ARCHITECTVRE

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PLATES AND ILLUSTRATIONS

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From a Photograph by J. B. Carrington.

THE WOOLWORTH BUILDING BY NIGHT THROUGH THE COLONNADE OF THE MUNICIPAL BUILDING.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
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The Use of the Order in Modern Architecture

By Egerton Swartwout

FIRST ARTICLE

THE column was one of the very earliest architectural expressions, and like all primitive forms had its origin in structural necessity. It was the need of some means of support other than that of the walls which led to its adoption, and its development into the classic order is one of the most interesting phases of architectural history. Vitruvius, in his quaintly entertaining but wholly misleading handbook of architecture, gives in great detail the origin of the orders and the rules of their proportion. In all probability there were others before him who wrote on the same subject, and there have been many since. The existing ruins of classic work have been surveyed and measured, excavations have revealed unsuspected construction, and from these investigations careful and, in most instances, correct restorations have been published. The most important and valuable of these publications are in the form of monographs which not only give the measurements and restorations in detail, but also contain extremely interesting information and speculations in the subjoined text. There are also monumental works on archæology and architectural history, but unfortunately these as well as the monographs are not generally familiar to the modern architect, who contents himself usually with a copy of Vignola or Despouy. Buehlmann, too, and Canina are often found, but of them all only the plates are consulted; no one ever thinks of reading the text, and it is only when some new or obscure point comes up, the solution of which cannot be found in the plates, that a frantic search is made for copies of Penrose or other authorities bearing on the subject. Then, too, it often happens that the information sought is not to be found in any one particular book. I have always felt there was a great field for some work that would present careful detailed restorations of the classic orders, supplemented by plans of the buildings in which they were used, with photographs of the existing remains, maps of the localities in which they were found, and a critical text which would not only describe the order as it existed but would also give the reasons which probably influenced the classic architect in doing just what he did in that particular instance; to this could be added a statement showing how the order could be used in modern buildings. It would be a most interesting and valuable work, one of the most valuable that an architect could possess, and I hope that eventually it will be undertaken by some one; but it is a monumental work which would take a lifetime to complete.

Some years ago I made a few notes on the general subject, which were published in ARCHITECTURE, and in which I endeavored to trace the origin and development of the classic orders, but made no attempt to present careful restorations; in fact, the notes were merely supplemental to the restorations, which have already been so carefully and fully presented. In these notes I made a few suggestions as to the use of the order in modern work, but the time at my disposal did not allow me to do more than touch the question. It is the purpose, therefore, of the following articles to supplement my former notes, and to endeavor to show how the classic orders can be adapted to the requirements of modern architecture. I say adapted, because it is very evident that considerable adaptation is necessary. We do not build Greek temples nowadays; our life and, consequently, our buildings are too complex to be expressed in the simple and beautiful forms of classic architecture; we can only adapt some of these forms to our requirements, and this adaptation can only be done successfully when it is done with a thorough understanding of the principles which led the classic architect to do certain things in a certain way. It cannot be done successfully by merely copying an order here and a doorway there, without the slightest regard to the location, material, or size of the prototype. I do not mean by this that we cannot follow, and follow very closely, the best examples of the past. I do not mean that we should try to design an entirely new order whenever we have occasion to use one. On the contrary, it would be the height of folly to neglect the precious opportunity we now possess of profiting by the experiences of those who have gone before. If we are to use a Greek Doric column we cannot do better than to follow the proportions of the Parthenon, provided that the size and materials at our disposal warrant it, but we cannot reproduce the gable end of the Parthenon as a portico of an office-building. Of course, on this point of adaptation as in all points in architecture, there is no definite rule; it is a matter of knowledge of the underlying principles, a matter of taste, a matter of common sense, and of these three the greatest of all is common sense. What mistakes would be avoided, and how architecture could be improved, if only the architect stopped to think; if instead of copying an order blindly he carefully considered how it would look on his particular design in the materials at his disposal; whether it would look well when seen from below, or in silhouette; whether the detail could be simplified or omitted entirely if it proved too expensive; whether the shaft should be fluted; whether the cap would adapt itself to a corner treatment, etc., etc. There are a thousand and one considerations in the use of an order.

Allusion has been made to the underlying principles of classic architecture. Of these principles the greatest is the most self-evident; that an order is a decorated means of support. There can be no question of that; everybody admits it cheerfully, and then generally ignores it. An order should not only actually be an adequate support for what is above it, but it should seem to be an adequate support. That is the difference between architecture and engineering. And again, as the order does express support, it should have something to support. The weight, superimposed, should be commensurate to the supporting members. In the Greek Doric order, for example, the face of the architrave is considerably beyond the upper diameter of the column; if it were not so, the entablature when seen across the angle would not seem to impose enough weight on the powerful abacus. Structurally, perhaps, it would be better if the architrave was on the column face, and was kept just free from the projecting abacus, and in the early Doric examples it was always in this position. But the outline thus obtained at the corner was not satisfactory to the Greeks, and they gradually extended the architrave outward until they arrived at the perfection of outline of the Parthenon. It was very simple, really; only common sense in realizing that there was no fixed rule, but that whatever looked the best was the best. The same thing applies to any order, and to pilasters as well as columns; I should say particularly to pilasters. The abacus is nothing but a survival of the plinth or plate placed on top of the column to give additional bearing; its practical function has become lost in its decorative quality to some extent, but the eye instinctively recalls this function and demands that the abacus be given something to support. It is, therefore, safe to say that the architrave face should always be, or seem to be, in advance of the main face of the supporting member below it. This principle was recognized by the Greeks in the best period of their work, and the Romans appreciated it, if they did not always apply it. It was very generally followed in the arcuated systems of the Romanesque and Gothic periods, but the Renaissance architects seemed entirely ignorant of it; their treatises on architecture as well as their completed work show the architrave face on a line with the face of the main supporting member below it, and also show the frieze face in the same line. This latter refers to another principle closely related to the first, which will be referred to later on.

As I have already said, this relation of faces was appreciated by the Greeks, and is most clearly shown in the main entablature and columns of the Parthenon; the architrave has a very noticeable projection beyond the upper diameter of the column; it is approximately half-way between the upper diameter of the column and the extreme projection of the abacus, and about on the column face at one-third the height of the column. This projection reaches its extreme in the Greek Doric because of the great size and projection of the abacus. In the other orders, on account of the relatively small size of the abacus, it is generally sufficient to keep the lowest architrave face approximately over the upper diameter of the column because when seen across the angle the square corner of the architrave as well as the abacus projects quite materially beyond the column face. I say approximately over the column face because in some cases when the abacus is heavier and of greater projection than usual it is advisable to project the architrave slightly. It is all a question of design and common sense, and can be determined by a large-scale model or by a careful projection of the corner on paper; but in the case of a model or a paper projection the greatest care is necessary; a little carelessness in laying out or a slight shrinkage or warping of the model will give an entirely wrong impression; also in a model it is extremely difficult to establish the centre of the column exactly in relation to the architrave above, and even more difficult to measure with exactness the relations finally established.

This necessity of the projection of the architrave is much more apparent in the case of pilasters than columns, because the pilasters, being square in plan, retain a constant relation to the architrave above, whether seen in direct elevation or on the diagonal. In this case the rule is invariable: the lowest architrave face should always project beyond the pilaster face. Unless this is done the abacus supports nothing at all and the entire cap becomes an unnecessary ornament, and also when seen from below the excessive projections of the abaci break into the line of the architrave with a most unpleasant effect. This is particularly noticeable if the projection of the pilasters is slight, in which case it sometimes happens that the projection of the abacus beyond the architrave face exceeds the projection of the pilaster, or that of the architrave face from the wall, and the cap has consequently an unstable appearance. Here again there is no general rule; the architrave face should project somewhat beyond the pilaster face, but the amount of projection is governed entirely by the character of the cap and the projections of the abacus—it is a question of design; but in general it can be said that the more the pilaster projects from the wall, the less need be the projection of the architrave face beyond the pilaster face. This is because the greater the projection of the pilaster the more the side of the cap becomes in evidence, and the better becomes the feeling of balance and stability. In the case of a pier the architrave face need project very little beyond the pier face unless the relation of faces is seen across the angle, and similarly the relation may approach the normal in the case of columns in antis, that is, the width of the beam over the column can be approximately the width of the upper diameter, except in such cases in which the anta is treated more as a pilaster, and the entablature carries for some distance beyond the front of the pilaster. In this case, if the architrave face is projected beyond the pilaster face, it would project unduly beyond the column face if the column centred on the pilaster, owing to the diminution of the column. In order to adjust this difference it is generally advisable to put the upper face of the column approximately on the outer face of the pilaster or a little behind it; the side of the pilaster then will be slightly narrower than the normal; the front of the pilaster could retain the normal width, and the discrepancy between the two sides would not be noticeable unless, indeed, the pilasters were fluted; in that case some further adjustments would be necessary; possibly, the fluting would have to be eliminated. I need not add that this general relation of faces is a very delicate one, and is somewhat comparable to the entasis of a column; it adds an element of beauty and stability, but it must not be so pronounced as to be noticeable. If the departure from the normal is distinctly apparent at first glance, it defeats its own purpose and is objectionable.

In close connection with the relation of faces of the architrave and its support below is the relation of faces of the frieze and architrave. This is an expression of the same principle of support which is the inherent feeling in the entire order. As I have shown in the notes heretofore published, the line of support is not a straight vertical line. Both theoretically and artistically this would be wrong. The supporting member should be wider at the bottom than at the top, and the artistic effect is improved if this line is not straight but slightly curved. The supporting member does not spring directly from the ground; for practical and artistic reasons it needs a base, which may be individual to each member or common to all. At the top there is necessarily a cap or plate to provide a more adequate bearing for the superimposed weight; this cap is wider than the top of the supporting member, and the line of support which inclines inward from the ground past the base up to the cap takes a reverse curve outward at the level of the cap. This reverse curve is followed by the superimposed crowning motive, whether it be the primitive beam with its projecting rafters, or whether it is in its ultimate form of the classic entablature. It is a crowning motive, and as such naturally projects beyond the walls or the supports below. The same general outline is expressed with the utmost simplicity in the batter of the walls of an Egyptian pylon and in the reverse curve of the simple cornice above. This slightly curved inclination with a reverse curve above is then the general governing line of the entire order. From the neck of the cap starts the reverse curve, and this gives the general character of the cap and of the entablature. All surfaces, all mouldings, must follow this curve in principle. If the frieze face should be placed over the lowest face of the architrave it would not follow this curve; it would cause a break in the continuity of the entablature. The architrave, whether considerably projecting, as in the Greek Doric, or substantially on the upper column face, as in the other orders, seems, when seen across the angle, to project considerably beyond the column face, and echoes the reverse curve, which starts with the cap. The frieze then must follow this general line whether ornamented or not (the ornament plays an important part in the curve, as I shall shortly show), and the cornice above the frieze is the culmination of the reverse curve. It has sometimes been stated that the frieze is an indication of the wall of the building, and it therefore should preserve the verticality of the wall. This is not so; whatever may be the derivation of the frieze, it is in the classic orders a distinct part of the entablature, and should be treated as such.

Of course the above principle is general in its application and cannot be followed with absolute literalness. It does not follow that in all orders the frieze should be actually beyond the architrave face. It only should be so treated that there is no break in the continuity of the curve. In the Greek Doric, for instance, the architrave has a slight inclination inward, and the triglyphs are on the architrave face and have also an inward inclination, but this is because the column shaft has such an apparent inclination, due to its excessive diminution and to the inward inclination of its axis, that any sudden change to verticality in the large surfaces of the architrave and frieze would produce an unpleasant break in the line and would lessen the effect of stability that is such a feature of the Greek Doric temple. But in spite of the similarity of plans of the architrave and frieze, the whole effect of the order is entirely in harmony with the line of support above described.

In all orders other than the Greek Doric the architrave is not plain, but consists of a series of stepped faces capped by a moulded member, and its outline consequently adheres more closely to the line of support, and in these cases the frieze must always seem to project somewhat to follow this line. In the Greek Ionic the frieze was usually ornamented with sculpture in fairly high relief, and it is this sculpture which gives the real outline of the frieze at the corners, and as it projects in mass quite well beyond the architrave face, the feeling of the reverse curve is very strongly pronounced.

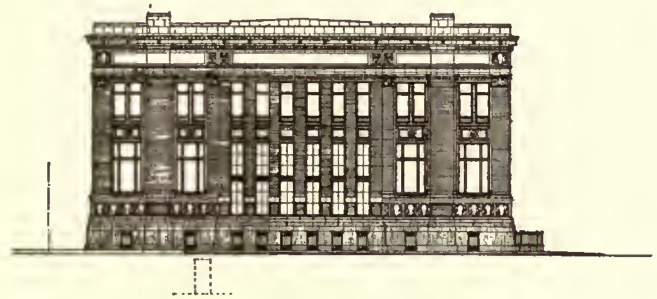
The actual face of the frieze, that is, the vertical background of the sculpture, is naturally behind the architrave face in order to provide room for the sculpture, and it sometimes happens that this face only is shown in the representations of the order given in the books of reference, and consequently the order as it is so shown is copied blindly by men who should know better; the frieze is left unornamented by sculpture, and has a most unpleasant recession, and the outline of the entablature is completely lost.

In connection with the sculpture of the frieze there is one point that is very commonly overlooked; namely, the outline at the corner. If the sculpture or ornament is kept away from the corner, the recessed background only will show on the diagonal view and the outline will be lost. The sculpture must run around the corner, and at the corner must be so designed that there will be more, or at least as much, projection at the top as at the bottom. In other words, the outline must follow the reverse curve. This applies to architecturally ornamented friezes as well as to those having sculptured ornament. The Renaissance architects had an appreciation of this point, although, as I have said, they were unfamiliar with the general principles of the relation of the faces of the architrave and frieze.

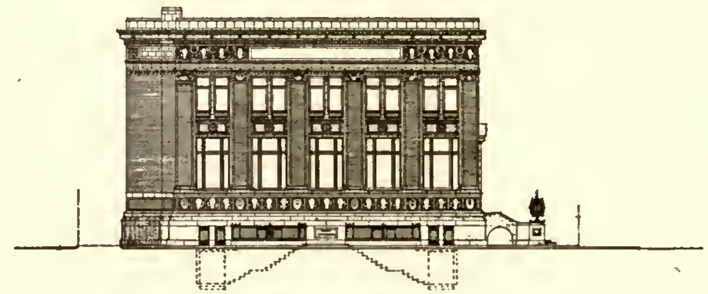
A very noteworthy example is in the frieze of the Colleoni Monument in Venice, where, in order to supply the requisite stability and strength of outline needed for the pedestal of such a robust and powerful statue, a cartouche has been placed at the corner of the frieze, which emphasizes the reverse curve and tends to unify the entire entablature. Unfortunately, there are numerous examples where this principle has not been followed; the sculptured frieze of the Arc de Triomphe in Paris is not accented at the corners, and there is a consequent recession at the top, which serves to separate the cornice from the rest of the entablature, an effect which is heightened by the great projection of the cornice and the relative shortness of the brackets. Also in the Madeleine in Paris the frieze is ornamented with festoons finished at the corners with candelabra; these candelabra have much more projection at the bottom than at the top, and consequently the outline of the candelabra meeting the corner outline of the projecting architrave form a convex surface apparently coming to a point at the top of the architrave. This line is very unpleasant and detracts seriously from the silhouette of the structure. Innumerable similar instances could be cited which would show the same disregard of this simple and apparent principle. The effect is so bad and the remedy is so easy that it is surprising that nothing has ever been done to remedy these defects, even after the work is in place. It is surprising also that such things should be done at all, and yet I suppose the reason is apparent.

We are so accustomed to take the classic orders as we find them in the books that we never stop to think what the detail means; nor do we study the order in the ensemble. It is usually drawn out at a small scale, and the actual detail is left to some inexperienced draftsman, who takes it straight from Despouy, Vignola, or Buehlmann, and who generally does not hesitate to change the proportions from the original drawing or sketch if the sketch does not agree with what he finds on the plate.

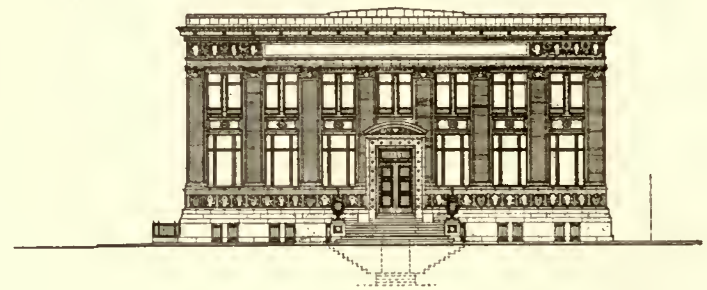
The models, too, which should be the means of invaluable study, are usually made piecemeal, and only show isolated fragments of ornament. Often parts of the ornament are approved and cast before the rest of the ornament, if the order has been started. The result cannot be satisfactory. The only safe way to study an order is from a very carefully made scale model, which should be complete and show all the detail in mass at least, and with at least two of the columns and the stylobate. The architrave and frieze should be made in separate pieces, so that the proper relation of faces can be studied. The full-size model can then be safely based on the proportions finally approved on the scale model, but the full-size model should also show a complete section of the entablature with the column cap in the proper relation, and it should be studied as far as possible from the distance and point of view from which it is generally seen. This entails, I know, considerable trouble and much relative expense, but the trouble and expense are slight compared with the results that are attained.



—REAR ELEVATION—



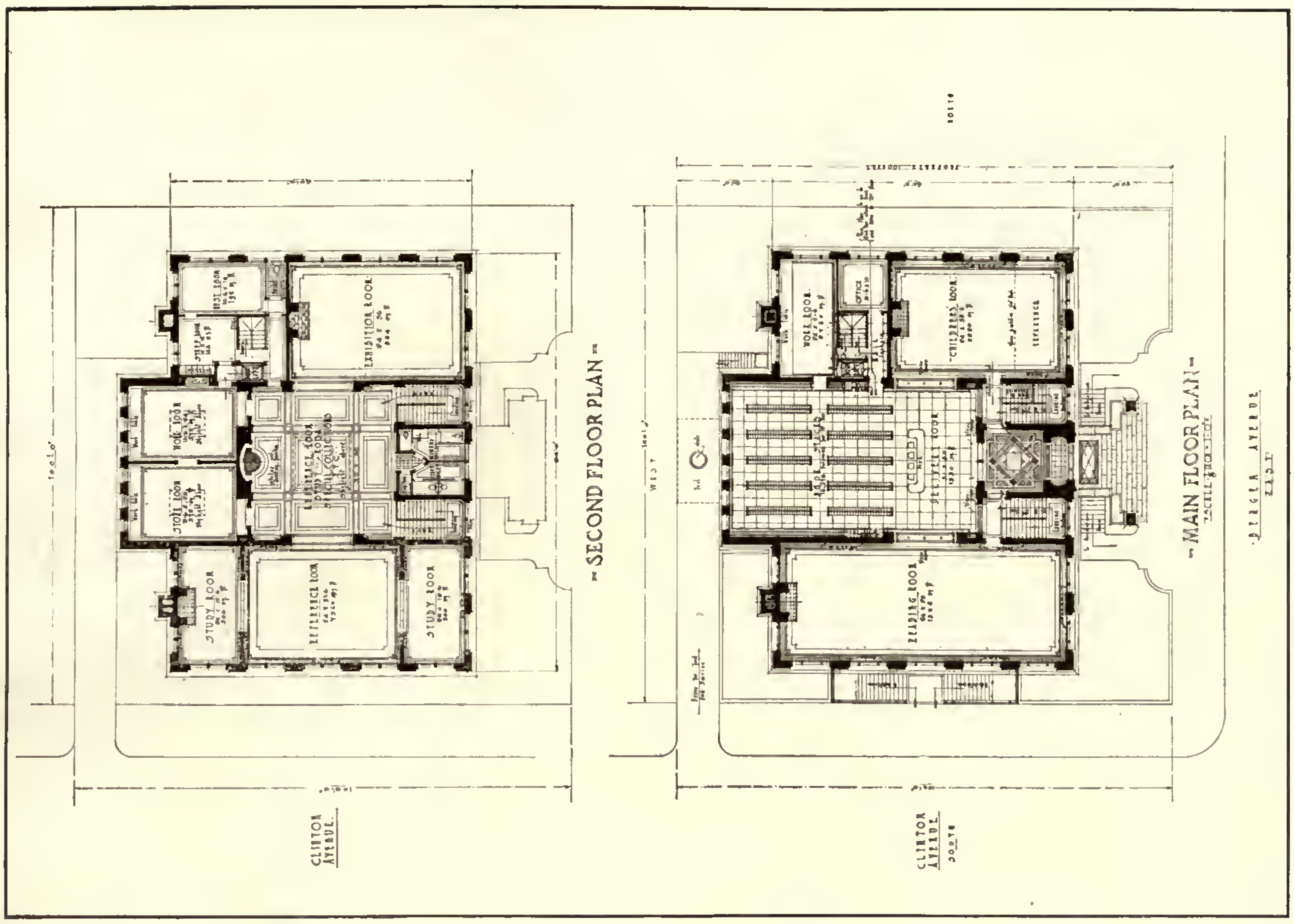
-CLINTON AVENUE ELEVATION-

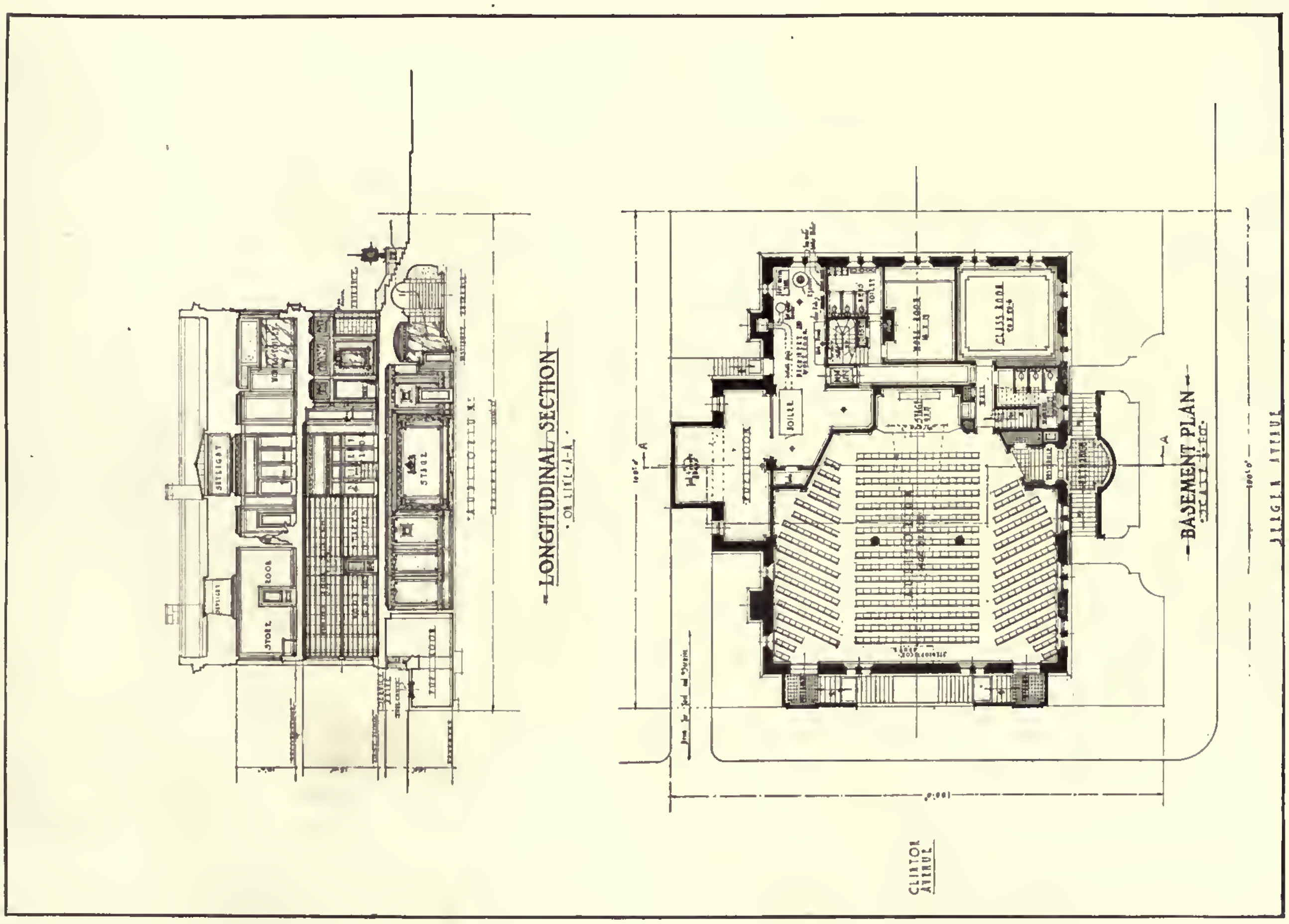


-BERGEN AVENUE ELEVATION-

WINNING DESIGN FOR NEW BERGEN BRANCH LIBRARY BUILDING, JERSEY CITY, N. J.

Arthur Frederick Adams, Architect.





Arthur Frederick Adams, Architect.

WINNING DESIGN FOR NEW BERGEN BRANCH LIBRARY BUILDING, JERSEY CITY, N. J.

Dead Styles

By Albert C. Phelps

A SHORT time ago I read in an English architectural journal a criticism on American architecture in which the author asserted that American architects had not yet gotten beyond the stage of the revival and miscellaneous application of dead styles. The term "dead styles" was not a new one, and I could not help but admit the justice of the comment concerning their inappropriate use; however, it seemed to me that it illustrated a common misconception of what an architectural style really is.

Styles and fashions are often confused, although, I suppose, from one point of view they are synonymous. When I began teaching, about twenty years ago, I recall that fashions in dress were distinctly different from those of to-day. Among my first students I shall always remember a gentlemanly and well-dressed youth with short jacket-coat, peg-top trousers, "Smokomis" shoes—advertised by a prominent dealer as "the ugliest shoes in town"—red socks, brilliant red tie, and a dinky little cap, the forerunner of the freshman cap of to-day; that was the fashion of those days; it served its purpose, as such things do, and gave place to subsequent developments that now seem equally absurd. I suppose we may say that that fashion or style died, although it seemed very much alive at the time.

As a student I used to be told of the deadness of classic architecture—it was when the Richardsonesque was very much in vogue—and, after studying Vignola and hearing sundry lectures, I agreed that it was very dead indeed—the lectures as well as the architecture. I remember I did have a slight doubt upon visiting the Columbian Exposition, but soon after graduation I spent several years in Chicago offices where the influence of Louis Sullivan was strong and I became fully convinced that all bygone styles were dead.

Subsequent reading and European travel awakened new doubts, and I determined to get to the root of the matter. I recall most vividly a visit to the Acropolis Museum at Athens when the vitality of Greek art asserted itself with startling effect. Among the crude but promising architectural forms were the weird pediment sculptures, the typhons with staring eyes and twisted tails and colors hardly subdued with the passage of time. And coming out, the Parthenon stood, every line vibrating with life, the incarnation of eternal youth. From that day I have never been able to think of classic art as dead.

Mediæval architecture protested with a thousand tongues that it was not dead and could not die so long as a scrap of carved stone or stained glass remained to bear witness to its greatness. You who have wandered among the cathedrals of France need not to be told this.

Then I thought it must be the very ancient styles that were dead, the Assyrian and the Egyptian. In a nightmare, after a day spent in the British Museum, I felt one of the great winged bulls standing on my chest, while Shalmaneser and his warriors marched past with majestic tread, rampant lions roared, and lean leopards leered from the blackness of the night, just as I had seen them on the wall-slabs from the palaces, in the museum, and another misconception was removed.

I have as yet been unable to visit Egypt, but the photographs my friends bring back and the exhibits we have in our museums convince me that the architecture of Hatshepsut's temple, and the sculptures and paintings in the Valley of the Kings are not works of a dead style.

Where, then, are the dead styles? I firmly believe there are none. When spiritual and material forces culminate in the production of a style of art the result is very different from a passing fashion that dies and is forgotten. That these living styles of bygone ages are applicable to our present-day problems is another matter. They serve us best by way of inspiration, encouraging us to great effort, but keeping us humble by exhibiting seemingly unapproachable achievements.

New Bergen Branch Library Building, Jersey City, N. J.

THE competition for the selection of an architect for the new Bergen Branch Library closed August 16. The competition was strictly anonymous and was open to any architect desiring to compete. The rules provided that all drawings should be of uniform size and scale and without identification marks, the names of the architects submitting plans to be in sealed envelopes without superscription. According to the terms of the competition the five best plans submitted were to receive an award of $250 each. The best one of these five was to be selected as the plan for the new building and its author to be appointed the architect. The award of $250 in the case of the competitor appointed as architect for the building was to be accounted as a first installment of his regular commission.

Thirty-two plans were submitted. The plans were then carefully examined by the trustees and the librarian, and, in accordance with the rules, the trustees selected the five best plans to receive the award of $250 each. From these five No. 29, by Arthur Frederick Adams, of Chicago, was unanimously chosen as the design and plan for the new building.

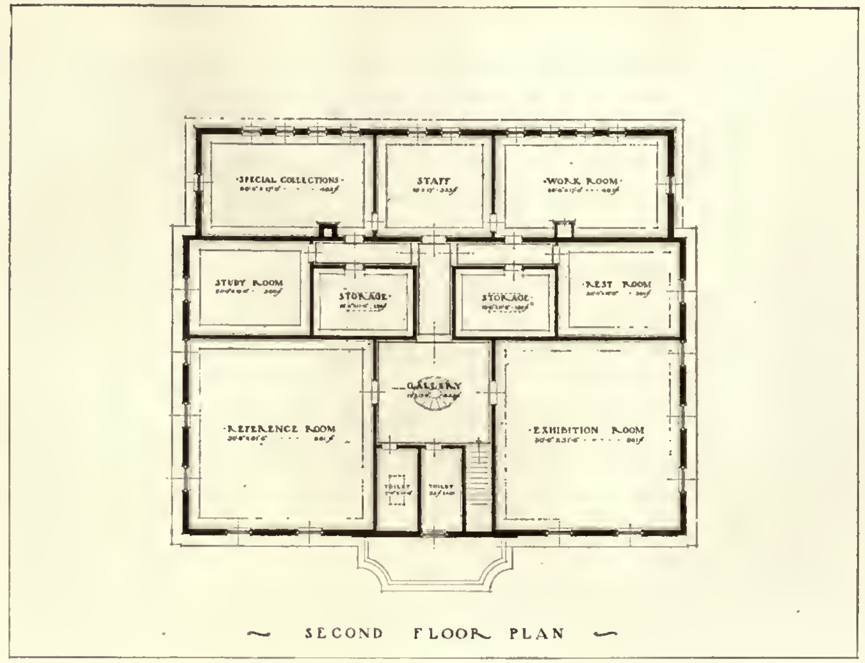
Mr. Adams is a prominent architect with fifteen years' practical experience in New York and Chicago. He is a graduate of the College of Architecture, Columbia University, the winner of the Paris Prize scholarship, and studied for three years at the Ecole des Beaux Arts, Paris. He took an active part in the design and construction of the New York Public Library, several of the branch libraries in Brooklyn and New York, and was the architect for a number of public and university libraries in the West.

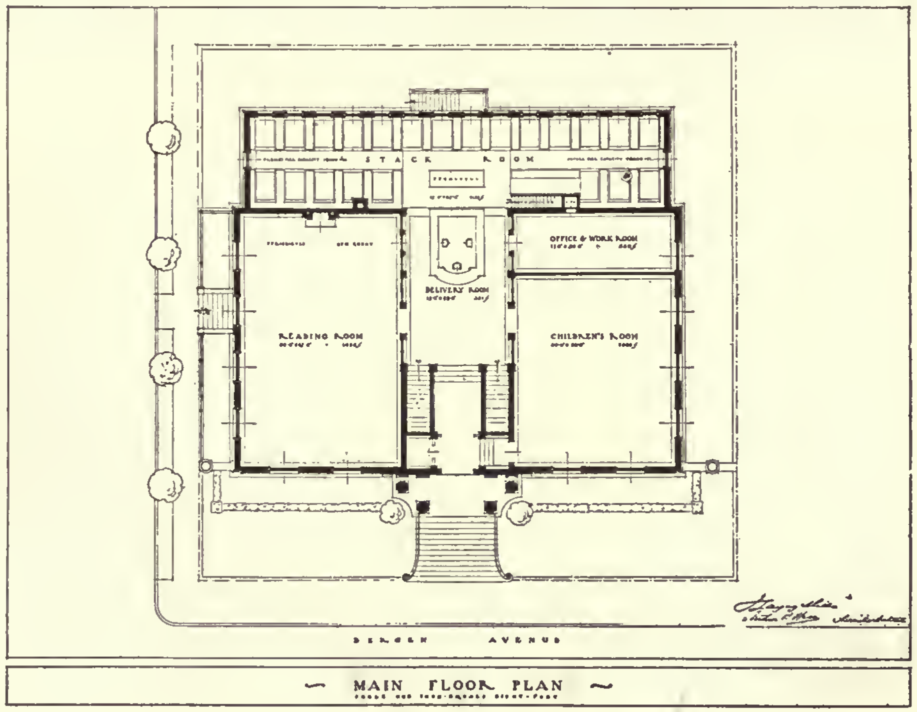
The new building will be erected on the corner of Bergen and Clinton Avenues. It will have a frontage of 85 feet on Bergen Avenue and will be about 70 feet in depth. It will have two stories and a basement. The building will be of fireproof construction throughout. The exterior will be of brick, terra-cotta, and granite—granite to be used from ground level to line of first floor; the remainder of the building to be of brick trimmed with terra-cotta.

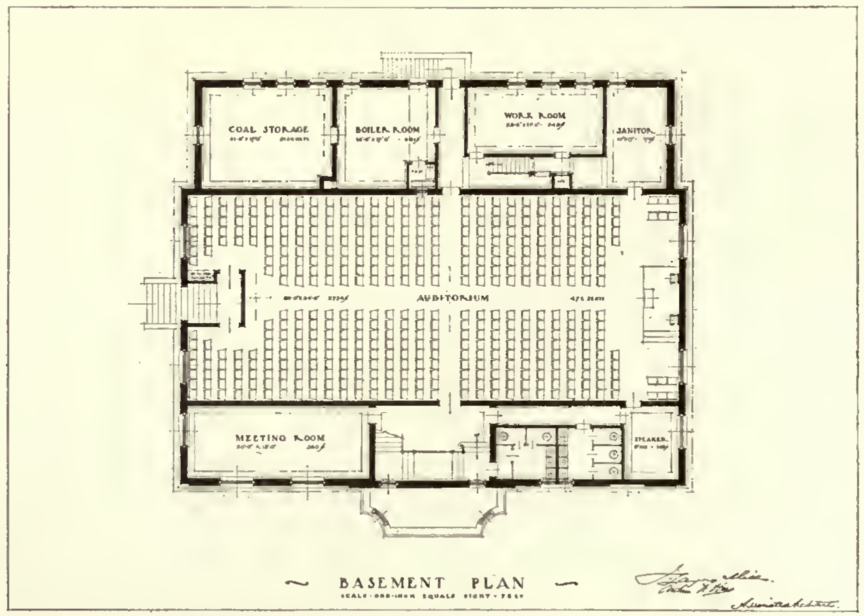
The new building will contain all the rooms and departments necessary for a modern, well-equipped library; and in addition will have an auditorium with nearly 500 seats in the basement and a large exhibition-room on the second floor.

The authors of the other four plans selected to receive the award of $250 are as follows:

Hindenach & Spangenberg, Boston, Mass. J. L. Mills & A. P. Hess, New York. Albert M. Kreider, Boston, Mass. Coffin & Coffin, New York.

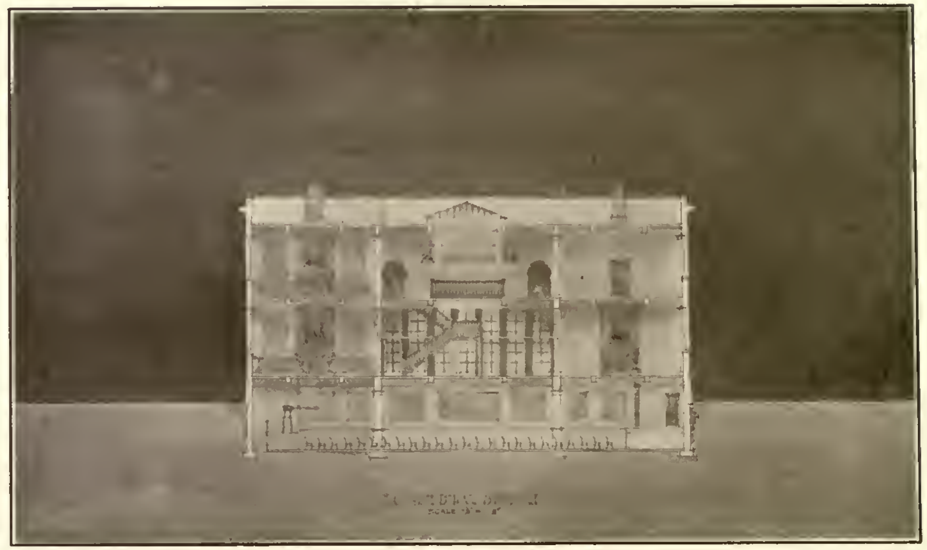


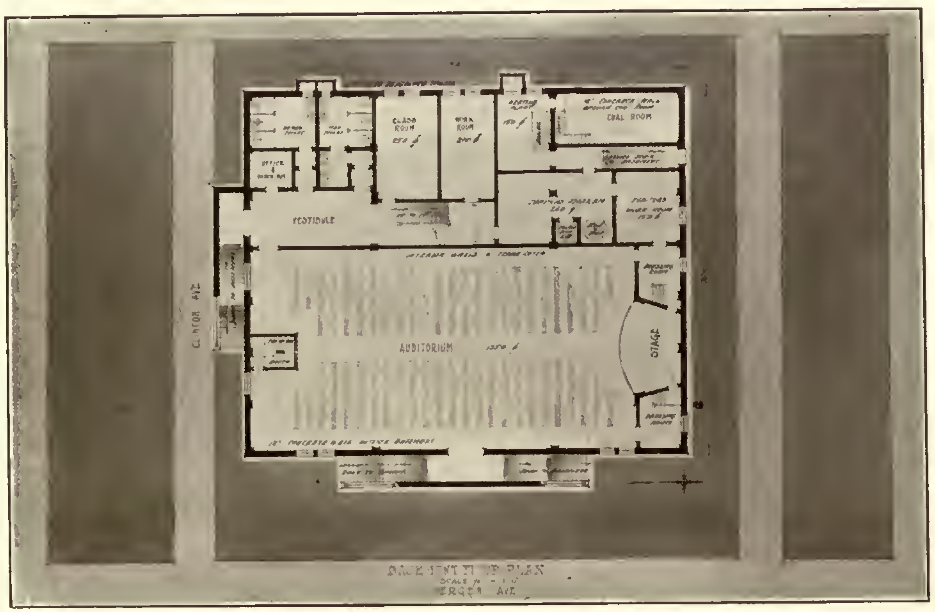


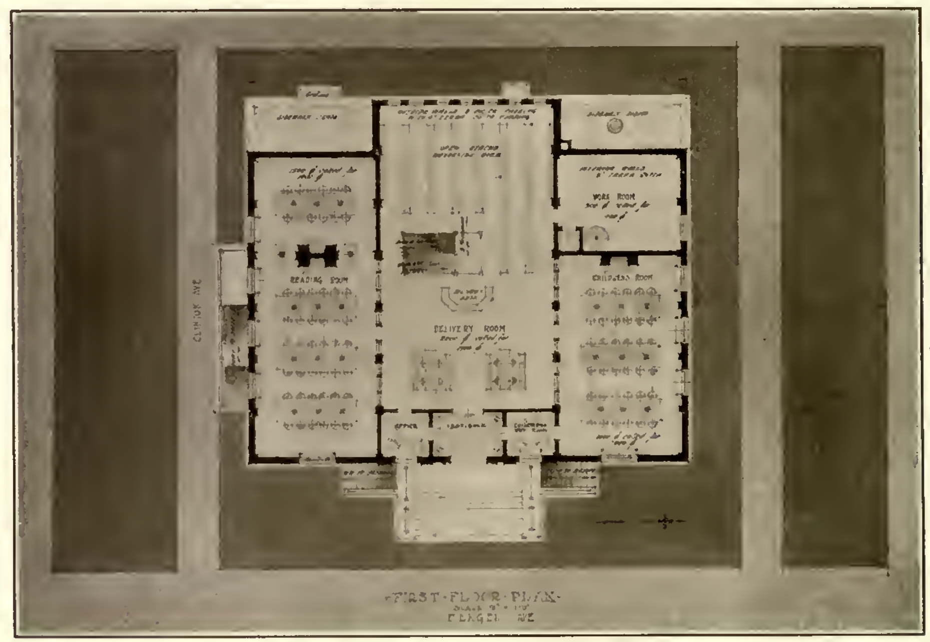


DESIGN No. 8. NEW BERGEN BRANCH LIBRARY BUILDING, JERSEY CITY, N. J.

J. L. Mills and A. P. Hess, Architects.

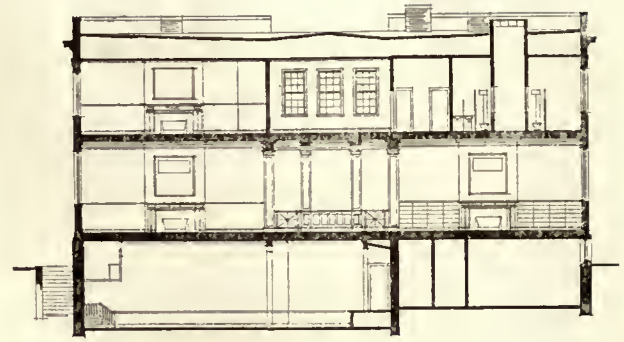




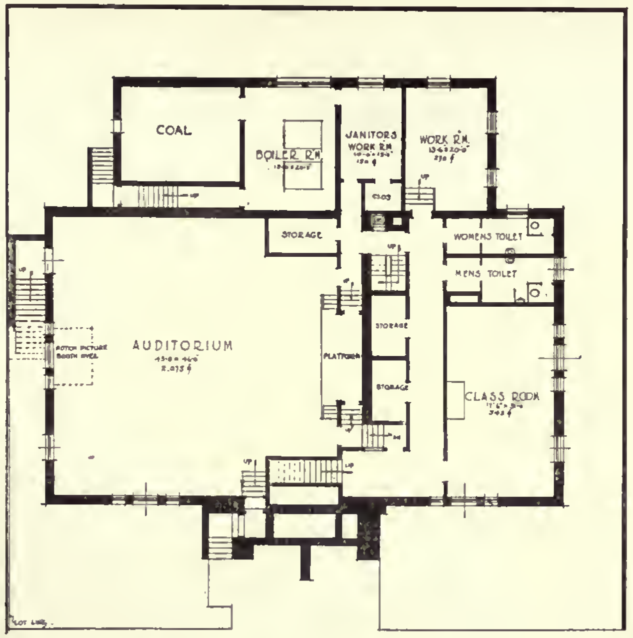


DESIGN No. 14. NEW BERGEN BRANCH LIBRARY BUILDING, JERSEY CITY, N. J.

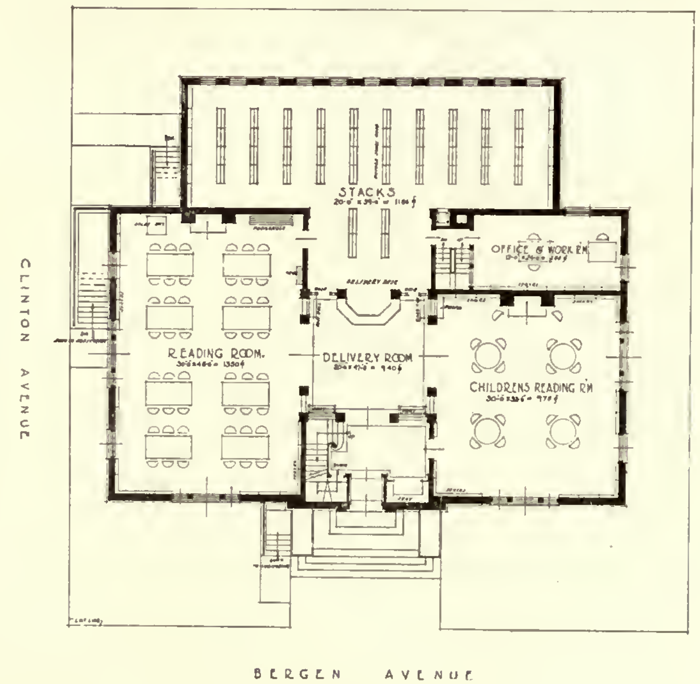
Hindenach & Spangenberg, Architects.



LONGITUDINAL SECTION



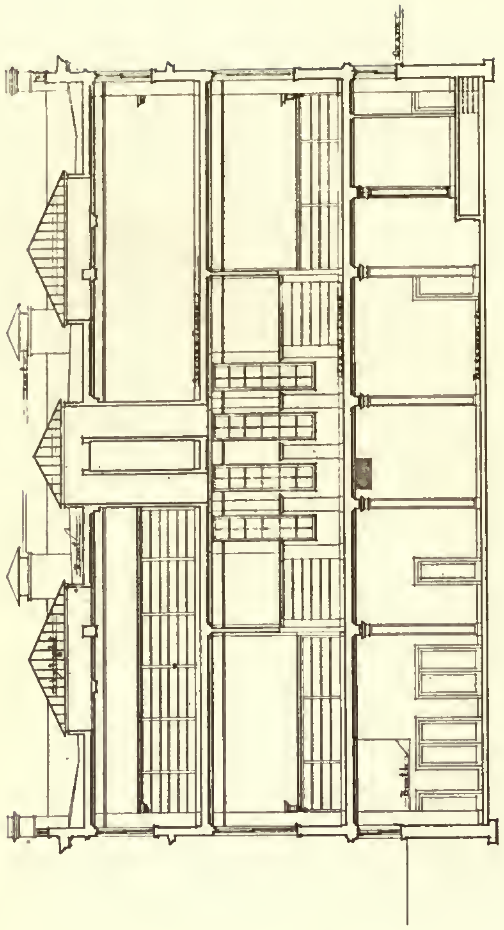
BASEMENT PLAN

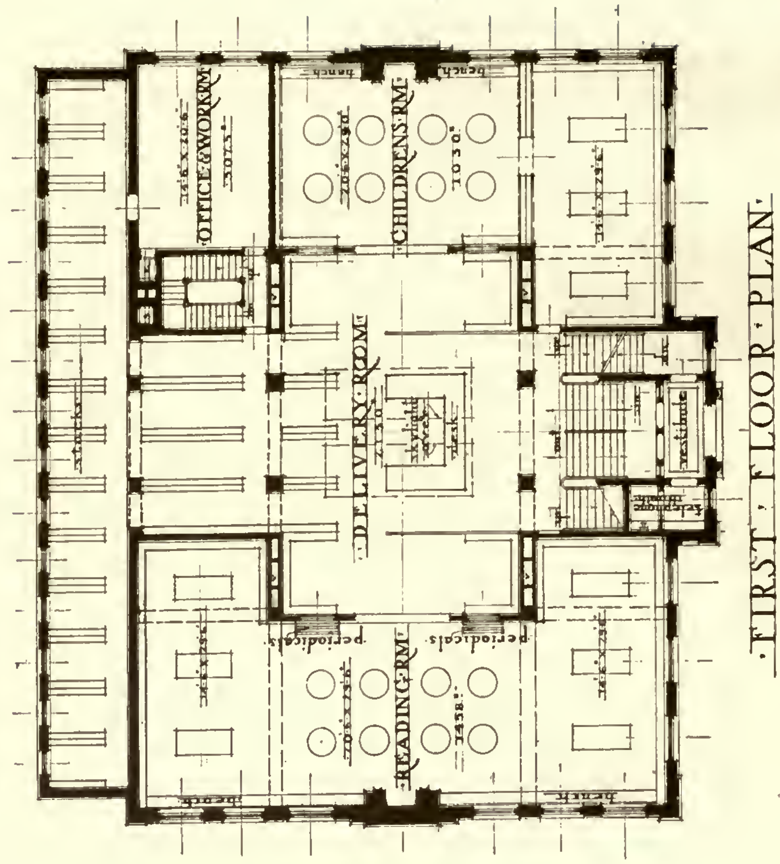


FIRST FLOOR PLAN

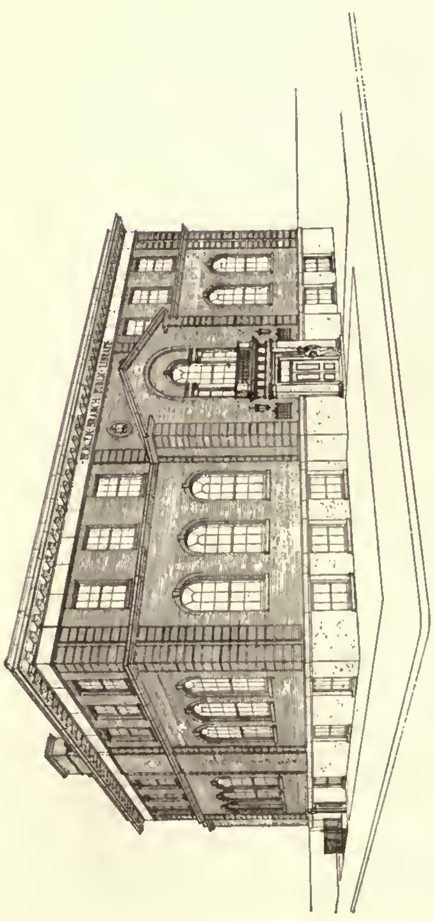
DESIGN No. 11. NEW BERGEN BRANCH LIBRARY BUILDING, JERSEY CITY, N. J.

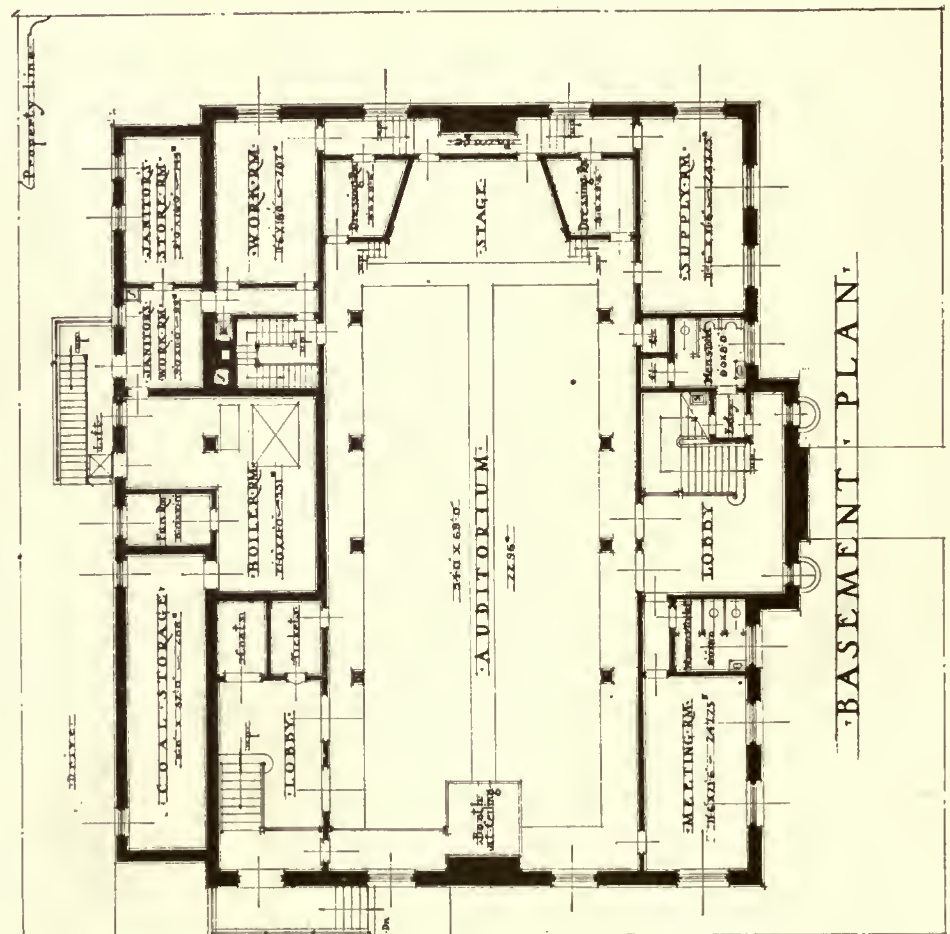
Albert M. Kreider, Architect.





Coffin & Coffin, Architects.





DESIGN No. 7. NEW BERGEN BRANCH LIBRARY BUILDING, JERSEY CITY, N. J.

Editorial and Other Comment

1921

THERE is always something of an affront to the average intelligence in hearing some incorrigible optimist iterate and reiterate his everlasting slogan of "keep smiling, good times are coming, the worst is over," and yet if we all sit tight in our own little corners of discontent and discouragement, it would be a still worse world. The trouble with the incorrigible optimist is too often simply the fact that he has found the sledding rather better than he expected and his problems thereby made easier.

The real optimist is the man who has had his soul tried, and can yet pull himself together and make ready with a foundation of clear thinking and acceptance of facts for the fight ahead.

He knows all about what has been, where and why he has failed, and knowing, he sets out to put his hard experience to better use.

We have certainly had a surfeit of revelations concerning rottenness and graft in the building trades, and the trail of the profiteer has been blazed so plainly that even the blind may follow. During the war the government put a stop to general building; "since the war a general chaos has followed. Blame it on George," for there doesn't seem to be any way of definitely placing the responsibility on any one group of persons or conditions.

We all know that times have been difficult for architects, and we all hope the times are surely going to be better. Thousands of homes *must* be built, thousands of factories and office-buildings, and they are going to be built, and the architects are going to build most of them. There are signs of better times, even if they are not yet lighted by electricity for all to see. The problem of readjustment must and can be solved—not in a day, a month, a year, but it will be solved, and somehow we believe there is going to be a new light in the land that will point the way to a better understanding between capital and labor and a fairer adjustment of prices between buyer and seller. Optimist? No! Here is the answer: If we can't do business under present conditions, and business must be done, then a better way will be found for doing it!

The air has been considerably cleared by recent exposures of graft, iniquitous combinations, and unconscionable profiteering. We know better "where we are at," and knowing, we may act accordingly.

Six Per Cent

WE have been in the habit for so long of thinking of the architect in general as an honorable and fair-minded gentleman that it rather grieves and pains us, not to say amuses us, to hear him referred to as a profiteer on a six-per-cent basis! We confess we had never thought the six per cent which is allowed by the institute exorbitant, in fact we had always thought it very modest, even modest to the point of being inadequate. We cannot think at the moment of any other profession that is so modestly paid, considering the education, training, and the responsibilities involved, and we only wish that more business could be conducted on the same basis of integrity and honor that we know to govern most members of the architectural profession. What we need, what the public needs, is a better understanding of the true place of the architect in the world of business. It is to him that we must look for a better way to solve the housing problems, the problems of construction, not only with a view to economy and suitableness, but with an eye to beauty and good taste. It is only the unseeing and unknowing who fail to recognize that practically all the achievements of the world have been made by men whose integrity of purpose and practical ends have been combined with an element of imagination.

It is often the so-called practical man who misses the real achievement by his very lack of vision. Almost any man may be a bricklayer of a sort, but to pile them up with a semblance of beauty and assurance of stability calls for something we call art. All of which is to say that the architect is worthy of his hire.

The Decoration of Schools

A RECENT correspondent asked us to give him a list of public schools that had been decorated with mural paintings. There are not so very many of them, so far as we were able to discover, and we wish that there might be more. In some instances murals have been given to a local school very much as silver service is given to a newly launched ship. It has been a matter of local pride and interest in some particular local historical subject.

There are in every school locality admirable subjects for murals of interest to the community and of value in developing a sense of pride in the pupils as well as giving them pictorial glimpses of some inspiring familiar historical or romantic legend. What fine subjects might be found in these days in the beginnings of our history, in the records of the pioneers, in the lives of men whose patriotism rose above self and party, in the splendid record of our men in the last and greatest of all wars.

If we are to Americanize the millions of foreign born, make their children feel that America is their home, we must surround them with things that speak for and tell of America. A pictured story, made with the lure of color, is worth whole libraries of text-books of dry paragraphs of history. Even tolerable murals would be better than none. We see many of our schools decorated with framed pictures of classic times, and some of us think that we dwell too much on the academic past. Our children of to-day need the inspiration of America much more than that of Greece and Rome. "No art is better than bad art," many will say, but we are inclined to think that even the story-telling murals that are frankly pictorial may have their value. Just when a picture is a mural and when it is not has been often discussed, and opinions will differ as much as the work of the painters.

On the Use of the Orders

WE take pleasure in calling attention to the series of three or four articles by Mr. Swartwout that begin in this number. Readers of ARCHITECTURE will recall a former series by the same author on "The Classic Orders in Architecture." In the new series Mr. Swartwout deals with the orders in their application to modern buildings. We believe that what he says will be of interest and real practical value in helping to point the way to a more intelligent and consistent dealing with classic details in buildings of to-day. There is a jumble of unmeaning and incongruous stuff foisted upon an unsuspecting public in the name of classic, and some of our modern temples of business stand out among the chief offenders.

Lectures at the Metropolitan Museum of Art

WE need not tell the readers of ARCHITECTURE of the immense practical value of the museum's wonderful collections and of the generous way it makes them available for students in all the arts. The following lectures are of especial interest to our readers:

SATURDAY SERIES

Jan. 22—"Dutch Landscape Painters XVII Century," Adriaan J. Barnouw, Professor, Columbia University; 4 P. M.

SUNDAY SERIES

Jan. 9—"Early New England Architecture," Henry A. Frost, School of Architecture, Harvard University; 4 P. M. Jan. 16—"English Country Houses," Eliza J. Newkirk, Wellesley College; 4 P. M. Jan. 23—"French Gardens of the Renaissance," Bremer W. Pond, School of Landscape Architecture, Harvard University; 4 P. M. Feb. 27—"Art in Oriental Rugs," Arthur U. Dilley, Lecturer; 4. P. M. March 13—"Decorative Ironwork," Samuel Yellin, Craftsman; 4 P. M.

To Own Your Own Home

HENRY K. HOLSMAN, Architectural Adviser of the "Own Your Home" Exposition to be held in Chicago, says:

"The way to resume building is to build. If for a brief time the banks, in their race for 'all they can get,' overlook the value of the building industry, let the building interests get together and devise other and possibly safer financial plans. The little savings of individuals put together make great ownerships. If those savings, gathered by the banks, are diverted to consumable and speculative investments for the time being, let the building industry, without waiting for the banks to disgorge, institute a strong teamwork drive for individual initiative in building ownerships, gather what individual capital is left here and there, organize co-operative ownerships and go ahead. It is the golden opportunity for the building and construction industry to save the nation's welfare and thus save itself."

A Seventeenth-Century New England Frame House

ONE of the best preserved houses of the earlier colonial period in New England is the "Parson Capen House," in Topsfield, Mass., built in 1683 by the Rev. Joseph Capen and described in the latest bulletin of the Society for the Preservation of New England Antiquities. The house is now owned by the local historical society and was carefully restored in 1913 by its secretary. This house was well built, even for its day, and it possesses architectural embellishments unknown in other existing dwellings of that period. The second story widely overhangs the first in front, the garret floors project at either end, and all are supported by ornamental wooden brackets. The overhang is a form of timber construction common in old English work and seems to have been done solely for its architectural effect. Beside the front door and under the gables are brackets that help to support the overhang.

The framework of these houses was usually of oak, though sometimes of pine, and made of heavy timbers mortised and tenoned together and held in place by wooden pins. Their joints were hewn with much skill by men who worked as their mediæval forefathers had done. The foundation timbers rested on an underpinning of field stones, laid without mortar.

The timbers of the framing in the Parson Capen House are of course very old, and the original newel and turned balusters of oak are still in place. Much of the interior woodwork, however, and all of the shingles and clapboards are restored. This restoration serves to show how the houses of the early period looked when fresh from the hands of the builders. Under the northern ends of the "summer beams"—which is one of the curious features in the Parson Capen House—being girts spanning the rooms, is incised with a chisel the date, July ye 8th, 1683, so that the exact date when the "frame" was raised is known.

Book Reviews

MEMOIRS OF THE AMERICAN ACADEMY IN ROME. Vol. III. New York University Association, 280 Madison Avenue, New York. Board covers.

One cannot help noting at once in looking at this handsome volume that it is printed for the American Academy in Rome by the "Istitutó Italiano Di Arti Graffiche-Bergamo." Type, paper, and plates are worthy of the subjects the volume includes: "The Bernardino Tomb," by C. Densmore Curtis; "Praxias," by E. Douglas Van Buren; "The Work of the School of Fine Arts." The Bernardino Tomb was discovered in the year 1876 at Palestrina, and derives its name from the Bernardino Brothers, who furnished the money for the excavation.

The text includes a descriptive catalogue of the many objects in gold, silver, bronze, and other metals that have been discovered. Praxias was the sculptor of the earliest figures made for the temple at Delphi, and was at work in the first half of the fourth century B. C.

The work of the School of Fine Arts shown includes architecture, sculpture, painting, landscape architecture. The object of the School of Fine Arts is "to discover the best available material among America's young artists, and to bring together a group of talented young men in quiet, attractive surroundings with the *chefs d'œuvre* of the great masters as a background.".

The plates include Plan of Delphi, by Richard H. Smythe, Fellow in Architecture; Women's Baths at Hadrian Villa, plan, by Raymond M. Kennedy, Fellow in Architecture; Plan of Isola Bella, by Edgar D. Williams, Fellow in Architecture; Interior of the Pantheon, by William J. Hough, Fellow in Architecture; Villa Lante, by Philip T. Shutze, Fellow in Architecture; Entrance Gate, Villa Borghese, by Edward G. Lawson, Fellow in Landscape Architecture; Relief, by Joseph E. Renier; Sower, by Albin Poladek; Duck Girl, by Paul H. Manship; Cupid and Gazelle, by Carl P. Jennewin, Fellow in Sculpture; Studies of Ezra Winter, Harry I. Stickroth, Eugene F. Savage, Fellows in Painting.

It is earnestly to be hoped that the Academy will be successful in raising the funds it needs for extending its scope and usefulness. It is an institution that should be supported by every one in the United States interested in the advancement of the arts.

RESIDENCE, BERNARD LIPPMAN, TEANECK, N. J.

Harold E. Paddon, Architect.

Plates I-XV follow page 12.

ENTRANCE-HALL, RESIDENCE, BERNARD LIPPMAN, TEANECK, N. J. — Harold E. Paddon, Architect.

DINING-ROOM, RESIDENCE, BERNARD LIPPMAN, TEANECK, N. J.

Harold E. Paddon, Architect.

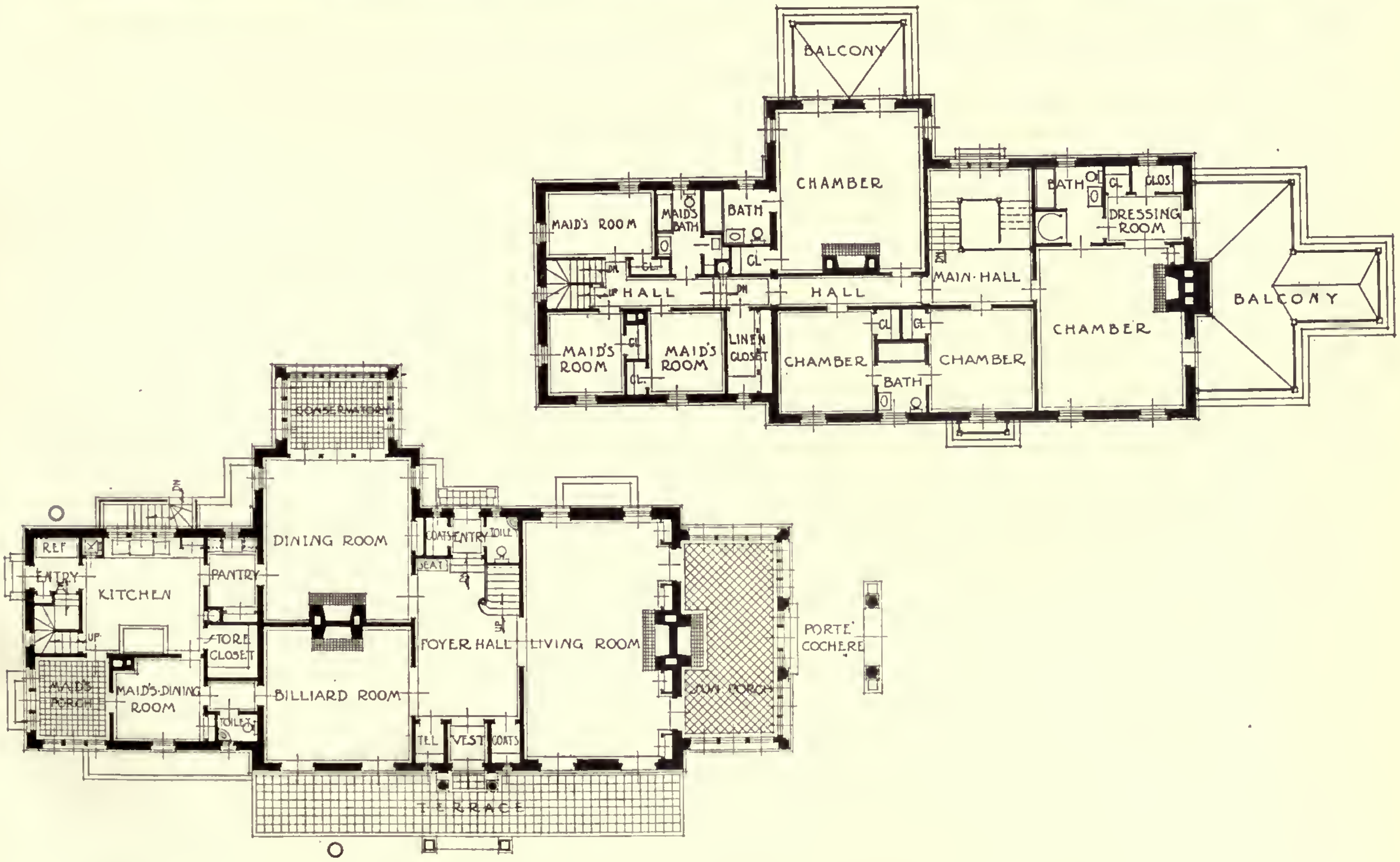
EAST CHAMBER.

LIVING-ROOM.

Harold E. Paddon, Architect.

RESIDENCE, BERNARD LIPPMAN, TEANECK, N. J.

GARDEN SIDE.



PLANS.

RESIDENCE, BERNARD LIPPMAN, TEANECK, N. J.

Harold E. Paddon, Architect.

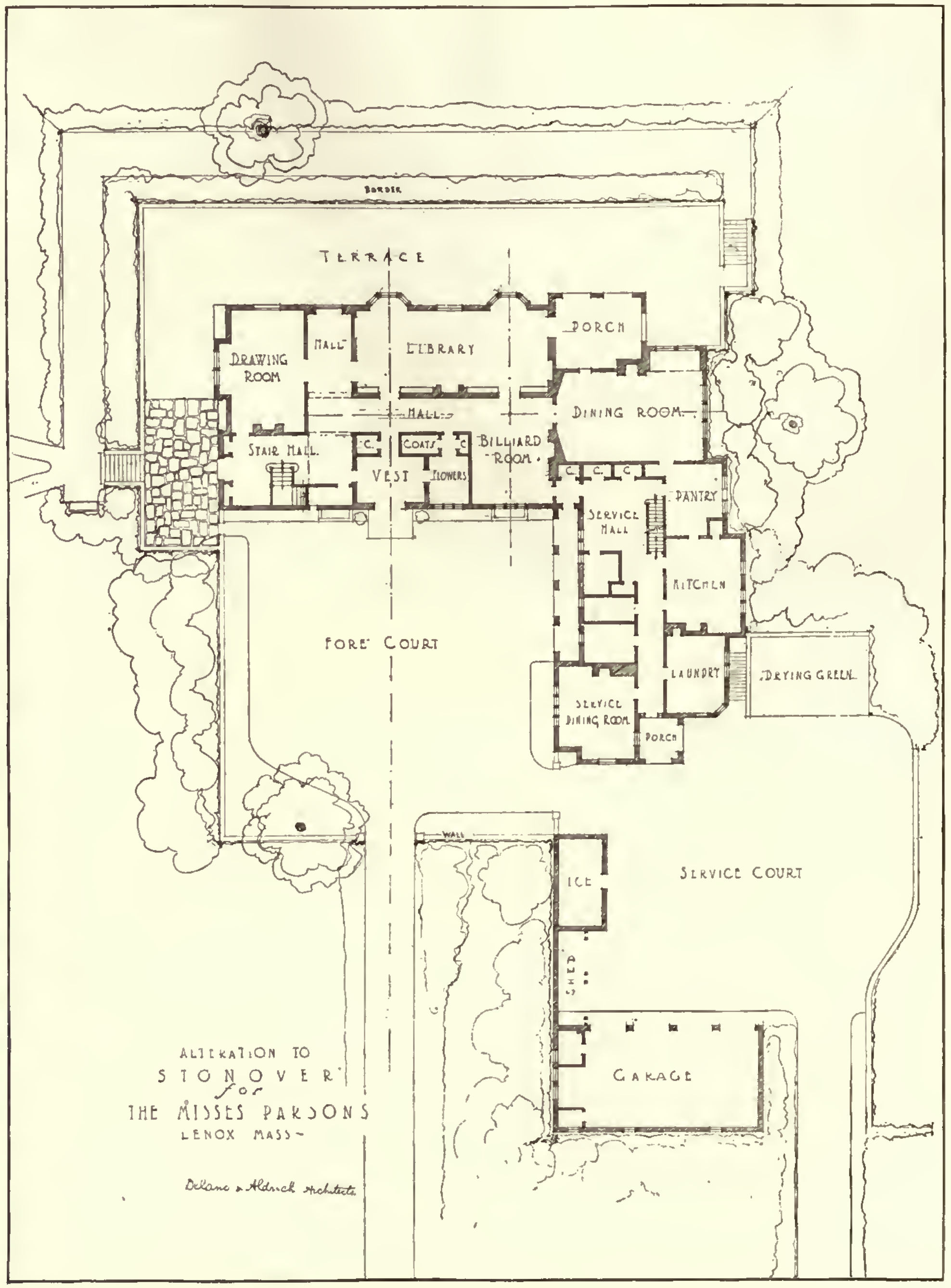
Surrounded by old Berkshire elms, it is the oldest place in the Lenox country, commanding a beautiful view from the south side.

