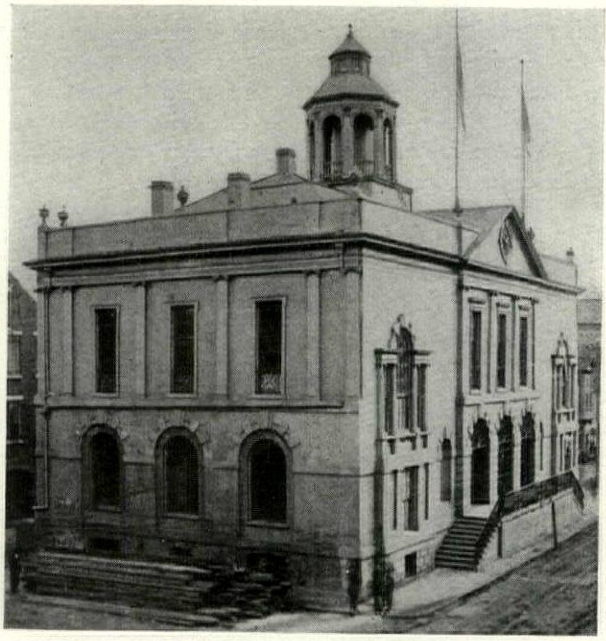
With these facts in mind, if we turn to Charleston as one of the earliest seats of colonial civilization of this country, we will find a sequence of civic buildings extending from 1767 to 1860. These survivors of fire and disasters have an architectural history which, independent of the political history that took place around and within them, has its own significance and its own important place in the ultimate development of our national architecture. In this article we can record but briefly a few buildings and state a few salient facts as seen by us, but trust that it will show how much ground still lies open for further close study of our heritage from the past.

The oldest of the purely civic buildings of Charleston is the Exchange Building or Custom House, commenced in 1767 and occupied in 1771. It is, as can be seen by the illustration, as pure an example of the English renaissance type as can be found in any of the colonies. For a pre-revolutionary building, we have the most plentiful documentary detail concerning it that one could desire. In the files of the *South Carolina Gazette* for 1767 can be found notices of the bill of appropriation for the building being read in the Commons Assembly on April 13, of the opening of bids on October 6, and of the awarding of the contract on December 1. There are also preserved the articles of agreement —which are practically detailed specifications for the building—between the commissioners for the province and the contractors, dated March 14, 1768, and the receipt of the contractors for the final payment, made January 4, 1772.

Messrs. Peter and John Horlbeck were the combined contractors and architects for the Exchange, as in those days the services of the two callings were generally combined. They appear to have been very thorough in their work, one going to England to personally select the proper materials and shipping them in a specially chartered vessel to his brother in Charleston. The whole construction seems to have been carried out with infinite care and with every endeavor to have everything of the best quality and workmanship.

While the Exchange, as it stands today, is just as it was built, it has suffered some curtailments of its original form. Although erected on the water front, the reclamation of land during a century and a half has placed it gradually nearly 500 feet inland. A narrow street on its front or eastern elevation has caused the sacrifice of a stone portico that rose almost from the water's edge, thus ruining the appearance of the main facade. This loss, combined with the growth of the warehouses around the building, has practically reversed it and made the west front, originally designed as the secondary facade, into the chief elevation. Other losses have been the parapet, ornamented with classic urns, and the cupola that surmounted the entire composition.

The history of the cupola is of interest. Old prints of the building in 1780 show a square cupola with pilasters at each corner and a segmentary domed roof, surmounted by a Latin cross. We do not know if a storm destroyed this, but the records of the Collector of the Port in 1817 say that "the cupola has been taken down many years since." In 1833 the government made arrangements with Charles Frasier, the miniature painter, to design a new cupola, which was erected in 1835. This, in turn, was damaged so badly by the earthquake of 1886 that it had to be removed and has never been replaced. We are fortunate in being able to reproduce an old photograph of the building, found in the collection of W. M. Aiken, Supervising Architect of the Treasury from 1894 to 1897. This is taken from the northwest and shows the Frasier cupola, the parapet and the urns, all of which have disappeared today, the roof now rising directly from the cornice. With regard to the rest of the building, however, it is the same at present as is shown in the photographic illustration herewith.



Exchange Building or Custom House (1767)
Cupola by Frasier (1835)
See Measured Drawing on Page 300

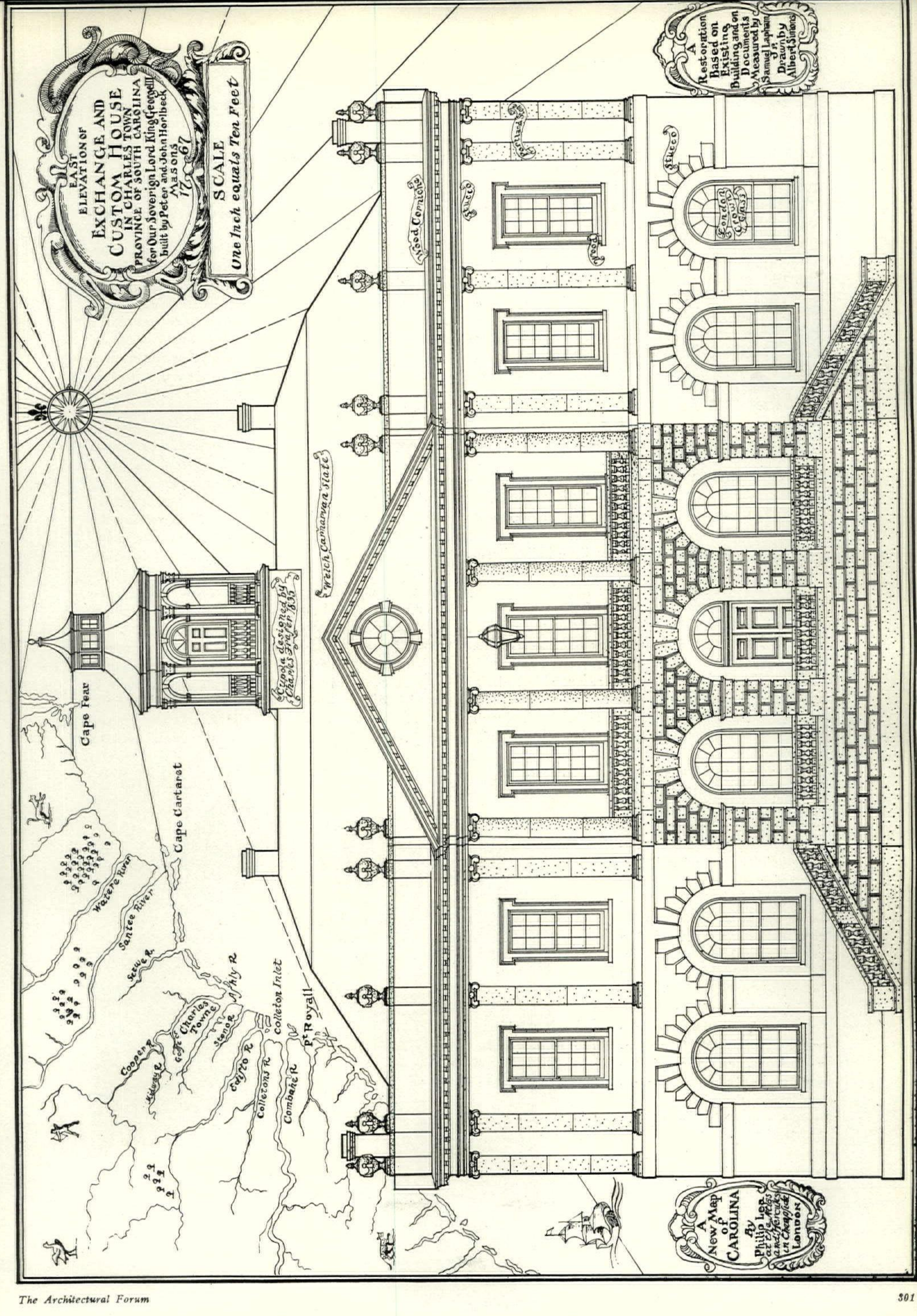
In 1913 the government conveyed the building to the Daughters of the American Revolution and the State of South Carolina as joint owners, to be preserved as a historic memorial, and as such it may be regarded as safely preserved for future generations.

Probably the first public building of any size erected in the city after the revolution was the County Court House, built on the site of the old State House, which was destroyed by fire in 1788. In Frasier's "Reminiscences of Charleston," published in 1854, and giving the author's recollections of the city as far back as 1791, are found these remarks on the court house: "The present state house was built on the foundations of the old and differed but little from it in its interior arrangement, retaining the old walls and doorways. It was originally a two-story building. I have always heard that the plan of the new building was furnished by Judge William Drayton, father of the late Col. William Drayton. But without knowing whether it was superior to the former one except by the addition of the attic, I have always thought it one of the best proportioned buildings in Charleston."

The original entrance to the building was on the wide side, which explains the reason for the projecting bay with the four engaged columns on that side. This is the earliest appearance in the city of a colossal order extending through two stories. The slender proportions of the columns and the use of the wall arcade below are characteristic of the Adam style. Outside of these features the building is, in general, an enlarged adaptation of the domestic type of the period with its quoins, belt course and pediment supported on consoles. These features appeared as early as 1762 in the Motte residence in Charleston. The applied ornamentation around the eastern doorway, with its orders, its broken pediment and inserted pedestal, is a change of unknown date. Prints exist showing both a plain entrance to match those on the south and an entrance that had an unbroken pediment carried on columns.

The City Hall was designed by Gabriel Manigault in 1801 for the United States Bank and was later purchased by the City of Charleston for its seat of government. The very attenuated proportions of the marble pilasters and engaged columns, the slight projection of the cornice of the south facade and the semi-circular bay at the rear mark a further tendency toward Adam design. This is one of the few buildings in the city where stonework was used on the main facade in place of the generally adopted imitation of stucco on brickwork. Gabriel Manigault, the architect for the building, is one of the first local architects that we know by name. He appears to have devoted himself to the designing of buildings rather than to their construction, thus being more the professional architect of today than the architect-builder of the colonies. He had a flourishing practice at this time, as several large residences and also the hall of the South Carolina Society, to which we will shortly refer, were designed by him.

The plans of these last two buildings are of little value as giving information in regard to the relationships originally existing between their component parts. Both the city hall and the court house,


EAST ELEVATION OF EXCHANGE AND CUSTOM HOUSE IN CHARLES TOWN PROVINCE OF SOUTH CAROLINA for Our Soverign Lord King George III built by Peter and John Horlbeck Masons 1767
SCALE One Inch equals Ten Feet
A Restoration Based on Existing Building and on Documents Measured by Samuel Lapham Jr. Drawn by Albert Simons
A New Map of CAROLINA By Philip Lea at the Atlas and Hercules in Cheapside LONDON
Cupola designed by Charles Fraser 1830
Welch Carnarvan Slate
Wood Cornice
Stucco
Portland Stone
Lead
London Crown Glass
Cape Fear
Cape Carteret
Wateree River
Santee River
Sewee R
Ashly R
Colleton Inlet
Pt Royall
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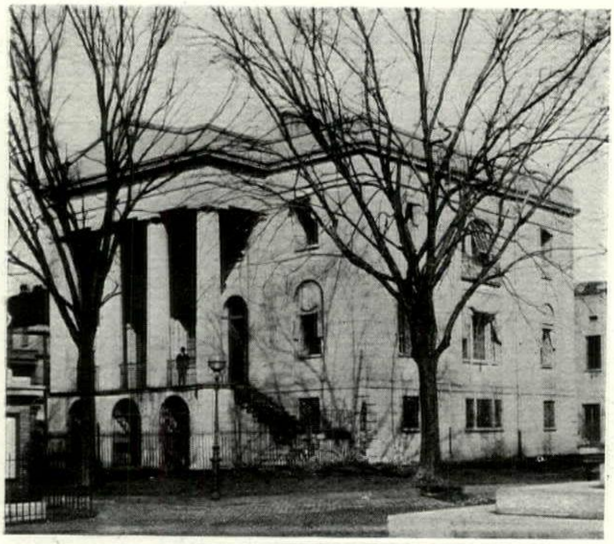
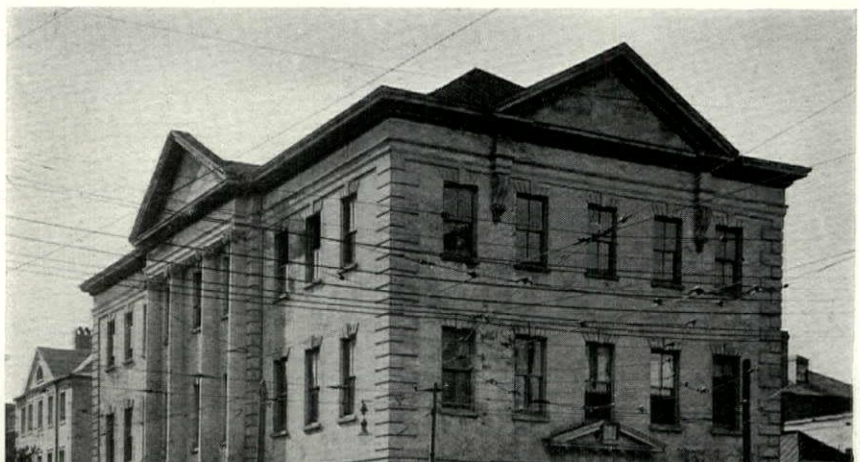


Charleston County Records Building (1822)
Robert Mills, Architect

while in general unchanged externally since erection, have been so remodeled and rearranged internally to meet different uses and requirements that they retain only the most primary divisions of the original schemes and give but little indication of their character.

The oldest of the semi-public buildings existing today in Charleston is the home of the South Carolina Society, built in 1804. The society was founded in 1737 as a charitable organization, but soon became a social club as well, in which membership was eagerly sought. It was therefore able to build a hall for its own use, capable of taking care of its large meetings and banquets. Gabriel Manigault, mentioned in connection with the city hall, was also the architect for the South Carolina hall and successfully interpreted the character that would be desired by such a society. The entrance portico extends over the sidewalk—those being the good old days when city street lines were by no means sacred—thus sheltering the stairs leading to the high main floor. This gives a very happy effect, the stairs being monumental enough to serve their public function, yet retaining their private character through the shelter of the projecting portico. The stuccoed Doric columns of the entrance, although rather attenuated as their height has to include the high base as well as the first floor, aid the monumental air and blend with the severe lines of the body of the building. The wooden Ionic columns and cornice of the wide second story piazza counteract the extreme severity and bring the whole composition back from cold public formality into the intimate atmosphere of personal relationship and social intercourse. The detail of the interior is especially charming. The mantel-pieces, door and window frames display the scheme of Adam decoration at its very best.

