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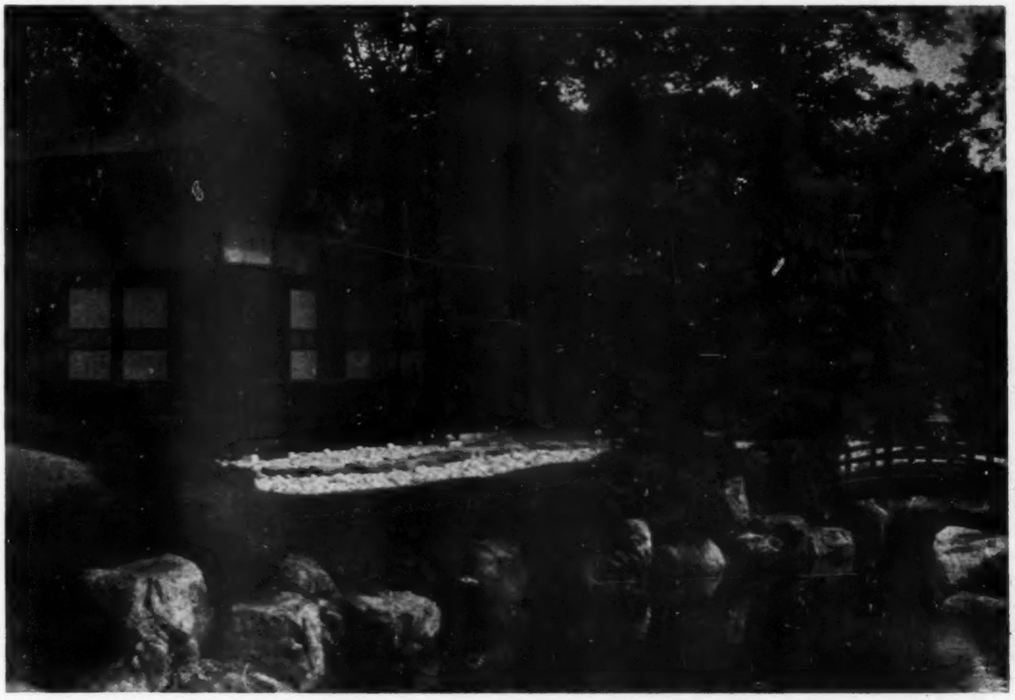


Japanese Tea House, Estate of John D. Rockefeller, Esq., Pocantico Hills, N. Y.

Welles Bosworth, Architect

THE RELATION OF CLASSIC EXAMPLE TO ARCHITECTURAL DESIGN

With particular reference to the work of Welles Bosworth, Architect

SOME years ago at the Century Club a number of men were discussing how posterity would judge our treatment of the tall building problem. Two of these men were architects. One, a member of an old and high reputed firm said: "Today we have generally accepted the base and shaft idea, adapted from the column, though the proportion of the building in most cases bears no sort of relation to the proportion of a column. We cite the column to justify the placing of a little architectural treatment at the top as a cap; a little more at the bottom as a base, and no treatment whatever in between and we call it good architecture. But we are too near it in time to judge of its merits as good architecture." The other cited the buildings of antiquity which show the manner in which the ancients would have treated the high building problem. Their eyes met simple temples and the elementary forms of construction. Their light house designs, as restored by Canina from coins, show a sustained decoration of superimposed orders from base to top. Their theatres and amphitheatres also were enriched by superimposed orders, but the most fitting example of high building was the Septizonium in Rome with its seven succeeding orders, one above the other. Built by Septimus Severus on the Southeastern flank of the Capitoline Hill, it was so placed that travellers from Africa, the scene of his greatest triumphs, should be impressed by it on entering Rome. It immediately became renowned as one of the "seven wonders" of the ancient world.

The Greeks also placed one order of columns above another, as in the case of the library at Pergamon. In this beautiful example, the lower order is Doric, the upper order Ionic. This motif has furthermore the distinctions of an unusual bay treatment in the upper story; the columns being united with a parapet wall, about one-third their height, which stiffens, in effect, the stability of the columns, while leaving at the same time a sense of lightness in the upper two-thirds of the order. It throws the capitals into relief and gives much grace to the entire structure.

The need for a central office building in New York of the Western Union Telegraph Co. and the American Telephone and Telegraph Co., which at that time were united, under the management of the great administrator, Theodore N. Vail, offered a fitting opportunity for this Septizonium motive.

As in the matter of style, so with the materials of which the structure is built; both stand for permanency inside and out. The whitest granite was chosen for the exterior, and Istrian marble for the interior lobby, with a beautiful creamy Alabama marble for the lining and mosaic of the corridors. All the details were specially designed for the building; the bronze push buttons for the elevator signals, the door knobs, and even the keys whose broad ends are fashioned in the form of a Greek shield, agreeable to the touch, instead of being ornamental with the name of the makers. There are no manufacturers' names to be seen anywhere in the building, not even in the elevators. It is a relief to the tired brain, not to be forced to read lettering on all the fixtures, as has been so universally customary in this country.

The new lobby will be used on the Fulton Street side for banking purposes by the Telephone Co. as the Dey Street side is now used by the Western Union Co. The intermediate space will serve for general circulation. The aisles between the heavy marble columns which form a veritable Hypostyle Hall, of great simplicity, dignity and beauty lead West to the elevators facing both side street entrances.

The National City Bank on Wall Street with all its member columns balanced rythmically one above the other offers another excellent example of organization.

The Tiffany store on Fifth Avenue is also a case of beauty and impressiveness obtained by superposition of orders.

The Telephone and Telegraph Building with its mounting heights of stories of white Greek Ionic columns rising above the sturdy Doric order as in the library at Pergamon, is full of dignity and rythmic beauty. There are those who argue that the essential expression of a steel framed structure is one of vertical lines. There are others who contend the contrary, that the floor beams being heavier count more solidly in the horizontal sense; interrupting the uprights at each story level, so that with their windbracing, the dominating effect is more one of posts and lintels as in classic architecture, than of the vertical shaftings of Gothic. Either line of argument is defensible; the result is great variety in our architecture. The Woolworth Building, as seen from the favorite point of view under the arch of

Garden Plan
Estate of Walter Farwell, Esq., Syosset, Long Island, N. Y.
Welles Bosworth, Architect

FIREPLACE IN OCTAGONAL MUSIC ROOM IN HOUSE OF WALTER FARWELL, ESQ., SYOSSET, LONG ISLAND, N. Y.

WELLES BOSWORTH, ARCHITECT

the Municipal Building, seems to rise out of the roof of the Old City Hall. This is a shock to some sensibilities, but a joy to others.

STANFORD WHITE used to say "All good things go together." Let us take comfort and enjoy what we can of the mêlee of periods and styles about us. Certain it is that if any style has a right to our allegiance, it is the Graeco-Roman, the origin of our early American tradition. The Gothic revival in all its phases from Harvard's Memorial Hall of pristine Victorian viciousness, to the Woolworth Building vestibule, comes to us as a voice from Mediævalism in sharp contrast with fair classic forms.

The trend of Gothic form drawing upward to its pinnacles, expresses the aspiration of the religious soul, or as Jay Hambidge puts it "In Gothic art all the movement of composition works from the center, outward, in emotional searchings; whereas in the Greek and Egyptian styles the outlying limits form the basis from which the center and other axis lines are established." This method produces inevitably greater repose though less romance. We are fortunate in living in an epoch when all styles are accepted and the owner following his caprice is certain to find some ardent partisans.

At any rate, it is fairly well established that the Greek style is likely to outlive all the others. In every epoch since its rediscovery by Stuart and Revett, it has come forward with fresh honor. The Greek revival in America, just at the moment when its prosperity made dignified and durable buildings a possibility, associates for all time the Greek style with this country. It is found from Salem to Salt Lake City, from Portland to Savannah—in every type of structure; from wharf-houses, custom houses, jails and court houses, to churches and private residences, both in cities and the country.

The grand old Sub-Treasury still stands on the corner of Broad and Wall Streets with Ward's splendid statue of the "Father of His Country" on its steps; and so long as this image remains before the eye of the active business center of the country, the Greek style of architecture will be identified with the early days of its national life.

House of Walter Farwell, Esq., Syosset, Long Island, N. Y.
Welles Bosworth, Architect
Entrance Courtyard and main façade. See text for description

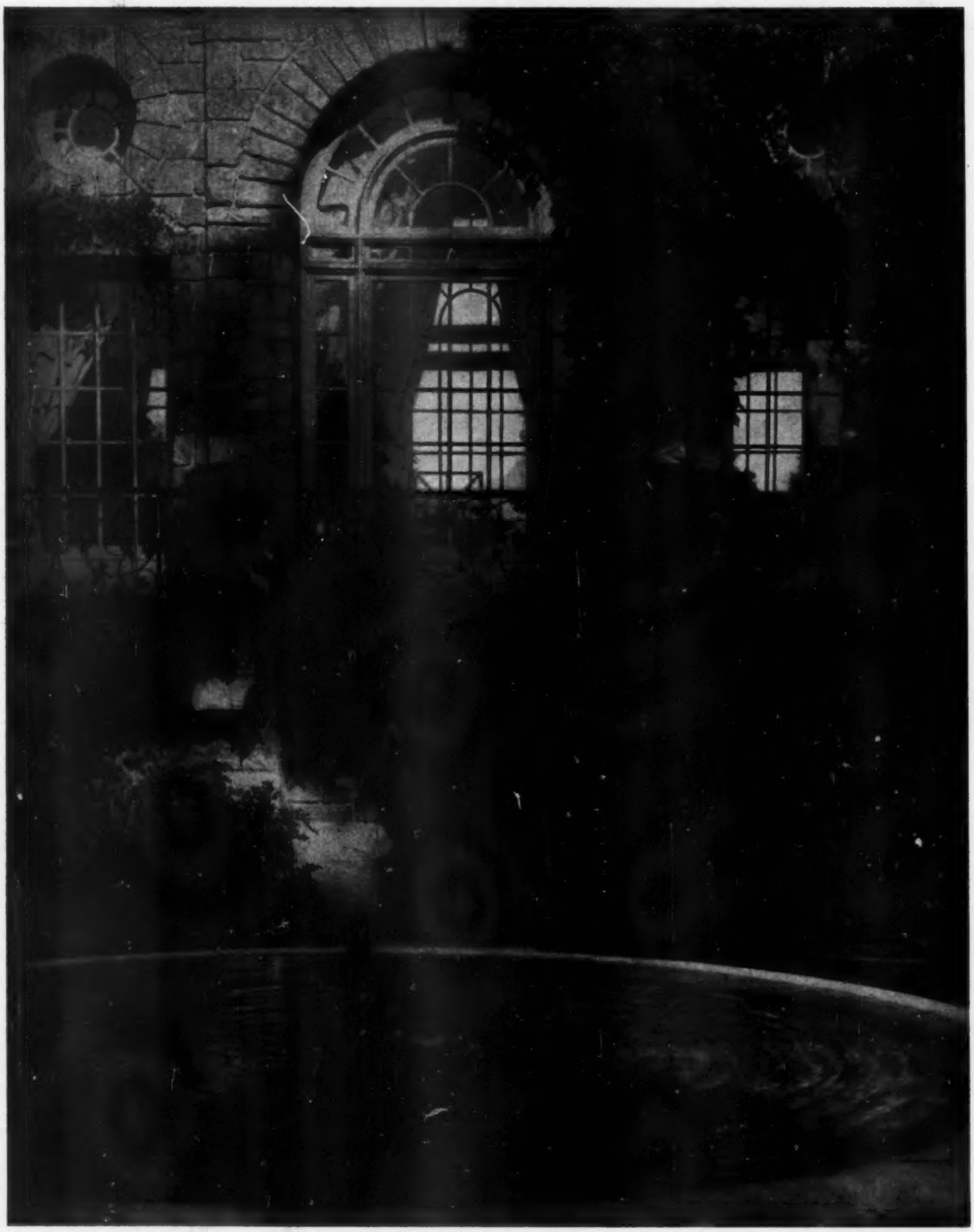
INFLUENCED by these ideas, the officers of the Telephone and Telegraph Companies decided to adopt the Greek style for their great headquarters building.

There will be four entrances on Broadway; Paul Manship's well known panels representing the four elements are to mark them. Very little work by the best sculptors is to be found in the lower part

FOUNTAIN GROUP BY PAJOU

GARDENS OF JOHN D. ROCKEFELLER, ESQ., POCANTICO HILLS, N. Y.

WELLES BOSWORTH, ARCHITECT



TEA HOUSE AND FOUNTAIN POOL

ESTATE OF JOHN D. ROCKEFELLER, ESQ., POCANTICO HILLS, N. Y.

WELLES BOSWORTH, ARCHITECT

VIEW IN INTERIOR OF TEA HOUSE IN THE GARDENS OF
JOHN D. ROCKEFELLER, ESQ., POCANTICO HILLS, N. Y.
WELLES BOSWORTH, ARCHITECT

of the city, and especially is this true of cases where they may be studied near the street level. Sky line sculpture is attractive and a natural crown to architecture, (note for instance the figure of electricity on the Fulton Street tower of this big building, often spoken of as the best terminal figure in this country) but a glance is all that is given to a sky line, whereas sculpture within easy range of one's vision is much more easily appreciated.

An example of the influence on building during the war period
One of a series of pavilions as designed for the
Massachusetts Institute of Technology

The attic story of the Telephone and Telegraph Building frames the groups of orders below into a harmonious ensemble. One admires the restraint exercised in keeping this simple wall space free from windows, and it speaks volumes for the appreciation of beauty on the part of those responsible that none were allowed there. As a matter of fact, there are squash courts and open air playground spaces behind this wall for the recreation of the employees. Their welfare and happiness are provided for in many ways in this remarkable building; even a special hospital for the general dispensary treatment where minor operations are performed as well, and restaurants, rest rooms for men and for women, soda fountain and quick lunch counters and a large lecture hall for movies are some of the varied service features.

The officers' quarters are of extreme simplicity, though done with fine feeling in all the details, panelling, fireplaces, special furnishings, and electric fixtures. The machinery and mechanical equipment basements are models of their kinds.

One sees no name placarded on the exterior of this building. It needs none. Its distinction gives it individuality, its noble quality needs no praise.

THE house of Mr. and Mrs. Walter Farwell at Syosset, Long Island, stands on a level piece of ground surrounded on all sides with wooded slopes—those at the South from which the house is approached are higher than the fore-

The pavilions at Massachusetts Institute of Technology as completed

This is one of the deprivations or depradations of the War on an American building. Finished during the worst of the War period, when a drive was on for an endowment fund to increase the salaries of the teachers, the Institute authorities felt it was impossible to appropriate a dollar to buildings which could be avoided—so these flanking porticos were omitted to save the cost. Fortunately it is not too late to add them on

FOUNTAIN IN FORECOURT OF GARDENS ON ESTATE OF JOHN D. ROCKEFELLER, ESQ., POCANTICO HILLS, N. Y.

WELLES BOSWORTH, ARCHITECT

REPRODUCED BY ROMANELLI, SCULPTOR, FROM ORIGINAL BY JOHN OF BOLOGNA court level, the woods at the West are level with the house, while to the North and East the ground drops away in billowy tree tops of oak pierced with beautiful native cedars in great abundance. The dominant particularity of this stately mansion is the fact that it is perfectly and completely symmetrical. There is no servants' wing. The suppression of this inevitable feature in American country houses has been so skillfully accomplished that at first glance one quite forgets to note the fact. Here, the house stands on a paved terrace between the forecourt walls. The kitchen and service entrance are wholly out of sight under the terrace at the East where the ground level is a story lower, thus giving abundant light in both kitchen and laundry windows.

The dining room is served, as in city houses, by a dumbwaiter to the butler's pantry above. Thus the house has its vistas unobstructed in all directions. A true *"Maison de Plaisance."* Gaston Redon, Mr. Bosworth's patron in the Beaux-Arts, always advised his students to read a program at first to see how many things may be put either in the basement or the attic, thus freeing the first floor. Mr. Bosworth has done it in this case. Rarely has so simple a plan been seen for a country house.

There are two axes only. From the entrance vestibule the eye is led out across the music room to the garden parterre beyond, and a Chinese pagoda overhanging the trees of the ravine to the North. At West and East a vaulted corridor with marble floor leads from the dining hall to the library. Both of these rooms are of splendid proportions, and though the windows are very large they seem in perfect scale. A reception and coat room are at the right of the entrance, an *"escalier a la francaise"* at the left, a writing room or ladies' salon, (in black with Chinese screens set in the wall), is at the West of the music room, and a small library or living room opposite on the side towards the dining room, which is served from an adjoining butler's pantry and service stair, completes the plan of the main floor. The octagonal music room goes through two stories with a flat dome above. This feature surprises and delights the visitor. Following through the vaulted vestibule and corridor the high dome forms a satisfying climax. The wall and ceiling decorations of the library were frankly inspired by "Sion House" though the antique marble mantels were purchased by Mrs. Farwell in Dublin as was also much of the furniture. The architecture of the dining room is more "early American" than that of the library and resembles the Doric order of pilasters and cornice in Independence Hall at Philadelphia. The antique staircase is somewhat light for the spacious hall enclosing it, but it possesses that quality of charm which can only be obtained, it seems, by thus installing old features in our new houses. They breathe the air of romance and the sentiment of foreign lands, as does some fragrant odor. Mere form and color can seldom do this, when they are fresh and new. Small wonder is it that the owner and the architect sacrificed a point of scale for the greater quality to be obtained by using this quaint old carved oak balustrade from England.

"Woman," by George Grey Barnard, Sculptor, in Gardens of Estate of John D. Rockefeller, Esq., Pocantico Hills, N. Y.

The style of the exterior has been described as

THE SLEEPING ARIADNE

DETAIL IN GARDENS OF JOHN D. ROCKEFELLER, ESQ., POCANTICO HILLS, N. Y.

REPRODUCTION BY FREDERICK G. M. ROTH, SCULPTOR —— WELLES BOSWORTH, ARCHITECT

View of the Antique Stairway, brought from England, and placed in house of Walter Farwell, Esq., Syosset, Long Island, N. Y.
Welles Bosworth, Architect

have an astonishingly beautiful variety of soft colors in pastel shades of pink, lavender and pearly grey and amply justify the trouble and expense of their transportation. The house is rectangular in plan, measuring, 48′-0″ in width by 122′-0″ in length; the terrace is 15′ wide and the forecourt a simple gravel space for turning and backing of automobiles is approximately 110′ by 90′. The drive leading to the garage turns out of this court to the East so that empty vehicles do not return by the same route by which they came—this according to the best old French tradition. The main floor is 16′-0″ from finished first floor to finished second floor, the second floor is 11′-6″ from finished second floor to finished third floor. Simple, dignified, spacious, elegant. Situated in a park of 160 acres of beautifully wooded land with dependencies of farm buildings, a gardener's house, garages, etc., this estate is certainly one of the most, if not, as many people call it, "quite the most perfect country home in America."

the work of an English gentlemen of the late Gregorian period who had travelled extensively in France and Italy. Limestone pilasters frame the end projections and carry a limestone cornice and balustrade. The central doorway, of Doric purity is also of limestone. The balustrade and high brick parapet cover the attic story of servants' rooms. This story, much smaller in plan than the one below, sets back from the parapet wall leaving a wide space for light and air and a promenade or out-door sitting space for the servants, thus completely isolating them and the noise of their voices.