"STONOVER," RESIDENCE OF THE MISSES PARSONS, LENOX, MASS. (Alteration and Additions.)

Delano & Aldrich, Architects.

The square wooden house originally situated at the top of the hill was removed to the slope, where the site was determined by the natural placing of trees. The building was pulled apart and added to and rebuilt around old rooms for sentimental rather than structural reasons.

TERRACE ON THE SOUTH SIDE.



Delano & Aldrich, Architects.

"STONOVER," RESIDENCE OF THE MISSES PARSONS, LENOX, MASS. (Alteration and Additions.)

The whole south side on the ground floor is occupied by the library, finished in panelled butternut.

VIEW FROM TERRACE.

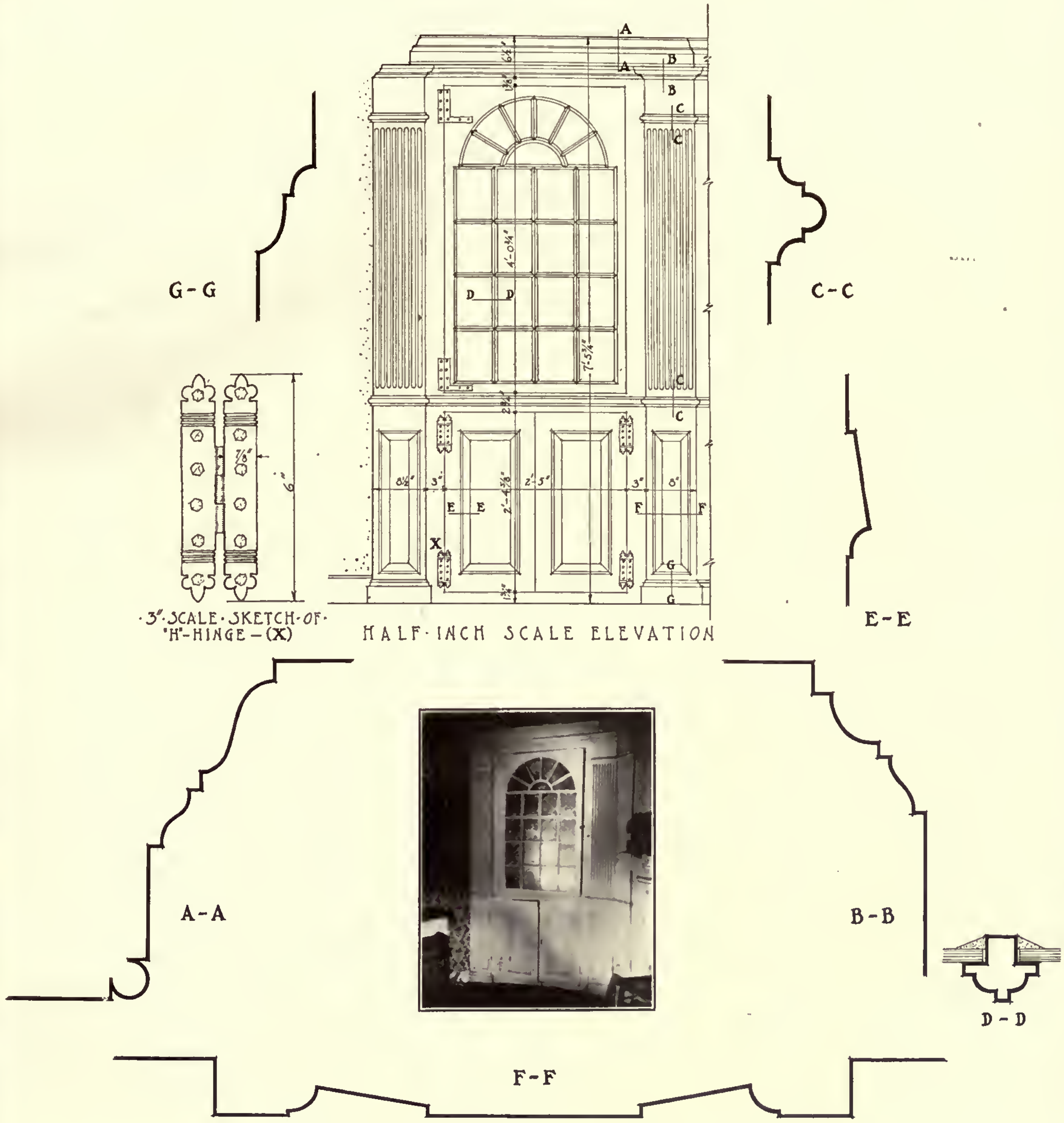
VIEW OF HOUSE FROM SOUTH.

DETAIL OF SOUTH FRONT.

CONNECTING WALL TO ICE-HOUSE, GARAGES, ETC.

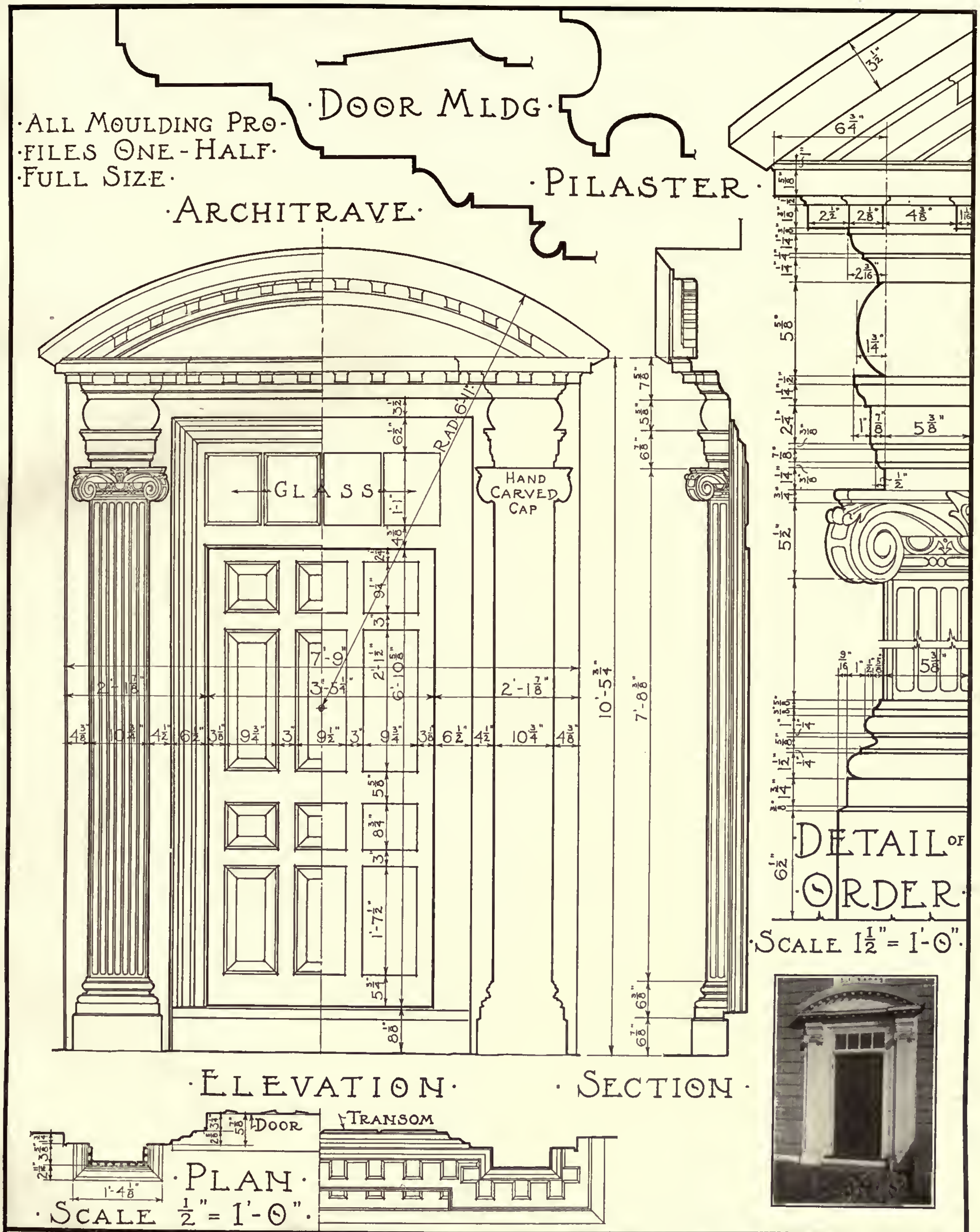
"STONOVER," RESIDENCE OF THE MISSES PARSONS, LENOX, MASS. Delano & Aldrich, Architects.

The house is of yellowish stucco and the woodwork is blue. The walls are of the same material as the building, with coping of variegated green and purple slates like the roof of the house.



·ALL·MOVLDINGS·ONE·HALF·FVLL·SIZE·

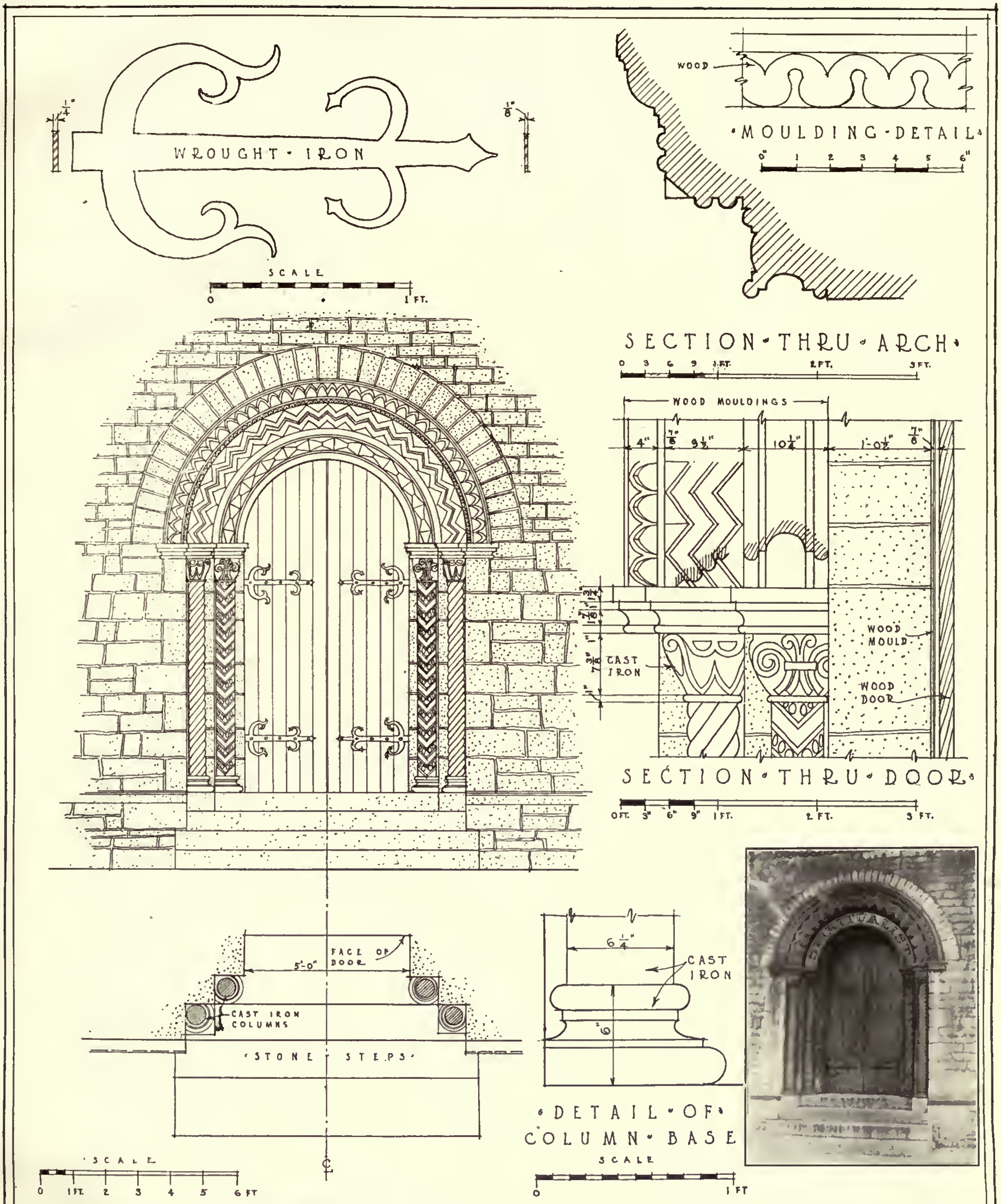
·EARLY· ·ARCHITECTVRE· ·OF· ·CONNECTICVT·	·CORNER·CVPBOARD·IN·THE·PARLOR·OF· ····THE·TAINTOR·HOVSE···· ·NEAR·COLCHESTER·CONN·	·MEASVRED·BY· J·FREDERICK·KELLY· ·DRAWN·BY· ·LORENZO·HAMILTON·



·EARLY·
·ARCHITECTURE OF·
·MASSACHUSETTS·

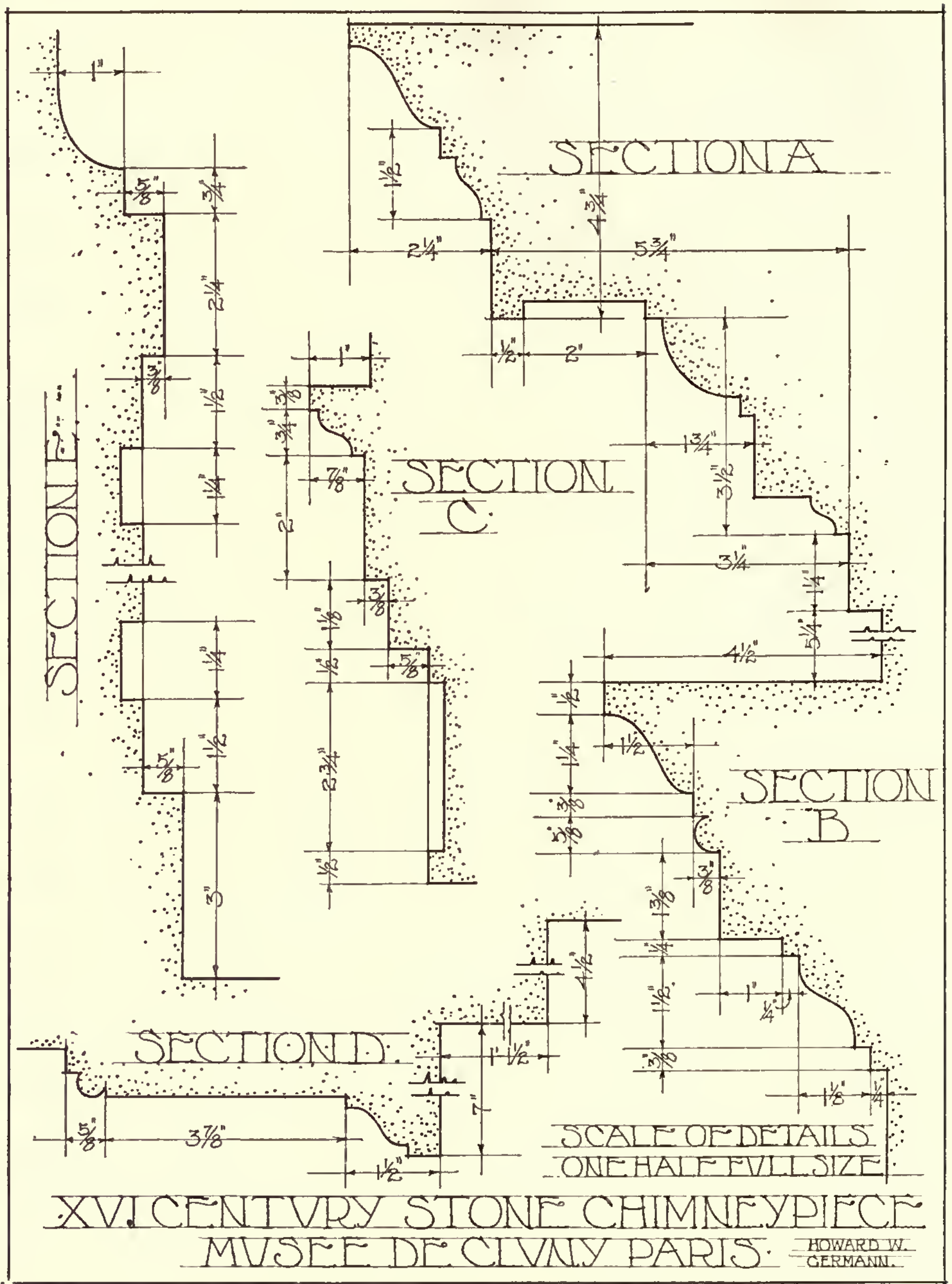
·WEST DOORWAY OF ROYAL HOUSE·
·MEDFORD MASS·
·BUILT 1737-1739·

·MEASURED AND·
DRAWN BY
·GEO·R·MITCHELL·



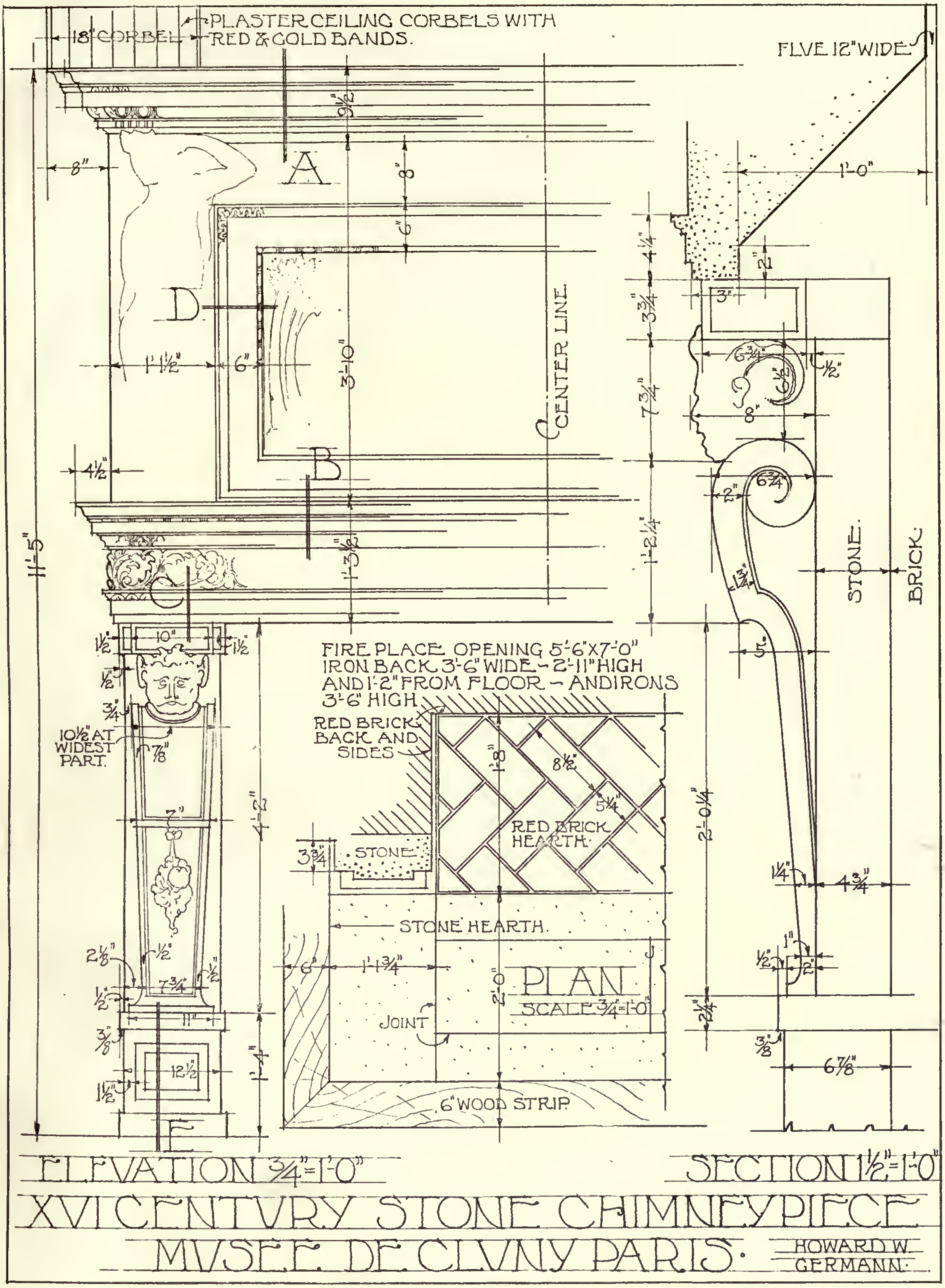
·EARLY· ARCHITECTURE· ·OF· THE · OHIO· VALLEY· ·CIRCA · 1840·	·ENTRANCE· ·TO· AN· OLD · CHURCH· ·COLUMBUS – OHIO·	·MEASURED · & · ·DRAWN · BY · · Daniel W. Weiny

STONE CHIMNEYPIECE DATING FROM 1562.



The work of Hughes Tallement.

In the centre panel is shown Christ and the Samaritan woman. Measured and drawn by Howard W. Germann.



Measured and drawn by Howard W. Germann.

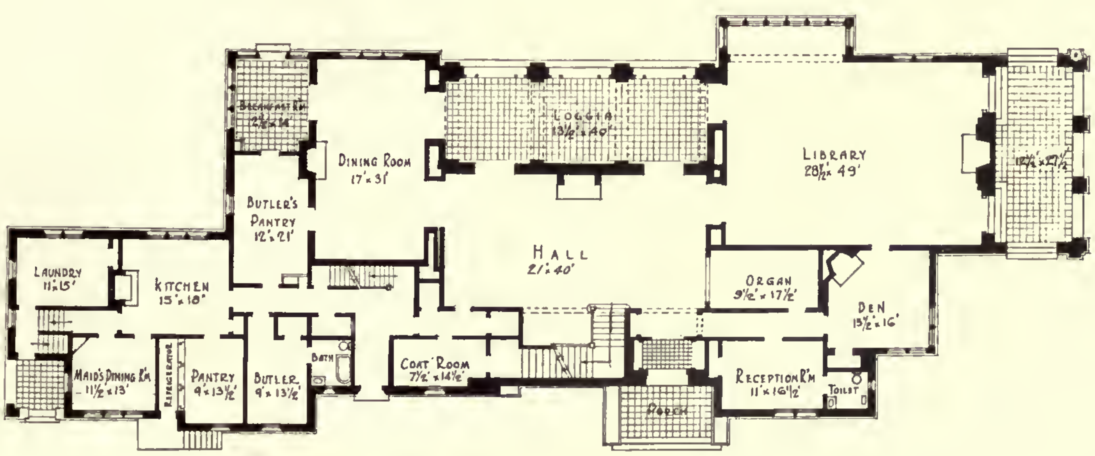
BLYNMAN FARM, RESIDENCE, WILLIAM A. COOLIDGE, MAGNOLIA, MASS. Charles M. Baker, Architect

PORCH.

HALL FIREPLACE, OPPOSITE ENTRANCE. Charles M. Baker, Architect.

BLYNMAN FARM, RESIDENCE, WILLIAM A. COOLIDGE, MAGNOLIA, MASS.

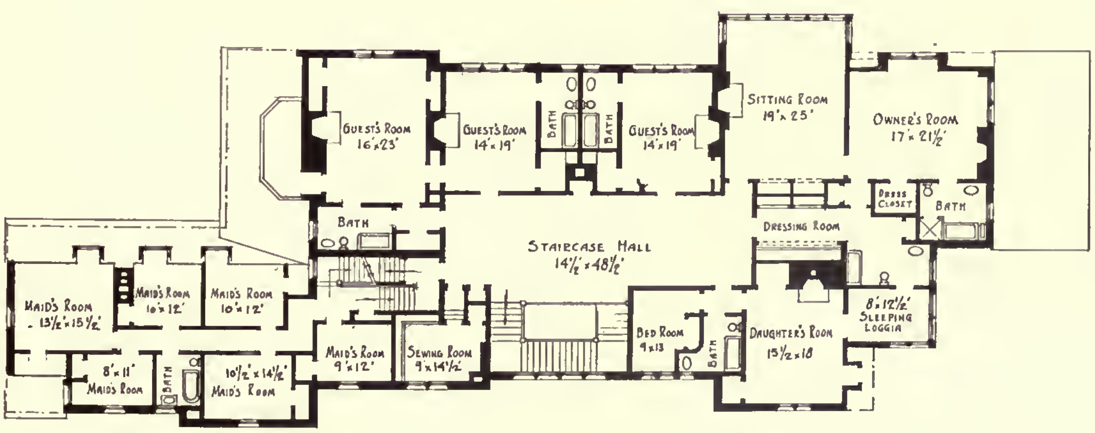
HALL AND STAIRCASE.



FIRST FLOOR PLAN

BLYNMAN FARM, RESIDENCE, WILLIAM A. COOLIDGE, MAGNOLIA, MASS. Charles M. Baker, Architect.

DINING-ROOM.



Second Floor Plan

BLYNMAN FARM, RESIDENCE, WILLIAM A. COOLIDGE, MAGNOLIA, MASS. Charles M. Baker, Architect.

Blynman Farm, at Magnolia, Mass.

Charles M. Baker, Architect

THE estate is a large one, bordering the back road that leads from Magnolia to Gloucester, overlooking country and sea. The house is in the Tudor style of architecture, closely following the English country house, although not an attempt at direct copy. It is very attractive with its stucco finish broken by stone trim over window and porch and cornice. It is topped by a roof covered with one-inch slabs of Tudor stone.

One enters through the wrought-iron door into an outer vestibule with Caen stone walls. This leads to the inner hall, which is finished in imposing oak panelling topped with Caen stone. Directly opposite the entrance is the fireplace, six feet high and five wide. This is backed with Holland splints laid in herring-bone pattern. It is an unusual house, showing many features such as are found very rarely, as, for instance, the organ chamber, which is at the right. The front of this is ornamented with a carved Gothic screen backed with silk. Under the stairway, which is directly opposite the fireplace, is the organ console, designed with two small concealed doors which, when closed, lend to view nothing but bench and pedals. Especial attention was paid to color schemes, and in this room Flemish tapestry is used as wall hangings and as upholstery for the settle and chairs. One can but receive a favorable impression of the house from the hallway, where hangings are red, and the final touch has been obtained by the tall bronze candlesticks, each one holding seven candles, which stand on either side of the hall.

Standing by the stairway, one can view the loggia or sun-room, one of the most charming bits of the house.

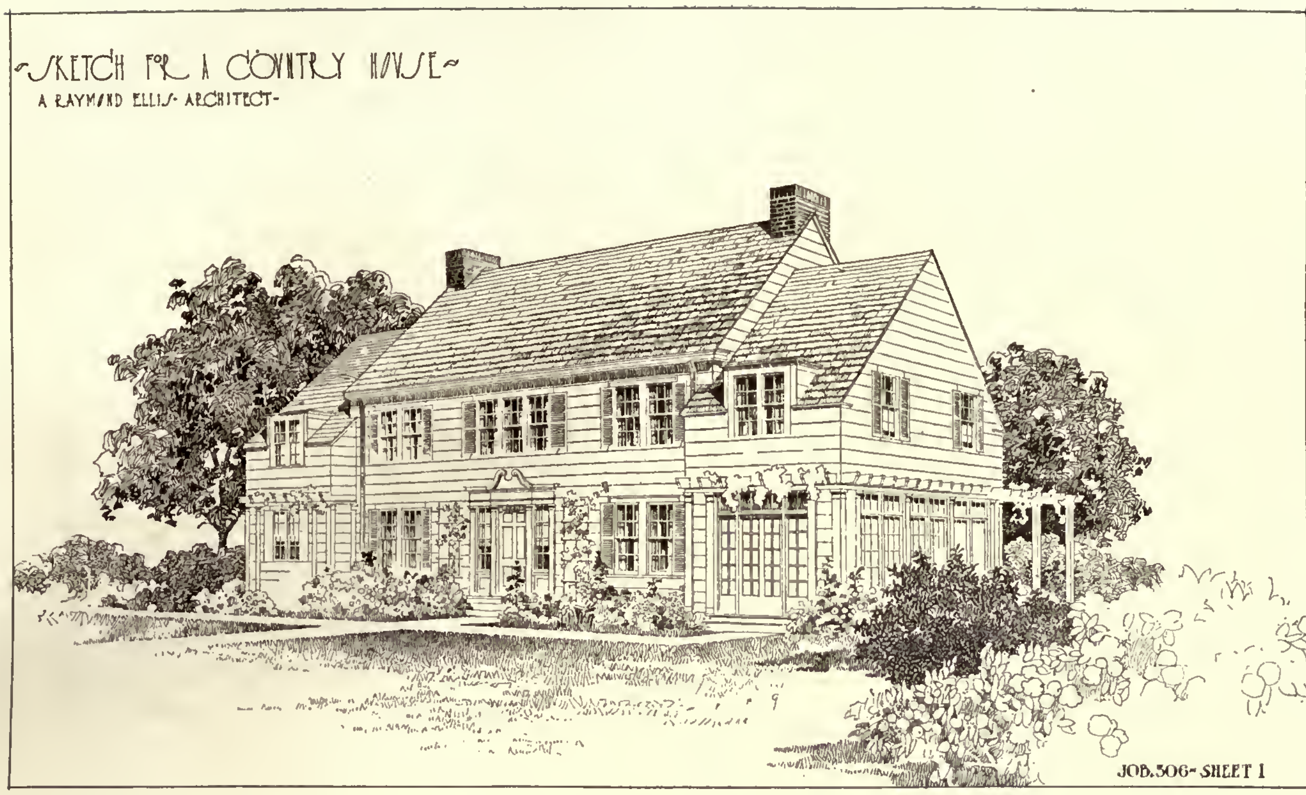
The den is at the right of the hallway, with a large bay window giving ample lights. The finish is oak, and posts supporting the rough-hewn beams are of oak also. Soft shades of rose in hangings and rugs give a restful tone.

Opening out of this is the library, a very large room connected with both the den and the loggia. All around the walls are bookcases, and a large bay window on the water-side gives a wonderful view of the sea. The room is finished with a plaster ornamental ceiling. The predominating color is green, which is worked out in hangings and furniture covers. The fixtures are black and bronze. This room overlooks the garden on the one side and the ocean on the front. A long French window leads out to the covered veranda, which is an out-of-doors living-room. From here steps go down to the sunken garden so closely connected with this part of the house.

The dining-room, which is entered from the hall, is on the opposite side of the house. It is large, and spacious panelled walls with linen folds are used for the upper part, meeting the strapped ceiling, which is a unique feature. Soft blue brocade hanging over white gives a subdued atmosphere. The furniture is Chinese Chippendale upholstered in soft blue, which blends with the tone of the Caen stone of the fireplace. One of the most interesting features here is the Chinese Chippendale cupboard, copied from a very old one which has been brought over the seas.

The most charming room of the house is the little breakfast-room with its small, square stone flooring. Here the hangings are Chinese printed linen with figures on a yellow background. The cane-seated chairs are covered with green-and-yellow slips.

No paper has been used on the second story nor, in fact, in the whole house. The rooms have had to depend on the hangings and rugs to give the necessary color.



A Suburban House

By A. Raymond Ellis, Architect

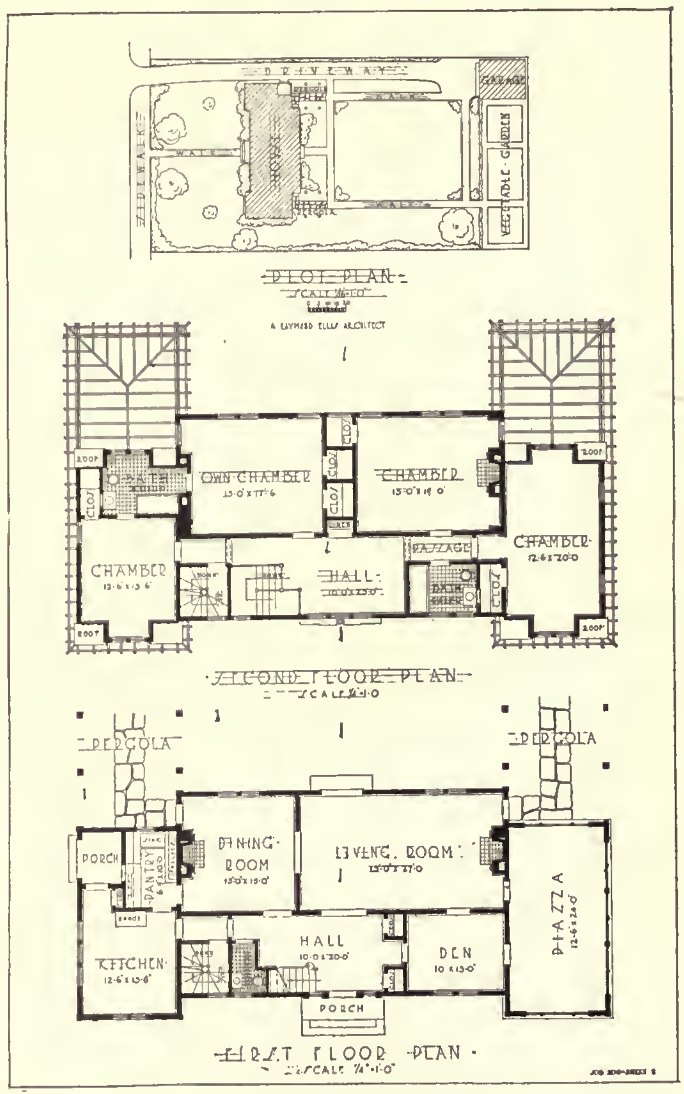
MANY intelligent people probably derive little conscious pleasure from good architecture, or feel any dissatisfaction at the sight of badly designed or improperly set buildings. Little do they realize the good or bad influence architecture exerts on them without their knowledge.

My limited space permits of only a very brief discussion of the subject of house-building and its most important details of plan and design. I believe the plans and perspective sketch are so graphic as to be almost self-explanatory.

In designing a house one of the most important things is to know what to omit for the sake of reasonable economy. The design presented here is of the most modern type of the elongated plan which is best suited to carry out the low roof lines which are used so much to-day in our present type and style of domestic architecture. While we have become tired of the old-fashioned square house, and prefer the lines of an extended front, this type of plan in general is better than the square or rectangle formerly used, and it obtains more privacy within the house and a better outlook over the grounds. The portion toward the street being planned to contain the less important parts of the house, acting as a screen in a way to the more important living portion at the rear, will be most attractive if a proper scheme of gardening is carried out.

The accompanying plan and design, I believe, is one of the most practical and successful that can be devised for a small house. It has been developed after a very careful study of several different schemes, each of which had been carefully worked out.

The entrance-hall is 10′ x 20′, and has been carefully planned and proportioned, with the idea of making it stand



out as indicative that the particular style of the interior is to be colonial. This has been done by the use of a low wainscot around the hall and up the stairs, with a simple colonial hand-rail and balusters gracefully ramped at the landing. At the ceiling there is a simple cornice with dentils to enrich it, all painted an ivory white. Under the stairs is a toilet-room, and at the opposite end are two closets for coats. From the hall a direct entrance is obtained to the dining-room and living-room, and a recessed entrance to the den gives to this room additional privacy that will be found a very desirable feature. The den is 10′ x 13′, and is so placed that it answers the purpose of den, library, or reception-room, with plenty of well-balanced wall space. The dining-room, 15′ x 15′, and the living-room, 15′ x 27′, occupy the entire east side, and opening into each other, should repeat the colonial detail used in the hall. Each has a fireplace. The piazza, 12′ 6″ x 24′ 0″, at the south end, is enclosed with glazed sash, which may be replaced with screens during the summer. The north end is given up to the service portion, which contains the service stairs, kitchen, 12′ 6″ x 13′ 6″, and pantry, 6′ 9″ x 10′ 0″, with refrigerator iced from the rear porch.

The second floor is planned for the convenience and comfort of both guest and owner. The owner's chamber is 15′ 0″ x 17′ 6″, contains two large closets, plenty of wall space for furniture, and has its own bathroom. The north chamber is also connected with this, so that it may be used by the owner en suite. Two large chambers at the south end may be used as guest or family chambers, and the bathroom is placed off the passageway, so that by closing the door to the hall the privacy of this part is maintained. The finish is whitewood painted old ivory.

In the attic there are three large, comfortable chambers and one bathroom, besides a storage-room and trunk-room.

The interior of the house may be finished in light or dark colors, as desired. I would suggest that the hall, den, dining-room, and living-room have the walls and woodwork painted in old ivory. The floors should be of oak. The service portion should be finished in hard pine, varnished, with the walls painted a sanitary cream or buff tint. The chambers and baths should be painted white or old ivory, with the chair-coverings and curtains adding the desired touch of color to carry out the owner's individual scheme of decoration, which affords an opportunity for either simple or elaborate decoration, as the owner may desire.

The house is of frame construction; the exterior may be covered with wide, old-fashioned clapboards, or with shingles laid about 10″ to the weather and painted white. The roof shingles and the blinds should be green.

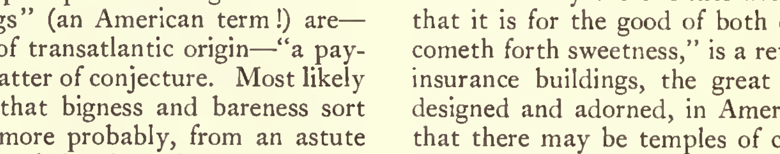
Our Temples of Business from an English Point of View

"The Artistic Soul" in Commerce

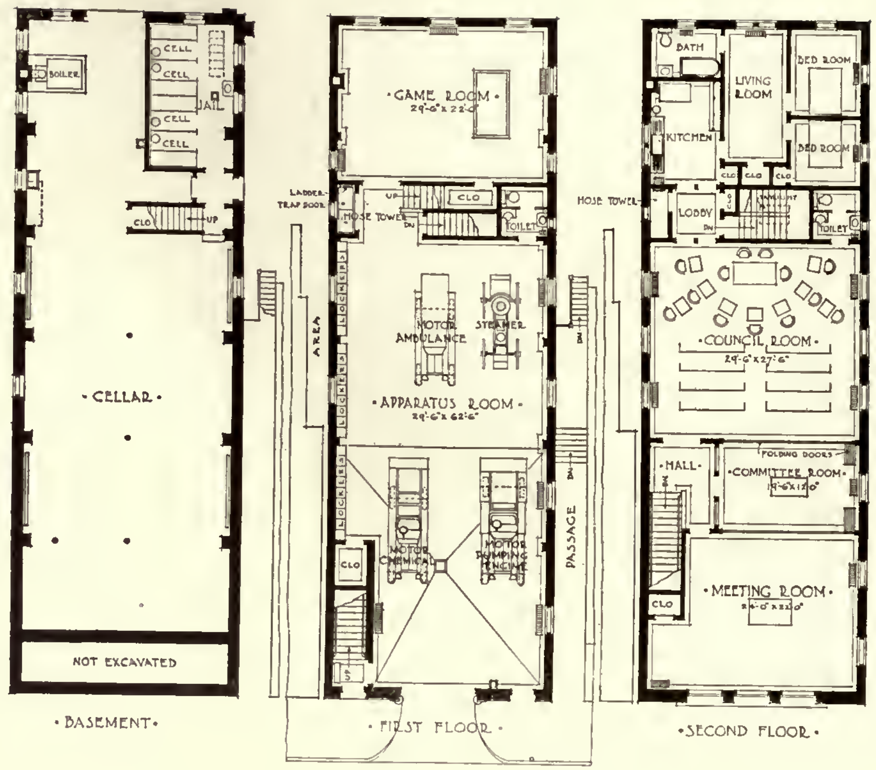
IN contemplating a British building of unusually large dimensions one's thoughts always take involuntary flight to America. This is not strange. In America the "mammoth" building is common. In Britain it is rare and remarkable. And as with the size so with the sumptuousness. Both lessons our commercial magnates have learned from the United States, where business enterprise may not be more keen than it is here, but is certainly more expansive, and, as some would say, more daringly experimental, which is equivalent to saying that it is more imaginative. Perhaps it is because America is a big country that its business men are alive to the value of scale as an investment; but by what mental process, or by what subtle business instinct, they have arrived at their shrewd perception that high-class decoration and lavish "trimmings" (an American term!) are—and again the expression is of transatlantic origin—"a paying proposition" is more a matter of conjecture. Most likely it arose from a realization that bigness and bareness sort not well together; or, still more probably, from an astute inference that a rich interior, being imposing and impressive, is, therefore, a valuable commercial asset.

This is to take the lowest possible "basal plane." Keen as the American commercial man notoriously is in the pursuit of wealth it does not follow that he is without æsthetic intuition and impulse. If he were he would not have called on the architect to do his best—would not have lavished such fabulous sums on marble, bronze, mahogany—would not have authorized his architect to commission the best carvers and painters to co-operate in the production of a costly palace of commerce. Not only the commercial value of art, but the artistic soul in commerce, is, we fear, better understood in the States than it is here, even to-day. Here there is a strong tendency to draw a broad dividing line between art and commerce; there, the two entities commingle as freely as the pigment with its vehicle. To say that commerce is there impregnated with art is to risk the retort that there also art is impregnated with commerce. Most certainly there is interaction—and we make no doubt that it is for the good of both elements. "Out of strength cometh forth sweetness," is a reversible proposition. Banks, insurance buildings, the great shipping offices, have been designed and adorned, in America, in suchwise as to prove that there may be temples of commerce as well as temples of art. Indeed, in bringing such so-called temples of art as the theatre and the opera-house into comparison with the architecturally conceived business building, it is evident at once where dignity and restraint abide.

From "The Architectural Review," London.



FIRE-HOUSE AND TOWN HALL, AMBLER, PA.



The Fire-House and Town Hall was erected for the Wissahickon Fire Company at Ambler, Pa., on the site of a burned-out moving-picture theatre. Old side and rear walls, which extended about four feet above new second-story floor level, were continued to the new height. New supports were provided to carry the second floor. The new front was designed along Florentine lines. Various old fire-insurance companies' insignia were used as the motif in decorating the spandrels of the arcade. Above is an original panel of polychrome tile, made especially for the building by H. C. Mercer, of the Moravian Pottery, in which is illustrated the history of fire-fighting apparatus. First is shown an old town pump, from which the firemen are carrying water in buckets. Next in order are shown an old-fashioned hand pumping-machine and a steam horse-drawn engine. Here, also, is suggested a fight between rival companies. In the last picture is shown a modern motor-driven pumping engine. The cornice is painted brown, orange, and green, touched up in places with red. While the paint was fresh it was rubbed over with dirt to give an antique effect. The front is faced with varying shades of "tapestry" buff brick, laid in shadow diamond pattern.

C. E. Schermerhorn and Watson K. Phillips, Associate Architects.

Recent Development in the Architectural Treatment of Concrete Industrial Buildings

By Arthur J. McEntee

THE design and architectural treatment of concrete buildings is probably the most interesting development that has taken place in architecture for many years. Buildings executed in stone, brick, and other materials have not shown any decided change or improvement, except in a few instances, but the use of concrete, which has only within recent years been appreciated by some of our foremost architects, has been productive of results which are surprising and worthy of careful consideration and study.

U. S. Army Supply Base, Brooklyn, N. Y. Cass Gilbert, Architect.

Reinforced concrete construction first gained serious consideration because of its fireproofness, the speed with which a building could be erected, the comparative facility with which the required materials could be obtained, and the economy of this construction as compared with other accepted methods. Not only was there a saving in the initial cost of such a building, but there was an appreciable reduction in the cost of insurance, maintenance, and other items which are vital factors in determining the value of a building to an owner.

The general use of reinforced concrete was adopted in the early '90s, and on account of the crudity of construction in the early stages of development its use was confined to industrial buildings. The lack of consideration formerly given to the designing of this class of buildings had long been apparent, and the advent and use of concrete has been, in a great measure, responsible for the marked improvement which has taken place.

The early concrete buildings were nothing more than "structures," usually designed by an "engineer," who is mainly interested in the structural design, and can see little reason for spending time and money in decorating or beautifying the skeleton which he has devised. In order to emphasize the economy of this type of construction, the columns, beams, and other structural units were reduced to the minimum sizes required by the conditions. This resulted in the necessity of using large window areas, which condition eventually caused a decided change in the planning and designing of this type of building, for clients were quick to realize the value of the increased lighting. This naturally led to a more thorough and comprehensive study of the lighting, heating, ventilating, and sanitary requirements to suit each individual case. It was during this phase of the development that the architect received consideration, and the many fine examples of industrial buildings of to-day are the result of co-operation between the architect and engineer.

The value, to the owner, of a well-planned and attractive building asserts itself chiefly in two ways: increased efficiency and production due to the conditions under which the employees work, and in its value as an advertising asset, which is generally recognized in the commercial world.

A building should indicate by its exterior treatment and design something of the purposes for which it is intended. The indiscriminate use of decoration and color should be avoided in the design of an industrial building, for if the treatment of such a building is kept along simple lines the result is always more satisfactory. This is especially true in the designing of concrete buildings for the disposition and proportion of structural units, and the selection of materials can be so handled as to obtain a building which at once conveys the impression of simplicity and utility.

Successful results in concrete requires that the designer possess a thorough knowledge and understanding of the material which he is using. The use of decorative details should receive the most careful study. In designing detail, the fact that forms must be constructed and possibly used

Rigney & Co. Building, Brooklyn, N. Y., six-story and basement building, 75 x 90 feet. Approximate area, 49,230 square feet. Helmle & Corbett, Architects.

THE AMERICAN CHICLE CO. BUILDING, LONG ISLAND CITY, N. Y. Ballinger & Perrot, Architects.

A. SCHRADER'S SON, INC., BROOKLYN, N. Y. Howard Chapman, Architect.

Ten-story factory, 100 x 184 feet. Approximate area, 184,000 square feet.

over many times should be considered in order to obtain a type of form which will permit of its being "stripped" in such condition as to allow it to be reassembled and reused. The use of concrete has developed a peculiar "stype" which is characteristic of the material and possesses a squareness and simplicity which is primarily due to the requirements of form construction.

Contractors who have had a wide range of experience in this line can be of invaluable assistance to the architect in deciding the manner in which such detail may best be handled. To prepare a design with the intention of having the contractor worry it out is seldom productive of the best or most economical results.

American Safety Razor Co. Bldg., Brooklyn, N. Y.

The use of intricate and complicated design is to be avoided, as it is almost impossible to properly fill a form which contains many corners. Furthermore, in removing forms from such work, a certain amount of damage is caused to the concrete surfaces, necessitating considerable patching, which at best is unsatisfactory, and is an added cost to the construction of the building. Details should be so studied as to reduce them to the simplest possible design, in order to obtain the desired result, as the cost of form work is a very large item and should not be slighted.

In the preparation of this article the writer has selected examples of concrete buildings erected by the Turner Construction Company, which may be considered typical subjects for illustration.

What is probably the simplest and most striking group of concrete buildings ever constructed is the U. S. Army Supply Base, Brooklyn, N.Y. These buildings are without any decorative detail whatsoever, and possess a quiet dignity and character which is at once apparent. The Austin-Nichols Warehouse, Brooklyn, is an excellent example of the modern adaptation of Egyptian architecture to the present-day requirements of commercialism. The simplicity of these buildings is most interesting and shows what satisfactory results can be obtained by the use of this one material—concrete.

The effective use of brick curtain walls is well illustrated in the U. S. Navy Supply Base, Brooklyn, N. Y., and the American Can building.

Examples of buildings of more ornate character are those recently erected for the Mint Products Company, Port Chester, and the American Chicle Company building, and illustrate the use of faience tile in conventional design. The architectural detail of the American Chicle Company building is a most interesting study of design, and shows that scarcely no limit is placed on a designer by the use of concrete as a material with which to execute his work.

Many other equally good examples are available to show the possibilities of design in concrete, and there is no doubt, since the concrete building is to be the subject of serious consideration, that the future development of design along these lines will be a revelation to those who have been inclined to give concrete but a passing thought.

Keep Water from Behind Stucco

SUCCESSFUL stucco work depends in large measure upon suitable design of the structure for stucco. Exterior plaster of any kind merits whatever protection can legitimately be given it, and while concession must sometimes be made to architectural requirements, there is rarely any necessity for subjecting stucco to an exposure which it cannot reasonably be expected to withstand. Even where stucco will remain structurally sound, it is sometimes wiser to use other treatment for the sake of appearance. For example, it is better not to run stucco to grade, not only because of the danger from frost action, but also to avoid staining of the stucco from dirt and moisture.

A fundamental rule in the design of a stucco structure is "keep water from getting behind the stucco."

MINT PRODUCTS CO., PORT CHESTER, N. Y. Lockwood, Greene & Co., Architects.

5-story factory, 202 by 80 feet; approximate area, 85,700 square feet.

U. S. NAVY FLEET SUPPLY BASE, BROOKLYN, N. Y., BUREAU OF YARDS AND DOCKS.

Howard Chapman, Associate Architect.

2 storehouses, 8 stories, each 700 by 200 feet; 2 warehouses, 1 story, one 355 by 300 feet, one 355 by 361 feet; power house, 3,000 horse-power; 10 miles of railroad tracks; 2 float bridges.

Writing the Specifications for a Small House

By David B. Emerson

THE specifications for small houses have in the past, as a general thing, played a very small part in the affairs of the architect. In most cases the small house has been built by aspiring young architects, or by near-architects who have graduated from the carpenter's trade or just took to architecture naturally; consequently, the specifications have been far from complete. All of this was very well when prices were normal and a house could be built for something like a reasonable amount of money, but in these days of high prices for both material and labor, and with the entire country facing a shortage of housing, the question of small-house building bulks very large.

In open competition nothing helps the bidder more than careful and complete specifications, couched in simple language, and free from unnecessary verbiage and needless repetition. Without proper specifications an honest builder will bid high to cover contingencies, and dishonest and tricky ones will bid low and then try to make their profit on the overcharging of extras and the using of inferior materials where no definite mention has been made in the specifications. It can be said the surest way to get what you specify is to be sure you have specified it. Taking, as an example, the very pleasing little house by Mr. Hertz illustrated in the June number of ARCHITECTURE, we will discuss the specifications for such a house, to be built in various localities, in the most satisfactory and economical manner.

After specifying the excavation, grading, and refilling, the first item to consider will be the footings, which in all cases, except where it is nearly or quite impossible to obtain broken stone, concrete should be specified. Concrete should be mixed in the proportions of one part cement, three parts sand, and six parts broken stone. The cement should be an approved brand of Portland cement; the sand should be clean, sharp, and well graded, and free from loam, clay, vegetable matter, or salt; broken stone should be good, hard stone, free from dirt or crusher dust, and it may grade up to 2½″ in its greatest dimension. If easier to obtain, a clean, coarse gravel or crushed blast-furnace slag may be specified. Concrete may be mixed either by machine or by hand, but in either case the resulting mixture should have the stone thoroughly incorporated in the mixture, and each batch should be of uniform color and consistency. Foundation walls may be specified to be of concrete, if other materials are not cheaper or more easily obtained.

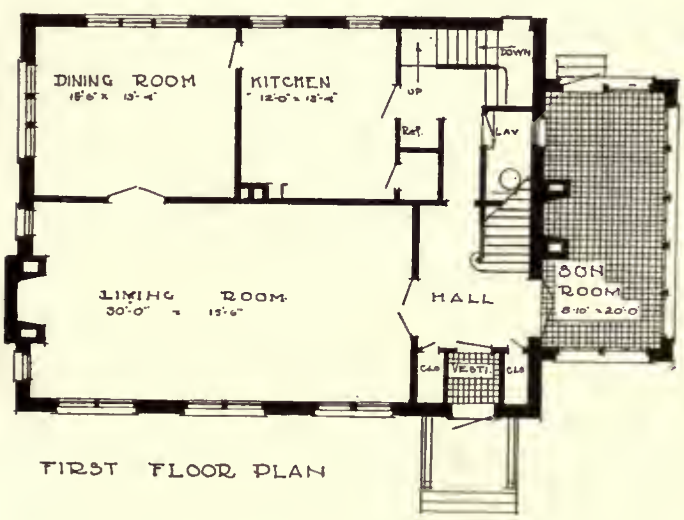
Forms for concrete should be of dressed lumber, well-braced and properly wired together to prevent spreading. If the soil is damp, and there is any liability of water seeping into the basement, the concrete should be waterproofed. This can be done, with very little added cost, by specifying that all concrete below grade shall have fifteen pounds of hydrated lime added to each bag of cement used. This will effectually close all of the pores in the concrete. The cellar floor should be of concrete, the same as specified for the walls and footing, finished with a cement finish composed of one part of cement and two parts clean, sharp sand, floated on while the concrete is still wet and trowelled smooth. Finish which is put on after the concrete is set seldom bonds with the concrete, and is liable to crack and shell off. If it should happen that split ledge stone is plentiful and easily obtained in the locality where the house is to be built, rubble-stone walls may be specified, and the chimneys up to the level of the first floor may also be laid up in rubble-stone masonry. The stone should be specified to be large-size stone, laid to the lines on both sides. All stone should be laid on its natural bed, should be well bedded, and all voids filled solid with spalls and mortar.

The walls should have one header extending through the wall every 2′ in height, and every 3′ in length, and properly staggered. Headers should be good flat stone, not less than 12″ wide and 8″ thick. No stone should be used which does not bond into the wall at least 6″, and at least one-half of the stones should be two-thirds the width of the wall. The foundation walls should be laid up in cement mortar, composed of one part Portland cement and three parts clean, sharp sand. All brick should be specified to be good, hard, well-burned, local brick, free from swollen or refuse brick, to be laid up with level and completely flushed joints. All brick which are not laid in freezing weather should be thoroughly wet. Mortar for laying up of brickwork above the foundations should be specified to be lime and cement mortar, composed of one part cement, one part slaked lime or dry hydrated lime, and six parts clean, sharp sand.

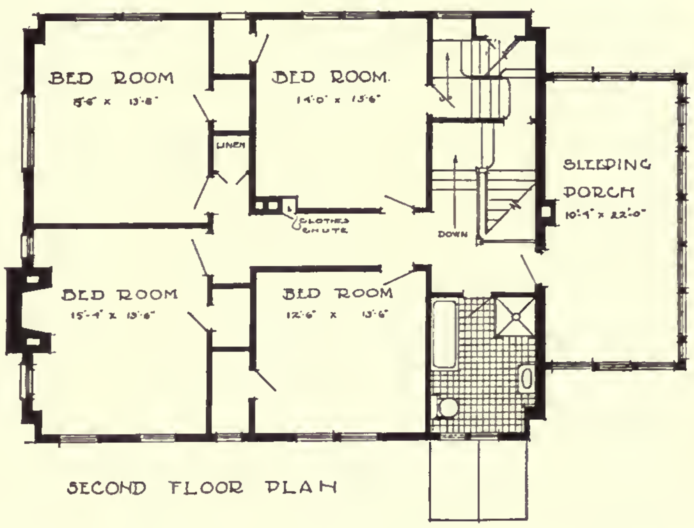
All fireplaces should be specified to have trimmer arches, which should be set low enough to allow for setting the hearths. All chimney-flues should be lined from the throats of the fireplaces to the top of the chimney with terra-cotta flue-lining. It is an excellent practice to specify that 4″ of brick should be laid up between the first-floor joists the full height of the joist. This will make the house warmer in winter, retard the progress of fire, and prevent rats and mice getting into the walls.

The kind of timber specified will depend entirely on the locality in which the house is to be built; in some sections spruce is used, in others white pine is used, and in the South yellow pine is used almost universally. The grade of timber should be specified. If white pine, No. 2 timber and No. 2 dimension should be used; if yellow pine is used, square-edged and sound should be specified. As a word of warning, let me repeat what almost every writer on specifications has already said: "Don't specify structural timber to be free from knots and all other defects," as the grading rules for timber allow a certain percentage of knots and other defects, so that such conditions cannot be enforced on the contractors, and have a tendency to cause your specifications to be held up to ridicule by them.

All headers and trimmers should be specified to be doubled, and all headers over 5′ long should be specified to be hung in wrought-iron stirrups, or some form of patent beam-hangers. All joists which come under partitions should be specified to be doubled. The sheathing and underflooring should be specified to be No. 3 D. and M. common boards, either white pine or yellow pine, according to the local market. Although this stock is defective, and does not look very well, it is sufficiently good for sheathing and underfloors where the knots, sap stains, and other defects will be covered. The sheathing and underflooring should be specified to be laid diagonally, as it tends to brace the frame. The walls should be specified to be covered with a good grade of sheathing paper, to be lapped 3″ and nailed to the sheathing



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE AND PLANS, ROBERT TURNBULL, NIAGARA FALLS, N. Y. Simon Larke, Architect.

boards with large-headed nails. Wherever the appropriation will allow it, specify cross furring on all ceilings, as it gives a much more level ceiling and a better surface for lathing. The furring strips should be of undressed lumber, ⅞" x 2", spaced 16" on centres.

All of the lumber for the exterior finish should be specified to be either white pine "C" select finishing, or yellow pine "B" and better. The weather-boarding should be of ⅞" stock, 9½" wide, surfaced one side and both edges, and laid 8" to the weather. The porch columns should be specified to be a lock-joint column, and they should be flashed on the tops of the caps with sheet lead.

Wherever the use of wood shingles is not prohibited by the local building code, they may be specified, and they make an excellent roof. The greatest danger from wood shingles is generally found in the advertisements for non-combustible roofing materials. Either Western red cedar or cypress shingles may be specified—whichever is the more easily obtained in the locality in which the house is to be built, although in most cases the cedar shingles will be the cheaper. "Extra clear" should be specified except where cost must be kept down; then, "Star A Star" may be specified. They should be laid 4½" to the weather, if 16" shingles are used, and 5½" to the weather if 18" shingles are used. Each shingle should be nailed with two 3d. zinc-coated nails. Specify that all valleys and hips shall be laid close, using wide shingles, cutting them to the proper shape, and working 9" x 14" pieces of tin into each course of shingles.

The window-frames should be specified to have 2" rabbeted sills, 1⅛" pulley-stiles, ½" parting beads, and ½" stop-beads, the remainder of the stock to be ⅞" thick. The pulley-stiles in all cases should be specified to be of yellow pine, the balance of the frame to be of the same kind and grade of lumber as is specified for the exterior finish. The frames for double-hung windows should have 5/16" pendulums hung from the yokes by means of galvanized annealed wires. Casement windows should have 1½" rabbeted plank frames. The sash should be made up of factory lumber, white pine, yellow pine, or cypress. They should be mortised and tenoned, and pinned. The casement sash should have moulded astragals and drip moulds.

The exterior door-frames should be 1¾" thick, rabbeted, with 2" sills and ⅞" outside casings. The sills should be specified to be of straight sawn red oak. The interior door-frames should be ⅞" thick, with ⅝" adjustable stops, ploughed in, and they should be properly blocked up for hinges and lock strikes. If hardwood doors are to be used, they should be specified to be veneered. The veneering should be done on cores of white pine or wormy chestnut, 1" wide by the necessary thickness, glued together. The veneers should be ¼" thick, and the end veneers should be ½" thick. Always specify that the stiles and rails of doors should be ploughed, and have a pine cleat glued in, to which the mouldings shall be nailed, so that the panels will be loose.

For interior doors, several very good types of veneered stock doors are on the market, which may be specified.

The interior finish may be specified to be either white pine "C" select finishing, "B" yellow pine finishing, or F. A. S. yellow poplar, all of which take paint or enamel very well.

The stairs should be specified to have heavy plank stringers, and main stairs should have treads 1⅛" thick, and risers ⅞" thick, tongued and grooved together, treads into risers and risers into treads. The size of the newel-posts and angle-posts should be specified, whether they are to be turned or built up. The size of the rails should be specified, and if they are to have ramps and easements, it should be so specified. The size of the balusters should be specified, how many to the tread and whether they are to be plain or turned, also specify that the balusters on landings shall be spaced the same as those on the treads. The cellar stairs should be specified to have plank strings, rough treads and risers, and plain ⅞" hand-rail dressed.

If oak floors are to be specified for the principal rooms, red oak "select" may be used, as it will wear as well, and after staining and finishing, look nearly as well as white oak "clear," and will cost much less. For kitchen and pantry floors, if they are not to be covered with linoleum, factory-grade maple may be specified. This makes a particularly hard, durable floor, and with a little culling out of the particularly bad pieces it can be laid so as to look very well, especially if it is to be stained in the finishing, so as to obtain even color. If the floors are to be covered with linoleum, specify either "D" flat flooring yellow pine or "D" white pine flooring, according to the price in the local market. For bedrooms, a "C" flat flooring yellow pine makes a very good floor. Where strict economy is necessary, all flooring may be specified to be of yellow pine. All flooring should be specified to be standard, matched flooring, to be blind-nailed with 8d. nails, and all joints to be well broken.

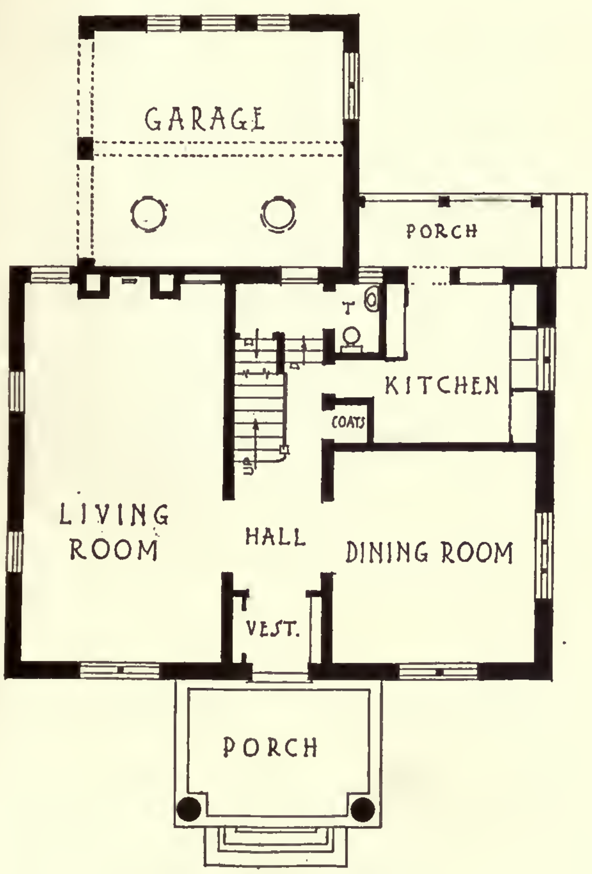
Tile floors should be specified to be laid on concrete foundations 3" thick, which are to be laid on ⅞" rough-board platforms set between the floor joists, and resting on ⅞" cleats nailed to the joists. The concrete to be the same as specified for the footings, etc. The tile should be set in a levelling bed of cement mortar ½" thick, in which has been bedded a painted or galvanized open-mesh wire netting. The joints in the tile should be specified to be grouted with cement mortar, mixed to the consistency of thick cream, and all of the surplus cement should be cleaned off before it has set. The joints in quarry tile should be specified to be ½" thick and slightly concave.

If a tile wainscot is specified for the bathroom the walls behind the tiling should be specified to be plastered with cement mortar on metal lath. The lath should be well lapped and stapled to the studding. The mortar should be mixed in the proportions of one part Portland cement and two parts clean washed sand, to be well scratched in a horizontal direction to receive the setting bed. The tile may be specified to be either floated on, or buttered. Specify that the tile shall have the joints washed out, and be neatly filled with thinly mixed white Portland cement, all surplus cement being cleaned off before it has hardened.

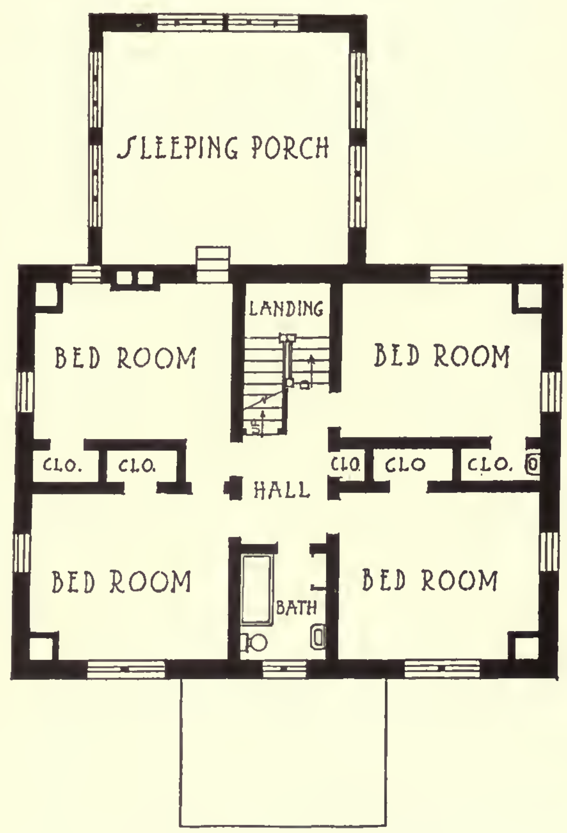
If hung gutters are to be used, they should be specified to be No. 26 gauge galvanized iron, with slip joints, and be hung in adjustable galvanized hangers. If box gutters are to be used, they should be specified to be lines with I. C. No. 40 coating tin, with flat seams, the tin to be painted on the under side with red lead or iron oxide before laying. The leaders should be specified to be No. 26 gauge galvanized iron, and to be provided with cast-iron shoes at the ground to connect with the drainage system.

The canvas roofs over porches and sun-parlors should be specified to be of 12-ounce cotton duck, tacked with 17-ounce tinned carpet tacks, the edges of the duck being lapped 1". After the duck has been laid it should be thoroughly wet, and then painted with pure white lead and boiled linseed oil before it has dried. Give it two extra coats of white lead and oil, allowing sufficient time between the coats for drying.

In specifying the painting, pure white lead and linseed oil, with the addition of 20 per cent of French zinc white should be called for. Now that the war is over, French zinc white is obtainable, and its use is recommended, as it



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE AND PLANS, CLARENCE LARSON, FORT DODGE, IOWA.

Damon & O'Meara, Architects.

greatly increases the oil-carrying capacity of the paint, and thereby prevents flatting and chalking. In writing the specifications for enamel work, it is well to follow the manufacturers' specifications absolutely. In kitchens and pantries a very good low-priced job which stands well can be obtained by specifying one of the several mill whites which are on the market. These can be put on in three coats—finish, gloss, or egg-shell. They will stand any ordinary usage, are not affected by steam from cooking, wash easily, and do not turn yellow. The floors may be specified to be varnished or waxed, varnish being the cheaper. In either case, the floor should be specified to be perfectly clean and dry before finishing. The floor should first be stained with an acid stain, then filled with a paste-filler, lightly sanding each coat. Never specify shellac or liquid fillers as first coats on floors, as they will not stand the wear and tear. Then specify either two coats of reliable make of floor-varnish or two coats of prepared floor-wax. The second coat of varnish may be rubbed with pumice-stone and oil, or left in the gloss. The floor-wax should be applied with a rag, and each coat polished with a weighted brush, rubbing it with the grain.

Before starting to write the specifications for the plumbing it would be well to become familiar with the local sanitary code, if one exists, and avoid specifying anything which is contrary to the code, which will help to prevent extras after the contract is let.

The materials and sizes of house-sewers, house-drains, fresh-air inlet (if required by the local ordinances), and soil-stacks should be specified. The house-sewer should be of vitrified tile-pipe, and 6″ in diameter will be large enough for a moderate-size house. The house-drains and soil-stacks should be of cast-iron 4″ in diameter. One of the leading authorities on plumbing advocates 3″ soil-pipes, but it would appear to the writer that he is taking a chance, so it will be well not to specify less than 4″ pipe, except for waste from isolated sinks or lavatories, which may be of cast iron 2″ in diameter. Short branch wastes from lavatories or sinks may be of galvanized wrought iron or lead, 1½″ in diameter. Unless the sanitary code calls for back venting, do not specify it, but call for non-siphon traps of some type which have been thoroughly tested and been proven to be efficient. The efficiency of back-venting is questionable, and it adds materially to the cost of the building.

The young architect is very liable to leave the size of the supply pipes and branches entirely to the plumber, which is a dangerous practice, as he is liable to have rather optimistic ideas as to how much water can run through a small-size pipe, especially if he has not figured in a large profit on the job. Therefore, the sizes of pipe should be specified. The main supply from the street in a house of this size, having two bathrooms, a kitchen sink, laundry trays, and servants' water-closet, should be 1¼″ diameter unless low street pressure or excessive distance from the street make a larger size necessary. Branch to laundry and servants' water-closet should be ¾″ in diameter. Branch to hose connection should be ¾″ in diameter, and should have a stop-cock so placed as to drain the line. Boiler supply should be ½″ in diameter.

As a gas-heater will be required, specify a ¾″ branch to the heater. The main riser to the third floor should be 1″ in diameter, taking off a ½″ branch to the kitchen sink, the branch supplies should be specified to be ½″ diameter to the shower-bath and the bathtubs, and ⅜″ diameter to the water-closet tanks and lavatories. The gas-heater should be specified to be one of the several instantaneous heaters which are on the market, and should be specified to have a galvanized steel storage boiler, connected with the house-heater, so that in the winter months, when the heater is being run, gas will be used only to boost the system in case hot water is drawn more rapidly than it is being heated.

In the selection of the plumbing fixtures much must be left to the discretion of the specification writer, as the question of cost and the desires of the client are largely to be considered. Where the appropriation is small, specify enamel iron bathtubs, lavatories, sinks, and wash-trays. Where more money is available, specify vitreous china lavatories and porcelain tub in the family bath. In any case, specify the make and pattern desired, and insist upon getting them. The gas piping should be specified to be standard galvanized mild steel pipe, with galvanized malleable iron, beaded fittings.