By the beginning of the third decade of the nineteenth century the classic revival in its Roman phase, with the Greek phase closely following it, had spread throughout the country. In the County Record Building (1822), by Robert Mills, we find a treatment of proportions that resembles a modified Greek Doric type. As Mills was an engineer as well as an architect, all his structures have a certain feeling of having been reduced to the fundamentals with the inclusion of as few secondary members and decorative motives as possible. The Baltimore Washington Memorial, the Bunker Hill Monument, and the Washington Monument, all from his hand, are essentially structural designs only, and even his work in later life smacks of the same character. In the building under consideration, Mills outdid the Greek Doric and the Tuscan orders in simplicity. His mouldings are reduced to the fewest possible, and those have profiles of the most elemental character. This building will well repay study. The utter bareness and simplicity of each part are amazing, but it is equally amazing to find that, to the casual glance, the building displays no appearance of bareness, but instead, a most satisfying appearance of completeness coupled with proportion. It may be said to be one of the first, if not the first, fireproof structures in the country. As the depository for the county records, it was Mills' aim to



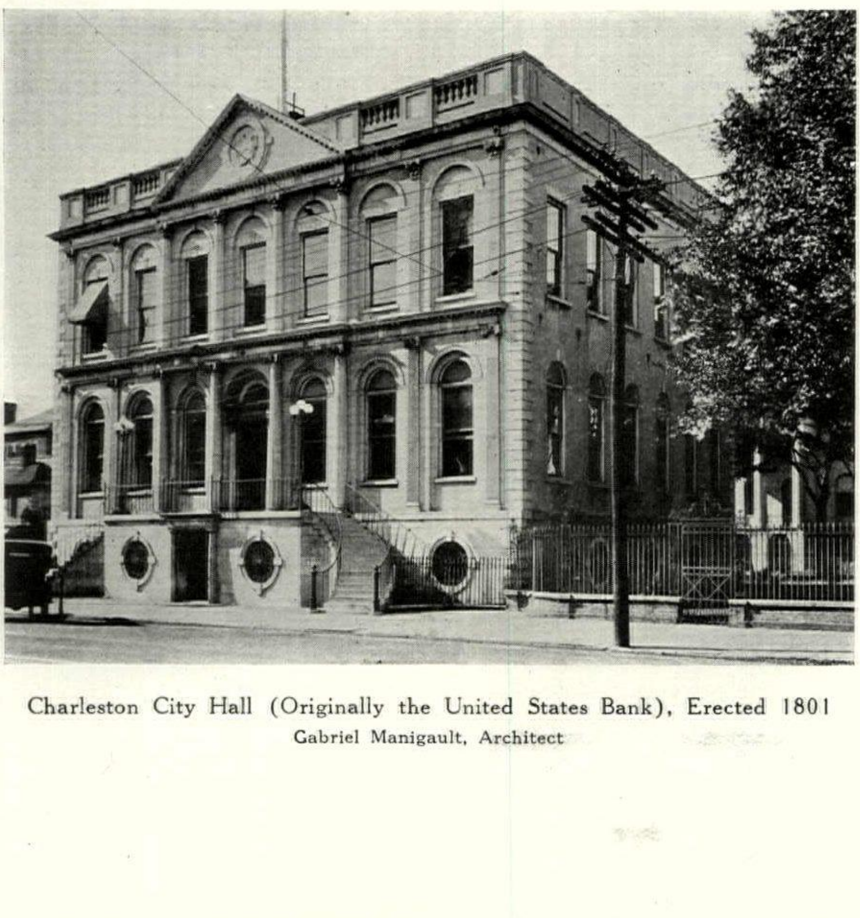
Charleston County Court House
Erected Between 1788 and 1800

make it fireproof, and from the time of its erection to the present day it has never been referred to locally save by the name of "the fireproof building," thus showing the deep impression that was created at the time of its construction. It certainly was as fireproof as it could be made with the materials at the disposal of the architect in those days. Not only the exterior walls but the inner partition walls were of brick for their full heights. The floors, therefore, could be carried on vaults of brickwork, thus obviating joist construction entirely. All openings have stone lintels or are made with circular heads in order to have a brick arch to carry the superimposed load; the floors are paved with stone slabs, carried by the brick vaults, and an interior flight of stone steps leads from the basement to the second story within a well of brickwork. A monograph could easily be devoted to this building, both in regard to its structural and its æsthetic design.

South Carolina Hall, Charleston (1804)
Gabriel Manigault, Architect

The College of Charleston can trace its history as far back as 1770, and as the college has occupied the same site for 150 years it is no surprise to find on its campus work that dates from every period of our architectural history. The main block of the college is a composite building, formed by the needs of a century and a half. The foundations, almost 3 feet thick, are the sole remains of two revolutionary barracks buildings that were utilized for college purposes in 1790. By 1825 these were in need of enlargement and repair, and we find the citizens subscribing to a fund for the erection of a central building. In the minutes of the board of trustees, for July 26, 1826 is the notation that the building committee be authorized to contract for a central building as soon as $10,000 were on hand, "agreeable to a plan to be obtained from a regular architect." In August of the same year, the secretary is instructed "to apply to Mr. Strickland of Philadelphia for a plan for a college building." In November, 1827, the contract for construction was given to Mr. Wm. Bell; the cornerstone being laid with Masonic ceremony on January 12, 1828. In the Charleston Library is preserved a pamphlet containing the address made on this occasion and a cut of the building, showing that the present portico was not included in Strickland's original scheme. Mr. Bell's final and total bill of construction, including extras, is recorded in the minutes of May 31, 1830 as amounting to $13,222.40.

In 1846 more room was needed, and we also find a committee recommending the addition of a portico on the south front. At that time Col. E. B. White was in Charleston as superintendent of construction for the new Custom House. He seems to have been able to combine a private practice with his official occupation and his army duties as he is known to have been the architect for the office of Judge Pettigru in St. Michael's alley and also, on May 4, 1850, we find him appointed by the trustees as architect for the new college buildings. These consisted of outer wings to the main building of 1828, presumably the portico to it and the combination entrance gateway and janitor's lodge. This gateway is a product of the high noon of classicism and could serve in any textbook of the orders as a copy plate for the Tuscan



Charleston City Hall (Originally the United States Bank), Erected 1801
Gabriel Manigault, Architect

College of Charleston, Charleston, S. C.
Central portion erected in 1828; extreme right and left wings and portico erected in 1850

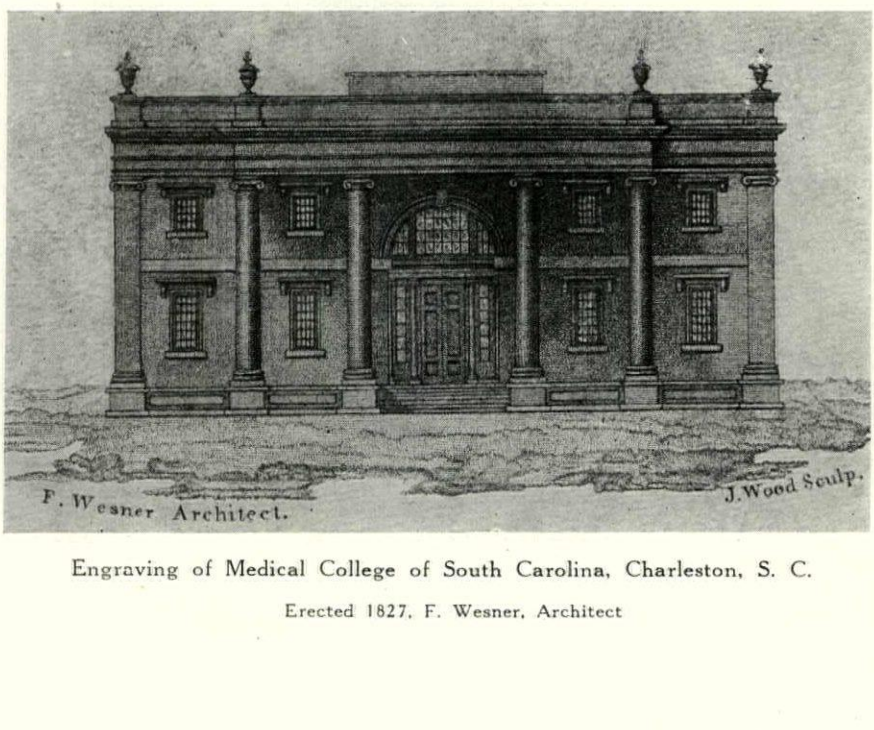
order. It was built certainly prior to 1852, as the minutes of October 18 of that year contain regulations governing the janitor occupying the lodge. Both wings erected by Col. White fell in the earthquake of 1886, but were restored on the same lines, the east in 1888 and the west in 1895.

Entrance Gateway, College of Charleston, Charleston, S. C.
Erected before 1852

The small College Library on the west of the campus was built in 1855. In the minutes we find ourselves in a most modern atmosphere of architectural practice, which seems quite out of place with the date. Three architects submit plans, the board selects one, then reverses itself and elects one of the rejected competitors. The bids run high; the committee wishes to build for $8,000; one contractor cuts his bid to $9,000 and is given the job. He, in turn, goes bankrupt and the whole matter is taken to the courts for settlement. We also come across our first record of an architect's pay as we find Mr. G. C. Walker's bill for architectural services in the minutes, the same being 5 per cent on the total $9,000.

The collection of pamphlets that gives us the cut of Strickland's building for the College of Charleston also furnishes one of the Medical College building, erected in 1827. The cut gives the name of F. Wesner as architect, and he certainly deserves credit for a most tasteful little structure. Today, with its portico destroyed and the building itself but a shell, we prefer to give a reproduction of this old cut rather than one of a decaying structure that will soon disappear.

In the Hibernian Hall, (1840), we have the first semi-public building of the pure Greek type to appear in the city. Among the churches however, Mills' First Baptist Church (1822) shows Greek proportions, although Roman in detail, and the synagogue of 1840 is Greek Doric. The first move of the Hibernians towards having a hall was made in 1828, but the society immediately divided itself into two camps—those wishing a hotel and those desiring a hall. The two parties fought tooth and nail for ten years, and it was not until 1838 that the hotel faction yielded and the building committee was definitely authorized to build a hall. What the poor architects suffered during this decade can best be realized by those who know the profession from the inside. We find "T. W. Walker, architect, of Philadelphia" submitting plans for a combination hotel and hall in



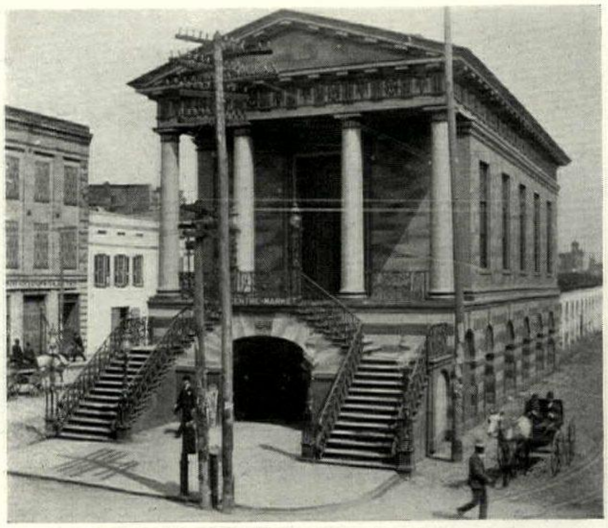
Engraving of Medical College of South Carolina, Charleston, S. C.
Erected 1827, F. Wesner, Architect

1833; in 1834 he submitted two other plans, and there were various plans from other architects; in 1835 the committee reports that they had advertised for plans in New York, Baltimore, Washington, Boston and Philadelphia, had received estimates and awarded premiums, but there is no mention of a selected architect. The cornerstone names no architect, although the stonecutter, the carpenter and the bricklayer are recorded there. The committee doubtless thought any mention of the architect unnecessary in view of their own knowledge, which they thus recorded in their report:

"The materials of architecture may be compared to words in phraseology having separately no power but which, linked together by ignorance may excite ridicule or disgust, or may be so arranged by skill as to affect the mind with the most thrilling sensations or sublime conceptions.

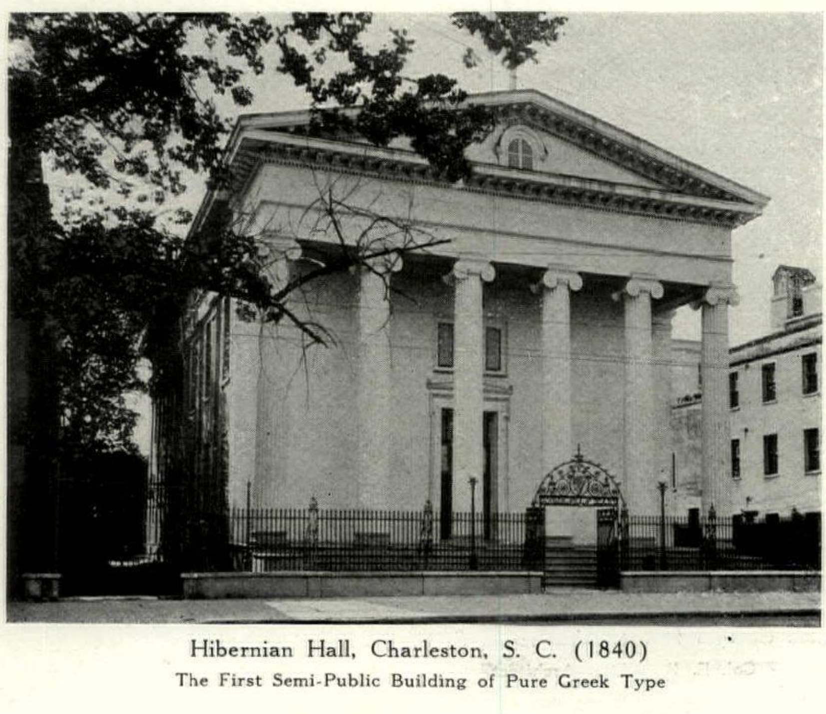
"Of this latter character we acknowledge the remains of those beautiful and venerable reliques which once adorned the temples of Attica and Italy; from one of which, the beautiful Ionic Temple, consecrated to the Muses, on the banks of the Ilisus, is your hall selected. In this selection your committee will not permit itself to doubt that they were but responding to the best feelings of the members of this Society and that a unanimous approval awaits their decision."

The "sublime conception" in this case consists of a colonnade of Greek Ionic columns, surmounted by a pediment. Internally, the building consists of a large hall on each floor with the necessary dressing rooms, committee rooms, etc. The entrance leads into a large stair hall, in the center of which an open rotunda extends to the roof. This is carried by the three Greek orders, very correctly superimposed, and crowned with a coffered dome. Fortunately for the peace of mind of the classicists on the committee, the second story is of such height as to allow the Ionic and the Corinthian orders to be superimposed without difficulty, although the circular balcony that the Corinthian columns rest on, cannot be reached in any way save through a trap door in the ceiling of one of the dressing rooms. As an interesting comparison with the prices of today, we find that the committee reported that the hall would cost $78,000 in stone and $48,000 in brick covered with cement, the building being 60 feet by 125 feet. As with almost all other work in the city, the brick type was chosen, but the actual final cost, according to the records, was close to $55,000.