The house walls are of old Colonial brick brought from Virginia. The buildings on the Breckenidge farm from which they came were said to have been built by Jefferson. These bricks

THE "Ocean Cable Building" on Broad Street was built on leased land, and was restricted in height by the owners to allow light and air in the Johnson Building, to the East, but the architect has found a treatment of this little façade at once individual, notable and characterful. It is light, yet strong; the architecture is simple yet rich. Standing as it does on a small lot surrounded by tall and imposing buildings, it announces itself even from Wall Street with a gentle yet insistent modesty, appropriate to the fact that its services require that all the world should note both it and its location. The panel beneath the central window bears sections of the first Atlantic cables, and an inscription giving the dates of their laying, with a pretty decoration of shells, waves and sea horses by the sculptor, Emil Siebern. Greek Doric in style, this edifice reflects with becoming grace the front of the old Sub-Treasury building on Wall Street, toward which it looks and to which it is evidently a near relative.

(Continued on page 20)

·EDITORIAL·COMMENT·

THE REPORT OF the Committee on Education to the fifty-fifth annual convention of the Institute, like previous reports on this very vital matter, is a scholarly and well written document.

It is gratifying to learn that the investigations of the Committee show that the conditions surrounding architectural education in this country generally have materially improved. There is evidently a strong desire on the part of those who have this important subject at heart, to study carefully every proposal that is presented and to apply such thoughtful research to the best ends.

The Committee is strongly of the opinion that it is only the exceptional graduate who at graduation is fit to practice architecture as a principal. And it states its belief that experience in an office is as essential to the architect as hospital experience is to the doctor. Just why it should have ever been thought that the architectural student might upon graduation be competent to practice his profession in its commanding aspects, it is difficult to understand.

The graduates at West Point and Annapolis graduate to the lowest commissioned rank and must serve through successive grades before they are given a command. No profession or craft considers its graduate students qualified to assume high responsibilities until they have had years of experience.

Experience in an office is highly essential, and this recommendation of the Committee will, if followed, insure the most satisfactory results. Offices are logically post-graduate schools of architecture. This being true, there devolves upon every practicing architect the realization of a duty, to see to it that the young man who comes to him from an architectural school, fired with great ambitions and high ideals, shall find exactly the proper guidance and instruction to carry him uninterruptedly on to the goal for which he strives.

Recently attention has been drawn to a large architectural office where young men have been trained and guided correctly. The roster of the men coming out of that office is the list of men who today rank highest in the profession of architecture. A similar attitude generally throughout the profession is a solemn duty. It is the highest development of paternalism, and the most satisfying effort that an architect can make.

* * *

RESULTS OF THE EXHIBITION of American architecture in France and England are far beyond expectations. That these results were greatly forwarded by the presence in Europe, during the period of the exhibition, of American architects high in the profession may not be questioned. So greatly appreciated was this collection of American work by our professional brethren in Europe that requests from many cities were made for the loan of the exhibit. The artistic press of Europe, without exception, warmly commended the work as setting the highest examples in architectural design. Distinguished architects in their addresses before the R. I. B. A. and the French architectural societies, were unstinted in praise.

It is, of course, proper that we should with modesty receive these fine expressions of approval of our architectural advancement, but it is difficult to refrain from a feeling of deep satisfaction, as the men who have acclaimed our excellence are, by reason of their high standing in their own country, the most competent of critics.

It would be a splendid exchange of courtesy to invite from Europe an exhibition similar in character to that of our own. While the Institute has yet to perfect its building plans for the Octagon, and has no place sufficiently large to house what would undoubtedly be a large exhibition, we have here in New York the Vanderbilt Galleries, and on those spacious walls an exhibition could be hung under the auspices of the Institute, that would be something very much worth while. As a part of the usual dignified exhibition of the Architectural League of New York, it would attract the largest attendance and have the utmost educational advantage.

* * *

THE SUBJECT OF WIRING for light and power in dwellings is one that assumes additional importance day by day. The series of articles in THE AMERICAN ARCHITECT, of which the concluding article appears in this issue, have been not a plea for more wiring but an exposition of what people today demand in the way of electrical service. A drive is on throughout the country to introduce electrical utilities large and small, the effect being to make the item of wiring fully as important as the items of foundations, walls and roofs, the indispensables which one expects as a matter of course in all houses. Electrical ranges are ideal for small kitchens for they radiate no heat and the cost of operation compares favorably with gas. Electrical refrigerators are in common use and electrical heating is no longer a small reflector sending a shaft or radiant heat through a room, but is an efficient apparatus capable of heating satisfactorily an ordinary room. Architects who fail to advise clients to provide an average of three outlets per room with a minimum of two outlets in any room, as well as a power circuit in addition to lighting circuits, will some day be reproached for lack of foresight.

* * *

STRUCTURAL DESIGNING HAS a literature so vast that one would think there is nothing more to be said. In this issue the first installment of an article on simplified methods of design will attract attention because of the obvious accuracy and common sense of the methods presented. Obtaining stresses by means of measured deflections in models is especially applicable to reinforced concrete because of the monolithic character of structures in this material. The assembling of frames of wood and frames of steel makes it necessary to form joints and the designer has at all times full control of permissible stresses. The assemblage however of parts of a reinforced concrete frame is a casting operation. The structure must act as a whole and no provision can be made for joints where stresses must end. Every applied force sets up interior forces, the effects of which are felt in lessening degree to the furthermost connections and parts.

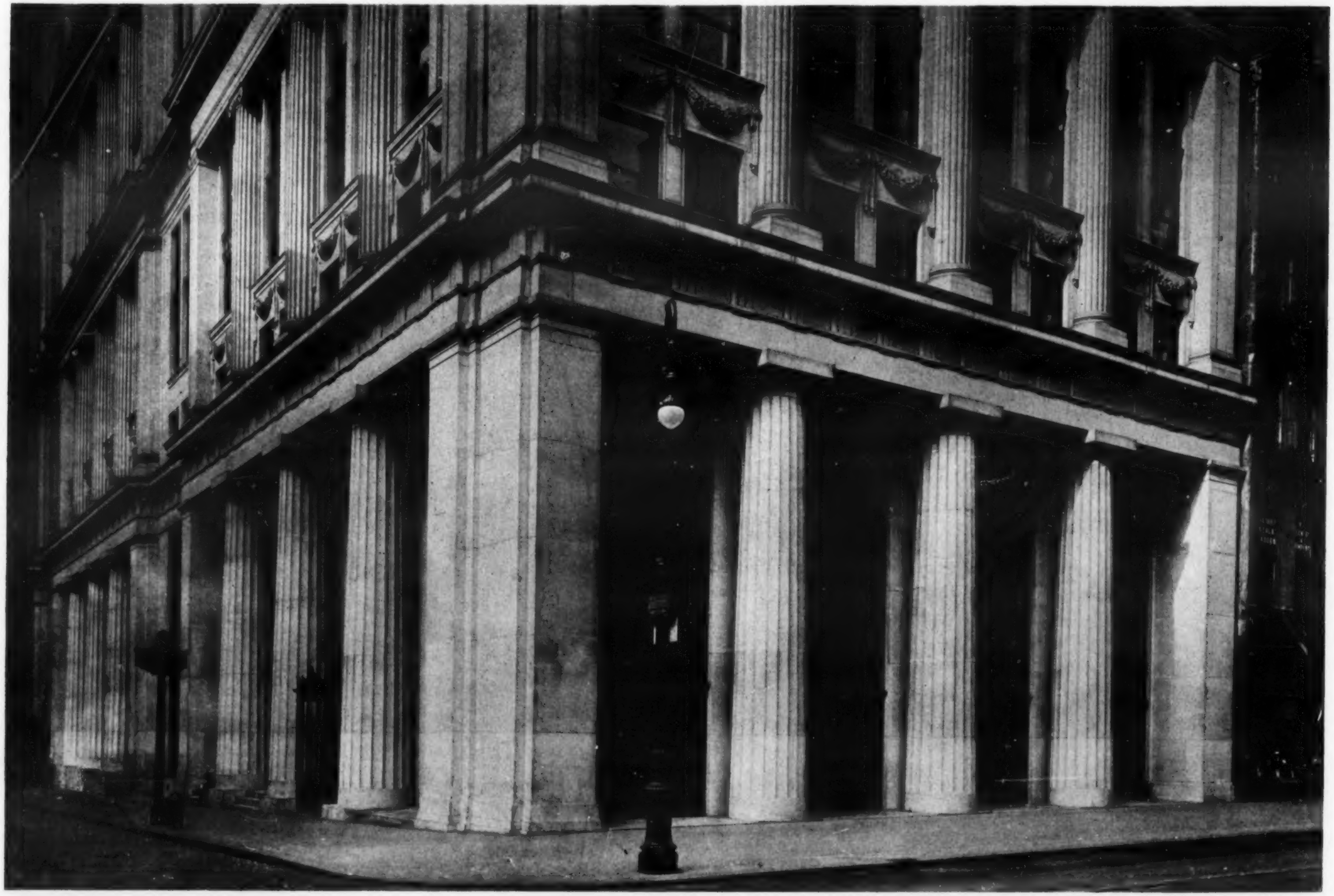
A question arises as to the accuracy of stress determinations in reinforced concrete frames in which the presence of steel affects the moment of inertia of the section. Professor Beggs in this connection, says that by means of a paper model of a structure the stresses are determined and the corresponding sections and reinforcement of the actual structure designed. A second model may then be made, if the refinement is desired, with the widths of its members proportional to the cube root of the moment of inertia of the actual section used. This second model is then tested to determine the new distribution of stresses, and the sections and reinforcement of the first design modified accordingly. It is seldom necessary to revise the first estimate of stresses more than once, for it is only the proportion and not the actual section of the members that determines the distribution of stresses. Considerable changes, too, can be made in the proportion of members with small change in the distribution of stress.

Warning must be given about using models in obtaining stresses, namely, that it does not offer opportunity for incompetent men to enter the designing field. The method is one that will shorten the time now required and lessen the labor of competent men in work which is so heavily mathematical that it breeds the habit of following the line of least resistance and the use of simple and uneconomical forms.

Study for a house at Mill Neck, Long Island, N. Y.

Alfred C. Bossom, Architect

(From the original pencil sketch by L. J. Keimig)



DETAIL OF LOWER STORIES

TELEPHONE AND TELEGRAPH BUILDING, BROADWAY, NEW YORK

WELLES BOSWORTH, ARCHITECT

ENTRANCE VESTIBULE AND ELEVATOR HALL

TELEPHONE AND TELEGRAPH BUILDING, BROADWAY, NEW YORK

WELLES BOSWORTH, ARCHITECT

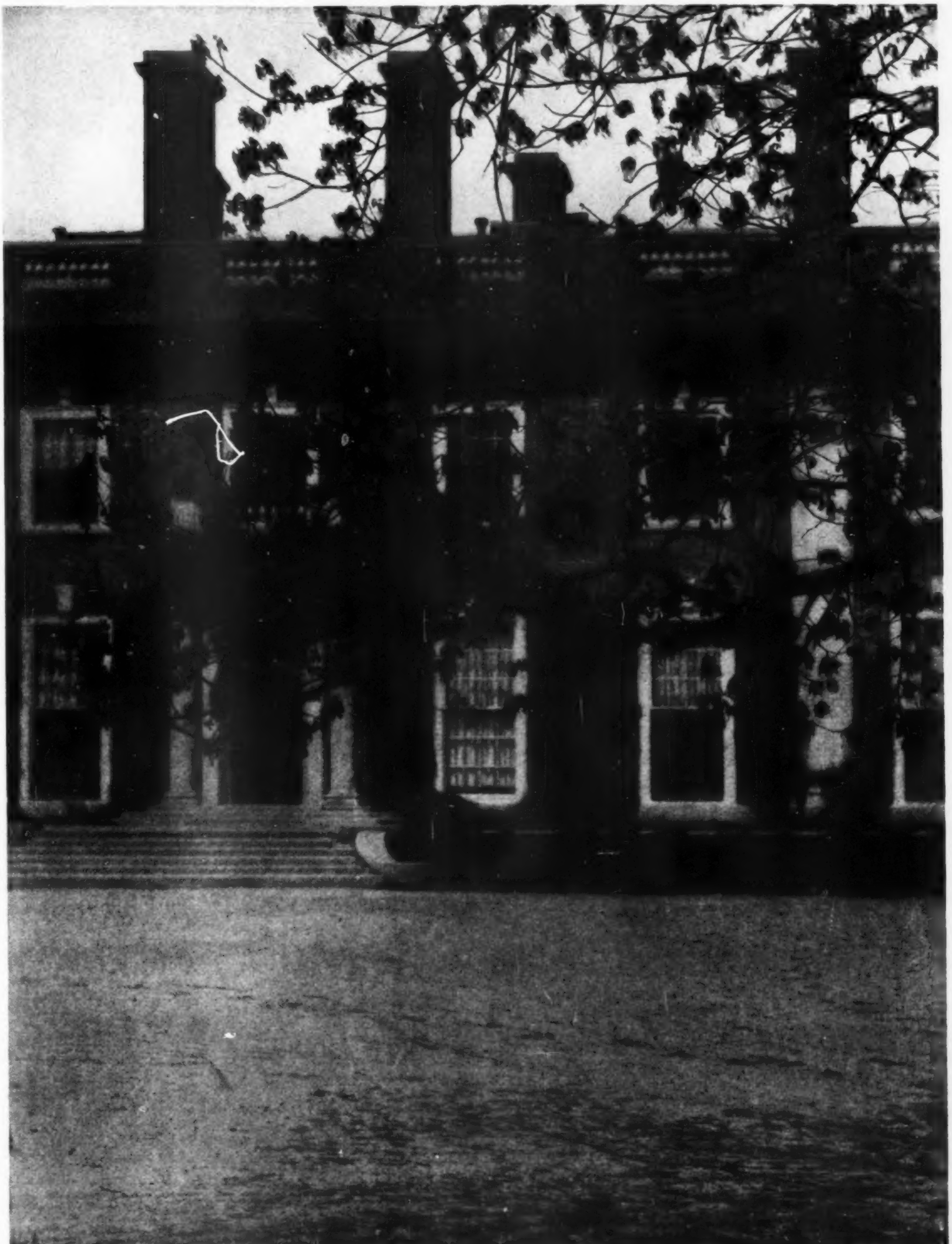
DETAIL OF TOWER SURMOUNTING NORTH WING OF THE TELEPHONE AND TELEGRAPH BUILDING, BROADWAY, NEW YORK

WELLES BOSWORTH, ARCHITECT

THIS BUILDING IS CONSTRUCTED ENTIRELY OF WHITE GRANITE. ALL WINDOW SASH AND MULLIONS ARE OF BRONZE. THE SURMOUNTING FIGURE OF "ELECTRICITY" IS OF BRONZE AND 19 FEET HIGH

HOUSE OF WALTER FARWELL, ESQ., SYOSSET, LONG ISLAND, N. Y.

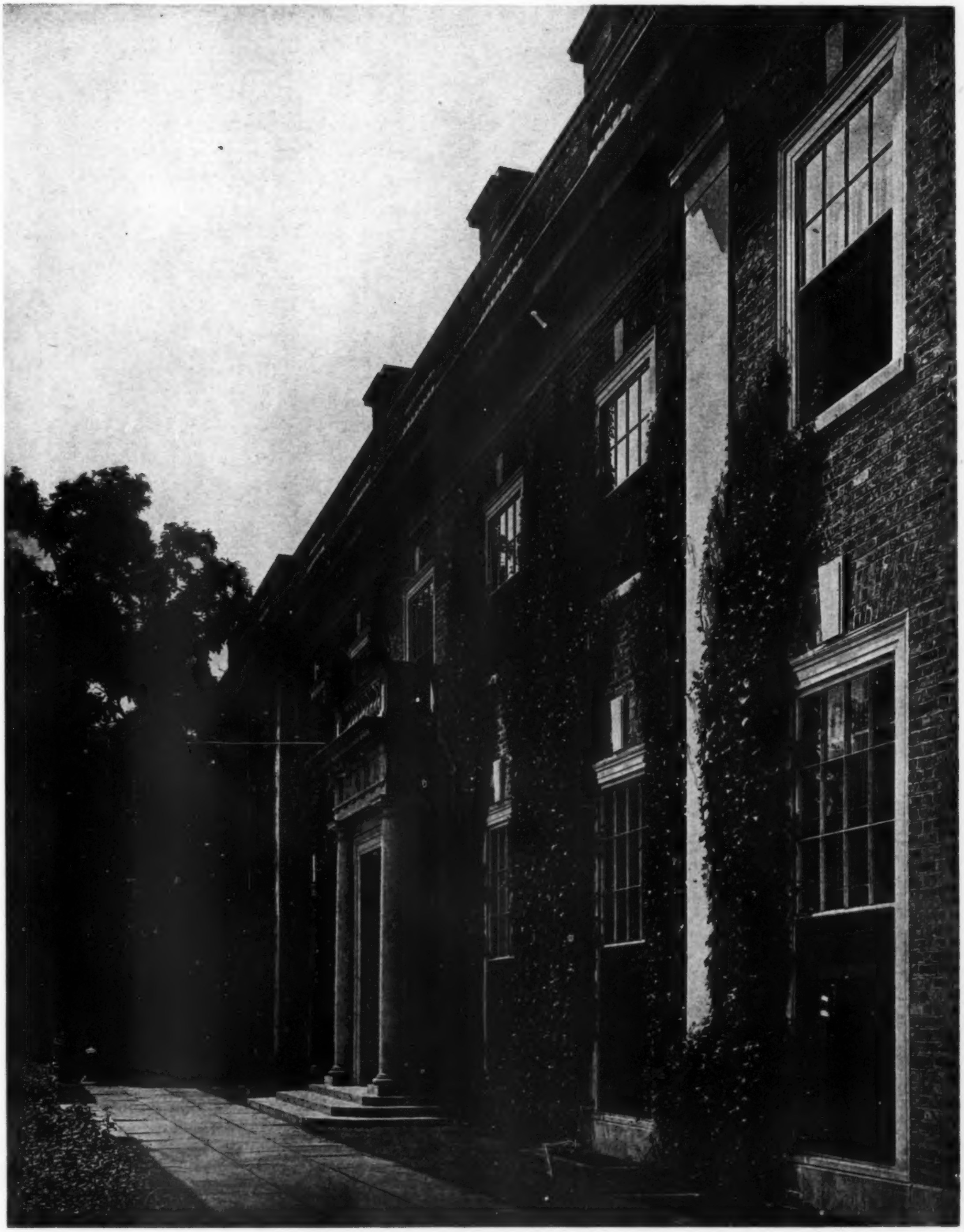
WELLES BOSWORTH, ARCHITECT



SOUTH FRONT

HOUSE OF WALTER FARWELL, ESQ., SYOSSET, LONG ISLAND, N. Y.