All pipe should be run level where possible, and when necessary to be pitched it should grade toward the riser and should be without traps. Specify that the pipe should be put together with red lead or litharge, and that gas-fitters' cement will only be allowed at the outlet caps. System should be specified to be tested for one hour with an air-pressure equal to 15″ of mercury, and that the mercury must not drop more than ¼″ during the test.

Both as a point of economy on installation and on account of many owners preferring it, hot-air heating may be specified, in which case be sure to specify that wherever the pipes run in the partitions the studs should be covered with tin, and that the lathing over the pipes should be done with metal lath. All pipes which run in the partitions should be specified to be made double, with an air space between the inner and outer pipes. It is also well to specify that all the pipes in the cellar be made double, as it insulates them, making it easier to heat the rooms, and saves fuel.

The specifications for steam-heating and electric-wiring having been thoroughly discussed in a previous article (April, 1919), nothing will be said of them at this time. As far as is possible in the limited space in a single article, the writer has tried to cover the most important items in the specifications of a moderate-size house of moderate cost, but in all cases the specifications will vary according to the design and the desires of the owner, but the general principles will always be the same.

Announcements

The National Association of Women Painters and Sculptors, Mrs. H. Van Buren Magonigle, president, will hold an exhibition of small pictures and sketches in the rooms of the Architectural League, 215 West 57th Street, New York, from January 20 to February 1, inclusive. These pictures are limited in size to 12x14, inclusive of frame, and may be in any medium, including etchings. The Annual Exhibition will take place later in the season.

We call attention to the exhibitions of The Arden Gallery, 599 Fifth Avenue, New York. They are of unusual distinction and of special interest to architects and designers and students of the arts.

Their January exhibition of ritual and theatrical masks, together with decorated costumes, designed and executed by Madame Marie Gallenga, of Venice, attracted much attention. Included in this exhibition were Javanese marionettes, and some marionettes of the Punch and Judy type.

Book Reviews

THE XVIIITH CENTURY IN LONDON—THE ACCOUNT OF ITS SOCIAL LIFE AND ARTS. By E. BERESFORD CHANCELLOR, M.A., F. R. Hist. Socy. New York: Charles Scribner's Sons. London: B. T. Batsford.

Contents: The Social Life of the Period; Street Topography; Pleasure Resorts; Clubs, Coffee-Houses, and Taverns; Great Houses and Public Buildings; The Churches; The Arts in the XVIIIth Century; Architectural Relics of the Period.

Few books have better illustrated the fact that the life and character of a people are reflected in its architecture and the arts. The Eighteenth Century was pre-eminently the age of red brick ornamented with stone. When we speak of Georgian our minds recall the familiar brick and stone trimmed houses, not only of London but of our own Georgian period, of which a number of landmarks yet remain, and the style is yet very much alive, and likely to be continued as possessing a certain stately dignity and simplicity.

The social life of the period has been pictured by Hogarth, Gillray, Rowlandson, and described by Pepys, Evelyn, Steele, Addison, Swift, and a host of artists and writers. In the illustrations that accompany the chapter on Social Life will be found many that show views of contemporary London, famous places of amusement and recreation: Southwark Fair, Hyde Park, Brook Green Fair, Bartholomew Fair, Smithfield, Covent Garden Theatre, Theatre Royal, Drury Lane, etc. Nearly all the illustrations from old prints include the contemporary architectural background. The chapter on "Street Topography" repeats the story of many cities, the great arteries of traffic are established, and the byways grow as the city grows. Piccadilly, The Strand, Fleet Street, Cheapside, Cornhill follow the way of two hundred years ago. The illustrations of Fleet Street, Cheapside, Temple Bar, Newgate, The Bank, The Mansion House, Gray's Inn, the View of St. James's Palace, Carlton House, and of other famous old buildings have universal interest. The Pleasure Resorts include such scenes as Hyde Park, Ranelagh Gardens, Bagging Wells, Marylebone Gardens, The Pantheon, famous in the writings of contemporary poets, essayists, and novelists. The Clubs, Coffee-Houses, Taverns were the centres of a social life that was peculiarly British. Brooks's, Boodle's Club, a notable building designed by the Adam brothers, White's Chocolate House, the famous Kit

Boodle's Club, designed by the Adam brothers and completed in 1765.

Kat, have figured in story after story. And the old Inns of England are among the most picturesque and comfortable hostelries that have ever existed.

Of the many London churches, the author says that there are two dozen the product of the century. Among these he particularizes the two by Gibbs, St. Mary-le-Strand and St. Martin's-in-the-Fields, the latter showing Gibbs at his best. In the first he says Wren's influence was still dominant:

"Of all the activities of the period that of building was one of the most marked. The Great Houses dating from this time, that still exist, are but a few of the products of this amazing energy, for many have been ruthlessly swept away. In ecclesiastical architecture notable achievements remain to bear witness that the glorious traditions of Wren were preserved by such men as Hawksmoor, Gibbs, Dance, and others. On the other hand, the dwellings of the poorer classes were appalling in their wretchedness and squalor, and misery and vice crouched outside the walls of the great houses wherein a careless butterfly existence was being lived.

"But in dealing with all the facets of this remarkable period, the author does not merely record what has passed away, fascinating as that record must always be to the antiquary. He describes with infinite care, not only the relative size and appearance of the Metropolis as it then existed, with what it is to-day, but he also enumerates the relics of that period which still remain scattered all over the Capital, remotely hidden and often overlooked by a hurried and feverish generation.

"It is fortunate that the celebrities of that gay period have left behind so much in their work—Hogarth and Rowlandson on the one hand, and Addison and Walpole on the other—that it is possible to present a vivid picture of the London of Anne and the Georges.

"The whole subject has been skilfully treated, and the volume, with its fund of anecdote, its pictures of society, its reconstruction of vanished landmarks, and its enumeration of all that, happily, remains, cannot fail to appeal to all."

If the text recalls the social and literary backgrounds, the illustrations may be said to afford graphic record of the characteristic architecture. The notable architects of the period began with Vanburgh and included among

St. Martin's-in-the-Fields. Architect, James Gibbs, 1721.

others Hawksmoor, Thomas Archer, Kent, Gibbs, George Dance, Flitcroft, the Brothers Adam, and Sir William Chambers. Chippendale, Hepplewhite, and Sheraton were great names in their special field, and were keen rivals in seeking the public taste.

London, like the rest of the world, is changing, many of the old churches have been condemned to make room for modern traffic, and these records of the past will have an increasing value with the years.

We can go around London town with Addison and Steele, Swift and Defoe, Goldsmith, Congreve, Farquhar, Burke, Reynolds, Gainsborough, Walpole, and visit the famous contemporary theatres with that genial egotist and historian of the stage, Colley Cibber.

THE COLONIAL ARCHITECTURE OF PHILADELPHIA. By FRANK COUSINS and PHIL M. RILEY. Illustrated. 8vo. Little, Brown & Co., Boston.

Of this handsome book, only 975 numbered copies have been printed from type.

There are few richer fields for the student of American architecture than that included in this volume. In fact, the wealth of material offered made the problem of selection a difficult one. The authors have solved it with comprehensiveness and good judgment. The contents include: Foreword. I. Philadelphia Architecture. II. Georgian Country Houses of Brick. III. City Residences of Brick. IV. Ledge Stone Country Houses. V. Plastered Stone Country Houses. VI. Hewn Stone Country Houses. VII. Doorways and Porches. VIII. Windows and Shutters. IX. Halls and Staircases. X. Mantels and Chimney Pieces. XI. Interior Wood Finish. XII. Public Buildings. Index.

In making the book the authors, while fully appreciating the human interest lent by personal and historic backgrounds, have kept in mind first the significant architectural features. The object has been to present a comprehensive showing of representative architectural types, with the historic background as a secondary but alluring interest. The many admirable illustrations show fine judgment in selection, and they are handsomely printed.

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, School of Architecture, Columbia University

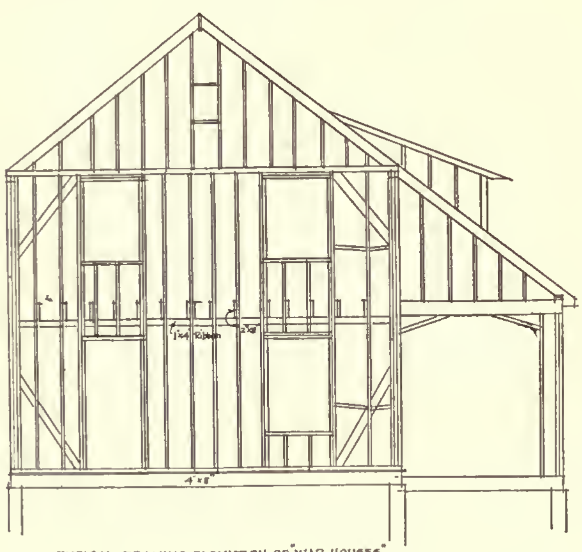
Article V

TYPES OF WOODEN-FRAME CONSTRUCTION

Types Explained

THERE are no sharp distinctions between various types of wooden-frame construction. But in order to classify certain tendencies, we will arbitrarily define four types. To these we will give the names of braced-frame, balloon-frame, combination-frame, and platform-frame.

The braced-frame is the oldest type, and originated in Colonial days in New England. It was developed under the influence of a tradition of heavy, European half-timber construction, and also nourished by the abundance of wood directly at hand. The fact that nails were not made, except by hand, urged the carpenters to use methods of fastening which required as few as possible. Because of these factors, then, certain definite characteristics of this type of wooden-frame construction manifest themselves in the use of timbers, far larger than necessary for safety, and joints consisting of mortises and tenons.



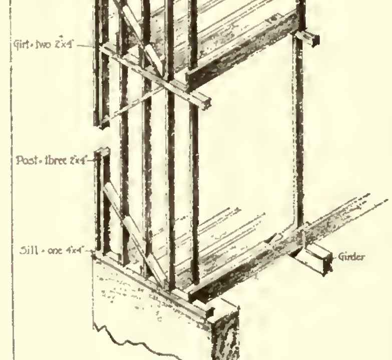
TYPICAL FRAMING ELEVATION OF "WAR HOUSES"

As the sawmill became mechanically more rapid, and as nails were being turned out by machines more plentifully, the Yankee who went West on adventuresome trips, and cared little for a permanent dwelling, devised a system of light frame construction which became known as the balloon-frame. This was put together with the greatest speed, and required only nails for fastening all joints. The timbers which were used were standardized to one size, namely, 2″ x 4″.

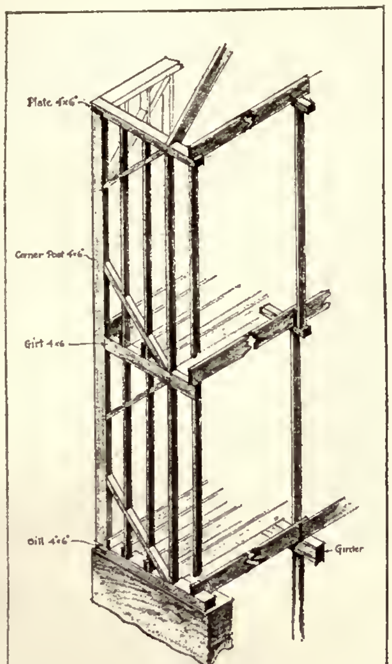
Now, both of these types had advantages and disadvantages which were bound to influence later builders. Those who had been accustomed to build according to the braced-frame system found that lumber was becoming scarcer, and that nails were cheaper than they formerly were. Certain features of the balloon-frame appealed to them, such as its greater speed of construction, its smaller timbers, and lightness. On the other hand, those people who had lived in houses constructed according to the balloon system of framing found that they were very flimsy, that fires quickly consumed them, that rats and vermin could travel freely through the walls, and that, after all, they were only the most temporary sort of shelter. These folks looked back at the old methods of building, and saw the good features of solidity and permanence. We had, therefore, the growing together of the two systems of construction into a type which we call the combination-frame dwelling.

However, progress did not stop at this point. The houses built according to this newly devised system were found to settle unevenly, which cracked plaster ceilings and walls and made doors and windows into leaning parallelograms. The cause of this was found to be due to the natural shrinkage of wood as it dried out. Now, all wood shrinks mostly across the grain and not with it, so that the amount of settlement of any wooden wall depends upon the amount of cross-section of wood which it contains. If there is more in the interior partitions than in the exterior, it is certain that the floor-joists will settle down on the inside ends more than the outside. This is exactly what happened. It occurred not only in the combination-frame but in the braced and balloon frame. Various devices were introduced to avoid this defect, but all were more or less incomplete. Nevertheless, it all leads gradually to the development of the fourth type of construction, which is called the platform-frame, for lack of a better name. This frame solves the problem of uneven settlement in the wooden structure. It also makes the location of the windows of the second floor independent of those of the first floor, which is not the case with the balloon-frame, for in this type the studs extend in one piece from the sill to the plate, requiring the centring of the windows of the second floor over those in the first.

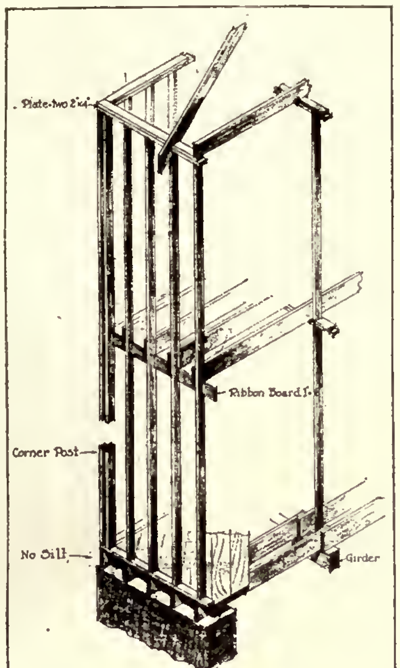
The methods which are used in constructing the small house of to-day are not as simply classified as the previous description would lead one to believe. The old, New England braced-frame has practically gone out of existence, yet



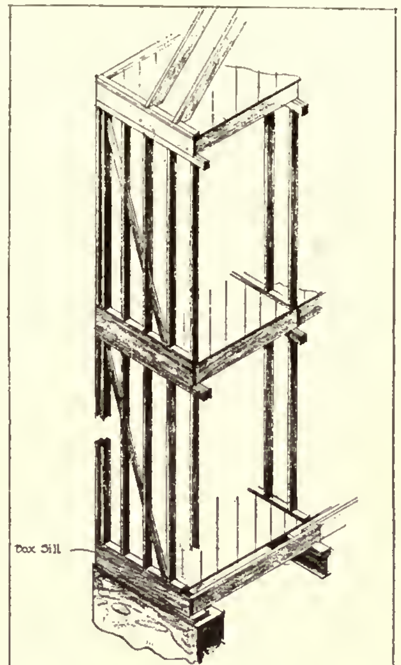
· COMBINATION · FRAME



· BRACED - FRAME ·



· BALLOON - FRAME ·



· PLATFORM - FRAME

many of its features survive. The balloon-frame is used only in the cheapest sort of structures, yet many of its details are found in the modern dwelling. The combination-frame in all its many varied forms can be called the advanced type, which is not used to any great extent.

Study of Detail in the Combination-Frame

The illustrations show the four types in their entirety. But in order to fully understand the combination-frame, it is necessary to know what features of the braced-frame and balloon-frame are used to-day.

The Features of the Braced-Frame Which Have Survived

1. *The use of the girt*, because it permits the location of the second-floor windows at any point irrespective of the first-floor windows. This cannot be done when a ribbon-board is used, for this requires studs which extend continuously from sill to plate, and if any windows are to be located on the second floor, they must be placed directly over those on the first floor. The ribbon-board does not act as a stop for either vermin or fire, as does the girt. However, fire-stops can be introduced in connection with the ribbon-board, if the extra expense and thought is taken.

2. *The use of the sill*, because it serves as a firm foundation for the outside studs and first tier of floor-joists. The balloon-frame has no sill, for the floor-joists are set directly upon the top of the foundation-wall, and the exterior studs are built on top of them.

3. *The use of the corner braces*, because they stiffen the frame.

Features of the Balloon-Frame Which Have Persisted

1. *The use of small timbers*, or the standardization of the 2 x 4 for all parts except the sill, because of economy. The corner-posts are made of three 2 x 4's, and the plate is made of two 2 x 4's.

2. *The use of the nailed joint*, because of its cheapness and its greater strength. It will not rattle loose when the timber seasons, as does the mortise and tenon joint in the braced-frame.

3. *The use of the ribbon-board*, in place of the girt, for those houses which are to be stuccoed, and a rigid, outside wall-frame is desired from sill to plate.

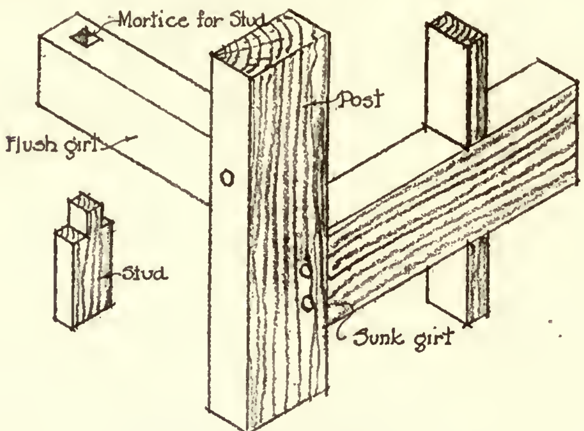
4. *The use of diagonal sheathing-boards* to brace the frame instead of the corner-pieces. The reasons for this are not very certain, since diagonal bracing with sheathing is not always effective, while it is extremely wasteful.

The combination-frame includes all of the present-day methods which make use of selected features of both the braced-frame and balloon-frame, such as was noted above. There are no rules to follow. In certain sections of the country one type is favored more than the other. Features of the balloon-frame are more in use in the West than in the East. In fact, where a house is to be covered with stucco, the balloon-frame is a better type to follow than the braced-frame, since it gives a stiffer outside wall as a backing for the stucco.

Platform-Frame

It will be noticed in the illustration how different is the amount of cross-section of wood in exterior and interior walls of the combination-frame, a thing which causes the unequal settlement previously alluded to. In order to reduce this to a minimum, it is often specified that the studs of all interior partitions be carried down to the top of the cap of the partition below or to the top of the supporting girder, thus reducing the amount of cross-section timber. This is not a complete cure, however, although it is a big improvement.

The real solution of the difficulty lies in the use of the platform system of construction. In this system, the first floor is built on top of the foundation-walls, as though it were a platform. A sill, called the box-sill, is constructed for the exterior support of the ends of the floor-joists by laying down a timber the same size as the joists and setting another one on the extreme edge in a vertical position. The angle thus formed makes a resting-box into which the floor-joist can be framed. The interior ends of the floor-joists should be supported upon a steel I-beam upon which has been placed a 2-inch-thick timber. The I-beam should be supported upon steel tube columns which have been filled with concrete. On top of the floor-joists should be nailed the under flooring, laid diagonally. The first floor then appears as a perfectly smooth platform. Now wherever there is to be erected an interior or exterior partition, a 2 x 4, called the sole piece, is nailed directly on top of the rough flooring. This serves as a sill for the studs of the partition, which are now erected vertically upon them and capped with double 2 x 4's on the top. Now the second floor is built on top of the partitions in the same manner as the first, and a new platform is constructed, so to speak. Upon this is then erected the partitions of the second floor, and on this the floor of the attic. In fact, this construction proceeds floor by floor, and each floor is an independent platform. Now if the drawings are examined it will be noticed that the amount of cross-section of wood in any one bearing partition is identically the same as in any other. The dwelling built



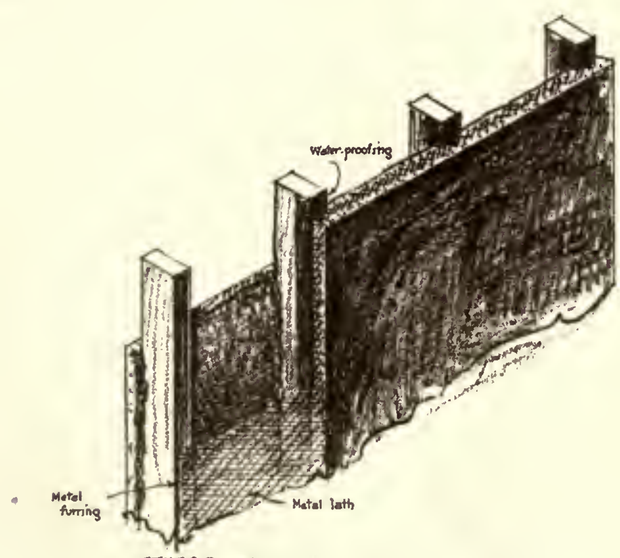
CORNER CONSTRUCTION OF BRACED-FRAME MORTICE & TENON JOINTS

in this way, then, cannot settle unevenly, and the cracked plaster and twisted doors will be eliminated.

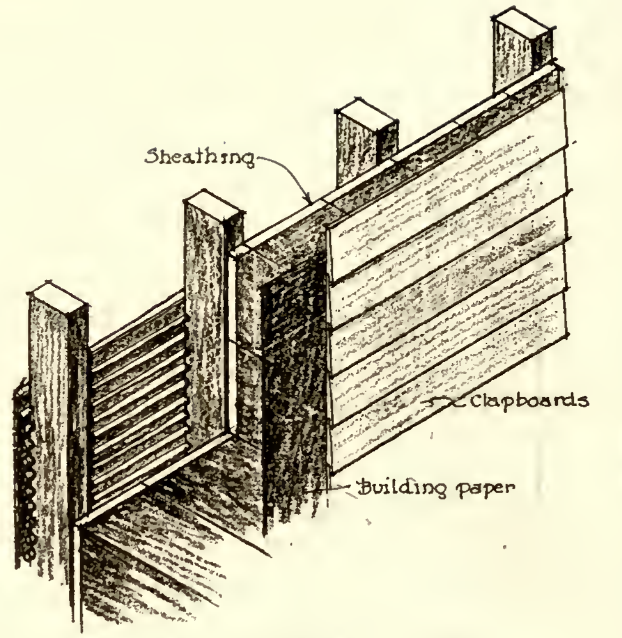
Features Common to All

There are certain features which are common to all types of frames. For instance, the framing around all doors and windows requires the use of double 2 x 4's or the use of one 4 x 4.

These framing studs around the window are set 5″ higher and 8″ wider than the dimensions of the finished window. Those about the door-openings are set 2″ higher and 4″ wider.



STUCCO ON METAL LATH OVER WOOD STUDS



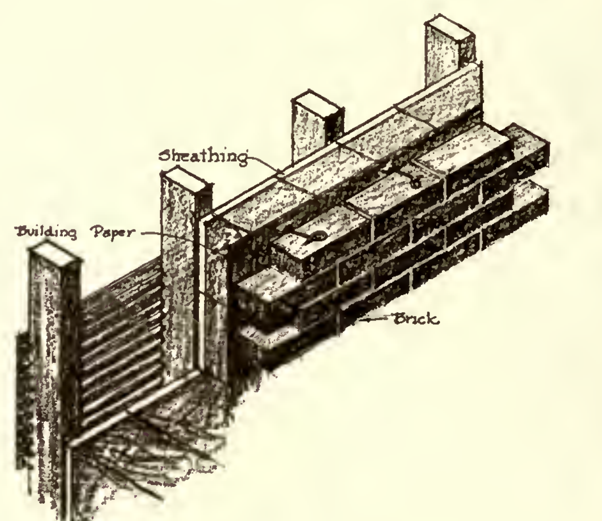
· CLAPBOARDS · OVER · WOODEN · STUDS

All use sheathing-boards of ⅞″ stock to cover the outside of the studs, and these are usually 6″ to 8″ wide.

The usual spacing of studs is 16″ on centres and they are generally of 2 x 4's, although where any pipes or flues are run through the partition they should be 2 x 6's.

Interior stud partitions should be bridged or braced once in their height, and partitions which run parallel to the floor-joists should have a capping-board, so that the proper nailing for lath can be secured. In fact, at all intersections of partitions, care should be exercised that the required nailing for lath is provided.

In the construction of roofs, the average spacing of rafters is 20″ on centres. They should be doubled around all openings. The ridge is usually of a 1″ x 10″ piece. The



· BRICK · VENEER · OVER · WOODEN · STUDS ·

size of the rafters varies with the length of span and load. They are usually 2″ x 6″ for short spans and light loads, and 2″ x 8″ or 2″ x 10″ for long spans and comparatively heavy loads. Valley rafters must always be deeper and heavier than the rafters and should be designed as a girder. The hip rafters do not carry any great load, but are often made deeper to fit the incline cut of the jack rafters.

All floor-joists are spaced 16″ on centres, and should be bridged. The following is the table commonly followed for good house construction, although lighter work is often specified:

SPAN	TIMBER
12′ and under	2″ x 10″ cross-bridged once.
12′ to 15′	2″ x 10″ doubled every other one, if good stiffness is desired, and bridged twice.
15′ to 20′	3″ x 12″ and of long-leaved yellow pine, crowned at centre ½″, and bridged three times.
20′ to 25′	3″ x 14″ of long-leaved yellow pine, crowned at the centre 1″ for the 25′ spans, and bridged four times.

Floor-joists should be doubled around all openings larger than 3′, and joists should be hung from the header beam by metal straps.

There are many precautions which should be taken to prevent the spread of fire in the wooden-frame house, but those will be discussed under an article devoted to this subject. Likewise the discussion of certain defects of construction which are commonly found in the speculative house will be dealt with in a later article.

Concrete Construction

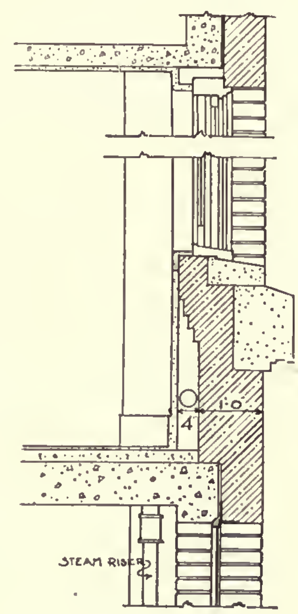
By DeWitt Clinton Pond, M.A.

THIRD ARTICLE

CONTINUING the study of column design of the 395 Hudson Street Building, it will be recalled that the roof load on column No. 9 was determined in the last article, and it was found that the section of the column, the design of which was determined by architectural considerations, was much larger than necessary. The load brought to the column at the ninth floor can be determined in much the same manner as was the roof load. First, the floor area which can be considered as being carried by the column is found. The ninth floor, unlike the roof, is supported by columns which form bays 20 feet square, and there are no 40-foot spans to be contended with. Because of this the area carried by column 9 is 10 feet long by 20 feet wide and contains 200 square feet. The unit live load for this floor is recorded as 100 pounds per square foot, as this floor is to be used for office purposes. The dead load is figured in much the same manner as that of the roof, that is, the thickness of the slab is assumed and its weight determined, to which are added the weights of the fill and finish. The slab construction under the ninth floor is flat-slab construction, and as the panel length is 20 feet, the thickness of the typical slab will be considered as 8 inches. This slab will weigh 96 pounds per square foot of superficial floor area. On top of this will be a 2-inch fill of cinder concrete and a 1-inch cement finish. The fill will weigh 16 pounds and the finish will be taken as weighing 12 pounds, so that when all these three loads are added together the total floor dead load will be 124 pounds. This will actually be considered as 125 pounds, on account of the additional weight of the small drop panel, which will be designed later, and which is found at the head of the column.

The total live load per panel will be 20,000 pounds and the total dead load per panel will be 25,000 pounds, and, as the live load cannot be reduced for this floor, it only remains to add the weight of the column itself and the wall load to find the total load on the section of column which extends between the eighth and ninth floors. The column is nearly 13 feet high, and has a cross-sectional area of 3 feet 10 inches by 1 foot 8 inches. The thickness—1 foot 8 inches —is determined by the rule that in flat-slab construction the least dimension of a column is one-twelfth of the span length. The area of column is 6.35 square feet, and it will contain 82.55 cubic feet. Its weight will be 11,887 pounds, or 12,000 pounds, allowing for the bracket at the column head.

In order to understand how the wall load is figured it will be necessary to study Fig. VIII. This is a section through the wall at the ninth floor, where a somewhat unusual condition is found. It will be noticed that the brickwork is corbelled out under the window. This was done by the architects, so that steam lines could be placed in the panel-backs under the windows, but also that there would be sufficient masonry to carry the window and have an 8-inch reveal. The brickwork under the windows will be considered as being 12 inches thick, but that in the mullions will be taken as 16 inches thick. As the columns are spaced 20 feet on centres, and as they are 3 feet 10 inches wide, the space between them will be 16 feet 2 inches, and the masonry between them, extending in height from the angle iron lintel over the head of the eighth-story window to the bottom of the daylight opening of the ninth-story window, will have an area measuring 4 feet 2½ inches high by 16 feet 2 inches long. This will contain 68 square feet of superficial wall area and, as the wall is considered as being 12 inches thick, will weigh $68 \times 120 = 8{,}160$ pounds. As there are three windows between the columns, and each is 4 feet wide, there will be a total width of masonry in the mullions of 16 feet 2 inches minus 12 feet, or 4 feet 2 inches. These are 1 foot and 4 inches thick and 8 feet 9 inches high, and will weigh $4.16 \times 1.33 \times 8.75 \times 120 = 5{,}820$ pounds. It will be noticed that the spandrel is only 8 inches thick where the concrete band is shown, but the additional weight figured in the spandrel will be offset by the brick facing on the column, as well as the weight of the window, so the



FIGVRE VIII

total wall load will be considered as 8.150 + 5,820 = 13,970, or, roughly, as 14,000 pounds.

The total loads on the column section will be 20,000 + 25,000 + 12,000 + 14,000 = 71,000 pounds. When this is added to the load on the column at the roof, the total load will be 136,000 pounds.

Because of considerations dealing with flat slab construction, which have been stated above, the column is made 1 foot 8 inches thick. Its width is 3 feet 10 inches, as explained in the last article, so the total area is 6.35 square feet, and the allowable stress on the concrete is $6.35 \times 144 \times 500 = 457{,}000$ pounds. As ½ of 1 per cent of vertical steel must be used, according to the code, there will have to be 4.57 square inches of vertical reinforcing, which will carry 32,000 pounds. Adding these two stresses together the result—489,000 pounds—is found to be much larger than necessary to carry the actual load. The actual size of vertical bars and hoops will have to be determined and listed in the column schedule.

The load brought to the column at the eighth floor is greater than that determined above, as the live load is increased to 200 pounds per square foot. This floor is used as a shop floor and this is the reason for the increase. The slab thickness will be considered as 8½ inches, and the weight of the slab will be 102 pounds per square foot. Adding the weight of the fill, finish, and drop panel, the total dead load will be 135 pounds per square foot. It must be remembered that the slab thicknesses are only assumed, when column loads are considered, and are subject to revision when the actual design of the floor slab is undertaken, but as the variation is usually very slight, the assumptions made are accurate enough when the total load on the column is taken into consideration.

The total live load on the panel is $200 \times 200 = 40{,}000$ pounds. This can be reduced 5 per cent in accordance with the code, so the live load brought to the column at the eighth floor will be considered as 38,000 pounds. The total dead load will be $135 \times 200 = 27{,}000$ pounds. The column load will be considered the same as that of the section above, or 12,000 pounds. The wall load will be determined on the basis that the section of wall above the slab is 1 foot thick and 16 feet 2 inches long, and 3 feet 4¼ inches high (Fig. VIII), and that the weight of the brick facing on the column and slab, the masonry between the windows and the column, and the weight of the window itself must be added to the weight of the wall.

In order to avoid figuring the weight of the masonry facing on the spandrel beam, there will be additional height figured in the curtain wall. This will be considered as 3 feet 9 inches high, and its weight will be $3.75 \times 16.17 \times 120 = 7{,}277$ pounds. The weight of the masonry facing on the column will be $.33 \times 3.83 \times 13 \times 120 = 1{,}992$ pounds. The weight of the masonry between the windows and the column will be determined on the basis that this section of wall is 1 foot 4 inches thick, and slightly higher than the window opening, as there is a section of this brickwork that extends down to the lintel. By referring to the plan (Fig. IX) and bearing the considerations given above in mind, the following calculations for determining the weight of this part of the wall will be clear: $1.25 \times 8.8 \times 1.33 \times 120 = 1{,}756$ pounds. The window measures 8 feet 6¾ inches high by 14 feet 11⅛ inches long, and will contain 127.7 square feet. As steel-sash windows are considered as weighing 10 pounds per square foot, this will weigh 1,277 pounds. The total wall load will be 7,277 + 1,992 + 1,756 + 1,277 = 12,302 pounds.

There is a spandrel beam, shown in the section (Fig. VIII), which should be added to this column load. The beam is 1 foot 2 inches deep over all, and will extend 5½ inches below the slab. A portion of this beam was figured in the drop panel in the floor load, but it is safe to assume that if the additional concrete is figured as 5 inches deep, 7 inches wide, and 16 feet long, the total loading will be determined accurately enough. The beam, having a section of 35 square inches, will weigh 35 pounds per lineal foot, and the total weight of the entire length will be $35 \times 16 = 560$ pounds. The total wall load will be 12,302 + 560 = 12,862 pounds, or, roughly, 13,000 pounds.

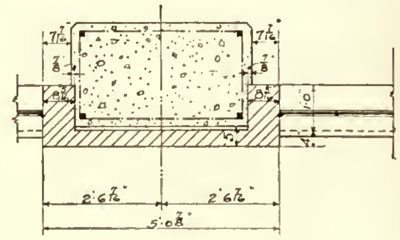


FIGURE IX

The total of the eighth-floor load on the section of column between the seventh and eighth floors is given by adding all the loads determined above.

38,000	pounds	live load.
27,000	"	dead load.
12,000	"	column load.
13,000	"	wall load.
90,000	"	total.

Adding this to the combined loads of the roof and ninth floor, the total column load is 136,000 + 90,000 = 226,000 pounds.

The column section remains the same as given above until a point is reached where the total load is greater than 457,000 pounds, which has been given as the safe load for this section.

It is hardly necessary to go through all the calculations for all the loads on the remaining floors. The loading at the eighth floor is typical, but as the live load decreases 5 per cent, the loads at each of the lower floors become slightly smaller, until the point is reached where the column increases in size, and then the increase in the column load about counteracts the decrease in the live load.

Another item in determining the loading on columns should be mentioned, however, and this is the loading due to partitions. In a warehouse of this type all partitions are substantially constructed of fireproof material—in the present case reinforced concrete, 6 inches thick. Such a partition occurs on the seventh floor, and the portion which bears on the column will be considered 12 feet high, 8 feet long, and 6 inches thick, and will weigh approximately 7,000 pounds.

As shown in the table below, this load is added to the wall load on that section of column between the sixth and seventh floors.

The loads can be arranged in columns such as shown herewith.

STORY	TOTAL LOAD PER STORY	TOTAL LOAD
9	65,000	65,000
8	71,000	136,000
7	90,000	226,000
6	97,000	323,000
5	89,000	412,000
4	88,000	500,000
3	88,000	588,000
2	89,000	677,000
1	89,000	766,000
B	209,000	975,000

It will be noticed that at the section between the fourth and fifth floors the load becomes larger than the safe load figured for this section. It will therefore be necessary to increase the section. The length—3 feet 10 inches—is determined by architectural requirements, so the only dimension which can be increased is the thickness, and for the purpose of study it will be assumed that this is increased to 1 foot 9 inches. The area of the column will be $3.83 \times 1.75 \times 144 = 965$ square inches. This will support 482,500 pounds. One-half of 1 per cent of this area is 4.82 square inches. This multiplied by the allowable stress in steel—7,000 pounds per square inch—will give the supporting value for the vertical reinforcement. 33,740 pounds added to 482,500 will equal 516,240 pounds as the supporting value of the section. As the actual downward load is only 500,000 pounds, this section is large enough. The required area of steel can be made up of four 1⅛-inch square bars. The next load is the total at the fourth-floor level, which is 588,000 pounds. As this is greater than 516,240 pounds—the safe load for the section designed above—another section will have to be designed. Unless the architect has a table giving the safe loads on concrete columns of this type, he will have to discover the area of this new section by trial. It will be assumed that the thickness will be increased to 2 feet. The section will then measure 24 inches by 46 inches, and will contain 1,104 square inches. The concrete will support 552,000 pounds. There must be 5.52 square inches of steel, which will support 38,640 pounds, and the total 590,640 pounds. This is very near to the required strength of the column. The steel will be made up of four 1¼-inch square bars.

In like manner it can be determined that for the portion of column between the second and third floors the cross-section must measure 2 feet 4 inches by 3 feet 10 inches, and the thickness increases to 2 feet 7 inches in the first-story height, and that the basement section increases materially in area, and is 3 feet 10 inches square. This is due to the fact that the live load at the first floor is 1,000 pounds per square foot, as stated in the first article, and that there is a proportionate increase in the dead load and area of column. By referring to the table of loads given above it can be seen that the load at the first-floor level is much larger than that at the second-floor level.

Column No. 10 has a much larger load at the roof level, as the framing at the roof is such that there is a much larger floor area to be supported. With this exception, however, the design is similar to that of column 9, and column 11 is approximately the same as 9.

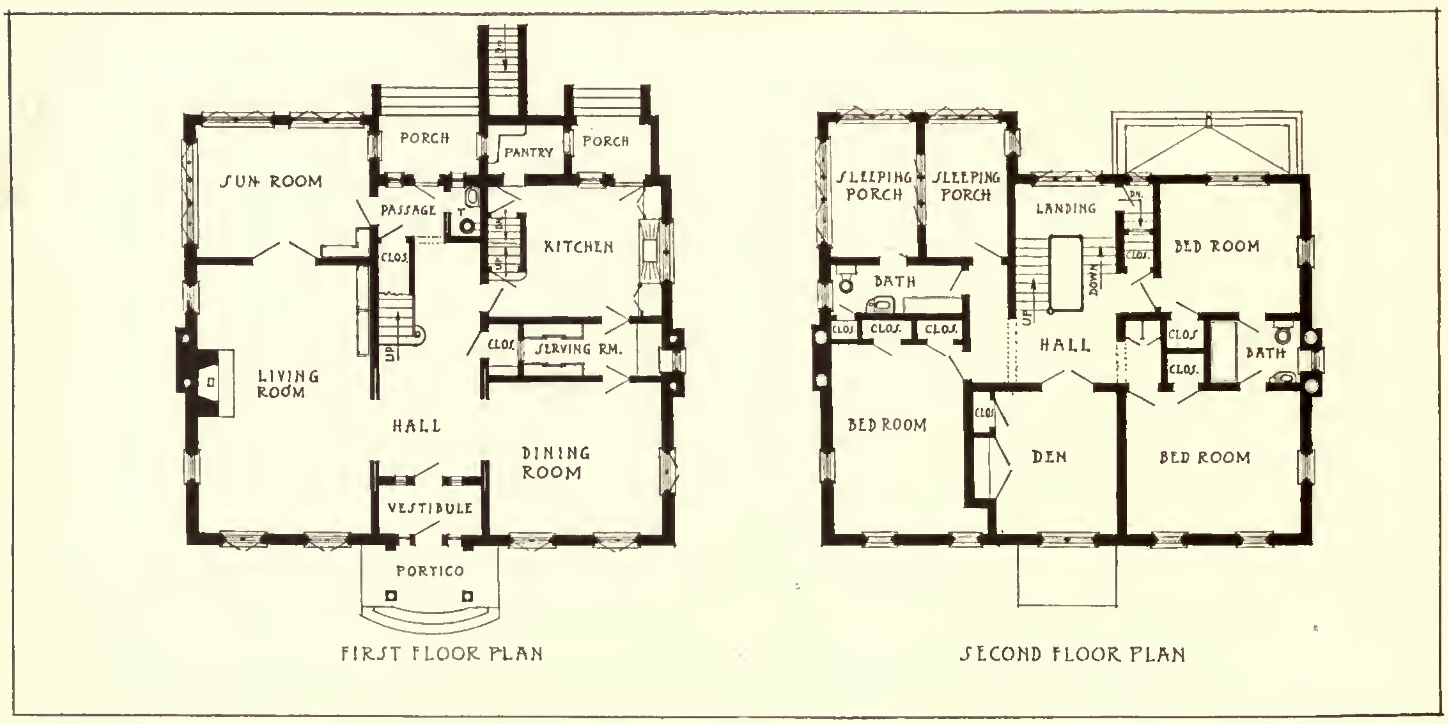
Column No. 12 is a corner column, and, therefore, it supports only one-half the floor load that is carried by each of the other wall columns. The wall load increases, as for architectural reasons it is desirable to have a heavier masonry pier at the corner than between the windows. It is desirable to have the corner column square, although there are cases in other buildings where corner columns are designed in the shape of a large L. Assuming, in the present case, that on account of the heavy wall load the total load at the roof level is 83,000 pounds, and that, in order to avoid too much eccentricity in the loading, the column will be 2 feet square, it is necessary to see if this section will carry the load imposed upon it.

A column 24 inches square will contain 576 square inches, and the concrete will support 288,000 pounds. The steel will carry 20,160 pounds, and the column will support 308,160 pounds, which is much greater than the actual load.

Where conditions are similar, as in the case of the wall columns 9, 10, 11, 13, 14, and 15, the loads on the columns do not vary greatly. The smallest load is 976,000 pounds at the footing of column 9, and the greatest is 1,014,000 pounds at the footing of column 15. The difference in these total loads is due principally to the difference in floor area carried by the columns at the roof. It will be recalled that No. 9 carried an area of only 100 square feet, where No. 15 carried an area of 400 square feet, due to the framing where the 40-foot spans were found.

There is no more need to investigate the design of the exterior columns, as there are no more types of loading or design than those already referred to. In the next article the design of interior columns will be investigated.

SCHLEICHER & SONS' PIANO FACTORY, STAMFORD, CONN.



HOUSE AND PLANS, E. O. DAMON, JR., FORT DODGE, IOWA. Damon & O'Meara, Architects.

ARCHITECTVRE

·THE · PROFESSIONAL · ARCHITECTVRAL · MONTHLY·

Vol. XLIII. CONTENTS No. 2

FEBRUARY, 1921

TEXT PAGES

PLATES AND ILLUSTRATIONS

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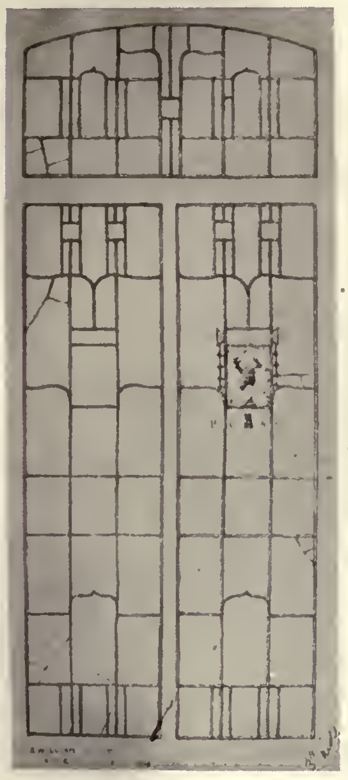
BUCHANAN MEMORIAL, ST. NATHANAEL'S CHURCH, PHILADELPHIA, PA. Designed and executed by Wm. Willet and A. L. Willet.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLIII FEBRVARY, 1921 NO. 2

Stained-Glass Methods Old and New

By W. E. Roberts

STAINED glass has a more diversified number of exponents than any other form of decorative art, and it has been described as the harmony of architecture. Many discordant tones are, however, struck in the attempts to revive mediævalism.



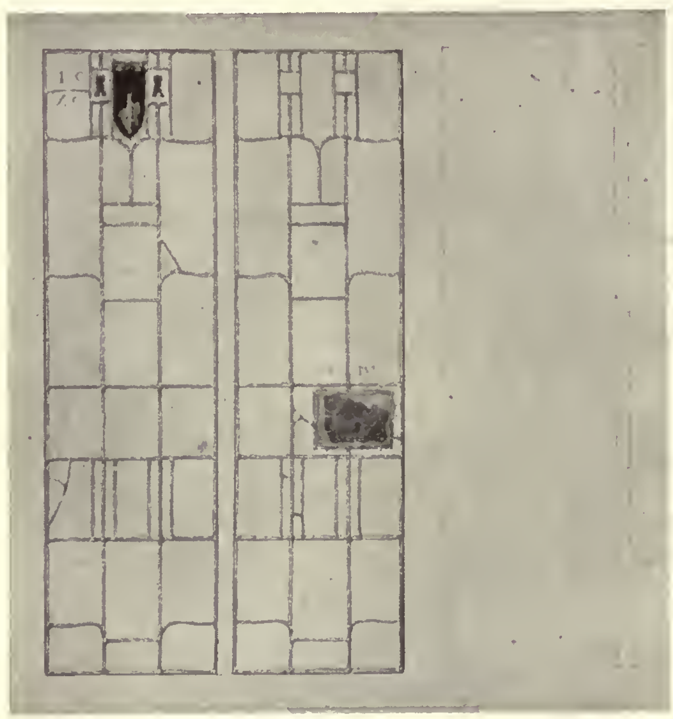
The trouble is chiefly caused by overenthusiasm coupled with a want of experience in the practice of the craft.

The considerable number of people interested in stained glass for the interest it gives proves that the study of glass is fascinating, and any one who has been privileged to see and study the early glass has been stimulated to increase his knowledge by reference to authorities on the subject. This would be well if it did not go any further, but the evil that results is due to the fact that some of these people with their enthusiasm blinding their better judgment literally try to force their opinions down people's throats.

It is easy to imagine what would have been the effect on the world's art had these enthusiastic but misguided people lived in the thirteenth century; probably Gothic art would never have been; the thirteenth-century artists would be copying Chaldean, Egyptian, or Grecian art; in fact, it is possible they might have reintroduced prehistoric art. Looking over the history of art, we find that every age has a style peculiar to that age, and although in some cases it may have been influenced by a preceding age its characteristics were its own. Confining ourselves to the Gothic Age, we do not find the fourteenth-century artist servilely copying the work of the thirteenth-century artist, nor the fifteenth-century artist copying from the fourteenth. Yet we are asked to make imitations of thirteenth-century glass.

The study of mediæval glass is very necessary to any one taking up stained glass professionally, and the study is not easily acquired. Yet people have been known to take a three months' tour of the European cathedrals, returning home as authorities on Gothic glass. What state of mind a person has who believes such a thing possible it is hard to conceive, and in these days of rapid transit it takes considerable imagination to form any idea of the amount of patient labor that was necessary to complete some of the large early windows. The limitations the artists had to contend with, and although time has added a charm that cannot be reproduced by man, the simple faith of the one who gave his best is evident throughout the different periods of early glass.

We in this country have not any mediæval glass, and prior to the advent of opalescent glass most of the stained

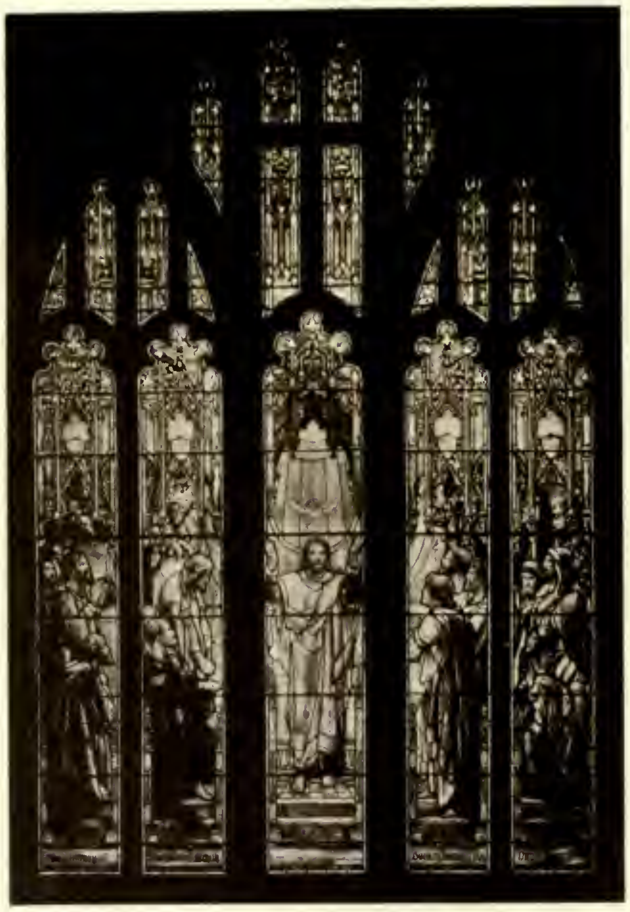


GLASS DOORS AND PARTITIONS

SAMUEL F. HOUSTON'S RESIDENCE, DRUM MUIR, CHESTNUT HILL, PHILADELPHIA

William Willet and A. L. Willet, Brockie & Hastings, Architects

This series of glass doors and partitions is carried out in crystal plate and the mediæval hand-run leading and give a delightful effect of openness and space and light. The inserts of painted glass are unusual. Mr. and Mrs. Houston were interested in the excavations at Nippur and conceived the idea of producing in imperishable glass some of the objects of ancient art which were discovered by the explorations conducted there by the University of Pennsylvania. The Nippur stone and the head of a bull from the oldest known picture in the world, 4000 B. C., are among the inserts in the glass partition leading into the conservatory, while the exquisitely tinted vases and jars found there are reproduced in the dining-room lights.



"Christ, the Holy Comforter." Erected in the Church of the Holy Comforter, Charlotte, N. C. By Tiffany Studios.

Design for Victory window, St. Philip's Church, Garrison's on the Hudson, N. Y. William Willet and A. L. Willet, artists. Hobart B. Upjohn, architect.

Design for Lady Chapel window, Blessed Sacrament Church, Detroit, Mich. By William Willet and A. L. Willet. Henry A. Walsh, architect.

"St. Michael," World War memorial, St. John's M. E. Church, New Rochelle, N. Y. By Tiffany Studios.

glass in our churches had to be imported, and although it was a time when glass was treated in a decadent manner through overpainting or the misuse of enamel colors, a great deal of it compares favorably with the best work done to-day.

Local glass firms to compete against the imported glass obtained glass-workers from Europe, principally from Munich, men who were accustomed to the use of that makeshift for leading, enamel painting. Prospective clients were shown how unnecessary it was to import memorial windows when there were European glass artists in the country more capable of doing work suitable to the conditions here.

This was partly successful, and in the struggle to check further importations some one conceived the idea of modelling the glass while in a plastic condition, giving it a suggestion of drapery fold and, by mixing the various colored glass in a molten state, produced opalescent glass.

In early mediæval glass, technique was consistent in all the different periods, and if it is now to be ignored, why attempt to revive the study of early glass? Suggestion of natural forms by light and shade do enhance the beauty of glass, so any attempt to produce an effect by labor-saving will merit its own reward.

Artistic license is permissible sometimes, but when it becomes the rule rather than the exception it is something to be shunned. Sensationalism has become a feature here and there, but if we would develop and maintain a standard, these tendencies should be checked.

"Resurrection," Apse of St. Agnes Chapel, New York. By Oliver C. Smith. (Heinigke & Smith.)

The Farragut memorial window presented by the graduates of the United States Naval Academy. By the Gorham Co.

"LANDSCAPE" ERECTED IN PILGRIM CONGREGATIONAL CHURCH, DULUTH, MINN. By Tiffany Studios.

Construction of the Small House

By H. Vandervoort Walsh
Instructor in Architecture, School of Architecture, Columbia University

Article VI

CONSTRUCTION OF THE MASONRY-AND-WOOD DWELLING

IN one of the previous articles it was pointed out that the type of construction next in general use to that of the wooden-frame house was the dwelling of masonry and wood. This was designated as Type II, and defined as a building with exterior walls of stone, brick, concrete, or terra-cotta, and interior floors and partitions of wooden-frame construction.

The difference in construction between the wooden-frame structure and the masonry-and-wood building is mostly in the material used for the exterior walls. The interiors of both types are constructed in practically the same way, the floors being of light wooden joists and the partitions of wooden studs.

The oldest varieties of the masonry houses in America are represented by the stone and brick dwellings of Colonial days. These are so substantially built, and often so artistic in conception, that they have become common models from which to draw inspiration. The concrete house of the monolithic or block type, and that of hollow terra-cotta tile, is a modern development.

The Stone House

The stone house is very adaptable to all those regions where this material can be secured from the excavation of the cellar or from some neighboring road improvement. Sometimes an old stone wall serves as a source of supply. Because of the native character of this material it will always be in harmony with the landscape.

In building the wall of stone there are a number of things to be observed, where success is desired. The wall should be well bonded together, the lintels over the windows should be strong, the foundations should be adequate to prevent cracks, the method of laying should be artistic, and the form of jointing in harmony with it.

All native stones used for rubble wall construction have certain characteristics of color and formation. Certain stones will split easily into long, flat shapes, others seem to have very little lamination and break into jagged, irregular patterns, while others are so soft that they lend themselves to easy shaping in squared blocks of regular size. Sometimes, even, the neighborhood may be filled with round field stones, which can be used to imbed into the face of the wall and produce a surface of round bumps. Whatever is the character of the native stone it should be used in its simplest form and not forced into imitation of some other type. The soft brown sandstones which are seen in some Colonial houses are easily cut and squared; but to cut up a hard stone into such carefully shaped blocks, in imitation of this Colonial work, would not only be a waste of money but a waste of artistic effect.

Method of Laying.—According to the way in which the stone naturally lends itself we have various types of rubble

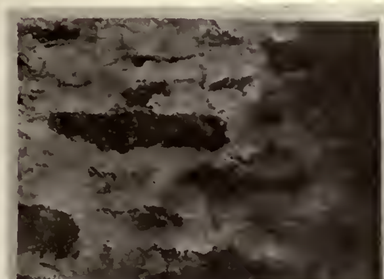


Fig 1. Rough Rubble — Plastered Joints

Fig 2. Rough Rubble — large white, roughly pointed joints

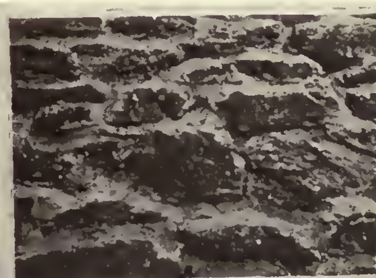


Fig 3. Rough Rubble - trowled joints

Fig 4. Rough Rubble, or ledged work Raked joints.

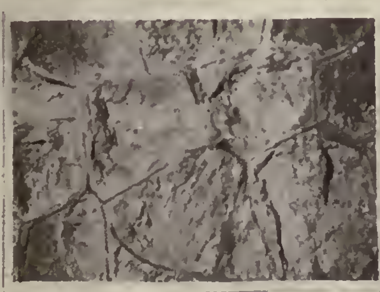


Fig 5. Cobweb Rubble — tooled joints- — no spalls

Fig 6. Square uncoursed Rubble tooled joints

Fig 7. Field stone Rubble raked joints

walls. The commonest is the rough rubble wall in which the stones have neither regular shapes nor regular sizes, or even courses. The wall is composed of large stones and small stones (the latter are called spalls, and fill in the interstices between the larger stones). The joints of mortar between the stones may be plastered roughly over the surface, covering much of the face of the stones themselves, or they may be roughly but neatly pointed with white mortar, or the joints may be raked out. Where the stone has a natural tendency to cleave into long, flat shapes, the rough rubble may become more regularly coursed in appearance. All of these types are respectively illustrated in figures 1, 2, 3, and 4.

A softer stone, which can be dressed with the hammer, may be treated in two different ways: It may be shaped to fit closely, without using any spalls to fill up the interstices, and, thus, appear as a cut-out puzzle; this is called "cobweb rubble." However, the more dignified treatment is the squared, uncoursed rubble, in which the blocks are cut to rectangular shape and the joints pointed with a tool. Figures 5 and 6 illustrate these.

A wall built entirely of field stone depends upon the mortar for its strength. It appears the best when the joints of the surface are raked out, permitting a large part of the stones to project outward. Figure 7 illustrates this kind of rubble wall.

When the rubble wall is built with very carefully squared stones, and in regular courses, it partakes more of the monumental character of ashlar work and draws away from the rustic value of rubble. In determining the amount of cutting which is to be done, the character of the building should be considered, remembering that the smoother and more finished the wall, the more monumental is its appearance.

Mortar, Bond, and Thickness.—The kind of mortar which should be used for the rubble wall depends upon its location and desired appearance. All foundation walls, and all walls which are subject to dampness, should be built with Portland cement mortar. Lime mortar may be used in walls above grade, although cement mortar, or cement-lime mortar is superior. As the strength of a rubble wall depends more upon the mortar than the bond, it is well to use the best. However, care should be taken that the wall is well bonded. A wall which consists of two faces, not bonded together, should not be built. A bond stone which carries through from one face to the other should be set into the wall every 2 feet in height, and every 3 feet in length. This bond stone should be flat and about 12 inches in width and 8 inches thick. The usual thickness of walls for dwellings not over three stories in height is 16 inches, and the foundation walls are made 8 inches thicker than the wall above, or 2 feet.

The footings under a stone wall should be of concrete, not less than 12 inches thick, and should rest upon solid ground at a depth equal to, or greater than, the frost line below the surface, unless solid rock occurs above this point. The width of the footings should be such that it projects outward on both sides of the wall at least 4½ inches.

Furring.—The interior of all stone walls, and in fact all masonry walls, will show condensation of moisture over the interior surface, and if they are plastered directly on the interior the decorations will be ruined by the collection of so much water. The cause of this condensation is the same as that which forms sweat on the exterior surface of a glass of cold water. In order to eliminate this disagreeable feature, all masonry walls are furred on the interior before the lath and plaster is applied. The furring makes an air space between the wall and the plaster, and all dampness is prevented from penetrating to the interior surface of the plaster. To further increase the damp-proof qualities of a masonry wall they are sometimes built hollow, as, for example, the hollow brick wall, or the hollow terra-cotta tile wall. This air space also serves as an insulator for heat, preventing the escape of heat from the interior of the building in winter and the penetration of it into the structure in the summer.

The commonest type of furring is the 1-inch by 2-inch wooden strip, nailed to the joints of the masonry or to wall plugs inserted in the joints. Metal furring strips are also extensively used, and occasionally hollow terra-cotta furring blocks.

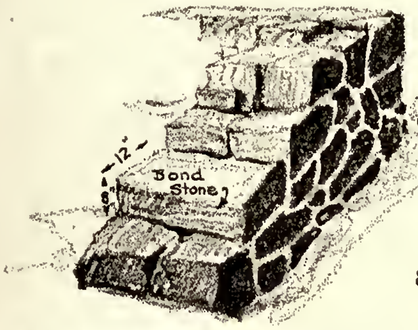
Brick House

Like the stone house, the brick dwelling is one of the oldest types in this country. Many of them were, in Colonial days, constructed of brick imported from Europe in the holds of ships, returning empty of cargo and in need of a ballast. Examples of early brick houses show a taste for good brick, which later died out on account of the introduction of the first American machine-made bricks. These early machine-made bricks were extremely ugly, due to their perfection of geometric shape, smoothness of surface, and monotony of red color. Later improvements in the manufacture of brick have released this material for extensive artistic use. The surface was given a varied color and texture, and the form was not made so machine-like. To-day we have a variety of bricks which range in colors through reds, yellows, buffs, greens, blues, and even dark violets. Textures of wire-cut bricks are rich and varied, and, if properly handled, can produce the very finest architecture.

Bonding and Construction.—The thickness of brick walls for dwellings, not higher than three stories, should be 12 inches, although some cheaper types are constructed with the upper story 8 inches thick. If the foundation walls are of rubble stone they should be 8 inches thicker, and if of brick or concrete they should be 4 inches thicker. Usually the walls will be faced with some variety of face brick, in which case they should be bonded into the wall. If a running bond is used, the face brick should be bonded into the backing at every sixth course by cutting the corners of each brick in that course of face brick and putting in a row of diagonal headers behind them, and also using suitable metal anchors in bonding courses at intervals not exceeding 3 feet. Where Flemish bond is used, the headers of every third course should be a full brick and bonded into the backing. If the face brick is of different thickness to that of the common brick backing, the courses of the exterior and interior should be brought to a level bed at intervals of about eight courses in height of face brick, and the face tied into the backing by a full header course or other suitable method.

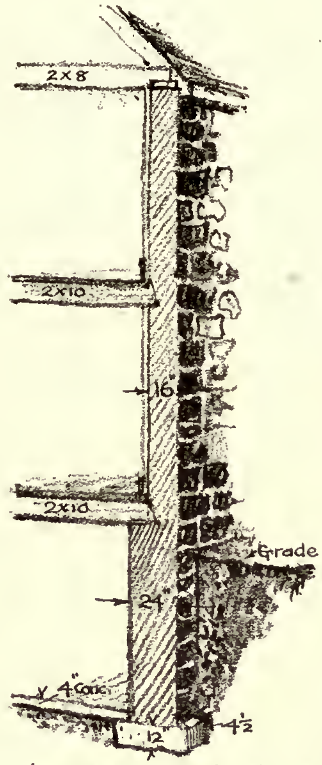
Fundamental Bonds in Brickwork.—It is very easy to understand the bonds in brickwork if the fundamental forms are known. There are, in reality, but two real bonds; namely, the English and the Flemish bond. The so-called running bond is no bond at all; while the common bond is found only in common brick walls, and uses a bonding course of headers every sixth course. The Dutch bond is only a slightly altered arrangement of the English bond, and is produced by merely shifting the centring of vertical joints of the stretcher course. By arranging these fundamental bonds in varying manners a decorative pattern can be produced on the wall of brick.

Types of Joints.—Here, again, as in the stone wall, the mortar joint plays a great part in the final effect of the



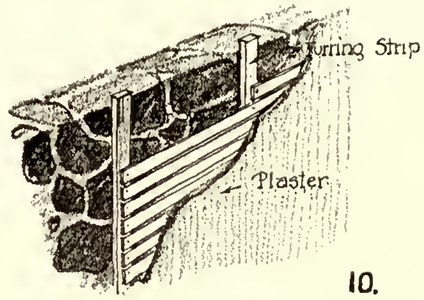
8.

Bond stone every 2' in ht. and 3' in length



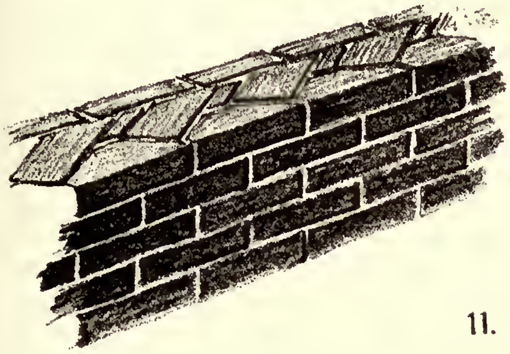
9.

Thickness of rubble stone wall



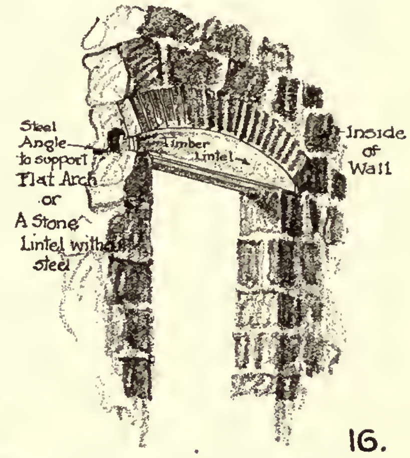
10.

Wood furring Strips



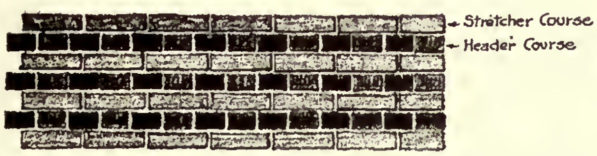
11.

Running Bond and method of Bonding

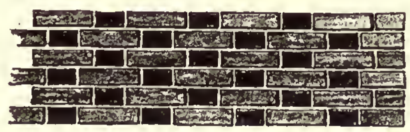


16.

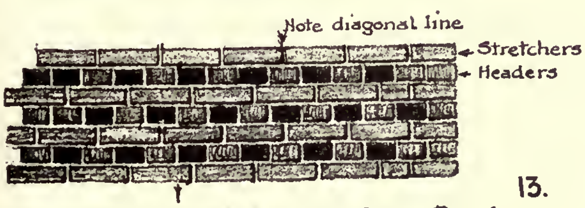
Lintel Construction



English Bond 12.

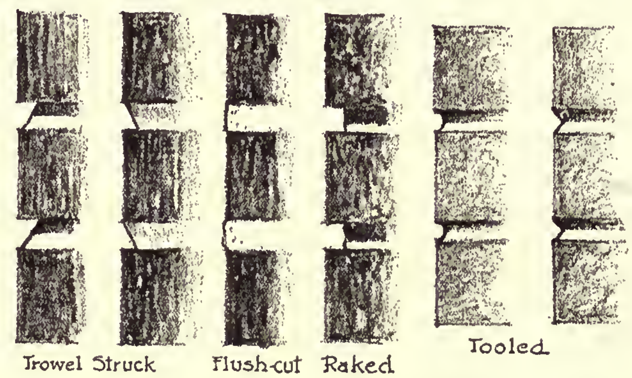


Flemish Bond 14.

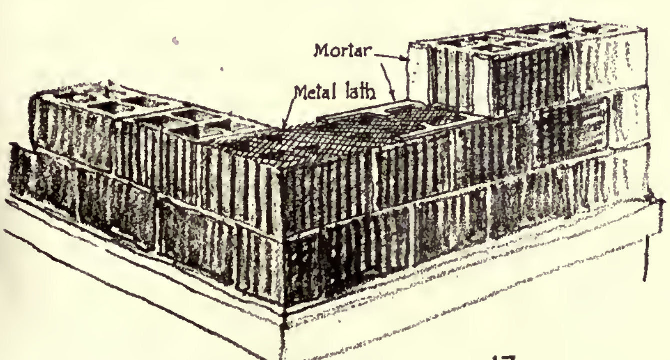


13.

Dutch Bond or English Cross Bond

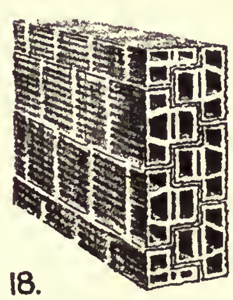


Brick Joints 15.



17.

Vertical cell Hollow tile wall



18.

12" Hollow tile wall
Cells Horizontal

19.

Brick Veneered
Hollow tile wall

design. It can be safely set forth as a rule that the rougher the texture of the brick used, the rougher and wider should be the joint. For the smooth-faced brick the joint should be small and finished with a tool. For a rough-faced brick the joint should be large and rough in texture. The various forms of brick joints in common use are shown in the illustrations.

Lintel Construction.—In the construction of lintels in either the wall of brick or stone, the introduction of either wood or steel is necessary for strength. Where the openings are less than 4 feet in width, timber lintels are used at the back of the lintel or arch, which are cut to serve as a centre for a rowlock or keyed arch. Any face brick may be supported by using a small angle. Where lintels are wider than 4 feet, steel I-beams, channels, or angles must be used. Where the span is more than 6 feet, it is necessary to build in bearing plates for the support of the ends of lintels.

Hollow-Tile House

The past decade has seen an increasing use of hollow terra-cotta tile as a building material for the walls of the small house. It has many advantages which have made its popularity increase, such as its larger and lighter construction unit, reducing the labor of setting, its cellular wall features, and its availability. There is much information published by the manufacturers describing the correct construction, but always, of course, with an eye to advertising the material.

However, there has been much conflicting testimony made concerning the practicability of hollow-tile construction, and some of the disadvantages should be noted. As a rule, they have proved to be strong enough to support the weight of the structure imposed upon them, but in the Southwest, where tornado winds are prevalent, these walls have been criticised because of their lack of stability and their porosity. Hollow-tile walls have been thrown down while those constructed of brick have stood, and driving rainstorms frequently make the inside of the walls wet.

The stability can be increased by filling them with concrete, but the allowable strength cannot be considered to have been raised. Tests have shown that this filling does not increase the strength, because of the difference in the elasticity of the two materials.

Types and Construction.—There are two types of hollow terra-cotta blocks: one which builds with cells vertically and the other which builds with cells horizontally. This latter is generally an interlocking tile. The strongest wall for vertical-load resistance is built with vertical-cell tiles.

All hollow tile should be laid in Portland cement mortar, and the webs should be arranged so that they build over one another. The bearing of floor beams and girders on walls, built with blocks of vertical cells, should be made by covering the tile with templates of terra-cotta slabs, filling them with concrete or protecting them with plates of steel. Where chases are required for pipes they should not be cut into the wall, but special blocks should be used to build around them. All lintels under 5 feet should be constructed with tile arches, reinforced with concrete and steel rods inside of their webs.

Precautions against Dampness.—In order to prevent the penetration of moisture the mason should butter all joints on the inside and outside edges, leaving an empty space between, in order to insulate against the transmission of moisture through the joint. To prevent the collection of mortar in the cells of the tile, due to droppings during construction, the spreading of metal lath over the top of each course of tile will accomplish this and also make the strength of the wall greater. Although it is often recommended that hollow tile be plastered directly upon the interior, yet this is not safe in those sections of the country where there are driving rain-storms. For this reason it is advisable to fur them on the interior. It is also recommended that a waterproofing compound be added to the stucco applied to the exterior. Another fact should be observed; namely, that all door and window frames, since they are of wood, will tend to shrink and thus open up the joints and permit the leakage of rain-water. Oakum should be stuffed behind all brick moulds to prevent this. Care should also be taken to make drips under all sills, so that no water will leak into the interior of the wall. All belt courses should also have steep washes. Stucco should not be carried down to the grade level, but a course of solid material, like brick, concrete, or stone, should be built at this point.

Veneering.—It is sometimes customary to veneer walls of hollow tile with brick, especially those tiles which are of the interlocking type, since a better bond can be secured. In any case, any brick veneer should be bonded to the backing with a row of headers every 16 inches, or be attached with metal ties. This veneering should not be considered as part of the required thickness of wall.