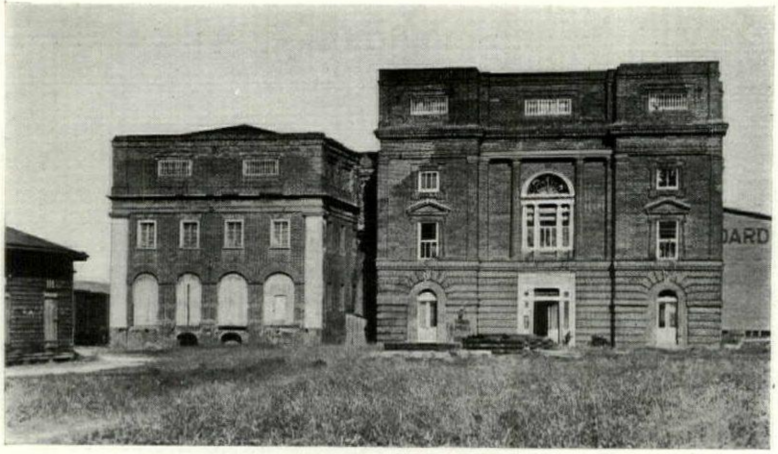


Market Hall, Charleston, S. C. (1841)

With the classic revival in favor for both civic and ecclesiastical buildings, we find that the Roman type had as many adherents as the Greek, and the field was equally divided between the two from 1840 to 1860. In 1841, the year of the dedication of the Hibernian Hall, we find in the Market Hall, above the market where the produce of the country was brought for sale, a pure Roman Doric temple on a high podium. This building is as good a copy plate for the Doric order as the lodge of the College of Charleston is for the Tuscan order. The metopes are filled with bulls' heads, rams' horns and wreaths, and even the neckings of the columns have the characteristic little rosette ornaments. Conforming to the other buildings, the Market Hall is of brick covered with stucco, but, on account of the completeness of its detail, it exhibits strikingly the skillful handling of the stucco and the careful modeling, simulating details originally designed for building with stonework.



Hibernian Hall, Charleston, S. C. (1840)
The First Semi-Public Building of Pure Greek Type



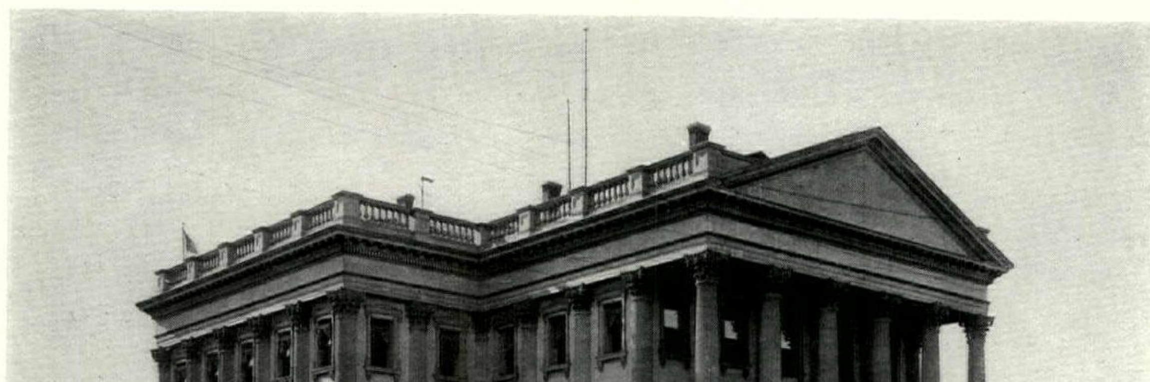
Bennett's Rice Mill, Charleston, S. C. (1844)

In Bennett's rice mill (1844) we see to what lengths the desire for classicism was carried, as here, in a purely industrial building, we have engaged orders, Palladian windows and details from the palaces of the Italian renaissance. Nevertheless, the unknown architect combined them to give a most striking composition and imparted to the building a most unusual air of distinction and individuality.

The Custom House (1850), by Col. E. B. White, whom we mentioned in connection with the College of Charleston, is the last of the public buildings in the period before the Civil War. Although patently of the type that, inspired by the national capitol, has produced so many state capitols and public buildings, it is beautifully executed and has detail and feeling enough to lift it out of the commonplace. Although originally planned to be crowned by a high dome and to have a portico at each cardinal point of the compass, through the intervention of war, only the east and west porticoes were built. Constructed of stone throughout, its Roman Corinthian porticoes dominate the water front as in some landscape after the manner of Claude-Lorrain and make it an architectural landmark worthy of the government that it represents.

In a sketch like this we have been able to examine only some of the chief civic and semi-civic buildings of the city, with hasty remarks to show the trend of influence and ideas that affected their material form and make them significant today as architectural documents of a period formative and historical.

Like each of the older cities on the Atlantic seaboard Charleston has its own architectural traditions and its own methods of using classical motifs and antique forms. From this glance into the past, it will be clearly evident that architecture in Charleston has been distinguished by dignity, by refinement and by a scholarly appreciation for correctness of form. In our present day quest for progress and modernity, which is altogether to be commended, let us not ignore the value of this great heritage, which is far more valuable than mere pedantry and more vital than mere sentiment; it is nothing less than the records of the ideals of a people.



United States Custom House, Charleston, S. C. (1850)
Col. E. B. White, Architect

Analyzing the Last Three Years of Building Activity

By C. STANLEY TAYLOR

IN this article there is presented for the first time a detailed graphic analysis of the building boom of the last three years. Nineteen charts are used to illustrate data which should prove extremely interesting to architects for the purpose of measuring the relative activities in different offices.

This information will also be found of direct value in discussing with clients conditions affecting new building projects. The activity which has taken place in each of the seven important building types is clearly pictured for the past three years.

The sequel to this article will appear next month as a forecast of building activity for 1924, based on reports received from nearly 2,000 architects and classified geographically and by building types. The combined information afforded by these two articles will give an exact analysis of the building situation as it affects the individual building problem of the average client, and will help him to determine the feasibility of immediately undertaking the proposed project.—*The Editor.*

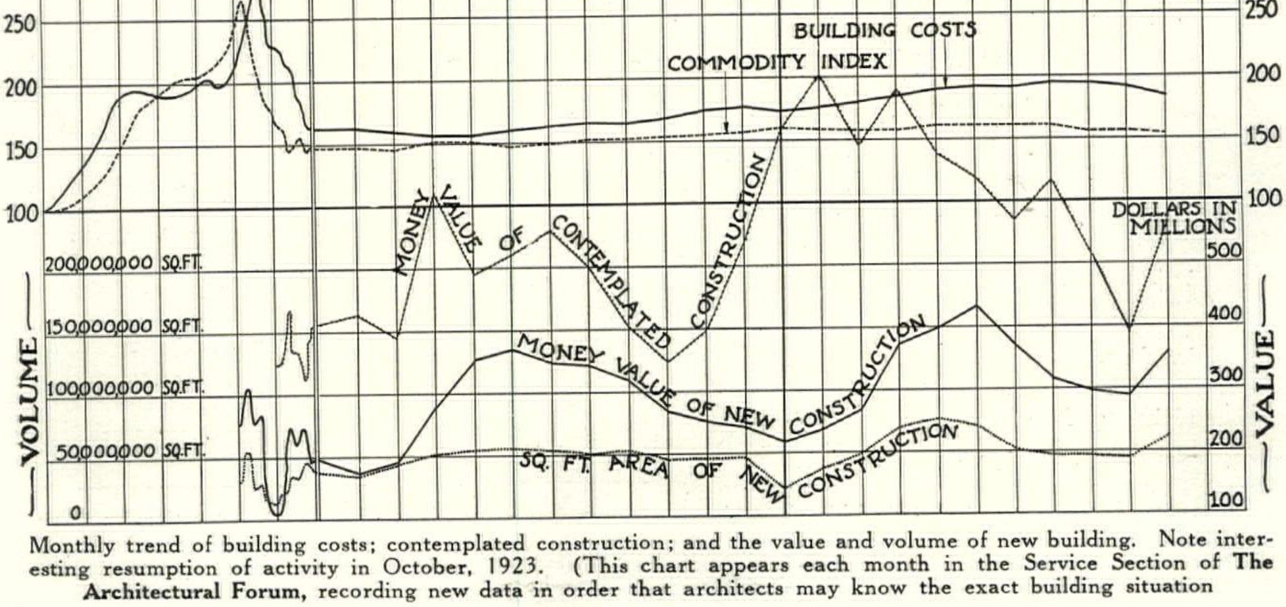
THE purpose of this article is to show clearly the part played by each of seven important building types in the unusual building activity of the years 1921, 1922 and 1923. It is also proposed to indicate the important basic factors which influenced and controlled building conditions during those years, so that the present building situation, as affecting anticipated activity for 1924, may be established against a clear background of facts.

In architectural circles, and generally throughout the construction industry, it is recognized that the last three years constitute the greatest period of building activity ever known in this country. Few individuals have either time or sufficient statistical data to thoroughly analyze new construction figures for this period, and as a result references must be somewhat vague in character and of little constructive value in discussions between the architect and his clients or when the architect is attempting to analyze his own business in relation to the unusual activity of the years in question.

In order to present this analysis in the clearest and quickest way we have selected the medium of graphic charts, 14 of which will be found in the color section immediately following this article. The 14 charts in question present an analysis of these seven building types, first as to the amount of money invested in new construction in each type, and, second, as to the physically measured volume of new construction in each. The types considered are:

1. *Residential Buildings,* including dwellings, apartments and hotels.
2. *Commercial Buildings,* including office buildings, banks, public garages, stores, and storage and warehouse buildings.
3. *Industrial Buildings,* including factories and power plants.
4. *School Buildings,* including structures of all types for schools, colleges and universities.
5. *Hospital and Institutional Buildings,* including sanatoriums and homes.
6. *Club and Recreational Buildings,* including fraternal buildings and auditoriums, theaters and welfare buildings.
7. *Church and Memorial Buildings,* including convents, monasteries, chapels and parish houses, covering all religious activities.

The graphic charts are arranged to indicate total monthly averages throughout the three-year period, and by the use of colored lines it has been possible



Monthly trend of building costs; contemplated construction; and the value and volume of new building. Note interesting resumption of activity in October, 1923. (This chart appears each month in the Service Section of **The Architectural Forum,** recording new data in order that architects may know the exact building situation to superimpose the years so that a quick comparison can be made for each month. The first series of charts indicates the amount of money invested each month in the various types of new building construction. At the left of the charts will be found a scale, given in millions of dollars so that each monthly figure may be easily read across. Similarly, in the second series of seven charts the information as to new construction is given in physical volume as measured by the number of square feet involved. At the left of these charts will be found a scale established in millions of square feet for the first four charts and in 100,000-square foot units for the last three charts, the scale having been raised for clearer indication in these building types which involve a volume too small to be shown properly on the 1,000,000-foot scale. With the exception just noted, these charts are subject to immediate graphic comparison, so that the relative activity in each building type is shown instantly.

Before taking up a detailed consideration of the 14 charts already described, it will be of interest to examine carefully the chart shown on the first page of this article which indicates the trend of several important factors in the building field during the three years. This is the chart which appears regularly each month in THE ARCHITECTURAL FORUM on the first page of the Service Section (yellow pages in the last section of the book). This chart shows the monthly variation of building costs as indicated by the line in the upper section. It also shows the variation of general commodity costs. In the lower section of the chart will be found

(a) the monthly averages of contemplated construction (which is the report of plans filed throughout the country);
(b) the money value of new construction (the total of contracts let);
(c) the volume of new construction (the square foot area represented by contracts let).

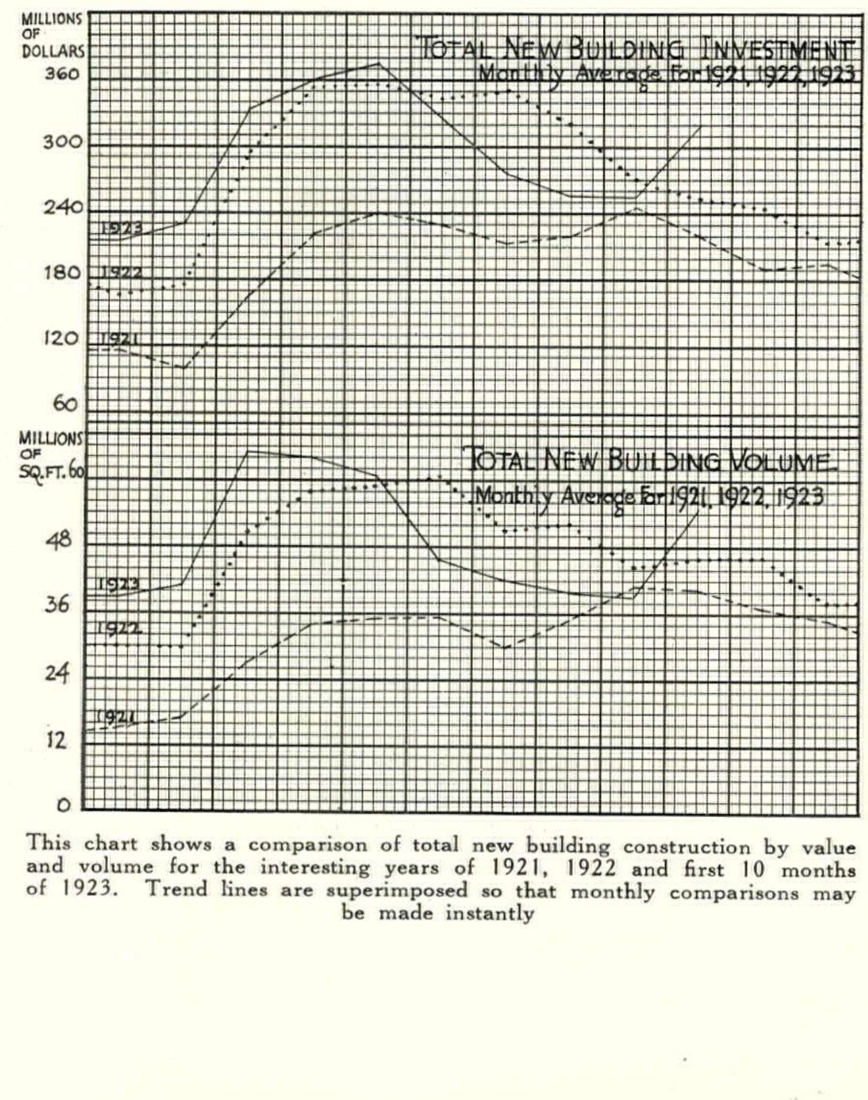
In order that an exact comparison may be made of the total new building investment and volume, there will be found on the second page of this article a chart with the yearly lines superimposed which represents the totals of the 14 individual type charts following.