WELLES BOSWORTH, ARCHITECT



SOUTH TERRACE AND ENTRANCE

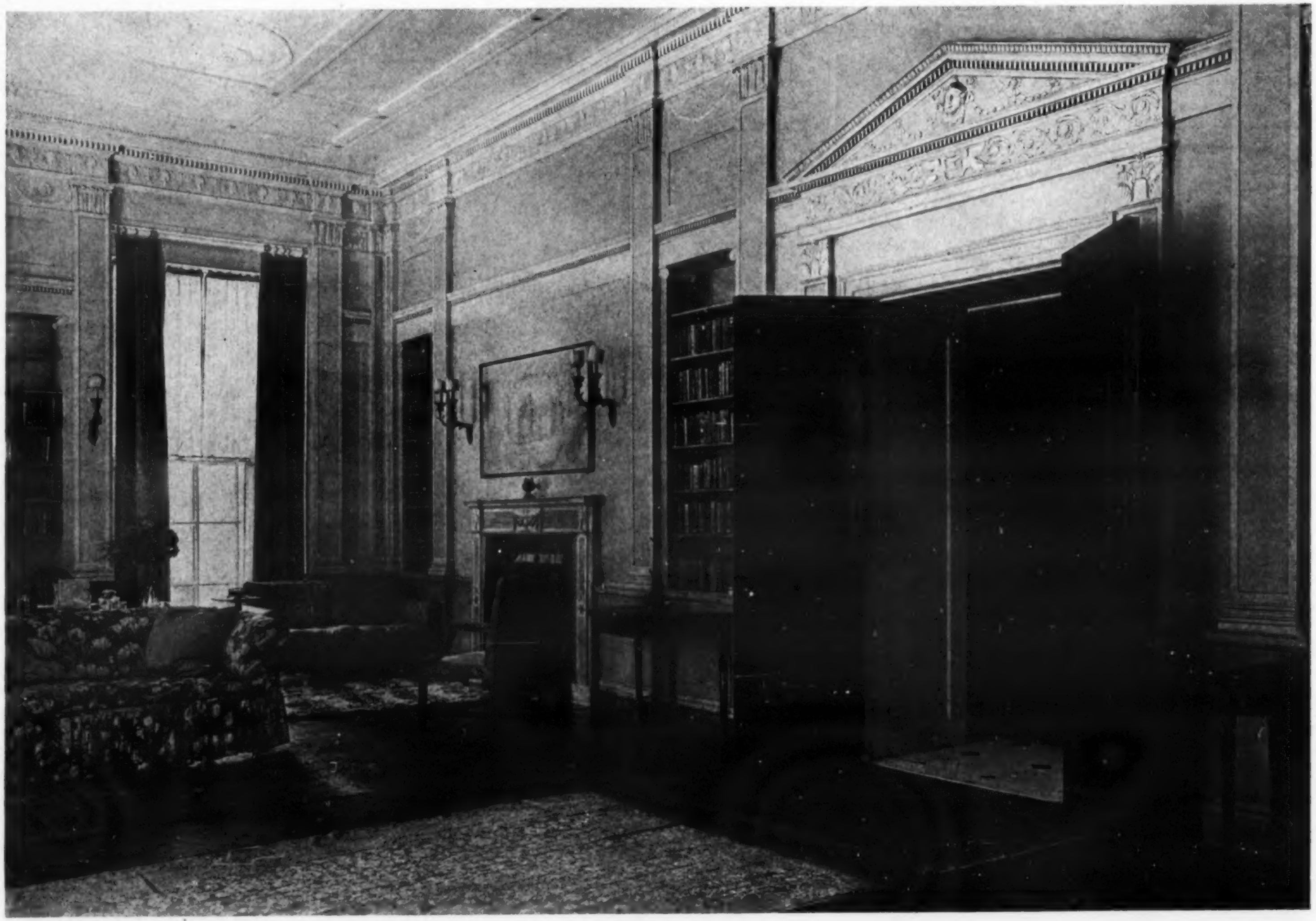
HOUSE OF WALTER FARWELL, ESQ., SYOSSET, LONG ISLAND, N. Y.

WELLES BOSWORTH, ARCHITECT

DETAIL ON NORTH TERRACE

HOUSE OF WALTER FARWELL, ESQ., SYOSSET, LONG ISLAND, N. Y.

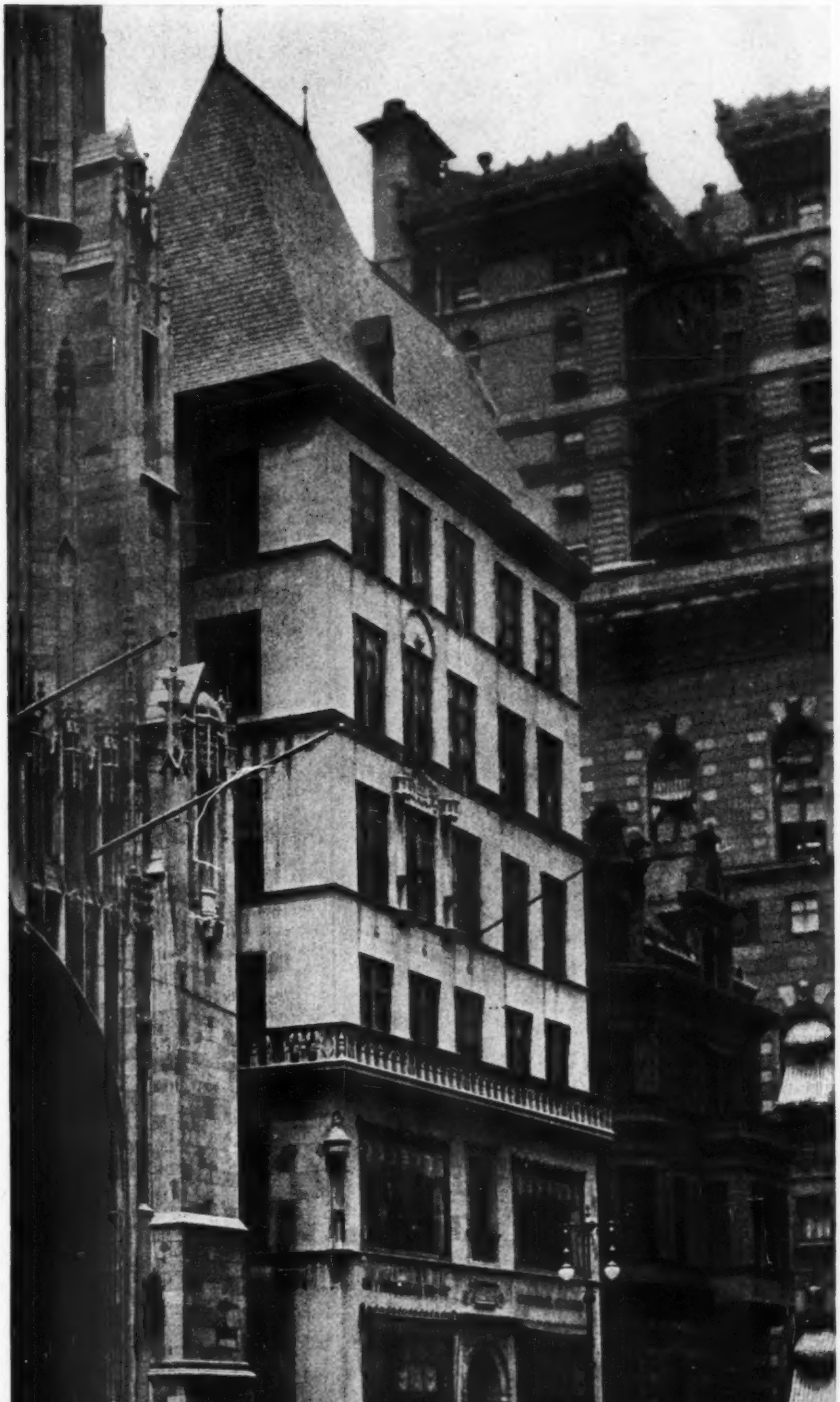
WELLES BOSWORTH, ARCHITECT



VIEW IN LIBRARY

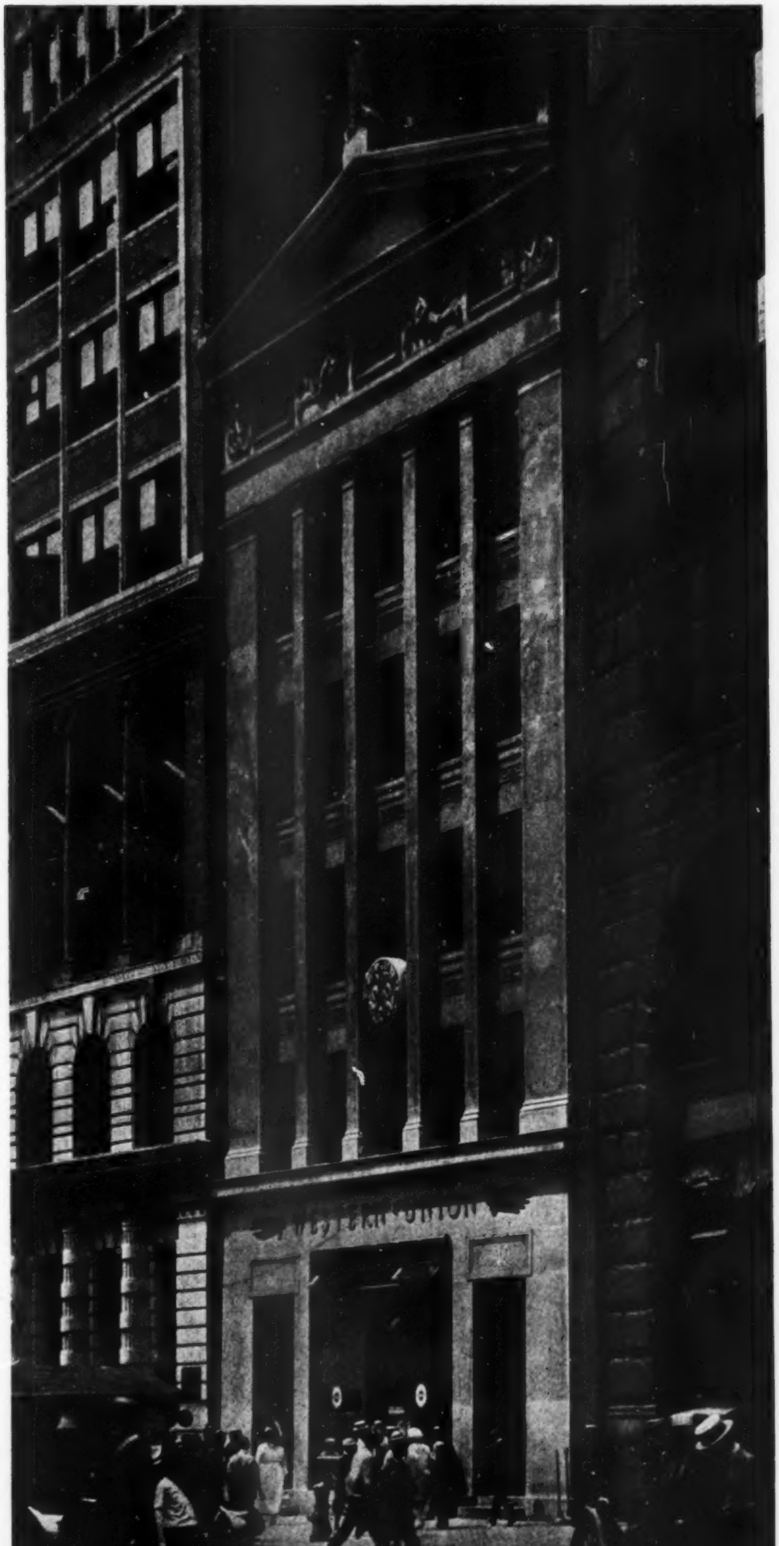
HOUSE OF WALTER FARWELL, ESQ., SYOSSET, LONG ISLAND, N. Y.

WELLES BOSWORTH, ARCHITECT



OFFICE BUILDING, 680 FIFTH AVENUE, NEW YORK

WELLES BOSWORTH, ARCHITECT

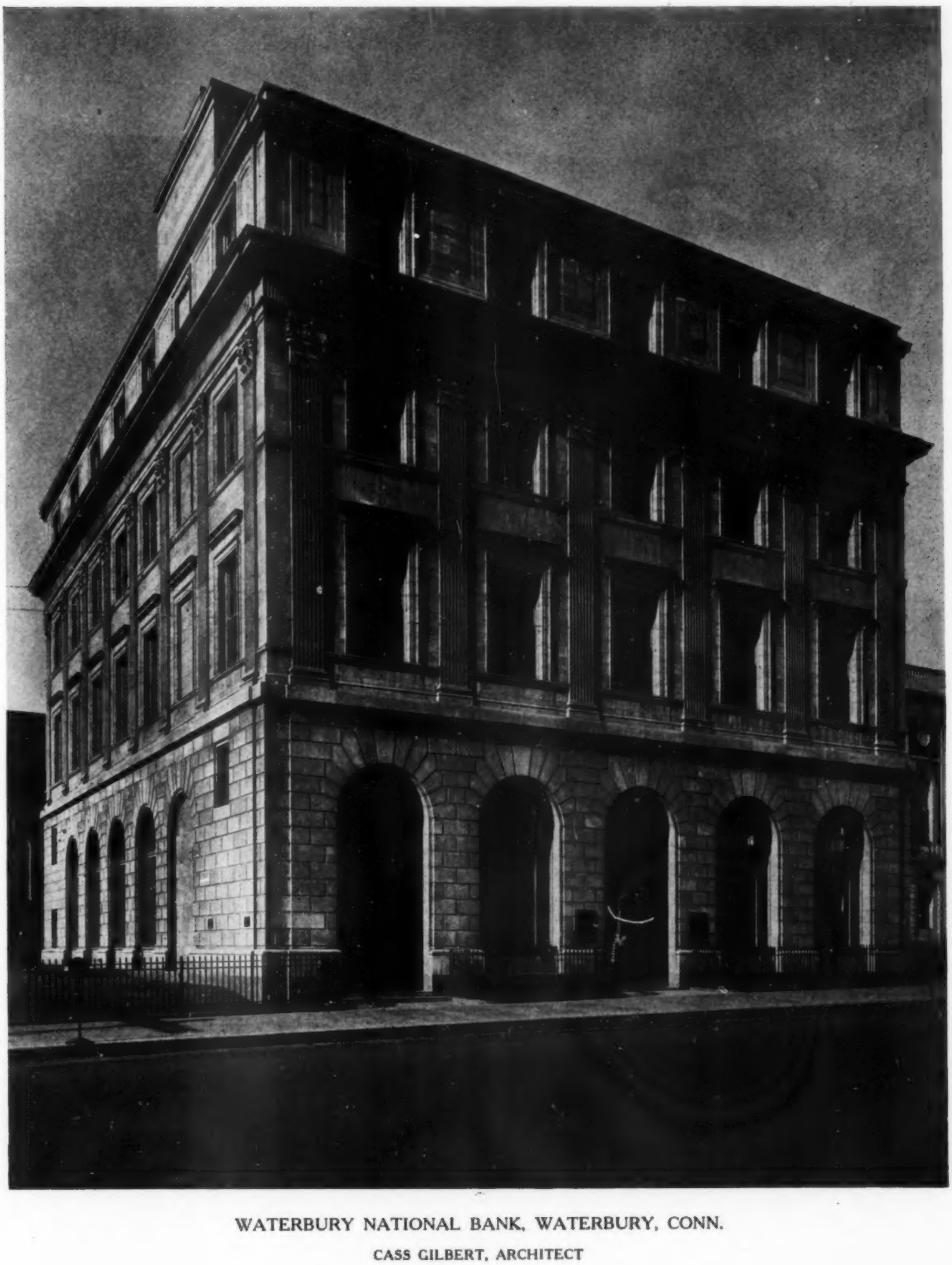


OCEAN CABLE BUILDING
OF THE
WESTERN UNION TELEGRAPH CO.

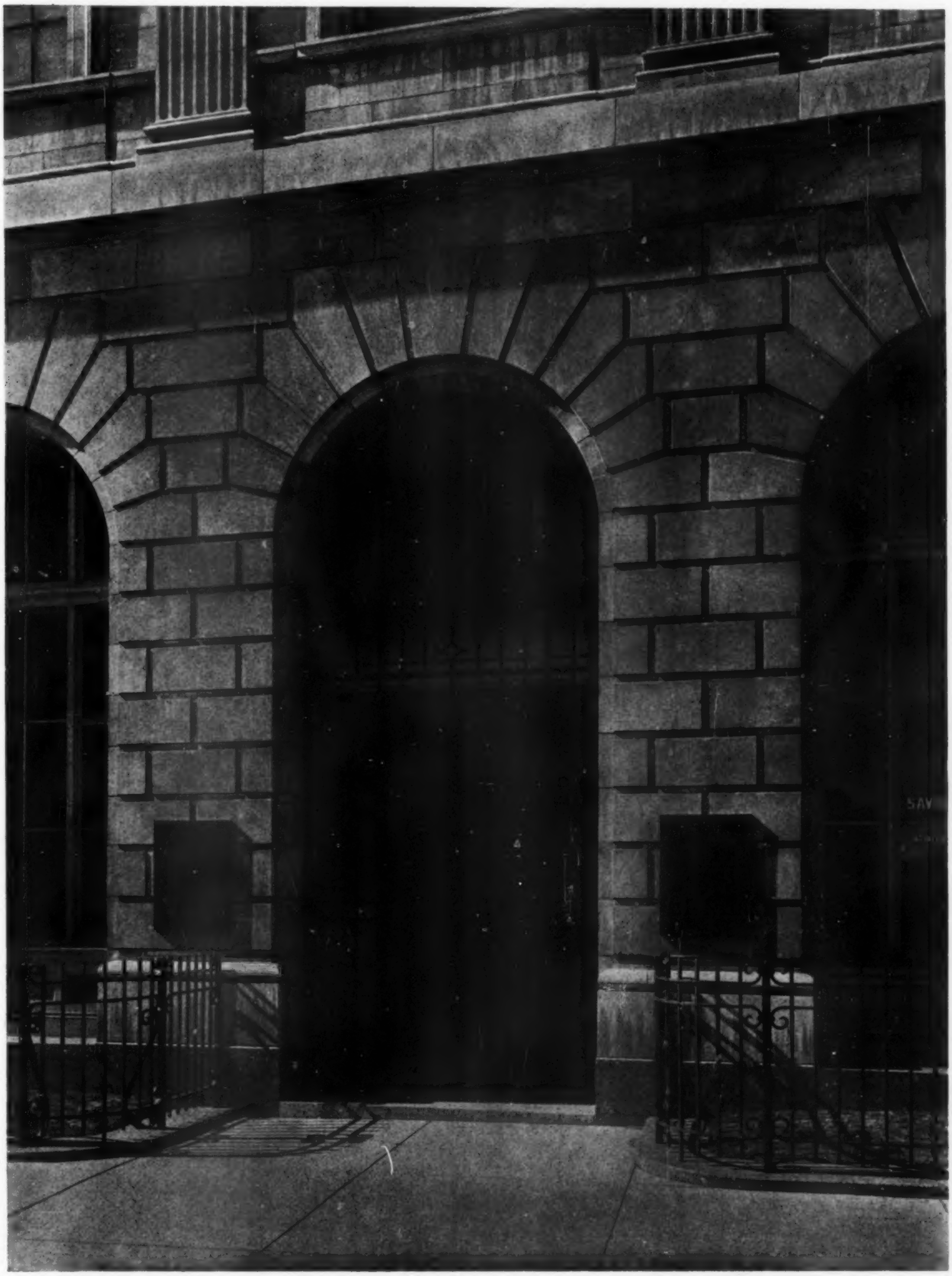
BROAD STREET
NEW YORK

WELLES BOSWORTH

ARCHITECT



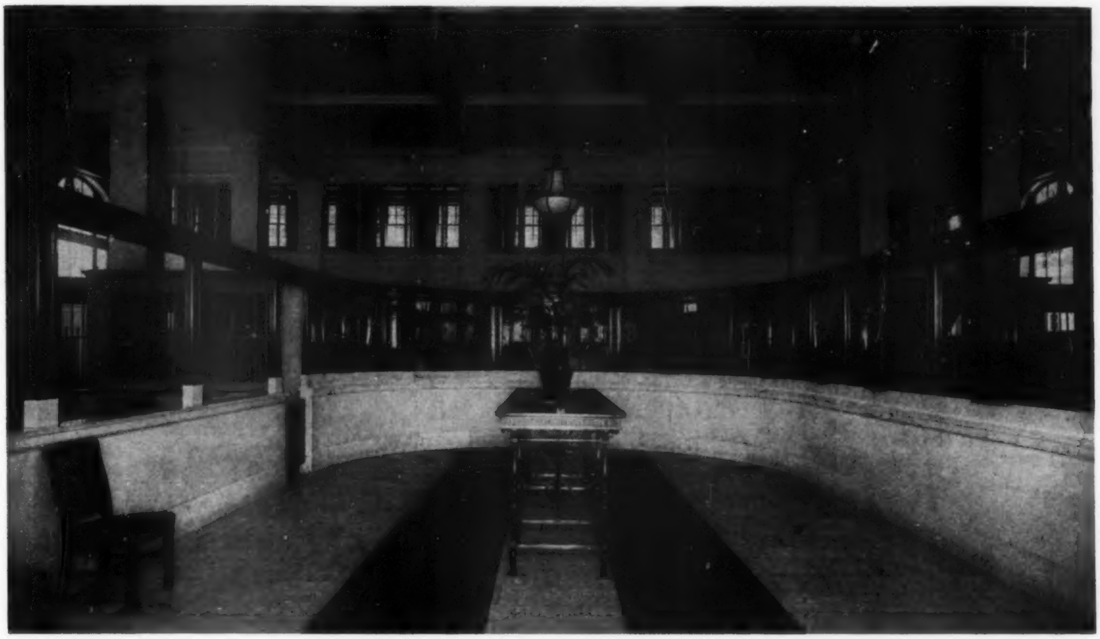
WATERBURY NATIONAL BANK, WATERBURY, CONN.
CASS GILBERT, ARCHITECT



MAIN ENTRANCE

WATERBURY NATIONAL BANK, WATERBURY, CONN.