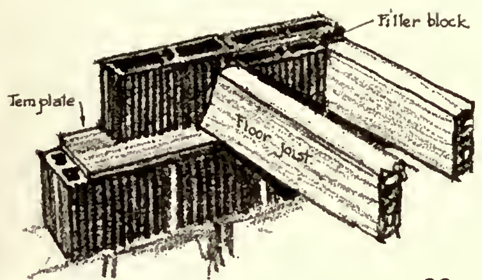
Wall Thickness.—The thickness of hollow-tile walls should be the same as for walls of brick. The construction of light 10-inch and 8-inch walls, while strong enough as a substitute for a frame dwelling, is not strong against weather or fire. The only justification for thin walls is the slightly reduced cost of materials. Hollow blocks, as a rule, are not used for foundations, although they are satisfactory under buildings not higher than 40 feet. It is better to fill such walls with concrete and waterproof them on the exterior.

Concrete House

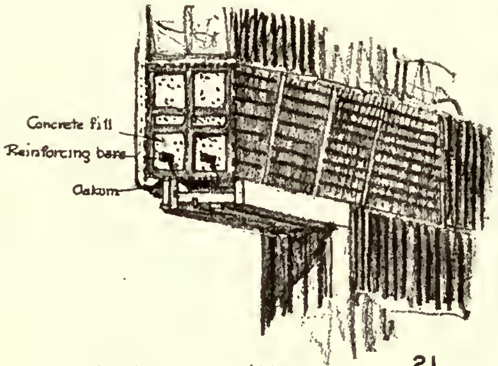
The development of the concrete house has been stimulated by large corporations erecting towns of them in one locality. The erection of concrete houses by individual builders cannot, as a rule, follow those systems which are adapted to group construction. The use of large precast units may be satisfactory for a development of a hundred or more houses, but it is not economical for a single operation. The use of heavy steel forms for casting monolithic houses of concrete, while under certain favorable labor conditions may be satisfactory for a small job, yet as a rule is better adapted to large enterprises. Such steel forms are represented by the Lambie forms and the Hydraulic forms. Even wood forms of heavy construction, like those used in the Ingersoll system in work at Union and Phillippsburg, are not adapted to an operation involving less than fifty identical houses. Another system, combining both the precast and the cast-in-place work, called the Simpsoncraft system, is not economical for small operations. This uses thin precast slabs for walls and floors, and precast concrete beams. The precast parts are tied together by casting in place reinforced studs of concrete.

Practically the only available systems which are useful for the small operation are (1) monolithic houses, built with light, portable steel forms or wooden forms, and (2) the concrete-block house.

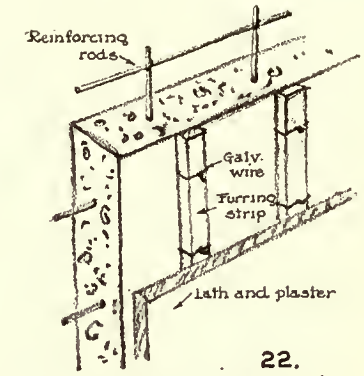
Block House.—The concrete house, especially that built of blocks, often has the defect of being damp on the interior, unless precautions have been taken to avoid this. It is always best to fur the interior of walls, although there have been cases where the blocks have been waterproofed and the interiors remained dry. Usually those blocks which are cast in a very dry state are porous, while those which are poured show considerable compactness. The great diffi-



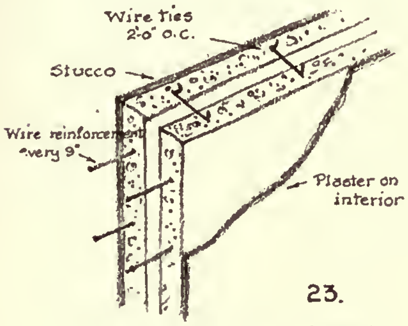
Support of floor joists 20.



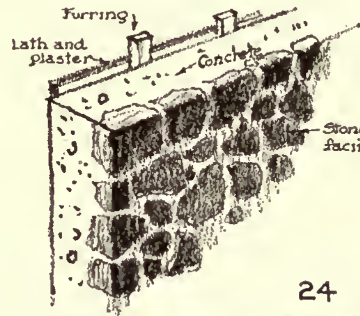
Construction of lintel 21.



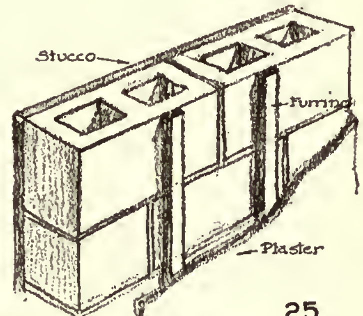
22. Typical monolithic wall construction



23. A double monolithic wall built by the Van Guilder machine.



24 Stone faced concrete wall developed by Ernest Flagg



25. Typical Concrete block wall.

culty in using concrete blocks lies in the inexperienced and inartistic work of the large number of "would-be manufacturers," whose only claim to the product consists of having purchased a machine which will turn out so many blocks a day and reap them an advertised fortune in a short period. A thoroughly reliable concrete block can be made if there is used plenty of good cement, clean aggregate with proper proportions of fine and coarse to secure density, sufficient water to make a wet mixture, and then the product kept damp while curing. The surface should also be finished in some artistic manner. A good method consists in applying about an inch of white cement and showy aggregate to the outer facing of the block, and then, when the block has been set into the wall, finish it off with a stone-tooling machine, such as a pointer, operated by a pneumatic hammer. Blocks, also, should be of the hollow-wall type, so that an air space between can be secured for ventilation and insulation.

Monolithic House.—The commonest method of building monolithic walls of concrete is to use wooden forms. These are built in sets of panels, one for the exterior and the other for the interior face of each course. These are successively raised, one above the other, in pouring the walls. Mr. Ernest Flagg, architect, has developed a remarkably simple system of concrete-wall construction with the wooden form. Roughly broken stone are set against the inside of the forms, used for the exterior face of the wall, and the rest of the wall is filled up with concrete. By raising the boards which are used for the forms, as each layer hardens, the wall can be erected without skilled labor and yet have the appearance, on the exterior, of a stone wall. Of course it is necessary to point the joints of the stone-work after the forms have been removed.

Of the light steel forms, the most important on the market are the Metaforms and the Morrill forms. The Metaforms, originally the Reichert forms, are composed of individual form units. All units are standardized and interchangeable, and equipped with the necessary clamps and locking devices. These units are built of sheet steel, strongly reinforced, and measure 2 feet square. A single course of Metaforms is composed of an inner and outer shell of plates. As the work progresses the bottom course is taken off and placed above for the next, there being usually three courses of forms in operation. The Morrill form is also a sheet-steel form, only it uses a hinged "swing-up" construction, by which the lower courses of the form can be swung up into position for the new course as the work progresses.

The Van Guilder double-wall machines have been gradually increasing in use throughout the country. They are not for sale, but the company establishes a contracting organization in different centres. The machine is a steel mould which is moved along and upward as the concrete wall is tamped in it. It builds a double wall in tiers. Each tier is 9 inches high and 5 feet long. A complete circuit of one tier is made around the wall, and then the next tier is begun on top.

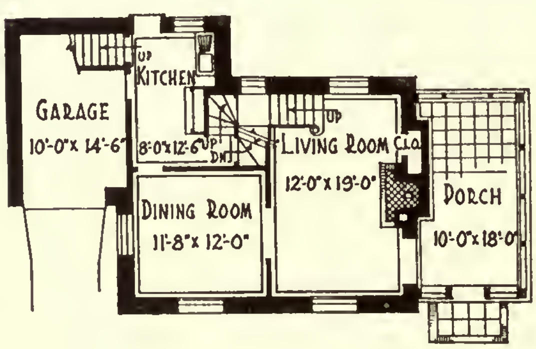
End.

A Correction

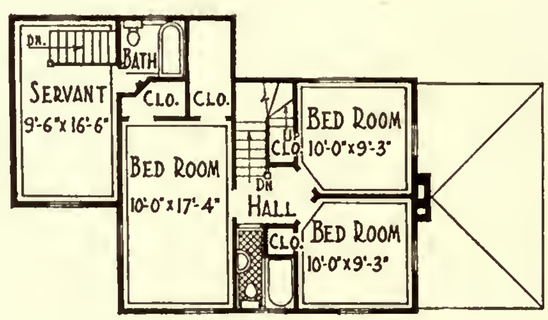
Mr. Walsh has asked us to call our readers' attention to an error in his article in the December number. The paragraph reading:

"It comes in two grades, IX and IC, the former being No. 27 gauge and the latter No. 29 gauge. The heavier is used for roofing and the lighter for valleys and gutters" on page 367, under the paragraph on Metals, should have been:

"It comes in two grades, IX and IC, the former being No. 28 gauge and the latter No. 30 gauge. The lighter is used for roofing and the heavier for valleys and gutters."



First Floor Plan



Second Floor Plan

HOUSE, MRS. HARRIET A. PIERSON, NARBERTH, PA.

Wallace & Warner, Architects.

Editorial and Other Comment

The High Cost of Waiting

WE are indebted to Mr. Davidson and his interesting "Bulletin of the Illinois Society of Architects" for some significant and instructive statistics, and they seem of so much value that we are going to pass them on to our readers, who may not have seen them.

The whole problem of building to-day is one that relates itself to the matter of high costs, and the attitude of the client in this case has been and is that of many all over the country.

An argument to the effect that you might as well build now, that there can be no possible return to pre-war prices, can be supported, and the further argument that the present high rentals warrant going ahead, may furnish an added incentive to immediate progress. We have had five or six years of mounting costs, and of late some more or less encouraging surface indications that times may be a little better. We have noted a number of times that there seems no lack of capital for large enterprises, and that big hotels, warehouses, factories, theatres, office-buildings are going up all over the country.

The one greatest need—small houses, places for people of moderate means to live—seems the difficult thing to meet. Ways and means have been and are being discussed, and the investigators are trying to devise some way to compel insurance companies and banks to use their funds for this purpose. Mr. Davidson's building was a warehouse, and, as he says, the owner preferred waiting for better conditions —with the results shown in the figures given below. They were the result of actual competitive bids:

	Aug. 29, 1917	June 18, 1918	June 18, 1919	Sept. 15, 1919	Feb. 3, 1920	Nov. 9, 1920
Masonry, carpentry, and concrete........	$98,783	$119,283	$136,700	$155,532	$213,000	$207,000
Structural steel and misc. iron..........	13,468	15,400	16,300	16,300	21,535	19,665
Cut stone............	1,195	1,965	2,438	2,792	3,748	4,970
Sheet metal..........	240	282	360	360	475	807
Hollow-metal stair doors..............	2,100	2,135	2,121	2,121	2,522	3,450
Elevator doors........	2,400	2,450	2,580	2,880	3,700	4,570
Fire-escapes..........	2,428	2,428	2,381	2,518	2,923	2,923
Plastering............	525	550	570	665	833	1,000
Glazing..............	1,820	1,645	1,526	1,681	2,524	2,919
Roofing..............	1,192	1,240	1,380	1,640	2,000	2,580
Vault doors..........	185	220	250	260	265	290
Painting.............	2,593	3,140	3,412	3,712	4,327	5,200
Plumbing............	5,355	5,782	6,054	6,654	8,538	10,040
Elevators............	4,740	4,800	4,900	5,100	6,450	6,700
Heating..............	4,000	4,300	4,500	4,800	6,500	8,000
Electric wiring........	2,000	2,000	2,000	2,400	3,000	3,400
Sprinklers............	17,500	17,500	18,000	18,900	23,187	23,187
Hardware............	500	520	560	575	800	875
Total..........	$161,024	$185,640	$206,032	$228,890	$308,327	$307,576
Cost per sq. ft........	1.46	1.68	1.87	2.07	2.80	2.79
Cost per cu. ft........	.097	.114	.124	.132	.187	.186
Percentage of increase over 1917..........		15%	28%	41%	92%	91%

A Plan for Cheap Houses

FROM the Borough of Richmond on Staten Island, one of New York's big suburbs across the bay, comes the encouraging news, in a booklet prepared by the borough's president, Calvin D. Van Name, of a businesslike plan to relieve the housing shortage. The plan is based on facts compiled by the chief clerk of the Bureau of Buildings:

"In the Borough of Richmond (Staten Island) we can erect a six-room, 1½-story detached cottage on a lot 25 by 100 feet, with all conveniences, near station, for $3,000. A large number of these homes could be built in sixty days. No initial payment would be required and the tenant could reduce his rent each year."

In a communication to the Board of Estimate last April, Mr. Van Name asked a $2,000,000 issue of corporate stock. He said:

"I am prepared to say that if this money is expended in Staten Island the borough government, as its direct contribution to the cause, will undertake without any additional help or expense to supervise, through its Bureau of Buildings, the erection of these homes."

"Another type of home suggested is a five-room, two-story building, complete in every particular, on a lot 25 by 100 feet. Such a home, including the lot, is offered for $4,000.

"In recent times large industrial corporations have built homes for employees. During the war the government did the same. There is no reason why a municipal corporation cannot erect homes as outlined above."

This seems to us full of promise. After all, much of the delay has been due to a lack of real getting together. When old ways have gone, new ways must be devised. We are prepared to say that the architects may be trusted to show the way to build with a thought for economy, and find practical ways for saving by new methods of construction and simplified use of standardized materials. We have had to learn a mighty hard lesson, but maybe it will have a wholesome tendency if the general result is to convince the home-builder that good taste is best evidenced in a certain dignified restraint.

The dominant architecture of many of our suburbs—we call it architecture by courtesy—has been in the past largely the result of the desire to make a five-thousand-dollar house look like the one near by that cost ten, and by co-operation between the the real-estate boomer and the builder and contractor.

The architects showed us how much charm could be expressed in the work done in some of the war industrial developments. Our country houses are designed too often to be something different, the something many times not born in the mind of an architect, but in that of a client who has been looking at the newest thing in bungalows shown in some publication devoted to the spread of real culture in every-day things.

The old carpenters and builders of New England, and all who inherited something of the Colonial tradition, followed certain accepted formulas, and the old houses that survive are still an inspiration.

We all think of old New England houses and old New England doorways as things usually worth while.

Their builders were content with following, with slight variations, the good work that had been done. We see in our towns the influence of all the styles that ever existed, and some that could be only the inventions of a lunatic asylum or a pseudo-something-or-other. No mere architect could tell from what they are derived.

The "Own Your Own Home Expositions" can do no greater service to the community than to convince the public that every home is likely to be a better home because it has had the benefit of the services of a trained architect.

The Small House Competition

THE architectural profession has enthusiastically entered into the spirit of the "Small House Competition," with the view to nationally stimulating home building and home ownership as approved by the American Institute of Architects, according to Henry K. Holsman, president of the Illinois chapter, who is acting as architectural adviser.

The prize-winning plans will be first exhibited in conjunction with the first annual "Own Your Home Exposition" in the Coliseum at Chicago, March 26 to April 2, according to Robert H. Sexton, managing director. Real-estate boards throughout the country are evincing much interest in the "Small House Competition," co-operating in connection with the "Own Your Own Home" movement as sponsored by the National Association of Real Estate Boards.

The Philadelphia Real Estate Board has asked that an exhibition of the prize-winning designs be held there. Similar requests have been received from Boston, New Haven, and the newly organized society, Art Center, Inc., New York City.

"The entire programme seems to have met with a very agreeable and very general response throughout the country," writes Mr. Holsman, who has received, among many letters, one of commendation from the president of the American Institute of Architects. At the Chicago "Own Your Own Home Exposition," a fac-simile of the first prize-winning house will be constructed of lumber, and the front elevation of the first prize-winning brick home is to be erected by exhibitors who have already been allotted space.

The Architectural League Exhibition

THE 36th Annual Exhibition of the Architectural League of New York, will be held from April 1 to April 30, inclusive, in the Metropolitan Museum of Art.

Information regarding the most efficient and economic methods for structure and equipment is vital to every architect. This exhibition is planned with a view to assembling, as completely as possible, all that is used in building.

Telephone Circle 2837, or write 215 W. 57th St., Miss A. M. Simpson, assistant secretary, for information regarding space.

Book Reviews

DESIGN AND TRADITION. A Short Account of the Principles and Historic Development of Architecture and the Applied Arts. By AMOS FENN. Universal Art Series. Charles Scribner's Sons: New York.

Now and then we come upon a book like this for which we have been looking, one that gives us in brief compass and well-considered essentials a summary of many volumes. Such books, frankly, but an introduction to a more thorough knowledge or a reminder of many things we find it hard to keep in mind for ready reference after much seeking, have a refreshing way of reviving our interest and often making clear some things that were more or less obscure, on account of the very completeness with which they were presented. There is an encouraging interest in the arts and crafts and our schools and museums are taking a more practical view of teaching, and of showing the value of a knowledge of tradition and of past achievement. Good design is not a matter of inspiration, nor is good taste something personal, a gift without cultivation. Good taste is invariably our own; bad, the selection of others, but it is irrational to assume that we all naturally possess a knowledge which indisputably takes many years to cultivate.

Mr. Fenn gives us a compact and clearly written historic review of styles in architecture and their associated crafts, from primitive times to the beginning of the eighteenth century. The essentials of Egyptian, Greek, Roman, Romanesque, Byzantine, Gothic, Renaissance and other styles are pointed out and are followed with a series of chapters dealing with such details as mouldings, architectural proportions, the use of the orders, division of surface, matters of wall spacing and decoration, conventional ornament, treatment in design, mythology and symbolism, ways and means.

The text is admirably free from technical affectations or theories. A book of this sort needs, above all, adequate and competent illustrations, and these are supplied in profusion. They are mostly in line, but these are supplemented with half-tones made directly from the objects.

It is a book that will be found of real and helpful value for every draftsman, designer, and student, and it will afford a compact, useful, and ready reference for all concerned in architecture and the kindred arts.

A HANDBOOK OF INDIAN ART—ARCHITECTURE, SCULPTURE, PAINTING. By E. B. HOWELL, formerly Principal of the Government School of Art, and Keeper of the Art Gallery, Calcutta. Author of "Ancient and Mediæval Architecture of India." 8vo. E. P. Dutton & Co., New York.

India, the land of mystery, has embodied in her buildings the symbols and aspirations of her religions, made them a part of her worship, of her honor to the dead. Her architecture is everywhere an outward expression of mystery, of the imaginings of the prophets, of the faithful. The Vedic rituals, the worship of Buddha were the inspirations of her builders. As in other civilizations, the tombs of the great or the saints were the basic forms from which many of her famous rock-cut temples grew. The great Sancha Stupa may be taken as a type, and illustrates Indian art from about the middle of the third century B. C. to the twelfth century A. D.

The tombs, the palaces, the temples are marvellously rich in their carvings and varied ornament. Kipling has made us realize best the intimate relation between the people and nature, and the poetry of India written about the wild, the knowledge of the jungle, may be seen embodied in her architecture.

The author has dwelt upon the things that express the intention of the builders, correlated the stupa, temple, monastery, palace, mosque with the life of the period.

In the chapters dealing with sculptures he explains the ideas that underlie the Buddhist and Hindu conceptions of the Deity and of divine worship.

The illustrations are profuse and represent the progression of Indian architectural monuments from the earliest forms to the incomparable and famed Tag Mahall.

A BOOK OF CEILINGS. By GEORGE RICHARDSON. London: MDCCLXXVI. 48 plates.

Richardson's famous book has been a favorite reference for years, but not easily accessible to most architects, except in the larger libraries. It embodied the best taste of its period, the eighteenth century, and reflected the ideas of design in stucco of many famous architects. Inigo Jones, Webb, Sir Christopher had given great attention to the decoration of ceilings, and the brothers Adam, with whom Richardson was associated, owed to him many of their best designs.

The plates, reproduced by photolithography, represent a great variety of design, simple and elaborate, and will be a valuable and helpful reference for any architect's library.

The accompanying explanatory texts have a quaint flavor of the times, quite in keeping with the classical motives of the designs:

"The subject of the middle picture is, Æneas going to Kill Helen, but is prevented by Venus." "In the pannel round the sky-light, are represented the different genii of the Polite Arts."

"The trophies and the other ornaments of this ceiling are executed by Messrs. Rose, with great taste."

CARPENTRY FOR BEGINNERS. By WILLIAM FARNHAM. 12mo. J. B. Lippincott Co., Philadelphia.

This should prove a useful little book for the handy man about the home, for it teaches the practical use of various tools and the way to put them to profitable ends in the making of all sorts of home utilities and conveniences, from a scullery mat to a fancy bookcase. It is every man his own carpenter, and many a back-yard workshop will profit by the clear description of the text and the excellent detailed drawings.

Plates xvii – xxxi bin page 46

THE TOWN HALL, NEW YORK CITY. McKim, Mead & White, Architects.

LOBBY.

ENTRANCE DETAIL, THE TOWN HALL, NEW YORK CITY.

McKim, Mead & White, Architects.

DETAIL OF INTERIOR, THE TOWN HALL, NEW YORK CITY.

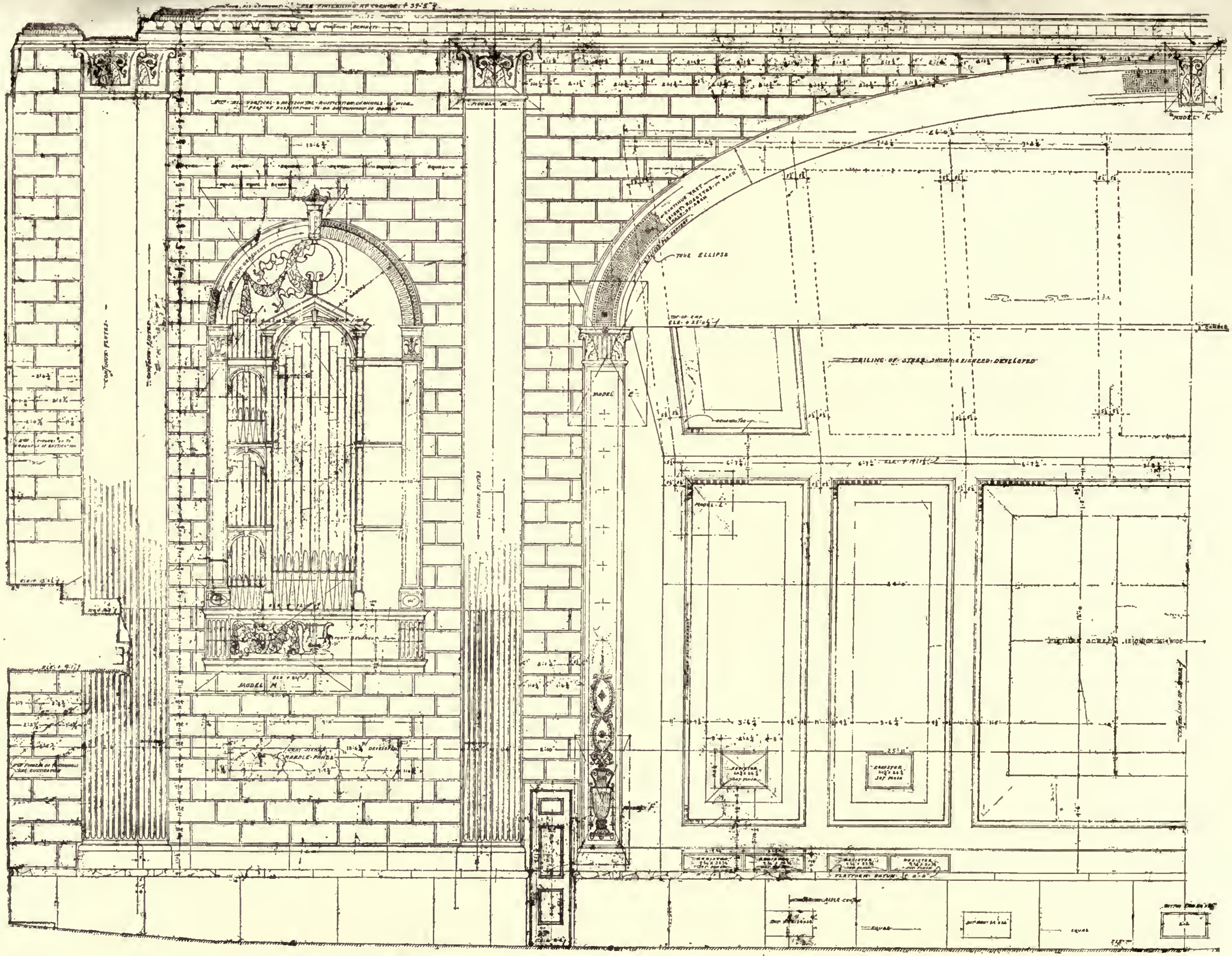
McKim, Mead & White, Architects.

THE AUDITORIUM, TOWARD PLATFORM, THE TOWN HALL, NEW YORK CITY.

McKim, Mead & White, Architects.

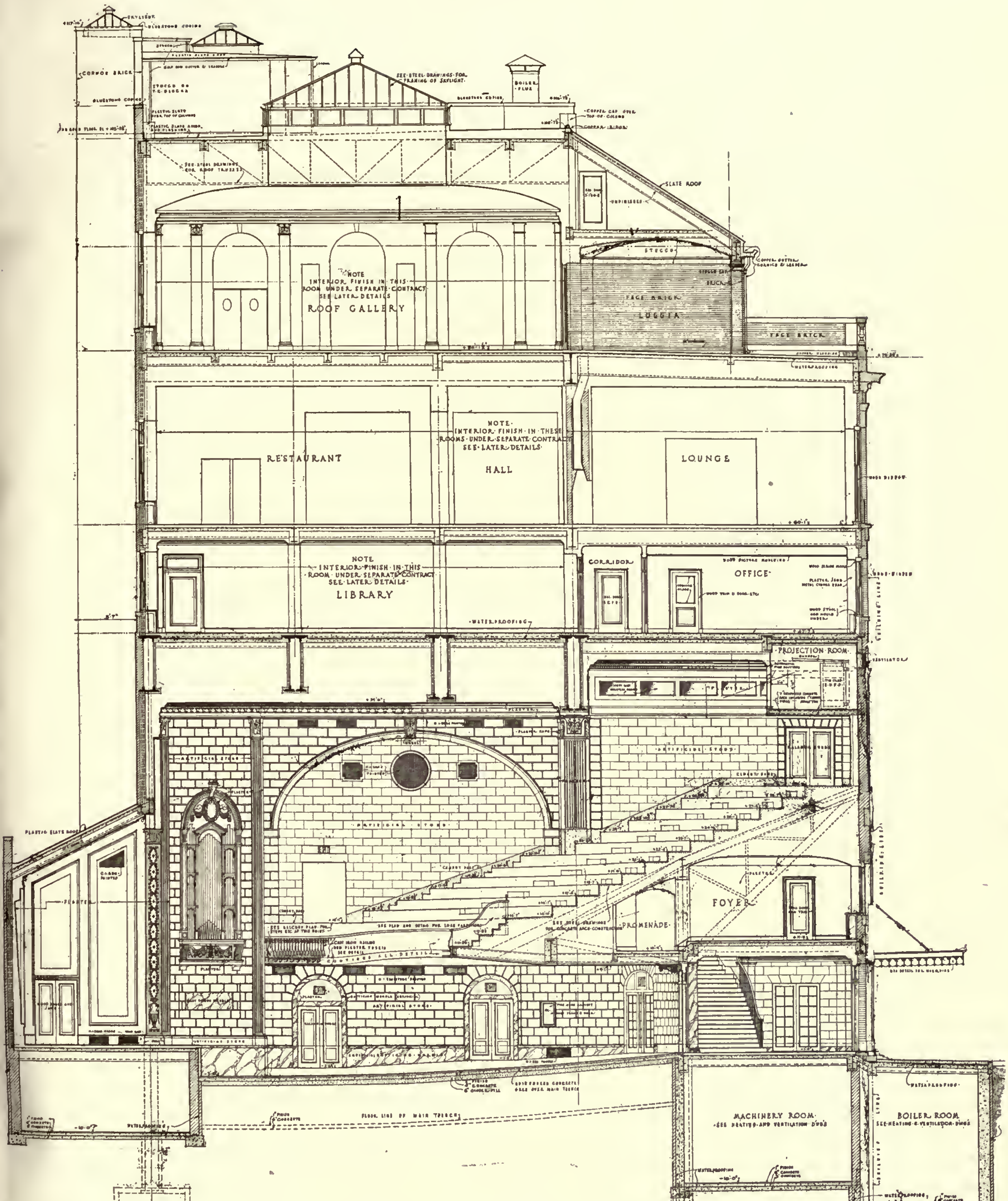
THE AUDITORIUM, FROM THE PLATFORM, THE TOWN HALL, NEW YORK CITY.

McKim, Mead & White, Architects.



DETAIL OF DECORATION, AUDITORIUM, THE TOWN HALL, NEW YORK CITY.

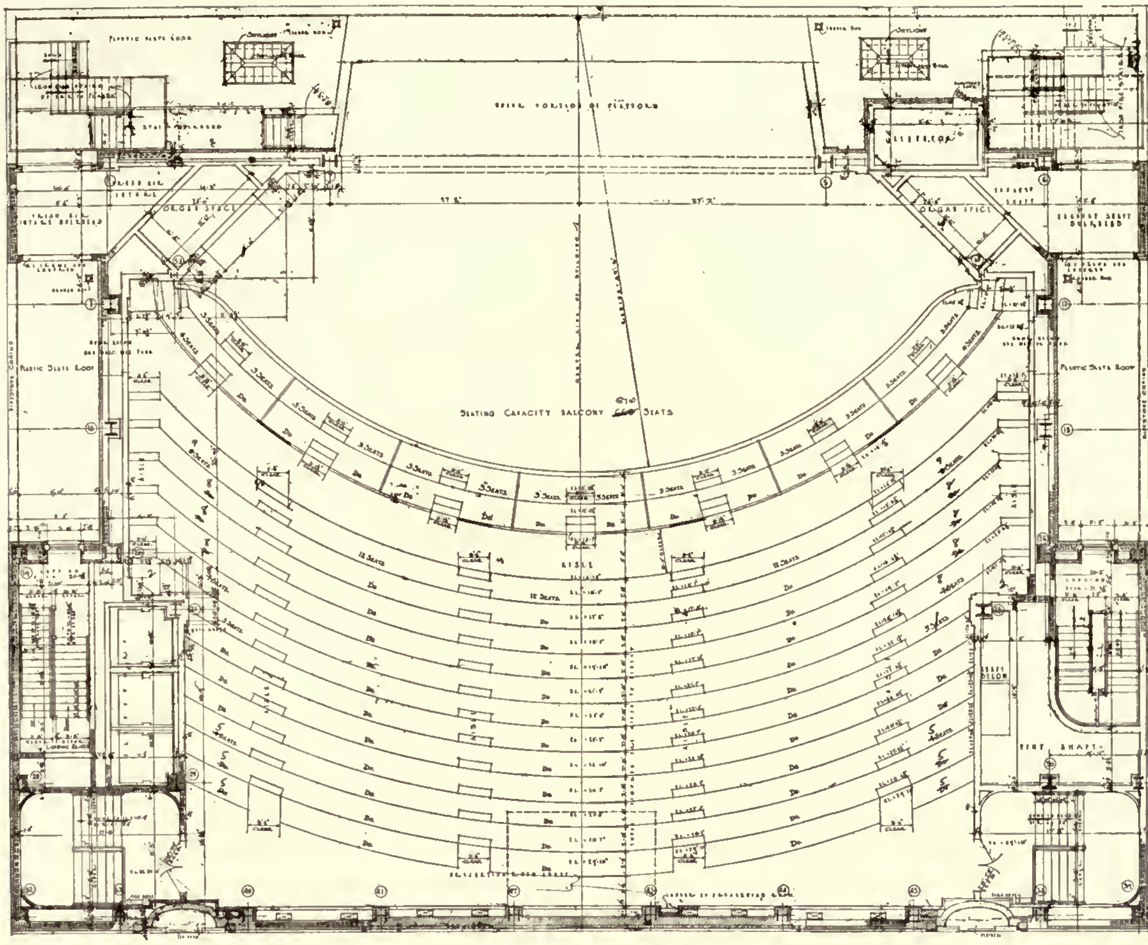
McKim, Mead & White, Architects.

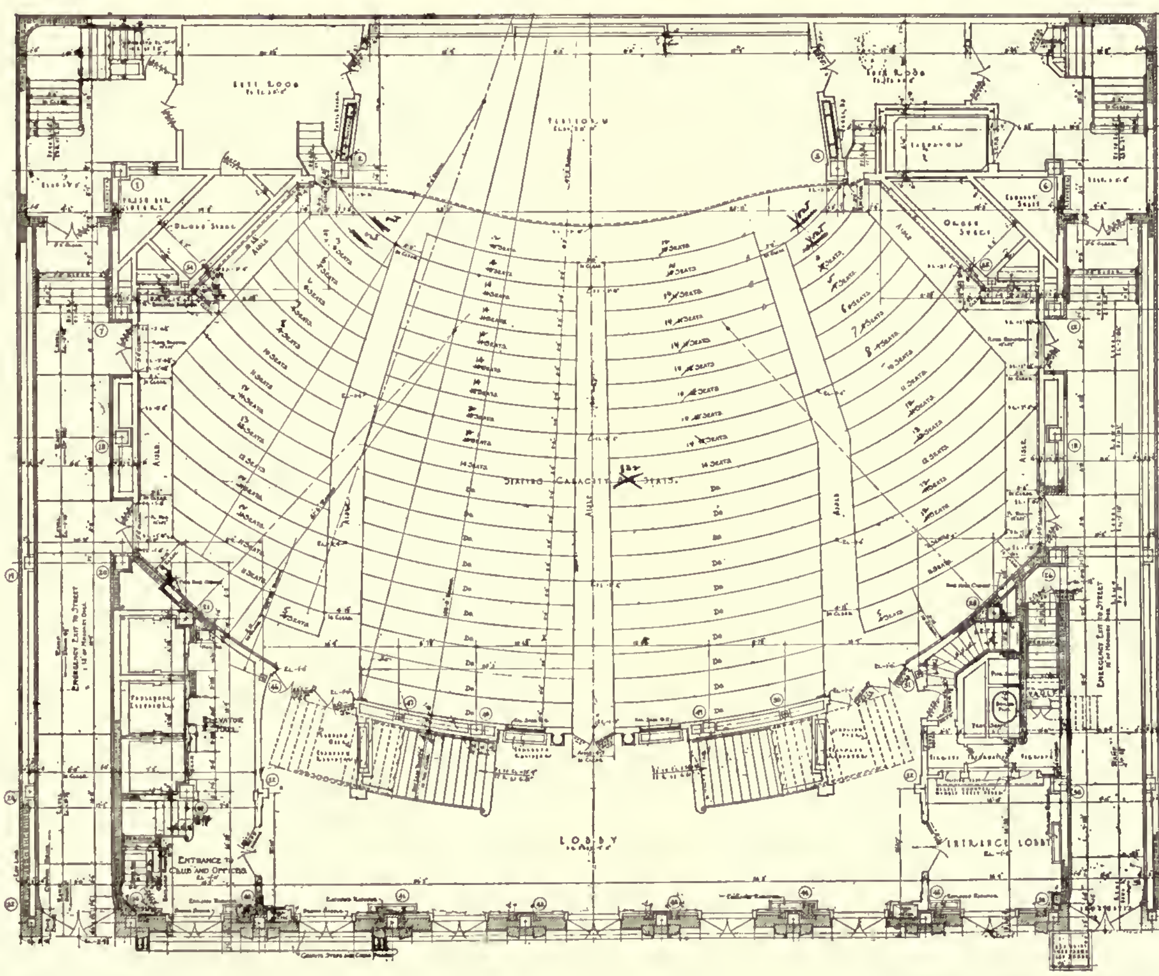


LONGITUDINAL · SECTION

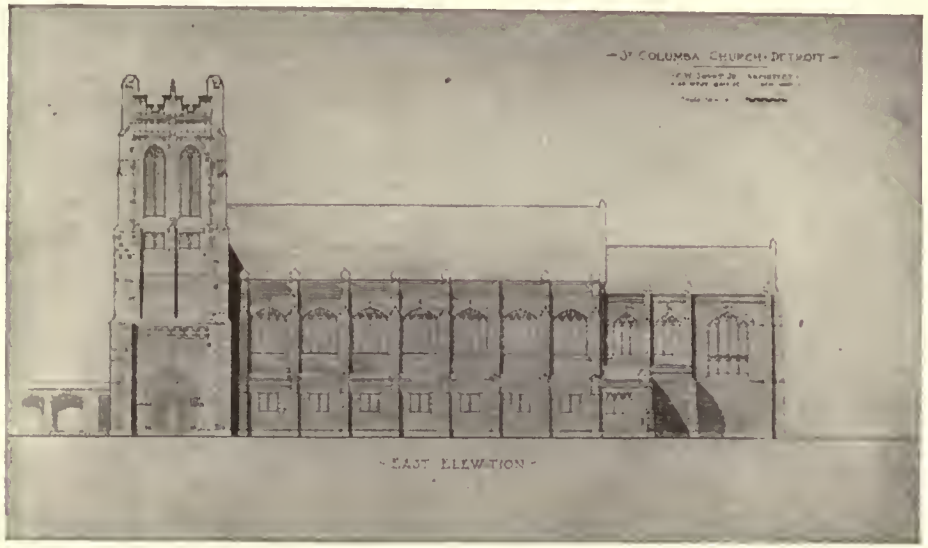
THE TOWN HALL, NEW YORK CITY.

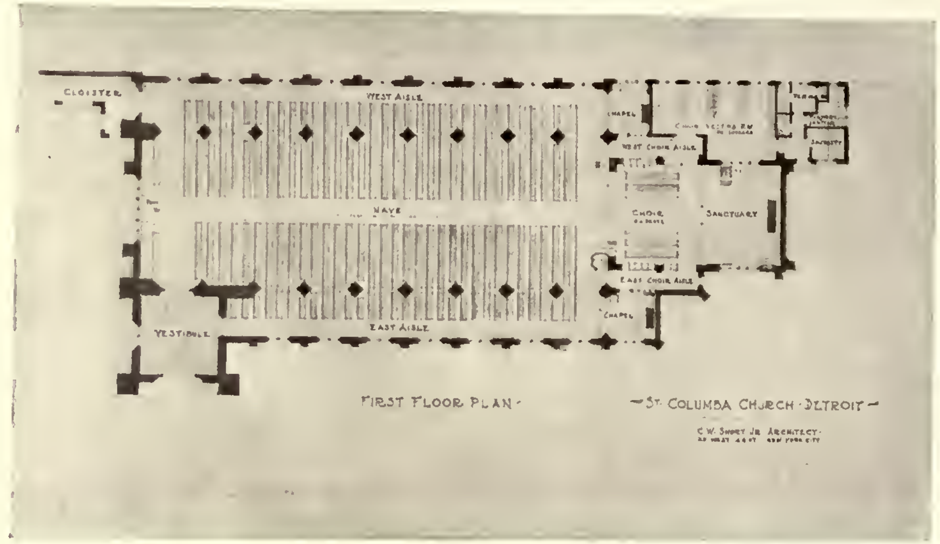
McKim, Mead & White, Architects.

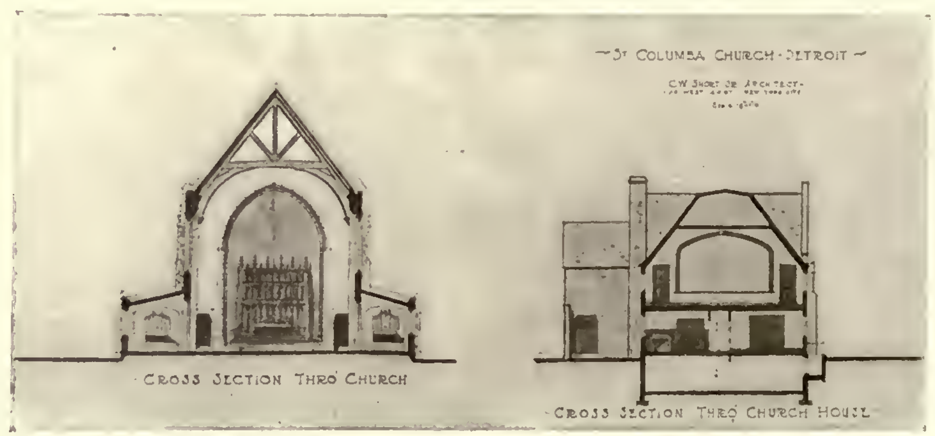




PLANS, THE TOWN HALL, NEW YORK CITY. McKim, Mead & White, Architects.

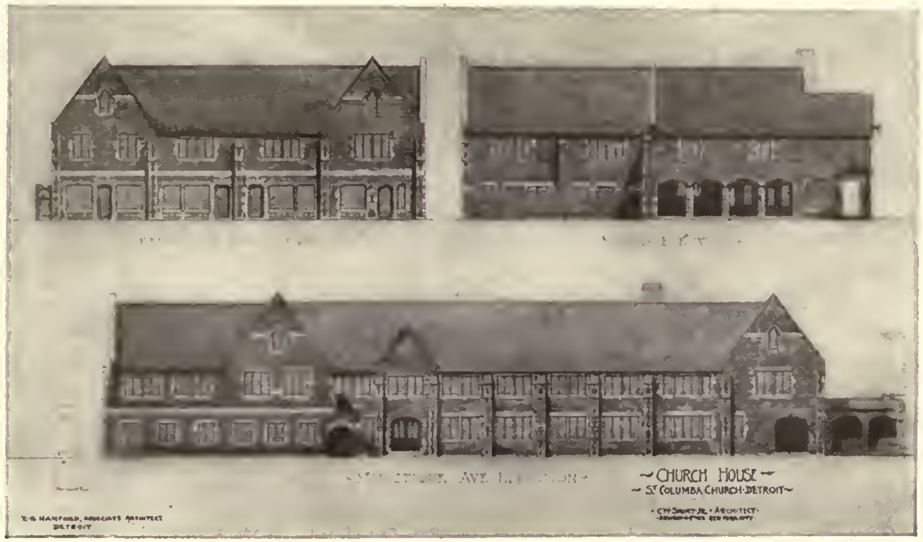


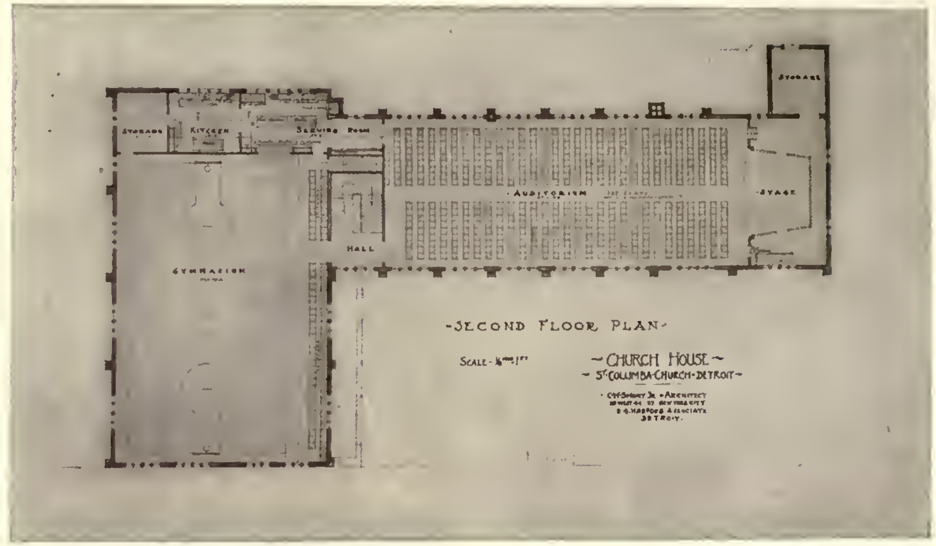


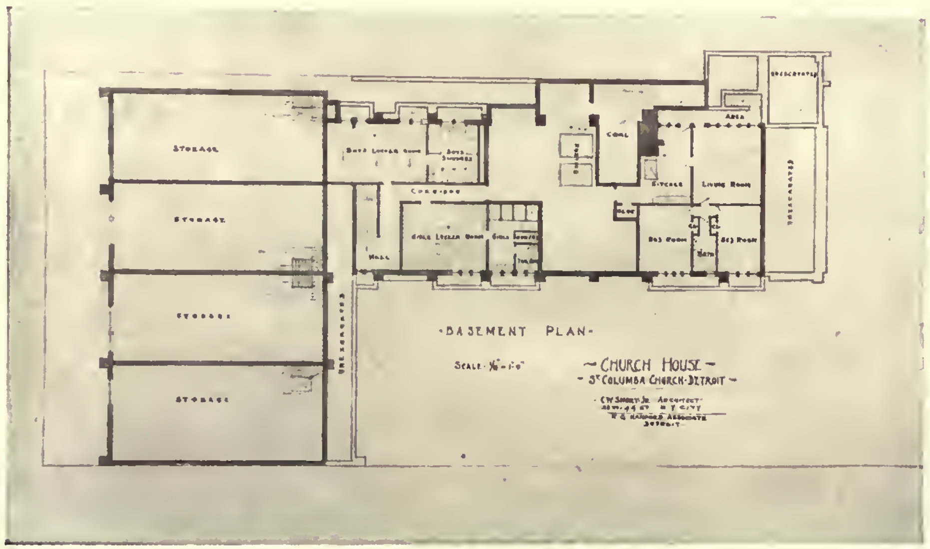


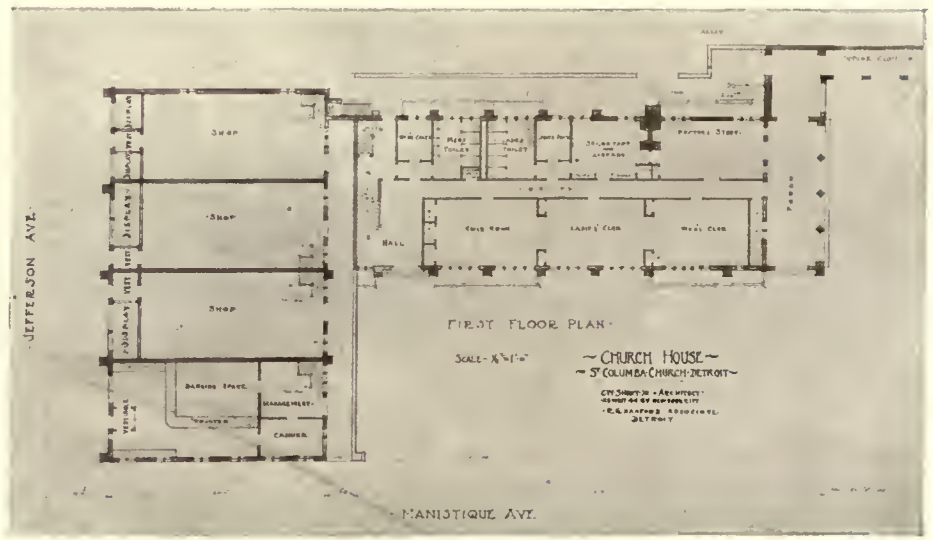
DESIGN FOR ST. COLUMBA CHURCH, DETROIT, MICH.

C. W. Short, Jr., Architect.









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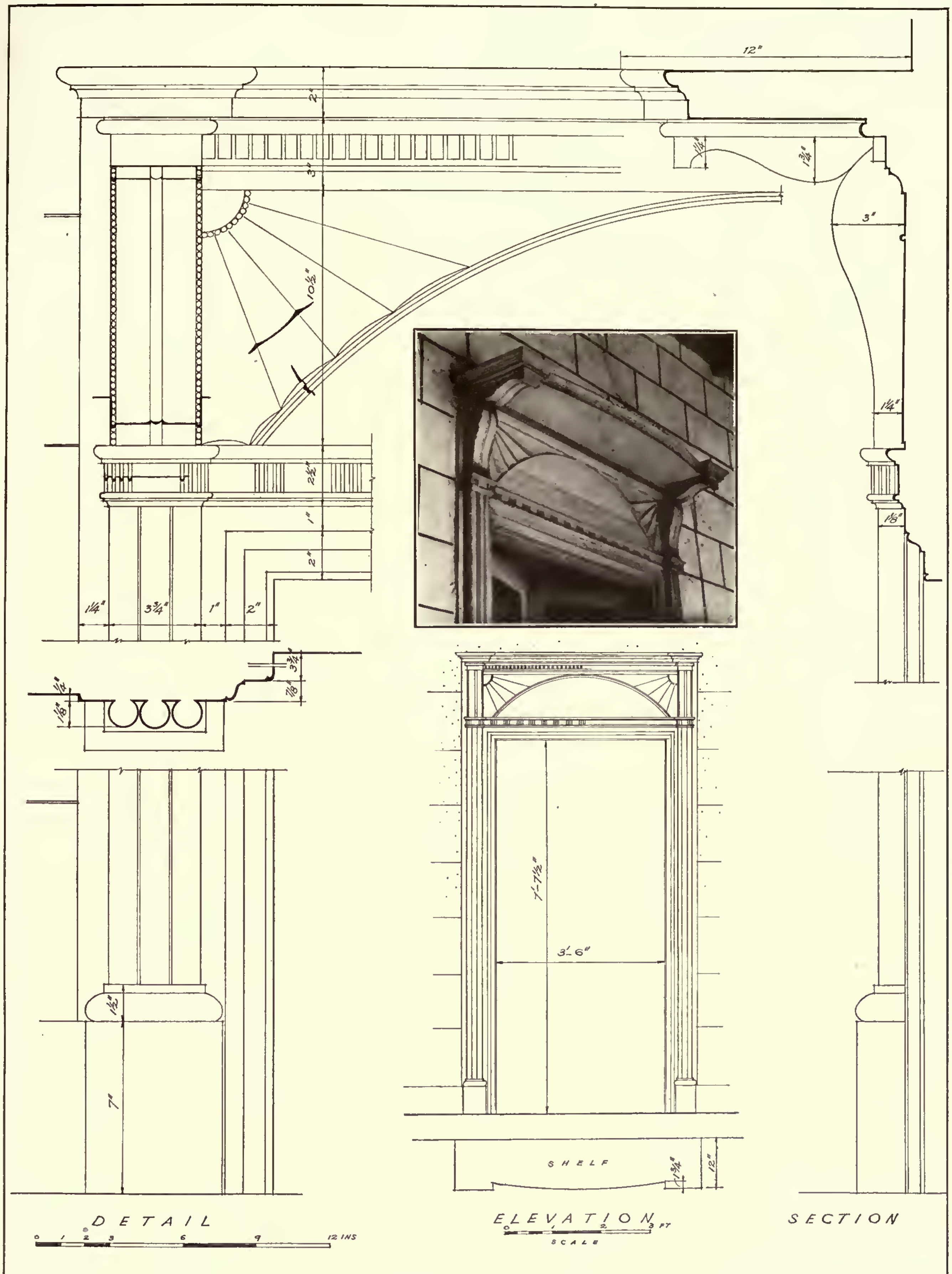
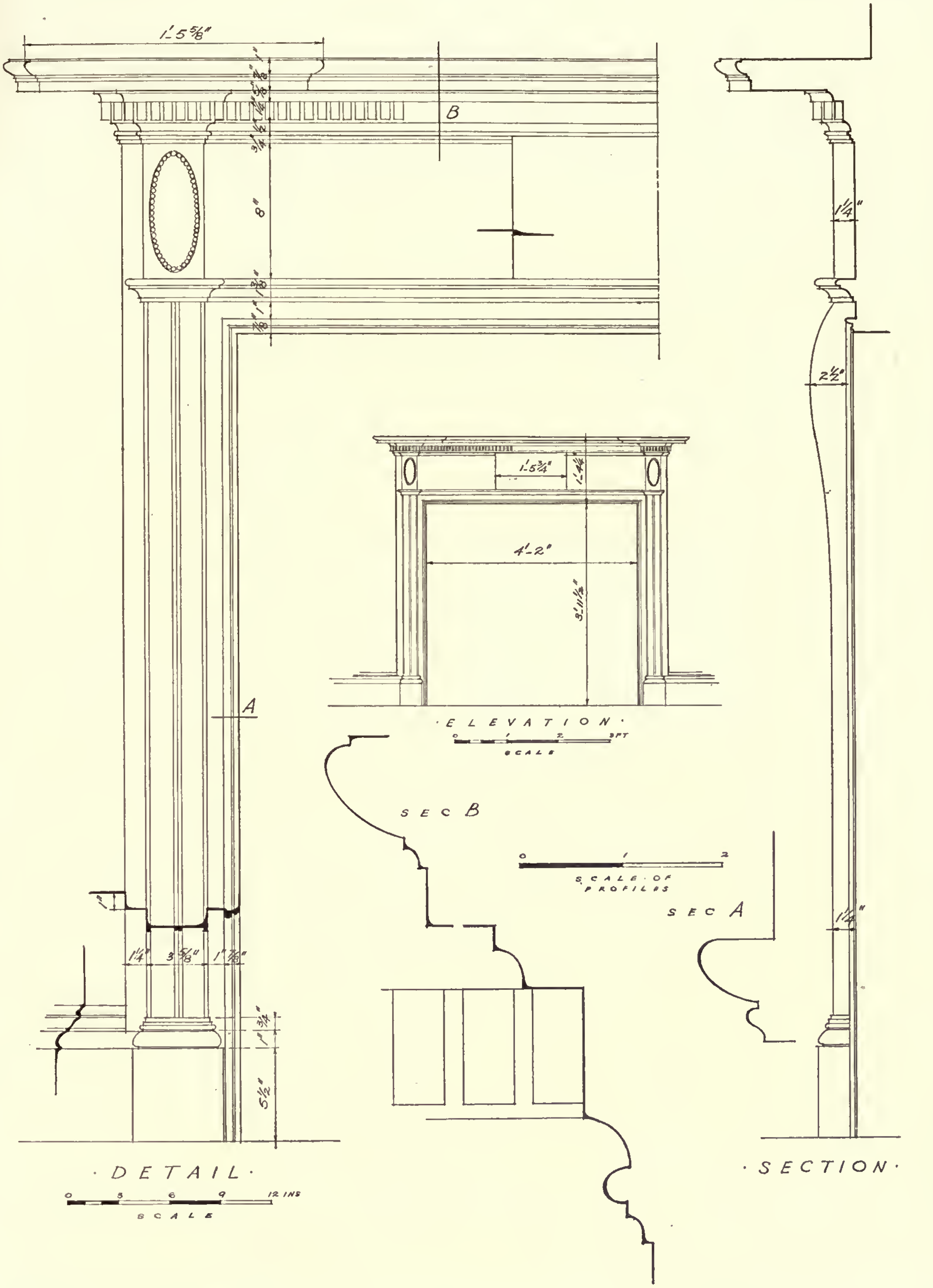


EARLY ARCHITECTURE OF SOUTH·CAROLINA

EXTERIOR·DOORWAY IN THE FRASER·MANSION ·BEAUFORT· S·C

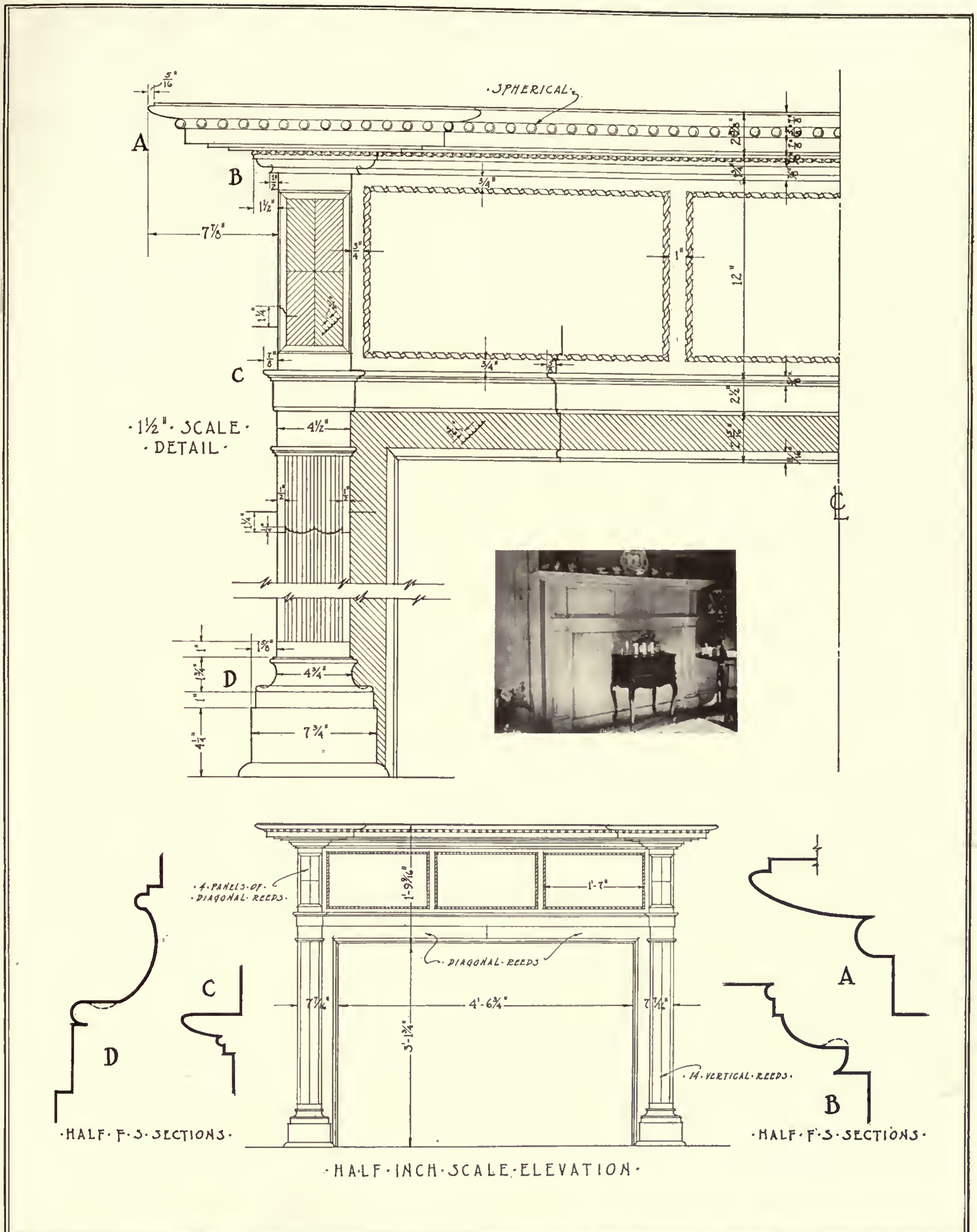
MEASURED BY DWIGHT·JAMES·BAUM DRAWN·BY· VERNA·COOK·SALOMONSKY



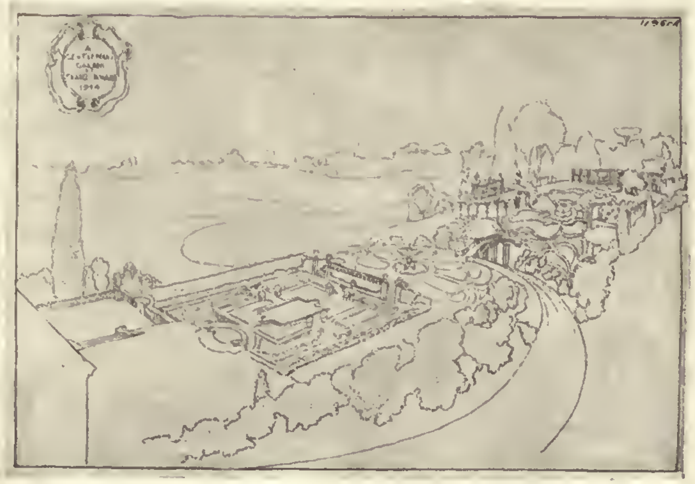
EARLY ARCHITECTURE OF SOUTH · CAROLINA

· MANTEL ·
IN · THE
FRASER MANSION
BEAUFORT S.C.

MEASURED BY DWIGHT JAMES BAUM · DRAWN BY VERNA COOK SALOMONSKY



·EARLY· ·ARCHITECTVRE· ·OF· ·CONNECTICVT·	·MANTEL· *in the* ·PARLOR· *of the* ·BARBER·HOVSE· ·SIMSBVRY·CONN· ·CIRCA·1750·	·MEASVRED·BY· J·FREDERICK·KELLY· ·DRAWN·BY· ·LORENZO·HAMILTON·



Bird's Eye View of Estate - Sketch from Memory - by FRANCIS HOWARD

A Developed Garden - Showing Sun-dial, Pool, etc.

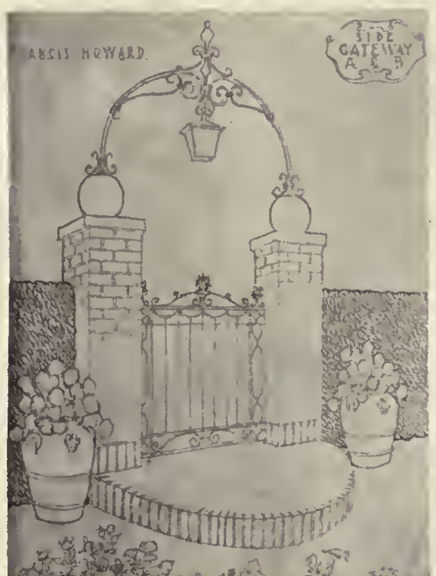
Dipping Well - End of Vista - Vegetable Garden

The Gate of Roses - With Greek Hermes by FRANCIS HOWARD

MAKING A GARDEN. FROM SKETCHES TO COMPLETION

The Water Gate in the Garden-First Sketch-

The Water Gate - Showing Finished Work-



Sketch of Small Gate

MAKING A GARDEN FROM SKETCHES TO THE COMPLETION BY FRANCIS HOWARD

Small Gate-as Built Complete

Original Sketch - Entrance to Estate -
by FRANCIS HOWARD

Entrance to Estate - Brick and Stone
by FRANCIS HOWARD

Approach to Lilly Pool - The Pencil Drawing
by FRANCIS HOWARD

Approach to Lilly Pool - The Completed Work
by FRANCIS HOWARD

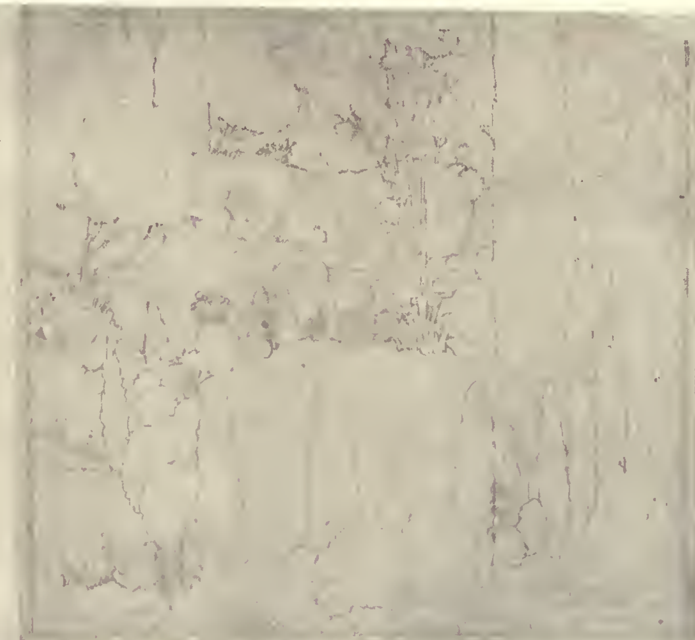
MAKING A GARDEN FROM SKETCHES TO COMPLETION.

Making a Garden

By Francis Howard

Of course a garden should be a place of dreams and kindly memories, not a place either of display or noisy talk, and any ornamentation of its natural beauty should be in harmony with its fundamental feeling of repose. Thus, I always approach a garden problem reverently, whether it is large or small, and try to picture it after the passage of the years, when its lines will be softened and its contours made gentle by the hand of time.

Then, too, a garden, however lovely in its colorful expanses of flowers, its grouping of shrubs, and its long lines of hedges, when not enriched or accented by the harmonious use of architectural ornament, has always seemed to me to be like a song without words, a thing of partial beauty or of a beauty half expressed. The song, charming as it is, even when written by a Mendelssohn can never stir one, or satisfy the heart like the lyrics of Schubert or the idyls of Schumann, filled with the personal gayety or pathos of a poet's inspiration and appealing thus to our more human qualities. Therefore, in those instances where the client has asked my judgment concerning the appearance of his country place, I have tried to picture to his mind something more than the grading of a few lawns, the hedging in of certain spaces, and the planting of various flowers, however beautiful, might imply. In fact, almost everybody who has owned or inherited a property, no matter how small, for a number of years, is almost sure to have experimented already both in flowers, trees, shrubs, and vegetables, so that in the mere field of natural evolution their places have either reached a phase of considerable cultivation, accompanied by good taste, or an era of effulgence almost amounting to chaos.



Sketch and details of secret garden.

Perhaps a book could be written on the subject of entrances alone; a subject replete with historic suggestion, but also tainted by contemporary abuse, relieved, now and then, by occasional appropriateness. For even the simplest entrance from a public road should curve in the right way, be wide enough to drive in, and mark in some manner the transition from the highway to the home grounds. The unsightly cedar posts with peeling bark and sagging joints, the old rail fence that straggles around the corners, the falling field stone wall that ends nowhere have been replaced by this, that, and the other device, sometimes with a more sorry result than the old, tumble-down original. But we have begun to recover from the period of immense stone boulder posts of Druidic proportions and also from the queer, cobblestone pyramids that used to be erected by the local contractor in the last century to mark our private roads, and we find that almost any material is good if properly and gracefully designed and so planned that outdoor spaciousness, sense of scale, and graceful lines are used in the preservation of an easy, pleasing, and commodious approach.

My way of doing things has been to wander around over an estate by myself until its contours and natural beauties are deeply impressed on my mind, and then, noting the relation of the house to its environment, try to apply a somewhat idealized and correlated plan of ornamentation to the existing conditions, so that one is gently led from one to another point of interest by easy transition, and not wearied by seeing too much at one time. This harmony can be best attained, I find, by doing nothing in a hurry and allowing the impression of beauty to rest until, in some happy moment, after leaving the actual scene, a bird's-eye picture of the whole unfolds itself before the vision and one seizes eagerly upon a ready pencil and, in very simple outlines, reproduces on paper the unfoldment of one's dream of what the place ought to look like if one could do it right.

Then comes the delight of perspective sketches of "Entrance and Approach," the "Terraces," "Garden Vista," a "Pool or Fountain," the "Sun-Dial," "Walk through the Woods," "Bench under the Pines," a rose-covered "Pergola and Lily Pool Steps," and when one is done with these, the "Vegetable Garden" with its brick wall and "Water Gate" leading through the willows down to the "Pavilion in the

Lake." One can by an unfrequented path come upon a little dell where a "Secret Garden" can be made, with its wild flowers, ferns, and evergreens, and its miniature cascade leaping down over rocks that are brought from far away, and all so skilfully placed that it looks as though it had been always there.

The permanent value of a garden seems to me to be its groups of trees and foliage, whose beauty is not dependent upon a hothouse or a seedsman's catalogue, however useful the latter may be, and these arrangements of foliage are always happier when forming the frame of a picture or assisting the eye to follow a vista to some distant and charming prospect. No school can teach this, only constant study out-of-doors and an unconquerable love of nature, seconded by an innate sense of scale and the instinct for form.

All elements of the hurry and bustle of the busy world should be far removed from the peaceful garden and its surroundings, and its effects should be achieved by patience and study from year to year, and by the embellishment of carefully selected places by the use of sympathetic ornaments having as true a relation as possible to the historic and æsthetic sense of the dweller in the garden, and made in such materials and of such color as harmonize with a setting of such sympathy. Although in Italy the classic background demands the use of marbles in the various ornaments, I feel that in our northern gardens a less cold and formal material should be employed, and the interesting points in our estates should be enriched by using stone, terra-cotta, lead, and variegated slate in many attractive forms, all more or less native to our domestic taste and looking less in our American surroundings like a man in evening clothes who has dropped in to breakfast!

The New Town Hall, New York City

McKim, Mead & White, Architects

NEW YORK has wanted, and now has for its discussions of controversial questions, a hall designed primarily for public speaking and not for entertainments and concerts.

The building, at 113–123 West 43d Street, provides the best equipped town-meeting hall in any community. It is within a half-mile of the two great railway terminals, many of the finest hotels, and the retail shopping district. Within the radius of a mile are the Waldorf-Astoria and the McAlpin Hotels to the south, the Plaza and Central Park to the north, Ninth Avenue to the west, and Third Avenue to the east. Times Square, the centre of the city's entire transportation system, is within a stone's throw of the Civic Auditorium.

Ceiling light in auditorium.

Perfect acoustics is one of the features of this new forum. The late Professor Sabine of Harvard, foremost expert in America on acoustics, was the authority whose counsels were sought and followed on this most important point. The result is one of the finest speaking auditoriums in the country.

The exterior is Colonial, constructed of brick with cut cast-stone trim—the white stone being veined similar to marble.

It is fitting that the foyer of the auditorium should be a memorial to public-spirited citizens not now living who were the leaders of their day in public usefulness. This memorial foyer stands in the centre of the city's life as New York's tribute to these far-sighted men and women to whom it owes so much. Coming generations will thus be reminded of those who have gone before, and inspired, it is hoped, to follow the way illuminated by these torch-bearers of civilization.

Every feature that makes for comfort has received careful consideration. Disturbing noises have been eliminated by the use of swinging doors at the beginning of each aisle. When a meeting opens, these doors are closed, shutting out confusion from late-comers finding their proper seats.

A welcome feature of the auditorium will be the fact that it is entered from the street without ascending even one step.

The interior of the hall is semiclassic in design. The direct emphasis of space is added to quiet dignity of treatment, and the aim is always at character. One is conscious of nothing but symmetry in the simple lines of the proscenium which overarches the wide platform.

Soft colors have been chosen to harmonize with the fine design. These colors tend to create an atmosphere of quiet and repose and help the attention of the audience.

No pillars or supports interfere with the audience's view of the speaker. Every seat on the floor and in the balcony has an unobstructed view of the platform.

Wide and convenient aisles, roomy, comfortable seats, and an indirect lighting system are all a part of the appointments.

The seating capacity is 1,700, with room, on occasion, for 200 "standees."