This analysis has been started with January, 1921 because (as an examination of the chart on the first page will show) that period represented approximately the middle point in the rapid drop in costs which had started in 1920 and continued to the end of 1921.

We have for comparison the year 1921, when costs were dropping rapidly and confidence of the investing public was being shown by the development of unusual building activity; the year 1922, when costs carried on at the new level and then turned upward again as a result of continued building activity; and finally the year 1923, when in spite of rising costs the greatest activity of any year has been witnessed, including the phenomenon of a winter building boom as indicated by the sharp upturn of the lines in October.

This unusual increase in activity as shown in the month of October is represented primarily by an unusual volume of new apartment and dwelling construction undertaken for winter building in the New York and New Jersey districts. This question of building in the winter is discussed in an interesting manner in an article in THE FORUM Digest, which will be found in another section, and it is interesting to realize that the scientific consideration of the possibilities of winter building seems to indicate that costs are no greater and that an even distribution of building activity throughout the year is entirely logical. Building contractors and investors in New York are certainly demonstrating their belief in this theory by undertaking a vast volume of building.

Another reason for this sudden building activity



This chart shows a comparison of total new building construction by value and volume for the interesting years of 1921, 1922 and first 10 months of 1923. Trend lines are superimposed so that monthly comparisons may be made instantly

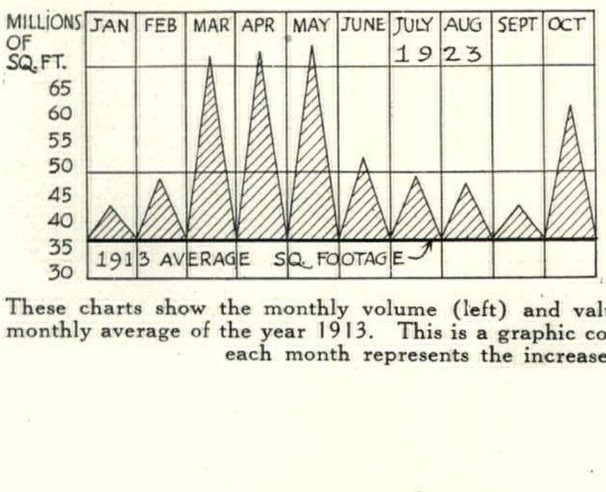
in New York is that large realty investors and speculators were waiting to see what conditions would develop in the fall rental market, particularly in high class apartment buildings. Practically all of these buildings filled up with tenants, many on two- and three-year leases and without any material reduction in rentals. As the result of this condition, many large contemplated projects were immediately undertaken for building during the winter to be ready for 1924 spring and summer occupancy.

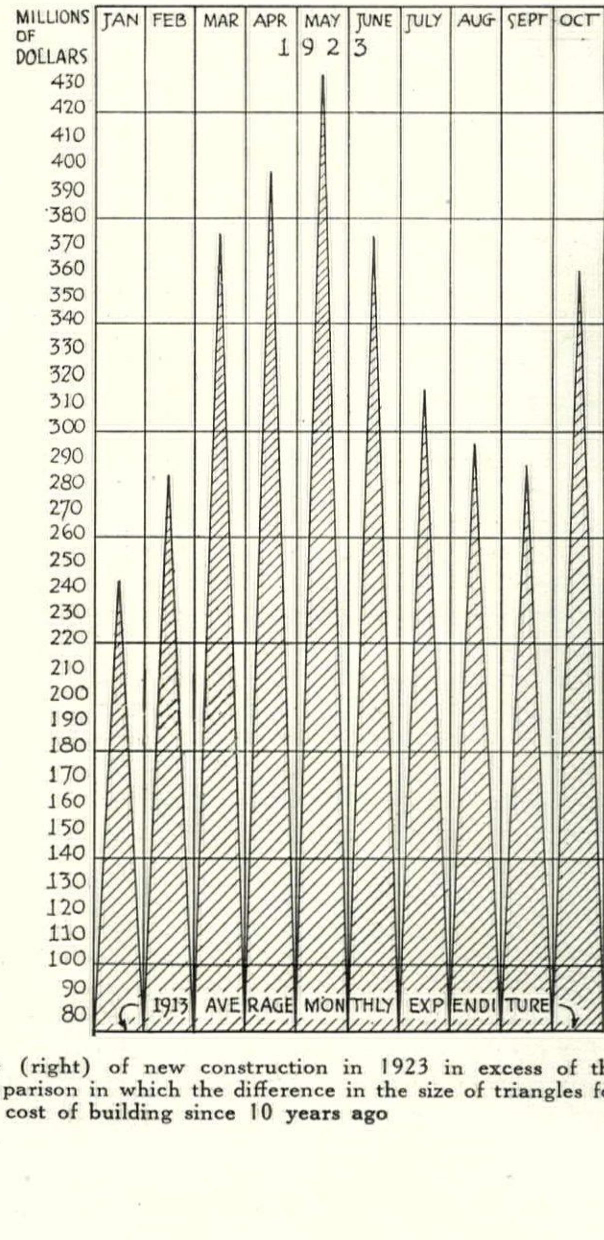
The confidence of loaning institutions continues unshaken, as indicated by the ease with which large building projects for 1924 are being financed. This confidence is based on a feeling of certainty that there will be no sharp decrease in the cost of building which might endanger collateral by establishing low replacement values. It is also evident that the investing public has great confidence in first mortgage bonds, because after a natural slowing down of mortgage bond investment during the summer of 1923, the fall showed a great increase in the amount of money flowing into the building field.

Another interesting consideration is indicated by the line (in the chart on the first page) showing the money value of contemplated construction as represented by the plans filed throughout the country. The month of October witnessed unusual activity in the filing of plans, which increased again in November. It will be noted in looking over past months and years on this chart, that whenever the value of contemplated construction shows high peaks, this is soon followed by a considerable increase in the number of contracts actually let. These factors would seem to indicate that there will be another phenomenal boom, this time probably starting earlier than in past years, because contracts must be let early in order to take advantage of the building material market.

At the present time the stocks of building material manufacturers and dealers are low, and the market is being drained by this unusual winter activity. Because of this situation there are serious dangers that the spring of 1924 will see again established chaotic conditions of unfilled orders and slow deliveries, with a probable rise in material prices. There are certain offsetting conditions which will probably relieve the situation as compared with the last two years. Production facilities of manufacturers have been increased to a certain extent and the railroad shipping conditions are much better. To a certain degree manufacturers are anticipating the heavy demands of the spring, and it may also be realized that the active program of winter building will serve to distribute the volume of activity.

On the second page of this article will be found a chart which provides a graphic comparison of total building activity for the past three years. This is shown both in actual money invested and in the volume of new buildings. The charts in the special color section following this article indicate a division of this activity. Thus, if an architect is discussing with a client the new hotel, office building or industrial building, it will be possible to trace the activity in each of these fields by referring to the charts covering the particular building type in question. These charts are presented on cross-section paper so that they may be easily read and also in order that additional lines may be plotted if the architect wishes to undertake an analysis of his own. The reading of these individual charts will show seasonal activity in the different building types and monthly comparison for the various years, all of which will help to determine the feas-



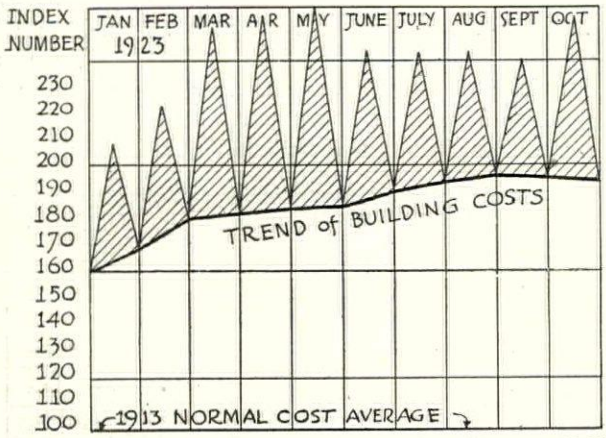


These charts show the monthly volume (left) and value (right) of new construction in 1923 in excess of the monthly average of the year 1913. This is a graphic comparison in which the difference in the size of triangles for each month represents the increased cost of building since 10 years ago

ibility of undertaking operations immediately, or at what season of the year such undertakings may seem logical.

Following is a brief consideration of some of the interesting points indicated in these individual charts:

Residential Building Investment. (Chart No. 6.) A glance at the various charts in this section indicates immediately the importance of residential construction which has constituted almost 40% of the building during these years. Residential construction as shown here includes not only dwellings, but apartment buildings and hotels, dwellings representing about one-half of the total. Beginning in January, 1921, it will be seen that the amount of money invested in residential construction has mounted from a monthly average of $31,000,000 in June, 1921, to the peaked month of March, 1923, in which con-



Plotting the monthly excess volume of building in 1923 (as compared with 1913) on a line indicating the increasing cost of building during 1923, we have a true picture indicating a comparison such as the months of January and September above—in these months the excess volume (represented by triangles) was almost equal, but increased costs show a much larger money expenditure

tracts let for new construction in this type amounted to over $165,000,000. The active periods for letting contracts were twice a year, the largest movement being in the spring and the secondary movement in the late winter. October, 1923, however, shows a much larger volume of contract letting as explained in previous paragraphs. This indicates a tendency toward a logical procedure of winter building and should encourage architects' clients to give serious consideration to this possibility. The chart shows a greater volume of residential building each year beginning in 1921, but that in the month of June, 1922, there was greater activity than in the same month in 1923.

Residential Building Volume. (Chart No. 13.) A comparison of the volume of residential building with the value as discussed above shows that the trend lines in both charts follow courses which are quite similar, which would seem to indicate that the activity in this field has been of a general nature, with no periods concentrated on particularly cheap or particularly expensive types of buildings. Otherwise there would be an average in the general trends of volume and money invested.

Commercial Building Investment. (Chart No. 7.) The lines on this chart indicate that the large volume of planning for office buildings and similar types is carried out through the winter and contracts are let somewhat later in the year than the residential building. The peak of activity is in the spring, and each year shows another active movement early in the fall, as it is evidently feasible to get large structures of this type under way in the early fall in order that they may be partially enclosed for the purpose of winter building.

Commercial Building Volume. (Chart No. 14.) The comparison of these charts shows more clearly a fluctuation due to the construction of expensive types of buildings. It will be noted that the line indicating the amount of money being spent in this class in 1922 passed above the line for 1923 in February. Comparing these lines in the volume chart it will be seen that this line did not pass above that of 1923 until April. This indicates that in 1922 the average type of commercial building was of a higher class and more expensive than during 1923.

Industrial Building Investment. (Chart No. 8.) This chart indicates that the amount of money spent for industrial building was considerably more in 1923 than in 1921. In 1922 an interesting period of activity is indicated in August and September, and again in May and June of 1923 there was considerable activity. September and October of 1923 show another increase in the letting of contracts for industrial buildings.

Industrial Building Volume. (Chart No. 15.) This chart indicates that the actual volume of industrial building gradually develops toward the middle of the year, subsiding again in the winter. The 1923 line shows slightly less volume in October than September, although the same line in the investment chart described above shows only a slight drop from August to September, although the investment chart shows a sharp increase in the amount of money spent which would indicate here that more expensive types of buildings have contributed to this increase.

In the same manner comparisons may be made in the other building fields indicated. Thus in hospitals and institutions (Charts Nos. 10 and 18) it will be seen that activity has been quite similar during the three years with various changes occuring in alternate months throughout 1921 and 1922, and a steadier line for 1923, which is almost an average of the activity of the two previous years.

Just as indicated in charts Nos. 12 and 19, the heavier periods of contract placement extend from May to August in every year. This would indicate a logical reason for letting contracts for church work earlier in the season when there is less competition in this particular class of highly specialized contracts and equipment.

Graphic Analysis of 3 Years of Building Activity

A Comparison by Volume and Investment of the Relative Activity During the Years 1921, 1922 and 1923 in Each of Seven Important Building Types, Representing 95% of the Total Construction Activity of the United States

THESE charts are completely explained in the accompanying article preceding this page. The purpose of the charts is to provide a complete comparative analysis of seven types of building activity during the years 1921, 1922 and 1923. In each chart the years are superimposed for the purpose of making rapid comparisons with building activity in any month. In order to facilitate the comparison of individual business with general trends in the building field, these charts have been carefully presented on cross-section paper, so that additional trend lines may be drawn using the units given for establishing a new vertical measure to fit the individual problem. Comparisons are given first, in the amount of money invested in seven types of new buildings, and, second, in the actual volume of new building construction in these seven types measured in total number of square feet involved in the letting of these new contracts.