CASS GILBERT, ARCHITECT



BANKING ROOM

WATERBURY NATIONAL BANK, WATERBURY, CONN.

CASS GILBERT, ARCHITECT

SECOND NATIONAL BANK, ERIE, PA.

W. L. STODDART, ARCHITECT

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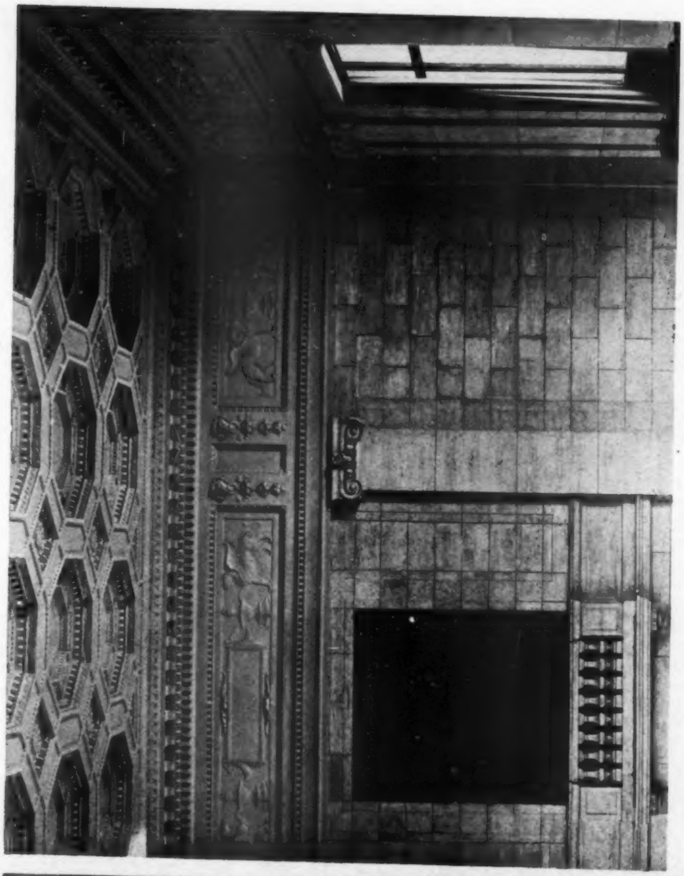
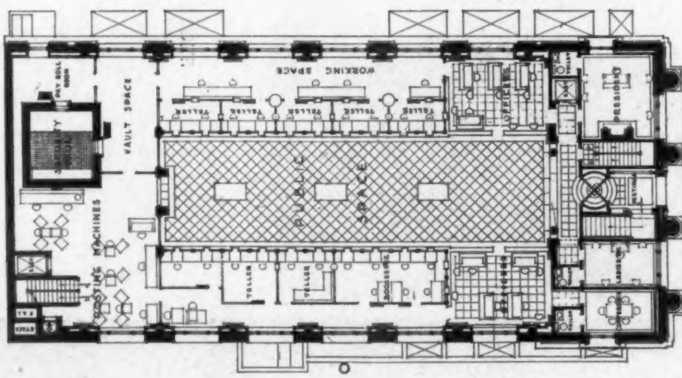


SECOND NATIONAL BANK, ERIE, PA.

W. L. STODDART, ARCHITECT

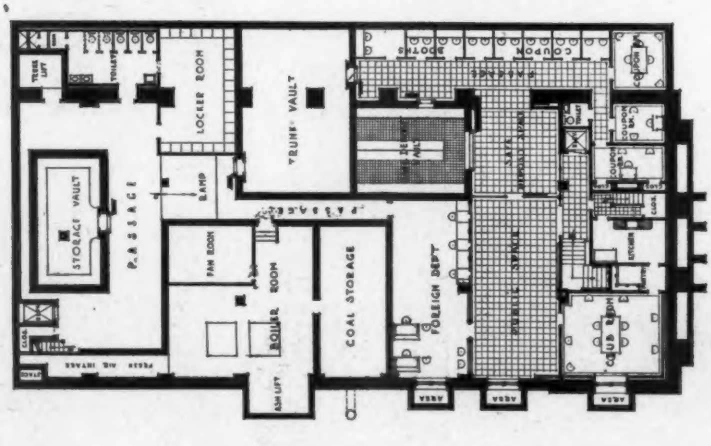
MEZZANINE FLOOR PLAN



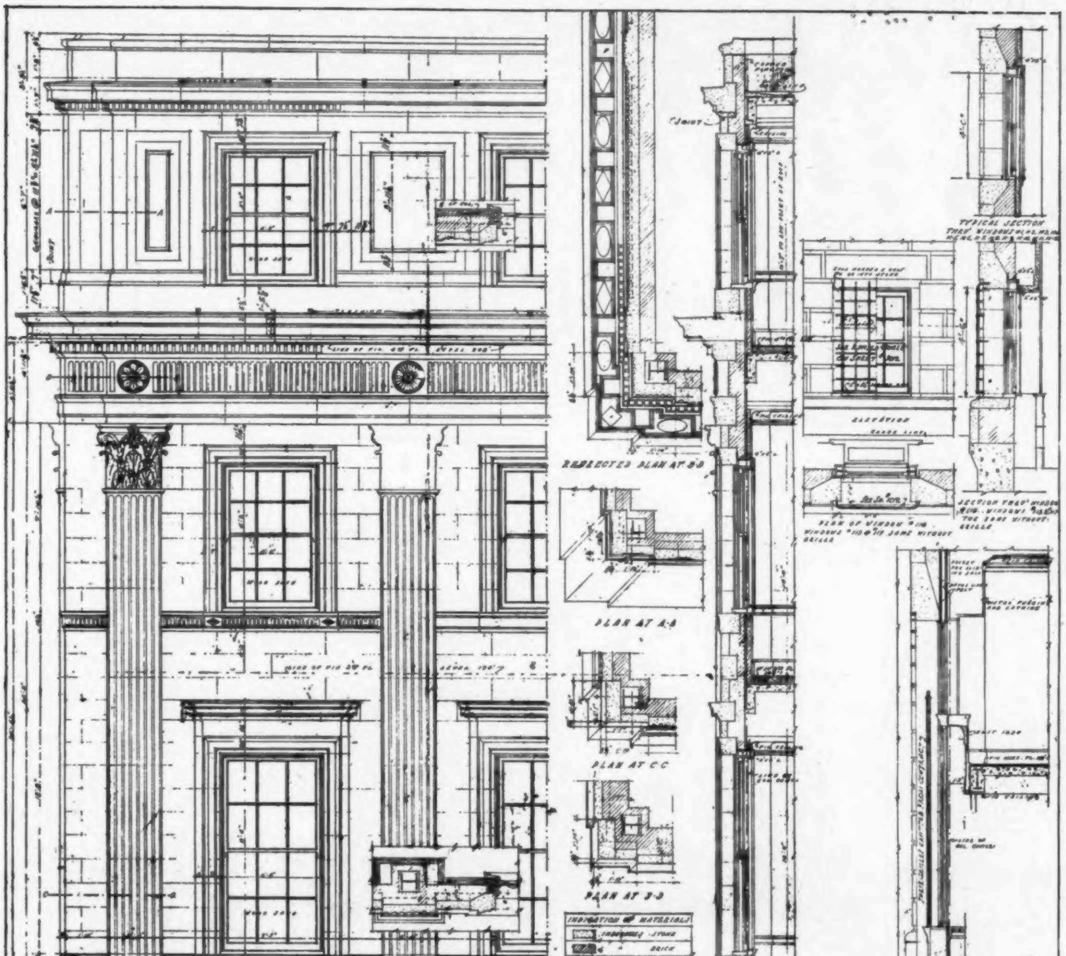
FIRST FLOOR PLAN

SECOND NATIONAL BANK, ERIE, PA.

W. L. STODDART, ARCHITECT



BASEMENT FLOOR PLAN



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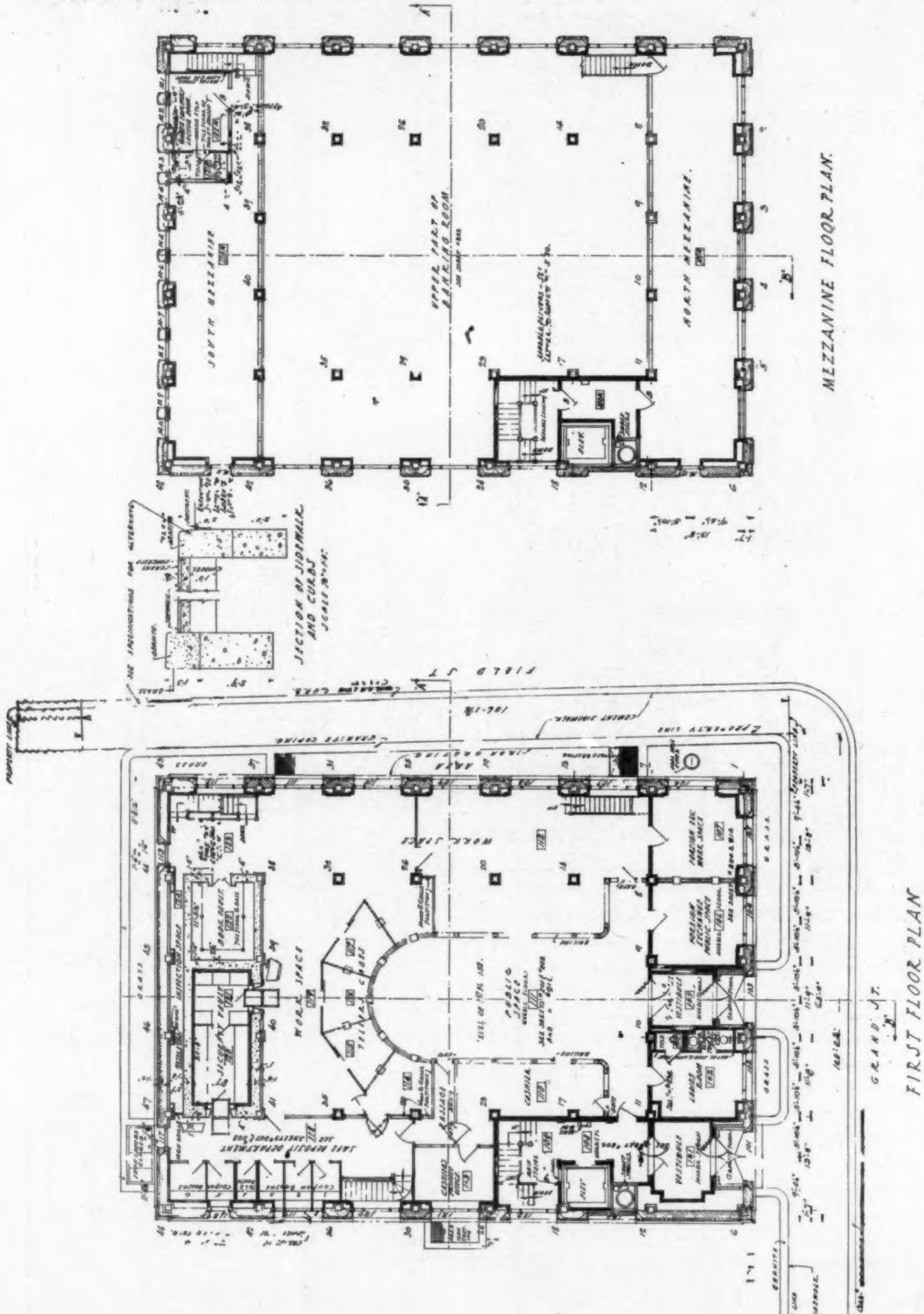
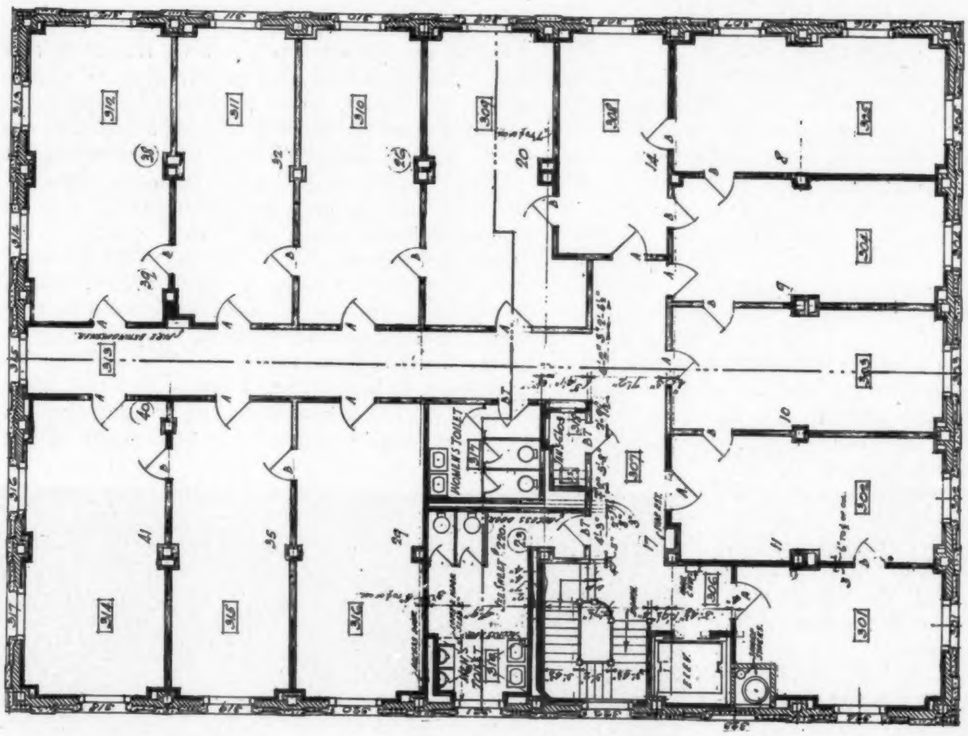
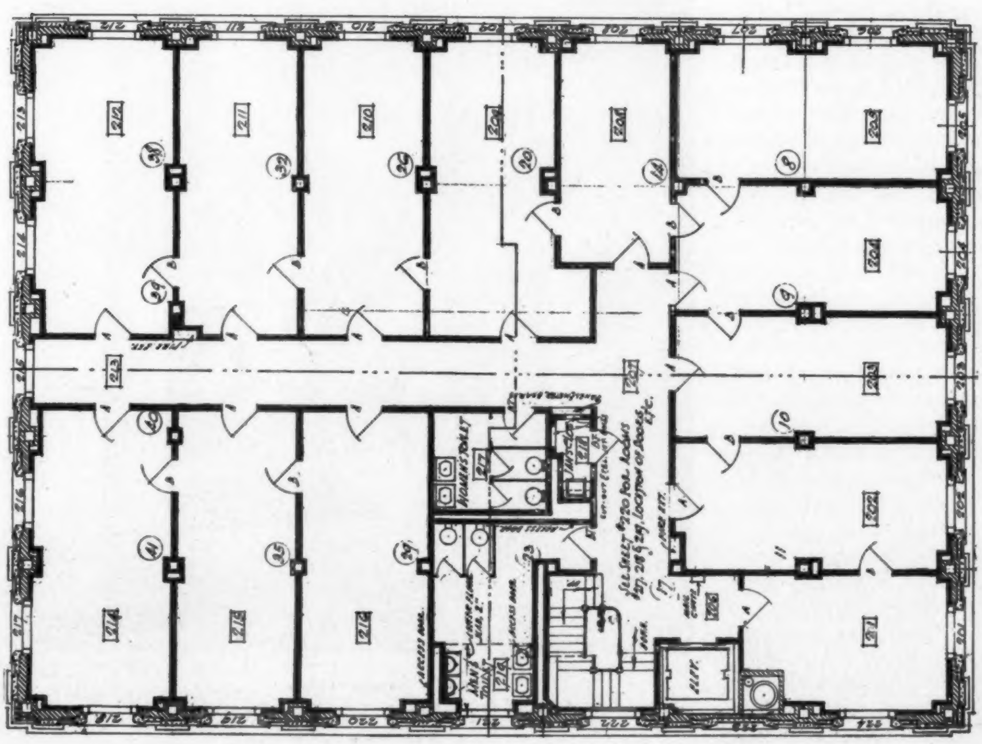
CASS GILBERT, ARCHITECT



WATERBURY NATIONAL BANK, WATERBURY, CONN.
CASS GILBERT, ARCHITECT



THIRD FLOOR PLAN



SECOND FLOOR PLAN

WATERBURY NATIONAL BANK, WATERBURY, CONN.

CASS GILBERT, ARCHITECT

Relation of Classic Example

(Continued from page 18)

The slim pilaster motive of the façade gives broad windows and occupies but little space in the total width. It also groups the upper stories into one and simplifies the composition with great advantage. The scheme seems to be original and to mark a new development in the adaptation of classic architecture to modern needs. A clock dial of marble gives "Western Union Time" to the street with smaller clock faces about the center marking the hour at London, Paris and San Francisco.