Philadelphia's Sesquicentennial, 1926

A Description of the Plan Prepared by Paul P. Cret, F. A. I. A., for the Fairmount Park Art Association, Showing the Availability of the Parkway and the Schuylkill Banks as a Site for the World's Fair Celebrating the 150th Anniversary of the Declaration of Independence

By John F. Harbeson

FOR the first time a world's fair is being planned with a permanent city-plan improvement as its avowed objective. Once before there was such a motive: one of the Paris fairs was partially undertaken to clean out an overcrowded part of the city inhabited by the worst class of criminals, strongly intrenched and defying the police, but this motive for the fair was not avowed for fear of reprisals.

Every world's fair of recent years has left some permanent improvement, either in city planning (Chicago, 1893; Paris, 1900) or in buildings (St. Louis Museum, the Grand and Petit Palais in Paris, Mediæval Castle in Turin, California Building, San Diego, etc.). It is legitimate to expect such permanent improvements in view of the great expenditures made by the city holding the fair as one of the returns in addition to the benefit to the local trade. This time the permanent improvements have suggested the scheme.

Mr. Cret was studying the project of the Schuylkill River Embankments for the Fairmount Park Art Association. It was this association that was largely responsible for having the parkway put on the map and for pushing it through almost to completion at the present time. Philadelphia has spent and is spending many millions of dollars to cut this diagonal boulevard through the city, connecting the City Hall, at the centre of town, with Fairmount Park. From Logan Square to the park—one-half of its length—the roadway is 300 feet wide, flanked on either side by gardens 500 feet wide.

At the park end of the avenue is being built the city's Art Museum. It is on a rocky promontory, 30 feet above the roadway, approached by elaborate garden terraces. When one climbs this eminence and turns to look back, his eye sees immediately to the right the Schuylkill River—dirty and black, the farther shore lined with dumps and waste spaces, and beyond this are railroad yards and smoke. One is appalled that this plaza, constructed at such cost, should have as prospect such a noisome sight.

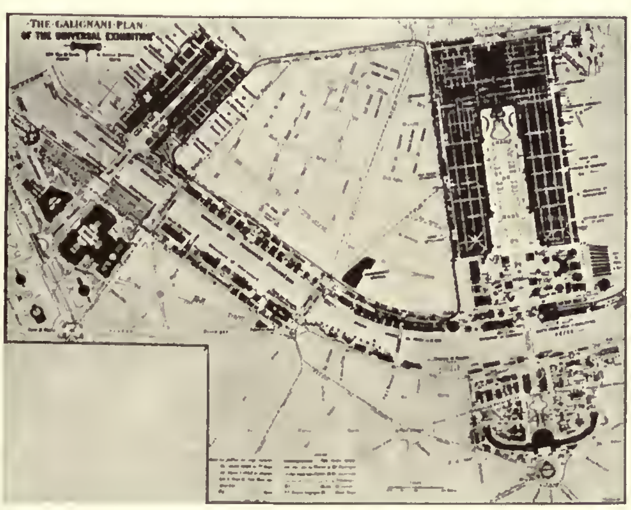


Fig. 4. Plan of the Paris Fair, 1900, along the banks of the Seine, showing the similarity of the Cret plan for Philadelphia.

It was during consideration of this point in working on the embankment project that the idea came of locating here the World's Fair, already planned by the mayor. The Centennial has always meant much to Philadelphians; it showed them at their best to visitors from other cities, and they

Fig. 5 An airplane view of the Paris Fair, showing the effect of utilizing the natural beauty of a river's banks.

have always contemplated making a return engagement in 1926. Here is an opportunity to divert this deep-seated feeling into a city investment, for the plan would prepare the way for the completion of the parkway and its buildings, and the realization of the Schuylkill Embankment project in five years—instead of twenty-five; which would clean up a foul section on the west bank of the river in the heart of the city, and would, on the east bank, by improving the river front, make available for development the region behind—a tax-producing section of a neglected area.

And it must be remembered that the Schuylkill is singularly fitted to play the rôle required. At Chicago, Buffalo, St. Louis, and San Francisco large sums of money were expended in constructing artificial basins to serve as reflecting pools, and to give life and color. Here this expense is unnecessary, the scheme resembling in many respects that of the Paris Fair of 1900, where the Seine played a similar part. The views of the Seine during that fair show some of the possibilities, and incidentally may be compared with those of present conditions. A necessary part of the scheme is the covering of the Baltimore and Ohio Railroad tracks on

Fig. 6. This view of the Paris Fair shows the fair building constructed over the railroad. The arcades just above the embankment indicate the position of the railroad-tracks.

the east bank, using this platform for the amusement concessions, with a promenade at a lower level along the river's edge. Figure VI shows the same treatment as used at Paris. (Why is it that in America all rivers, usually on both sides, are defaced by railroad-tracks?)

The main entrance is at Logan Square, ten minutes from the railroad-stations, hotels, restaurants, and the shopping centre. Logan Square is surrounded by public buildings and sites of projected public buildings which should be completed by 1926. Within this entrance on either side, and extending to the plaza in front of the Art Museum, are to be exhibition buildings, 1,500 feet long, of temporary construction, on the land to be used ultimately for the gardens before spoken of, but as yet unimproved. The Plaza and the Fine Arts Museum, parts of the permanent parkway scheme, would be hastened to completion for the fair—were it not for such an incentive they might stand unfinished for a score of years in this era of economic pressure. The museum would become the fine arts group, with outdoor exhibits on its terraces and stairs.

From the Plaza a bridge would span the Schuylkill to the west bank, ending in an esplanade facing an artificial cascade. The abattoirs and ash-dumping grounds on this side of the river would be acquired by the city and become the site of exhibition buildings, screening the railroads in their rear and facing gardens and terraces along the riverbank. It is suggested that the machinery exhibits be placed there, close to the railroads. The construction of a bridge across the Schuylkill at Arch Street, with exhibition buildings on the lower side as a part of the bridge, would form an end to the vista down the river, and would serve the additional purpose of hiding the unsightly railroad bridges and unimproved river-banks to the south.

Fig. 7. The Court of Honor at the Chicago Fair, 1893, showing effective use of water. The basin was artificially constructed at great expense. The Cret plan will give Philadelphia a more beautiful setting.

On the east bank, coming up the river to the Plaza, would be the amusement concessions, built over the B. & O. Railroad tracks, as before mentioned. The State and foreign buildings would be placed on the west bank of the river above the Plaza bridge, in land already part of the park, but not heavily planted or improved.

The total development gives an area of 165 acres, which could be increased to 214 acres by the inclusion of the so-called "Lemon Hill Section," though the present trend in such matters is toward smaller fairs.

As a comparison may be noted the surface of some of the recent fairs:

Buffalo, 1901	200 acres
London, 1908	134 "
Paris, 1900	247 "
Leipzig, 1913	200 "
San Francisco, 1915	625 "

In adjacent areas would be a stadium and field for athletic sports and pageants, already projected as a city improvement, and an aviation field, either the present field on Belmont Plateau or a larger one, made by covering the immense area of the East Park Reservoir.

While the proposed fair ground is within a few minutes' walk of the centre of the city, and its ten entrances would tap all quarters of the city as well as all the railroad-stations, it yet does not interfere with existing lines of traffic.

The north-south traffic from the Germantown-Chestnut Hill district through the park to town would be deflected from its present course down the parkway to Pennsylvania Avenue, just outside the fair, until it reached Logan Square. The east-west traffic from West Philadelphia via the Spring Garden Street bridge at the museum would bridge the fair circulations at either side of the museum, passing behind that building, the trolleys going under the Plaza in a subway, an improvement that is part of the permanent parkway plan.

Three other advantages of the plan may be mentioned: that no portion of Fairmount Park, fully developed, need be used, thus avoiding the cutting of trees and ruining of lawns; a large portion of the grounds required is still unimproved, and condemnation of properties would be at a minimum, considering the central location; the existing trolley service to the more than ten entrances and the proximity of the hotel and restaurant district to the fair would make the night attendance an assured success.

Fig. 2. Present condition of banks of the Schuylkill from Plaza Bridge. This is the location selected for the World's Fair.

Fig. 3. East bank of Schuylkill—present condition. The hill in the background shows the museum in course of construction.

The Use of the Order in Modern Architecture

By Egerton Swartwout

SECOND ARTICLE

THE DORIC ORDER

OF all the orders that exist or have existed from the earliest Egyptian to the late Renaissance, the noblest and the most monumental is the Greek Doric. It is also the simplest, but it is this very simplicity that makes its reproduction in modern times so difficult—for in its supreme simplicity there is a subtlety, a refinement that is almost imperceptible, which makes the Parthenon a living organism after all these centuries of neglect, and by contrast renders modern work cold and mechanical. But if the perfection of the Parthenon as a building cannot be approached, still the order can be used with good and even noble results if the work is done carefully, with a knowledge of the principles involved and of the detail that must be used. It should be realized, however, that the Greeks used the order in a way foreign to our construction, to our types of building, and, strange as it may seem, to our taste. It was in its completeness essentially an exterior order, it was not a portico or part of a building; it was the building.

The Doric temple was in its main features a covered colonnade, and the entablature was designed not in reference to the order alone, but to the entire temple. It was the cornice of the building, the crowning member of the structure. When the Greeks did use the order with a superstructure, as in the interior of their temples, they never used the entire entablature. They reproduced the columns at a smaller scale, but substituted a string course of varying design for the entablature they had employed for the exterior of the temple. How seldom is that principle followed when we use the order now! There are scores of office-buildings with rows of Greek Doric columns surmounted by a complete entablature and twenty stories on top of it. The cornice, a thin projecting member quite sufficient for the crowning motive of a temple, becomes a hard, thin shelf, entirely inadequate as a string course for the great building of which it is a part. For the temple the cornice was, as I have said, adequate, because it counted to a great extent with the marble tiled roof above it. The Greeks themselves felt this thinness, for when they used the cornice on the gable they surmounted it with an additional member. This additional member, or cymatium, is not merely a gutter, as it has been described; it was an integral part of the design. I have no doubt that if the Greeks had found it necessary to cover the roofs of the temples with some dark covering instead of marble tiles, they would have continued the cymatium in some form along the flanks of the temple.

Their methods of construction were also quite different from ours. The stone was cut by hand, and, as we say, on the job; most of it was cut in place after being set. But the main difference was that the Greeks did not regard the material as marble or stone, beautiful in itself, but merely as a structural surface to be decorated. They took the most meticulous care to make the joints so fine that, in some cases, the stone has grown together; this was not merely due to good workmanship, but because they wanted to lose the joints. If marble that could be brought to a smooth finish was not to be obtained, they covered the rougher stone with a coating of stucco, and painted this as they did a thin marble building. We cannot hope to grind our joints as they did, and if we could, we could not set the finished drums without spalling, nor do I think we should wish to disguise the joints, for as we use stone or marble the joint is an important feature of the design. But we must appreciate this love of the Greeks for surface decoration to understand the delicacy of their detail. Nearly adjoining the broad, massive surfaces of the architrave and abacus come thin, delicate, sharply undercut mouldings, mouldings that could only be cut in marble or run in stucco. But when it is appreciated that these mouldings were colored or gilded, it is easy to understand their existence. Our use of the details of the order must be governed by the material at our disposal and by the scale of the column. The columns of the Parthenon were approximately 34 feet high, and those of the Propylæa at Athens were somewhat over 29 feet, while the great columns of Selinus and Agrigentum were over 50 and 60 feet, respectively, in height. As far as the mere height is concerned, there is practically no limit, but there is a decided limit to the scale of the order imposed by the length of the architrave stones which can be commercially obtained. The longest architraves in the Parthenon were something over 14 feet long, and of the Propylæa over 19 feet, and of the big Sicilian orders about 21 feet. The chief concern of the Greeks was the distance between bearings; this was a structural condition and was about the only approximately constant quantity between all the orders; for example, while the diameter of the columns of the great temple at Pæstum is in comparison to that of one of the small columns in the triangular forum at Pompeii in the proportion of 3.72 to 1, the length of the architrave between bearings is not more in proportion than 1.18 to 1. In other words, the larger the columns, the closer was the spacing. This timidity of the Greeks as to the strength of the lintels had undoubtedly a great deal to do with the large size and great projection of the primitive abacus. Of course, with our modern methods of steel construction, it would be a simple matter to take the superimposed weight entirely off the architrave, but even so, it would be difficult to get a stone over 15 feet in length that would safely carry its own weight. I would dismiss entirely any proposition to suspend the architrave from iron beams; such a suggestion has no place whatever in monumental architecture.

The size of the order naturally influences the scale of the detail. Some of the mouldings of the Parthenon are so small, notably the filets below the echinus of the column and the bead and reel mould above the triglyphs, that it would be difficult to cut them, even at the scale of the Parthenon, in any hard material; and at a smaller scale they would have to be considerably simplified. In fact, the whole order as it exists in the Parthenon is not susceptible to working in granite; the delicacy and charm of detail would be entirely lost even if it could be reproduced. But the order is, in its general character, so massive that a granite scheme could be used, and used to good effect. The mouldings could be simplified and made bolder, and, while the charm of detail would be lost, a certain rugged stony quality could be obtained which in many ways would be more appropriate to our climate and to our conditions.

There is one point of design in the order which is generally overlooked, and that is the influence of sculpture and color. We generally think of the order as it appears in the line reproductions. In line the triglyphs count as a gray tone on account of the channelling, and they also echo in tone the flutings of the column shaft, while the metopes are lighter. In the actual work, as the Greeks conceived it, the reverse was true. The metopes were filled with sculpture, generally colored, on a red ground, while the triglyphs were blue; there was a marked contrast, and the metopes counted darker than the triglyphs. In our modern work we are very seldom able to introduce sculpture, and we generally intend the triglyphs to be darker, but the channels of the triglyphs are shallow, at an angle of about 45 degrees, and the triglyphs themselves project very little from the face of the metope. There is hardly ever any shadow except at the top of the channels, consequently at a short distance away the frieze hardly counts at all, and yet the frieze is one of the most important features of the order. I have always had an idea that, with a little care in the selection, darker pieces of stone could be used for the metopes, the same kind of stone but of a darker color or with more pronounced veining, or possibly even a different kind of darker stone. In a marble building some heavily veined or colored marble could be used to good effect. I have before me, as I write, a reproduction of a beautiful French rendering of the Parthenon which gives a good idea of how well this contrast of triglyph and metope would look, but the effect is marred by the shields on the architrave, which are most unfortunate in composition. It is true there are traces of these on the Parthenon, but they are undoubtedly a late and debased addition.

I have said that the frieze is one of the most, if not the most, important feature in the entire order in point of design. It is, too, of prime importance in the layout of the structure, for it is the spacing of the triglyphs which determines the spacing of the columns. I cannot agree wholly with Mr. Ernest Flagg, who has recently, in a paper read before the American Institute of Architects, advanced a theory that the triglyphs were, in reality, an expression of the module by which the temple was laid out; that is to say, I don't think the Greeks thought of a column as being so many triglyphs high any more than they designed their temples on the scheme of proportion advanced by Mr. Hambidge, but it is true that the spacing of the triglyphs played a great part in the layout of the building. Normally, the triglyph occurs over the centre of the column and over the centre of the intercolumniation, the metopes between the triglyphs being approximately square. There are two exceptions to this rule. In the case of the corner column the triglyph is not over the column centre, as this would leave a half metope on the corner. Architecturally, the frieze must end with a triglyph, consequently, if the normal spacing was kept for the end column, the last two metopes would be very distinctly wider than the centre ones, and would be rectangular instead of square. The only solution was to narrow the intercolumniation of the end bays so that the spacing of the triglyphs would approach the normal. This sudden change in intercolumniation is relatively large, there is a difference of about 2 feet in the two adjoining bays of the Parthenon, but great as it is, it is not directly apparent. The casual observer would not notice it and, even if it is noticed, the effect is distinctly good; it gives a sense of solidity and strength to the corner, and to increase further this feeling of solidity the Greeks made the corner column slightly larger than the others, about one-fortieth larger in diameter. This adjustment of the spacing varies in method and in degree in all the temples; sometimes the triglyphs of the centre bays are equally spaced and over the centres of the columns. Sometimes they vary slightly and are not directly over the columns. Sometimes the spacing of the columns themselves is varied. There is no general rule here any more than in any other case in Greek art; any adjustment is satisfactory that restores the appearance of regularity to the frieze. In Perrot and Chipiez' monumental work may be found diagrams and dimensions of the spacing of the triglyphs in the more important examples. There is one curious fact which shows conclusively that the narrowing of the end bays was due to the difficulty of spacing the triglyphs and not for the purpose of giving solidity to the corners, and that is that this narrowing occurs only in the Greek Doric temples. In all other orders the spacing is normal, or nearly so, at the corners.

There is another exception to the normal spacing of the triglyphs. In the Propylæa it was essential that the space between the central columns should be wider than the general intercolumniation to provide requisite space for the proper passage of triumphal processions and the like. In this case the intercolumniation was abruptly widened by the addition of a triglyph and a metope, so that there are two triglyphs instead of one over the central opening. This is a simple and practical expedient which would not be architecturally satisfactory in a temple, but which is quite unobjectionable in a gateway; in fact, it emphasizes the gateway. In the smaller orders, such as the order in the triangular forum in Pompeii and in the temple of Cori, which are only 13 and 18 feet high, respectively, the columns are much slighter and the entablature is much lower, proportionately, than in the larger examples; the column spacings, however, are wide, as the space between the columns cannot be reduced below practical limits, and in these cases there are three triglyphs over each intercolumniation. This is a perfectly rational and natural arrangement; the proportion varies with the size, and it well illustrates the free and untrammelled method of the Greek designers. It also illustrates the necessity of the consideration of the size of the prototype. In the reproductions of the orders they are usually represented not in their proportionate size, but in the same size. It is more convenient doubtless for the reproduction, but it prevents any direct comparison, and is often the means of misleading the student.

The details of the order have been so carefully reproduced in so many publications that they are accessible to all, but in following these details careful consideration must be given to the size of the proposed order and to the materials to be used, as I have before explained. There are some points, however, in the way of refinements which do not generally appear in the reproductions. The finish at the top of the channels of the triglyphs is very unusual. The bevel is lost in an undercut in a rounded form which finishes in a sort of lip. It is hard to draw this, and still harder to make the stonecutter understand it. It can be studied in the casts at the museums, and the detail here should be modelled to insure the best results.

The matter of entasis receives scant attention in any of the reproductions. Penrose, of course, is the ultimate authority. Generally the entasis is very slight. Sometimes there is none at all. In any event the entasis should never be perceptible. In the Parthenon, where the columns are 34 feet high, the maximum entasis is about ¾ inch, or approximately one-twelfth of the semi-diminution, or one-one hundred and tenth of the lower diameter. By maximum entasis is meant the greatest projection of the curve from a straight line connecting the upper and lower diameters. The maximum entasis occurred in the Parthenon at two-fifths the height of the column, and in the Theseion at one-half the height. Just how this curve was obtained by the Greeks, or what form of curve was used, is not known. Penrose assumes it was laid out from the ordinates of a small hyperbola, and it is possible that this could be done, but as a matter of fact the curve is so slight that it does not matter much what kind of a curve is used, or how it is obtained. I have found the best results can be secured by laying out the columns carefully at a reduced scale; any reduced scale that will make the actual drawing from 6 to 10 feet high. If one-quarter full size or 3-inch scale can be used, the work is simplified, as the ordinates of the curve can be scaled fully as accurately as they can be measured full size. The extent and location of the maximum entasis having been established, a flat steel bar is bent the flat way after being fastened securely at the upper and lower diameter of the column, until it touches the point of maximum entasis, and the outline of the curve thus formed is drawn on the paper. Ordinates are drawn at the height of every course, and these ordinates carefully scaled. The measurements thus obtained can be adjusted mathematically if any discrepancy exists. I don't say this method is the best, but has proved generally satisfactory, and the ordinates at the joints being given in figures are a great aid to the stone-cutter in laying out his work and also provide a method of checking the sizes of the drums at the building. The entasis is, as I have said, extremely slight, so much so that in the height of an ordinary course the outline of the column is, to all intents and purposes, a straight line; in fact, the outline would be perfectly well maintained if each course was a section of a cone, provided, of course, that the drums were not of unusual size. As a matter of fact, the horizontal curves in Greek architecture, which will be later referred to, are not really curves at all, they are simply a succession of straight bends placed at a slight angle to each other; the apices of these bends are on a curved line, the curve of the line being so extremely slight that the breaks in the line are imperceptible.

The Greeks at the culminating period of their art introduced a number of refinements which were of so slight a nature that for a long period their very existence was unknown. Penrose gives these in detail, and they are explained by Professor Goodyear in his monograph on the "Curves in Greek Architecture." Allusion has already been made to the narrowing of the end bay and to the increase in size of the corner column. In connection with the latter it is interesting to note that the projection of the abacus of the corner column is less than the normal. The reason for this is apparent. If the normal projection was used for the larger corner column the abacus would project farther beyond the face of the architrave than the abaci of the adjoining columns. It is a small point, and its omission probably would not be very noticeable, but it shows the care taken by the Greeks in the slightest detail.

The most unusual and characteristic refinement instituted by the Greeks was the abolition of exact symmetry. Their plans in conception were generally symmetrical, and the result they achieved was indeed symmetrical in appearance, but the hard, mechanical exactness that is the usual concomitant of modern classic work was not to be seen in Greek art. It was purposely eliminated. To do this the most infinite pains were taken, and no detail was too small to be neglected. Straight, horizontal, and vertical lines were avoided; the stylobate was curved in elevation, as was also the entablature, the columns had an inward inclination which was echoed in the architrave and frieze, while the abacus and corona projected forward. Professor Goodyear explains these refinements at length, but, briefly, their existence is solely due to their artistic value; they improve the appearance of the structure, and take away the hardness and rigidity of an exactly symmetrical scheme. In their use there was no exact rule. The stylobate was sometimes raised in a vertical curve, sometimes curved in plan. The entablature was generally raised at the centre, but in one temple, the little temple at Cori, the entablature has a convex curve in plan which would, when seen from below, give a depression toward the centre. To my knowledge these curves have not been used in modern work, but I don't see why they could not be. The laying out would be troublesome, but the expense would not be great, for it should be borne in mind that these so-called curves were not actual curves in the stone. They were composed of broken lines, and the difference would be so slight it could be taken up in the joints. The inclination of the columns has been done, quite often, I think. I myself have done it several times. The scheme was this: The columns of the Greek temple were inclined inward slightly, in the case of the Parthenon about 2¾ inches in the height of 34 feet 3 inches, the corner columns being inclined on the diagonal. The effect was to increase the pyramidal appearance of the building. The inclination was taken up in the upper and lower beds, the other beds being perpendicular to the axis of the column; this difference in the beds being very slight. There is no particular difficulty in the setting; a heavy wire is tightly stretched at a fixed distance from the column centre and having the desired inclination; on this wire a trammel will give the exact centre of each drum. The inclination, even with an order of less diminution than the Greek Doric, is imperceptible, but the effect is an improvement. The architrave and frieze naturally had an inward inclination, relatively greater than the inclination of the column, about 1 in 80; the greater inclination being used so that the lines of the architrave and frieze should be in harmony with the outline of the column, whose relatively great diminution was increased by its inward inclination. The abacus, however, did not follow this inclination; it had an outward inclination. I assume this was done to separate the abacus from the architrave, as from its forward inclination it would naturally be less in light than the architrave, and would become in tone more a part of the columns than of the more brilliantly lighted architrave above. This refinement seems really more necessary in modern work in stone than in the elaborately decorated Greek temple. It is a very noticeable fact that at a distance the heavy abacus does tend to count with the architrave, and seems to give a stepped outline to the bottom of the entablature.

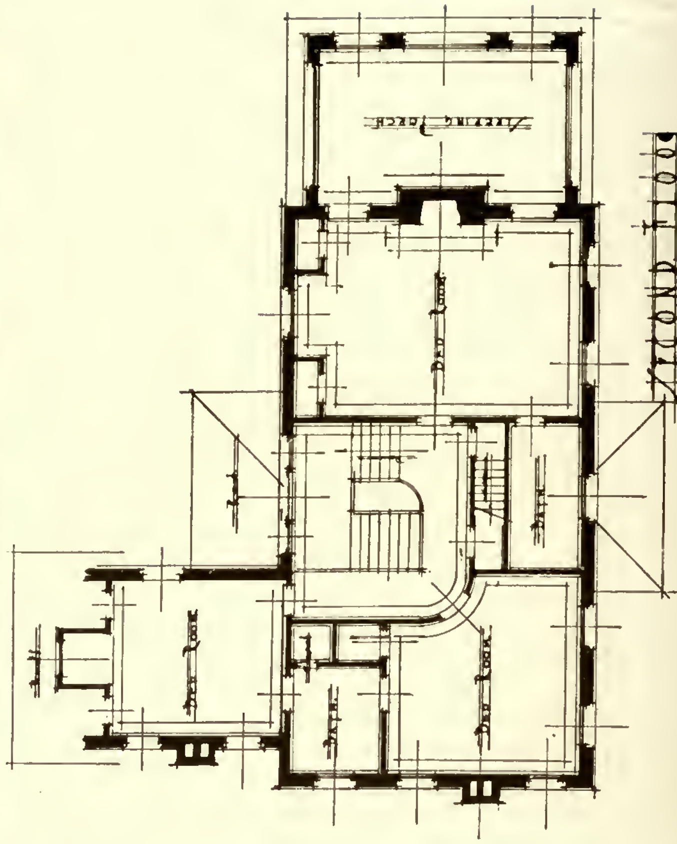
In conjunction with the inward inclination of the column is the slightly inward inclination of the cella wall. This inclination is slight, and its use in modern work is probably unnecessary. I myself don't see what effect is gained by it, but it is probably merely to accord with the inward inclination of the column axes, although if the face of the anta had an outward inclination, as Penrose says, I should think this outward inclination would, when seen across the corner, tend to nullify the inward inclination of the wall itself. This inclination of the cella wall contradicts the theory, often advanced, that the inward inclination of the columns was for the purpose of making the space between the columns and the cella wall approximately the same width at the bottom as at the top, which would not be the case if the column and wall were both vertical, due to the excessive diminution of the Greek Doric column. This idea always seemed to me entirely fanciful. It is very obvious on a drawing, but in reality it is impossible to stand in any position in which you could see the wall and column in the relation shown on the drawing.

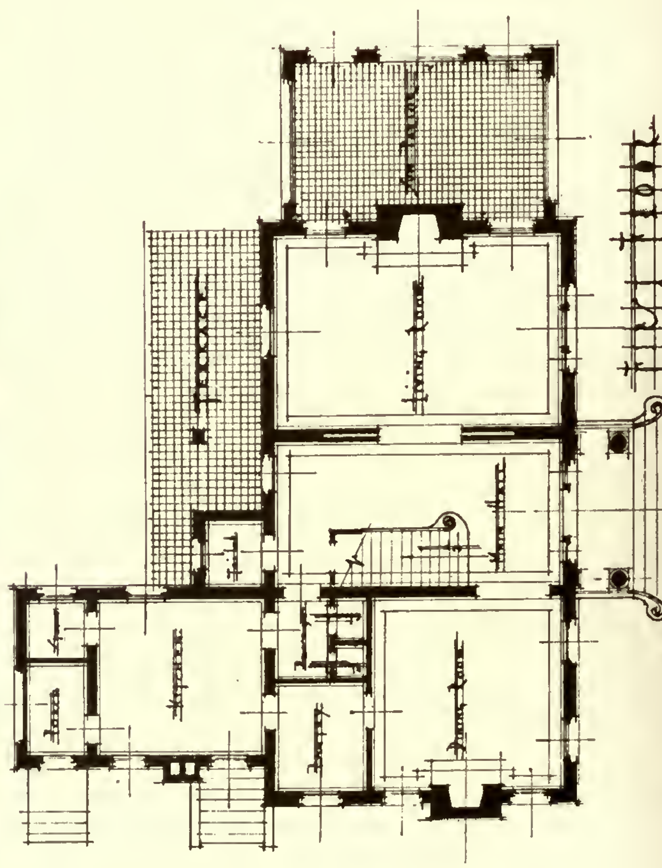
Another apparent refinement introduced by the Greeks in this best work was the slightly unequal size and spacing of the columns, particularly the columns of the flank. These irregularities are very slight, and are absolutely unnoticeable. They cannot be due to carelessness in execution, for the variant or builder's error is only two-one hundredths of a foot between the two fronts of the Parthenon, and it cannot be, as Penrose says, due to the disinclination of the Greeks to abandon an architrave stone that was very slightly smaller than it should be, or from difficulties in obtaining a number of stones of equal length. This would presuppose that all the architraves were cut before the stylobate was laid, an extremely unlikely proposition. It seems more in accord with the freedom of Greek work that slight irregularities were allowed, or even sought, in order to increase the artistic effect.

In connection with the pediment there is one fact that is generally overlooked: the raking cornice of the pediment is not the same as the horizontal cornice. It consists merely of the projecting fascia crowned by a cymatium; the mutules are not repeated nor is there any substantial bed mould; that happens because the pediment itself is completely filled with sculpture in very high relief with which the mutules would seriously interfere; the cornice is a mere frame or protection to the sculpture. In modern work the sculpture is usually omitted, and yet the face of the tympanum is kept in the same relative position in which the background of the sculpture is shown in the restorations. The result is to intensify the thinness of the cornice and cause a dark, unpleasant shadow at the corners of the pediment. Therefore in all cases where sculpture is not used there ought to be a bed mould under the fascia, and the face of the tympanum should be brought forward considerably from the relative location of the background of the sculpture to a plane at least over the face of the triglyphs, perhaps even more. This point is particularly true if the Roman Doric order is used, as the cornice here has more projection than the Greek Doric. There are practically no classic examples to follow, but generally, in this case, the metopes should be omitted, as in the Greek work; the effect is much more solid if this is done and if the projection of the Greek cornice is much reduced. The latter can only be accomplished by moving out the face of the tympanum beyond the frieze face. This is not noticeable in execution; in fact, this face can be advanced at least a third of the distance between the frieze face and the cornice fascia without bad effect; if the cornice is not very projecting, and if the detail is strong, it might be even advanced to half the distance. One other point, the acroteria: It is evident that most Greek temples had at the corners of their pediments acroteria of some sort or other, but the exact form they took is largely a matter of conjecture. Generally they were some form of anthemia, sometimes sculpture, human figures or animals; very possibly there was some religious or traditional significance attached to them; they hardly could have been used entirely for artistic effect. Personally, I have always felt they were better off the temple than on it. They seem a little frivolous and disturbing, particularly when seen, as they usually were, in silhouette.

In this article reference has been made chiefly to the Greek Doric order, but in a general way the same principles apply to the Roman Doric. In the latter, however, the architrave face is generally over the upper column face, or approximately so. This is because of the relatively small projection of the abacus and its slight depth as compared to the Greek Doric. But in the case of pilasters the conditions are the same as in all orders, as has been hereinbefore explained; the architrave face is always beyond the pilaster face. As to the location of the triglyphs in regard to the corner column, there is only conjecture. Vitruvius says that the use of the order was abandoned for temples and porticos because of this inherent difficulty, and that in his opinion the triglyph should always be over the column centre. Vitruvius is not a very safe guide, as a rule, but in any event the Romans seemed to have used the order sparingly, and usually as an engaged order. In most instances the intercolumniation was proportionately wider than in the Greek Doric, and there were, consequently, two or more triglyphs over the intercolumniation instead of one, as in the Greek order. Vignola and the other Renaissance architects follow the ideas and rules of Vitruvius, and show the triglyph over the corner column, but it seems to me that this effect in a portico of any size would be most unfortunate. It would seem, also, that owing to the increased number of the triglyphs it would be easier and less noticeable to make an adjustment of the spacing in the Roman than in the Greek order. Perhaps the best way out of the difficulty would be to omit the triglyphs altogether in a portico or pediment. The Romans often used a plain frieze with monumental effect even in cases which presented no difficulties in the triglyph arrangement. In these cases the mutules are usually omitted. In my opinion a pediment would be much finer if the cornice did not have the excessive projection usual in the Roman Doric, particularly in the order as shown in the plates of Vignola. This is especially the case if the order is in stone; in wood or in stucco the excessive projection is more natural. In point of fact the Roman Doric has never the stony monumental quality of the Greek order unless the detail is greatly simplified, so that the order more nearly resembles what is called Tuscan in the restorations. This simplification of the order was generally used in great amphitheatres in Rome, and a modern example is the arcade of the Pennsylvania Station in New York.

A reminiscence of the Greek feeling is retained in the fluting. The flutes are not separated by a filet as might, perhaps, be expected from the design of the cap and the base, but finish in a sharp arris as in the Greek Doric. I have seen modern examples in which the filet was used, but the effect was not good. Just why this should be the case I don't know. Possibly, because the flutes when separated by a filet are deeper in section, and have consequently more shadow, and this perhaps tends to reduce the scale of the shaft. In any event, the effect is better if the shallow sharp arris fluting is used. I have seen this fluting used in pilasters, but here the effect is distinctly bad. In such cases there is naturally a filet at the corner for structural reasons so that the fluting is neither one thing nor another. The effect is bad and the pilaster should never be fluted.





HOUSE, ED. PRATHER, HOUSTON, TEXAS.

B. P. Briscoe, Architect.

Thebaid Architecture

By T. L. M. Meares

Illustrated with photographs by the author

THE Thebaid is the ancient district enclosing Karnak, Luxor, Der-el-Bahri, Medinet Habu, The Ramesseum, and Kurna.

Egyptian architecture dates back to a period far earlier than that of any other race, and for this reason it is strange that so little has been done for it as compared with the work which men like Mueller did for ancient Rome and Greece.

THE GREAT SOUTHERN GATEWAY, KARNAK

Its size may be judged by a comparison with the man standing at the foot of the left-hand upright.

Egyptian sculpture and architecture was determined at a period when no other nation was so far advanced, consequently their art was not influenced by foreign importations and their history can be traced more definitely than that of any other nation.

Most of their edifices were built somewhat carelessly, and their foundations, until up to the latter portion of the Ptolemaic period, were of the poorest description. This fact is borne out by the condition of the temples at Edfon and Dendereh, which were built in the latter period and which are the most complete of any of the Egyptian edifices. The materials chiefly used for the body of these great edifices were limestone and sandstone, and it was only when the choicest and most expensive materials were required that granite was used. Granite, however, was generally used for isolated objects, such as obelisks, sarcophagi, etc., or, in other words, for the sculptors rather than for the architects. Mud bricks were also used for buildings other than temples and were quickly and cheaply made from Nile mud.

The rulers of Egypt were great taskmasters, and they had unlimited labor. Their giant monoliths could be placed on rafts at Syene (Assonan) and floated down-stream and then, if it was required to erect them some distance from the stream, they were placed on wooden sledges and drawn in some cases by as many as three thousand slaves to their destination.

The ruins of Karnak lie on the eastern bank of the Nile. The series of temples built within its walls covered the period from about 2400 B. C. to 200 B. C. The Gateway of Ptolemy IX affords fine opportunity for study, as it shows clearly that in spite of the Persian, Macedonian, and Greek invasions of Egypt, the architects still retained the same style as in their earlier buildings. The bas-reliefs show Ptolemy making offerings to Amen, Isis, Ptah, Ra, and other deities. On the overhanging cornice is shown the winged sun Horuhudit, so frequently used as the finishing touch to Egyptian buildings.

Probably the most modern of all the Egyptian methods of decoration is that of the sphinx, or sacred ram. These generally flank the causeways leading to the various entrances of their temples. They always face inward and yet, although the ram was sacred to north Egypt, in Thebes we find no signs of their ever being placed inside the temples. Their use, therefore, in these avenues is probably entirely confined to ornamentation, and has no religious significance.

Karnak stands out as the finest and most remarkable series of ruins in the world. Amongst these, however, we find a few examples of the high standard of work such as the great Hypostyle Hall, or Hall of Pillars. In extent it is the largest and most spacious hall ever built by the Egyptians, and measures 340 feet by 170 feet by 76 feet

JOSEPH'S GRANARIES, THEBES

The wonderful preservation of these granaries, made from mud bricks, is a fine tribute to the dryness of the climate. The ancient millstone is seen in the foreground.

THE RAMESSEUM, THEBES

The heads of all these columns were destroyed during the early Greek and Roman invasions. The head seen at the foot of the centre column has no connection with the ruins in view.

THE GREAT HYPOSTYLE HALL, KARNAK
Note the fine preservation of the writings and the early stone window

high, containing in all 134 massive pillars. Twelve of these are the largest ever used in any building in the world, and measure 76 feet high, 11 feet 10 inches in diameter, 33 feet in girth. They are placed in the centre of the temple, supporting the main weight of the roof, which on each side of this centre court is about 33 feet lower in height. The hall was begun about the year 1640 B. C. by Rameses I and continued by his son Seti I, and finally completed by his grandson Rameses II (The Great), about 1423 B. C. Apart from its hieroglyphic writings and embossed inscriptions, this hall is also remarkable as containing the only known example of a stone window over the age of 3500 years. At the far end of the hall may be seen the obelisk built by Thothmes I, about 1800 B. C. To realize the greatness of this mighty structure one must needs have seen it, but it may be of help to draw a comparison and to say that the cathedral of Notre Dame in Paris would easily stand on the surface covered by this hall, which in itself is only a portion of this great temple.

Another form of decoration common to the twelfth, fourteenth, and fifteenth dynasties is what is now commonly known as the lotus column. The lotus-plant was in those days very common in Egypt, and, due probably to its numerous uses, became sacred. Thus when architects were searching for decorative art we find them utilizing the shape of an unopened lotus-blossom (which is rather like that of an inverted bell). In Karnak we have a very fine example of this in the temple of Usertesen I (2900 B. C.). Here the columns mark the spot where once the people believed that a divinity resided, and inscriptions to this effect may still be traced. Another example shows also the famed papyrus column described by Strabo as "a peeled wand surrounded by a plume of feathers"; the significance of these two emblems in this picture is that they represent the joining of upper and lower Egypt, which took place under Menes in 3400 B. C., the lotus being the sacred symbol of the Thebaid, or Upper Egypt, while the papyrus represented the Delta, or Lower Egypt. Another shows the development of the lotus from the decorative to the structural feature. Karnak is still undergoing extensive excavation work. Until 1892 A. D. a large portion of it was covered by the modern village of Luxor, and as can still be seen there are still the remains of a modern mosque in its very centre. Although the ordinary dwelling-houses can easily be removed, it is doubtful whether European reverence for the Mohammedan religion will allow of the mosque being removed in order to complete the work of excavation.

The temple of Der-el-Bahri (Convent of the North), built by Queen Hatasu, is as unique in conception as it is notable in construction, and in its general arrangement is without parallel in Egypt. It rests way back against the precipitous walls of the mountains of Libya, and is built in a series of terraces, while large portions of the temple are subterranean. The general arrangement of the inner temple is rather like that of the apsidal chapels so common in European cathedrals.

In the previous reign Thothmes had led his victorious armies through the lands of the Medes and Persians, where

THE TEMPLE OF DER-EL-BAHRI
The flat-sided columns as opposed to the usual cylindrical type is of special interest. The gateway of Thothmes II is in the background toward the right.

THE TEMPLE OF LUXOR
This photograph shows a portion of the west colonnade.

THE LOTUS AND PAPYRUS COLUMNS, KARNAK
The lotus is on the left and papyrus on the right. Toward the top of the left-hand pillar of the arch is seen a member of the community paying homage to Rameses, who is sitting on the throne.

THE THOUSAND-TON COLOSSI OF RAMESES, THEBES
A portion of the inscription can be seen on the right arm.

the "terrace" architecture was in vogue, and therefore this style of architecture probably emanated there. This is, therefore, the first example of outside influence altering the style of the true Egyptians.

Another interesting portion of ancient Thebes is the Ramesseum, which lies on the western side of the Nile. It was built as a cenotaph by Rameses II to himself. The various hieroglyphics as is usual on all ancient Egyptian monuments described his achievements. The statues built into the main columns represent Rameses as Osiris.

Here also is lying the remains of the greatest statue ever carved from one single piece of stone by the Egyptians. The desire to destroy, on the part of some conqueror, has, however, unfortunately robbed the world of one of its finest sculptural monuments, representing Rameses II sitting on his throne. Its height, according to eminent Egyptologists, must have been over 57 feet, while its weight is calculated at 1,200 tons. Furthermore, it rested on another single block of granite weighing over 1,000 tons. It was carved in the granite quarries nearly 150 miles distant and then floated down the Nile.

A further interesting type of architecture seen in the Ramesseum—that of mud bricks—recalls the work of the children of Israel. Lying some fifty yards north from the main temple can be seen the granaries which Joseph, as overseer for Pharaoh, erected for the storage of corn prior to the seven lean years. These ancient granaries were almost always built with round arches, though a few were built in later periods with the more pointed arch. The walls were usually of great thickness and extremely well constructed, in order to preserve an equable and low temperature to keep the provisions in good condition.

THE TEMPLE OF KOURNAH
Looking through the entrance can be seen some of the openings to the tombs of the princes on the hillside

The last portion of Thebes under review is the Temple of Kournah, which lies on the west side of the river and is the most northern temple in the city. Built by Seti I in 1450 B. C., it was dedicated to his father. It is of very sombre appearance but is a good example of the work of the period.

Concrete Construction

By DeWitt Clinton Pond, M.A.

FOURTH ARTICLE

THE determination of loads on interior columns of the northeast section of the 395 Hudson Street Building is a comparatively simple matter. The unit floor loads, which have already been determined in the design of the wall columns, are multiplied by the areas carried by each column, and this area in the case of most of the columns is a square panel measuring 20 feet by 20 feet.

The first interior column to be designed will be column 59, which does not project through the ninth floor but which stops at the ceiling of the eighth story. The first load will be the ninth-floor load. The live load on the entire area is 40,000 pounds, and as there is no reduction of live load on this floor it is only necessary to add the dead and column loads to obtain the total. The dead load will be 50,000 pounds, and the total dead and live loads will be 90,000 pounds. To this must be added the weight of the column itself, as in the case of all the wall columns which were designed in the last article. Because this column is used to support flat-slab construction its diameter must be one-twelfth of the span length. The span length in this case is 20 feet, and the diameter is 1 foot 8 inches. The story height was given in the last article as 13 feet. Knowing the diameter and height of the column it will not be difficult to determine that the load is 5,000 pounds. The total load on the column, including its weight, will be 95,000 pounds.

Although this column would be designed, under ordinary circumstances, with spiral reinforcing, in this case the reinforcing in the upper-story section will be the same as in the exterior columns—vertical steel and hoops. The reason for this is that the area of the column is so great, on account of its diameter being as required by law, that the concrete alone would support the load and only the minimum amount of reinforcing is required. The area of the column is 314.16 square inches, and one-half of 1 per cent of this is 1.57 square inches. This can be made up of four ⅝-inch bars. The hoops must be spaced 15 times the size of a vertical reinforcing rod, or 15 × ⅝ = 9¼ inches.

The upper section of column 59 will be, therefore, 1 foot 8 inches in diameter, and will be reinforced with four ⅝-inch rods and ¼-inch hoops spaced 9¼ inches on centres.

As the live load increases to 200 pounds per square inch on the eighth floor, and for all floors below until the first floor is reached, the dead load will also increase, and the total dead and live load will be 135,000 pounds. There will be no increase in size in the column, so it will weigh the same as before, or 5,000 pounds, and the total load per bay will be 140,000 pounds. The total load on the column at the eighth floor will be 95,000 + 140,000 = 235,000 pounds.

This section of the column will be reinforced with spiral steel and vertical rods. If 1 per cent of vertical steel is used, and the area within the spiral is 201 square inches, the area of vertical steel will be 2 square inches, and this can be made up with four ⅞-inch round rods. The combined area of these rods will be 2.4 square inches, and if cold-drawn steel is used in the reinforcing of the column this will support 2.4 × 5,800 = 13,920 pounds. The value of 5,800 pounds per square inch is taken for the cold-drawn steel on the basis that a rich—1, 1½, 3—mixture will be used and 2 per cent of spiral reinforcing.

The concrete will support 201 × 600 = 120,600 pounds, and the vertical steel and concrete will carry 120,600 + 13,920 = 134,520 pounds. The load has been found to be 235,000 pounds, and therefore there will be 100,480 pounds to be supported by the spiral steel. Assuming that there will be 2 per cent of steel used, there will be 201 × 2 × .02 × 20,000 = 160,800 pounds added to the strength of the concrete. This is too much, and it will be necessary to have a percentage of only 1.25 per cent. In order to find the pitch of the spiral it will be necessary to assume the diameter of the spiral steel, and this will be assumed to be ⅜-inch round steel with a cross-sectional area of .110 square inches.

By substituting in the formula given below it will be possible to determine the pitch.

$$p = \frac{4 \times \text{area of spiral steel}}{\text{percentage} \times \text{effective diameter}}$$

$$p = \frac{4 \times .11}{.0125 \times 16} = 2\tfrac{1}{4} \text{ inches}$$

The only difference in the loads added at the lower floors is that the live loads are reduced 5 per cent, at each of them, but as the column increases in diameter, and its weight increases in proportion, there is not much variation in the loads at each floor, until the first floor is reached. In the ceiling over the wagon courts at the first floor there will be located crane beams which will carry motor-operated hoists, which will be capable of lifting 5 tons each. On this account there will be added to the column load at the second floor a load of 25,000 pounds. It will be recalled that in the first article of this series attention was called to the fact that there will be a live load of 1,000 pounds per square foot on this part of the first floor. Therefore, on the basement section of this column there will be a much larger load brought to it at the first floor than at any other floor. In the following table of loads it will be noticed that the load added at this floor is even more than twice as large as that at the second floor, and this is larger than any other load.

STORY	TOTAL LOAD PER STORY	TOTAL LOAD	OUTSIDE DIAM.
8	95,000	95,000	1′ 8″
7	140,000	235,000	1′ 8″
6	138,000	373,000	2′ 0″
5	137,000	510,000	2′ 2″
4	136,000	646,000	2′ 6″
3	134,000	780,000	2′ 8″
2	132,000	912,000	2′ 10″
1	168,000	1,080,000	3′ 2″
B	385,000	1,465,000	3′ 8″

An item that was not touched upon in the discussion of the design of the seventh-story section of column 59 was the determination of the effective diameter, as this was determined in advance by the requirements of flat-slab construction. In the sixth-story design, however, it will be noticed that the diameter increases, and it may be well to investigate the method of determining the required diameter.

There is nothing very complicated about this method. It consists of simply dividing the load by 1,146 and taking the square root of the result. The load on the sixth-story section is 373,000 pounds. Dividing this by 1,146 gives the result 325. The square root of this is approximately 19 inches. This is the effective diameter, and the outside diameter will be 4 inches greater than this, or 23 inches. For the sake of even figures this diameter is taken as 2 feet, as shown in the table above.

The area of the concrete within the spiral is 314 square inches. One per cent of this will be 3.14 square inches, and this can be made up by using four 1⅛-inch round bars for vertical reinforcing. Actually these bars will have an area 3.97 square inches, and a supporting strength of 23,000 pounds. The concrete will support 314 × 600 = 188,400 pounds, and with the vertical bars will support 211,400 pounds. As the total load is 373,000 pounds there are still 162,000 pounds to be carried. Assuming that there will be 2 per cent of reinforcing furnished by the spiral steel, the additional strength allowed to the concrete will be 314 × 2 × .02 × 20,000 = 251,200 pounds, and as this is too much it can be determined that there will be necessary 1.29 per cent. If it is assumed that $\frac{7}{16}$-inch spiral wire will be used, it will be a simple matter to substitute the proper amounts in the formula given above to obtain the pitch.

$$p = \frac{4 \times .153}{.0129 \times 20} = 2\tfrac{3}{8} \text{ inches}$$

In a similar manner all the reinforcing can be found for the other stories, but as the method has been shown the only other sections which will be designed will be the first-story and basement sections.

By referring to the schedule it will be seen that the load at the second-floor level, but which includes the weight of the first-story section of column, is 1,080,000 pounds. By the calculations given above it can be found that the diameter of this column should be made 3 feet. For practical considerations, which will be given below, the column was actually made 3 feet 2 inches in diameter. The effective diameter is therefore 34 inches, and the diameter of the concrete within the spiral is 907 square inches, and the area of vertical steel 9 inches. This last area will be made up by eight 1¼-inch round bars, which will have a combined area of 9.81 square inches, which will support 5,800 × 9.81 = 56,932 pounds.

The concrete will have an area of 907 square inches and a supporting value of 544,200 pounds, and the combined concrete and vertical steel will support 601,132 pounds, which will leave 478,868 pounds, which must be added to the concrete.

If the percentage of spiral steel is 2, then the additional strength of concrete will be 726,300 pounds, so the percentage used will be 1.18. Assuming that ½-inch round steel will be used in the spiral the pitch will be 1¾ inches.

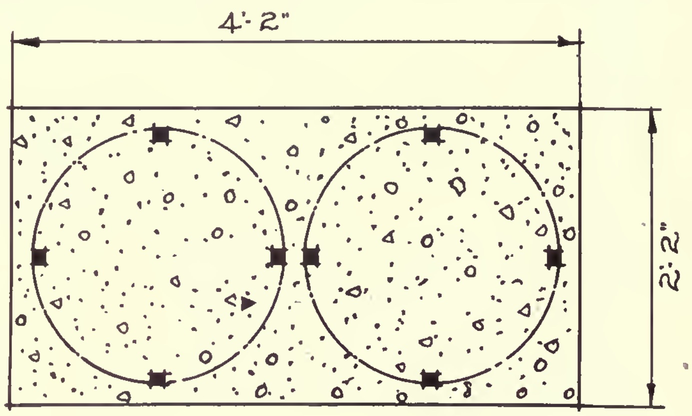
At the first floor the heavy load increases the total load on the column to 1,465,000 pounds. By the methods given above, the diameter can be determined as 3 feet 4 inches. As before, however, the actual outside diameter will be made larger, or 3 feet 8 inches, and the effective diameter will be 40 inches. The area of the concrete within the spiral will be 1,257 square inches, and the required area of vertical steel will be 12.5 inches. If 11 round bars 1¼ inches in diameter are used, their combined area will be 13.5 square inches, and their supporting value will be 78,300 pounds. The concrete will support 754,400 pounds, and the combined materials will carry 832,700 pounds, which will leave 632,300 to be taken care of by the spiral steel. If 2 per cent is used, the additional strength of the concrete will be 1,005,600 pounds, so it will be necessary to use only 1.25 per cent. If ½-inch wire is used the pitch will be 1⅞ inches.

It will be noticed that the diameters are large and the spiral wire small. The reason for the use of small spiral wire is that at the time the building was being designed this was the only wire which could be procured. Because of this it was necessary to use less than 2 per cent of spiral wire and to have a pitch which was fairly small, and also to have a greater diameter of column than would be found under ordinary circumstances.

Column 60 projects through the eighth floor and supports the roof construction above. The roof area carried by the column measures 40 feet × 20 feet, as other columns stop at the ceiling of the eighth story, and 40-foot spans occur in the roof beams and girders. The live load on the roof is 40 pounds; the dead load, which is determined on the basis of beams and girders which have been tentatively designed, is taken as 100 pounds. The total of the dead, live, and column loads can be found to be 117 pounds, and the same type of reinforcing will be used to support this as was used in the case of column 59. The steel will consist of four ⅝-inch square rods, and ¼-inch square hoops spaced 9¼ inches on centres. The mixture used for this upper section is a 1, 2, 4 mixture, as was used in the upper portion of the first. Below the ninth floor, however, the richer mixture is used. By referring to Fig. VI in the second article it will be seen that column 60 is made square in the ninth story. As this is an office floor the reason is obvious.

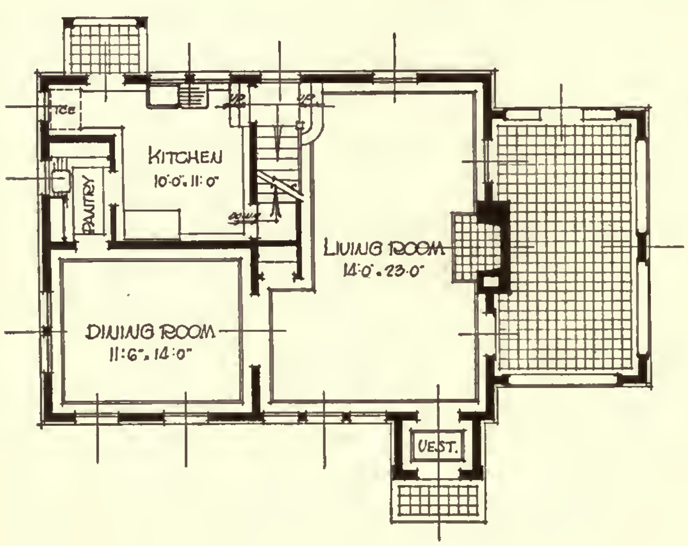
Reinforcing with vertical steel and hoops is the best method of adding steel to a column of this kind. The area of this section, which is 16 inches square, is 256 square inches, and it is reinforced with four ⅝-inch square bars, which have a total area of 1.56 square inches, and with ¼-inch hoops, as has been stated above. It will be found that this section is capable of supporting 138,000 pounds, which is more than the actual load.

Below the ninth floor the column is reinforced with spiral steel, as was column 59. The loads are about the same as those given for the last column, and about the only difference is the load carried at the roof. Because of this additional load the total at the first floor, which is carried

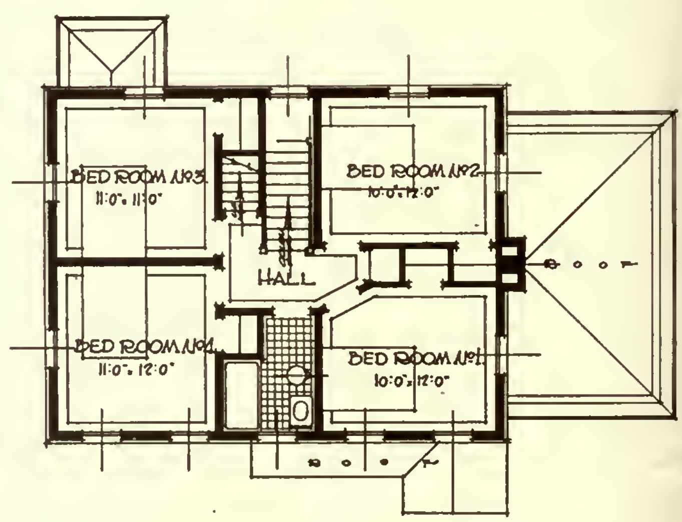


· DETAIL · OF · COL· 61 & 70

·FIGURE· X·



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE AND PLANS, GUY C. FOSTER, TENAFLY, N. J.

R. C. Hunter & Bro., Architects.

63.

Barrett ROOF FLASHINGS

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For general distribution, Architectural Service Sheets Nos. 7, 8, and 9, show these Flashings in detail. Copies will be gladly furnished free by our nearest office by the basement section, is 1,526,000 pounds, and the column is made 3 feet 10 inches in diameter.

Columns 69 and 70 are similar, and their design is interesting, as at the first floor these columns are designed with rectangular sections. This is done so that they will not project into the wagon court, as shown in the architectural plan in the first article of this series. The method of reinforcing, shown in plan in Fig. X, is different from that used in the average rectangular column. Two spirals are used and placed adjacent to each other, and these are enclosed within the rectangular section. The load brought to each column at the second floor is 1,080,000 pounds, which is the same as that on column 60. The design is determined as if this load were split in half, and each half carried by a single spiral. The load on one spiral then becomes 540,000 pounds, and by dividing this load by 1,146 and extracting the square root, the effective diameter is found to be 22 inches, which will make the outside dimension or width of the rectangle 2 feet 2 inches. The length will be 4 feet 2 inches, which allows 2 inches between the spirals and 2 inches outside of each for fireproofing. The effective area within the spiral is 380 square inches, and the vertical steel will have to have an area of 3.8 square inches. If four 1⅛-inch round bars are used in each spiral their area will be 3.96 square inches, which will support 23,000 pounds. The concrete will carry 228,000 pounds, and the two materials will support 251,000 pounds, leaving 289,000 pounds to be added to the strength of the concrete by the spiral steel. If 2 per cent is used this will add 304,000 pounds, and it will be necessary to use only 1.9 per cent. If ½-inch round wire is used its area will be .196 square inch, and the pitch will be 1⅞ inches.

As all other columns in this part of the building are similar to columns 59 and 60, there will be no more need to discuss them, and in the next article the design of the footings under them will be taken up.

Announcements

Edwin F. Simpson and Rolland L. Githens announce that they have formed a partnership for the practice of architecture, with offices at 869 Reibold Building, Dayton, Ohio.

W. E. Gore, Architect, Paducah, Ky., now occupies his new offices in the City National Bank Building.

The handsome catalogue of the Richardson & Boynton Company bears the title "Comfort and Economy in Heating." The four good ways are shown, heating by warm air, heating by steam, heating by vapor-vacuum pressure, heating by hot water, and the best equipment for these methods.

Owing to the extended territory in which he is now practising, and to his desire to render still more efficient service to his clientele, Mr. G. Lloyd Preacher, architect and engineer, wishes to announce the association with him of Messrs. Geo. Harwell Bond, J. F. Wilhoit, and Nicholas Mitchell, to practise under the name of G. Lloyd Preacher & Co., architects and engineers, with offices in Healey Building, Atlanta, Ga., and Masonic Building, Augusta, Ga.

The Magnesia Association of America sends us an attractively illustrated and printed catalogue, "Defend Your System with 85% Magnesia Pipe and Boiler Covering," showing its practical uses in various ways. As a conserver of heat its reputation and proved utility are well known the world over.

The General Fireproofing Co., Youngstown, Ohio, have sent us a Review of the Metal Lath Association, written by the president, W. B. Turner, showing what has been done in investigation along the following lines: Fire Tests, Weather Tests, Distortion or Structural Tests, Acoustical Tests, Thermal Conductivity Tests. The value of metal lath as a fire-resistant needs no argument.

The United States Radiator Corporation, Detroit, Mich., has issued the sixth edition of their catalogue, showing their complete line, with price lists. It contains valuable information regarding the proportion of radiation for both steam and water heating, size of rooms, etc.

We are in receipt of the handsome catalogue of the Roddis Lumber and Veneer Co., showing a complete line of their Standard Flush veneered doors. They are of five-ply construction, and are made to resist all variations due to heat and cold. Their method of laminated construction prevents shrinking and swelling. Their general sales office and factory are at Marshfield, Wis., with branch offices in all important centres.

Joseph Hudnut, architect, begs to announce that he has moved his offices from 41 Union Square to 51 West 10th Street, New York City.

The Chas. T. Main Engineering Organization, Boston, Mass., sends us a catalogue showing a number of their important hydroelectric developments.

The colored plates and the drawings of details in the pamphlet issued on "Architectural Granite" by the National Building Granite Quarries Ass'n, Boston, contains much valuable information. The colored plates are remarkably good reproductions of both the color and texture of the various granites.

Adamson Now Makes Tanks and Arc-Welded Products.—The Adamson Manufacturing Company, East Palestine, Ohio, have added a new department for manufacturing all kinds of storage, pneumatic, and pressure tanks, welded pipe, battery casings, evaporators, condensers, and a large line of arc-welded products.

The exhibition of "Preliminary Sketches for the War Portraits" now on view at the Metropolitan Museum, recently shown at the Arden Gallery, 599 Fifth Avenue, was most interesting and attracted much attention.

These sketches were made from life by the Group of American Painters selected by the National Art Committee to paint a restricted number of distinguished men who by their untiring efforts, vision, and sacrifice have been able to marshal the resources of the world against its common foe, and have an interest for all students and art lovers.

They were made under exceptionally interesting conditions, as the painters were given unusual opportunities to study their sitters, both at their homes and during official gatherings.

ARCHITECTVRE

·THE· PROFESSIONAL· ARCHITECTVRAL· MONTHLY·

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TEXT PAGES

PLATES AND ILLUSTRATIONS

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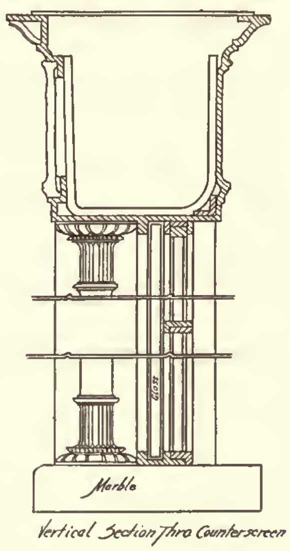

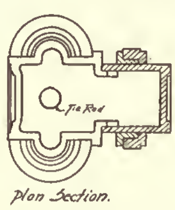

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ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLIII MARCH, 1921 NO. 3

Planning the Modern Bank

By Philip Sawyer

IN 1905 the writer attempted to treat of bank planning in an article for a special bank number in the *Architectural Review*, and it is amazing to see the difference with which the subject must be approached now.

At that time it was still possible to divide such institutions into three classes (commercial banks, trust companies, and savings-banks), to consider these as either individual buildings for the purposes of the bank alone or as office-buildings, housing the bank in the lower portion of the structure, and one could assume with some assurance what the organizations would be and how they should be provided for.

In those days deposits of twenty millions meant a big bank, and the six or eight or nine hundred millions of to-day would have sounded to any banker like a fantastic dream.

Study for a bank entrance.

Since 1905 we have seen the national banks opening trust departments, the trust companies and commercial banks establishing numerous branches, and even the savings-banks maintaining branches where they are enabled to open them by taking over other savings-banks. Moreover, the growth of the larger banks has been so great that the old practice of putting practically everything in a single room, the officers overlooking the clerks and intimately connected with the working force, has become impossible, and not only is the clerical work carried up through many stories of high buildings but the principal officers are sometimes widely separated from the working force. This tendency has gone so far that it is frequently undesirable to put the officers on the main banking floor, and, especially in the narrow streets of crowded cities, they are better taken care of in an upper story; the higher above the noise, dust, and dirt of the pavements the better.

Preliminary study for a city bank. York & Sawyer, Architects.

In 1905 one could say definitely that the officers should be immediately accessible to the public, their platform placed near the main entrance of the bank; that the receiving tellers should also be close to the entrance; the loan cage next to the officers, and that the paying tellers need not be quite so accessible. Now, even these few rules are subject to more exceptions than those in a Russian grammar; and each bank has become increasingly an individual problem, each year more complicated and more difficult of practical solution.

In the old days a bank expected the architect merely to plan a building; the bank would then fit itself in as best it might. Now the bank requires the architect first to plan a proper layout in every detail and, only when this is accomplished, to design the banking-rooms and the building con-

Entrance, Brooklyn Trust Co. York & Sawyer, Architects.

taining them. This makes planning more difficult, since the scheme of design preconceived as best may not admit of the required arrangements, but it is more interesting, since once the organization and its functions are provided for, the design of a structure to fit it becomes a definite problem; the more interesting as its conditions are more rigorous.

A few years ago a banker said to his architect: "There's no use telling me of your experience in bank planning—no architect knows anything about it; you build the building and we'll move in and put the desks in place; the officers alone know how to do that." That attitude is rarer now, and bankers themselves are becoming familiar with the difficulties of making shifts where each piece of furniture is fixed within narrow limits by its telephone, lights, and bell or signal outlets; the low-tension work involving a nest of conduits embedded in the floor-fill almost as complicated as those beneath a city street. Each bank says that its requirements will involve little such work, and each year the wiring becomes more complicated.

The rigidity caused by these requirements is the architect's chief difficulty. Not only must he plan for the present, or rather for the date of completion (for the bank often grows tremendously while the building goes up), but he must go as much farther forward in allowing for future growth as his imagination suggests and as his clients will allow. In twenty years we have never built one single bank big enough, and we have provided as much as two and one-half times the area already in use. Moreover, after the best estimate of, say, ten years' growth has been met, it is still wise to put the units most likely to develop apart from each other, if possible next to the divisions most readily displaced, planning everything so as to admit of such displacements with the least physical interference and expense. So important have these changes become that some of the banks maintain a large staff who do nothing but plan and carry out shifts of personnel and equipment.

In general, since the first floor and basement are always the tightest, everything which can be put below the basement (plant, etc.) should be kept out of it in the first place, and everything which does not have to be in the first floor should be placed elsewhere: vaults below, working divisions requiring slight public contact above.

In one instance where the first floor had been kept reasonably clear, the trust department was forced up-stairs before the room was started and the bond department just after, unfortunately, its quarters were finished, but still before it had moved in. In this institution the entrance-floor banking-room is now practically an officers' space with an "island" of tellers, and even the loans and discounts are about to be removed from it, which brings us to this interesting point—if a bank is so big that it is no longer possible to put it all in one room or on one floor, or even on several, and if many activities must be reached by elevator, why retain the street floor for officers other than those necessarily in immediate contact with the working force?

In a recent case it appeared that if the officers were moved up-stairs and the area gained given to working space, 80 per cent of the public could be handled on the lower three banking-room floors, while only about 5 per cent of the public, seeking access to the officers, need go higher, and they might as well go directly to the tenth floor, where the general officers could be out of the noise, dust, dirt, and heat of the streets, in a location better suited to their comfort and efficiency.

The president of one of the great down-town banks said recently that at the first opportunity he would move his officers up to the top of his fifteen-story building, where now the dining-rooms are the only quiet place for conference, since the organization has outgrown the old close contact,

Doorway in counter-screen, Brooklyn Trust Co.

RHODE ISLAND HOSPITAL TRUST CO. BUILDING, PROVIDENCE, R. I. York & Sawyer, Architects.

and his officers are no longer in direct touch with the widely located working force, nor need they be.

These larger institutions present many problems almost non-existent in 1905. Where then the employees numbered tens or hundreds, there are now thousands. The necessary physical examination of applicants establishes a medical department; the prevention of loss of time and decreased efficiency on account of easily avoidable illnesses suggest periodic examinations and visiting of the homes of those absent as sick. Medical examination entails educational work and recreation, including corrective exercises. A consideration of proper food follows, and cafeterias with adjacent rest-rooms are established. One New York bank is now providing four thousand lunches each day.

Clubs are formed and are well worth encouraging; the architect is told to arrange their quarters with some chance for exercise or sport—a gymnasium or bowling-alleys. He must plan a co-operative store where the members buy monthly ten thousand dollars' worth of merchandise, from automobile tires to canned tomatoes, and a theatre ticket-office doing a business of forty thousand dollars a year. The club gets its members railway tickets, hotel accommodations, acting as a tourist agency, and suggesting vacation-trips, and its Thrift Association, managed with the sanction and advice of the bank's officers, pays a percentage on deposits which I am afraid to state. The opportunity to address large bodies of employees is so desirable that a general hall or assembly-room is required.

Handling these great numbers of employees involves many problems: their control, the entrances through which they may come in at the rate of one hundred fifty a minute, the elevator service which will deliver this peak load night and morning without strain and yet be equally accessible to the public during the day—flexible enough to shift in varying proportion between the two services. The thousands of wet garments, of overshoes and umbrellas, arriving in so few minutes on a winter morning, must be taken care of; shall the lockers be together near the entrances or scattered through the height of the building near each department, or shall open check-rooms be used with a dozen attendants, and if the latter is adopted, can any known authority compel the aristocrats of the credit and foreign divisions to use it? Employees' packages and bags must be checked somewhere and delivered with the celerity of a railway-station when they leave at night.

In these larger banks the physical handling of material is that of a considerable factory. Mail comes in and goes out in bulk. Gold, coin, currency, and securities arrive and depart in trucks and taxis, or by messengers on foot. Supplies of stationery, furniture, equipment, materials for the kitchens or medical departments must be routed directly to their separate destinations. Refuse paper is gathered, carted to storage and kept thirty days, each day's refuse in its separate steel bin, before it is baled and sold. Files are accumulating at the rate of fifty cubic feet a day and must be freighted off to storage, where they may not be touched for years but must be instantly accessible. The shipping platform is a busy place. Like a factory, too, is the necessary flow of all this material in the building. Currency or mail, gold or securities, must go directly to the divisions handling them, through the necessary routine and then to vault, files or out again directly and smoothly. Delay, indirection, unnecessary handling costs money and time, and here time also is money. Intercommunicating systems, telautographs, pneumatic tubes or conveyers contribute their part.

Banking-room, Rhode Island Hospital Trust Co., Providence, R. I. York & Sawyer, Architects.

The protection of the treasure in the modern bank presents a further problem. What should the vault construction be? Should there be round doors or square—twenty inches thick or fifty?

In general, the bigger institutions may be regarded as safe from ordinary attack—it is the smaller banks, isolated in country towns, which cannot afford heavy vaults, which suffer from burglars or yeggmen. These big vaults, far below the city streets, separated by observation spaces from the massive building foundations—often below water—are immune from anything except attack from a mob or from within. The watch, sometimes a hundred men or more, if carefully selected and trained, are the best safeguard, but the architect can do much in planning the vaults, money-handling divisions and their connection, and in the disposition and control of entrances, to make the task of the watch easy. Such an emergency as a riot, fire, or a great explosion should find the building closed, the guard at their stations, everything in what Robinson Crusoe termed "a posture of defense."

The day after the Wall Street explosion the chief watchman of a down-town bank was asked: "How long did it take you to lock your main-building doors?" "Shee-e-sh!" he muttered cautiously, "we don't use 'em much, and they ain't closed yet!"

Electric protection for vaults, which is now almost universal, can to advantage be extended to cover all ex-

ENTRANCE-GATES.

BRONZE ELEVATOR-DOORS.

York & Sawyer, Architects.

RHODE ISLAND HOSPITAL TRUST CO. BUILDING, PROVIDENCE, R. I.

terior entrances. This gives protection and is also a moral guaranty that everything is properly closed, since, if a single closure does not make contact when the switch is thrown, the gongs go off and the captain of the watch is in for an explanation.

In conclusion, the latest development in American banking is the institution so big as to require a high building, and so complicated in its organization as to make its disposition over a number of floors not only necessary but desirable.

The first decision in planning such a bank usually involves the position of the elevators, which should probably be nowhere on the entrance-floor, and in the centre of the working floors above, in order that the public and private circulations of these upper floors may be kept separate.

The entrances must provide for (*a*) public, (*b*) employees, (*c*) mail securities and bulk freight and supplies, (*d*) coal.