The Money Which Has Been Invested in New Buildings

(A Series of Seven Charts Showing Comparisons for Three Years)

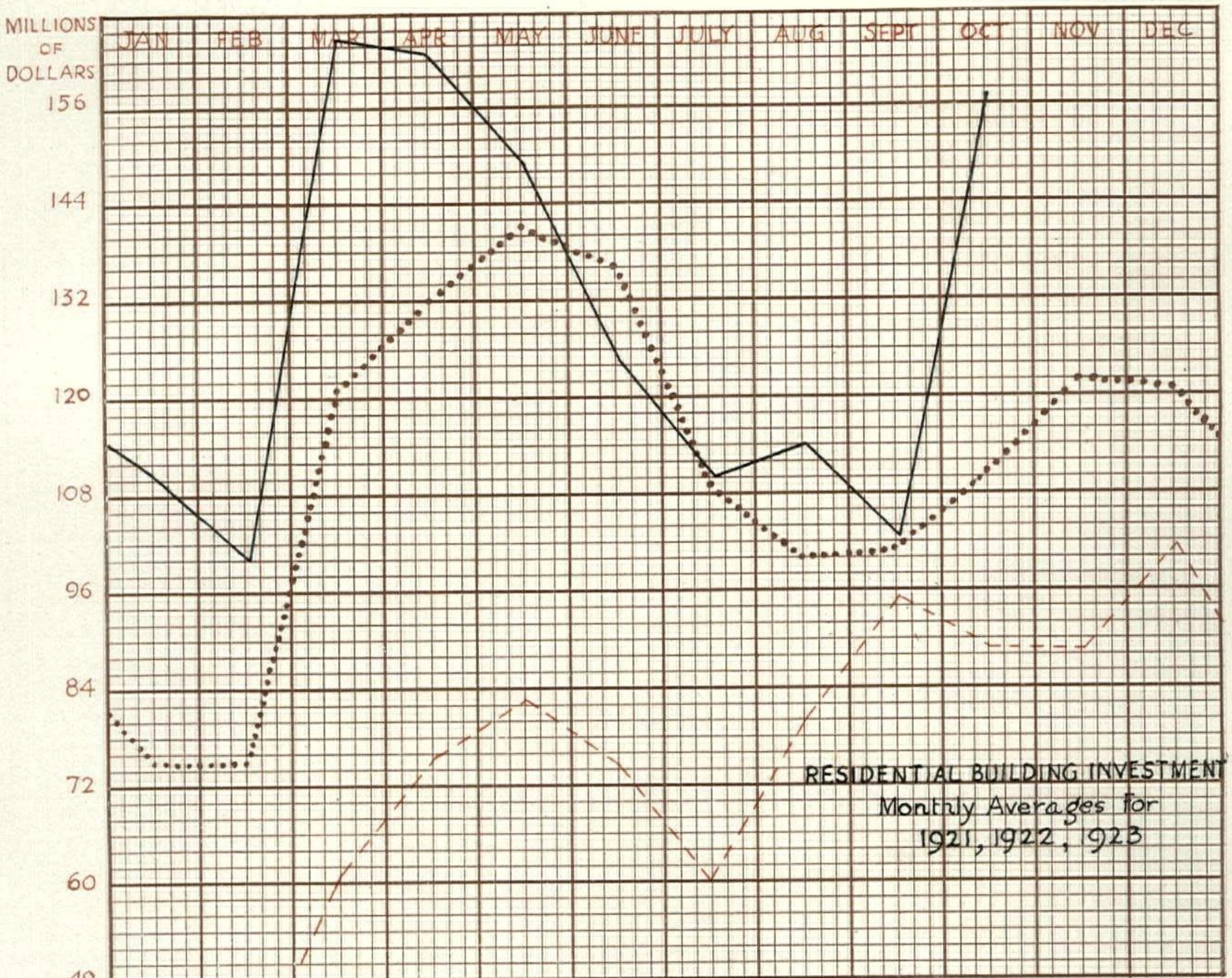


Chart No. 6 © The Architectural Forum, Dec., 1923

A 3-Year Investment in Residential Construction

The Investment Charts

THE first seven charts beginning with the one above indicate the monthly totals of money invested in the different types of buildings as designated. The trend lines are to be read from left to right in accordance with the color key provided below. In each month the amount of money is to be read at the center point in accordance with the scale provided on the left. The years being superimposed, it is possible to read at a glance the monthly totals for any given month in each of these years. As the amount of money expended for building is affected by the cost of building, it is also interesting to know how much actual new building volume this money represents. In order that this comparison may be made, the figure of the seven charts beginning on the next page indicates the volume of new building in the same graphic method, using millions of square feet for the scale instead of millions of dollars.

KEY—Red, 1921; Brown, 1922; Black, 1923.

For Comparison by Volume See Following Pages

Graphic Analysis of 3 Years of Building Activity

(See Preceding Text for Full Explanation)

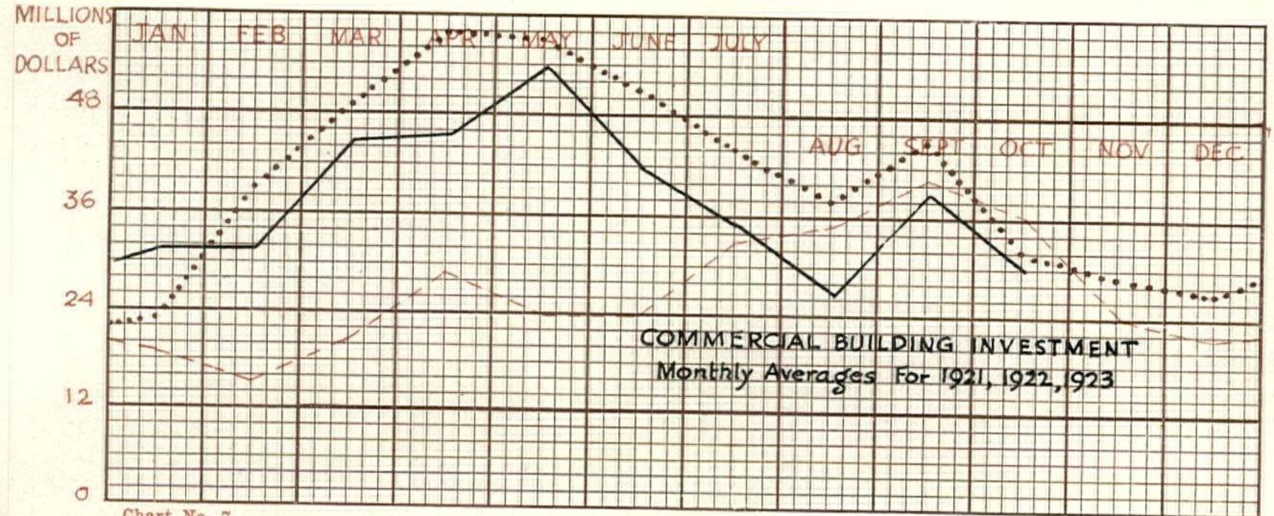


Chart No. 7

KEY—1921, Red Broken Line; 1922, Brown Dotted Line; 1923, Black Solid Line.

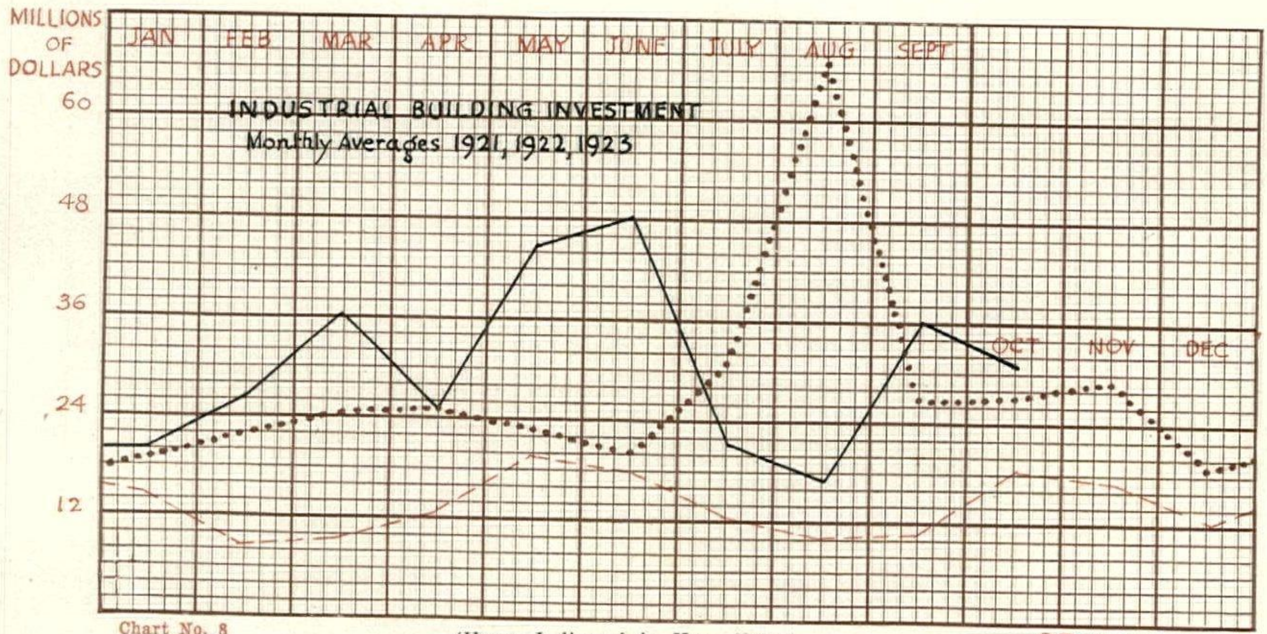


Chart No. 8

(Years Indicated in Key Above)

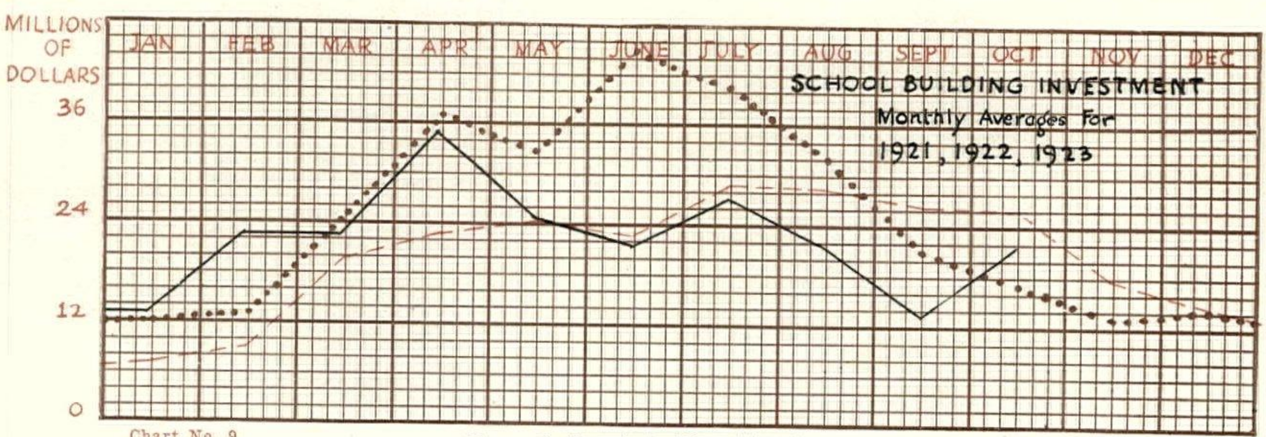


Chart No. 9

(Years Indicated in Key Above)

Graphic Analysis of 3 Years of Building Activity

(See Preceding Text for Full Explanation)

Chart No. 10

KEY—1921, Red Broken Line; 1922, Brown Dotted Line; 1923, Black Solid Line.

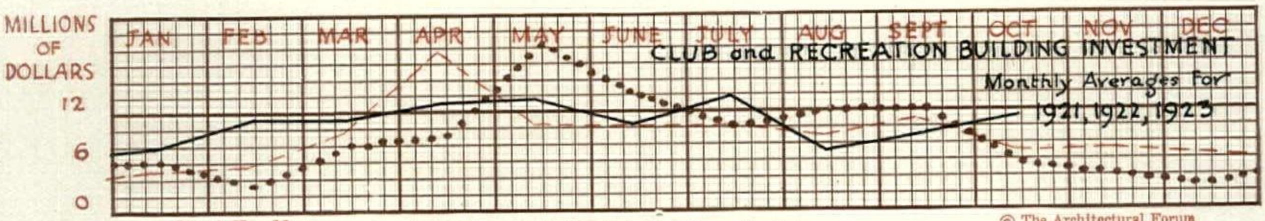


Chart No. 11

(Years Indicated in Key Above)

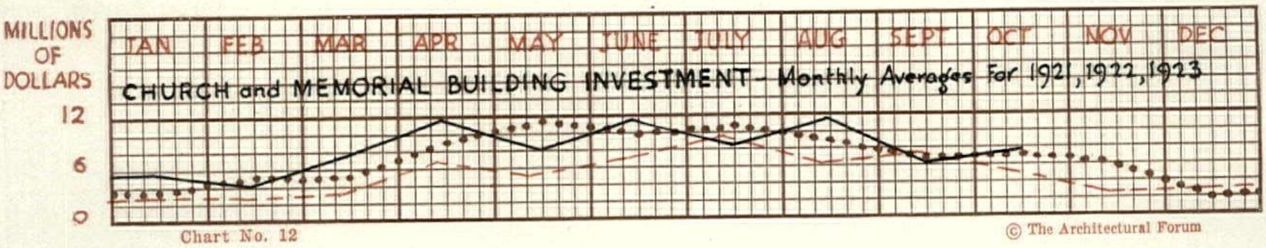


Chart No. 12

The True Picture—Structural Volume of New Buildings

(A Series of Seven Charts Showing Comparisons for the Three-Year Period)