Under the pediment, surmounted by a spirited acrothemion with "elan," a frieze of windows and sculptured figures of wind and lightning, gives a note of decoration to the façade. The first story wall is inclined towards the top and forms a strong basement to the pilaster stories above. There are several Goodyear "refinements" or rythmic spacing of openings, curves, etc., and the whole effect is an expression of the best architectural tradition.

ADJOINING the St. Thomas' Church with its staggered offsets and broken surfaces, its great entrance arch and elaborate detail on the South, and carrying over to the University Club on the North the store and office building at 680 Fifth Avenue, New York, presented a difficult problem even if it had not been further limited by the fact that it was required to be a so-called "commercial proposition;" all expenditures not required for business considerations were to be avoided. Though the owner had restricted the height so that it should not cut off the sunlight from his house on 54th Street, he left the matter otherwise to the judgment of his real estate agent and his architect.

The treatment adopted, it will be observed from the illustration, possesses only two features in excess of the average business building, and these are relatively inexpensive, the plain slate roof and the third story balcony, which takes up, by the way, the break in the front wall corresponding to the roofs. These two features, however, suffice to do a fine thing for the passerby. They make not only a charming façade to look upon but they make a whole block front into a harmonious ensemble, instead of an eyesore. It has been remarked that the one-sided composition of St. Thomas' façade at first objected to by some critics, has quite disappeared since the 680 Fifth Avenue Building was built. Its tall roof and broken mass below support and help rather than detract from St. Thomas'. We learn that the architect was urged by some interested persons to use the Gothic style. He objected and fell back on Dr. Stires of St. Thomas' and Mr. Goodhue, both of whom argued that it would look as if St. Thomas' had gone into business. Mr. Bosworth, therefore, adopted the style of the French Renaissance as being midway between the Gothic of St. Thomas and the heavy formality of the University Club. Nothing could have been happier and quite aside from the matter

Entrance Vestibule
House of Walter Farwell, Esq., Syosset, Long Island, N. Y.
Welles Bosworth, Architect

of its neighbors; it is a beautiful yet highly practical commercial structure. The two stories of shop windows, heavily framed with the balcony above, give to them an importance of great value for display and advertising purposes. The entrance with its round arch decorated jambs announces the fine office floors above. The windows of these offices are especially tasteful and pleasing. In their flat, iron frames, the plates of glass cut to decorative sizes, reflect the light in pretty patches, thus breaking up the usual dark holes in the façades where single sheets of glass are used. Two details on this building are especially amusing and enjoyable, the bronze crestings over the shop windows of the second story and the little column pedestal in the empty niche at the corner. There are many empty niches on St. Thomas'. Perhaps when they are filled something may be placed here, but, if so, it will not be as pleasing, in all probability, as it is at present for then, as Rudolph Evans the Sculptor puts it, "the mystery will be explained away."

ART AND ORGANIZATION

BY RICHARD SCHERMERHORN, JR., Fellow, American Society of Landscape Architects

MR. ERNEST FLAGG'S article in a recent number of THE AMERICAN ARCHITECT contains a line of thought familiar to other professions as well as that of architecture. I think I have heard landscape architects talk in similar vein, and at the end of the discussion, there is always one question which has not been satisfactorily answered, and that is, "Which in the long run will predominate, art or organization?" Can the artist develop his greatest opportunities and realize his utmost success by subordinating everything to art alone, or do the requirements of the period demand special efforts along other lines as well? The main argument, that with the education of the people will come the maximum appreciation of the artist, is theoretically sound, but who will say that the time will ever arrive when the public will have reached a real advanced stage of appreciation? The war has taught us many things we had not even begun to think of a decade ago. We had reached a point where it seemed the public had begun to understand; at least there were signs of definite progress in art appreciation. With the war, however, came a blasting of many traditions, and a new group of principal citizens to contend with. It seems nowadays as if it were almost necessary to begin all over again when it comes to the point of working for greater recognition of merit in art, and who can say but what this condition may not occur again, and frequently, during an artist's lifetime?

There is a very good reason why commercial firms are entering the field of the architect and landscape architect in large numbers and are successfully securing the patronage of the public. The public cannot always understand the various points of distinction between good and inferior design, but when it comes to contracts, economics, the provision for practical utilities and the value of organization, these are subjects which have a familiar ring to them, and who can blame the average citizen for being more or less impressed by the firm who talks fluently about these first and art, perhaps, afterward? The language of one is easily understood; the other, more or less complicated.

Yet after resolving the whole question into its elements, there is really only one very important reason why a commercial concern secures work that an architect should get. That reason is because it knows very well how to advertise its wares and the architect does not. There is of course nothing discreditable to the architect in this condition, but at the same time it is a situation worth seriously considering. Before a competent tribunal, there is no question that an architect with properly organized office could illustrate his superiority in every relative particular over the building concern, not only in the design of structures but in execution of work and economics. But architects have apparently not yet discovered the way of approaching the general public and talking to them in a language they can understand. And in too many cases they seem to underrate the value of organization for carrying out work as it should be carried out. When they overcome these drawbacks, architects will be architects, and builders, builders, and the building art will advance. It may be that architects will be forced now and then to step from a pedestal to accomplish a certain end, but if they secure greater opportunities in so doing, and through these opportunities are able to create more and greater monuments to their art, who will say that the path to the ultimate goal has not been shortened? Ethics after all have principally to do with the advance of a just cause toward a definite object, and professional ethics if fully analyzed will be found to be based principally upon common sense. Whatever relates to good sense in the professional ethics of architecture and has natur-

CIRCULAR WHITE MARBLE COLONNADE IN THE GARDENS OF SAMUEL UNTERMYER, ESQ., GREYSTONE, N. Y.

WELLES BOSWORTH, ARCHITECT

(See text for description)

ally to do with honorable conduct, will have much to do with the advancement of the profession.

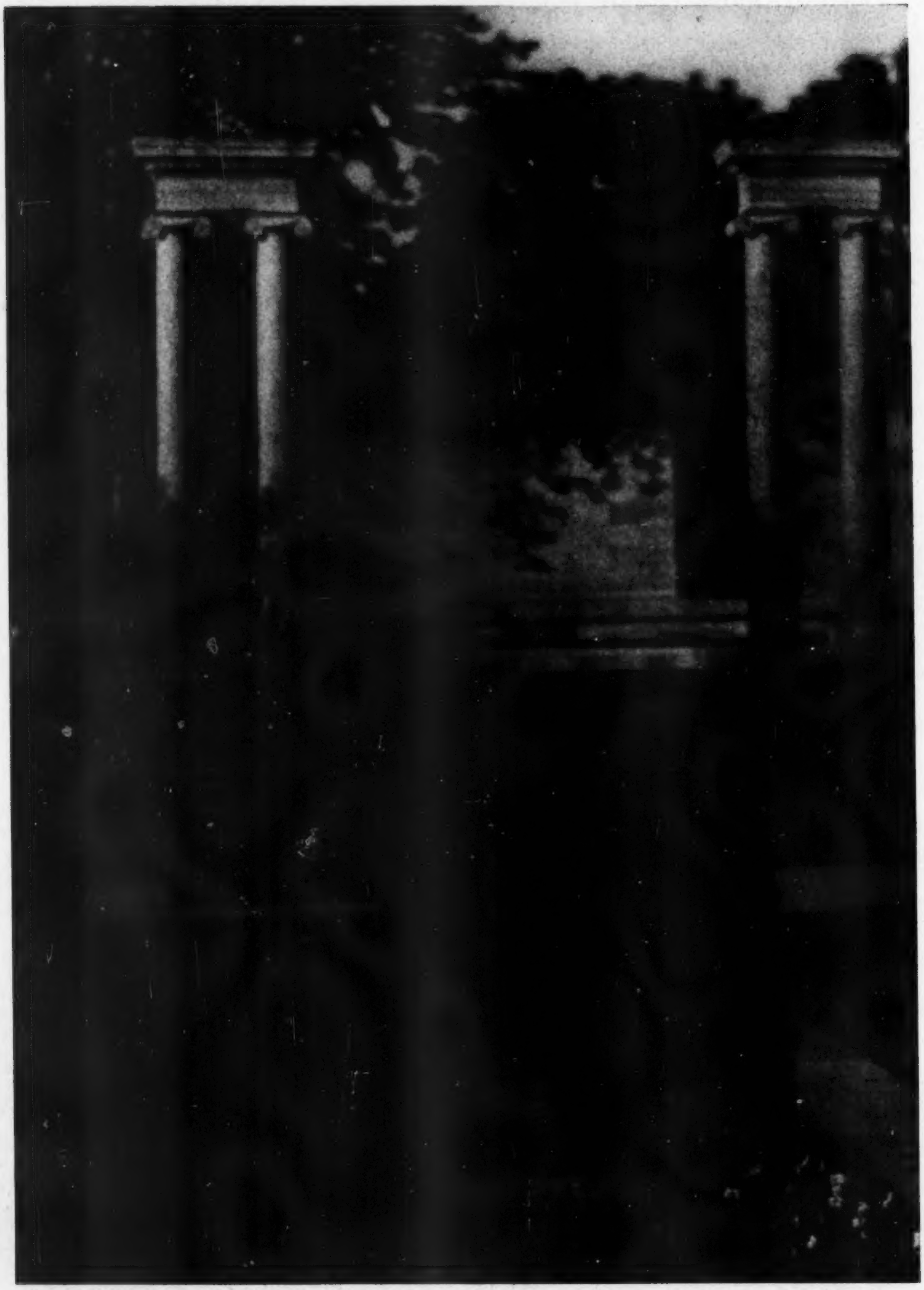
The writer of this article is a landscape architect, not an architect, and the reader may thus believe him guilty of taking unwarranted liberty in thus airing his views about another profession. But the problems of the landscape architect, and principally the ethical problems, are to a great degree similar to those of the architect, though I am quite sure the seat of the former is much more uneasy than that of the latter. It is difficult to read Mr. Flagg's article without wondering if his views on the exalted side of art are shared by most of the architects. If this should be so, one of the first things architects should do, if they are to be consistent, is to give proper recognition and aid to landscape architects. For landscape architecture is a fine art and a distinct specialty and architects are in a more advantageous position to extend aid than any other group of men.

The landscape architect has undergone a very serious course of specialized training and devotes himself solely to his particular profession. While his art instincts and facility in design have naturally been fully cultivated, he is also supposed to be thoroughly familiar with details of horticulture, land engineering and elements of architecture, to say nothing of the practical methods of organization and execution of work and the economics pertaining to it. Yet there are not only commercial firms who undertake the whole work, including design and all technical features, but architects themselves practice in landscape architecture, and this condition is increasing daily in extent. The argument is, of course, that landscape architecture should be classed as one of the details of architectural work, that the architect has also had training in landscape design and it is necessary for art's sake for him to maintain control of the work. There are courses in landscape design in architectural schools, and though they contain only a slight smattering of the whole subject, nevertheless architects deem this knowledge sufficient to enable them to practice almost any kind of landscape work. It is, therefore, quite usual for the architect to make plans for the layout of a country property without seeking the assistance of a landscape architect. The working out of planting and construction details can then be entrusted to some firm of landscape contractors, who execute the contract part of the work also.

There is no need of going into the arguments which would show this to be an inefficient method of conducting landscape work. Before a competent and unbiased tribunal it would be easy to bring out the positive superiority of the professional landscape architect for authority in landscape work. The manner in which many architects provide for landscape work in this day is one illustration of poor organization.

There is another method of carrying out landscape work which is also used by some architects. Viewing the landscape architect in the same light as structural and sanitary engineers, interior decorators, etc., he is sometimes willing to employ the former on this basis, for just such assistance as he may believe he needs. This means that the landscape architect accepts his fee direct from the architect and they sign their names jointly on the landscape plans. There are many defects to this arrangement also, but it is far preferable for both professions to the first method.

If the architects therefore are puzzled nowadays over encroachments upon their profession, how much more perplexed are the landscape architects who are getting beset from all directions. Yet the trouble of the landscape architect could be relieved amazingly if a better understanding could be arrived at between the two professions. There is a reason why the architect may desire to retain some control over landscape work. The landscape treatment of the surroundings of his house may make or mar his house, and he cannot always be a personal friend of the landscape architect or be fully familiar with the competence of his work. But even if this were not granted, I am still inclined to advise that landscape architects offer, when necessary, to identify themselves with architects in the same way as the engineers and others. True, landscape architecture is a fine art, and should not be classed wholly with the sciences, and this arrangement would not be in accordance with the lines he has chosen in following out his ideals. But there are the necessities of the times to contend with, and, as I believe, architects will have to make some sentimental sacrifices in order to reach the higher things, so also must landscape architects, though, perhaps, in other ways. It is worth trying, anyhow, and it will help improve a field for the landscape architect from which he is now frequently barred. It would also mean that the architect would use his influence in directing the attention of his clients to the uses of landscape architects, that the work would be carried out more successfully than if the landscape contractor were alone employed, that architect, landscape architect and client would all benefit and that local nurserymen and contractors would fill their proper offices. Personally the writer believes this would prove successful because he has tried it and it has been successful. The success may be even greater than estimated, because it has been proven (in the writer's case) that though architects indicate their desire to control landscape work, it actually has developed that when architect and landscape



GREEK THEATRE IN THE GARDENS OF SAMUEL UNTERMYER, ESQ., GREYSTONE, N. Y.

WELLES BOSWORTH, ARCHITECT

THE POINT SHOWN IN PICTURE OVERLOOKS THE HUDSON RIVER AND THE PALISADES architect fully understand each other, the former is only too glad to give the latter full sway. Art and organization may both be advanced by the development of proper relations between architect and landscape architect.

Mr. Flagg speaks also about the improper standards of American architecture and criticizes the practice which aims principally at reproduction, and not development or adaptation. He states that for one hundred years the architecture of this country has been principally composed of flat copies of European styles. I presume he refers largely to country houses in this connection. There is certainly plenty of record to show that we had in America, as early as the 1830s many representations of the Italian villa, Elizabethan manor house, French Chateau and various other distinct European types. Before this period, the simple Colonial style, as it is now known, was invariably employed, and it is the architecture of this era (1750-1820-30) which has proven to be of the most lasting satisfaction. It is probably not because the builders were less copyists during this period, but because the styles they copied were simple and in good taste and easily harmonized with surroundings, that we look back upon this Colonial period as one in which there may have been some really good American architecture. It is also probable that it is the Colonial type which furnishes the basis of what may eventually prove to be the American type. Irrespective of what is copyism and what is not, it seems to the writer that the greatest need in American architecture is the study of those types which will help to produce landscape harmony, in other words so to design buildings that they will fit properly into the landscape, be the latter in the city or in the country. The harmony of the architecture of the French cities is easily apparent,—sometimes there is too much of it, so much that it becomes monotonous. On the other hand, there is a disharmony among our own architectural civic units, which so hurts the senses that there are few portions of an urban area that may be safely travelled if one desires to avoid disagreeable architectural contrasts. Once in a while we notice a building which may strike our eyes as being particularly superior. If we look closer we are more apt to find that it is superior only in contrast with the vast superabundance of wretched specimens in the same neighborhood. Architectural harmony in a city may be an impossible ideal, but the lack of it is one of the great deficiencies in the cities of America. Why are the old towns and villages that still remain unchanged from a century ago, so distinctly attractive? Not necessarily on account of the vast superiority of their architectural specimens, but because there has been an architectural harmony in the type of buildings.

In regard to the country house, this situation of disharmony is not so bad, but as a matter of fact we have just started on the road to recovery from a terrible spell of over-elaboration in the country house. It has been the habit for an owner to choose the type of house he desired to build before he had even purchased his property. Will we ever get away from that spirit? This is the height of abuse of copyism. A villa sits picturesquely on a terraced slope overlooking an Italian sea. A citizen of America admires it and makes up his mind to have the same thing back home. He has it copied and set amid scenery absolutely different from that of the original. This is where architecture and landscape architecture meet and press most closely. Why is not the landscape architect called in before the site for a house has been chosen?

Landscape architecture has also suffered from over-copyism. Our early Colonial estates were most attractive places. Those of the North developed the picturesque landscape and gave little attention to formal effect. Their trees and parks were beautiful, their gardens attractive but nevertheless details only. Those of the South lent a somewhat different air, employing a more or less formal design in the layout of areas adjacent to the buildings, and their gardens were features, and in most cases connected with the dwelling. Yet these formal features were never overdone and in time blended into the informal landscape in a perfectly natural way. From what we know of these old places it is easy to judge that in landscape architecture also, there was more Americanism in Colonial times than later. There has been, however, exceptionally fine work done in landscape architecture during the past thirty years, even outside of the public parks in connection with which we have really outclassed Europe. The many-terraced Italian garden has had its sway, and so has the French garden of elaborate courts and long axial features, and the multitudinous stepping-stoned paths and broad terraces of English origin are also familiar to us. But I know that the landscape architect of this period is also seeking for the less ostentatious and more ruggedly picturesque, and therefore the more truly American, in his design, and it is hoped that his opportunities may be enlarged, as these dubious times go by, rather than restricted. Architects may help greatly in this.

DETAIL OF MANTEL IN OFFICE OF WELLES BOSWORTH, ARCHITECT
WELLES BOSWORTH, ARCHITECT

LEGAL DEPARTMENT

Conducted by

CLINTON H. BLAKE, Jr., of the New York Bar

IN a previous issue, I referred to the recent amendment to the New York Law on the registration of architects. I have before me now a complete copy of the amended law. It will be of interest, not only to those architects whose practice is in the State of New York, but to architects generally who are in sympathy with the increasing tendency to adopt legislation of this character in the interests both of the profession and of the public. The registration laws, insofar as they have been adopted by different states, vary, of course, in character and scope. This New York law, however, is an excellent example of the purpose which underlies the legislation and of the results which the legislation attempts to secure. I am giving the various sections of the law in this issue in full, as adopted, and as the full text cannot be included within the space of one issue, its publication will be completed in the succeeding numbers. The law is known as "Article 7-a of the General Business Law of New York."

The New Law For Registration of Architects in New York State

ARTICLE 7-A.

Registered Architects

Section 77. Definitions.
77-a. Registered architects.
78. Board of examiners and registration.
79. Qualifications; examinations; fees.
79-a. Certificates.
79-b. Violation of article.
79-c. Certificate presumptive evidence.
79-d. Conviction and prosecution of offenders.
79-e. Fees, fines and penalties.

§ 77. *Definitions.* As used in this article:

1. "The education department" means the education department of the state of New York as provided for by the education law.

2. "University" means the University of the State of New York.

3. "Regents" means board of regents of the University of the State of New York.

4. "Board" means the state board of examiners and registration of architects of the state of New York.

5. "Architectural college or school" means any architectural school, college, technology institute or department of a university, registered or accredited by the regents as maintaining a proper architectural standing and as such legally incorporated.

6. "Architect" means one who designs plans for structures and superintends or supervises their construction.

§ 77-a. *Registered architects.* 1. Any person residing in or having a place of business in the state, who, before this article takes effect, shall not have been engaged in the practice of architecture in New York state, under the title architect, shall, before being styled or known as an architect, secure a certificate of his or her qualification to practice under the title architect, as provided by this article. Any person who shall have been engaged in the practice of architecture under the title architect, before this article takes effect, may secure such certificate, in the manner provided by this article. Any person having a certificate pursuant to this article may be styled or known as a registered architect. No other person shall assume such title or use the abbreviation R. A., or any other word or words, letters or figures to indicate that the person using the same is a registered architect, or architect; but his article shall not be construed to prevent persons other than architects from filing applications for building permits or obtaining such permits.