The vaults should probably be connected with the money-handling divisions by special elevators. Where the vaults are so large as to be placed on several floors, they can either be separate vaults superposed, separately ventilated and entered from each floor, as is intended in the case of the Federal Reserve Bank of New York, or entered only on the upper level, a coin lift and stairs within the vault giving access to lower levels, as in the New York Assay Office. Vaults should never be placed over boiler-rooms, unless more thoroughly insulated from heat than sometimes happens.

Divisions having the greatest contact with the public are best placed on the entrance-floor, the next on the second, and so on, the purpose being to keep the elevator service down to a minimum. Officers, other than those who must follow their departments, should be placed together on an upper floor, with their secretaries' rooms, conference rooms, board-room, and as liberal a number of additional unassigned rooms as the area of the building admits of. Stenographers' space, files to which officers need immediate access, and a certain amount of statistical work should be provided for in their vicinity.

The telephone central, which can be located anywhere, is preferably placed in the quiet of a remote part of the building, and the girls are entitled to a rest-room in connection with their working space.

Finally, when everything has been thought of, when each unit has been placed in proper relation to the others and due allowance made for growth, it is merely a piece of extraordinary good fortune if some newly created department, some fresh activity, is not thrust into the midst of things to dislocate one's best arrangements. No modern bank building can be successful which is not so planned that every part of its area is separately accessible, individually heated, lighted, and ventilated, and equally available either as a thoroughly protected working space or with public contact. All that one may be sure of is that a modern bank is a living, growing organism, extremely sensitive to general conditions in this country and in the world, to every change in the banking system or the new laws which may at any time modify its procedure, and that any shell, intended to house it, will be satisfactory only in proportion as it allows of the easiest modifications of practice and arrangement.

The Problem of Administration in Bank-Building

By Charles E. Myers

Of Abell, Smalley & Myers

IT is recorded somewhere that in the building of King Solomon's temple, at a critical stage in the finishing of the work, loud outcries were heard because of the lack of proper drawings on the trestle-boards.

Although the tradition is not clear as to the character of the missing designs, we believe that they had to do with the furnishing of the temple rather than with its construction. It is known that the structural and architectural elements were substantially completed, the various walls, rooms, and exits, or gates, being in place. This is clearly indicated by the mention of watchmen, who, even in this day, are employed when a building nears completion, to keep out the curious, whether they be critical fellow craftsmen, idle slaves of business, or prying interlopers, such as reporters and photographers. The idea of guarding the exits then, as now, was, without doubt, founded on a desire not to be distracted at a critical moment, when the allotment of space and the placing of the furnishings (equipment) could no longer be avoided. Hence the outcries now, as then, because of the lack of certain "designs."

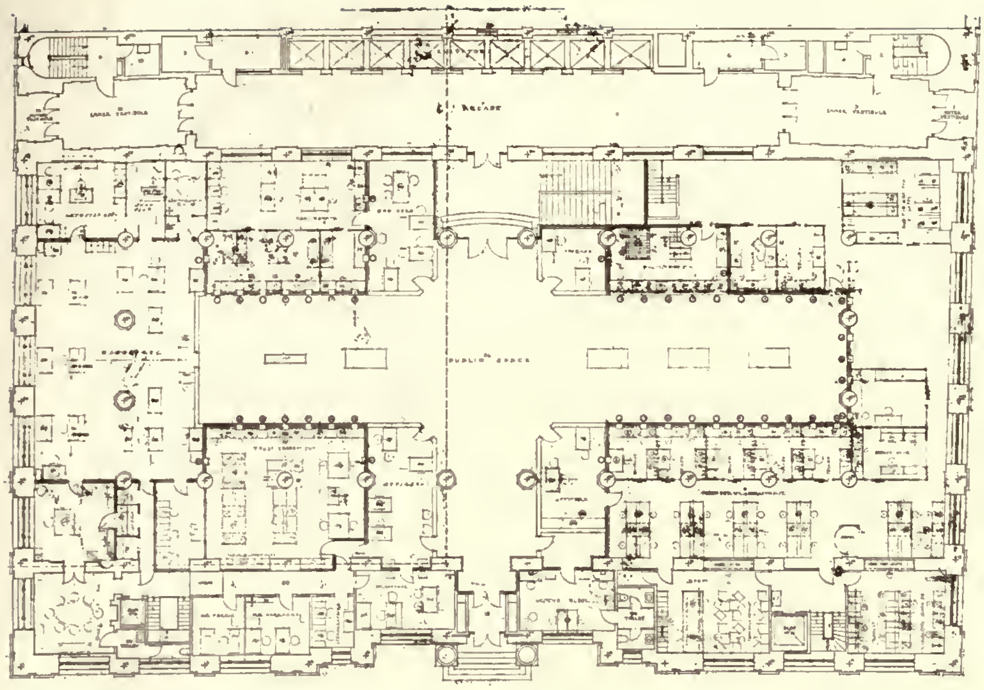
Our belief is thus strengthened that the practice of specializing in equipment, or what is now sometimes called "equipment engineering," had its beginning far back in history, and we may safely assume that the desirability of planning in advance for the equipment of the temples of those days was recognized.

Perhaps even in that early time the risk of depending upon the free (*sic*) advice of itinerant peddlers, "sales engineers," and "contracting designers" was known and avoided by using, instead, experienced professional talent. Indeed, it must have been so, else why the trestle-boards? But why, then, the loud outcries? The explanation is simple: the equipment specialist employed on the temple work had been called to refreshment by the master architect, a practice seldom imitated in modern times. Perhaps the missing designs were even then at the blue-printer's, as is often the case now, and the outcries proceeded, of course, from the hirelings of the "general contractor," who have not changed their habits in all these centuries, and whose moans to this day are never stilled.

However faulty may be our attempt to recall the past, the fact is that the desirability of employing specialists for the allotment of space and the design of equipment has been recognized for the last ten years, prior to which time their value was utilized mainly by manufacturers of equipment for increasing the sale and use of their product. The specialist had not appreciated his opportunity, and was only dimly conscious of the conflict involved in attempting to serve two masters.

Since 1910 the value of the services of the equipment specialist has come to be more generally recognized, and it is due in a large measure to his own efforts that he has demonstrated the worth of his services.

There is a tendency to call this person an "equipment



First-floor equipment plan, Rhode Island Hospital Trust Co., Providence, R. I. York & Sawyer, Architects. Abell, Smalley & Myers, Equipment Specialists.

engineer," but the fact is that he does not graduate from any school except that of experience; that he does not study his methods from any text-book except that of daily life, and that there is no university to grant him a degree. He has learned his profession in the field, and has graduated from the ranks of the industry, the products of which are, in part, the expression of his practical skill. He has had experience in the administrative routine of modern business, and his work is to plan an arrangement of space for the efficient transaction of business and to specify the business man's tools.

While his usefulness is increased by a sufficient comprehension of architecture to enable him to understand the architect's purpose, he may be limited in his field at the pleasure of the architect, who may prefer to design furniture for special rooms in which the artistic quality predominates. Nor is he a purchasing agent, although contracts for equipment are let upon his drawings and specifications, and his advice is valued in placing contracts.

Guided by his special experience, logical in his methods, earning by his attention to practical details and by his loyal co-operation the good-will of architect and client, he works within the special field which is his own, supplementing the knowledge of architect and owner, furnishing the information upon which both can agree and depend.

The equipment engineer gathers his data for a proposed plan from the same sources as the architect but from a different angle. With him it is not so much a question of areas as of the number of people who will be required, the work they will perform, and the tools with which they work. His units are these employees, each with his individual provision of desk, machine, counter, or cage.

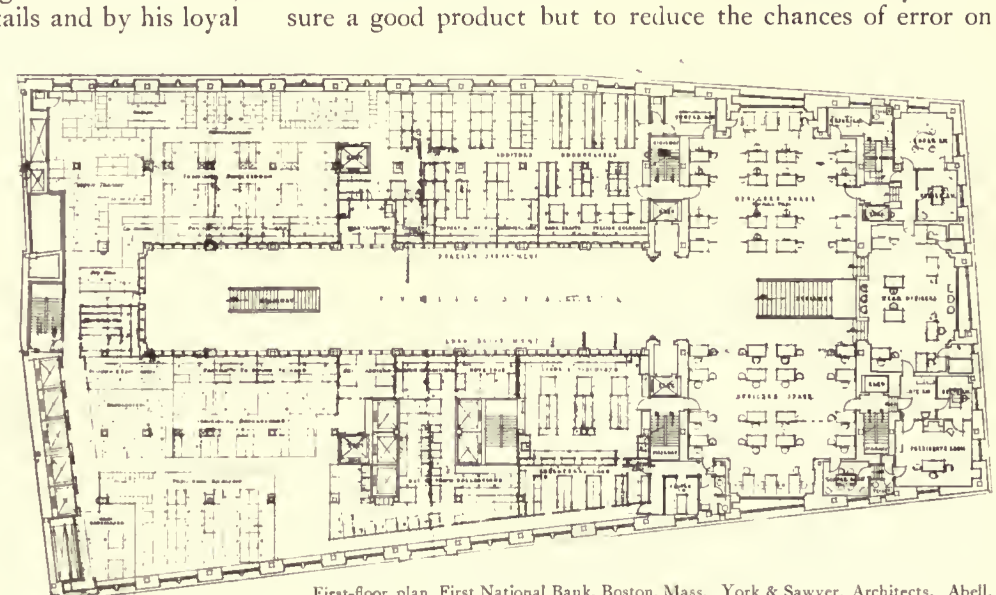
His usefulness in the early development of a plan depends upon the facility with which he can gather information, the accuracy with which he forecasts the probable development of the various activities, and the clearness with which he interprets for the use of the architect the contradicting or conflicting considerations which present themselves in dealing with the administrative work of a modern business. He works closely with the architect, co-operating with him, analyzing the problems which the architect must decide.

The allotment of space having been satisfactorily determined, the architects are enabled to proceed with their plans, confident that the practical utilization of the areas is assured, since the plans are based upon the detailed requirements for the conduct of business, as well as upon the structural and architectural elements of design.

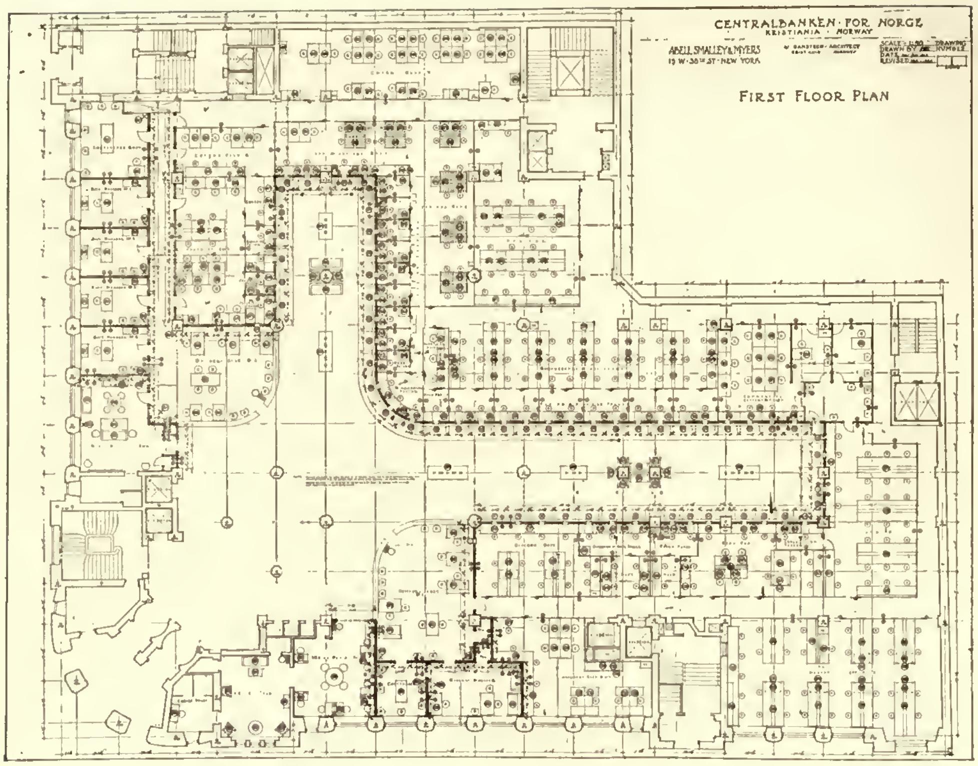
Following the architect's plans, diagrams are then made which show the location of each piece of equipment, whether fixed or portable. Each article is identified by a number, and an accompanying schedule tells exactly what it is, of what material it is made, and by whom it is to be provided. Such portions of the owner's equipment as it may be his desire to retain in use are shown in the same way, together with any alterations which may be required to permit its installation with the new work.

The use of this schedule permits the classification of the equipment into as many manufacturing lines as will result in securing bids from the sources of original supply, eliminating practically all intermediary handling. The saving effected by bringing the manufacturer and consumer directly together on all important items amounts to a considerable sum, which accrues to the benefit of the owner.

The engineer prepares detail drawings and specifications, showing the construction of all new equipment and the alterations to the old, together with such data as will give a clear conception of the problem of its fabrication and installation. These drawings are carefully worked out and the details of construction so shown as not only to insure a good product but to reduce the chances of error on



First-floor plan, First National Bank, Boston, Mass. York & Sawyer, Architects. Abell, Smalley & Myers, Equipment Specialists.



the part of the prospective bidders in figuring the costs upon which their prices are based. This eliminates the contingent sums often included in proposals, because of the lack of definite knowledge of the requirements, and it insures low prices.

If the bids, when received, prove to be in excess of the amount set aside in the budget to cover equipment, the work may then be revised. The practice of requiring bidders, in submitting their proposals, to state unit prices for each item in the equipment permits of eliminations or additions without affording the contractors the opportunity to take advantage of such changes at the owner's expense. The cost of most "extras" is in a measure determined in advance and a definite control established, so that when an item is eliminated the amount of the contract is reduced not only by the cost of the item but by the amount figured as profit upon it.

During the time that the equipment is in process of fabrication inspections are made with two definite objects in view: one, perhaps the less important, is to insure that the "intent" of the specifications and drawings is being followed and that the work is not being scamped; the other, and with reputable contractors the more important effect of the inspection, is to insure that the work is being fabricated in a manner to meet the conditions that will prevail at the time of its installation, and to make certain that the items first required on the job have priority.

When the installation of the equipment is begun, the personal attention of the equipment specialists and their assistants serves to relieve the owners, as well as the architects, from an immense amount of annoyance. Comprehending fully the locations and the installation conditions affecting each piece of the equipment, its assembly on the job proceeds smoothly, without conflict with other trades, and without hindrance to the early completion of the project.

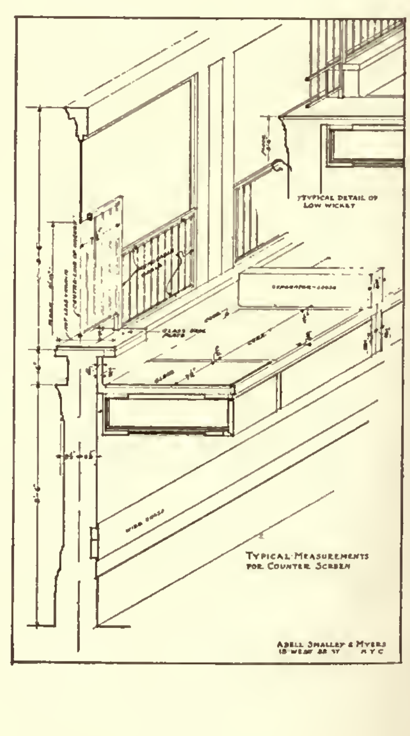
The removal from the owner's old quarters to the new is also handled in a manner not to interfere with the conduct of business, and the transition from the old to the new working quarters is carried on smoothly, quietly, and economically.

When the activities have been transferred to the new quarters, and all of the equipment is in its proper place, there is still opportunity for the manifestation of the "cussedness" of inanimate objects, and the equipment specialist is not relieved of his responsibility until these manifestations have been successfully overcome—typewriters attached to their desks, refractory locks and other "gadjets" properly adjusted.

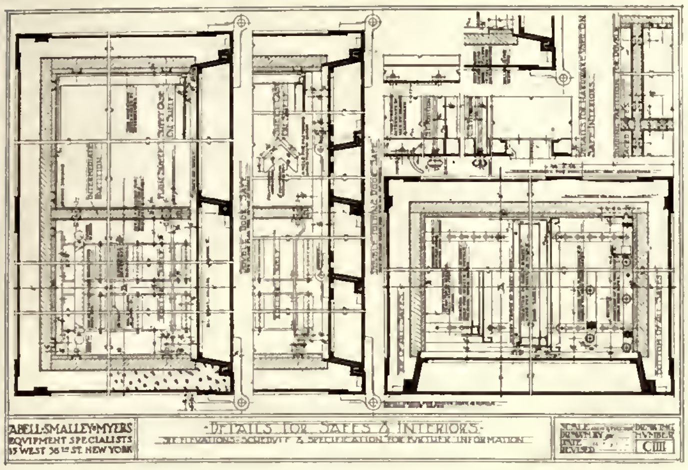
There are many items in connection with the equipping of a large administrative staff in which the equipment specialist is interested professionally rather than financially. He is frequently called into consultation by others employed upon the work, such as the electrical and ventilation engineers. The location of the equipment affects in some measure the location of ventilation registers and ducts, and the electrical engineer depends, to a considerable extent, upon the specialist's analysis of present and future conditions for the location of electric outlets for lighting, low-tension wiring, and telephone circuits.

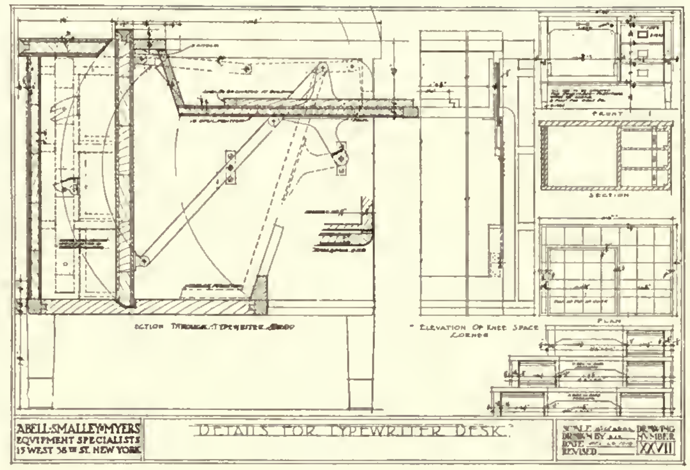
The combination of all of these elements constitutes what is known as "equipment engineering," and the extent to which the value of this new profession is recognized is indicated by the fact that the services of American equipment specialists have been recently utilized by architects and owners in Europe and in South America.

Both owner and architect profit by the skill of the specialist in arranging equipment advantageously to occupy the minimum floor space. In a recent operation an analysis of a client's needs resulted in a saving of twenty-five per cent of the area which had been previously set aside for the accommodation of the staff, releasing for revenue purposes an additional floor in the contemplated building. This added revenue would have paid the specialist's fee many times.



As against the old method of buying, the employment of a specialist results in equipment being secured on a known competitive basis, and without any capitalization of the so-called "selling points" invented for the obfuscation of the casual buyer. The less reliable venders of administrative equipment do not approve the employment of an equipment specialist, because it requires accurate figuring on their part and





close competition. The specialist, by eliminating the less competent and by the restriction of bids to reputable houses, insures a dependable product at a minimum cost. The middleman's profit is practically eliminated, and equipment either in large or small quantities is secured oftentimes at better than wholesale rates. Secret commissions, collusive bids, and substitutions are not employed when an equipment specialist is known to be on the job, because bidders have learned that a clear conscience and a sharp pencil avail more in securing the approval of the specialist than the hot air of former days.

The value and importance of conservation of space and the protection of the owner's pocketbook are not the only services rendered by the equipment specialist which warrants his employment. The careful attention given to the arrangement and relation of departments is, after all, of the greater value. Upon the efficiency with which these elements are adjusted depend the convenience and economical daily functioning of the staff. Any executive or subordinate will recognize the truth of the statement that cheap equipment poorly arranged is false economy. An administrative staff correctly located, adequately equipped, discharges its duties speedily, effectively, and economically. These results are a chief consideration, and to their accomplishment the equipment specialist devotes his undivided attention.


Check desk.

The LeBrun Scholarship Award

THE jury in the LeBrun Scholarship Competition for 1920–21, conducted by the New York Chapter A. I. A., has made the following awards:

Travelling Scholar, Oliver Reagan, New York City.

First Honorable Mention, Robbins L. Conn, New York City.

Second Honorable Mention, Edward S. Lacosta, New York City.

Third Honorable Mention, Charles J. Irwin, Brooklyn, N. Y.

The following men, whose names are given alphabetically, were mentioned by the jury for the excellence of their work: Howard Stanley Atkinson, Philadelphia, Pa.; John S. Burrell, New York City; Louis Fentnor, New York City; J. Harold Geisel, Philadelphia, Pa.; Owen L. Gowman, New York City; Carl W. Lason, Boston, Mass.; Benjamin Moscowitz, New York City; John G. Schuhmann, New York City; Edgar F. Stoeckel, New York City.

Forty-one sets of drawings were presented, representing thirteen States, widely distributed throughout the country.

The committee consisted of Charles Butler, Ernest Greene, R. H. Hunt, William M. Kendall, and Louis Ayres, chairman.

EXTERIOR.

ENTRANCE DETAIL.

DETAIL, BANKING-ROOM. Childs & Smith, Architects.

FIRST NATIONAL BANK, APPLETON, WIS.

Editorial and Other Comment

The Modern Bank Building

THE business of banking has grown tremendously in recent years, and many of the older institutions have completely outgrown their quarters. The need for new and time-saving methods of business has called forth from the architects their best endeavors in planning and put them to the test, also of using every foot of space to the best advantage. Banks that used to employ hundreds now have thousands on their pay-roll, and every minute of time wasted by reason of poor planning that obstructs fluency in the coordination of departments is money lost. The addition of new branches of business is one that should be anticipated in new construction, as well as the best possible adjustment for the facile and expeditious conduct of present details. The problem is constantly presenting new aspects, and the cost of building has added the necessity for additional care for every possible adjustment to fill present and future needs. In this number are presented a number of typical banks, large and small, with some exceptionally interesting comment by authorities on the construction of banks in general, on the problem of smaller branch banks, and some facts in regard to the marked differences between American and European ways of doing business. The bank building in its large aspects has something of a monumental character, and there are exceptional opportunities open to the architect in the way of design. In these days of high cost, when the conditions warrant it, there is a tendency to make the bank building a part of a general office-building that will return a handsome rental profit on the investment.

Tax Exemption

IT will be interesting to see what will be the effect of New York City's ordinance exempting new buildings to be used as dwellings from taxation to the extent of five thousand dollars for each unit. It has had the encouragement of a number of prominent builders and it is asserted that savings-banks and insurance companies will make loans for such purposes. If it proves effective in stimulating home-building, it will be a welcome temporary measure at least, but there are questions regarding the future effect of such exemptions that are well worth seriously considering. We can only hope that such a measure may be so safeguarded that there will be no opportunity for unscrupulous speculators to profit at the ultimate expense of the already much-harried city-dweller. If the privilege is only going to give further opportunities for rent profiteering, the ultimate result can be foreseen. If it leads to the building of homes and apartments of moderate costs and the rentals are based on those existing in buildings without the tax exemption, we shall no doubt hear from several back counties. Far be it from us to imply any wish for paternalism in the conduct of business—we have had too much already—but if the tax-exemption builder accepts special privileges he should be ready to give the public the benefit of his share in the privilege awarded.

For the Man Who Builds Now

IN an interesting summary of present conditions the *American Contractor* has some pertinent things to say in reply to the question involved in the title of this editorial. In the last analysis the problem centres in confidence in the country's innate stability. It brings to mind the old adage about foresight being better than hindsight, and that it is better to be near the head of the parade than a mere tail-ender.

"It pays to analyze the future possibilities in store for the ones who are building now. The builder of an apartment at the present time has in store the possibility that in the future other men may obtain the materials and labor service similar to his present use at reduced figures. He has to pay a good per cent on the money he uses. What does he look to for return? He looks to the fact that the demand for housing is greater than the supply and that in accordance with this fact rentals are high. He looks to the fact that even if a building programme of considerable proportions be prosecuted, there would still be a shortage for a considerable period of time, and he banks on good returns throughout this period.

"There are two possible terminations of his profitable income. One is that there be so big a boom in building that the market be really flooded. Against the possibility of this is stacked the limited number of trained men and the limitations of existing contracting organization, and the present period of hesitancy. The other is that there be an absolute cutting off of the ability of tenants to pay high rents. This possibility is only possible if there is a long-drawn period of unemployment, low wages, and general hard times.

"In short, the man who builds now banks on the future. He banks on the inherent stability of the country and upon the inertia of his competitors. A man who so banks is in a much safer position if his work is being done now than if he comes in with the bigger class which is always second at the table."

New Jersey and the Office of State Architect

A BILL has been introduced before the Legislature of New Jersey abolishing the office of State Architect and the Department of Architecture, and transferring the powers of this office to the Department of Institutions and Agencies. The object is to afford a wider choice in the selection of architects for particular buildings, and to enable the authorities to have the privilege of calling upon the profession in general for plans for particular types of buildings; in other words, to take advantage of the work of architects who have established reputations in designing institutional buildings of a particular type. The following statement makes the purpose of the bill clear in detail:

(1) The aim of this bill is to enable the State to secure modern practical types of building construction and to place responsibility for determining the types of buildings and type of construction for State institutions upon the Department of Institutions and Agencies. This responsibility is now divided between the several boards of managers, the State Board of Control, and the State Architect. (2) The costly conflict of authority and responsibility incurs delay in the construction of the State institutions, a prolific waste of public funds, and has resulted in the building of inefficient, inadequate, and impractical types of institutional construction. Ordinarily and presumptively in the future the greater part of the building construction work of the State will be institutional buildings. The Governor's recommended budget for the next year carries a total for new construction of institutional buildings of $950,000,000. Modernizing the present inefficient and inadequate types of construction, planning and constructing new buildings to meet the requirements for the proper modern methods of hospital care and institutional treatment at a minimum cost requires that the plans and specifications for alteration and for new construction of institutional buildings shall be prepared under the supervision of the Department of Institutions and Agencies, which department is responsible for the development and proper administration of the State institutions. (3) The transfer of authority to the Department of Institutions and Agencies will permit the department to have proper plans and specifications prepared so that there may be the widest competition in bidding and consequently lower construction costs. (4) Adequate and effective inspection will be possible at a much lower cost when the authority and responsibility for the institutional construction work is definitely placed in accordance with the provisions of the act, and conflict of opinions and authority thereby eliminated. (5) The State board may in its discretion employ any of the employees of the Department of Architecture.

Electricity in the House

THERE is nothing that better makes for economy in household conduct in these days of servantless homes than an up-to-date electrical equipment. No architect should overlook this fact in designing the new house, and it should be his duty to keep himself fully informed regarding new time and labor saving devices. Future needs in the way of sufficient and rightly placed outlets for electrical appliances as well as adequate lighting should be an essential part in all planning. Too often the lack of foresight in this has meant the later intrusion of unsightly and expensive wiring methods, offensive alike to the architect and householder. The electrical dishwasher and family washing-machine are said to be almost the standards for the proper conduct of life in many of the new California houses.

The Art Students' League of New York—Annual Competition for Scholarships

A SCHOLARSHIP competition open to all art students in the United States, with the exception of those in New York City, will be held at the Art Students' League of New York on March 25, 1921.

Ten scholarships will be awarded to that work showing the greatest promise. Work in any medium, from Life, the Antique, Landscape, Etching, Portrait, Illustration, Composition, also photographs of Sculpture, may be submitted. All work should be forwarded so as to reach the league not later than March 19, and must be sent with return express or parcel-post charges prepaid.

Students entering for this competition are urged to send the most comprehensive exhibition possible, to facilitate the work of the jury. It will be readily understood that the work covering the widest field of art expression will best enable the jury to judge of the individuality and promise of the prospective student. The league wishes to emphasize that the jury will be guided in making their awards, not by the degree of proficiency displayed by the applicants, but by an effort to find interesting individuals whose strength the league desires to add to its own.

The scholarships so given will entitle the holder to free tuition in any two classes of the league during the season of 1921–1922, or in the classes of the Woodstock Summer School of Landscape and Figure Painting for the season of 1921. The jury will consist of the following instructors of the league:

George B. Bridgman, A. Stirling Calder, Arthur Crisp, Guy Pene Du Bois, Frank B. Du Mond, Andrew Dasburg, Thomas Fogarty, Fred W. Goudy, Robert Henri, Leo Lentelli, George Luks, Wallace Morgan, Kenneth H. Miller, Edward Penfield, Charles Rosen, Boardman Robinson, John Sloan, Max Weber, Mahonri Young.

All students interested are cordially invited to enter this competition. Address all letters and packages: For Scholarship Competition, Art Students' League of New York, 215 West 57th Street, New York City.

Book Reviews

THE ENGLISH VILLAGE CHURCH EXTERIORS AND INTERIORS. By ALFRED HOPKINS. William Helburn, Inc., Publishers, 418 Madison Avenue, New York.

No one who travels in England forgets the charm of the village churches; they are a centre of architectural interest, and their great variety of form and detail a veritable mine of suggestion. The little parish church has been always the centre of community life and a source of local pride.

There is but a rill of text here as an introduction, with comment on the special features of some specially noteworthy churches, but the real value of the book is in the many excellent plates, showing churches in Berkshire, Gloucestershire, Oxfordshire, Warwickshire, Wiltshire, Buckinghamshire. In looking over these prints one cannot help thinking how much charm is added to the general composition, flavor of antiquity, and established usage by the churchyards, with their moss-grown monuments.

NOTE.—In the notice of "A Book of Ceilings," by George Richardson, last month, we omitted to state that the photolithographic reprint of this famous work bore the imprint of William Helburn, Inc.

MODERN MOVEMENTS IN PAINTING. By CHARLES MARRIOTT. Universal Art Library. Charles Scribner's Sons, Publishers, New York.

"Painting is, after all, a traditional craft, and its conventions, though they may be abused by authority or made sterile by inferior talent, are in the long run based upon common-sense."

This sentence from the author's chapter on "Naturalism" seems to sum up his own attitude toward the various manifestations in modern art that he analyzes with so much sanity and understanding.

He speaks of Constable as one of the great Naturalists, and of Naturalism as "the mother of Impressionism." "It might be very well claimed that Naturalism—and particularly the refinement of Naturalism that we call Impressionism—discouraged the direct action of design."

He aptly compares the attitude of the Barbizon school in painting to the work of the English lake poets; "the Barbizon men were both Naturalists and Romantics." The chapters on Impressionism are especially lucid and interesting.

There is a chapter given to Whistler, who he says gave an entirely new turn to English Impressionism. Whistler was of no country in his art, but a cosmopolitan. "It is more than probable, if you want to get down to the root of the matter, that cosmopolitanism, as Whistler exhibited it and Mr. Sargent does not, is precisely the reason why this great country (America) has not yet found national expression in painting."

Cézanne, Gauguin, and Van Gogh are the three leaders in the reaction from Impressionism, and from them we have gone down in a natural retrogression to such things as are called Post-Impressionism, Cubism, Expressionism, Futurism, Verticism, and all the other modern isms that confront us and fill us with wonder, not to say disgust.

But we cannot ignore these things, unless we are blind, and if they have any meaning or significance we are glad to have it pointed out in terms we can understand. This is what Mr. Marriott has done. We like the fine sanity with which he approaches the whole subject of the artist and his work.

"The view of art that is taken in these pages, then, is one that conceives of the artist as a being pretty much like the rest of us, except as subject to the conditions of his particular craft. He is very much more of an ordinary man and very much more definitely a craftsman than he is commonly considered—particularly by writers on art. Most of the mental and emotional characteristics that are supposed to be peculiar to the artist—imagination, invention, susceptibility to natural beauty, sense of color, and so on—are in fact shared and often in high degree by thousands of people who, so far as it is possible to judge, have no artistic talent at all; and, on the other hand, a high degree of artistic talent of a definite kind is often found in persons deficient in the qualities that are supposed to be artistic."

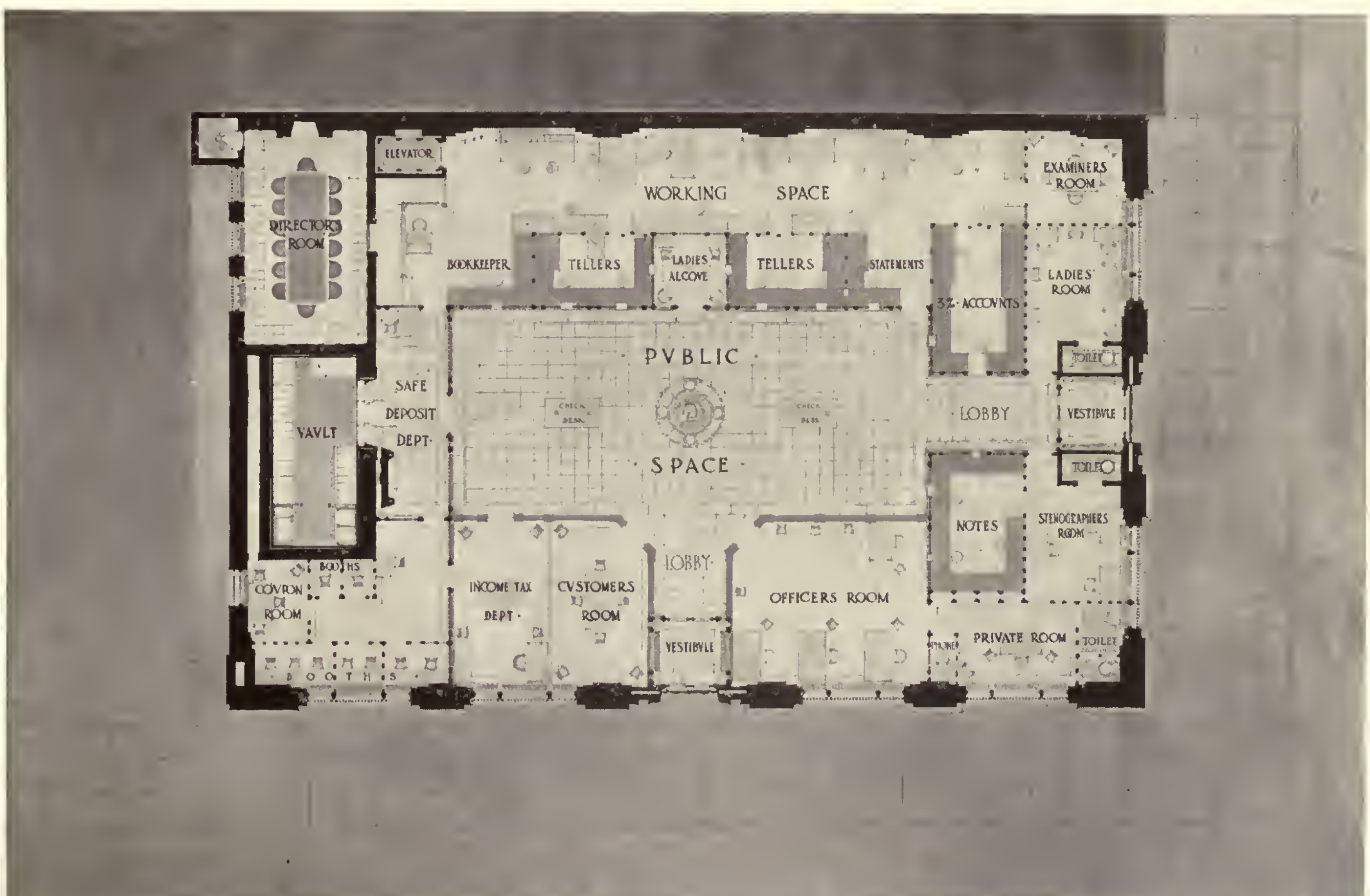
The second half of the book is made up of a descriptive catalogue, with illustrations of the work of all of the chief figures in the modern movements, beginning with Constable, Turner, Gainsborough, Corot, Manet, Monet, Renoir, Cézanne, and including exponents of all the isms that have achieved notoriety.

Plates XXXIII – XLIV follow page 76.

FIRST NATIONAL BANK, NEENAH, WIS.

Childs & Smith, Architects.

BANKING-ROOM, FIRST NATIONAL BANK, NEENAH, WIS. Childs & Smith, Architects.



THE TRENTON BANKING COMPANY, TRENTON, N. J. Dennison & Hirons, Architects.

MAIN ENTRANCE.

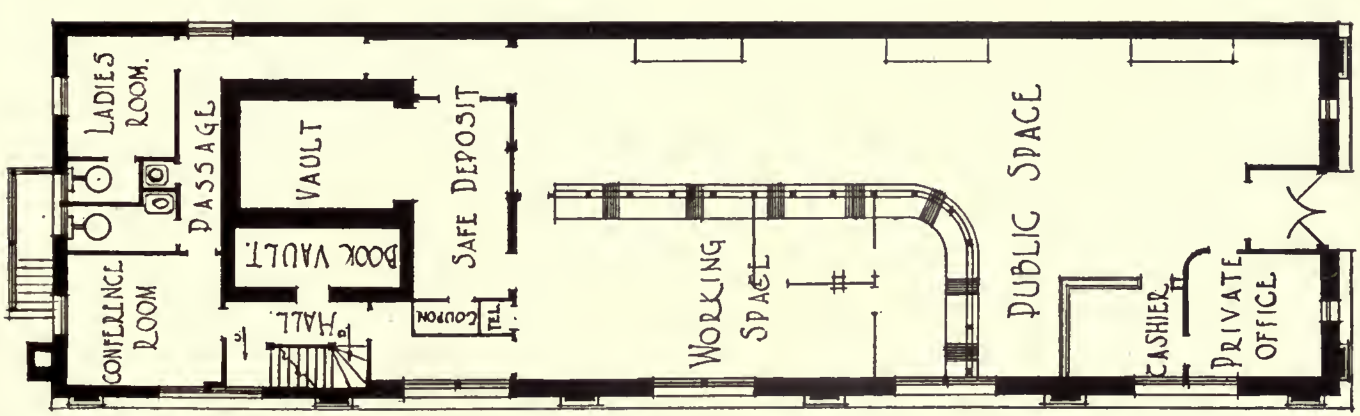
BANKING-ROOM.

Dennison & Hirons, Architects.

THE TRENTON BANKING COMPANY, TRENTON, N. J.

THE BROAD STREET NATIONAL BANK, PHILADELPHIA, PA.

Paul A. Davis, 3d, Architect.



THE CITIZENS NATIONAL BANK, COVINGTON, VA. Alfred C. Bossom, Architect.

CORN EXCHANGE BANK, BRANCH, 311 LENOX AVENUE, NEW YORK.
S. Edson Gage, Architect.

CORN EXCHANGE BANK, BRANCH, 12 WEST 28TH STREET, NEW YORK.
S. Edson Gage, Architect.

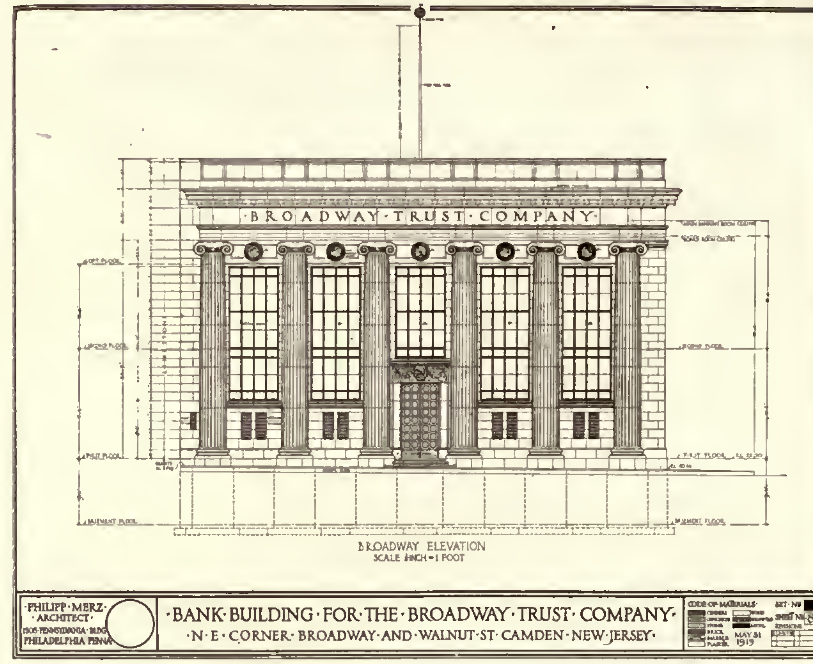
EXTERIOR.

BANKING-ROOM.

Allen & Collens, Architects.

FIRST NATIONAL BANK, BRUNSWICK, MAINE

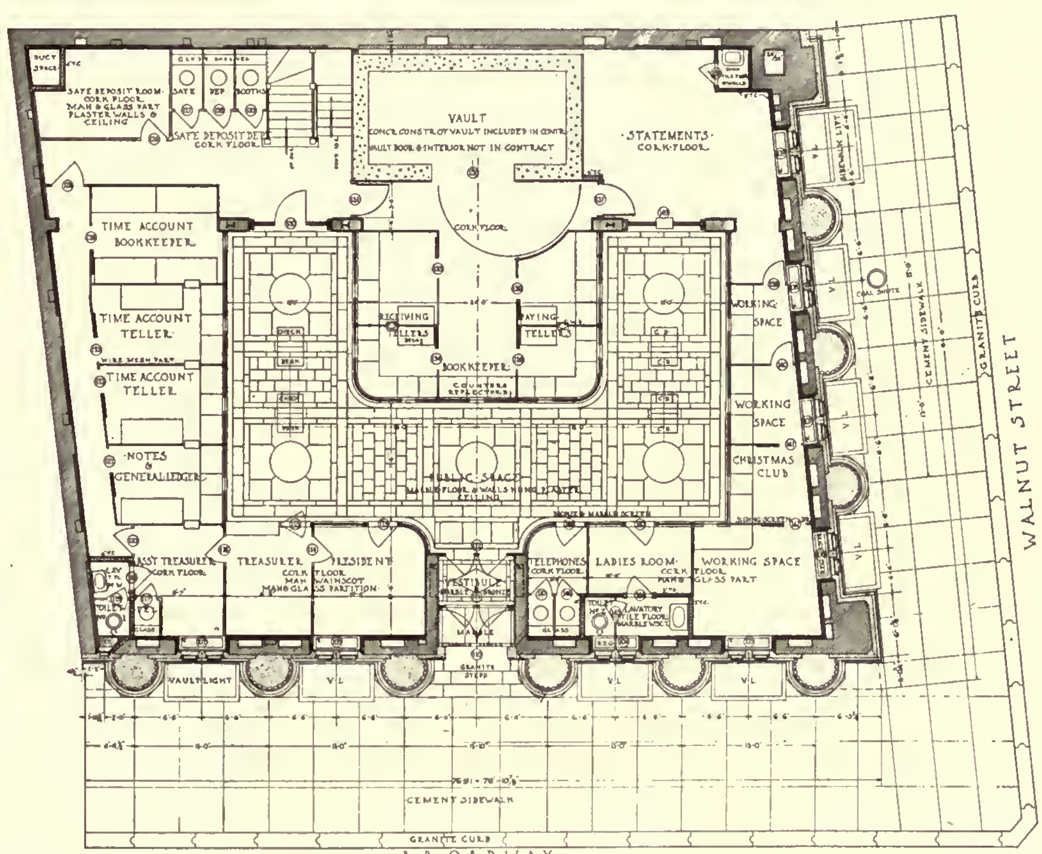
BROADWAY TRUST COMPANY BUILDING, CAMDEN, N. J.



BOARD-ROOM.

Philipp Merz, Architect.

BANKING-ROOM.



FIRST · FLOOR · PLAN ·
$\frac{1}{8}$ INCH EQUALS ONE FOOT

BROADWAY TRUST COMPANY BUILDING, CAMDEN, N. J. Philipp Merz, Architect.


·EAST·ELEVATION·OF·PARAPET·WALL·OF·MAIN·PORTICO·
·SOUTH·ELEVATION
OF·PARAPET·WALL·OF·
·MAIN·PORTICO
·NORTH·ELEVATION·
·OF·PARAPET·WALL·OF·
·MAIN·PORTICO·
·NORTH·PHILADELPHIA·TRUST·COMPANY·
CEILING
2ND FLOOR
GALLERY FLOOR
1ST FLOOR
BASEMENT FLOOR
ALL METAL TO BE BRONZE
INCH SCALE DETAIL OF FLAGPOLE FINIAL
LIMESTONE
GRANITE
ELEVATION OF OUTER VESTIBULE DOOR
OLD FOUNDATION NEW FOUNDATION
·GERMANTOWN·AVENUE·ELEVATION·
·SCALE·¼INCH·EQUALS 1 FOOT·
·ADDITIONS & ALTERATIONS·TO·THE·NORTH·PHILADELPHIA·TRUST·COMPANY·BUILDING·
·PHILIPP·MERZ·ARCHITECT·
·1205·PENNSYLVANIA·BLDG·
·PHILADELPHIA·PA·
·BROAD·STREET·GERMANTOWN·AVENUE·AIRDRIE·STREET·
·PHILADELPHIA · PENNA·
CODE·OF·MATERIALS
CINDERS
CONCRETE
STONE
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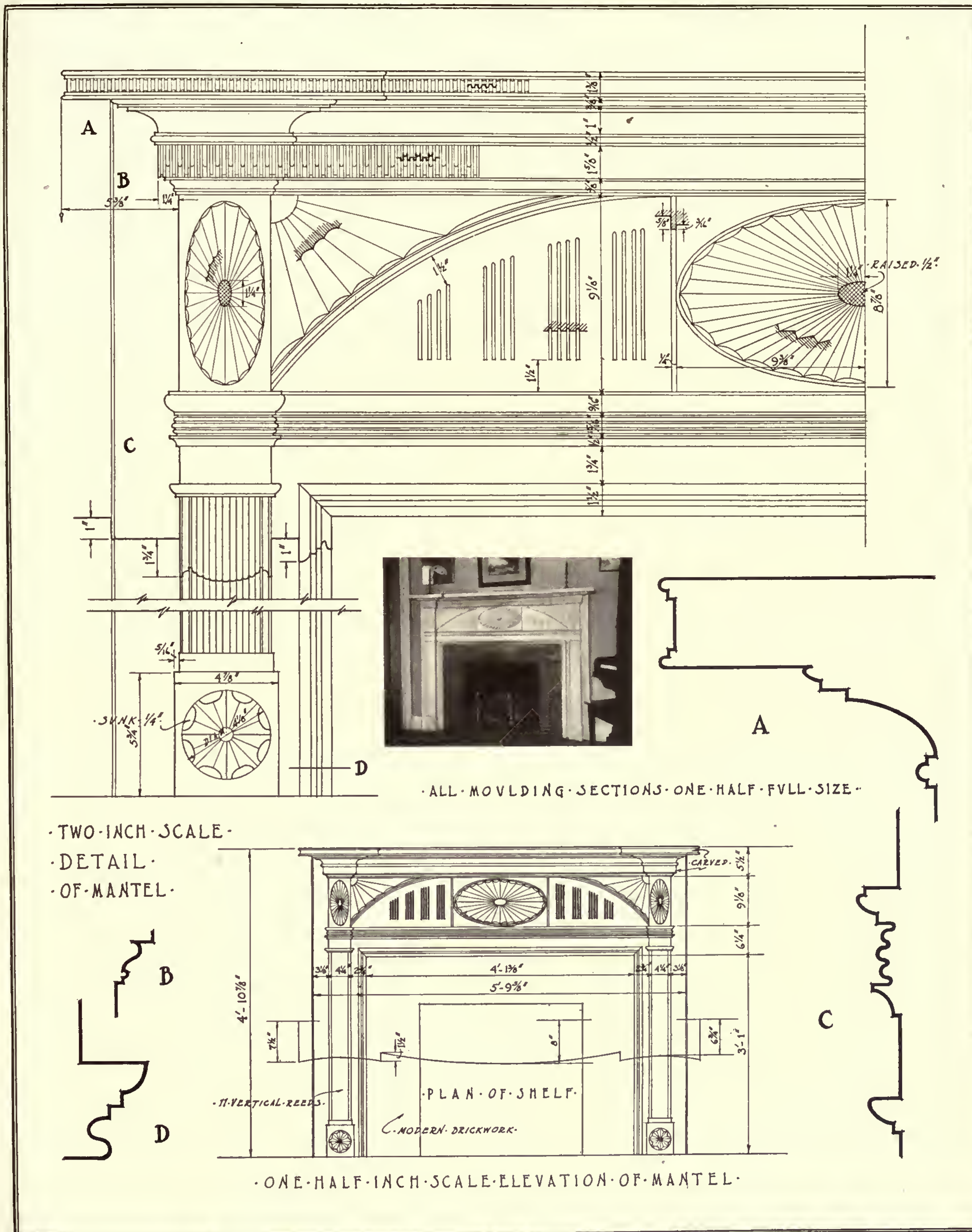
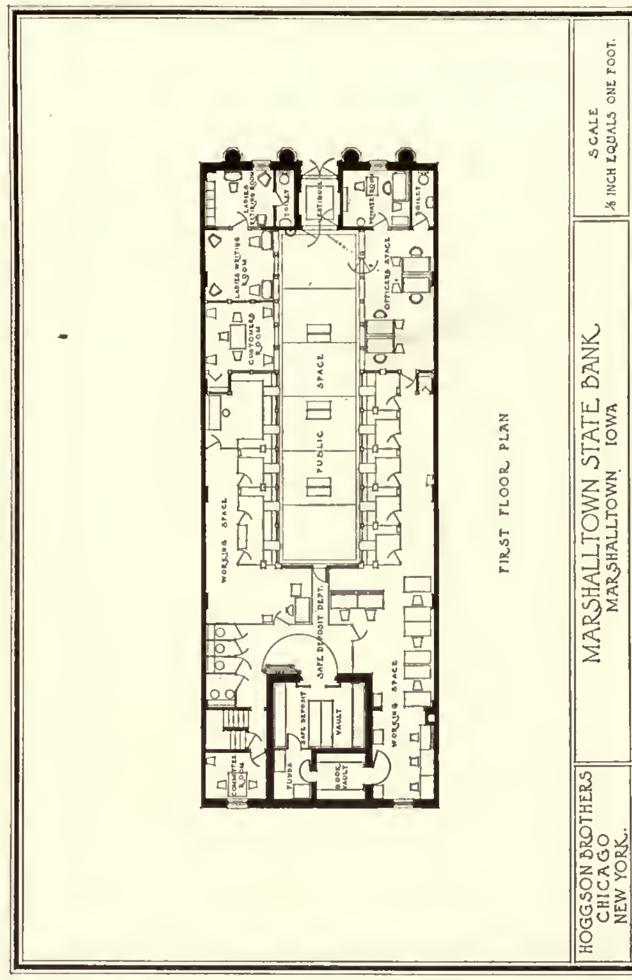
MARBLE
WOOD
PLASTER
HOLLOW TILE
METAL
OLD WORK
SHEET 6
REVISIONS



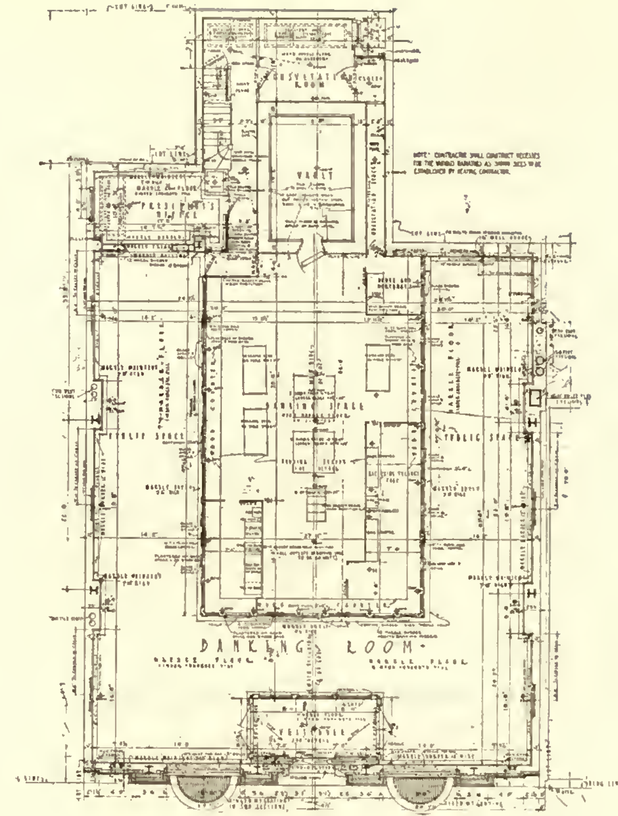
EARLY ARCHITECTURE OF CONNECTICUT	MANTEL *in the* PARLOR *of an* OLD HOUSE *at* 86 BROADWAY NEW HAVEN CONNECTICUT	MEASURED BY J. FREDERICK KELLY DRAWN BY LORENZO HAMILTON

STATE BANK, MARSHALLTOWN, IOWA.

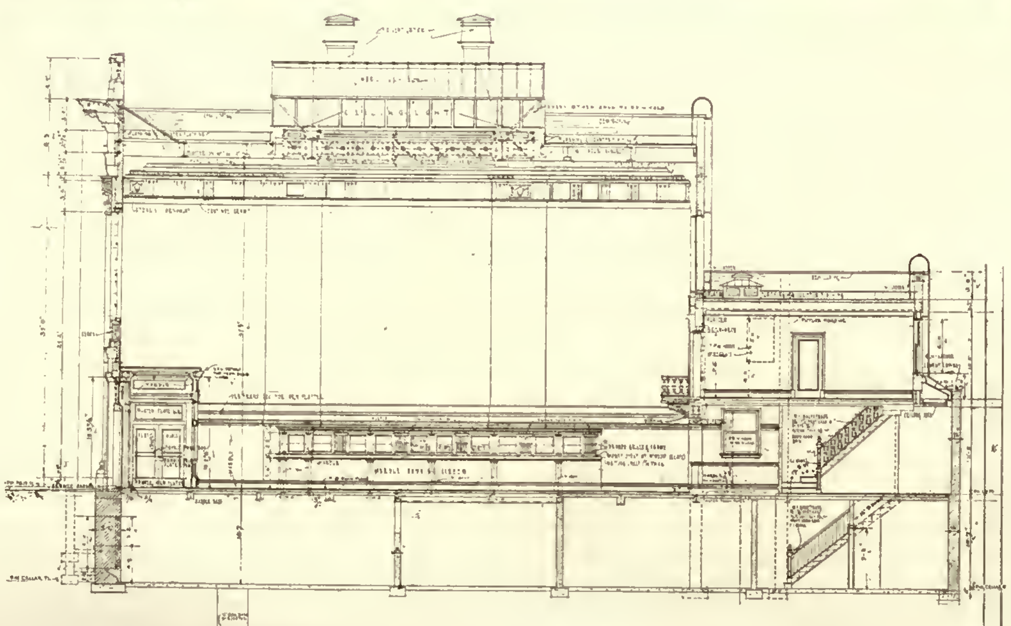
BANKING-ROOM.

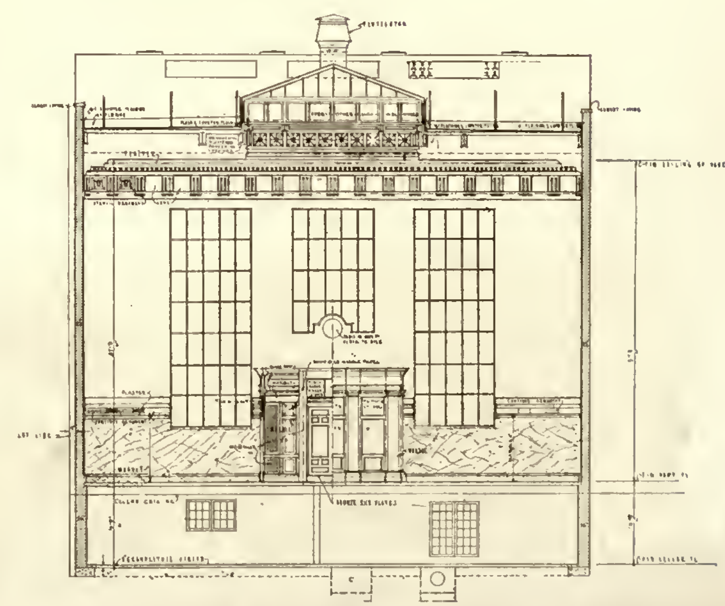



BANKING-ROOM.



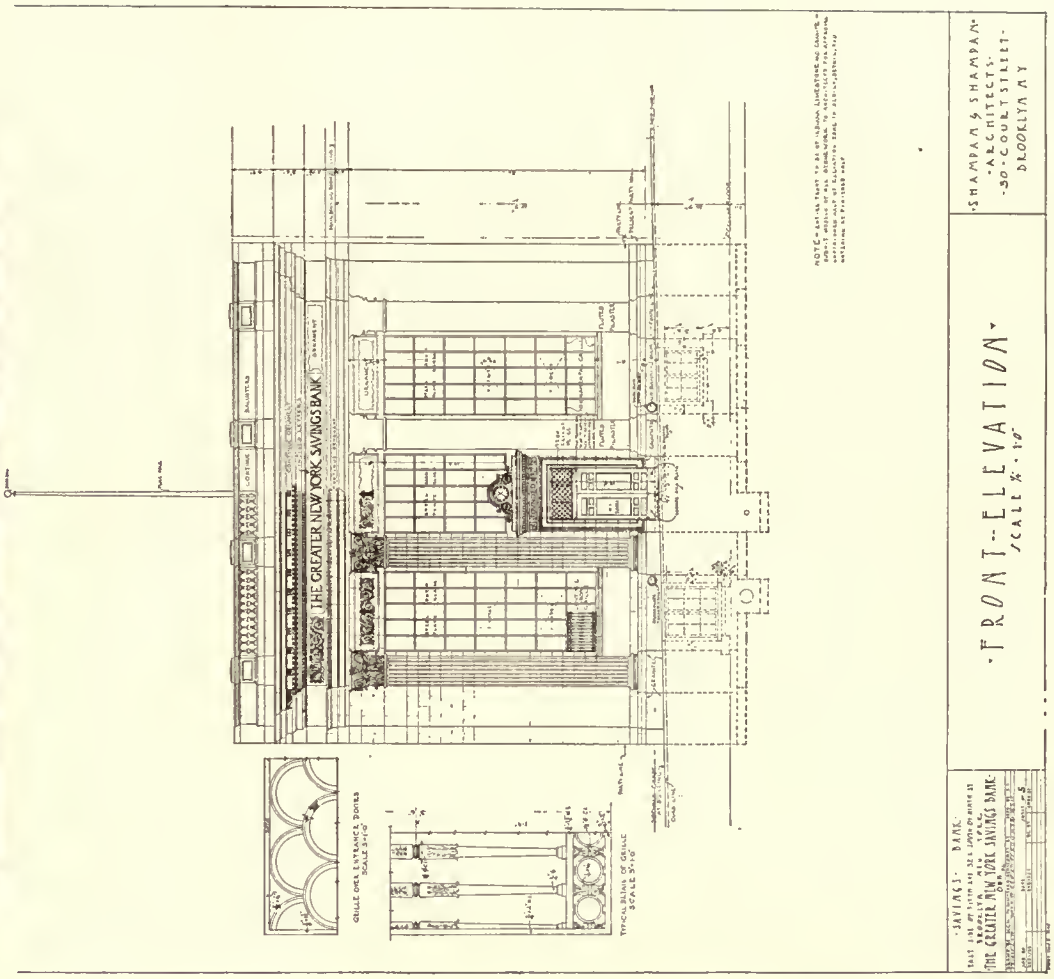
PLAN, BANKING FLOOR.


LONGITUDINAL SECTION.


TRANSVERSE SECTION.

Shampan & Shampan, Architects.

GREATER NEW YORK SAVINGS BANK, BROOKLYN, N. Y.



Shampan & Shampan, Architects.

GREATER NEW YORK SAVINGS BANK, BROOKLYN, N. Y.

The English and French Banks

By Alfred C. Bossom

I VISITED this summer every one of the larger banks in London and Paris with the hope that I might find some fresh ideas that could be adopted to make our banks more efficient or enable us to reduce the cost. All of these considerations are very much in the minds of many bankers just now, particularly those who need a new building.

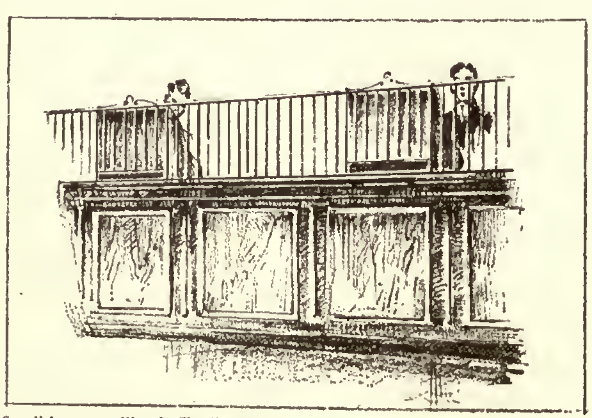
One very conspicuous condition impressed me everywhere in England, and that was the abnormal amount of time the bankers wasted in their efforts to be polite. The rapid-fire methods that we use are certainly not popular over there; but for real service and practical help the American banker is an entirely different being to his colleague across the ocean.

Bank of England.

Usually the English banks are housed in antiquated and mid-Victorian buildings, structures that do not convey the impression that they were intended to be banking-houses in any way whatever. None of them have had much money expended upon them, to judge from the American standards, but the façade in the majority of cases showed a large amount of what we shall term meaningless carving, but which, of course, cannot be attributed to the present-day architects, but rather to the Victorian practitioners.

Internally is the utmost simplicity. The general layout in practically every case is the reverse of our latest theory for banking-room design. The bank's working force is in the centre of the room under a skylight, working at huge desks upon huge books that appear to be large enough to require a small crane to move them. The counter is made of wood and has no protection above it except a small bronze railing about 18 inches high. There is a little sentry-box in front of each teller, about 2 feet 6 inches wide, consisting of a desk with a glass protection around it, so that the visitor cannot see the actual counting of money; but as regards hindrance to a thief jumping over into the bank's space no protection whatever is provided. Marble or bronze was not to be seen in a single one of the banks. In America we do everything to make the visit of the customer to the bank as pleasant as possible, but in England there is little consideration given to the convenience of the waiting public. The employees have a top light over their working space, but around the lobby surrounding the bank's employees there is often little or no light at all, and as for seats, there are none. The check-desk arrangements are, to say the least, somewhat primitive, although the shelf in front of the counter-screen is always wide, so that it is possible to sign a check (if you have a fountain-pen with you) on the counter while waiting to receive the attention of the teller.

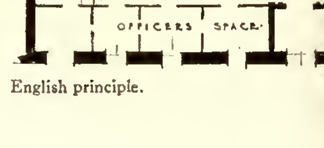
Interior, Guaranty Trust Co., London.



Small bronze railing in English banks.

We do not seem to think a bank is equipped without one of those huge burglar and fireproof vaults, but in England I did not see one of them. They were very conspicuous by their absence. There may be some vaults with circular doors, but I could not find any.

The general wall treatment was perfectly plain plaster in practically every banking-room that I visited. Paint, without enrichment, had been applied to this, and, of course, although the war had prevented much renovation during the last five or six years, it appeared as though it had been many years before that when any effort at renovating or plastering had been attempted. The rooms rather impressed you as being large, rather barnlike places, without the slightest pretense at

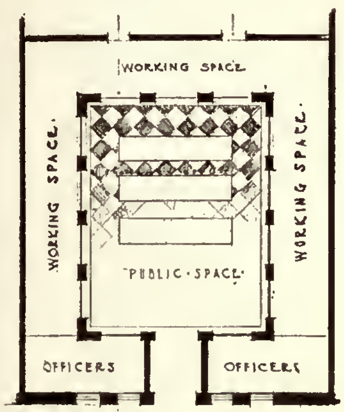


English principle.

architectural treatment; just commercial rooms in which banking transactions were carried on.

The private rooms for the bank were usually up-stairs, though in some cases they extend across the lobby and quite in the dark, lit only by artificial light from the general tellers. The floors were practically all of wood, though some had linoleum upon them.

In France an entirely different disposition was made of the employees and the customers. The entire centre of the room was given up to the customers, and large tables that looked as though they were intended for dining purposes, with chairs or benches beside them, occupied all of this space. The impression the visitor obtained was that these were intended for customers to use when answering correspondence which might have no relation whatever to the bank's business. The bank's employees always surrounded the walls and worked there all day long by artificial light. The central portion of the building, being top lit, was for the customers only.



French principle.

The bustle or activity that is always associated with the American banking-house is entirely absent. The buildings in most cases had been created into banks, and not originally built for that purpose.

The French vault idea is quite the opposite to ours. They believe in having a great number of small safes in an ordinary room; in very marked contrast to our idea of having a very strong room with comparatively large safes inside it. In one case in particular, the head office of one of the largest banks in France, the top of the vault consisted of sidewalk lights which could have been very conveniently broken into with an ordinary sledge-hammer, but apparently it is not customary to break into banks in France, and the officials don't seem to worry at all on that account.

. The general banking-rooms were more or less plain; not quite as plain as those in England, but they were at the best treated with a little plaster enrichment and some paint, marble or bronze practically never being used, except a little in the floors, and this very seldom.

My conclusions are that we have created a very marked fashion of the very handsome bank building here. These old countries have been doing banking business for centuries, handling transactions that have in their time staggered the world of finance by their magnitude, without any of the expensive setting that we have developed and assumed as necessary. Of course the temperament of the different peoples has had a lot to do with this, and to-day the advertising value of the fine bank building is an item which no self-respecting banker tries to avoid, but in Europe it seems to be the one thing he tries to get away from.


Interior of French bank.

Of course in the British possessions, like Canada, American ideas are slowly making their way and the English banks are coming around to advertising in a way that a few years ago was quite unknown.

In the final analysis, the impression that is left on one is that we have created a very efficient banking-house machine, one that accomplishes its purposes with far greater expedition than by the Old World slow processes. They are still fighting very hard to hold their place, but there is very little from their point of view which we can take and adapt to our requirements.

Branch Banks

By Harold Jewett Cook

ALTHOUGH successfully operated in New York City, Cleveland, and Detroit for a number of years, branch banks are comparatively new in the city of Buffalo.

While the first branch bank was opened early in 1916 by the Bankers Trust Company, it was not until 1919 that the advantage of such a system was really recognized and the great banking institutions reached out for community business. Then there was a sudden rush for permits, locations, and buildings, with the result that now the Marine Trust Company has eighteen branches, the Citizens Commercial Trust Company five branches, the Liberty Bank three branches, and the Fidelity Trust Company one branch (in preparation). Aside from these, numerous separate national, State, and private banks were organized and are now operating. To George F. Rand must be given much credit for the development of the idea. After being convinced of its practicability, probably through numerous visits to Canadian banks, he committed his power, foresight, and energy to the project, with the result that banks were opened up in all sections of the city.

A branch bank has a peculiar advantage in that it gives the depositor the privilege of "corner store" service, together with the vast resources and safety of a large institution.

It has the personal touch of a small bank. The manager

Fillmore Avenue Branch, Marine Trust Co., Buffalo, N. Y. Harold Jewett Cook, Architect.

Banking-room, Fillmore Avenue Branch, Marine Trust Co., Buffalo, N. Y.

Genesee Street Branch, Citizens Commercial Trust Co., Buffalo, N. Y. Harold Jewett Cook, Architect.

Banking-room, Genesee Street Branch, Citizens Commercial Trust Co., Buffalo, N. Y.

South Park Branch, Citizens Commercial Trust Co., Buffalo, N. Y. Harold Jewett Cook, Architect.

Banking-room, South Park Branch, Citizens Commercial Trust Co., Buffalo, N. Y.

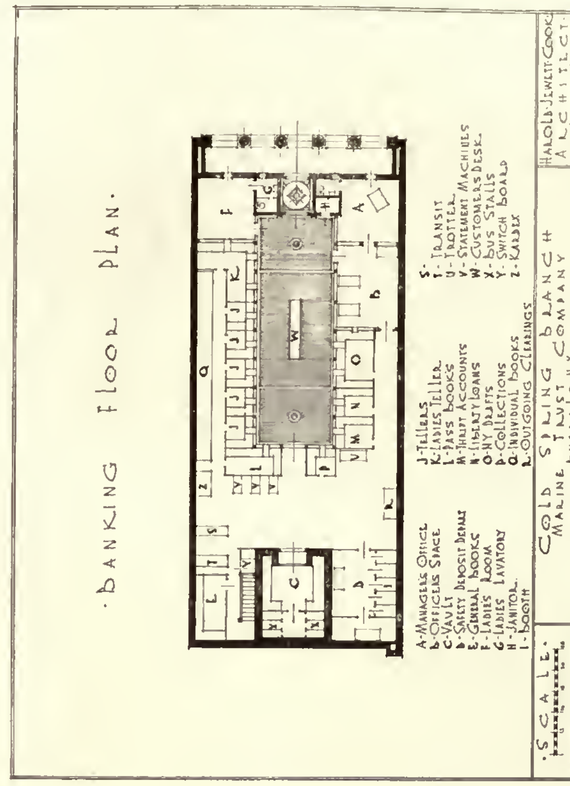
soon knows practically every person entering his branch, and can accord them a neighborly welcome. He becomes the financial factor of the neighborhood. Troubles are brought to him for adjustment. He knows from contact with the merchant whether his business is good, and whether the merchant is worthy of credit or not. This is vital to successful banking, because it may mean a prosperous merchant who recognizes his indebtedness, and who will not only be a continual customer but will influence other profitable accounts.

In every locality where a branch has been opened there is a notable improvement in all business, and particularly in the immediate vicinity of the bank. Property values and rentals have increased, due to the prevalent feeling of the permanency and stability of a bank.

One of the phenomena of the system is that within a period of say six months several hundred thousand dollars seem to find themselves within the coffers of the newly opened bank. A considerable portion of this is what may be termed "mattress," "teapot," "sock" money—good cash—sometimes frayed, old and dirty, but nevertheless legal tender.