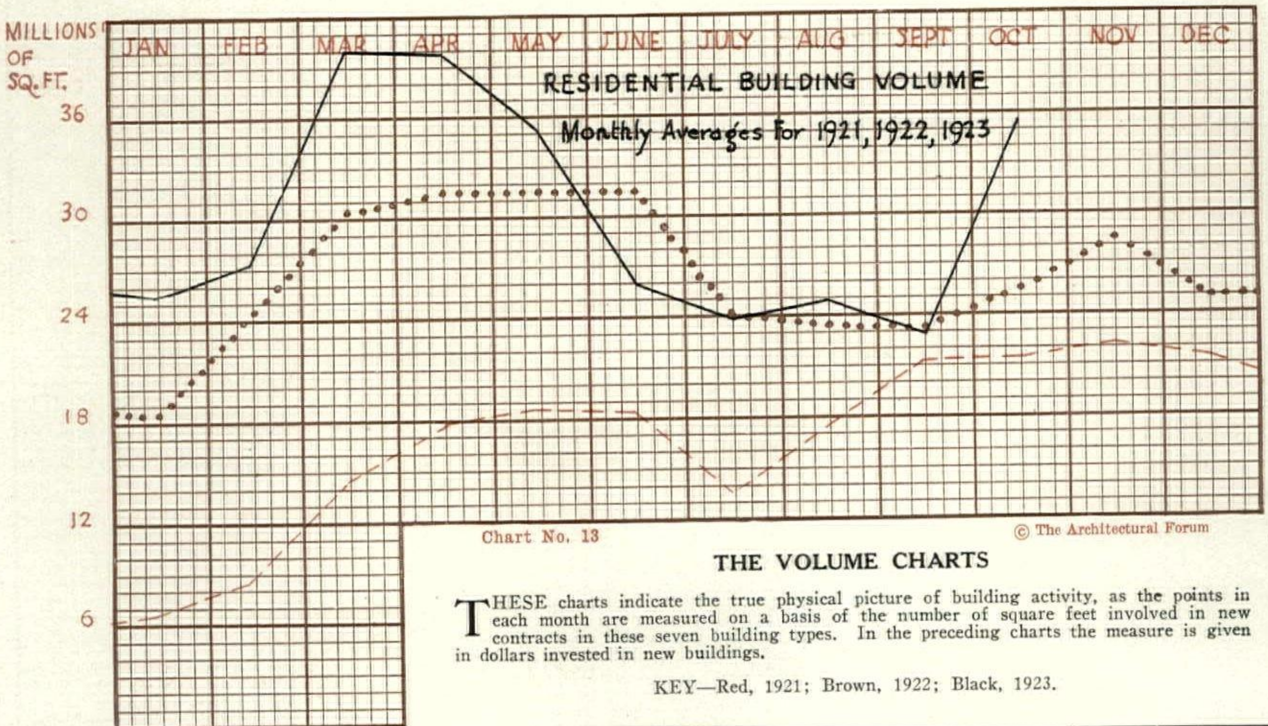


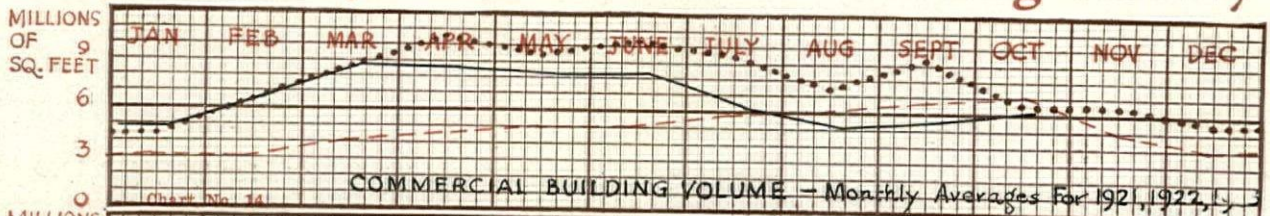
Chart No. 13

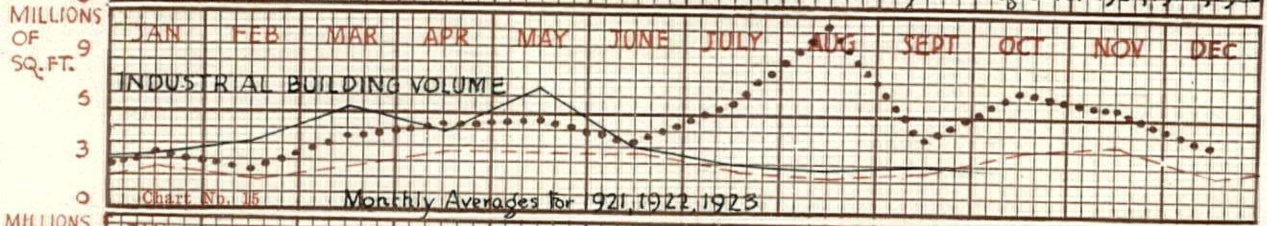
THE VOLUME CHARTS

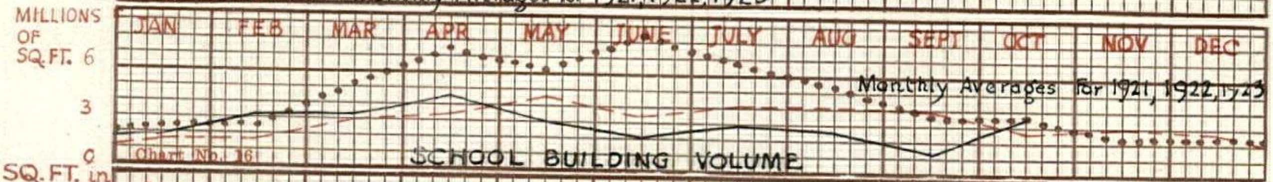
These charts indicate the true physical picture of building activity, as the points in each month are measured on a basis of the number of square feet involved in new contracts in these seven building types. In the preceding charts the measure is given in dollars invested in new buildings.

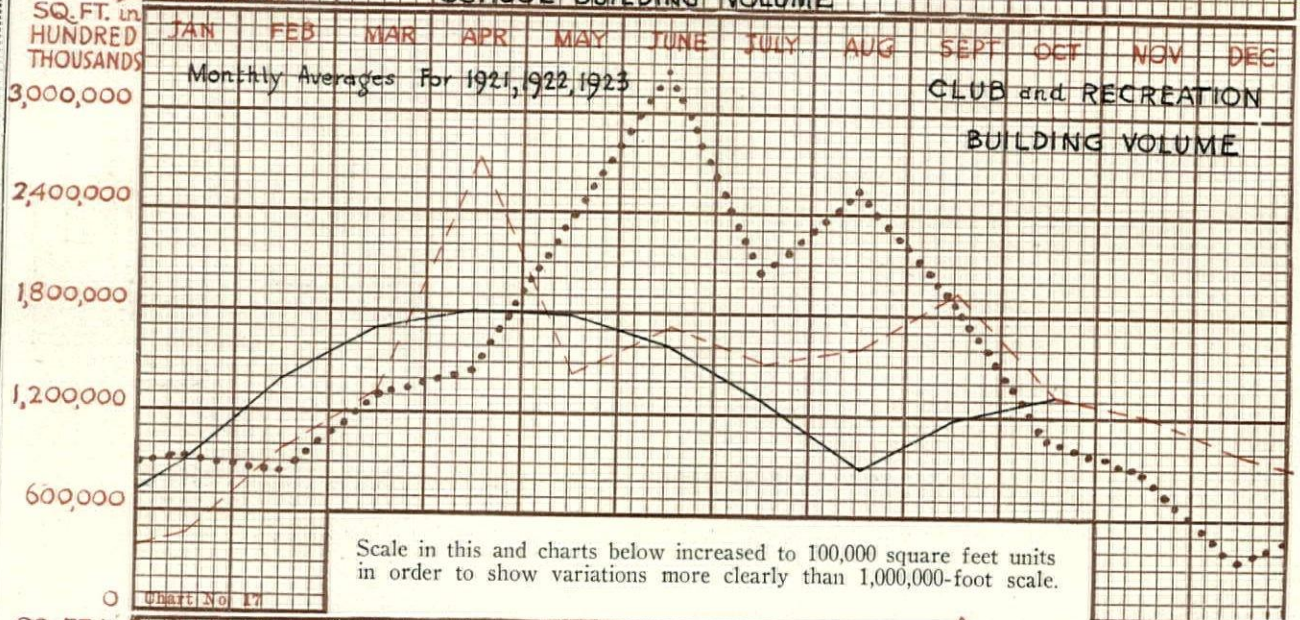
KEY—Red, 1921; Brown, 1922; Black, 1923.

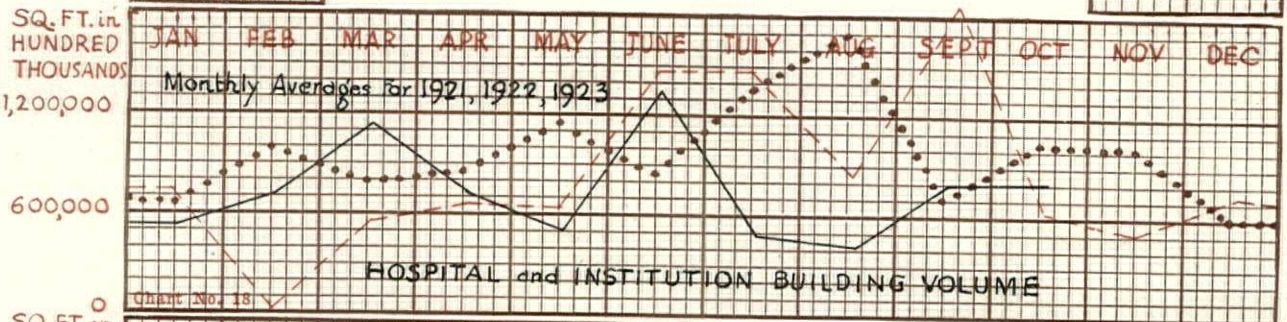
Graphic Analysis of 3 Years of Building Activity

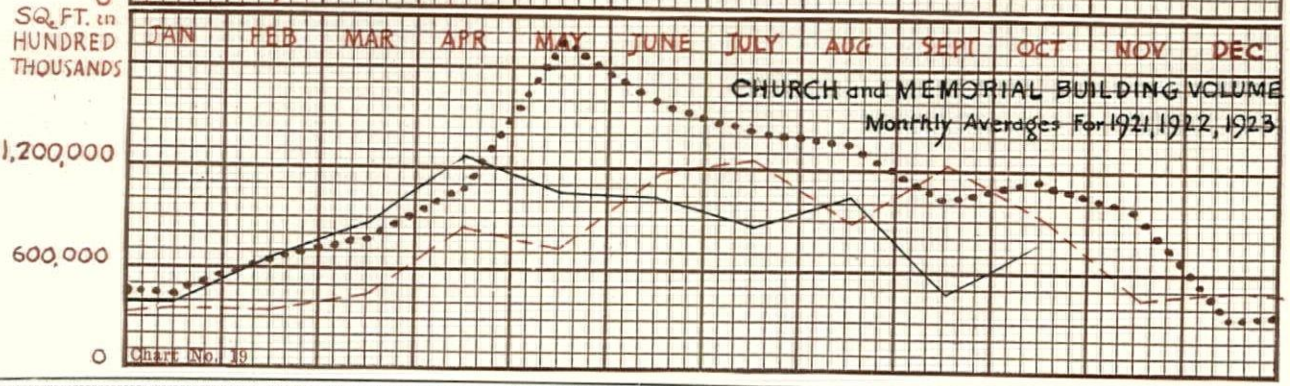






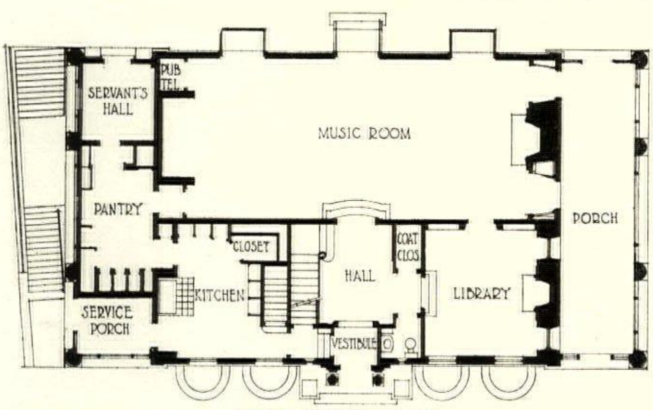




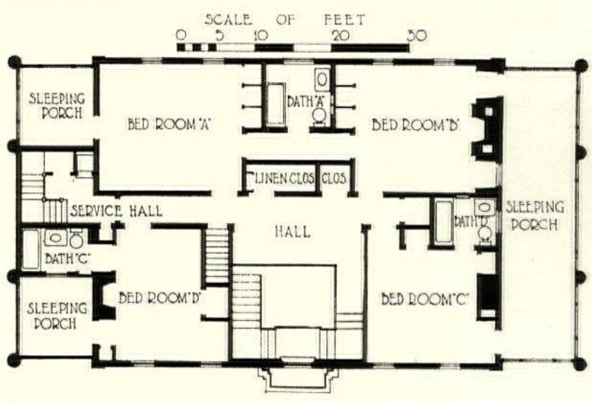


These Charts May Be Reproduced by Any Publication If Proper Credit Is Given to THE ARCHITECTURAL FORUM

GENERAL VIEW OF STREET FRONT



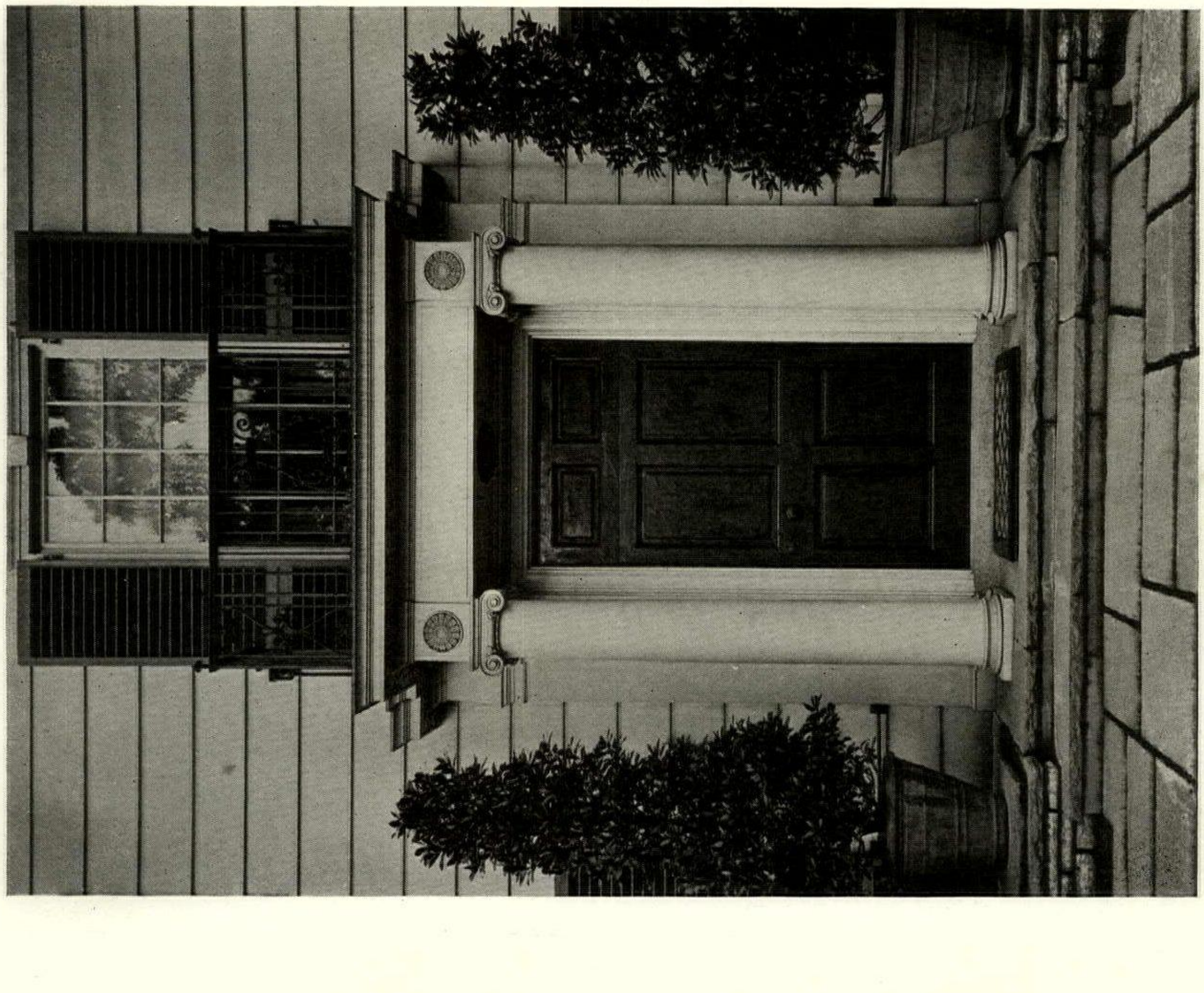
FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF GEORGE F. LINDSAY, ESQ., ST. PAUL