2. Any person claiming the right to practice as architect or registered architect by reason of his or her having been in practice as such prior to the twenty-eighth day of April, nineteen hundred and fifteen, may be required by the board to file an affidavit setting forth the facts and to present such evidence as will satisfy the board that he or she was in bona fide practice previous to such day.

§ 78. *Board of examiners and registration.* There shall be a state board of examiners and registration of architects, who, and their successors, shall be appointed by and hold during the pleasure of the board of regents of the university of the state, and who, subject to the approval and to the rules of the regents, may make rules for the examination and registration of candidates for the certificates provided for by this article. Such board shall be composed of five architects, who have been in active practice in the state of New York for not less than ten years, previous to their appointment, selected by the regents. Such examiners shall be entitled to such compensation for their services under this article as the regents shall determine, not exceeding in the aggregate the amount of fees collected from applicants for certificates and renewal of registration.

§ 79. *Qualifications; examinations; fees.* Any citizen of the United States, or any person who has duly declared his or her intention of becoming such citizen, being at least twenty-one years of age and of good moral character, may apply for examination or certificate under this article, but before securing such certificate shall submit satisfactory evidence of having satisfactorily completed the course in a high school approved by the regents or the equivalent thereof and subsequent thereto of having satisfactorily completed such courses in mathematics, history and one modern language, as are included in the first two years in an institution, approved by the regents, conferring the degree of bachelor of arts or science. Such candidate shall in addition submit satisfactory evidence of at least five years' practical experience in the office or offices of a reputable architect or architects, commencing after the completion of the high school course. The board may accept satisfactory diplomas or certificates from approved institutions covering the course required for examination. Upon complying with the above requirements, the applicant shall satisfactorily pass an examination in such techincal* and professional courses as are established by the board. The board in lieu of examinations may accept satisfactory evidence of any one of the qualifications set forth under either subdivisions one and two of this section.

1. A diploma of graduation or satisfactory certificate from an architectural college or school approved by the regents, together with at least three years' practical experience in the office or offices of a reputable architect or architects; but the three years' experience shall be counted only as beginning at the completion of the course leading to the diploma or certificate; the board may require applicants under this subdivision to furnish satisfactory evidence of knowledge of professional practice.

2. Registration or certification as an architect in another state or country, where the qualifications required for the same are equal to those required in this state.

3. The board in lieu of examinations shall accept satisfactory evidence as to the applicant's character, competency and qualifications, and that he or she has been continuously engaged in the practice of architecture for more than two years next prior to the twenty-eighth day of April, nineteen hundred and fifteen, or that he or she has been actually engaged in the practice of architecture on his or her own account or as a member of a reputable firm or association for more than one year prior to such day; providing the application for such certification shall be made on or before January first, nineteen hundred and twenty-three.

Any architect who has lawfully practiced architecture for a period of more than ten years without the state shall be required to take only a practical examination, which shall be of the nature to be determined by the board.

Every person applying for examination or certificate under this article shall pay a fee of twenty-five dollars to the regents.

§ 79-a. *Certificates.* 1. The result of every examination or other evidence of qualification, as provided by this article, shall be reported to the regents by the board, and a record of the same shall be kept by the regents, and the regents shall, unless deemed otherwise advisable, issue a certificate to every person certified by the board as having passed such examination or as being otherwise qualified to be entitled to receive the same.

(*To be continued*)

* *So in original.* [*Word misspelled.*]

LEGAL DECISIONS

A BUILDING contract provided that the heating plant to be installed should be sufficiently effective, so that it would easily heat the building to the agreed temperature. The contractor guaranteed the heating plant on this basis for one year. When the plant was first tested, it seemed satisfactory. The agent for the purchaser of the building, after this first test, accepted the plant at that time, but did not waive in any way the one year guarantee provision. The Trial Court left the case to the jury under instructions which were so worded, that the jury had the right to find and did find that the plant was accepted, after the first test, in the sense of a final acceptance of the plant. On appeal, the Appellate Court held that the court below should not have left the case to the jury on this basis; that the evidence simply warranted the jury in believing that the building was properly heated on the first test and the fact that this was so, and that the owner occupied the building and accepted the plant at that time was not a waiver of the one year guarantee, and did not waive the rights of the owner when it appeared, after the first test and within the one year period thereafter, that the plant did not comply with the requirement of the contract or the terms of the guarantee.

Mayor etc. v. Semmes, 86 Southern (Mississippi) 273.

* * *

WHERE the client claims an agreement on the part of the architect, that the latter should receive no fee unless the cost of the building did not exceed a specified maximum amount, such agreement must be shown by clear and convincing proof where the character and nature of the building are within the client's discretion.

Diball vs. Grunewald, 7 La. 59.

DEPARTMENT OF SPECIFICATIONS

CONCRETE SPECIFICATIONS (*Continued*)

THE next sequential step in the writing of specifications for concrete work will be "Concrete Floors." Concrete floors are laid on earth, on structural slabs and may be made finished concrete floors integrally with the structural slab.

On the assumption that the sub-grade for concrete floors on earth has been excavated to the correct level, the specifications will require that this sub-grade be leveled off and graded where necessary and generally prepared to receive whatever sub-base will be provided. In cases where it is known that the sub-base will consist of sand or gravel, such soil is sufficient to receive the concrete rough slab without an intervening pad. Where the concrete slab would otherwise rest on ordinary earth, on clay, or on some classes of shale, it would be necessary to provide a pad of sand or cinders from six inches to twelve inches thick. If the soil is water-bearing and the sub-base is hard shale or rock, the customary practice is to provide a similar pad in order that drain tile may be placed to relieve water pressure. Where ground water does not occur above the underside of the concrete slab, the pads usually are not required, but the individual case must be studied from this angle to make sure that whatever sub-base or foundation is available will be of the proper character to receive the concrete and to insure its permanency.

Should there be any low places or soft spots in the sub-base, the specifications must require that the low places must be filled and the soft spots cut out and filled with the material that is used for the pad. Where it has been determined that the existing soil will provide a sufficiently firm foundation without the placing of a pad, the specifications, as a matter of precaution, should require that low places that may have occurred because of excavation being carried deeper than necessary must be filled, and that soft spots should be treated as above suggested. It is an axiom of concrete floor work that where excavations have been carried deeper than necessary, they should not be refilled with the excavated material where such filling would be required to carry concrete floors.

The sand, gravel, or cinder pad should be graded to the proper levels and pitches, then rolled and tamped to a compact mass.

The concrete base for floors on earth will vary from four inches thick upward, depending on the use to which the floor is to be put, and water conditions. Where water pressure exists the design of the concrete structural work may have taken into account the mass of concrete entering into the basement floor to provide strength or weight sufficient to resist the water pressure. This fact should be borne in mind as it is necessary at times to make sure that the concrete floor is of strength sufficient to resist a hydrostatic head that would result in hundreds of pounds of pressure. Economic considerations usually determine whether the weight of the concrete is to be made sufficient to resist water pressure, or whether it is to be reinforced in the manner similar to the reinforcement of flat slab floor construction to accomplish the same purpose.

Where certain areas within the main area that is to be covered with the concrete floor are to have finished floors of other material, such as tile, terrazzo, or composition, the drawing should indicate the distance below the finished floor level that the concrete slab is to be placed, and should show whether the rough concrete base will be made thinner, or will simply be depressed a distance to receive the finish floor material, which in the case of tile, usually is three inches.

Often times a boiler room floor will have a low pit, the sides of which may be vertical or inclined. In either case the dwarf wall, if the sides may be called such, would be cast integrally with the general floor base. In other cases basins will be provided below the level of the boiler room floor to receive ejector pumps or to form other pits of a similar character. It is possible that the floor and walls of these pits and bases will be built separately, that is, preceding the laying of the general floor base, but as a usual thing these operations are simultaneous.

The rough concrete base should be leveled off a distance below the finished floor level sufficient to receive the finished cement topping that is to be provided. This topping should be not less than one-half inch thick with a minimum of three-quarters of an inch preferred. The concrete base must be properly graded, of course, and rolled and tamped. As mentioned heretofore the specification should require that the concrete for floors on earth be made somewhat drier than the concrete for the general work. This is an important point, and in the interest of securing substantial floors, should not be neglected. If the specification writer has confidence in the use of any of the available integral mixing compounds that are presumed to render concrete dampproof, he will see that his specification calls for dampproof concrete for the floors that are to be laid on earth. This is a subject that each specification writer should study and determine in his own mind. In any event, the concrete base should be well compacted by the use of heavy iron tampers or rollers.

The above suggestions apply not only to concrete floors, but to concrete walks and the roadway pavement usually encountered in building construction work. Specifications that must be written for the construction of roadways similar to those now being constructed for the highways, must, of course, be patterned after the best known practice, and form a special subject which it is safe to say at present, is not quite as thoroughly understood as it might be.

Some specifications mention the placing of finished topping in the several places of the specification where bases for different types of floor are specified. It seems the best practice, though, to complete the specifications for concrete bases and then write one specification for finished topping that will apply to the various conditions covered.

Where concrete floors are to be provided on structural slabs, the slabs will, of course, be constructed practically level and approximately at the desired level below the finished floor level. These structural slabs may be of concrete, hollow tile arches, combination hollow tile with reinforced concrete joists, or heavy wood construction with a rough wood floor underneath the concrete. The wood floor sub-construction must be assumed to have been designed correctly to support the load and to take care of any inequalities in the shrinking of the timbers. The specification for concrete floors, however, should include a sheet reinforcing to be laid over the rough wood floor and held above it about one inch. This reinforcing may be light, but it should not be as light as the common chicken netting that is so often specified.

The specifications for concrete floors on masonry slabs should require that all pipe work that is to be embedded in the concrete has been laid and accepted by the architect; that the slab surfaces be cleaned with a broom and that any voids in hollow tile be covered over with tile slabs or left open to be filled with concrete. The contractor should be required to check the various finished floor levels with the levels of the rough slab construction to make sure that the conditions of the drawings and specifications will be met in a correct manner. If there are any floor drains such as those in shower stalls, automobile wash racks, or gutter drains required by any industrial use, there should be provided as a part of the drains, a metallic flashing that will be embedded in the concrete. Although the architect himself should make sure that these fittings and numerous other fittings, such as inserts, anchor studs, etc., are in proper position, it is well to have in the concrete floor specifications a clause requiring that the contractor check these, preferably in conference with the architect to make sure that after his work has been installed, it will not be necessary to open it up with unsightly patches resulting. Specifications also should require that the contractor exercise care so as not to displace or injure any of the things that are to be embedded in his work.

All concrete base or fill as it has been called in numerous instances, which is to have a top finish, should be placed not longer than thirty minutes or at the most forty-five minutes before the finished topping is to be placed. This is a rule that should be broken only in those cases where it is known that a contractor will be able to lay the topping in such a manner that it will adhere perfectly to the base. There are contractors who are able to guarantee that topping laid a long time after the base has been laid will adhere to the base, but safe practice requires that the general rule given above be followed. This base should, of course, be graded and leveled and compacted, and be brought to the proper level to receive the topping of specified thickness. It is advisable to include in this specification a clause that the placing of base concrete should stop soon enough in the day's work to permit the placing of topping by the end of that day.

Where roof slabs are built of concrete they will be finished similar to the manner of finishing floors that have a topping made integrally with the slab as discussed hereafter. Where the roof slabs are of tile, and require a concrete fill to receive the finished roof waterproofing, the specifications for this fill should be similar to those for the general concrete floors.

In the matter of sidewalks, the specifications for those on earth have been discussed. Where sidewalks occur on structural slabs, the conditions generally surrounding such construction are similar to those encountered in the placing of finished floors on concrete or tile slabs. Where the sidewalks are laid on slabs such construction is usually required because of finished basement spaces that must of necessity be protected from leakage of water or dampness that may be the result of condensation. The waterproofing of sidewalk slab may be accomplished by any of the waterproofing methods discussed in the last previous issue of this Department. If membraneous waterproofing is used, it is advisable to lay over the membrane, a cement mortar protection at least one-half inch thick, this mortar coat being reinforced with light weight mesh such as chicken netting. In a number of cases the structural slabs do not cover the complete distance that is to be overlaid with finished walk surfaces, the portions of the walk not occurring over basement spaces being laid directly on earth. Where such a condition occurs, it is suggested that the specification require the placing of reinforcing of a character sufficient to prevent shearing of concrete along the line of demarkation between structural slab base and earth base. This reinforcing should extend at least one foot beyond and at right angles to the probable line of cleavage, but it is well to have some engineering computation made by the individual specification writer.

Where sidewalk lights or vault lights, as they are sometimes called, are to be placed, if these lights are to be made in precast slabs that are becoming so popular these days, it is probable that the thickness of the slab is not as great as the thickness of the finished sidewalk. In this case the walk contractor should be required to build low curbs around the light openings in the rough slab to receive the bedding for the precast light slab, or the rough curbs should be provided in the rough slab construction.

Often times it is desired to extend the walk from the building line to the curb line, in which case it is often necessary to reconstruct the curb, and if the character of the paving requires, reconstruct the gutter flagging. It is unusual to find any village or city of such short-sighted policy that it does not require the construction of curbs and gutter flaggings to be in accordance with a predetermined standard. This matter should be determined by the specification writer so that his specifications will call for a curb and gutter flagging either acceptable to the authorities having jurisdiction, or at least of a type acceptable to similar authorities in his home town.

The specifications for the placing of fill for the sidewalk should be similar to those for the general floor fill with the exception that joints in the base should be provided to guard against unsightly cracking of the finished walk surfaces. The joints should be formed by wedge-shaped boards of a width equal to the finished thickness of the walk, and they should be as narrow as possible but not less than one-quarter inch at the bottom.

The specifications for sidewalk lights, whether precast or cast in place will generally follow the standard specifications of a particular manufacturer, or will consist of a composite specification that will permit of free competition among the manufacturers of such items that are acceptable to the architect. It is not possible to say a very great deal respecting this construction except that the specification writer should be guided entirely by past performances of the manufacture of the system to be used. The specifications should not be written without knowledge of the available types of sidewalk lights and if it seems unlikely that the desired type will be available, some effort should be made to establish a certain minimum in strength and a minimum standard in the selection of glass that will at least assure average good work. The sidewalk light systems of former days have not withstood pedestrian usage in a very commendable manner, but during the past few years the manufacture of this class of building equipment has increased in excellence. It seems possible to say now that many of the former difficulties that were traceable to imperfect glass can now be overcome to a very great extent by either of the two methods for the testing of a piece of glass, that are now available. The specification should require some sort of test for the glass and should require that all cement be reground Portland cement.

The specifications for the finished topping for the various floor and walk surfaces discussed in this article may be written in a somewhat general form with specific references to any general cases that may occur. As a general rule, finished cement topping is not made as well as it could be made for the reason that the workmanship is quite deficient even though the material may be of the best and even though the contractor may exert his utmost ability in the production of the work. It is because of this that the specification writer should be extremely careful to be letter perfect in the specifications for finished cement topping even though they may be given in general terms only. As mentioned heretofore, one of the prime requisites for the placing of topping is that it be laid immediately after the concrete base directly underneath has been laid, and the specification should prohibit the placing of topping after the base has taken initial set. Such a clause will bear repeating even though the subject has been covered in the specifications for the placing of the concrete base.

The topping should be placed as dry as screeding will permit and as soon as a sufficient area has been covered and the finished mortar has taken initial set. The work in any specific space should be completed before daylight has passed, as the placing of topping under the kind of illumination generally available in building construction is not desired, especially where good finish is expected. The topping should be troweled to a perfectly smooth, plane surface, without trowel marks or blemish of any kind and should be immediately barricaded against intrusion. As soon as troweling in any space has progressed sufficiently, that space should be covered with sawdust that is free from rosin or sap, and this sawdust should be kept wet for a period of at least ten days.

Topping for roof surfaces need not be finished so well as it is only necessary to require that ridges or depressions that would be harmful to the finished roof surfaces do not occur. Unless the roof is to be absolutely dead level, a few concave or convex spots will not be very objectionable.

It is often desired to provide for sidewalk surfaces or even for some interior floor surfaces, a true non-slipping surface, which may be obtained by abrasive grains that have been proved efficient. It is customary in such instances to provide that these grains be dusted over and troweled into the cement topping, rather than to call for them to be mixed into the mortar where the greater part of them will not be of great surface in producing the finish desired.

The general joints in walk surfaces, together with joints around sidewalk lights, and against the building wall where sub-sidewalk spaces occur,

(Concluded on page 41)

DEPARTMENT OF ARCHITECTURAL ENGINEERING

SIMPLIFIED DESIGNING METHODS

Description of an accurate mechanical solution of statically indeterminate structures by use of paper models and special gages

STATICS is a science based upon the laws of equilibrium. When the laws of equilibrium are sufficient for the determination of the supports of a structure it is said to be statically determinate with respect to the supports. When all the forces may be deterr :ined without reference to the elasticity of the material of which the structure is composed it is said to be statically determinate. When the forces acting at the joints of a structure may be found by dividing it up into parts, not necessarily elements of parts, it is said to be statically determinate.

When several elements are connected together to form a rigid body the forces acting at the points of connection are internal forces. When these internal forces cannot be determined by dividing the structure up into parts it is said to be statically indeterminate. It may, however, as a structure, be statically determinate with respect to the supports.

The analysis of a statically indeterminate structure is tedious. For that reason there is a tendency on the part of many designers, especially in English speaking countries, to avoid forms which are favored on the continent of Europe. Statically indeterminate structures are more rigid and are more economical in material than statically determinate structures, therefore anything that will lessen the amount of computation and insure accuracy should be welcomed by structural designers. Professor George Erle Beggs, Associate Professor of Civil Engineering, Princeton University, proposes to accomplish the desired result by the use of paper models and presented an interesting paper on the subject at the 18th annual meeting of the American Concrete Institute in 1922.

The use of models in checking the result of engineering calculations is not new. One of the early examples of this method was in connection with the Brittania Bridge in England, built by Stevenson in 1848. It is a tubular plate bridge with two spans of 460 ft. and two of 230 ft. The girders were proportioned as simple beams but were connected to form a continuous girder in order to increase the carrying capacity and by this means add to the factor of safety. This was the first important metal bridge of the beam type and was also the first continuous girder bridge. The designer made a small model on which a number of tests were made and thus determined the position of the points of contraflexure of the elastic line. This line he regarded as fixed and each span was divided into two cantilevers and a central beam. Incidentally he laid a foundation for the later development of the cantilever bridge in which there are hinges at the points of contraflexure.

In the intervening years methods of mathematical analysis were so well developed that models ceased to be more than pieces of apparatus for demonstration use. In the design of continuous beams the theories of deflection and least work were used by means of which ordinates were computed for influence lines.

The method of influence lines is gradually coming into general use for it facilitates computation in some cases. Weyrauch in 1873 outlined the method and it is believed the first mention of it in the English language was in 1887, in a paper by Professor Swain before the American Society of Civil Engineers. An influence line for any given point A on a beam or truss is a line, the ordinate of which at any point B gives the bending moment, shear or similar quantity at A when a unit load is placed at B. A very good presentation of the subject of influence lines for simple beams and trusses is given in the Kidder-Nolan handbook.

Professor Beggs in his paper stated that in the summer of 1916 his attention was directed to the problem of the deflections and stresses of the triple span continuous trusses of the new B. & L. E. R. R. bridge over the Alleghany River. One of these trusses is shown in Fig. 1. On account of the various conditions of loading for which it was necessary to calculate the four truss reactions, it was considered advantageous to construct their influence lines, after calculating their ordinates by the theories of deflection and least work. These influence lines, plotted in Fig. 1, resembled the elastic curves of continuous beams fastened at three supports and deflected a unit distance at the remaining support for whose reaction the influence line was drawn.