Undoubtedly part of the success of branch banking has been due to the fact that they are open Saturday evenings. This is convenient to the depositor. The near-by merchant

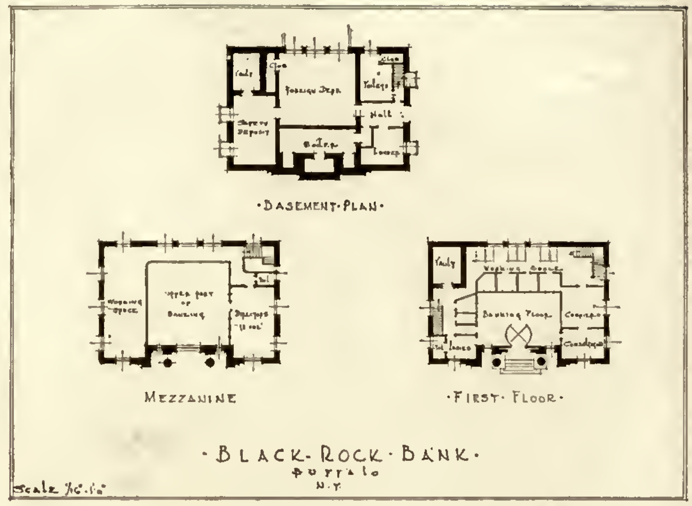
BANKING-ROOM.



Harold Jewett Cook, Architect.

COLD SPRING BRANCH, MARINE TRUST COMPANY, BUFFALO, N. Y.

Entrance, Black Rock Branch, Citizens Commercial Trust Co., Buffalo, N. Y.



Mann & Cook, Architects.

gains accordingly because of the people going to the bank each Saturday night.

The opportunity of depositing a portion of pay will induce an individual to save money and make him acquire habits of thrift.

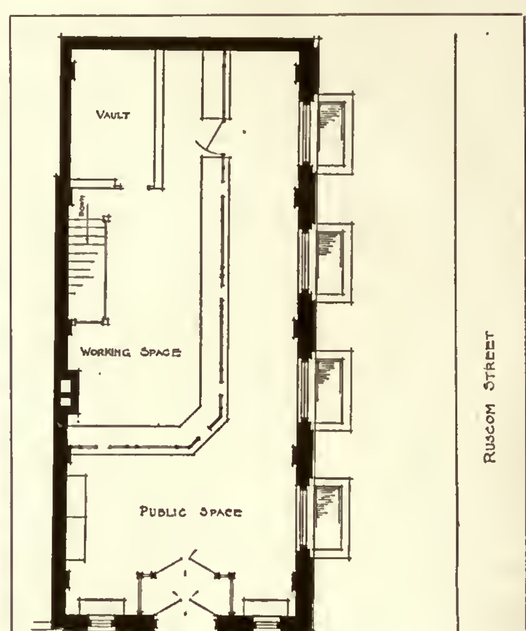
Quite notable is the number of accounts opened by persons who have not had previous banking experience.

Perhaps a word about arrangements and equipment may be pertinent. Standardized equipment is always used so that combinations and shifts may be made without inconvenience. In leased quarters there is no permanent vault, but is otherwise a complete bank. Desk work and fixtures are always of the best type to insure efficiency.

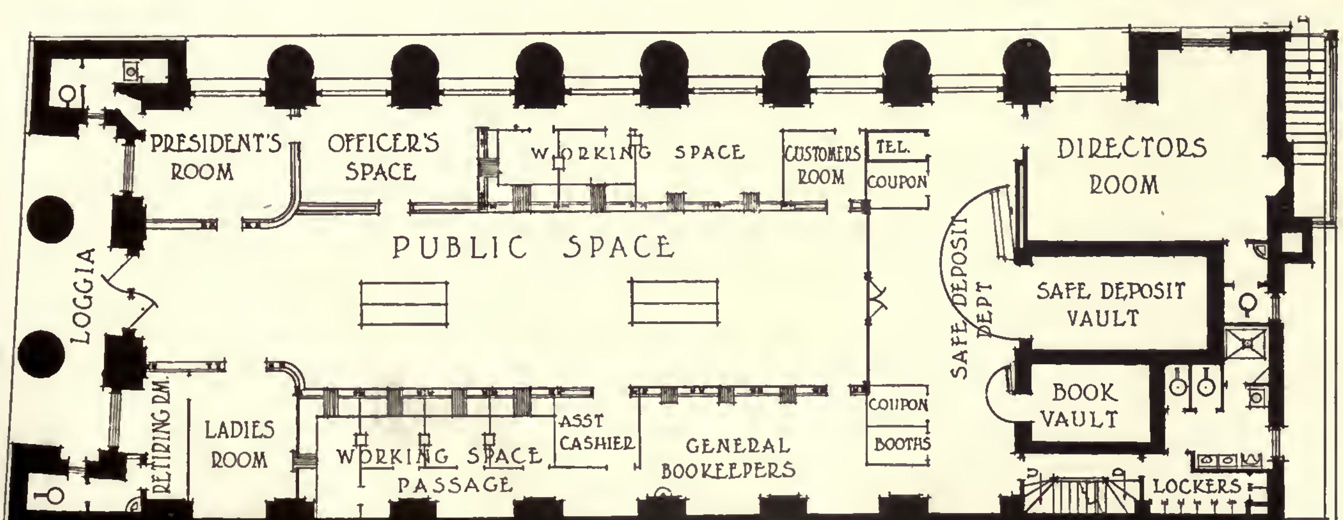
Advantages to the parent bank are obvious. Increased accounts and wider friendships belong to the institution having successful branches. The idea will continue and grow because it affords points of contact in the many communities of the city between the small depositor and the administration of the head office. This means the stimulation of thrift and resultant prosperity to the community at large.

Banking-Room, Black Rock Branch, Citizens Commercial Trust Co., Buffalo, N. Y Mann & Cook, Architects.

Logan Office of Germantown Trust Company, Philadelphia, Pa.



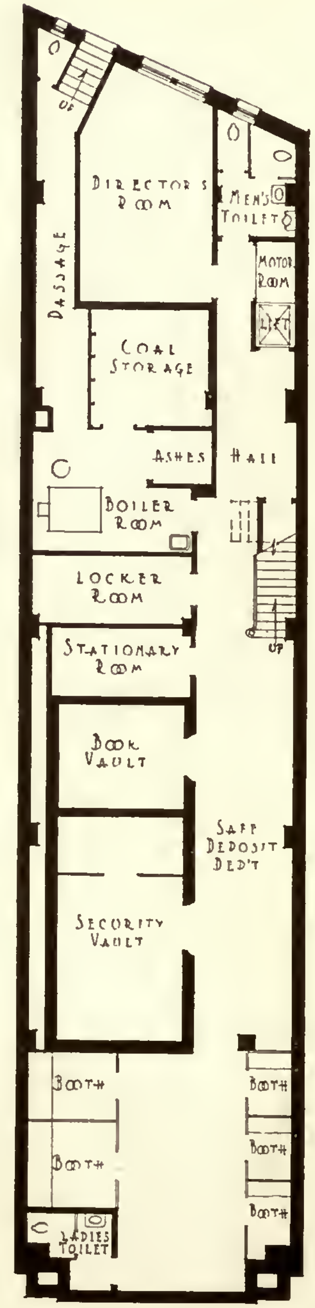
Arthur H. Brockie, Architect.



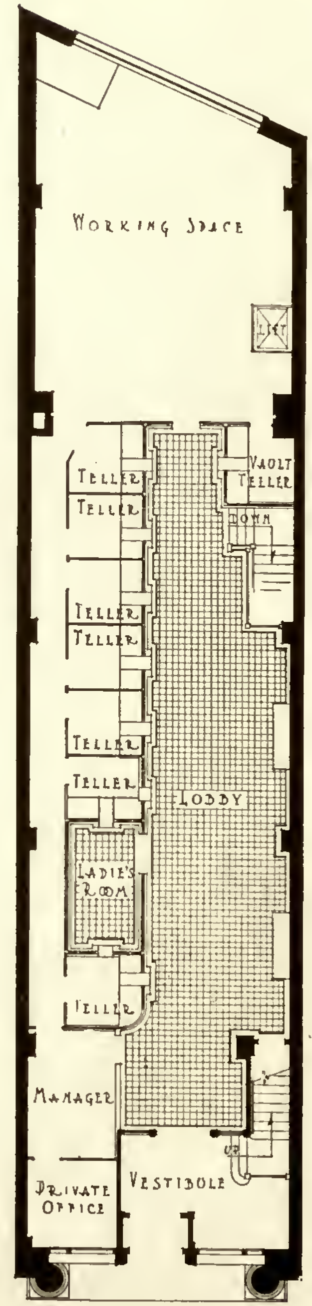
CHARLOTTE NATIONAL BANK, CHARLOTTE, N. C.

Alfred C. Bossom, Architect.

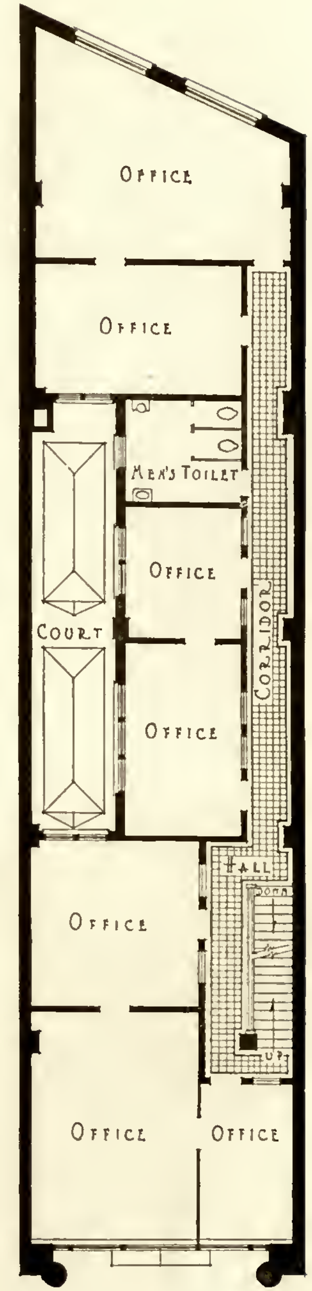
CITIZENS SAVINGS BANK, WASHINGTON, D. C.



BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Appleton P. Clark, Jr., Architect.

CITIZENS NATIONAL BANK, ALTON, ILL.

The Citizens National Bank, Alton, Illinois, recently completed, is an individual building in which the installation of the foundations presented several serious constructional problems.

The site was three hundred feet from the Mississippi River at a location where the river, during flood periods, rose above the sidewalk levels. Under a portion of the foundations and touching them was a culvert six feet in diameter through which surface water from the surrounding hills drained to the river. This culvert was constructed of rubble stone laid without cement, and almost directly above it ran the double tracks of the Chicago and Alton Railroad. The constant impact of heavy railway traffic had disintegrated the walls of the culvert and in several places actually destroyed them.

Surface water, together with water escaping from the culvert, kept the soil wet at all times. In order to construct a building under these unusually difficult circumstances it was necessary to build a concrete footing for the foundations in a form which practically became a raft floating on a sea of mud. This raft of concrete, technically called a floating-mat foundation, was reinforced with steel rods, and upon it was erected the entire building.

As under flood conditions this concrete foundation-raft might be floated from its place, it was necessary to anchor the foundation-raft with a mass of concrete sixty-six feet long, six and a half feet deep, and nine feet wide, the weight of which was sufficient to hold it.

Hoggson Bros., Bank Builders.

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, School of Architecture, Columbia University

Article VII

SAFEGUARDS AGAINST FIRE IN DWELLINGS

The Necessity for Safeguards

THE majority of small houses will be built of either wood-frame construction or of wood-and-masonry construction for many years to come, in spite of the propaganda favoring fireproof dwellings, for the cost of materials and labor are so adjusted that houses of this better type cannot be built by the average citizen. In fact, 90 per cent of the houses erected to-day use wooden studs and floor beams.

This method of building costs the fire-insurance companies about $60,000,000 in 1918. The actual loss must be even greater than this, for not all houses are insured.

We might as well face these facts frankly and accept the next best means of preventing this enormous annual loss of dwellings by establishing safeguards against this fire dragon at the most vulnerable parts of the building. We must place the armor of protection where it is needed most, and set up the safeguards against fire where the dangerous enemy attacks.

On examination of the insurance reports upon this question, we find that 96 per cent of all the fires originate inside of the houses. The most important cause of these fires is defective chimney construction. Bad fireplace design, careless flue construction, and poor masonry work in the chimney are responsible for many a tragic fire and a total loss of furniture, clothes, and household goods of well-meaning citizens. It is true that this is a cause of fire which may be prevented by building good chimnies and fireplaces, but there are other causes that are not so easily regulated, such as explosions from kerosene, short circuits in the electric iron or vacuum cleaner, careless throwing around of burned matches and cigarettes, and many other accidents which are bound to occur in spite of the best intentions. When such fires start, there is only one thing to do: extinguish them in the quickest possible manner. But this cannot be done easily if the walls and the floors of the house are so built that they act as hidden passages and flues for the flames to creep insidiously throughout the building, breaking out in the most unexpected places and entrapping the unwary in dangerous positions. The way that many dwellings are constructed makes it possible for a fire to start in the cellar over the smoke-pipe from the furnace, in the dead of night, creep silently through the floors and up the interior partitions to the attic and second floor, until suddenly, bursting forth in all its fury, it has the sleeping inhabitants ensnared in a box of fire that has cut off their escape. The terrible heat has eaten away the strength of the bearing partitions, the floors collapse, the stairs are encircled with a writhing flame, and smoke and fire issue from everywhere as suddenly as though they had been spontaneously produced. There is no time to fight such a fire as this; about all that can be done is to escape in safety, and then the history of such conflagrations tells of the tragic death of many children left behind in the excitement.

It is this fearful danger of the secret entrapping of fire that is possible to eliminate from the wooden house. At least we can make this demon element come out into the open, where we can see to fight him. We can set safeguards against his passage through floors and walls, up stairs, and behind wainscots. In most cases where houses are so protected a fire can be quickly extinguished by the fire department or by a chemical fire-extinguisher kept in the house.

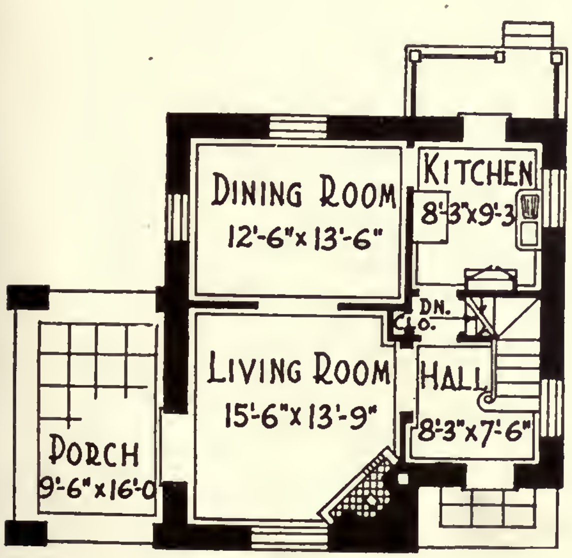
Placing of the Fire-Stops

There are two general places where these fire-stops should be constructed: in the vertical walls to cut off concealed drafts and in the horizontal floors to act as barriers between one floor and the next. A fire which starts in the cellar can be confined for some time from spreading upward if the ceiling is covered with metal lath and plaster and all the possible vertical openings in the walls are stopped with concrete, mineral wool, or other effective material. On the other hand, a fire which starts in the attic may spread to the lower stories by sparks dropping down inside of the partitions, unless they are properly fire-stopped.

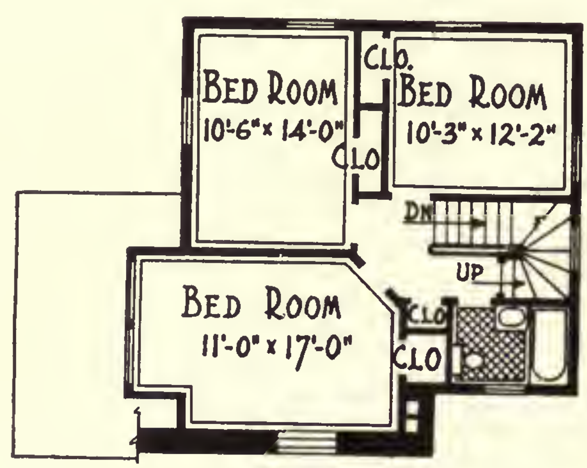
It is very important, however, to have fire-stops carefully built, for when gas is heated to the temperature of combustion it will pass through very small crevices, setting fire to the materials on the other side. It only requires a temperature of 1000° F. to ignite wood, and if the air is this hot, although it may appear harmless, it will set fire to whatever combustible material it touches. For this reason, fire-stops carelessly installed are as good as none. As an example of this, blocks of wood are sometimes used between the studs as a fire-stopping material, but, as it requires time to fit this material in place, small cracks are often left between the blocks and the studs which permit the heated gases easily to pass through them to the other side. This is also true when bricks are used for fire-stops. As the average stud is only about 3⅝ inches wide, and the average brick is 4 inches, it is impossible to fill the space between the studs with bricks, laid flatwise, but they must be set on edge, leaving a wide crevice which must be filled in with mortar. This is often poorly done or omitted entirely, making the brick fire-stop inadequate.

In enumerating the places where fire-stops should be built, the most important ones appear to be the blocking of the space between the plaster and furred brick wall at each floor level and the closing of the air-space in exterior stud walls at each floor (Figs. 1, 2, 3). The filling in of the hollow space at the base of every interior stud partition is likewise necessary (Fig. 4). A wooden cornice banks up the heat from any neighboring fire, and it is advisable to fire-stop the space around the ends of the rafters where they join with the ceiling joists over the plate (Fig. 5). Where the second floor of the house projects out over the porch, it should be filled with fire-stopping material, not only for safety against fire but also to keep out the cold in the winter (Fig. 6). The pockets into which sliding doors roll should be lined with gypsum board, not only as a fire retardent but also to prevent cold drafts from coming out of these pockets (Fig. 7). The plaster should be carried down behind all

(*Continued on page* 90.)



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE, H. B. KNOX, NARBERTH, PA.

Wallace & Warner, Architects.

(*Continued from page* 88.)

wooden wainscots as a fire-stop (Fig. 8). The space between the stair carriage should also be closed at each story (Fig. 9), and all chases and ducts should be filled at each floor level. Wherever exposed pipes pass through horizontal parts of the house they should be run through sleeves. Wherever hot-air flues go from one floor to the next they should be packed around with incombustible material (Fig. 10), and all registers in floors should be insulated in the same way. The space between floor-joists and chimneys must also be filled in with fire-stopping materials.

Materials To Be Used

It is not necessary to use expensive materials for fire-stops, but they should be carefully placed. Materials like mineral wool are the best, since they expand as the wood shrinks and fill up the space. Concrete which is held in position by strips of metal lath is also excellent. The concrete or mortar used can be made from refuse material, and need not have any great strength. Old bricks are satisfactory if they are slushed into position with mortar which fills all the crevices. Gypsum blocks are good except for damp location, where they absorb moisture easily and, holding it, induce dry rot in the surrounding timbers. Asbestos board, gypsum board, and metal lath and plaster are suitable for covering large areas, such as cellar ceilings, over the boiler. In fact, fire-stopping can be cheaply done with odd and end bits of material which usually go to waste around the building.

The details of constructing these fire-stops are best shown in the illustrations, and no further descriptions will be necessary.

Chimney Construction

In view of what was said in the first part of this article, the construction of a chimney by approved methods is also a safeguard against fire. It can be considered a rule that every chimney should be lined with a terra-cotta flue, that every chimney should be an independent structure of its own, with walls thick enough for stability, capable of standing upon their own foundations and not hung from any part of the structure, that all woodwork of the building should be framed far enough from the chimney to make no contact with it, and, finally, that all the smoke-pipes which enter into the flues should be proof against leakage of flames and heat of such intensity as to cause combustion.

In the past this need of lining the flues of a chimney with terra-cotta flue tiles was not considered important, but to-day it is a well-recognized fact that no chimney is safe without this protective lining. There are many instances where chimneys are built without this lining and show no fire dangers, but the action of flue gases is slow and sure, and the mortar is attacked gradually, with the resulting disintegration of the brickwork, through which the flames eventually find their way to the surrounding wood timbers. It is found that even where terra-cotta flue linings are used the hot gases from the burning of natural gas as a fuel break down their resistance and they crumble, so that in such cases the flue linings should be made of fire-clays. From practical experience the minimum thickness allowable for any of these flue linings should be 1 inch, and the joints should not be made with collars.

When setting these linings they should be laid in cement mortar, not in lime mortar, for this disintegrates under the action of gases from burning wood. The joints should be struck smooth on the inside, and the space between the lining and the brickwork filled in solid with mortar. Whereever two flue linings are run within the same chimney space, the joints should be staggered or offset at least 6 inches. Two linings, however, in one chimney space should be the maximum number permitted. Where more are required, each group of two should be separated by brick walls of at least 4 inches which are well bonded into the outside walls of the chimney. This is in order to give stability to the chimney and also prevent any fires in one flue spreading to others. The thickness of outside walls of the chimney around the flues should not be less than 4 inches if built of brick or reinforced concrete, but if built of stone they should be 8 inches. Wherever there is no flue lining of terra-cotta, such as in the smoke-chamber, the thickness of the masonry from the interior to the exterior should never be less than 8 inches.

If chimneys are built of reinforced concrete, the reinforcements should be run in both directions to prevent cracks during the setting of the cement or from temperature stresses. Where concrete blocks are used, reinforcements should run continuously around the blocks, and the shell of the blocks should not be less than 4 inches thick.

Wherever the walls of dwellings are of brick and 12 or more inches thick, they may be used to contain chimney-flues. If it is necessary to corbel out the flues from the wall, they should not extend farther than 4 inches from the face of the wall, and the corbelling should not be done with less than five courses of bricks.

Next in importance to the correct lining of flues is the proper construction of the foundation under chimneys. There are often cases where it is necessary to cut off the chimneys below in part or in whole to supply room on the first floor. This should be avoided as much as possible, but if it cannot be done it should be supported by steelwork from the ground up.

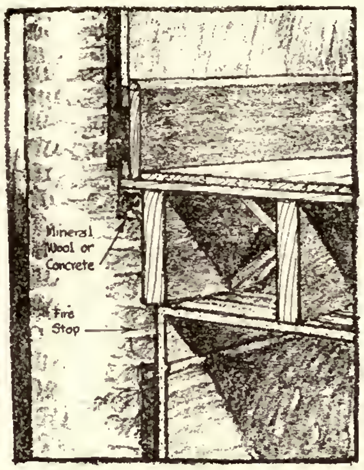
Another mistake that is continually made is to cut off the chimney at too low a level and cap it with only a plastering of mortar. All chimneys should be carried at least 3 feet above flat roofs and 2 feet above the ridge of a peak roof and properly capped with stone, terra-cotta, or concrete. If they are not capped, and the bricks improperly tied, the mortar joints will be loosened by the action of the weather and the heat issuing from the chimney, and eventually the bricks will be moved from their position, leaving the top in a dilapidated condition.

This extension of the chimney through the roof leaves a joint which must be covered with flashing to prevent leaking. The usual method of building a tin-covered cricket behind the chimney, and protecting the other sides with tin flashing counterflashed is very satisfactory; but the practice of corbelling the brickwork out over the roof, in order to cover over the joint, is extremely bad practice. When a chimney built in this way settles, the corbelled-out parts catch on the roof, and the whole top of the chimney is lifted off, leaving a crack through which the hot gases pass to the wooden rafters.

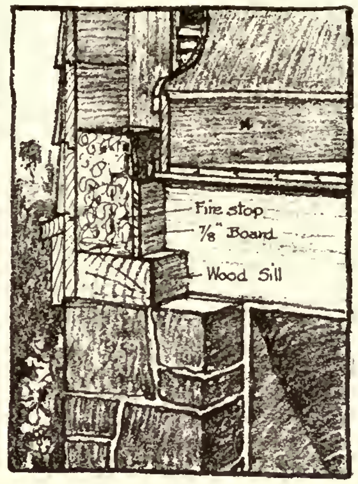
If there are any fireplaces to be built in the chimney the walls should never be less than 8 inches thick around them. It is best to line them with fire-brick of at least 2 inches in thickness. Hearths should extend in front of the fireplace at least 20 inches to prevent sparks from falling on the wooden floors. These hearths should be supported upon trimmer arches or be constructed of reinforced concrete. It is important to keep the woodwork of any mantel away from the opening at the top at least 12 inches and at the sides at least 8 inches.

In fact, no woodwork should be permitted to come in contact with any part of the chimney. Wooden beams and joists should be kept at least 2 inches from the chimney and at least 4 inches from the back of any fireplace. This space,

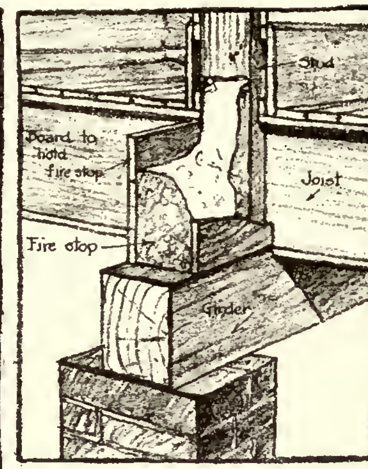
Fire stopping of furred off space in brick wall
Fig 1.



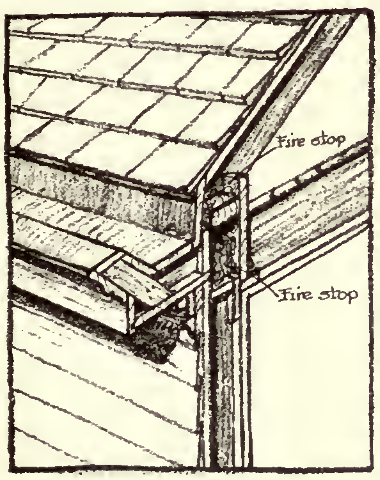
Fire stopping of furred off space in brick wall
Fig 2



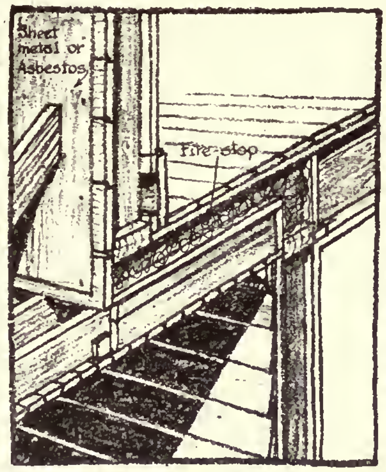
Fire stop at base of exterior stud wall
Fig 3



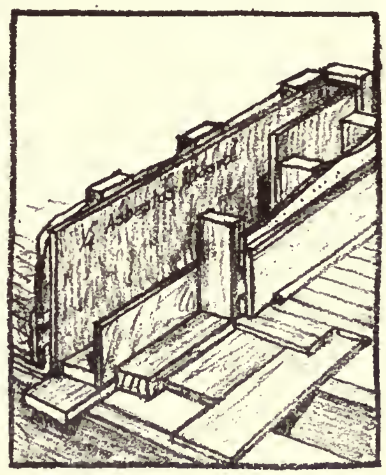
Fire stop for interior bearing partition of studs.
Fig. 4



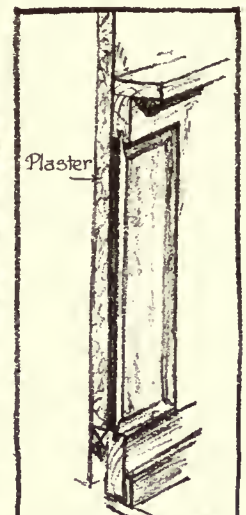
Fire stop at end of rafters
Fig 5



Fire stop in ceiling of porch roof where 2nd floor projects over.
Fig 6



Fire-stop of sliding door
Fig 7



Fire-stop of Wainscot
Fig 8

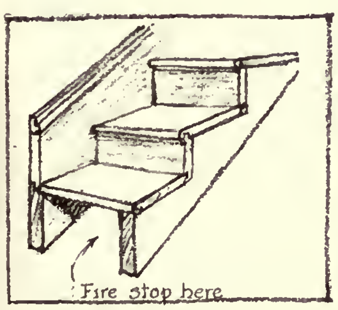


Fig 9

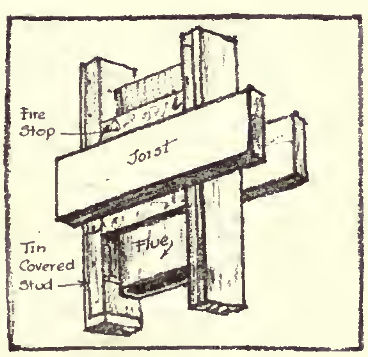


Fig 10

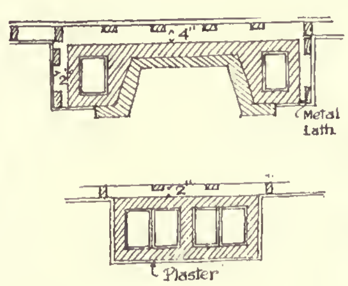
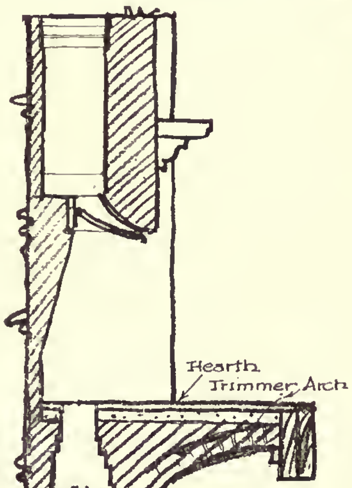


Fig 11



Fire place
Fig 12

This business of setting up fire-stops when the house is being constructed should be known by every architect. The closing of the passage between the plaster, furring strips, and masonry wall, the blocking of continuous ways through exterior stud walls and interior bearing partitions, the filling in of the hollow spaces behind wainscots, the protecting of the underside of stairs, and many other precautions can be provided for in the plans and specifications without adding much to the expense.

as was previously stated, should be filled in with fire-stopping material. Where a chimney is on the line with a wooden stud partition, it is better to plaster directly over the brickwork of the chimney than to carry studs over it on which lath and plaster is constructed. By using metal lath over the brickwork the danger of cracks can be eliminated. Where a baseboard must be carried along this wall in which such a chimney occurs, the plaster should be carried down behind it and then asbestos board should be placed behind the baseboard to prevent too much heat coming in contact with it.

If these precautions are taken in the construction of the chimney and the correct methods of fire-stopping employed, the house of wood can be made less of a fire-trap than it is to-day. None of these devices require much additional expense, and should, on this basis, have a broad appeal.

The Use of the Order in Modern Architecture

By Egerton Swartwout

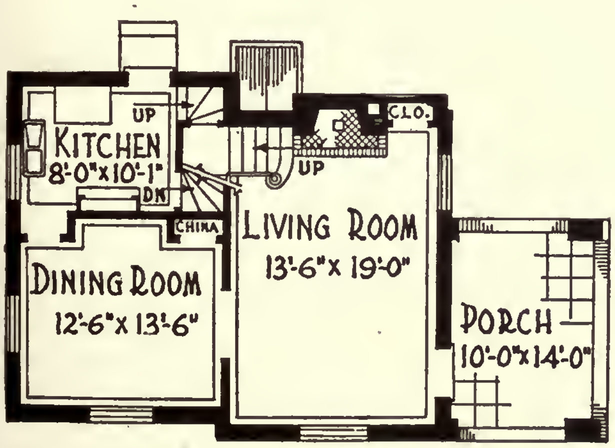
Third Article

THE IONIC ORDER

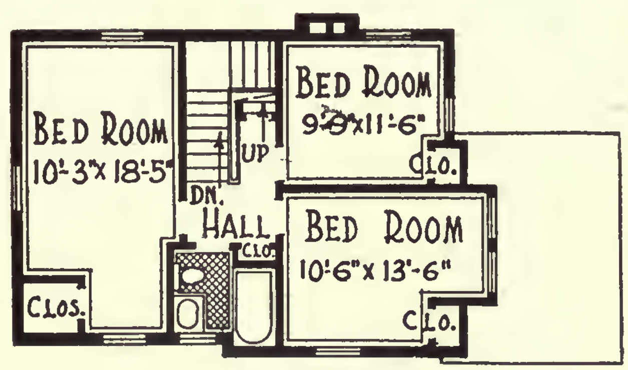
IT has been stated in a previous article that an order is a decorated means of support. Considered as such, and with particular reference to the function of the cap, there are but two divisions of the orders: the structural, represented in its simplest form by the Doric and in its decorated form by the Corinthian; and the unstructural, the Ionic. In the structural the column terminates in a block or abacus which may be square, as in the Doric; or more gracefully shaped, as in the Corinthian. The transition between the abacus and the shaft, between the square and the round, is made by the simple echinus in the Doric and by a decorated bell-shaped form in the Corinthian. The principle, however, is the same, and seen in perspective the effect is strikingly similar in outline, particularly if you compare the Roman Doric with some simple Corinthian form. In the Ionic, the unstructural, the block on top of the column is the main feature of the order; the corners of this block have been rounded and have taken the form of volutes, and because of the projection of these volutes, the cap is not square or four-sided, as in the other orders, but is rectangular and two-sided: the echinus is relatively smaller and is largely hidden by the volutes. The whole cap is unstructural; it is mere decoration, but artistically it is beautiful.

As its name implies, its origin is Asiatic, but, like the Doric, it reached its apogee in Greece, although there it never displaced the Doric in general favor, and, in fact, was only used in smaller and more intimate work, or for interiors. Nor was its use traditional or of long duration on Greece. It was first used as an already perfected order in the little temple in the Ilissus and in the Nike Apteros temple on the Acropolis at Athens. In a few years it attained its perfection in two quite different forms on this same acropolis, the simple but magnificent interior order of the Propylæa and the exquisitely decorated order of the Erechtheion. Shortly afterward an entirely different variant of the Ionic was developed in the interior order of the temple at Phigalia or Bassæ, a most curious and interesting example of a four-sided cap. There are also very highly developed orders in Asia Minor at Priene, Halicarnassus, and elsewhere. In Rome, although the order was used frequently, it never attained the popularity of the Corinthian. Its use in both countries was probably limited by the fact that it was not a four-sided cap, and therefore could not be used in its regular form at the corner of a portico or temple, and it is this very fact which limits the use of the order in modern times. In the Erechtheion it was so used, and also probably in the mausoleum of Halicarnassus and in other temples in Asia Minor, but the corner cap was merely an expedient and not a fortunate one. Evidently the Attic Greeks so considered it, for the experiment was not repeated. In Renaissance and modern times it has been used very successfully in porticos of only one range of columns; in these cases, as there is no return on the flanks, the two-sided cap is satisfactory enough for the corner; and, of course, for a portico in antis it is eminently satisfactory.

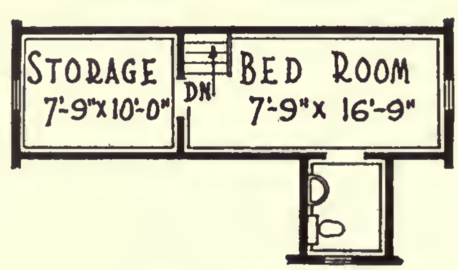
In the adaptation of this order to modern use, the principles heretofore outlined are generally to be recognized. Particular attention must be given to the size of the prototype and to the material of which the order is to be constructed. As to size, the little order of Nike Apteros is only about 13 feet high; this accounts for the proportionately excessive size of the volutes and for a certain clumsiness of proportion which would be most objectionable in a larger order. The two orders of the Erechtheion are only 22 and 24.5 feet high respectively, the measurements given being in all cases column heights. The Erechtheion order is, therefore, relatively small and is extremely delicate in detail; in fact, the detail is only adapted to marble, and the effect becomes grotesque where the same is attempted in granite with a column height of 40 feet. Such a thing has been done, and done more than once. In fact, this order is one which I think we should never attempt to copy. It is such an exotic thing, so typically Greek in feeling, so delicate in detail, that it does not seem to be appropriate to our times nor to our method of work; and yet, curiously enough, it seems to have been one of the most popular. On every side and in all materials and of all sizes it can be seen. Its sudden development in Greece presents one of the most fruitful fields for architectural speculation that I know. It shows the wonderful ability of the Greek artist in a way that not even the sculptures of the Parthenon can equal. The Greek architect has for centuries been developing one order: the Doric. He had greatly improved it, he had even perfected it, but after all it was a very gradual development, and practically a development of an order; the plan and arrangement of the temple itself had not been materially altered. But suddenly Mnesicles abandoned all tradition and built the Erechtheion on an entirely new plan and with an order new to Greece. The man actually invented a new style overnight, as it were. And yet I wonder if the development was so sudden after all. The architect had undoubtedly travelled in Asia Minor and had seen the Ionic examples over there; he was familiar with the Ilissus and the Nike Apteros temples; he had probably long studied the anthemion ornament in its painted form in Greece and in the carvings of Asia Minor, and had, undoubtedly, made careful



First Floor Plan



Second Floor Plan



Third Floor Plan

HOUSE, MRS. RENEE C. BARRIE, NARBERTH, PA.

Wallace & Warner, Architects.

studies of the order long before he had an opportunity to use it. The plan is so radically different from any existing temple that it must have been dictated by the priests and is entirely fortuitous. In all probability the temple does not exist in what was intended to be its ultimate form. In any event, it was a remarkable production, and as an order as remarkable as that of the Parthenon.

I have said that I don't think it æsthetically adaptable to modern work. Practically, its adaptation is even more difficult. I don't mean that modern carvers with the aid of the pneumatic tool cannot equal the mechanical perfection of the ornament. It can be done, but the spirit would be lacking. It seems almost impossible to reproduce the spirit and character of Greek ornament nowadays; the result is always hard and wiry. The Greek work was formal but very free, and this freedom was undoubtedly the result of the employment of enthusiastic and highly skilled workmen, who were not copying by the yard ornament designed fifteen hundred years ago, but were doing something new and original, and who were as much interested in the anthemion they were carving as Phidias himself was in the carving of the chyselphantine statue of Zeus. They were also well paid for their work. Records that have been found prove that as much was paid for the carving of a running foot of egg-and-dart moulding as for one of the figures in the metopes. I have often thought that the reason for the hard wiry feeling in modern reproductions of Greek detail was largely due to the fact that most of the reproductions of classic work were done in line. Line-drawings are interesting and present the detail clearly, but they do not represent it correctly in most cases, and they entirely fail to give the spirit and character of the original. Even the carefully rendered French restorations are nothing more than line-drawings drawn at a large scale and with mathematically cast shadows. It is all hard, hard as nails, and the original was not. Greek detail should be studied from casts and from photographs, and directly in the clay, not on paper. From the casts, or even from photographs, an idea can be obtained of the character, of the projection, of the sections, and the sweep of the curves that can never be gotten from the line productions.

But to return to the Erechtheion order. As I have said, I don't think it should be reproduced, or rather its reproduction attempted, but still such an attempt will often be made, and, if so, careful consideration should be given to the fact that the order as it stands is a most carefully studied whole; every proportion, every piece of the detail, has its use and plays its part in the design of the entire order. It will not do to use the cap with a plain shaft, or with a shaft that has not the deep fluting and narrow arris of the original. Even the curious rounded fillet over the top of the flutes must be retained or some other means adopted to bring the plain surface of the shaft between the tops of the flutes into scale with the detail of the cap. The ornaments in the mouldings are architecturally necessary, and the sculpture in the frieze is an important feature, or rather it is the most important feature in the entire entablature. It should be remembered that in Greek architecture the frieze was always the principal element of the entablature, just as the cornice was in Rome, and the Erechtheion order without a sculptured frieze is like an otherwise well-dressed man without a necktie. In the Greek order the effect was intensified by contrast; the sculpture was in white marble on a background of bluish-gray Eleusinian stone. The cornice was small and thin, a mere shelf of marble, with a simple bed mould which, on account of the undercutting of the soffit of the cornice, is scarcely visible in direct elevation. The cornice counted to a great extent with the marble roof, as in the Doric temples, and is not enough of a crowning feature when used alone; the Greeks added a cymatium where it was used on a gable. It never, by any possibility, should be used as a string-course.

There is in the Lateran Museum a cap which is interesting to compare with the Erechtheion cap; there is a certain similarity in scheme in that both have neckings decorated with an anthemion motive, but the detail in the Lateran cap is as distinctly Roman and florid as the other is delicate and Greek. In some ways the Roman example is fully as interesting as the Greek, and is certainly more adapted to modern work.

Of the simpler form of cap there are many examples, the best Greek cap probably being that of the Propylæa at Athens. The cap of the mausoleum of Halicarnassus is also good, and interesting examples are found in the temple of Athene Polias at Priene, Apollo Didymeus at Miletus, and Diana at Ephesus. These orders are larger than the Erechtheion. The Propylæa order is over 33 feet and that of the temple at Priene is 39 feet high. While the caps themselves of these latter Ionian examples are good, the relation between the cap and the shaft is not always happy; in point of fact it is this relation of cap and shaft which is the main feature of the Ionic order. There is, of course, no absolute rule of proportion governing this relation. It varies in all examples and is a matter of design solely, and should be studied as such. The projection of the volutes varies with the actual size of the order, the material and character of the cap, and the proportion of the shaft, and in this most important feature the plates in the books must be followed with caution. Most of these plates do not show the entire order, or if they do it is at a very reduced scale, too small to measure accurately. Usually, the cap only is shown, generally with modular dimensions, while there is nothing to show the dimensions or proportions of the shaft. It often happens that a cap is detailed directly from these modular dimensions and placed upon a shaft entirely different in proportion to the shaft of the prototype.

As to the proportion of the shaft itself there is, of course, no definite rule. Vignola puts it at 9 diameters high, perhaps basing this on the proportion of the order of the theatre of Marcellus, but this is the only classic order which has this proportion. The small order of Nike Apteros is only 7.7 high, while the Erechtheion, also a small order, is much more slender, reaching a proportion of 9⅓ to 9½. The Ionian orders are also thin, being somewhat over 9, and this slenderness is rendered more apparent by the relatively small size of the cap, the volutes of which are much too small for the column. The Attic Greeks undoubtedly felt this, for in their first orders, the Ilissus and Nike Apteros, the columns were very sturdy and the volutes large. When the Erechtheion was built there was an evident desire for a more graceful column, and they made the proportion even greater than in the Ionian examples, but increased the size of the volutes and added the necking. A comparison of the Ionian orders and that of the Erechtheion shows clearly the superior ability of the Attic Greeks. The Roman orders, as might be expected, are generally more sturdy than the Greek, being 9 or a trifle under. The entasis is very slight in the Greek work and greater in the Roman. It is a question of taste and design, but in no case should it be noticeable. The entasis should be a slight curve beyond a straight line connecting the lower and upper diameters. There is no reason whatever for considering the lower third of the column as vertical, as is sometimes done in books of reference. It is true that the curve of the entasis beyond the straight line of the diminution approaches the vertical, but it is not actually vertical in any case; it is a continuous curve.

As to the proportions of the cap, the size and projections of the volutes, etc., I would refer you to the various types shown in the books, but in following any of these examples, the size and proportion of the shaft, as well as the material, should be carefully considered; in fact, the only common-sense way to determine the size of the cap and the projection of the volutes is to study the entire order, particularly the shaft cap and base, at a large scale in silhouette. Three-quarter scale is generally large enough; the background can be blocked in, or the column itself can be darkened; the latter scheme is perhaps better and is certainly easier, but any scheme will do that will enable the silhouette to count when the drawing is placed upright. A number of studies should be made and the one that seems the most satisfactory should be modelled in plaster. No detail need be shown on the model, except that the sides of the volutes should be cut away approximately as they should be, otherwise the effect of a quartering view will be lost. This model must be absolutely accurate, however, otherwise it will be worse than useless. A study of this model may suggest further changes in proportion and the whole thing may have to be done over, but when the model is finally satisfactory the dimensions thus found can be followed with confidence both in the details and in the full-size model. I am emphasizing this point because I am convinced that in no other way can a satisfactory proportion be obtained. A cap merely taken straight from the book and modelled full size may come out very well indeed, but if it does it is purely by accident, and not because of any skill or care on the part of the architect.

When once the size and the projection of the volutes is determined the detail can be put in according to the design adopted. There is no absolute rule of proportion or treatment. There are a few points, however, that should be borne in mind: the abacus is generally square, and its size depends chiefly on its projection from the line of the volutes on the front of the cap. If the volutes have an excessive sideways spread there is no reason why the abacus should not be slightly rectangular, provided always that the cap is not on a corner column. Again, the echinus, which is usually ornamented with an egg-and-dart motive, should not be entirely lost under the side-cushions; a portion at least of this moulding should be distinctly visible for the entire circumference of the cap, as well as the fillet or bead and real mould below it. These mouldings fulfil the function of the echinus of the Doric cap, and unless they are well in evidence the transition between the column and the abacus will not be sufficiently marked. I have seen examples in which the overhang of the side-cushions completely obscured these mouldings, and the effect was distinctly bad. And, again, in some examples the section through the centre of the side-cushion is finished at the top with a reverse curve. If this is done, care should be taken that there is no hollow in the curve, but that the entire curve is completely visible when seen from below. The volutes themselves can be laid out mathematically by compass; there are several methods which are more or less clearly shown in the restorations. I have found it good practice to lay these out carefully full size rather than to rely on the modeller's working it out freely in the model. There is nothing in the world harder to model than a volute, and a better result can be obtained if the outline of the carefully laid out volute is pounced on a flat piece of plaster which will form the basis on which the mouldings of the volute can be modelled in clay.

As to the relation of the lower architrave face, it generally comes over the upper face of the column, and in the case of a pilaster generally over the pilaster face or a very little beyond it if volutes are used on the pilaster. If, on the contrary, a moulded anta cap is used, the relation is the same as already described for the Doric order: in all cases in advance of the pilaster face. The frieze should always be slightly in advance of the lower architrave face, in order to follow the line of support as heretofore explained, and I would again emphasize the fact that when a plain frieze face is shown in the restoration of the Erechtheion and temple of Nike Apteros, it is the background of the applied sculpture, and its location should not be followed if the sculpture is omitted. A pleasing effect can be obtained in the case of a plain frieze if the frieze is given a slightly outward inclination. In the case of a sculptured or ornamental frieze, the same principles should govern the projection of this ornament or sculpture as have been hereinbefore stated. This is particularly the case in the treatment of the corner.

The cornice is differently treated in the Ionian and in the Attic Greek orders. In the latter the cornice consisted merely of the corona and bed mould with a cymatium added on the gable. The Ionian examples always employed dentils. These are strongly reminiscent of the beam ends of primitive construction, even in the later work retaining the excessive projection so typical of wooden construction. In point of fact, there is evidence to warrant the belief that in most of the Ionian orders the primitive construction was so closely followed that the entablature consisted merely of a stepped architrave, reminiscent of the beam over the columns, directly crowned by the beam ends and gutter expressed in stone by the dentils and corona; there was probably no frieze. In most Renaissance and modern work the dentils are retained as well as the frieze, and the cornice has more of the importance and character of the Roman cornice than the thin, shelf-like corona of the Greeks.

There were, as I have said, examples of four-sided caps, the most notable in Greece being the interior order of the temple of Apollo at Bassæ. The interior arrangement of this temple is quite different from the normal, although it is but little later than the Parthenon and is attributed to the same architect, Ictinus. The order is engaged, or rather forms the termination of short wing-walls which project into the cella. The volute, therefore, is free standing in the front but flat against the wing-walls on the side. Its peculiarity is the large size of the volutes and their great downward sweep. The effect was undoubtedly fine in the location for which they were designed, but the cap is not adaptable to a free-standing order. In the few instances where it has been used, the effect is clumsy in the extreme. It is, however, very appropriate for a small metal cap; in fact, it would seem as if the original was adapted from a metal form. There are some charming examples of small four-sided caps in Pompeii which are very Greek in feeling, and there are various specimens to be found in Roman work, the latter forming the prototype of our well-known Colonial caps. These four-sided caps are interesting but are adaptable only to smaller work; the effect is not monumental or simple enough for a large portico. In a pilaster cap the effect is better, particularly if the pilaster has a strong projection; in point of fact, the straight cap does not look well on a heavily projecting pilaster, as the side of the cap is too much in evidence and is difficult of adjustment.

In connection with the detail of the four-sided column cap it is well to remember that as the volutes are on the diagonals, the projection of the volute has to be considerable to show a proper projection in direct elevation. An examination of the best examples, particularly in Georgian or Colonial work, will show a surprising projection on the diagonal.

(*To be continued.*)

Reinsurance Building, New Rochelle, N. Y.

Geo. B. Post & Sons, Architects

EXTREME advances in rentals for commercial as well as residential space in buildings in New York City—amounting in many cases to double or triple the rentals charged a few years ago—is an aftermath of the war growing out of increased business and population, plus a practical stoppage of speculative building in the metropolis. Rent-raising has driven hundreds of business concerns from tenant occupancy to landlordship. Old properties have been bought, especially in lower Manhattan, and remodelled for business use, or sites have been acquired and new buildings erected—some of the sky-scraper type. Some business or light manufacturing concerns have even gone further than this, and moved away from the congested sections of the city, shaking off the dust of the streets, as it were, and built for themselves new homes in outlying boroughs or suburban communities, where good transportation is provided, land is cheap, and good air and sunlight abound.


Detail.

The Reinsurance Clearing-House, for many years a tenant of one of the down-town commercial buildings, is in the last category. It has moved its entire organization and equipment to a new building planned by Geo. B. Post & Sons and recently completed in record time at New Rochelle, seventeen miles from 42d Street. Located on a corner plot at Beauchamp Place and Maple Avenue, in a quiet residential section of the city, away from noise and bustle, the new building affords an unusually attractive and commodious centre for the transaction of business. As the name implies, the building provides a centre for the handling of reinsurance business for a large number of allied fire-insurance companies. The nature of the work is such that it can be best handled in a general workroom where stenographers and typists are all grouped together under the supervision of a director. A considerable amount of filing space is required, within easy access of the main room.

To meet these conditions the building—designed of a one-story-and-basement type—provides on the first floor nearly 5,000 square feet of clear space for the staff and over 5,000 square feet of well-lighted storage and filing space in the basement. Two small rooms on the main floor are also provided.

The main floor and basement are flooded by light and air from spacious windows on all sides. As the building plot is sufficiently ample, setbacks of the building have been arranged assuring protection of light and air in the future against encroachments of buildings on adjacent plots.

One of the conditions under which the commission was awarded to the architects was that occupancy should be given in a fixed time and at the expiration of leases on the down-town New York quarters. The problem therefore was not so much a question of plan and design as of rapidity in construction and the elimination of detail requiring time for its execution. The exterior of the building was designed in a plain but dignified treatment, with an accenting of the principal entrance, which overlooks the greensward on the main street frontage of the plot.

The drawings had to be revised from time to time in the course of preparation to produce a result that would lend itself to rapid construction. Foundations are of concrete, and walls of hollow tile and magnesite stucco. Candelabra and all sculptural details about the entrance are done in cast stone.

The contract was awarded to the Turner Construction Company in the midst of a winter season that was one of the worst experienced in this part of the country in many years. Rock was encountered within two feet of the surface and, due to this, scheduled progress was greatly hampered, but through foresight in the purchase of materials and the use of an organization thoroughly experienced in the use of concrete as a medium of building construction, rapid progress was made, and occupancy was given to the owners on May 1, only eight weeks from the starting of the foundations.

The grounds have been tastefully planted, and the building and its setting blend happily with an environment of modest suburban homes and gardens.

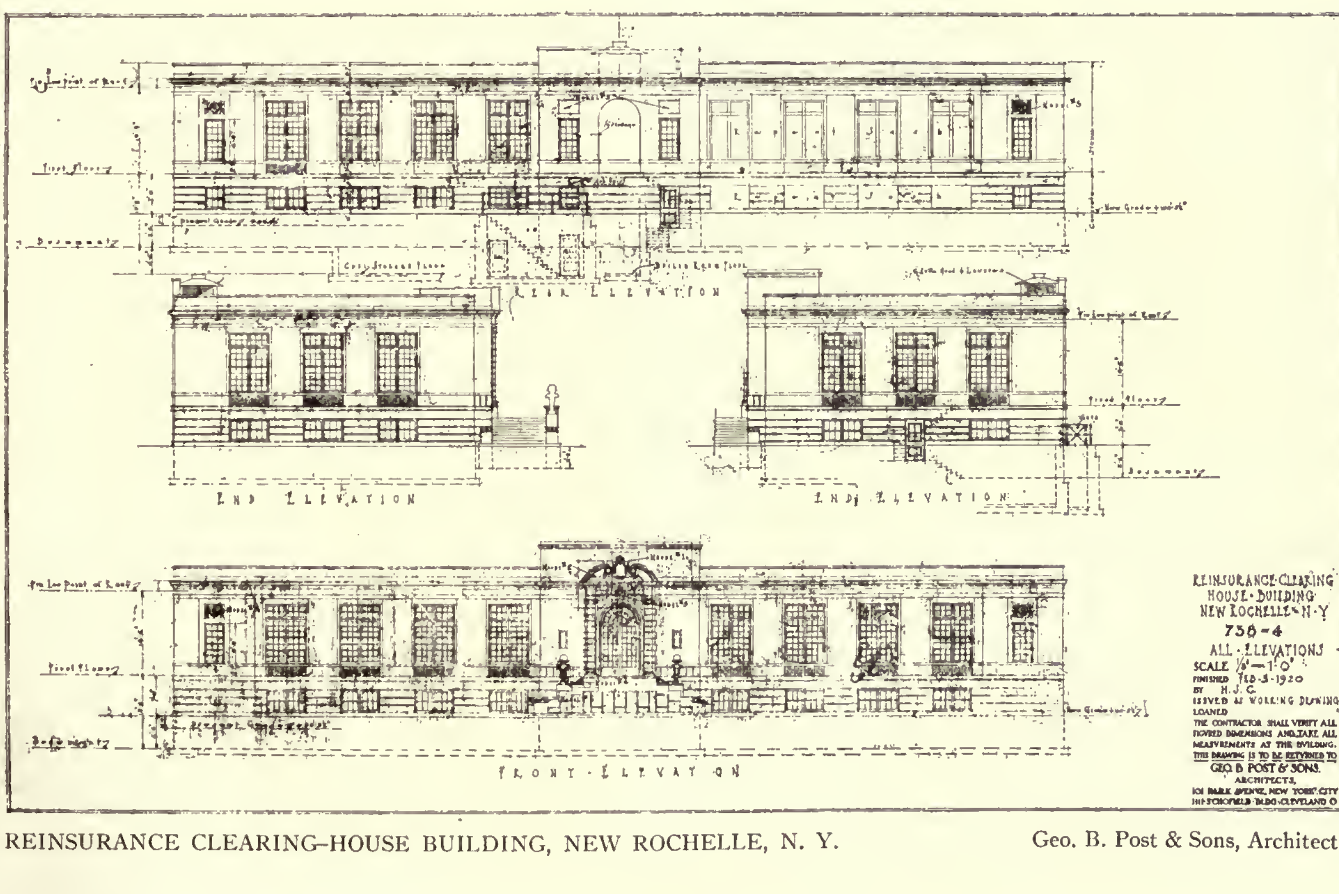
The Influence of American Architecture in Canada

THE architectural tendency of the Dominion is obviously and naturally that of her great neighbor, the United States, where, within recent years, the monumental manner has received fullest and finest expression. Canadian talent has been considerably augmented by intercourse with the States, and direct influence has been exercised by numbers of American architects who, realizing the opportunities afforded by the Dominion, have migrated to Canada and set up in permanent practice there. That Canadian architecture, though quite capable of looking after itself, must be substantially and permanently benefited by the leaven thus afforded is obvious; for the Americans bring with them a new and definite tradition, a freshness of outlook, an ordered and dignified theory of architectural design—all, no doubt, the ultimate result of Beaux-Arts methods, which have won the suffrages of American architects to the almost total exclusion of all others.

The Architectural Review, London.

$5,000,000 Given for Chicago House Loans—Metropolitan Life Leads Plan for Relief

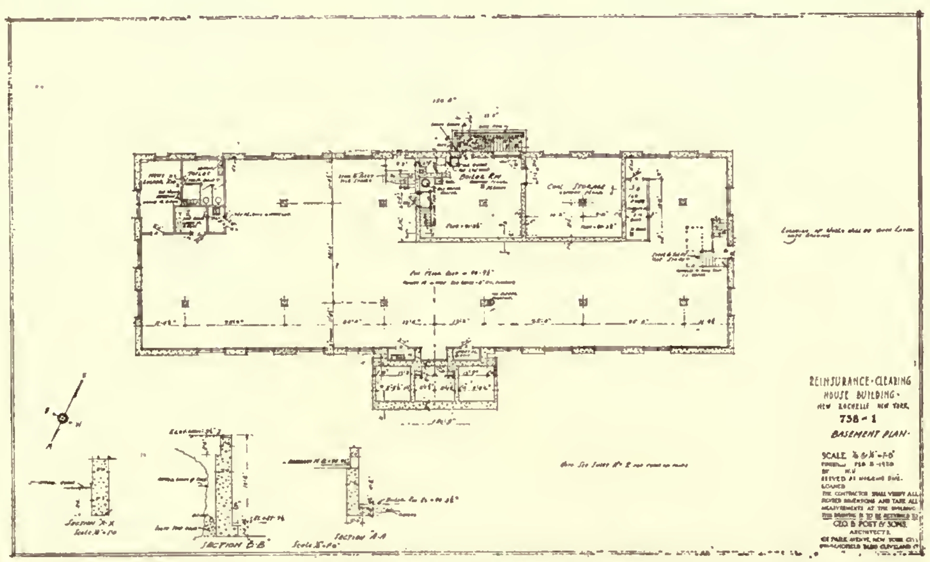
DECISIVE steps to provide measures to relieve the housing situation in Chicago were taken recently at a conference at the Chicago Real Estate Board. It was announced by the Chicago Trust Company that the Metropolitan Life Insurance Company has appropriated $5,000,000 for loans on new homes and apartment buildings.

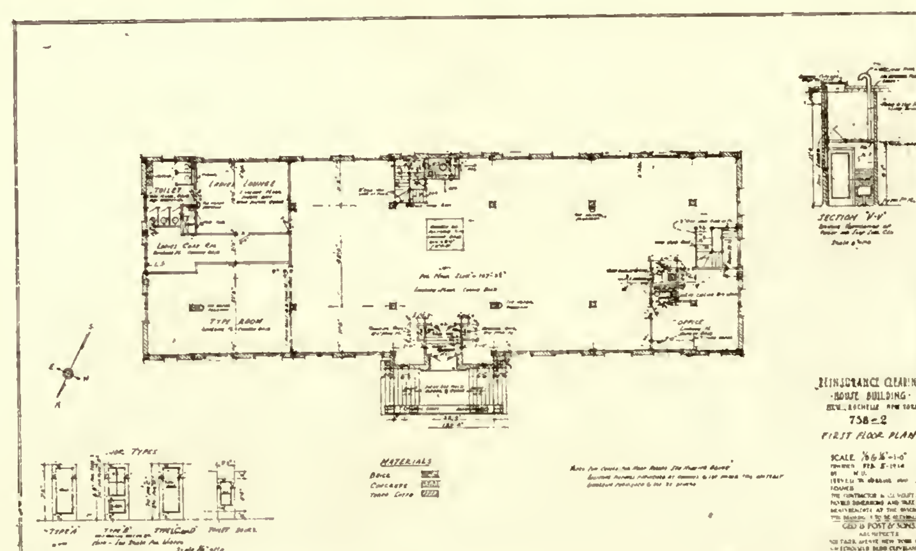


REINSURANCE CLEARING-HOUSE BUILDING, NEW ROCHELLE, N. Y. Geo. B. Post & Sons, Architects.

REAR OF BUILDING.

INTERIOR.





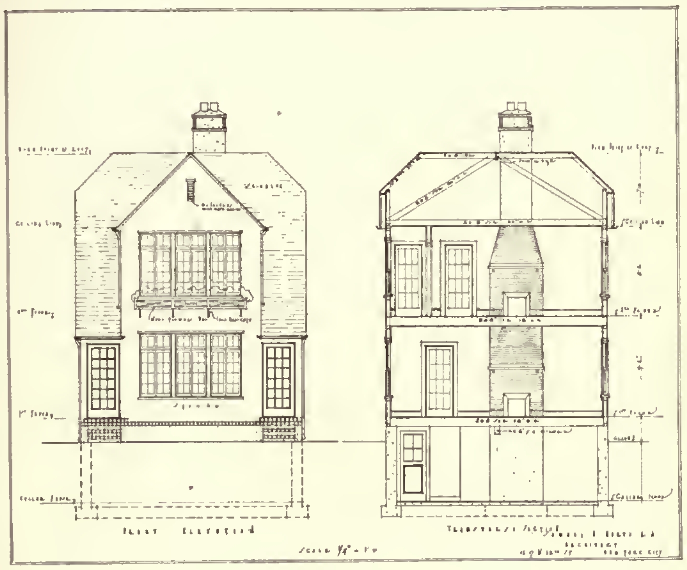
REINSURANCE CLEARING-HOUSE BUILDING, NEW ROCHELLE, N. Y.

Geo. B. Post & Sons, Architects.

The Economical Two-Family House

Samuel A. Hertz, Architect

IN view of the shortage of homes, which has been prevalent for an extended period, I have sought to work out a plan for an economical two-family house designed in the English Colonial style, adapted particularly to the restricted sections of the residential suburbs. The dimensions of the house are 20 feet 10 inches by 47 feet 10 inches in depth.



In this plan there is an open terrace with brick steps at both ends, enabling each family to enter its floor in privacy.

Both floors contain five rooms and bath as well as a combination sun-parlor and sleeping-porch facing the front. This should prove an asset, since such a feature has always been considered a prerequisite of a fine country home. The floors of the sleeping-porches have been laid up in red cement squares, and the rooms are heated with steam radiation, so that they may be used in the winter months as chambers; they are enclosed in the front with removable casement sash.

In planning this house the architect has had uppermost in his mind the object of providing the prospective client every convenience with which a two-family house should be equipped. The house, therefore, although of minimum dimensions, has every facility to eliminate needless waste of time and energy on the part of the housewife.

Another feature of this house is the rear staircase, which can be used jointly by both families. It has direct access to the cellar, where laundry-tubs and steam-boiler are located. This stair, which extends to both first and second floors, serves as a tradesman's entrance.

The façade of the building has been finished in pebble-dash stucco on wire lath, while the sides of the house are finished with 10-inch wood clapboards. The design of the exterior is distinctive. The roof, it will be noted, pitches toward the front on both sides of the building and extends beyond the entrance-doors approximately 30 inches, forming an overhanging cornice, which possibly may add to the appearance of the house.

A spacious living-room is entered from the main-entrance vestibule on the first floor. In this room is a fireplace laid up in tapestry brick, pointed off in white cement mortar, and furnished with a gas connection for the use of gas-logs. A coat-closet is provided on one side of the room beneath the stairs leading to the second floor. The room may be finished with a beam ceiling. From this we enter the combination sun-parlor and sleeping-porch through a pair of French casement doors, directly in the centre of the room; this feature is maintained on both floors.

The dining-room is entered from the living-room through a single French casement door, and may be finished in effect similarly to the living-room.

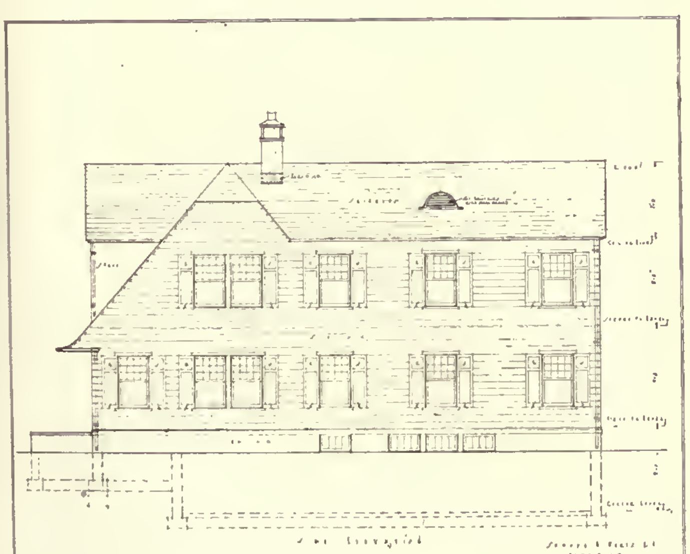
The kitchen, while occupying a minimum amount of space, allows free and easy movement, and is fitted out with all necessary equipment.

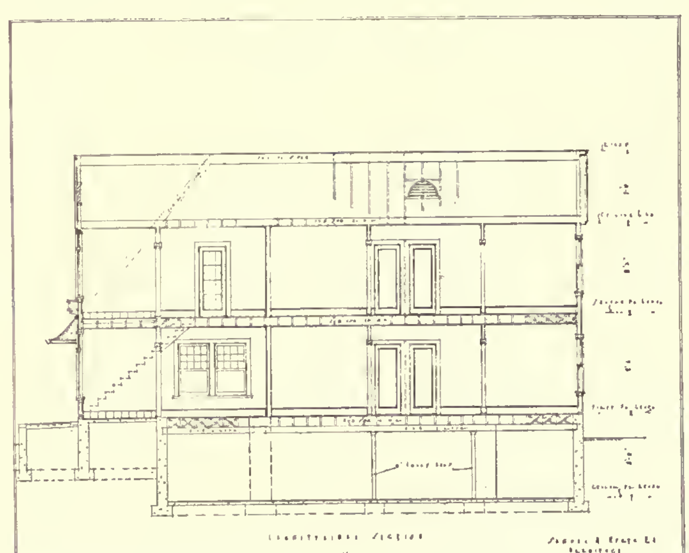
The two chambers, entirely separated from the living quarters, are entered through a private passage adjacent to the bathroom. In the chambers are large coat-closets, and a linen-closet opening directly on the private passage. Both floors are similar in plan.

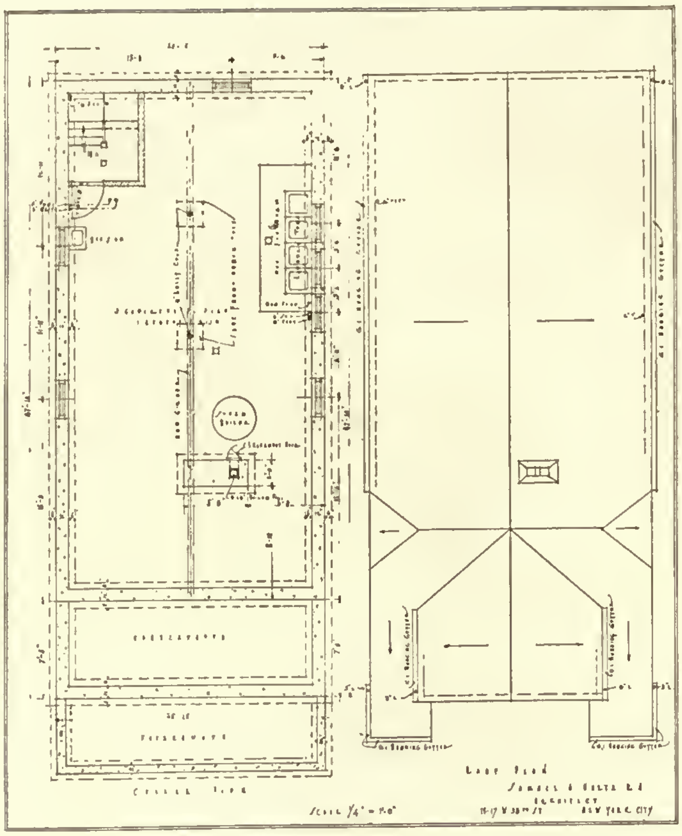
For the general specification and finish of the rooms the reader is referred to the article published in the issue of ARCHITECTURE of June, 1920, in which the architect illustrated an economical house for one family.

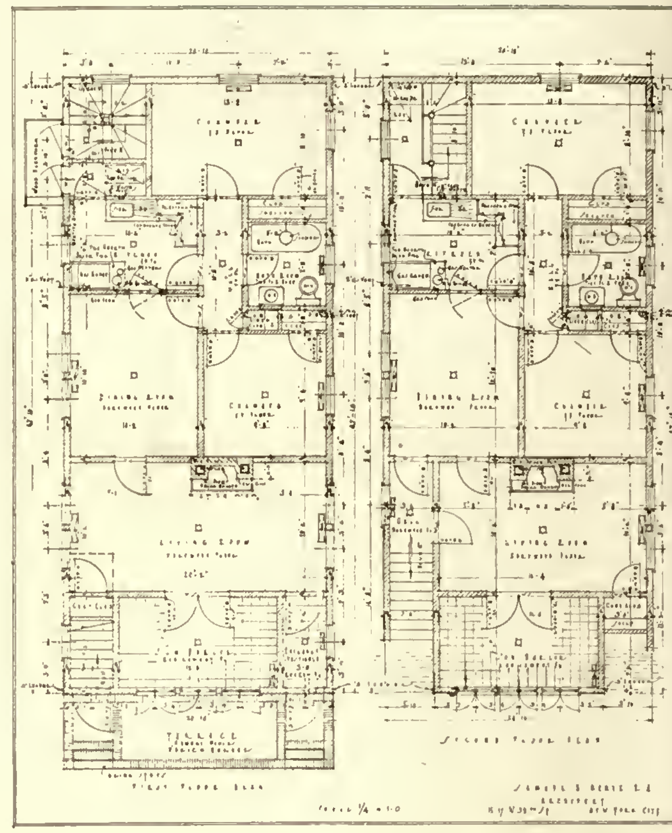
The approximate cost of construction, based on present prices, is $13,000.

While the cellar is an open one, and contains one steam-boiler and four laundry-tubs set on a single wood slat plat-









form for the use of both families, it may be arranged, if so desired, by properly partitioning off the cellar that each family be provided with an individual laundry, and by the installation of an additional boiler with individual boiler-rooms. This arrangement may be desirable should one family not wish to conflict with the other in the supply of heat and the use of the laundry. The cellar has a 3-inch concrete floor throughout with a 1-inch cement finish; the walls are of 12-inch concrete, properly waterproofed. The cellar also contains windows of ample size, offering plenty of light and ventilation.