PARKER, THOMAS & RICE, ARCHITECTS



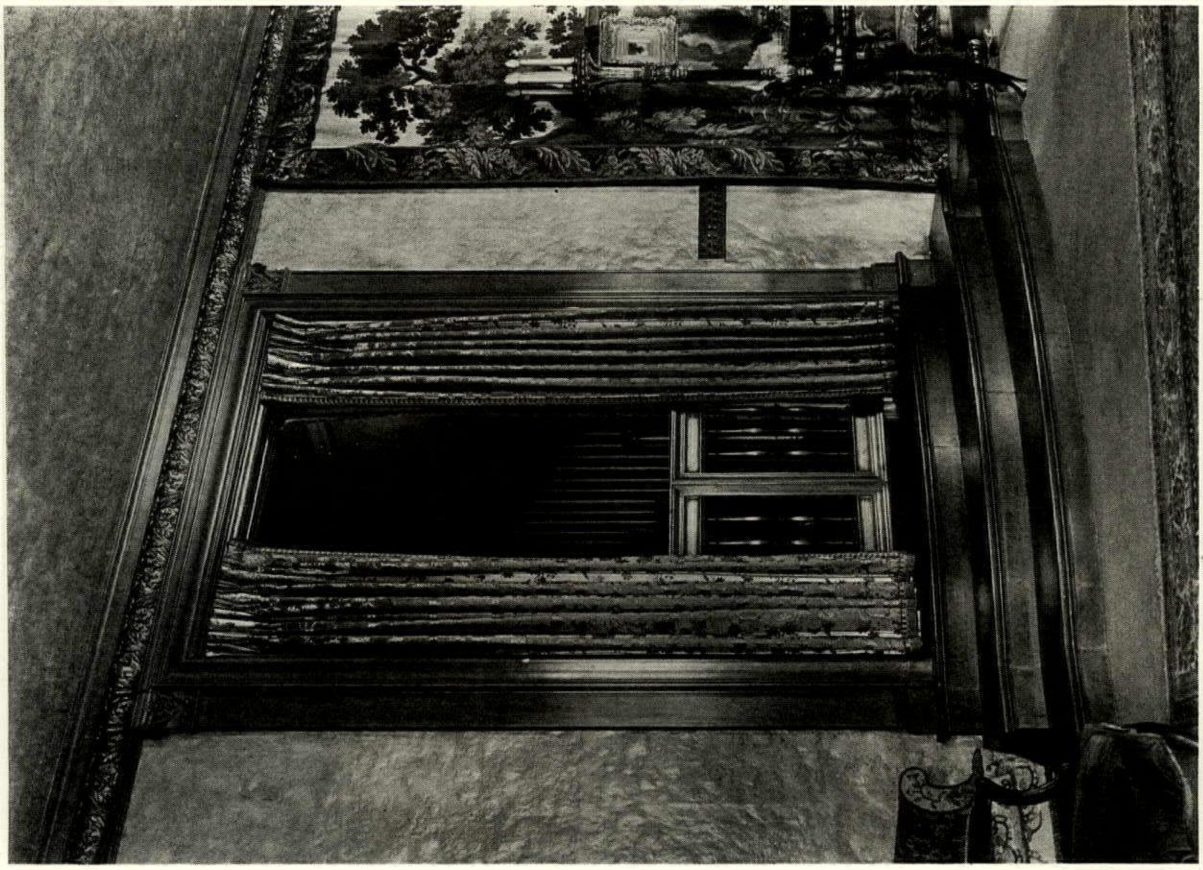
DETAIL OF MAIN ENTRANCE

DETAIL OF GARDEN FRONT

HOUSE OF GEORGE F. LINDSAY, ESQ., ST. PAUL

PARKER, THOMAS & RICE, ARCHITECTS

FIREPLACE END OF MUSIC ROOM



DOORWAY TO HALL FROM MUSIC ROOM

HOUSE OF GEORGE F. LINDSAY, ESQ., ST. PAUL

PARKER, THOMAS & RICE, ARCHITECTS

TWO VIEWS OF THE GARDEN

HOUSE OF GEORGE F. LINDSAY, ESQ., ST. PAUL

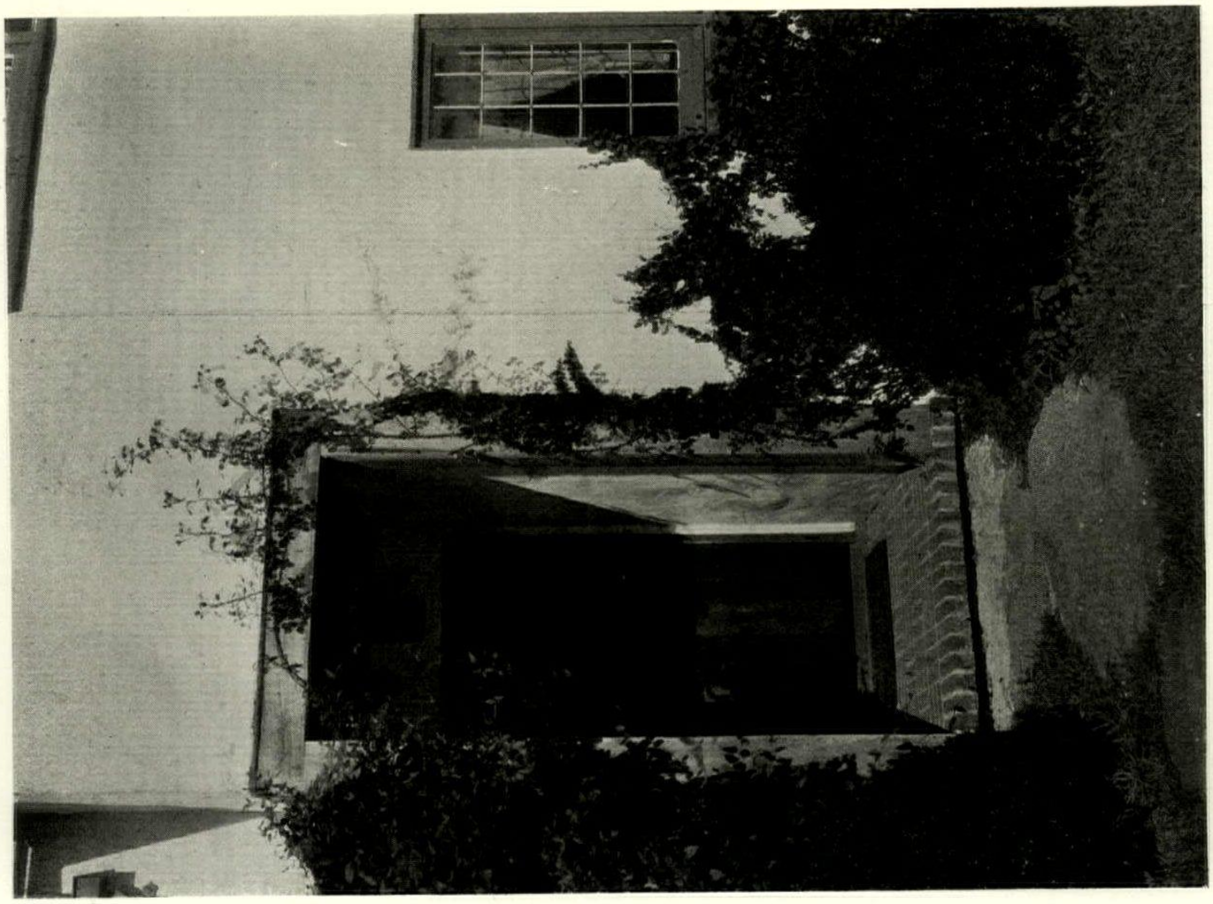
PARKER, THOMAS & RICE, ARCHITECTS

VIEW FROM APPROACH

VIEW SHOWING SERVICE WING

HOUSE OF J. AVERELL CLARK, ESQ., WESTBURY, NEW YORK

PEABODY, WILSON & BROWN, ARCHITECTS



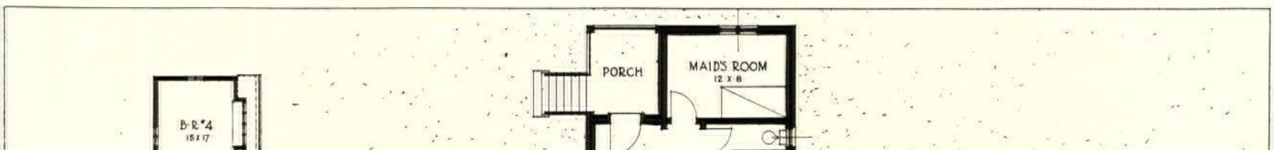
ENTRANCE DETAIL

DINING ALCOVE

HOUSE OF J. AVERELL CLARK, ESQ., WESTBURY, NEW YORK

PEABODY, WILSON & BROWN, ARCHITECTS

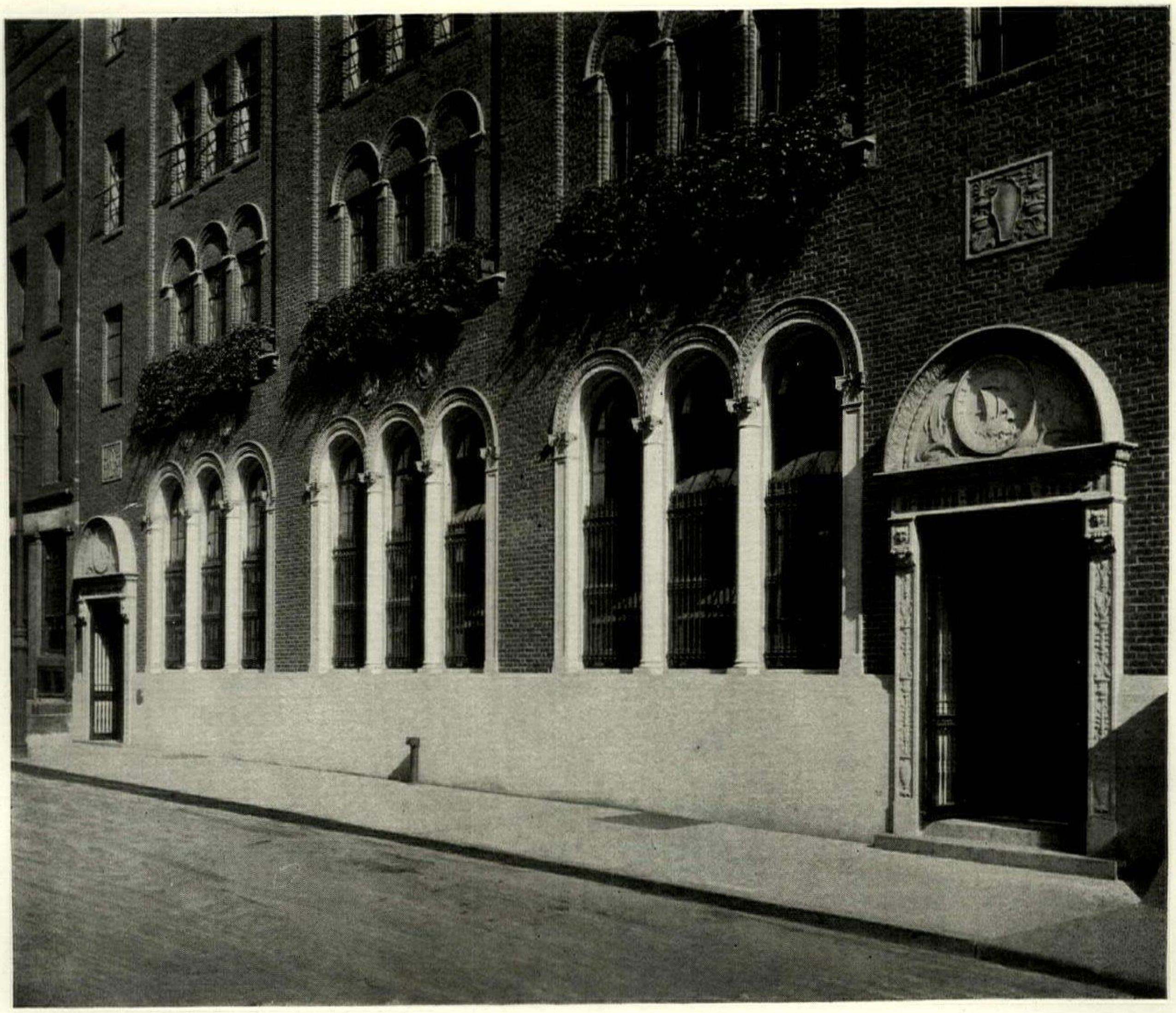
FIREPLACE END OF LIVING ROOM



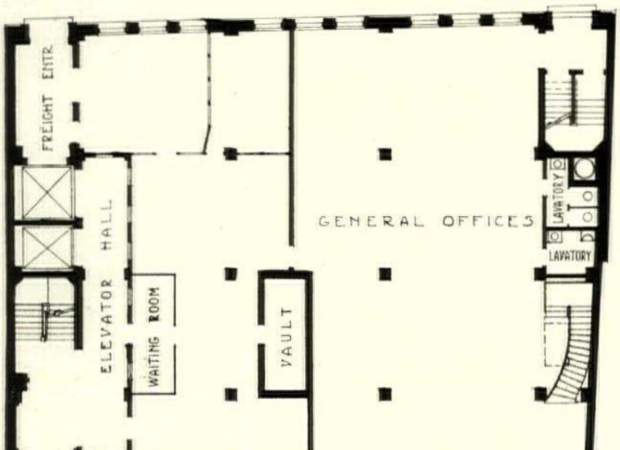
FIRST AND SECOND FLOOR PLANS

HOUSE OF J. AVERELL CLARK, ESQ., WESTBURY, NEW YORK

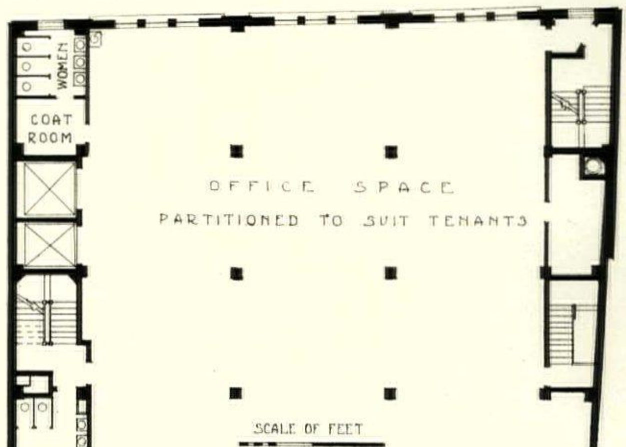
PEABODY, WILSON & BROWN, ARCHITECTS



DETAIL OF LOWER STORIES



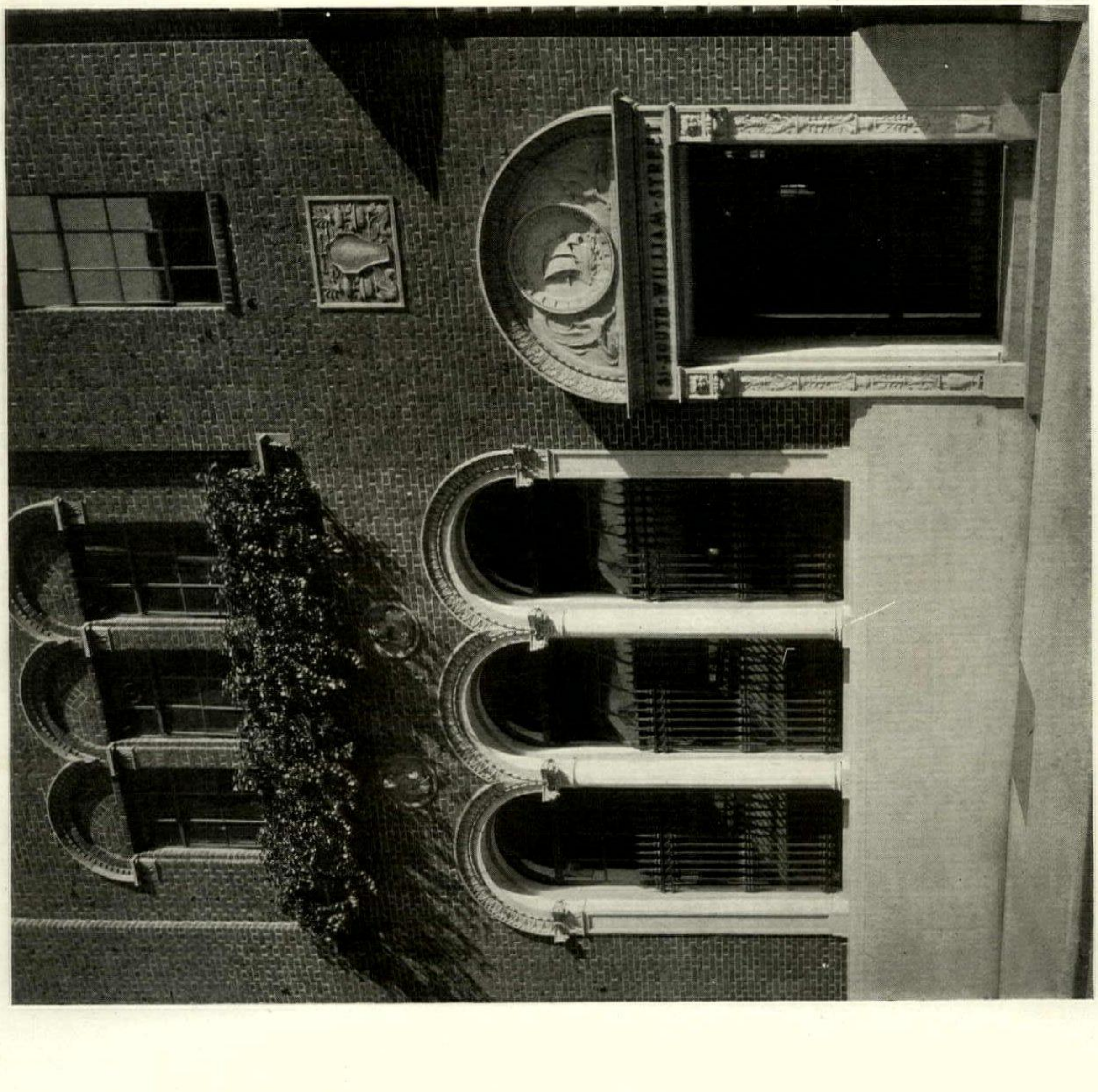
FIRST FLOOR PLAN



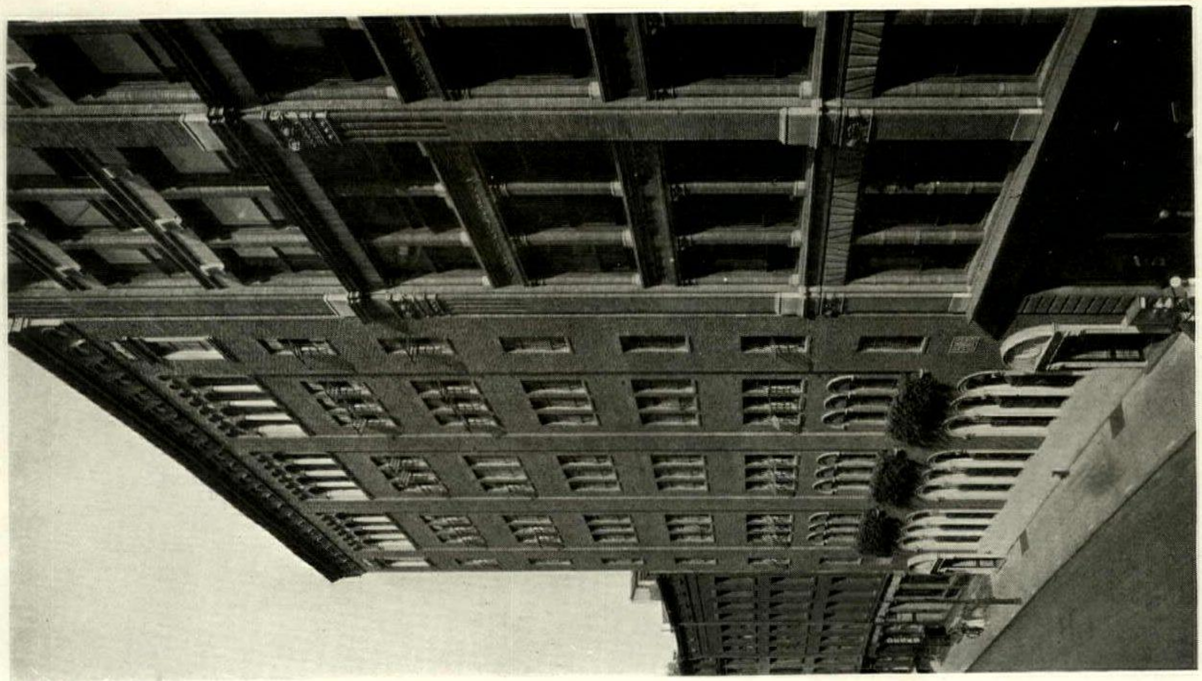
TYPICAL FLOOR PLAN

TERMINAL WAREHOUSE, 31 SOUTH WILLIAM STREET, NEW YORK

JAMES W. O'CONNOR, ARCHITECT



DETAIL OF ENTRANCE



GENERAL EXTERIOR VIEW

TERMINAL WAREHOUSE, 31 SOUTH WILLIAM STREET, NEW YORK

JAMES W. O'CONNOR, ARCHITECT

EDITORIAL COMMENT

THE ARCHITECT AND CRAFTSMANSHIP

WE are wont to complain of the lack of craftsmanship in modern building practice, and it is true that by and large it is seriously lacking; yet do we readily recognize higher standards of workmanship when they do come to light today, and do we take sufficient advantage of opportunities for securing good architectural effects that are offered us in new materials and methods of construction?

Concrete construction is an instance. Its use structurally has been perfected within the time of the present generation, and within only the last few years has it been sufficiently developed with surface treatments to warrant its being considered a material suitable for architectural expression.

The memorial bridge at Wilmington, illustrated in this issue of THE FORUM, is an example of modern craftsmanship in a modern material. The entire structure is of reinforced concrete, and the whole exterior surface is likewise of concrete, poured in place with the exception of the balustrade, which was assembled from pre-cast concrete units. The surfaces display a range of finishes from simple carborundum rubbing on the soffits of the large arch ribs to a highly developed granite aggregate surface on the superstructure that has the appearance of being of stone and yet does not masquerade as stone, because the absence of joints and the simple character of ornament suggesting the wood forms with which it is made proclaim it to be monolithic. The architectural forms are classic and naturally suggestive of stone masonry; their construction in concrete has, however, not been overlooked, and they are greatly simplified to make them easy of manipulation with wood forms.

Architecture, unlike the other fine arts, cannot be created in tangible form by the artist who conceives it; the idea which the architect sets down on paper must be interpreted in varied materials by many and diverse kinds of workmen, building under the architect's supervision, before any work of architecture is completed. The possibilities of disappointment in the visual effect of materials, in the technique of building whereby certain expected textures are not developed, are legion and serve to indicate the powers of visualization that the architect must possess and exercise.

The selection of materials presents as much difficulty as any feature of architecture. Successful handling of material demands of the architect the power to judge from a small detached sample the effect of a large mass of material in the completed building, affected as the final appearance is by the important considerations of scale, color, and texture.

The close and intense study of mediæval and renaissance architecture that American architects have engaged in during the last 20 years has revived in us respect for the physical attributes of materials; we have learned that a brick building must claim interest first because of the character of its walls; that a stucco building must be of interest for the textured surfaces it displays; that a stone building must indicate that it is built of a natural material, with the slight variations of grain and color that a natural material possesses in evidence. Architectural beauty differs from natural beauty in that it is the result of a conscious effort to create beauty; it is governed by more or less defined laws of composition; it is artificial in nature, yet without adopting the sentimentalism of Ruskin it should not attempt to conceal the natural beauty of the materials that make it. Today, with the cost of construction exercising so strong an influence on architecture, it is of the greatest importance that the full beauty of materials be realized, because there is but little opportunity to fall back on use of ornament and elaborate architectural motifs.

Architects generally recognize this; the reason that evidence of it in finished buildings is so slight is that the building trades worker is still laboring under the delusions of the Victorian period of building, when the award of excellence was given to mechanical accuracy; the machine product age took away from the workman every artistic interest in the qualities of the material with which he worked; any effort that was made to recognize physical qualities of materials was always in the wrong direction, as witness the hideousness of polished golden oak.