To determine the accuracy of this observation, a 10-ft. pole and three nails were used. To draw

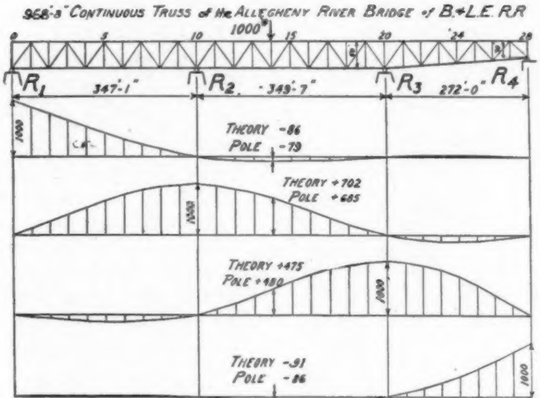


Fig. 1. The first experiment in using a flexible pole to draw influence lines. Work done by Professor Beggs in 1916

the influence line for R_1 the pole was restrained by single nails at R_2, R_3, R_4 and deflected at R_1, a distance to scale 1000 lbs. The ordinates to this elastic curve were measured. The operation was performed at each support in succession. The comparison of values obtained by this crude mechani-

COMPARISON OF INFLUENCE LINE ORDINATES
OBTAINED BY THEORY AND BY POLE
FOR THE 968-8" CONTINUOUS TRUSS OF B.&L.E Br.
CALCULATED FOR A UNIT LOAD OF 1000#

LOADED POINT	R_1		R_2		R_3		R_4	
	THEORY	POLE	THEORY	POLE	THEORY	POLE	THEORY	POLE
0	1000	1000	0	0	0	0	0	0
1	+ 881	879	+ 142	149	− 28	35	+ 5	6
2	750	754	287	307	− 55	71	8	13
3	641	633	428	450	− 83	104	13	22
4	526	518	561	585	− 103	128	17	27
5	414	404	687	717	− 120	148	20	29
6	309	302	798	825	− 128	150	21	29
7	216	209	880	910	− 113	139	17	30
8	134	124	942	977	− 89	115	13	22
9	62	57	981	1008	− 49	68	7	12
10	0	0	1000	1000	0	0	0	0
11	− 37	− 40	956	965	+ 105	102	− 24	− 25
12	− 64	− 63	890	894	223	218	− 49	− 46
13	− 81	− 78	807	798	346	345	− 71	− 68
14	− 86	− 79	702	685	475	480	− 91	− 86
15	− 79	− 75	573	560	613	619	− 107	− 100
16	− 67	− 63	445	435	736	738	− 115	− 109
17	− 49	− 48	313	312	845	842	− 109	− 105
18	− 32	− 32	195	187	924	930	− 88	− 89
19	− 13	− 13	85	82	980	981	− 52	− 54
20	0	0	0	0	1000	1000	0	0
21	+ 9	9	− 58	− 51	974	965	+ 74	74
22	15	17	− 97	− 80	917	895	165	169
23	19	18	− 121	− 95	834	792	268	282
24	18	18	− 120	− 95	710	665	392	409
25	16	17	− 105	− 79	557	520	531	545
26	11	12	− 75	− 55	381	350	682	690
27	8	7	− 45	− 32	201	180	836	840
28	0	0	0	0	0	0	1000	1000

Fig. 2. A study of the data in the above table shows that the results obtained by the pole are safe

cal apparatus and by exact theory are given in Fig. 2. The agreement of values is seen to be remarkably good.

Three years later, in the summer of 1919, the attention of R. Fleming of the American Bridge Company was called to this method of solution, with the result that he carefully computed the reactions of the three-span continuous beam of uniform section shown in Fig. 3, and published the solution in the *Engineering News-Record*, August 28, 1919. For the mechanical method he used a 3-ft. spline with ordinary pins for supports. The influence lines were assumed to correspond to the elastic curves produced by bending the spline a distance unity from each of the four supports in succession as shown. The reactions for the actual loadings were then found by summing algebraically the loads times their corresponding ordinates. The closeness with which the reactions sum to the total load is remarkable and the comparison between reactions obtained by theory and by spline is practically satisfactory.

To Mr. Fleming, at that time, Professor Beggs stated the possibility of extending this mechanical

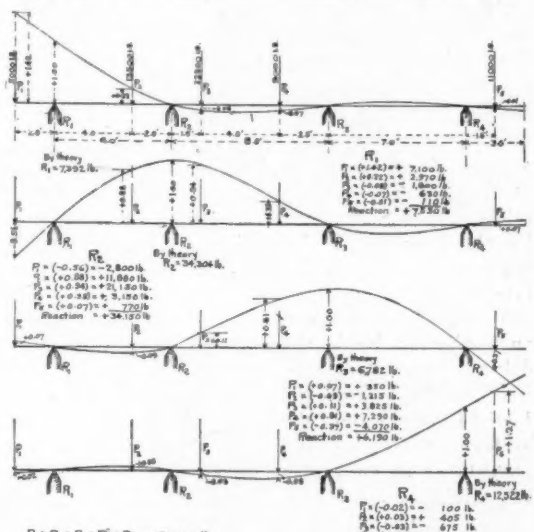


Fig. 3. Results of experiment in 1919 by R. Fleming to check work done by Professor Beggs

method to the solution of indeterminate frames. Does not the layman estimate the severity of stress in an elastic structure by observation of its distortion under load,—the "give and swell" of the members as one man expressed it? Why then should not the engineer closely observe the deflections of model elastic structures, and so estimate their reactions, moments, shears and thrusts, and thus avoid the derivation or the application of such laborious and questionable formulas as are at times quoted in treatises? Such tedious calculations are most disheartening, and lead the so-called "practical" man to make his best guess. Nature solves such problems in actual structures instantly and accurately. Could not the engineer enlist nature as his ally, and so eliminate much of the mathematical work incident to the solution of problems in indeterminate structures?

The fundamental principle of any mechanical solution is Maxwell's Theory of Reciprocal Deflections which establishes a mutual relation between any two points in a structure. This theory shows that when a number of loads rest upon a beam the deflection at any point is equal to the sum of the deflections at this point due to each of the loads acting separately. Also, a force applied to any part of a structure exercises an effect, the amount of which may be computed, on every part of the structure.

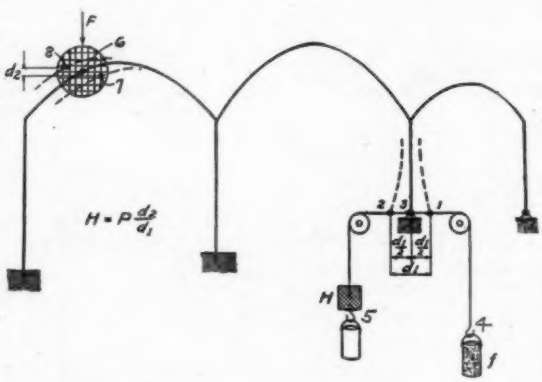


Fig. 4. Illustrating the principles. A model used to show movements in frame with two fixed columns, one hinged column and one column with roller bearing

Consider the very complicated structure shown in Fig. 4 and assume that this figure represents the actual full-sized structure. Let it be required to find the horizontal thrust at the hinge at the foot of the third column caused by a load P on the first arch. Assume for the sake of argument that the third support is changed from hinged to roller bearing, so that horizontal motion may occur freely. Attach to the lower end of the column a cable which carries a weight H. This weight is such that it holds the column from deflecting horizontally when the load P rests on the arch. Now attach to the right-hand cable a pail as shown, to carry a very small load equal to f pounds of sand. From the weight H hang an empty pail.

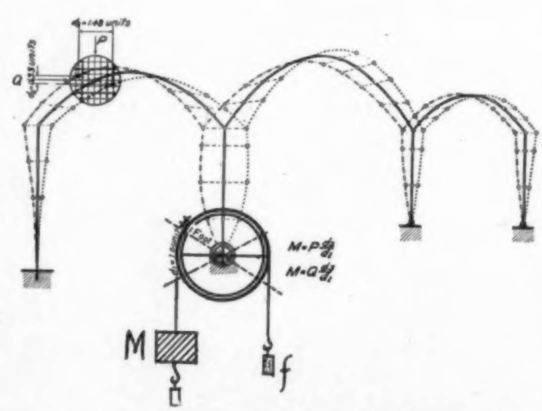


Fig. 5. Illustrating the principles. A model with one fixed and three hinged columns

The foot of the column deflects a small distance, $0.5d_1$ from point *3* to point *1*, and at the same time the load P is moved from point *6* to some point 7. Transfer the sand f to the pail at the left of *3*. The column deflects a horizontal distance d_1 from *1* to *2*, while the load P moves from point 7 to *8*. From Maxwell's Theorem, it follows that

$$H = P\frac{d_2}{d_1}$$

It is to be noted that in general the value d_2 is the component of the deflection of P in the direction of P, in this case vertical. It is evident from this equation that H becomes known as soon as the ratio d_2/d_1, is evaluated, and the load P specified. It is further apparent that this ratio of deflections may be obtained by applying to an elastic unloaded model of the actual structure a small deflection d_1 and measuring by accurate means the corresponding deflection d_2. There is an advantage in introducing the deflection d_1 half to the right and half to the left of the mean position, for the frame is distorted from its geometric position less than if the deflection were all on the same side of the mean geometric position.

Assume in the second instance that it is desired to know the bending moment at the foot of the second column due to a load P on the first arch. Assume that the connection of this second column is changed from fixed to hinged, Fig. 5. Let the hinge pin be a shaft keyed to the foot of this column and turning freely in a bearing that is fixed to the foundation. On this same shaft mount a wheel of 1-ft. radius as shown. Support by a cable wound on the circumference of this wheel a weight M of such value that the foot of this column is not rotated from its normal position when the load P rests on the first arch. Attach to the right-hand cable a pail carrying a very small load f pounds of sand, and from the weight M, hang an empty pail as shown.

The circumference of the wheel deflects a small distance $0.5d_1$ clockwise, and at the same time the load P is moved downward and toward the right. The motion shown by the drawing is greatly magnified. Now transfer the sand to the empty pail. The circumference of the wheel will deflect a distance d_1 counter clockwise, and at the same time the load P will move upward and toward the left, the component of its motion in the direction of P

being d_2. From Maxwell's Theorem it follows that

$$M = P \frac{d_2}{d_1}$$

It is evident that the value of the weight M that will produce elastic equilibrium becomes known as soon as the ratio of d_2 to d_1 is evaluated and the load P specified. It is also apparent that this ratio may be obtained by applying to an elastic unloaded model of this structure a correspondingly small rotative deflection d_1 and measuring by accurate means the corresponding deflection d_2.

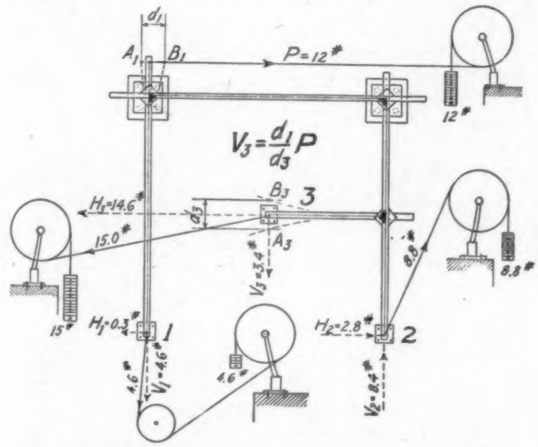


Fig. 6. A model made of wood used in the 1920 experiments to prove the truth of the principles on which the new designing methods are based

It is further clear that the value of the weight M is numerically equal to the bending moment at the foot of the second column, since the radius of the wheel is unity. As before and for the same reason, the deflection d_1 is applied half on either side from the mean geometric position.

Not wishing to rely entirely on such philosophical considerations, Professor Beggs decided in January, 1920, to check the above principle by a practical test. A model of an indeterminate structure of the form shown in Fig. 6 was constructed. The frame was made of wood strips about 5/8 by 7/8 in., the columns and main horizontal member being 50 in. in length center to center of connections. Metal gussets and screws fastened the bars together. The three-hinged frame was supported in a horizontal position on the floor and floated on ball bearings that moved freely between glass plates. While measuring deflections no weights were applied to the structure. In order to determine by deflections the value of V_3 at support *3* that would be caused by a load P equal to 12 lb., the ratio d_2/d_1 was first determined as follows: the pin at *3* was removed and the point *3* of frame forced to deflect vertically upward by an amount $0.5d_3$ and then vertically downward by the same amount. The corresponding motion of B_1 was to A_1, and its deflection d_1 was measured.

According to the principle previously explained

$$V = \frac{d_1}{d_3} \, 12 \text{ lb.}$$

in which equation the ratio of the known values d_1 and d_3 was such that V_3 was calculated to be *3.4 lb.* By a similar method H_3 was calculated to be *14.6* lb. The hinge reaction at *3* for P equal to *12* lb. was thus completely determined, its value *15* lb. being equal to

$$\sqrt{14.6^2 + 3.4^2}$$

The pin was replaced in hinge *3*. The load P equal to *12* lb. was applied by means of a counterweight acting through a cord wound over a bicycle wheel as shown in Fig. 6. A force of 15 lb. was similarly applied in the line of the resultant of H_3 and V_3 by a cord attached to a screw in the bar close to point *3*. The pin at hinge *3* was then removed. "To my great satisfaction," said Prof. Beggs, "no deflection occurred upon removal of the pin." The reaction of *15* lb. at hinge *3* as determined mechanically, was therefore correct, for it produced both static and elastic equilibrium. Similarly the reactions at hinges *1* and *2* were determined, and their correctness tested. The three reactions as determined entirely by deflection measurements are seen to satisfy very well the three laws of statical equilibrium. The small errors may be chargeable to the crudeness of the apparatus.

In order to reduce the scale of the models and at the same time to improve the accuracy of the observations, it was soon decided to make the models of celluloid, and to read the deflections by use of micrometer microscopes of the type shown in Fig. 7. This microscope will read directly to 1/16000 of an inch. It is a stock pattern except for the cross section lining in the field of view.

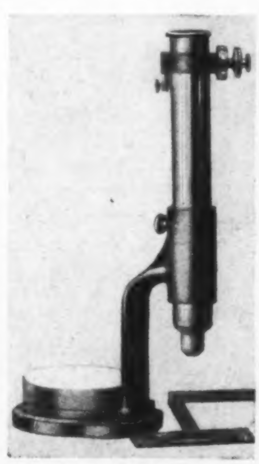
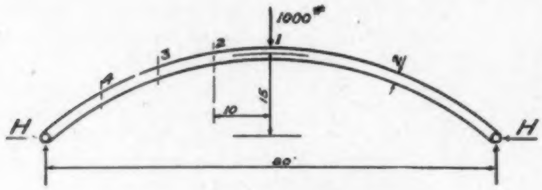


Fig. 7. The microscope used by Prof. Beggs. It is a stock pattern with cross-section ruling placed in the field of view to measure small movements

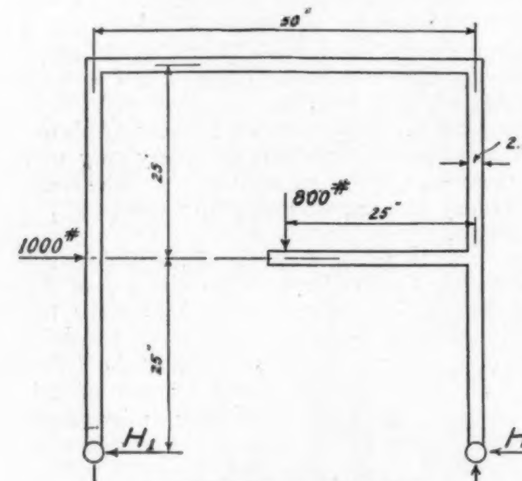
The first structure solved by aid of the microscope was an arch of 60 ft. span made of celluloid to a scale of 10 ft. to one inch. The experiment was most encouraging but difficulty was encountered in making models of celluloid. At the suggestion of one of his students Prof. Beggs decided to use heavy paper or cardboard for model making. The thickness chosen can be cut with a few heavy strokes of the penknife. Needles pressed through the paper make very satisfactory hinges. A model of the two-hinged arch shown in Fig. 8 was made of paper to scale span equal to 20 in. The values of H obtained from the deflections of this paper model read through the microscope compare very closely with those given by the common theory. In Fig. 9 the agreement is very close. Other examples were given in the paper which are omitted here to save space.

The difference between results by model and theory for the ring in Fig. 10 may be partly chargeable to the approximations in the mathematical analysis. In any case the error is negligible for practical purposes.



1000# at	H Model	H Theory
1	1000	1000
2	920	930
3	720	720
4	420	400

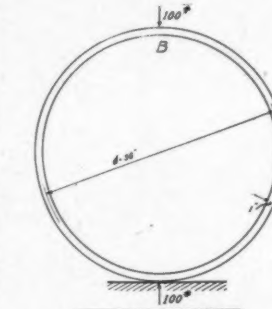
Fig. 8. Results obtained with a paper model of arch with hinged ends



H_2	Paper Model	Theory
	497.4	497

Fig. 9. Results obtained with paper model of frame similar to frame shown in Fig. 6

The paper model of the arch with fixed ends shown in Fig. 11 was made to scale with span equal to 20 in. The right end was fastened to the drawing board and the left end glued to a movable block. The model was floated on small ball bearings. Unit moment, thrust and shear deformations were introduced in succession at the left support, where one micrometer microscope was used to measure the motion of the foundation. The second microscope was used to read the vertical components of the deflections of the rib. These latter deflections are directly proportional to the influence line ordinates for the moment, shear and thrust at the left support of the arch. The small variation between the dotted and full influence lines in Fig. 11 indicates the close agreement of the values read from the paper model with those obtained by theory.



M_B	Paper Model	Theory
	590	572.4

Fig. 10. Model of ring tested to prove a theory which is an example of sound reasoning

In order to bring the theory into agreement with the results read from the model, it was necessary to apply to the values obtained by theory the correction for thrust shortening. The two solutions agree quite closely enough for practical design. There are strong reasons for believing that the mechanical solution is fully as near the truth as is the theoretical solution. In the paper referred to, Professor Beggs presented a table showing the agreement between theory and experiment for each ordinate of the arch.

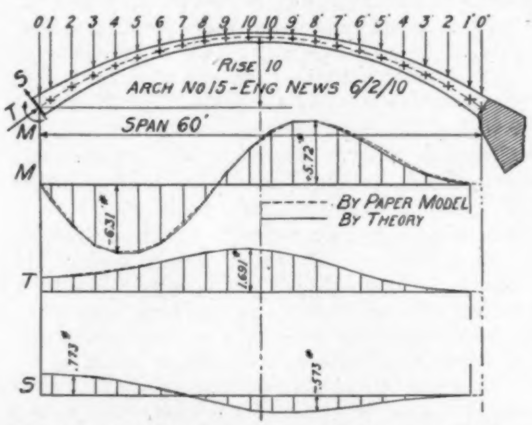


Fig. 11. Comparison of results obtained by theory and by paper model for Arch No. 15, Engineering News, June 2, 1910. Effect of thrust shortening included in both cases

(*To be continued*)

ELECTRICITY IN THE HOUSE

VII—HALLS, STAIRS AND PORCH

BY M. O. WHITTON

ONE'S theoretical house having now been wired from garret to cellar, but one further phase of the subject remains to be covered, and that is the adequate wiring of hall, stair and porch. The subject is not a very wide one, and yet it includes discussion of some of the most ingenious applications of electricity to the problems of lighting and living.

For instance, there is the matter of adequately fitting out the entrance to a house, be it city or suburban; that is, there are front steps to be lighted, usually in connection either with a country entrance porch, or a city vestibule. In the former case, there may be a ceiling light in the porch, or lantern brackets may be used adjacent to the steps themselves, depending on the style of the house; in the latter case, the most generally accepted solution is some sort of ceiling fixture to be used in connection with the vestibule roof. In the city, this light will generally be controlled only from a switch inside the door, but in a suburban location, it is better to use a three-way switch, so that the light can be controlled either from within or without. This sort of illumination does not generally demand a high-powered lamp, nor is that advisable, since in many instances in connection with the family's social life, these outer lights will often be kept going well on into the night.

Some wires, some buttons and a switch or two in combination with appropriate furnishings make the home porch a formidable competitor of country vacation resorts. The wire should go through the rug. It is dangerous as shown here

Once within doors, the question of hall lighting is encountered. Now the term "hall" is in itself a little ambiguous, as it may be employed to designate a hall in its simplest terms, which is a small entrance way or passage leading to the stairs, or it may be applied to a considerable area, requiring the same treatment and consideration as a reception room. Taking first the term "hall" in its narrower sense, one finds that the first need is for adequate and flexible lighting, since hall lighting

A hall lighted to bring out the architectural details with comfort to the eyes

usually serves to illuminate at least the lower portion of the stairs. There then arise the apparently contradictory requirements of ample light for convenience during the usual living hours, and that of a smaller light to be left going possibly all night, as a measure of safety. This double demand can be simply satisfied by the use of a fixture having two outlets, in one of which is inserted a high-powered bulb for ordinary use, and in the other of which a small unit is employed to serve as a night light. In turn, this arrangement calls for two wiring circuits and two switches, so that the householder can at will command either the large or the small light.

What type of fixture is here designated may well be left to the architect who has in mind the particular problems of a particular house, since as far as illumination is concerned, either a hanging fixture or wall brackets can be employed with equal satisfaction, though in general the hanging fixture will be preferred in halls having high ceilings. It is true that one other form of lighting is possible, though one would hardly mention it except as the warning of a horrible example. A certain war millionaire in this country, unlearned and unlettered, when building him a house, demanded that all his halls throughout be lighted by floor lamps, because he had heard that floor lamps were in vogue. "And," said he, "everything here is going to be up-to-date." Just how many casualties in the shape of broken shins and crockery have resulted as a result of this innovation, the writer knows not, but so far none of his more discriminating neighbors has followed his example. On the other hand, where a hall broadens out into a good-sized reception room, there is no reason why the usual ceiling or bracket lighting should not be supplemented by lamp lighting, although a table and table lamp, rather than a floor lamp

An example of three-way switching so lights may be turned on and off from floors above and below

would undoubtedly suggest themselves in the greater number of cases.

Hall and stair lighting present a situation in which three-way switching will be found of greatest convenience. The first switch would naturally be placed directly near the entrance door, and the second switch on the landing after the first flight has been traversed. In this way a person entering the house may light himself up, and then extinguish the light after him; or the process may be exactly reversed in the case of a person leaving the house. Similarly, in a house several stories high, each floor may be treated as a unit in exactly the same way, so that it is possible to ascend the full height of the dwelling, with light all the way, and yet leave no light behind, unless it is so desired. Again, in general, it may be remarked that the smaller torch brackets, many times in the general style of candle and sconce, and calling for comparatively low-powered lamps or bulbs covered with frosted glass, are usually found both suitable and practical for hall lighting.

Even where the hall is strictly a hall and no more, at least one outlet per floor should be allowed for cleaning purposes, and so located that a vacuum cleaner can be employed upon the stairs, especially in those houses where stair carpeting, rugs or runners are employed. And where the hall, either on the first or the second floor, serves either as a reception or an informal sitting room, this is even more true, for in this case, other electric appliances have to be considered, such as a possible use of a fan in Summer, or an electric radiator in Winter.

In most country or suburban houses, there is generally a large piazza in addition to the regulation entrance porch. Where houses are designed for all-the-year use, the larger piazza is frequently glassed in for bad weather, screened in Summer, and practically used as an exterior living room, in which case, its electric wiring should be treated almost as if it were a part of the house enclosure. In any event, lighting should be arranged either from overhead fixtures, from wall brackets, or by means of tall porch lamps, or the smaller lamps placed upon tables. Except where porches are carefully screened in Summer, either lamps or brackets will be found more practical, for otherwise the lighting will draw innumerable insects around the ceiling fixtures, which then cannot be cleaned readily.

How much wiring, besides lighting, is allotted to the porch will depend on how far it is employed as an outdoor sitting room. In many families, it is the custom to take breakfast or supper on the porch, in addition to serving refreshments there on occasions of informal entertaining. For such purposes, a wired tea-wagon or porch tables at which the smaller electrical cooking devices could be operated, will become a very popular piece of porch furniture. Where it is not desired to go to this length, at least one double baseboard outlet should be provided, to supply a source of current for cleaning, and for the other supplementary uses of electricity; if a family wishes to make a feature of its outdoor meals or porch parties, the equipment could be increased, or duplicated at some distance, so as to make at least two centers of supply.

Before parting company with our well wired house, let us not forget the attic, an adjunct possessed by some city and by most suburban dwellings. As the attic is chiefly used for storage purposes, the only reason for wiring it is to secure adequate lighting whenever it is necessary to commit furniture or trunks to the garret, or conversely, to remove goods and chattels therefrom. Lighting in the attic, then, should be safe, but it need not be beautiful, and the same sort of utility wiring recommended for the cellar will also be found satisfactory for the opposite extremity of the house. A few bulbs should be noted here and there, the number depending on the size of the area concerned; one of these lights, however, should be switched from the attic stairs, to obviate groping around in garret dimness, and stumbling over unseen obstacles, while reaching for the pull chain. Should the space involved warrant having several lights, the others may well be locally controlled. As an element of safety, in a low-ceilinged attic, wire guards for the bulbs are recommended to prevent their possible breakage when furniture and trunks are moved around.

There are doubtless some readers of this series on house wiring, of which this is the concluding number, who will consider that undue emphasis is placed upon making provision for the supplementary uses of electricity, outside of the regular demand for light and power. The enormous, and steadily increasing extent of the use of electrical appliances of all kinds is something realized most clearly by those in closest touch with the situation. The electric industry is not forcing convenience outlets upon the public; the public is forcing them upon the owners of dwelling and apartment-house property. For instance, a survey made during March of the present year shows that in one of the finest apartment houses in New York City, located on Central Park West, the electric load as represented by the electric appliances used by the tenants is actually greater than that derived from lighting or power. In actual figures, the lighting of the building totalled 114.39 kilowatts; the power load was 138 kilowatts, and the appliance load amounted to 148.49 kilowatts. Among the appliances employed by the tenants in this apartment (which, by the way, furnishes vacuum cleaner service) are 42 flat irons; 38 electric stoves; 36 grills; 23 percolators; 18 toasters, besides a smaller number of egg boilers, heating pads, heaters, hair curlers, vibrators, hair dryers, sewing machines, ovens, violet ray outfits, waffle irons, hot plates and electric fans. The situation revealed by such a report as this is one deserving careful consideration by all architects interested in the design of houses or apartments.

It is becoming increasingly evident that some day all houses will be wired for power as well as for light. Savings and reductions in cost estimates can no longer be figured on the wiring which is now as important as the item of foundations.

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The purpose, simply stated, is to afford an organization which, it is believed, will become a most important element in architectural practice and building operations, a medium through which it may, without expense to itself, reach a class of readers that are most intimately identified with the field of the activities of The American Specification Institute.

Publishers, THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW.

BULLETIN No. 8, which is a revision of Bulletin No. 6, has just been distributed to members. The subject of this bulletin is Standard Specification For Concrete and Reinforced Concrete (Super-Structure). The outline of this specification is as follows:

GENERAL CONDITIONS
SCOPE OF CONTRACT
WORK NOT INCLUDED
CO-OPERATION WITH OTHER CONTRACTORS
QUALITY OF WORKMANSHIP
QUALITY OF MATERIALS
- Types of concrete
- Portland cement
- Fine aggregate
  - Grading
  - Sieve analysis
  - Decantation test
  - Organic impurities
- Coarse aggregate
- Crushed slag
  - Grading
  - Sieve analysis
- Water

TESTING
- Testing laboratory
- Molds and sieves
- Slump tests
- Compression test specimens
- Number of specimens
- Sampling

STORAGE OF CEMENT
STORAGE OF AGGREGATES
STORAGE OF REINFORCEMENT MATERIALS
SAMPLES OF MATERIALS
SURVEY, GRADES, BENCH MARKS
TEMPORARY WALKS, DANGER LIGHTS, BARRICADES
PUBLIC PROTECTION
EXTENT OF SUB-STRUCTURAL WORK
CUTTING AND CHANNELLING WALLS AND FOOTINGS OF ADJOINING STRUCTURES
FORMS
- Description
- Type of forms
- Design of forms
- Fabrication of forms
- Moldings
- Inspection of forms

HANGING WIRES
VAULT DOOR OPENINGS
REINFORCING STEEL
- Cleaning
- Bending
- Straightening
- Placing
- Approval of bar spaces and supports
- Offsets in column reinforcement
- Future bonding
- Fireproofing of reinforcing steel

STRUCTURAL STEEL
- Cleaning
- Erection of structural steel
- Fireproofing of structural steel

SLEEVES AND HOLES
SASH SLOTS
ANCHORS, INSERTS, SHELF ANGLES
EMBEDDED PIPES
BRICK TIES
INSPECTION AND APPROVAL
CONCRETE PROPORTIONS
- Unit of Measure
- Method of measuring
- Determination of proportions
- Increase of cement ratio
- Change of aggregate ratios
- Consistency of concrete

COMPENSATION FOR ADDITIONAL CEMENT
WATER SUPPLY
MIXING OF CONCRETE
- Machine mixing
- Time of mixing
- Hand mixing
- Retempering

DAMPPROOFING CONCRETE

DEPOSITING OF CONCRETE
- Cleaning mixer and equipment
- Handling
- Compacting
- Depositing continuously
- Bonding

CONSTRUCTION JOINTS
- Type
- Joints in columns
- Joints in floors
- Monolithic construction

REINFORCED CONCRETE LINTELS
REMOVABLE SLABS
CONCRETE BACKING FOR STONE AND TERRA COTTA
FLASHING RAGGLES
CONCRETE WALL COPINGS
BUMPER CURBS
EXPANSION JOINTS
PROTECTION OF GREEN CONCRETE
- Moistening
- Cold weather

REMOVAL OF FORMS
MECHANICAL SURFACING OF CONCRETE
- Rubbed finish—wooden floats
- Rubbed finish — carborundum or cement bricks
- Tooled finish

PLASTERING UNDER SIDE OF SHEET-REINFORCED SLABS
TESTS OF CONCRETE CONSTRUCTION
WATERPROOFING OF SUB-GRADE CONCRETE
- Methods
- Protection of waterproofing

STONE CONCRETE FLOOR FILL
CINDER CONCRETE FLOOR FILL
CINDER ROOF FILL
CONCRETE FLOORS ON EARTH
- Sub-base
- Floor

SURFACE FINISHERS
- Preparation
- Top surfaces not subject to wear
- Surfaces to receive mastic floors
- Surfaces to receive terrazzo
- Surfaces to receive mastic floor paint
- Surfaces to receive composition floors
- Wearing surfaces
- Wearing surfaces integral with base
- Wearing surfaces not integral with base
- Stair treads, landings, steps
- Curing
- Roof surfaces on cinder fill
- Expansion joints in roof surfaces

CONCRETE FLOOR HARDENING
SIDEWALKS
- Sidewalk lights
- Waterproofing of structural walk slabs
- Sidewalk concrete fill and topping
- Reinforcing for walk slabs
- Curbs and gutters
- Caulking of walk joints
- Cutting and patching

PROGRESS PHOTOGRAPHS
GUARANTEES

Department of Specifications

(Concluded from page 31)

must be caulked. This caulking is usually accomplished by means of oakum driven into the joints, the joints then being filled with an elastic cement that will not run during hot weather or crack during cold weather.

Where steel pan stair construction is provided, to be finished with cement treads and floor landings, the specifications for the concrete fill and finished topping should be the same as specified herein for general floors, except, of course, that the thickness will be less. The coarse aggregate will be smaller, and more care will be exercised in the placing of the finished topping.

INDUSTRIAL NOTES

Terra Cotta in Other Days

MR. FREDERICK C. HIRONS, of the firm of Dennison & Hirons, architects, on a trip to Italy in 1921, collected some interesting photographs of early examples of terra cotta work. He also made and procured measured drawings of interesting profiles of much of that work.

The Atlantic Terra Cotta Company has revived the monthly journal *Atlantic Terra Cotta,* suspended during the war, and in each issue of this publication an example will be presented of the use of terra cotta in early Italian Renaissance structures. Some of the work will be of well known buildings and there are to be many little known examples secured in places remote from the beaten path and never before published. Mr. Hirons, we learn, will actively co-operate in the work of preparing these special issues.

The May issue describes the Ospedale Maggiore, Milan. This building was started in 1456 and was not completed until 1626. There is one page of text, six full page halftones of various details and two pages of measured profiles, contributed by Mr. Hirons.

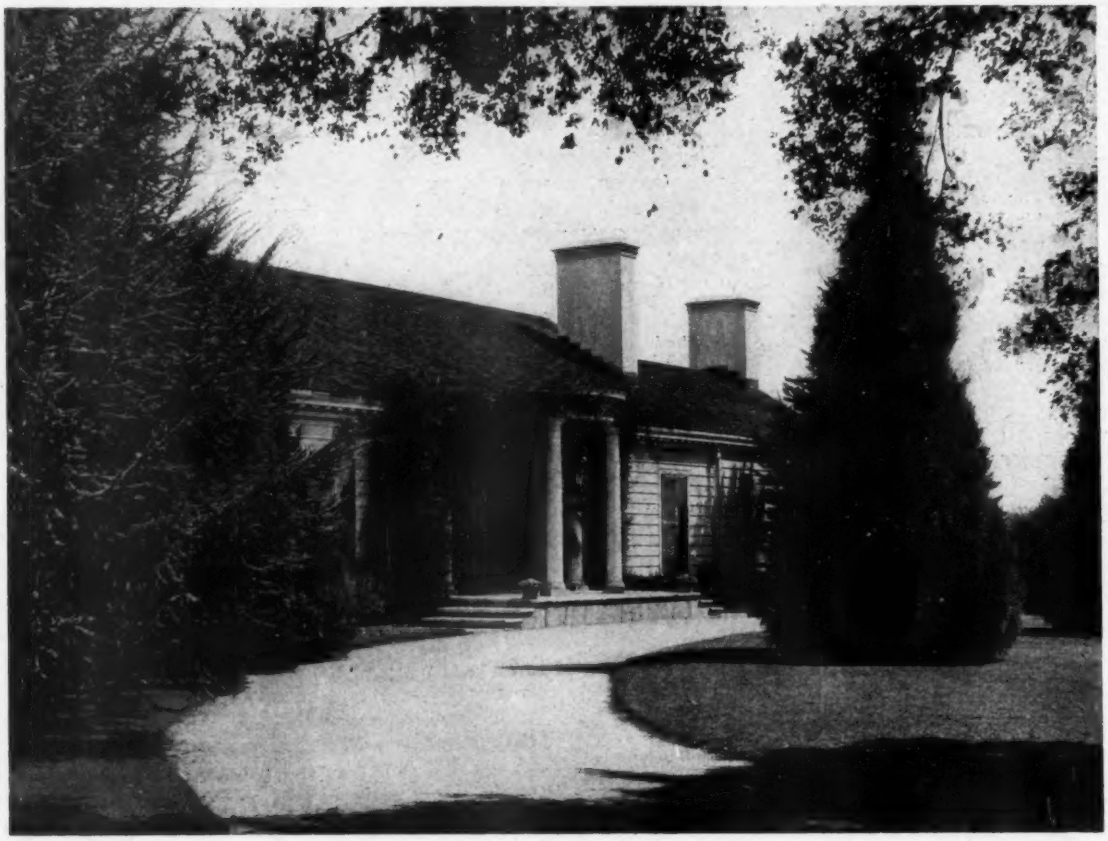
The June issue contains Part 1 of an article on the Certosa of Pavia, started in 1396 and completed in 1491. This is also the work of Mr. Hirons and consists of one page of text, six full page halftones and two pages of measured profiles, contributed by Mr. Hirons.

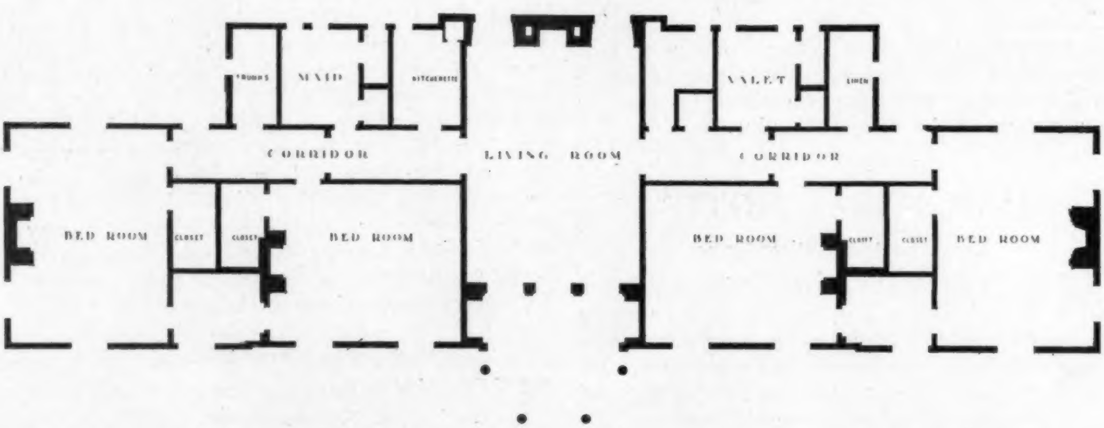
These brochures are printed on good quality paper on 8½ x 11 in. pages. The company announces that there will be twelve issues in the series and that the edition is limited. Copies will be sent free by the Atlantic Terra Cotta Company, 350 Madison Avenue, New York City, to any architect, designer or draftsman making request for same on his business stationery.

Copper and Zinc Shingles

THE Glidden Company has just closed a contract with the Anaconda Copper Mining Company through one of its subsidiaries, whereby the Glidden Company and its affiliated companies will have the selling rights on Anaconda copper and zinc roofings throughout the United States.

The Glidden Company has also arranged through the Anaconda Lead Products Company for the exclusive manufacturing rights to Anaconda Lead in Oil, a new product made by the electrolytic process.





GUEST COTTAGE ON THE ESTATE OF HENRY E. HUNTINGTON, ESQ., SAN MARINO, CAL.

MYRON HUNT, ARCHITECT

HOUSES IN SEGOVIA, SPAIN

(From the original water color by Cass Gilbert)