Manufacturers, in the main, are similarly affected in their production by temporary and popular influences, irrespective of their being good or bad fundamentally. The manufacturer under present economic conditions must of necessity be governed by popular demand; much as he may appreciate better things than the normal market offers, he cannot be expected to spend his capital in an altruistic educational effort; he must make what his experience shows him will sell. On the architect, therefore, rests the whole responsibility for creating architecture. He must not alone conceive the design, but he must also expend his energy in developing a live interest in true and honest building methods, encourage the efforts of intelligent manufacturers, and give advice when possible to those laboring under false standards. Just as keen, live coöperation between designer, contractor and workman has developed concrete, so will the same effort build up standards of craftsmanship in the manufacturing and fabrication of all building materials. The effort is large, but the joy in creating a work of architecture is sufficient compensation.

Plate Description

OAKLAND GOLF CLUB, BAYSIDE, N. Y. Plates 97-101. Conditions were favorable in the case of the Oakland Golf Club, of which Roger H. Bullard is architect, for creating an interesting group of buildings. The type selected is that of the early American farmhouse, developed in a combination of shingles and field stone, both whitewashed, with roofs of moss-colored tiles, the grouping and composition being very much aided by the various retaining walls of stone which are necessary for providing upon rolling ground an area sufficient for buildings and dependencies so extensive.

The structure is fireproof, notwithstanding its shingled exterior walls, for the shingles are backed with hollow tile construction. The L-shaped plan of the building conforms to the character of the site, the main portion of the building having a southerly exposure overlooking the golf course. The service wing extends toward the north, with ample parking facilities at the main entrance court, traffic passing under the service wing and around this to the north to a lower parking level. In the basement provisions have been made for chauffeurs' sitting room, dining room, etc., with entrance from the service court. The second floor includes women's locker rooms over the lounge, card rooms over the dining room, and steward's room over the service wing.

The interior treatment is broad in its handling, with heavy ceiling beams and trusses of hand-hewn timber and boldly simple fireplace facings of limestone. Walls are in many instances treated in plaster applied in a free and irregular way as though on masonry, and then toned down by the application of wax glazed. The construction of the building makes possible window reveals of some depth, and excellent use has been made of the decorative opportunities by using red tile for the sills. A great part of the interest of the interior is due to the excellent taste which has guided the selection of furniture and accessories of every kind, which are an aid in giving character to the building.

HOUSE OF GEORGE F. LINDSAY, ESQ., ST. PAUL. Plates 104-107. The popularity of the sleeping porch presents difficulties in the way of architectural composition which are not always as successfully solved as in this instance where it has been treated in the only consistent and logical way,—by regarding it as a part of the structure proper and not as an appanage. Here the architects, Parker, Thomas & Rice, have incorporated ample porches, upper and lower, at the ends of the house, treating them as integral parts of the body of the structure and extending the roof over them, thus adding materially to the width of the house and increasing the excellence of its proportions.

Exterior walls are covered with wide clapboards, and wood shingles are used upon the roofs. Much of the beauty of the exterior is the result of using gracefully designed wrought iron in the guards about windows and in the rail at the sides of the French window which opens from the music room upon the stone flagged terrace. Probably with a view to securing upon the lower floor one room of unusual size instead of two or more smaller rooms, considerable area has been given to the music room, one end of which, since it opens from the service quarters, can be made to do duty as a dining room. Upon the upper floor each of the four bedrooms opens upon a sleeping porch.

HOUSE OF J. AVERELL CLARK, ESQ., WESTBURY, N. Y. Plates 108-110. With its excellent composition and rambling form, graceful roof surfaces, clustered chimneys and excellent use of walls to enclose gardens and service quarters, this house suggests an American adaptation of the "modern English style." The building is of stucco of moderate texture, whitewashed. The chimneys are of brick, also whitewashed, while the roofs are of wooden shingles, stained. The wall about the service portion of the house is, like the building itself, of stucco, whitewashed. What little wood trim is visible upon the exterior, is of oak which has been allowed to weather.

The plans of the house, of which the architects are Peabody, Wilson & Brown, illustrate a tendency which for several years has been noticeable in American country and suburban house building,—a tendency to minimize the number and sizes of the rooms on the lower floor to make possible the placing there of the necessary maids' rooms, thus leaving the entire upper floor for master bedrooms. Here the lower floor includes a living room of generous size, while the conventional dining room has been omitted, its place being taken by a "dining alcove."

TERMINAL WAREHOUSE, 31 SOUTH WILLIAM STREET, NEW YORK. Plates 111, 112. That the value of good architecture is not entirely overlooked, even for structures which are not often regarded as presenting many opportunities for the exercise of care and skill in design, is being proved by the excellent designing being done for many structures of a strictly utilitarian nature. A case in point is this building, near the lower end of Manhattan Island, of which James W. O'Connor is architect.

The facade, eight stories high, is of brick with ornament of limestone about the doorways and windows of the two lower floors and the windows of the upper story. The structure has been planned for the storage of documents. The left half of the ground floor as one enters the building is occupied by the owning company; the remainder of this floor is leased to a single tenant, while each of the floors above is occupied by some individual tenant. The building is of steel construction, the facade as already said being of brick and stone; floors are of cement treated with a hardener.