An open attic is provided for storage and may be reached by both families from the rear stairs. The attic contains galvanized-iron louvres, so that proper ventilation may be afforded. The pitch of the roof is of such an angle that it will readily shed rain-water and carry off any snow that may accumulate. The roof is equipped with leaders and gutters at all desirable locations.

The house herein described can be built on a 25-foot lot. Should the owners desire to build a garage in the rear of the house, the lot would have to be proportionately larger to admit of a driveway on one side of the house. For all practical purposes a 30-foot lot would be sufficient.

An Automobile Sales and Service Building, Bridgeport, Conn.

Joseph N. Northrop, Architect

THIS building was erected for the Erwin M. Jennings Co. to accommodate a large and increasing business in sales and service of automobiles.

It occupies a site near the business centre of the city, the lot being large enough to give an 18-foot concrete driveway all around and a large parking place in the rear.

The front, and extending for two bays, or about 50 feet on each side, is faced with terra-cotta in imitation of light granite of a warm gray shade, the panels in a medium shade of blue; the base is of granite, the windows of plate glass, divided into small lights in the upper stories.

The rear part of the building and the upper stories are devoted to service, sale of used cars, storage, etc. The top floor contains repair department, machine-shop, painting and finishing shop, etc.

The construction of the building is in reinforced concrete, flat-slab system, with two-way reinforcement.

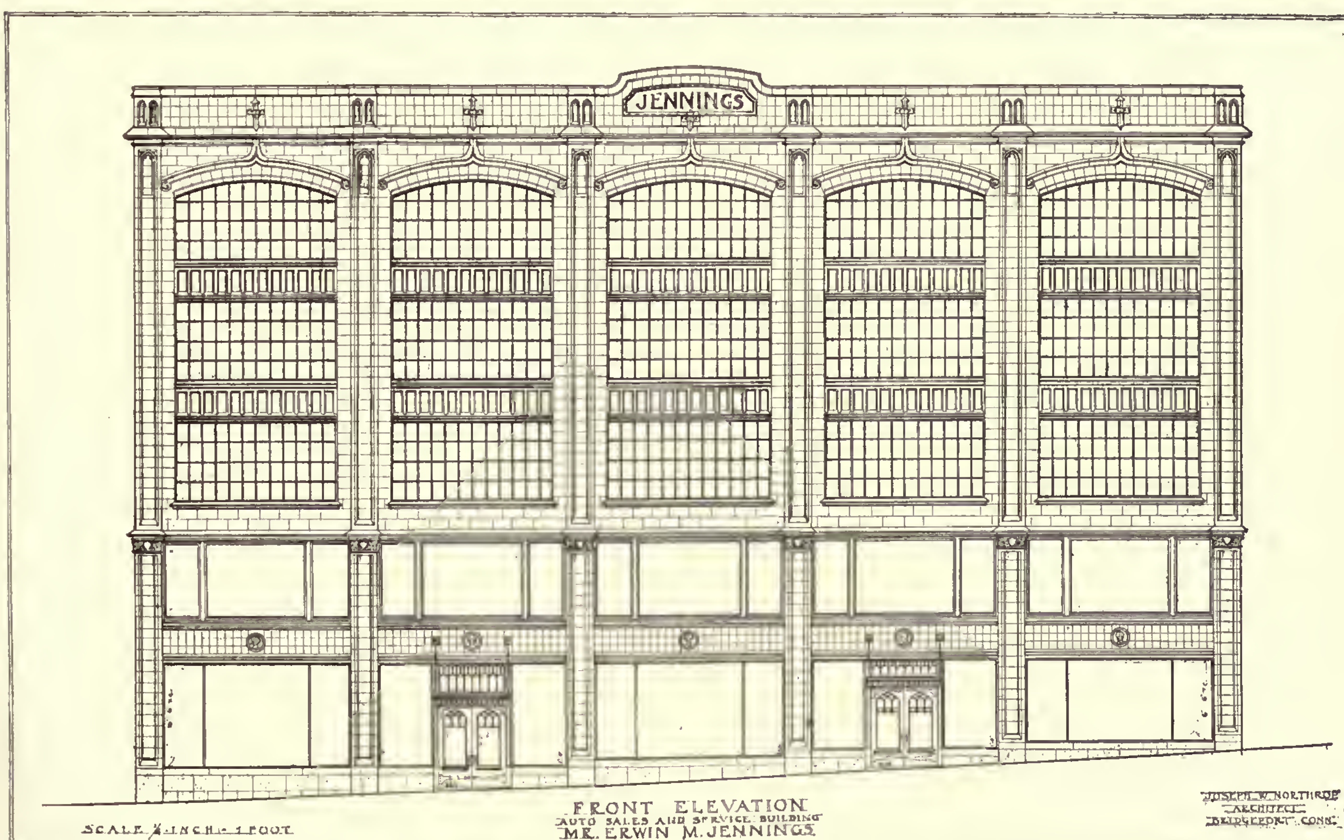
The store for the sale of accessories also has a gallery on rear and two sides, with cases for goods, manager's office, etc., in the gallery. The cases are of steel.

The front part of the store has a tile floor similar to the show-room, and the rear part and the galleries are covered with heavy linoleum cemented down.

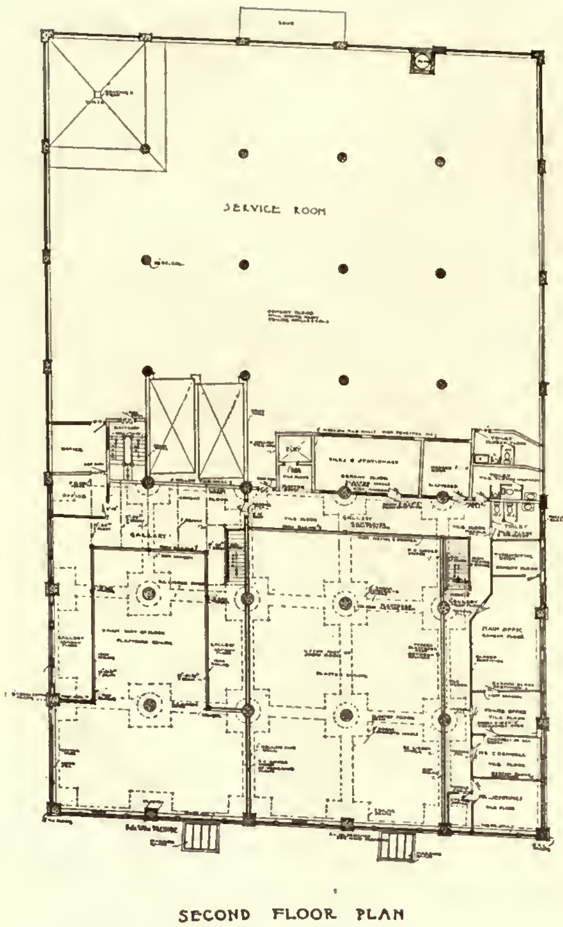
Marble stairs with wrought-iron railings lead from the store to the show-room, and wide plate-glass windows between the store and the show-room give a fine open effect.

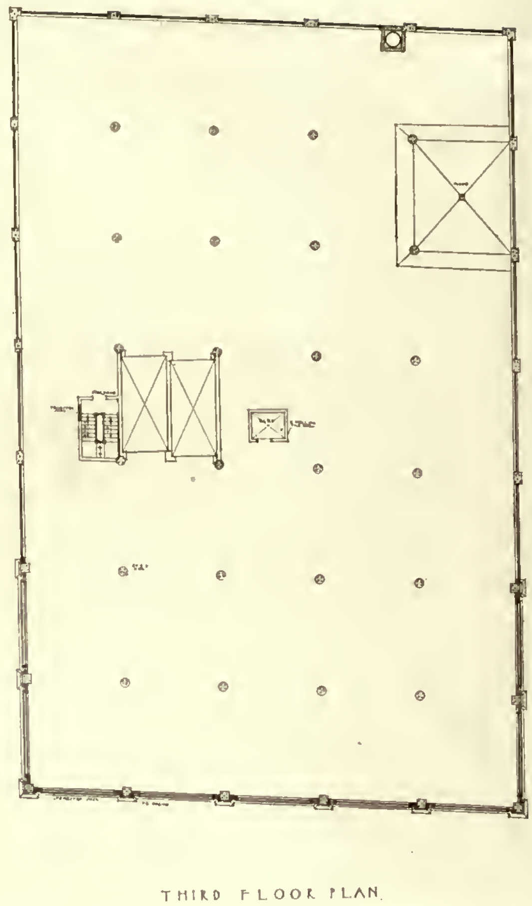
The heat of the building is by vapor, there being two tubular boilers in the rear cellar. A large trench of sufficient size for a man to work in extends entirely around the walls of the building, the heater pipes and returns being carried in this, with risers and drips to the radiators above. The main feed rises to and along the ceiling of the fourth story, and from it the feed-lines to the various floors are taken up and down.

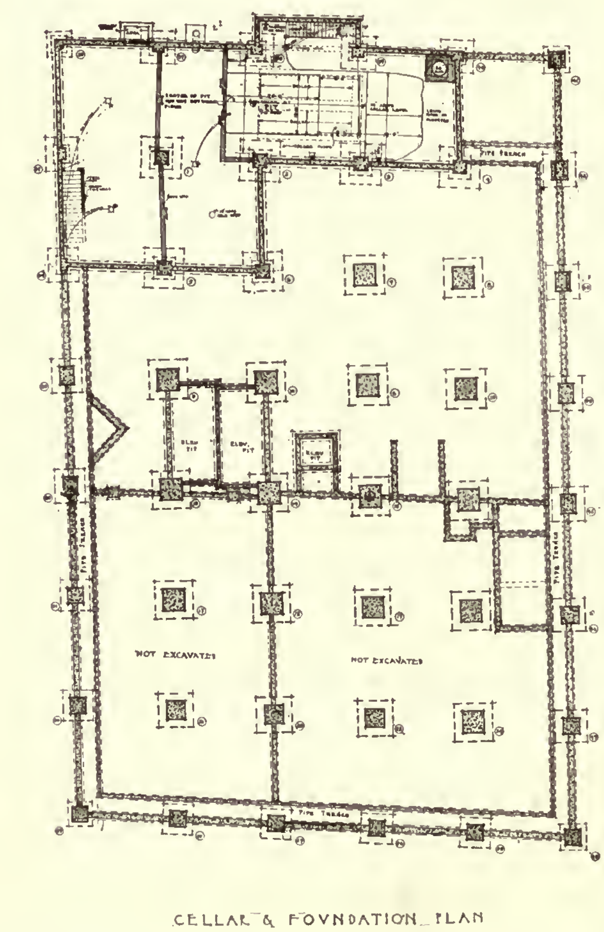
There is an independent system of pipes for the heating of show-room, store, and offices, enabling the heating of these portions at times when the remainder of the building does not require heat.

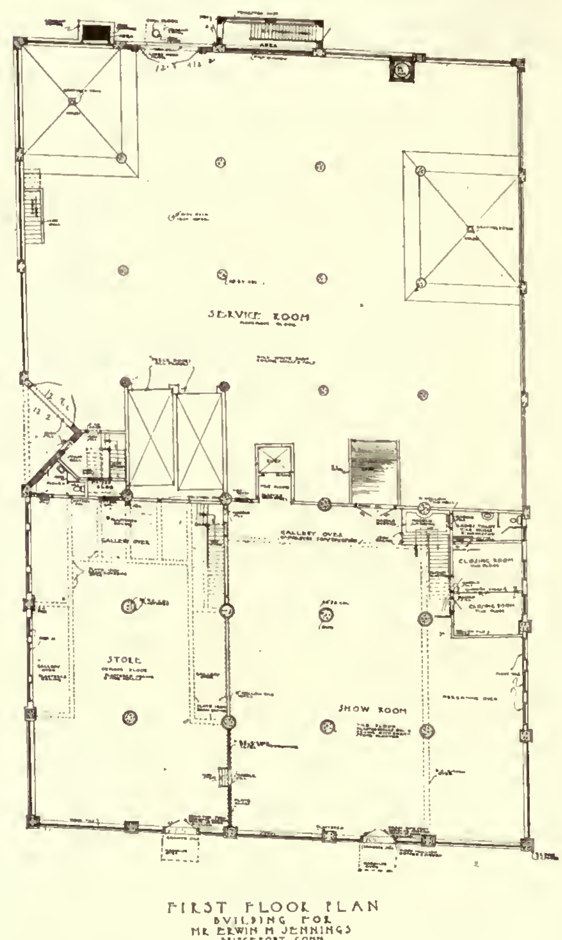


The building is 110 feet front by 170 feet deep and five stories in height, with cellar in the rear portion for heating apparatus and storage. The first story is 14 feet and the others 12 feet in height.

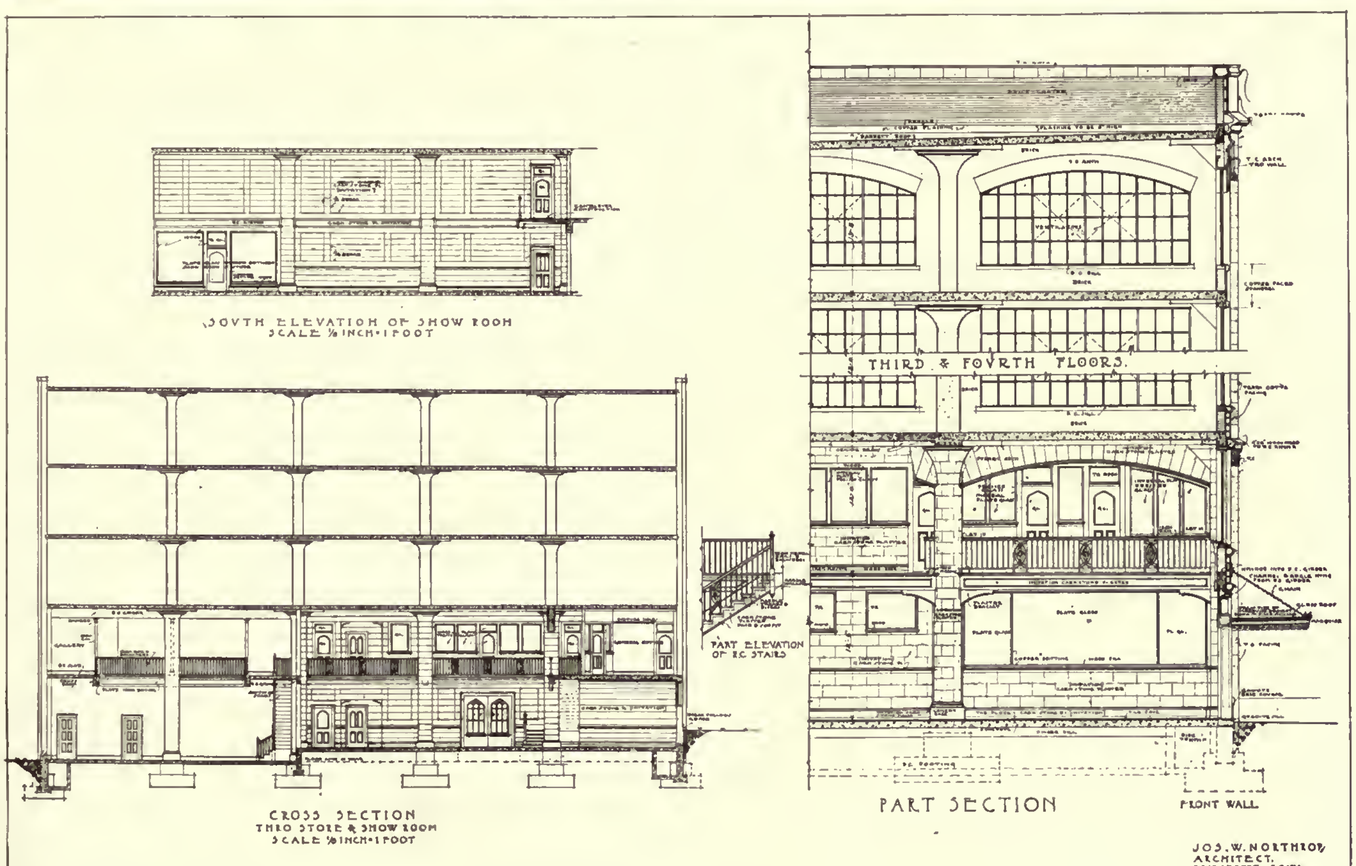








PLANS, AUTO SALES AND SERVICE BUILDING, ERWIN M. JENNINGS, BRIDGEPORT, CONN. Joseph W. Northrop, Architect.



The show-room, as indicated by the photographs, is a fine, simple, dignified room, the constructional features of the building naturally giving it a strong architectural effect. There is a gallery on one side and rear, the offices opening on the side-gallery.

The floor is in 12-inch squares of white and gray tiles; the walls of imitation caen stone lined off in blocks; the stairs of light marble with wrought-iron railings, which continue about the galleries.

The columns have bold moulded caps and bases. The ceiling is in large panels following the constructional lines.

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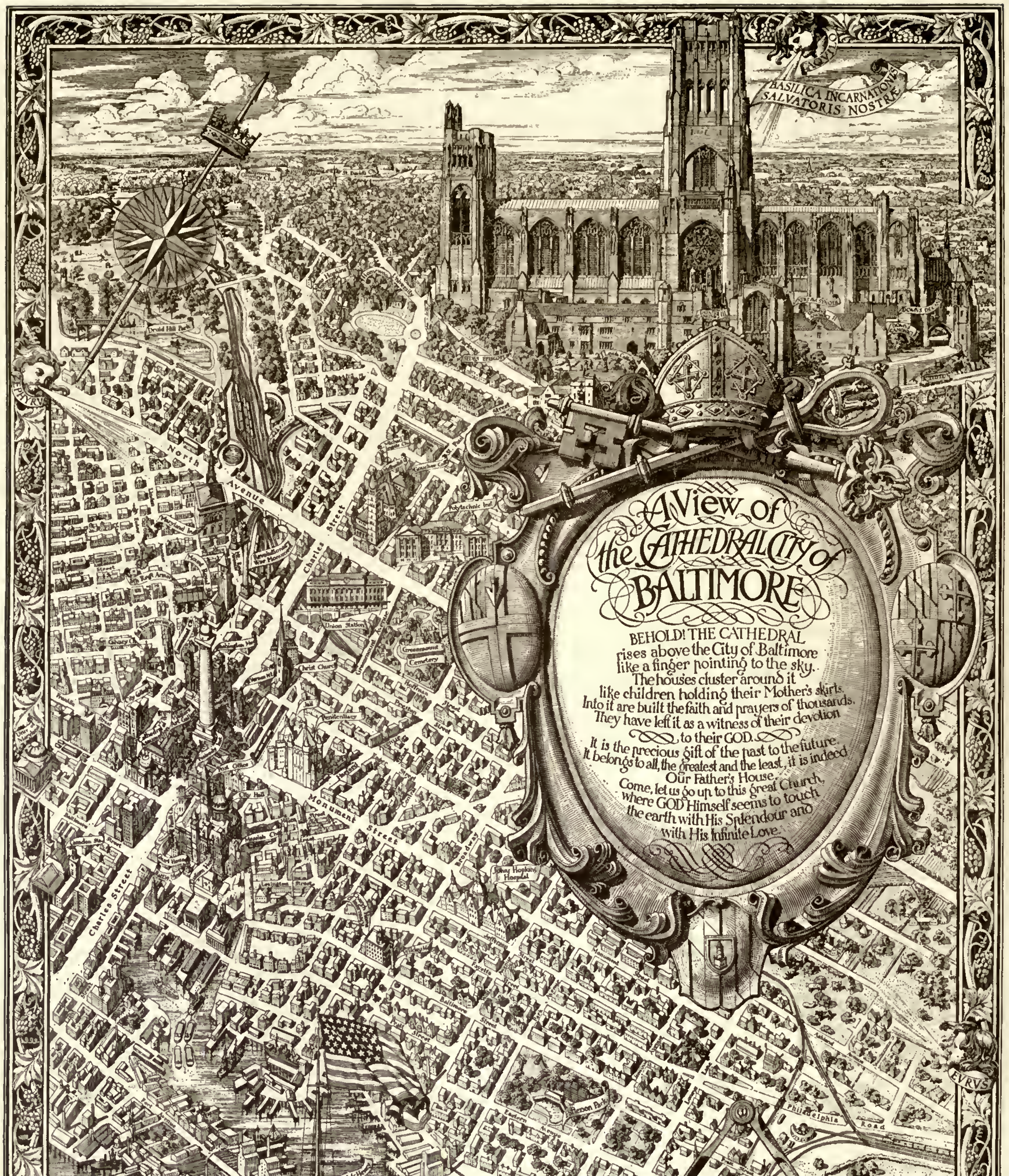

POSTER FOR THE BALTIMORE CATHEDRAL

Designed by Bertram Grosvenor Goodhue.

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Gothic Space

By C. R. Morey, of Princeton University

Fig. 1. Hypostyle hall at Karnak.

MOST of the readers of this article, once or many times, have climbed the stairs from the train tubes of the Pennsylvania Station into the vast expanse of the concourse, and felt the sensation of well-being that this spacious interior gave them after the noisy compression of the train. All of them have had the same soothing effect from the wide panorama of a landscape. In both cases the source of pleasure is the same—the indeterminate roominess of the building or the view suggesting an infinitude into which one's personality willingly merges, seizing the chance thus offered to "get away from itself" and dissolve self-consciousness in the harmony of things as a whole.

But this love of indeterminate space is a peculiarity of the modern man alone, or at least of human beings since the thirteenth century, since we find no passion for landscape in either ancient art or literature, and no unlimited space effects in ancient architecture. Some one has said that Petrarch was the first man to climb a mountain for the view, and certainly the Gothic cathedral was the first building that deliberately united its interior with all outdoors. The ancients did not like such effects; not only did they avoid the profusion of windows common to modern and Gothic buildings, by which interior space is connected with space in general, but they were very slow to admit the use of space at all as an æsthetic factor in architecture.

The most striking example of this is afforded by the Egyptian pyramids, which have no space at all save for a diminutive tomb-chamber whose location within the pile was a secret lost with the builders. The Egyptian temple also excludes interior space from its effect, whether it be of the underground variety or the more imposing structure above the soil. In the subterranean temples the chambers have their interiors dwarfed by colossal columns or statues, so that the space enclosed is measured thereby, losing the vastness which the observer would impart to them in unconscious comparison with his own dimensions. In the temples above the ground the spaces actually enclosed are small, and the ample areas of the open courts are not, properly speaking, æsthetic factors, for the space here treated is still so to speak in the raw material. It lacks composition and contributes scarcely more to the architectural effect than a pile of bricks awaiting the builder's hand in the workshops of the temple. Even the vast columnar hall at Karnak (Fig. 1), imposing though it is, supplies no grandeur of space composition, for here the bigness of the columns so subdivides the interior that the net impression left with us is that of the supporting masses.

Greek architecture, as one might expect, shows no example of such brutal suppression of the space element. Its

Fig. 2. Hermes, Eurydice, Orpheus. Rome: Villa Albani.

Fig. 3. The triumph of Titus. Rome: Arch of Titus.

sane harmony had a place for space composition, but the Greeks were characteristically antique in that the place they gave it was one of distinct subordination. No one hears much of Greek interiors; it is only the archæologists that are interested in the inside of the Parthenon. And if we lived in the days of Pericles and Phidias, and penetrated into the cella of that temple, we should find its interior dwarfed again by a massive colonnade, and also by the colossal statue of Athena, 40 feet high from the pavement. The fact is that the composition of a Greek temple is limited æsthetically to its outside porch, wherein the space enclosed is used as a subsidiary element, to relieve and isolate against a pleasing background of shadow the delicate refinement of the colonnade. The clear rendering of architectural *forms*, not voids, is what the Greek is seeking.

The Greek passion for the definition of form, and the consequent avoidance of spatial effect, becomes clearer when we look at an example from sculpture. In any Greek relief the space suggested is practically nil, the whole effort of the artist being devoted to the clear isolation of his figures. To this end he eliminates the dimension of depth, and one can realize his composition completely in terms of height and breadth alone (Fig. 2). If the modern soul loves the plunge into infinitude afforded by landscape vistas and vast interiors, getting relief thus from too sharp a definition of individuality, the ancient man had quite the opposite purpose, and strove always to make his outlines clearer and to isolate his concepts against the background of existence. Hence that search for definition of form, imperfectly manifested by the Egyptian, but becoming a passionate necessity in the Greek. Hence also the avoidance of space, because it blurs ideas of form, as any one can find out for himself by trying to recall offhand the details of columns, pilasters, capitals, or vaulting in the Pennsylvania concourse, only to find that such forms are swallowed up in the general impression of space. Such indefiniteness was very distasteful to the Greek mind; Aristotle even goes so far as to identify the unlimited with evil and the finite with good.[1] Contrast this with the concepts of mediæval and modern Christianity!

But as Greek art and thought passes on into the Hellenistic period, and thence into its Roman phase, this uncompromising hostility to space in architecture and sculpture becomes modified. It could not be otherwise in view of the sophistication of late Hellenistic culture, and the realism which the Roman genius injected into it. Roman reliefs, for example, forsook the old mythology and began to depict the exploits of contemporary emperors, too vivid in the memory of the beholder to be idealized in respect to place, and therefore demanding a more or less realistic treatment of environment, which inevitably introduced the dimension of depth and the suggestion of unlimited space. In the Arch of Titus at Rome (Fig. 3) we have for the first time the suggestion of atmosphere in the background of relief in the solution of the outlines of the lictors' staves into the final plane. The rendering of the procession also is very un-Greek; the ranks of men pass by as if seen from an open window, with little attempt to clearly define the single figures; most striking of all is the suggestion of the continuation of the procession to right and left instead of the careful framing by which the Greek sculptor avoids such impressions of unlimited extent.

Roman relief, therefore, admitted space into its effect

[1] Nich. Eth. II, 5: τὸ γὰρ κακὸν τοῦ ἀπείρου, ὡς οἱ Πυθαγόρειοι εἴκαζον, τὸ δ' ἀγαθὸν τοῦ πεπερασμένου. "For, as the Pythagoreans expressed it, evil belongs to the unlimited, and good to the finite."

Fig. 4. Marcus Aurelius sacrificing. Rome: Capitoline Museum.

in order to get the rendering of environment which the Roman realistic taste demanded, but even this concession is qualified in characteristically antique fashion. For never in Roman relief does the background *enclose* the figures; they are rather relieved against it, so that the space represented degenerates into a symbol instead of a real locality, and the personages never assume the size they should in proportion to the buildings or landscapes which appear in the background (Fig. 4). Man, not nature, is still the measure of all things, and human action remains the chief interest of the representation. We see then that space even in the Roman mind was never a vaster concept than man himself. It was a lesser thing, controllable and conceivable by the human mind, and hence not infinite but finite.

Now if we translate this Roman conception of space into architecture, we shall expect it to be at once like and unlike the Greek; like it in the avoidance of suggestion of the unlimited, unlike it in the admission of space as an æsthetic element of equal value with form. And so in fact we find it, for while in the Greek temple the æsthetic interest centres in the outside porch, the new building forms introduced by the Romans transferred the composition to the interior. In the Pantheon (Fig. 5), for instance, our admiration is divided between the dignified niches, columns, pilasters, the elegant coffering of the ceiling, and the vast interior which these provide. But the space thus set before us is all *enclosed;* the single opening which admits the light in the top of the dome plays no part in the composition. Such space is measurable and conceivable in geometric form, isolated from infinite space without, and thus still holding true to the classic ideal of clear definition.

The subsequent treatment of space composition in Roman architecture follows the trend of Roman art in general, which is toward the disintegration of the larger units into smaller ones, whereby the whole becomes divided up into separate unarticulated parts. Thus in Roman sculpture the figures begin to degenerate into manikins of disjointed movement, and in ornament the natural rhythm of plant forms breaks up into conventionalized units. So also in the great hall of the Baths of Caracalla, built a century later than the Pantheon, we find the single unit of the Pantheon replaced by a division of the interior into three bays, and each of these subdivided in effect by the groins of the vaulting, the huge engaged columns, and the vast openings of the lateral portals. And as Roman architecture passes into Byzantine the disintegration increases, but it is a disintegration of space effects rather than of forms that impresses us, for the columns, pilasters, mouldings, etc., gradually fade out of the effect. In Hagia Sophia such details are lost in the ensemble; the sole means used by the architect is space, which he piles up by constantly increasing units into a swelling crescendo (Fig. 6). From small half-dome the eye leaps to a larger one, and from this to the vast hemisphere poised over the centre, its tiny windows twinkling like the corona of a chandelier.

These windows are very small in proportion to the masses of masonry they pierce and to the expanse of interior space which they illuminate, and this is true not only of the windows of the dome but also of those that penetrate the great side-walls. There is, in fact, no intention on the part of the architect to open up his walls in the modern way; he still demands the isolation of his space after the ancient fashion. He splits it up into smaller units, it is true, but balances them in perfect symmetry, moulds them in definite geometric forms, and merges them one after another into

Fig. 5. Interior of Pantheon, Rome.

Fig. 6. Interior of Hagia Sophia, Constantinople.

the absorbing dominance of the dome. The unity of this interior is complete, and undisturbed by the intrusion of the infinite out-of-doors.

We have traced the evolution of ancient space composition[1] in so far as it was governed by the conservative attitude toward unlimited space which characterized the antique point of view. But the Gothic cathedral arose from none of the forms which we have described. Its genesis can be found in an unimposing structure which Western Christianity used for its churches in the primitive period, deriving its form and its name from the old Roman basilica, a rectangular structure with an interior colonnade, used for law-courts and other public purposes. The Latin basilica (Fig. 7), as this early type of Western church is called, is an interior composition like the domed churches which the Byzantines employed, but it contains two features which were quite opposed to the antique way of looking at things, and were therefore pregnant with change.

The first of these is the destruction of the classic symmetry of the interior. Its plan shows an interior colonnade and semicircular projection at one end which was called the apse, both of which are found in the Roman basilica which was its prototype. But if one looks at the plans of these older basilicas, it will appear that the interior colonnade is usually carried all around the building, masking the apse, and maintaining a classic symmetry and clearness of disposition. In the Christian basilica this symmetry is given up in favor of an axis that runs in only one direction—toward the apse. In fact, the whole interest in the Christian interior centres at the apse, because it is there that the altar is placed, and the eye and the imagination of the worshipper move very quickly along the colonnade to that point. I say very quickly, because there is little to arrest the eye. The columns are small, and their vertical lines are not continued in any way into the wall above, nor are they co-ordinated with the windows. There is thus an absence of vertical axes that would contradict and arrest the onward movement of the interior, which comes to an abrupt stop at the sanctuary of the altar and the apse. The abruptness of the stop, in fact, leaves a sense of unrest and incompleteness in these early Christian interiors, which will lead to interesting developments later, since the movement which is suggested by this interior space must sooner or later find an æsthetic outlet in space outside; for the first time in the history of architecture the interior has lost its symmetrical stability and is no longer self-sufficient.

The second feature of change in the Latin basilica is its clearstory. Here the windows are no longer mere decorative spots of light, as they were in Hagia Sophia, for they are too large to be thus conceived, and they flood the nave with light in a suggestively modern way. Such lighting shows a tendency to connect space inside with out-of-doors, and foreshadows the composition of Gothic interiors in which this union is accomplished. It is the point of view of Western Christianity timidly expressed in its first experiment in architecture, for the infinite, shunned by the Greco-Roman mind as unclear, and therefore evil, is courted by the Christian mystic, whose theory of salvation involves the union of finite humanity with infinite God.

Here then in the Latin basilica are the germs of future development of space composition—an axis of movement and the non-isolation of interior space.

The next stage in the progress toward Gothic is Romanesque architecture, which simply consists in putting a vaulted ceiling on the Latin basilica instead of the primitive wooden one. The various methods employed in doing this gave rise to the various schools of Romanesque—sometimes the builders vaulted the nave with a series of domes,

Fig. 7. Nave of St. Paul's, Rome.

[1] This sketch of ancient space conceptions is little more than a résumé of Riegl's brilliant essay on the subject in his *Spätrömische Kunstindustrie.*

Fig. 8. Nevers, St. Etienne; nave.

Fig. 9. Interior of Sainte-Chapelle, Paris.

as in the French school of Périgord; sometimes they used a series of cross-vaults, as in Lombardy, Germany, and Normandy, and occasionally in Burgundy; most often they covered the nave with a tunnel vault, as in Provence, Poitou, and Auvergne (Fig. 8). In the early Romanesque experiments the result is bad for space composition; the logic of the interior is usually lost, in that the horizontal movement of the basilica is maintained while the vaulted ceiling inevitably draws the eye upward without a proper axis to conduct it, leaving an unsolved contradiction.

Any vaulted interior composes naturally on a vertical axis. This was true certainly of the successful vaulted interiors which we have discussed, such as the hemisphere of the Pantheon and the more subtly mounting curves of Hagia Sophia. The Romanesque builders had thus started a counter-effect to the horizontal axis of the early churches, and they gradually began to feel this, and to work out its implications in two different ways.

Their first innovation consisted in slowing up, so to speak, the onward movement of the interior. This was done by gradually increasing the size of the supports, and correspondingly decreasing the width of the arched voids between, with the result that a slower rhythm is established whereby the eye moves more deliberately toward the altar; for it is a principle of decorative rhythm that if one element be overemphasized, the eye seizes it alone, and finding it always the same, moves quickly along the series of similarities thus provided. But bring the intervening counterfactor to equal prominence, and the eye is arrested by the difference, moving along the design more slowly, and with rhythmic progression. In this way the rapid movement of the early Christian interior was changed to a more dignified advance, heavy and significant, charging the approach to the altar with mystic meaning.[1]

The second method of breaking the horizontal axis lay in the simpler means of emphasizing the vertical one, and from this developed the characteristic feature of the *bay*, by which we mean the uniting of the nave arch with the wall above it into a vertical composition. To this end the triforium gallery was introduced and emphasized as time went on, and engaged colonnettes began to spring from the pavement, following the vertical surface of the pier, and crossing the nave in transverse arches. Thus, the nave splits up into vertical units, separated one from the other, establishing an upward interest that further impedes the horizontal movement of the eye. The final step is taken when the Gothic builders perceived the fitness of the pointed arch for this effect, since by it the upward movement comes to a point and vanishes.

This leads us to the second pregnant feature of the early Christian basilica, the clearstory windows. These constituted a serious problem for the Romanesque builders, for if they vaulted the nave, they either had to raise the ceilings of the side-aisles to brace the nave vault, thus shutting off the clearstory windows, or else take the chance of raising the vaulted nave above the ceiling of the side-aisles in order to retain these windows. In the first case they darkened their interiors; in the second they ran the risk of the nave vault's falling in. In the south of France they preferred a dark nave and a strong vault, but in the north, where the Gothic style was finally evolved from the Romanesque,

[1] This has been observed in detail for the Romanesque of Normandy by Pinder, *Rhythmik romanischer Innenräume in der Normandie*, Strassburg, 1904.

the builders insisted on the clearstory with its row of windows, taking the chances thus involved, or frankly reverting, in their earlier buildings, to the old wooden ceiling of the Latin basilica. As time went on, however, they found various ways to lighten and strengthen the unbuttressed vault of the nave, first by pointing the arches of the tunnel vault, to give a more perpendicular thrust, then by using the old Roman cross-vault, and finally by the innovation of the ribbed vault, whereby the whole superstructure of the church became a skeleton of arches, transmitting the thrust of the vaulting to the main piers, and self-supporting so long as these were properly braced by the flying buttresses which were eventually introduced outside. When this was done, the walls were no more necessary than they are in steel construction, and the builders, as this fact gradually dawned upon them, began to open up the sides of the clearstory, timidly at first and then more boldly, until in the developed Gothic edifice the clearstory walls disappear entirely between the piers, and every available bit of space is filled with glass (Fig. 9). Thus the upper part of the cathedral becomes a well of light, fusing the interior with the infinities of space without.

Fig. 10. Cologne Cathedral; nave.

This adds the last element to the trio that compose the finished Gothic conception of space composition: a vertical axis of movement, undefined (non-geometric) shapes in the spaces enclosed, and the freest union with space outside that will still retain an æsthetic concept of the interior. The flood of light from without is so strong that it must be stemmed with colored glass; the space enclosed is no longer defined, symmetrical, and self-contained, as was the Pantheon's, but is deprived of conceivable geometric form. Nor is it stable, but carried upward by the vertical axis of the bays, which have merged their horizontal divisions and strengthened the vertical ones so that the eye travels inevitably upward along the lines that lead to the summit of the windows, or the vaulting of the ceiling, and there disappear in the tips of the pointed arches (Fig. 10).

These pointed arches are, indeed, the epitome of the Romanesque quest and the Gothic discovery. The Romans never used them, preferring the finite semicircle. The Romanesque builders hit upon the form as a device for making arches stand without so much buttressing and to render the thrust of their vaults more nearly vertical. But as Romanesque merges into Gothic, and becomes conscious of æsthetic purpose, the pointed arch becomes the essence of the Gothic style—the symbol of the Christian point of view. It represents not the classic ideal of the isolation of form (finite reality) *from* space (infinity), but the Gothic ideal of the solution of form *in* space, wherein the mystic builders of the cathedrals felt the embodiment of God. This effort toward the dissolution of form grows and grows in Gothic art until it reaches an almost unendurable refinement; but in the details of the thirteenth century it results in works of exquisite beauty—tapering spires and flêches, sharp cusps and tracery that destroy the form of windows, crockets that break and dissolve the straight lines of the structure into the surrounding air.

Gothic space is thus simply the inclusion of the factor of the infinite in architectural composition. It is not surprising, therefore, that the Gothic cathedral constitutes the last creation in the field of monumental architecture of an original character that the world has witnessed, because it has supplied this *sine qua non* of modern conceptions. It is more curious that the element of unlimited space was so long in finding its way into the other arts, appearing two centuries later in the Flemish landscapes, and finding its full expression only in the plein-air painting of recent times.

We realize the infinite by feeling alone, whence it follows that Gothic interiors arouse emotion rather than ideas. This it was which the ancients abhorred in the effect of unlimited space; their intellectual ideals required an isolated and geometric interior. But as classic self-sufficiency decreased and man's dependence on the infinite grew, the builders were forced to include space as an essential element in architectural effect. The Romans still made it symmetrical, measurable, and finite; and so did the Byzantines, who were the true heirs of classic tradition; but Western Christianity had already undermined this attitude when it introduced the restless movement and flood of light into the Latin basilica. The Romanesque builders befogged the concept at first by shutting in the lighted interior with their heavy vaults, but gradually they felt the urging of the upward axis, and always in the north the necessity of opening up the interior to external space. From their efforts were born the magic interiors of Gothic, soaring higher and higher as the Gothic ideal became defined, and dissolving more and more the structural forms in the infinitude of space, until attenuation could go no farther, and the style lapsed from a mode of building to a mere veneer of tracery.

School Developments in the South

By James Russell Harris

Magaziner, Eberhard & Harris, Architects

ONE of the most promising and encouraging developments in the near South is the establishment of the various schools which cater to the youth of those local districts where before it has been impossible to secure more than a limited education. The Board of Education of the Methodist Episcopal Church and the Woman's Home Missionary Society have both been liberal backers of the movement, and are already showing results that more than justify their expenditures of moneys and their confidence in the work.

As architects we feel warranted in making these assertions, for in pursuance of our duties we have come intimately in touch with the movement. To proceed from generalities we shall discuss in detail some of these institutions now in operation which are improving their facilities by the latest and most modern methods and appliances. In no two of these establishments is the proposition quite the same. Therefore, each must be studied as subject to its own immediate environment and conditions.

The John H. Snead Seminary lies on the broad plateau of Sand Mountain, one of the Blue Mountain range, running diagonally through the north Alabama country. All through this mountainous and wilderness country live innumerable thrifty, upstanding farmers and woodsmen. They are descended, like the North Carolinians, from a stout old virility and kindly simplicity of their progenitors. No sooner was Snead Seminary established than there was a veritable rush to secure admissions for the sons and daughters of these mountain people. Some parents have driven fifty to a hundred miles from their isolated homes to the little village of Boaz, where the seminary is located, to place their children under its care.

So promptly did the people of the locality appreciate the advantages this seminary could offer that the establishment as promptly outgrew its facilities. Moreover, not only lack of room was the complaint but lack of proper equipment and facilities was emphasized. Realizing the truth of the demands of Doctor Fielder, the president of the institution, the Board of Education sent a commission, of which we were part, to look over the site and prepare a scheme for a proper development of the institution.

Plenty of land was at our disposal but not so—money. The wants were almost unlimited, but the means for satisfying were decidedly and wisely so. Here was not a site to erect elaborate and imposing structures—pupils must not live in an atmosphere which would tend to dissatisfy them with their position later in life. At the same time each boy and girl should have opportunity to live under the most sanitary conditions, in a healthy Christian atmosphere, and with surroundings that would appeal to his sense of service, utility, and beauty. How to best gain this result was partly the proposition put up to the architects. Several buildings were already on the site—a boys' dormitory, a girls' dormitory, and, lying between them, an administration and classroom building. The two former, while far from ideal architecturally, were commodious, sanitary (so far as ventilation and cleanliness went), and substantially built.

It was impossible to at once tear down the adminis-

Buildings marked *G*, *C*, and that part of *A* which is hatched in are the original buildings. Note the difference in grades. *A*, Administration and Classrooms Building. *B*, Girls' Dormitory. *C*, Girls' Dormitory. *D*, Girls' Dormitory. *E*, Chapel. *F* and *K*, Science and Industrial Work. *G*, Boys' Dormitory. *H*, Boys' Dormitory. *L*, Gymnasium. *M*, Grand Stand. *P*, Power-house.

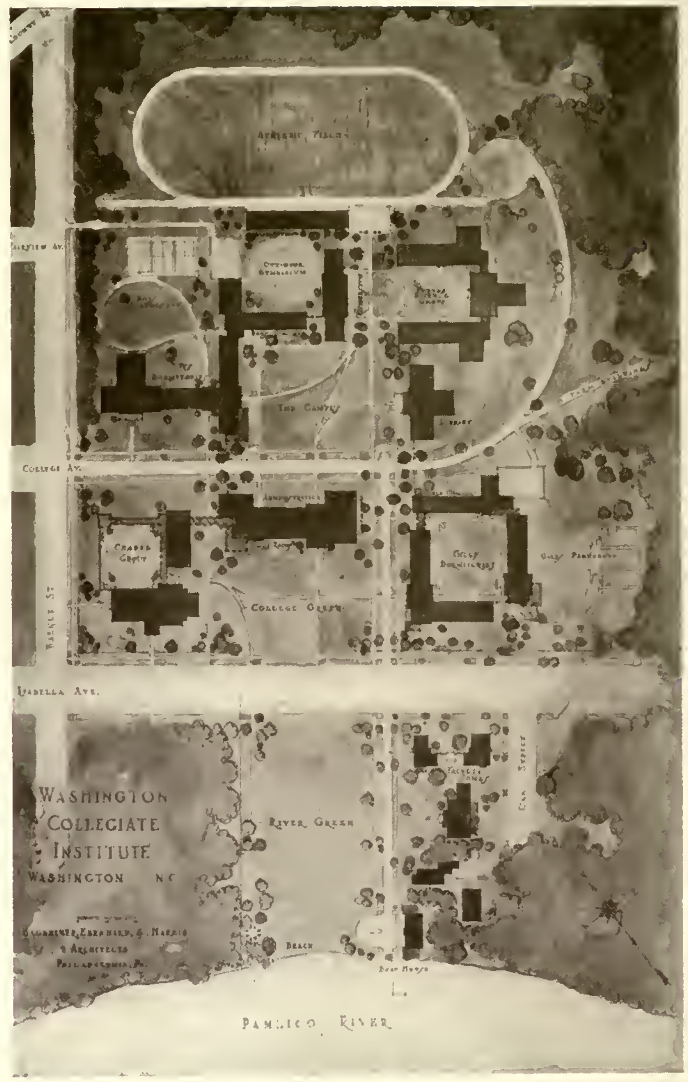
tration building, owing to lack of classroom space; it was, therefore, determined to erect a new administration building on the site of the old one, but to erect it in units. We therefore designed the entire structure, but built only the two wings encompassing the present building. At their completion the school work can be conducted in the new classrooms and auditorium, which they contain, while the central unit will rise on the wreck of the old structure.

The simplicity of design, or almost lack of any, in the two dormitories demanded a very quiet treatment of the central building. We have therefore depended chiefly on the general lines of this building rather than on any decorative detail. The result, even in its present detached state, is eminently satisfactory. The maximum of light and air has been secured; the exterior, while conforming with neither of the dormitories, has proved a good compromise with both and serves to tie the three into a homogeneous whole.

The most immediate necessities having been relieved, the commission turned its activities toward the development of a plan for the entire college plant which could gradually be realized as conditions would demand. The proposed new buildings are not set on rigid lines, as the college authorities particularly desire to preserve the atmosphere of domesticity which the college now possesses.

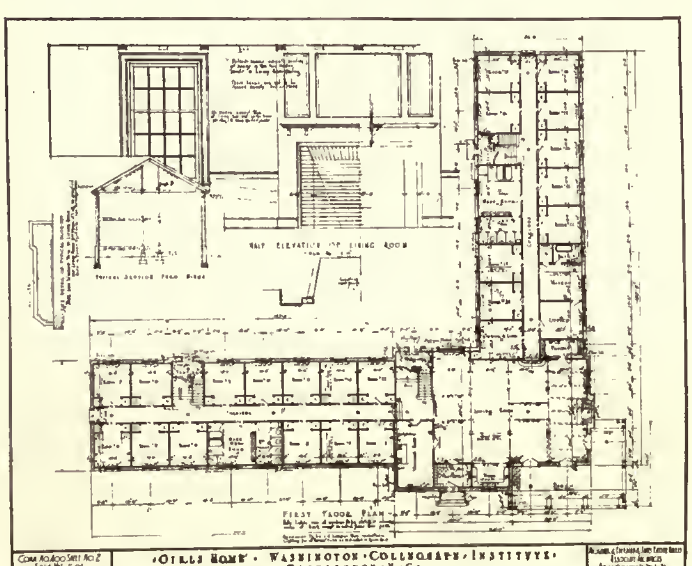
Between the administration building and the new girls' dormitory, to its north, an entrance-drive leads to the inner square or campus. This campus contains great possibilities for development.

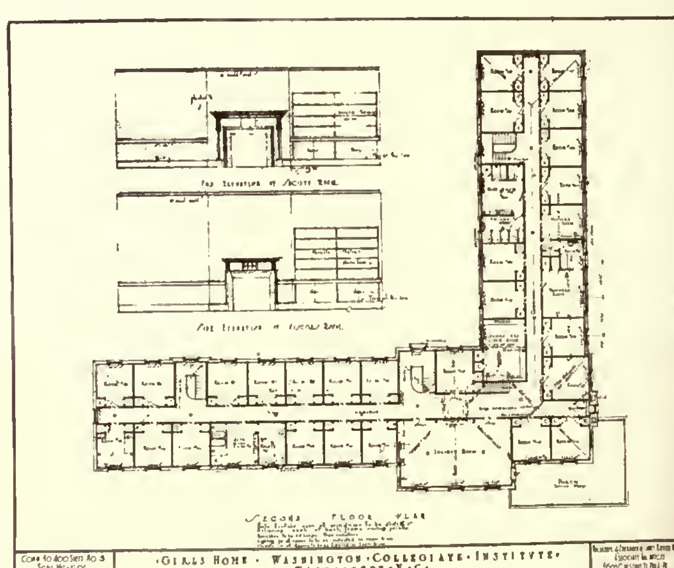
This campus measures about four hundred feet in breadth by three hundred feet in depth. At each side, both north and south, dormitories are planned to line its borders, while toward the setting sun the view would be unobstructed. Beyond the campus a fall of about ten feet locates a second terrace on which will be located the chapel to the right and the library to the left. These two buildings will give distinction to this part of the plan, as they will permit of a more pronounced and dignified treatment than the more domestic buildings. Stretching beyond this second terrace, on a slightly higher level, the athletic-field bounds the western limit of the college grounds. On this last terrain are located the gymnasium, containing all necessary dressing-rooms for athletic teams, and the social building, in which will be located all the society, club, and other organizations connected with the seminary. Thus the buildings are all located in logical order—first, the administration and classroom buildings with attendant laboratories and workrooms; next, all living quarters, that is, dormitories and eating-halls; farther, the chapel and library, and finally the recreational features. It is now only a question of time until the entire concept shall be realized.



An entirely different but equally as beneficial proposition is the *Washington Collegiate Institute*, located at Washington, North Carolina.

This educational establishment draws from a most





interesting territory for its pupils. Situated on the north bank of the Pamlico River, which itself flows into Pamlico Sound (that great inland waterway that is separated from the sea by a series of long, low-stretching islands), it is admirably located to attract the sons and daughters of the families that have been located in these deserted and forgotten islands for decades. Of course many come from the lowland districts of eastern North Carolina as well—but to the islanders it is an especial boon.

Washington, North Carolina, a very lively, up-to-date town, boasting of its precedence over all other Washingtons in age, has taken the institute under its wing, and the citizens are proud of possessing such a thriving institution in their midst.

The grounds lie a little to the east of the town and extend down to the water-front. This in itself, with its cypress-lined banks and the great expanse of blue water, is a fine asset. No two sites could be more unlike than this one at Washington and that at Boaz. An entirely new view-point is necessary for the proper solution of this problem.

At present there is on the site, at its northwestern extremity, one large brick building which answers the multifold purposes of administration, instruction, dormitory, and commons. It is vital that this building be relieved of its overpowering load and proper buildings be erected for the various departments. The commission and Doctor Fletcher, the president of the institute, both realized that a girls' dormitory should be the first new building, and this they are erecting at the present time. The building will accommodate one hundred students, has rooms of sufficient size to accommodate two girls in each, including their study-desks, and, moreover, is provided with a fine assembly-room for general gatherings, and a small library and writing-room for those desiring quiet.

The general style of architecture for this set of buildings has been suggested by both the church and domestic work erected in this part of the country, when attention was given to style and purpose in building. The Episcopal Church in Washington itself was an inspiration in conceiving the chapel for the institute. In plotting the general layout for the college, no variation in levels needed to be considered, as the ground inclines gently from north to south toward the river-bank.

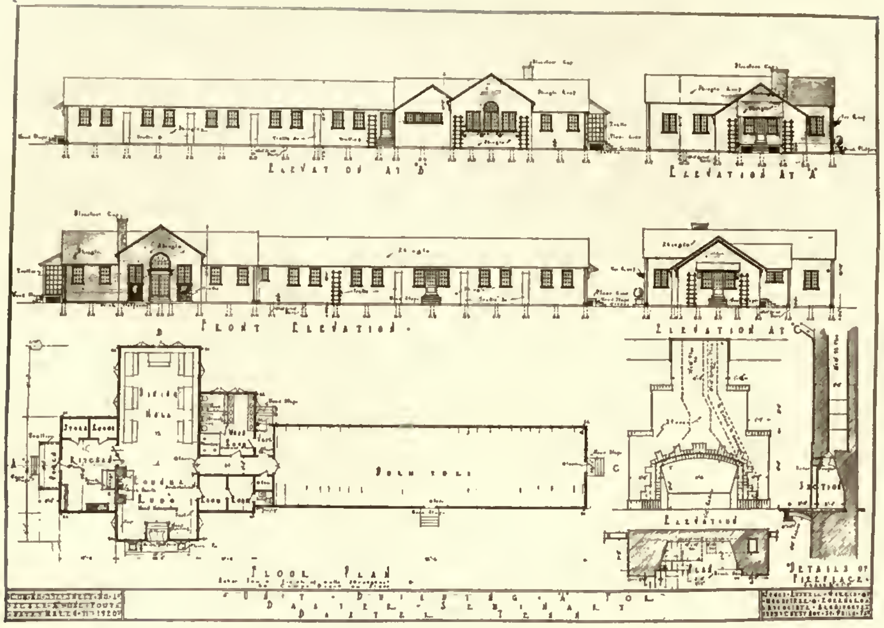
The boys' dormitory was already in situ; the only change here will be a sufficient addition to the present building to enable it to accommodate the increasing number of boy students.

The new general plan calls for courts, or squares, about which the various college buildings shall be grouped. These courts are to be separated by the new administration building, which will be located between the chapel group and the girls' dormitory group, and forming the third side of the hollow square which they border. The location of the administration building on the great longitudinal axis of the property and almost along the transverse axis gives it the necessary dominance, and also locates it in the most utilitarian manner. The boys approach it from the north and the girls from the south. The northern court becomes a men's court or quad with men's dormitories, athletic buildings and commons facing it, while the front court will provide a dignified and more reserved air surrounded by chapel, administration building, and women's dormitories. College Avenue, a recognized road, parallels the administration building to the north, and can be prolonged to encircle the various other buildings of the men's group, and finally lead directly to the athletic-field.

The chapel is very happily located, as it is bordered on two sides by roads, one leading directly from the town, and thus readily reached without traversing the college grounds. The less traffic on college property surely tends to a more scholastic atmosphere. It is simple and not too fine in detail, expressing the serious and workaday attitude of the student community. This type of architecture is symbolic of the old Scotch stock that dominates that part of North Carolina.

There is more roofing expanse to these buildings than to those of either Snead Seminary or of Murphy College, to be described later on. The decision to show ridged roofs to these buildings was based on the belief that where the country itself had no hill or mountain profile for background, the variation produced by ridge roofing the various structures thus would in itself effect a pleasurable variety of sky-line. Again an occasional cupola accentuates a bit of the assemblage of buildings, which should be emphasized. It is proposed to preserve an open expanse of lawn from the front of the administration building to the water-front, leaving only such trees as border the shore and form a leafy fringe to set off the stretch of college green and the encircling buildings.

The girls' dormitory is provided with blinds to all its windows, to give a rather more domestic and homelike feeling to the building. The general color scheme planned is a pigeon gray or dove-color. All exterior woodwork, such as sash, frames, and cornices, will be of a creamy white. The entire group has for background an extensive and noble



pine forest, some of whose members are of virgin growth and tower like sentinels above the surrounding woods.

At Baxter, Tennessee, a problem of entirely different type presented itself, but one which would be likely to occur sufficiently often to demand careful study of the conditions. Here, the main building had already been constructed, but, as usual, the enrolment had greatly outgrown the accommodation for students.

The building as designed is cruciform in plan, its greater axis formed by the dormitory units (to be increased in number as required)—the short axis composing the dining-hall and lounge-room—the upper arm of the long axis contains one unit, the kitchen and adjacent storerooms. In the present case the structure is but one story in height, but the scheme would not preclude two-story units where it might seem advisable. In such case, the living unit could be increased correspondingly in height. Each unit has ample space for six cots and intervening space, and these units could be added almost indefinitely. The wash and toilet rooms are located adjacent to the living-room unit, but should the building expand considerably, a second service unit could be located at the farther end of the sleeping units. This should prove an economic method of construction, and so simple that local builders could erect the structure understandingly.

The fourth and last problem we shall take under consideration is located at Sevierville, Tennessee, and known as *Murphy College*.

The old site for Murphy College had been made impossible by the bisecting its campus with the new railroad-tracks and the destruction by fire of its dormitory building. Losing no time, the president and his committee set about securing an option on a new property and a purchaser for the present one. A beautiful site was shortly determined on, and the commission was requested to inspect it and prepare plans for the complete layout in this new location.

The site selected is a ridge about thirty feet above the valley road, having a slight curve which conforms with the gradual bend of the Little Pigeon River Valley. It was one which left no alternative for the proper disposition of the building group. The only question was the locating of the central administration building and the juxtaposition in relation to this of the various other buildings.

Viewing the ridge from the roadway, the observer notes in about the centre of the curve a plateau of sufficient dimension to provide for the most important building of the group and a terrace in front of it. Therefore, the commission has located this central building on this spot. To give local color to the group, the architects have taken as a keynote the example of the Hermitage, the former home of Ex-President Andrew Jackson, a few miles out of Nashville, Tennessee. The dignity of the Hermitage and its simplicity of treatment both appealed to the designers as a prototype for these new buildings.

To the right of the administration building is the boys' dormitory, a long, low structure of only two stories, dominated by a cornice and attic. To the left the chapel is situated, very simple in its façade, but expressing faithfully its real dimension, which is incorporated more in its length than breadth. To the left of the chapel the land begins to rise into a cone-shaped hill, but still permitting sufficient shelf to place the girls' dormitories that curve forward with the incline of this shelf. Thus the appearance of these four important buildings from the roadway is that of a gently enclosing arc.

The absence of ridge roof is offset by the magnificent background of the Tennessee mountains, distant as they are—for they rise like great blue shadow-forms almost unreal in their haze. The architects, to better study the buildings of this group, had constructed a model to scale, placed on a contour base also to scale. This has proved eminently satisfactory for studying the best heights, locations, and orientation of the buildings, and has also been a big factor in assisting prospective contributors to visualize the entire scheme and to decide to give it their financial and moral assistance.

The college has already drawn on the mountaineer population of the great smoky mountains to such an extent that those people feel that this is their especial boon. When the new buildings are finally accomplished facts, no section, north or south, east or west, will be able to offer better facilities than will Murphy College to those who come under its influence.

Editorial and Other Comment

If

WE do not like the word very much, but it attaches itself to about everything that we could possibly say regarding the immediate present and future concerning building. If prices could be stabilized, if wages could be based on an honest and full day's work, if the uncertainties of future market conditions could be eliminated, if the solution of the great problems of adjustment that confront the whole world could be clearly visioned, the rest would be easy and the "if" could be eliminated from most of the questions that confront the architect and the rest of the world. According to the F. W. Dodge Company review, the construction industry is in very much the same position as it was in 1919. A spring awakening is predicted in some quarters, to be followed by increased activity during the summer and fall. While the amount of money involved in construction contracts in 1920 in twenty-five northeastern States was the same as in 1919, this amount of money—over two and a half billions of dollars—paid for a volume of construction that was *nearly one-fourth less in 1920 than in 1919.* The italics are ours.

The Real Crux of the Building Situation

OF all the things that have been said about the high cost of building, nothing has hit the nail on the head more effectively and accurately than a recent letter from Grosvenor Atterbury on "Labor and Housing." It is not a question of the cost of materials that is delaying housing, but the price of labor. The very people who are praying for homes are the ones who are making the building of homes impossible.

"Of all the items that go to make up the price of the working man's home, land, building, labor, and material, taxes, interest, and profits—by far the largest is the cost of labor—the thing he supplies himself. It is over two-thirds of the cost of the house itself. It is four or five times the cost of the land, and many more times the cost chargeable to taxes, interest, profits of employers and owners—even with graft included.

"What the situation cries for is a trade-union reformation. We should have membership on the basis of efficiency, like the old guilds. We should substitute levelling up for levelling down, and in place of the slogan 'An injury to one is the concern of all,' we should have 'The benefit of all is the concern of each one.'"

The Architectural League Exhibition in the Metropolitan Museum of Art

A VERY casual and rather hurried preliminary view, as we are going to press, of the Exhibition of the Architectural League in the new south wing of the Metropolitan Museum of Art gives us the impression of what great opportunities are there presented by the provision of adequate space for our art shows. This exhibition is one that should attract and interest the general public and by this means spread the gospel of good architecture in association with the kindred arts, sculpture, mural painting, and decoration. We have not had time at this writing to study details in the way of particular exhibitions, but first impressions incline us to look upon this exhibition as making a new start toward greater dignity, a happy reversion to type in the league's shows, and a new departure in the attitude of the Metropolitan Museum of Art toward the art of to-day. We are inclined to be somewhat enthusiastic in our views of this show, and we hope that the league's exhibitions may become an annual feature among the museum's special exhibitions. There is no place where it can be so adequately placed, and no place which seems to us more in keeping with the museum's own purposes of making it serve not only as a great historical review of the arts of the ages but as well a living inspiration for to-day. For years both the Architectural League and the National Academy have been wofully handicapped by lack of space. We hope to see the next academy show in the Metropolitan Museum, and believe that it would prove a great popular success for both the museum and the academy.

Princeton's School of Architecture

THE article in this number on "Gothic Space," by Professor C. R. Morey of the faculty of Princeton's School of Architecture, we feel sure will be read with interest by every one of our subscribers. This school is already meeting with notable success. Five of its students who recently entered a competition conducted by the Beaux Arts Institute of Design received distinguished recognition, winning one first prize and four honorable mentions. The Department of Art and Archæology, with which the School of Architecture is identified, is referred to as one of "the strongest departments of the university."

Professor Allan Marquand is internationally known for his distinguished work in the field of art and archæology, and he has gathered about him a group of able scholars and teachers, among them Professors Howard Crosby Butler, '92, Frank Jewett Mather, Jr., Charles R. Morey, George W. Elderkin, Baldwin Smith, and Shirley W. Morgan. Professor Butler, whose archæological excavations in the Near East are of world-wide fame, is the director of the School of Architecture. Associated with the school is an advisory board of prominent architects of New York, Boston, and Philadelphia. The school equips its students for the practice of architecture as a profession, and confers the new degree of Master of Fine Arts in Architecture. Its curriculum is founded on the sound conviction that "an architect should have a well-rounded education in liberal studies, that he should approach his profession primarily as an art, that he should understand and appreciate the other arts in their relation to architecture, and that he should be taught the science of building construction as a part of his training in design, rather than as an end in itself."

Workable Drawings

By David B. Emerson

THERE are working drawings and workable drawings, a slight distinction but a big difference, to which any builder or builder's superintendent will readily testify, and some drawings fail in their purpose by having too much on them, while others fail by having too little.

The draughtsman should not try to write the entire specification on the drawings, and yet he should put on enough notes to properly explain them. Another aid to the builder is marginal details to a larger scale on the plans, elevations, and sections, but in putting marginal details on the drawings the draughtsman should always remember to put the details on the sheet where that particular piece of construction occurs: not like a draughtsman of the writer's acquaintance who put a detail of basement construction on the roof plan,—as he naïvely put it—"because there was room on that sheet and the builder would find it anyway." How many things are left for the builder to find, and how many, as a result, are not found until afterward, and the builder pays the bill or the owner pays an extra.

Right here let me repeat what was said to me by one of the older architects, some years ago: "Always work under the assumption that every mechanic is a fool." Therefore, if drawings are made so they are fool-proof, or nearly so, they will not offend the sensibilities of the great number of very intelligent mechanics who are still with us, and will also prevent the less intelligent ones from making very natural mistakes, which are always liable to happen.

After the drawings are completed, and everything is properly indicated, the most important item on the drawings is the figures, and there is where many young draughtsmen fail. All four sides of a plan should be figured, even though the building be perfectly symmetrical and two of the sides be duplicates, as the writer has known of a case where the builder's superintendent laid out one side of a pilastered building by the figures, and the other side by scale measurements taken with a two-foot rule, and as the drawings were not accurately drawn, the result was startling to say the least.

All lines of figures should be continuous from end to end of the building, so that the builder may prove up his work and, if he finds any discrepancies, can report them to the architect for correction. Care should always be taken in putting of figures on the plans not to have them come on top of plumbing fixtures, light outlets, etc., as they are liable not to be seen, and if seen, may be very hard to read, as the blue-prints are very often not as legible as the tracings from which they are made. Also where wall thicknesses are figured, do not hatch over the figures; leave good-sized open spaces to call attention to the figures. Figures should be from rough to rough, that is, from brick wall to brick wall, or from stud to stud, as the work will be laid out and the rough construction set, and the finish put on that, and if the rough work is correctly set, the finish must naturally be correct.

All columns, beams, girders, and trusses should always be figured to centres, whereas it is a better practice in figuring brick and stone buildings to figure openings, pilasters, etc., to jamb or to arris. Don't figure to the axes of rooms, etc. It is better to figure from wall to wall, as in laying out the work the builder will have to double the figures, as he will not have the axis fixed, as an axis, like the equator, is an imaginary line; it is very necessary, in fact, indispensable in designing, but it can be wisely disregarded in the figuring, except in very special cases where it is the only possible station point from which to work. Always, in figuring, avoid the use of fractions which are not multiples of four, such as thirds, sixths, and seventeenths, as the mechanics use the divisions on the two-foot rule.

If there are three panels on the front of a building, it is a very simple matter to figure the centre one a quarter of an inch wider than the two side ones, and no human being, no matter how close he might look, would ever be able to tell the difference. There is one exception to this rule though, and that is, in figuring the height of the risers in iron staircases; which should always be figured in inches and decimals of an inch, as it is the custom in stair-shop practice to use a decimal rule in laying out risers. On the other hand, the treads should always be figured in inches and eighths. In figuring the risers in wooden stairs, divide the height from floor to floor by the number of risers, carrying the decimal out at least three places, and then by referring to the table on page four hundred and eight of the Cambria Steel Company's handbook, convert the decimals to the nearest fraction in sixteenths of an inch. Any little discrepancy will be taken up by the stair builder on the top and bottom risers.

The young draughtsman will do well, for many reasons, to procure a steel handbook and become more or less familiar with its contents, as there are a great many helps in them which are not engineering matter, such as the sizes of structural shakes, the sizes of bolts and nuts, conversion tables, and much other matter which is very often needed by the architectural draughtsman in full-size detailing, figuring of plans, and other practical parts of his work.

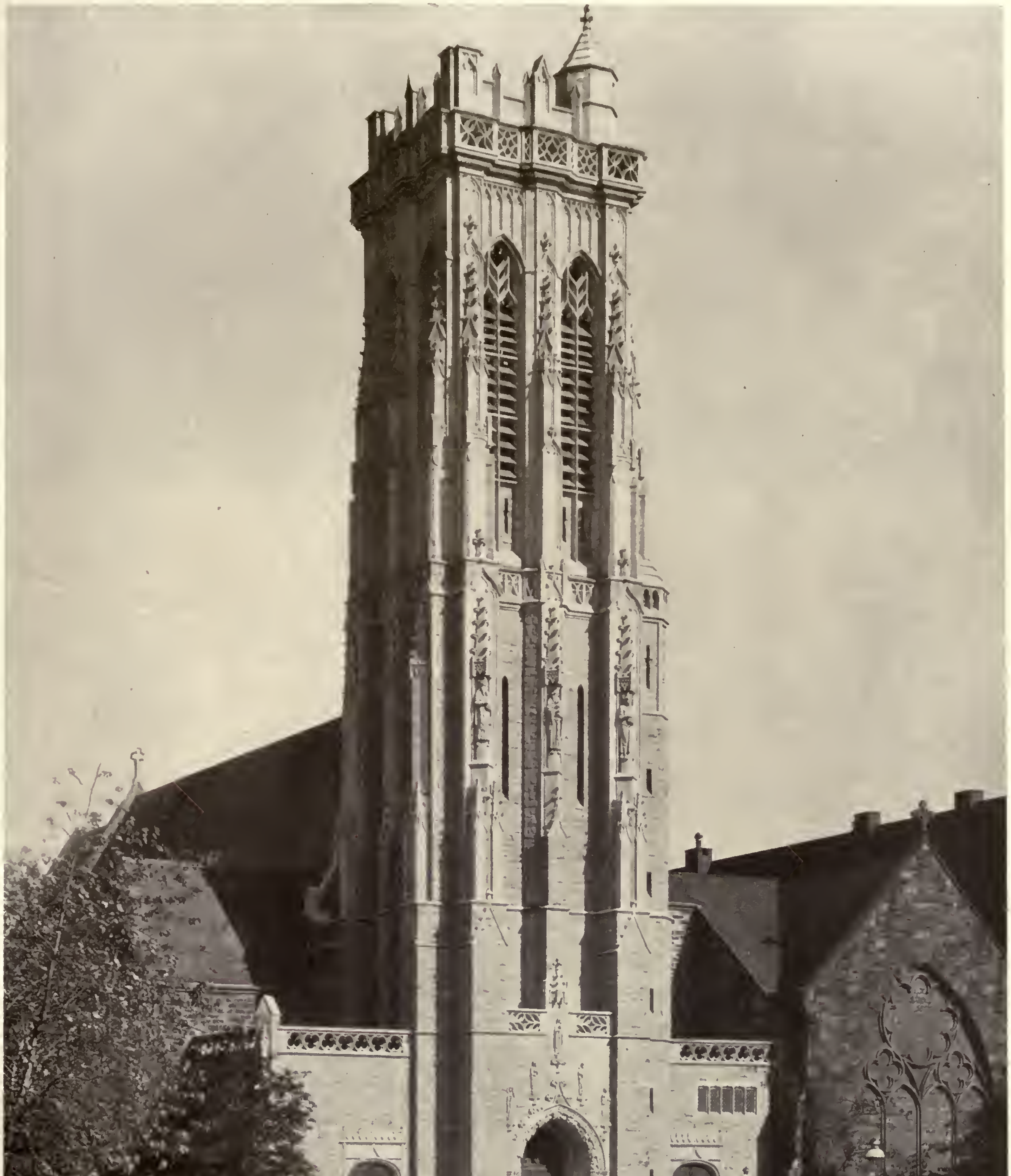
The first and most important thing in drawing an elevation, and something which the writer has found it rather difficult to get the young man fresh from college to do, is to show the floor lines. As a presentation drawing, an elevation looks very well without floor lines, but on working drawings they are vitally necessary. Elevations and sections should be figured from finished floor to finished floor, and openings should be figured from finished floor to sill, and from sill to head. In figuring the heights in a brick building, they should always be figured to work out in brick courses, so that all courses will work out even. The Hydraulic Press Brick Companies of St. Louis publish a book of figured heights for the various thicknesses of brick courses, accompanied by a set of brick scales, which are a great assistance in enabling a draughtsman to work faster and more accurately, and most young draughtsmen do not always appreciate the cost value in getting out their work quickly. If the book and the scales do not happen to be a part of the office equipment, it would pay the young draughtsman to secure them for his own personal use.

In making the drawings for city buildings, the building line (that is, the boundary-line between the lot and the sidewalk) should be shown on all plans and sections, and all projections beyond the building line, and all setbacks from the building line should be figured with relation to the building line. Also, the sidewalk grades should be given, and the grade of the finished first floor established with relation to these grades. These are simply a few of the many little things which the young draughtsman just starting out will have to learn, and although they may look trivial, and some of them are trivial, they will help to make the drawings more workable, and thereby make the work run more smoothly both in the office and on the job, and, incidentally, will make the young draughtsman more of an asset and less of a liability.

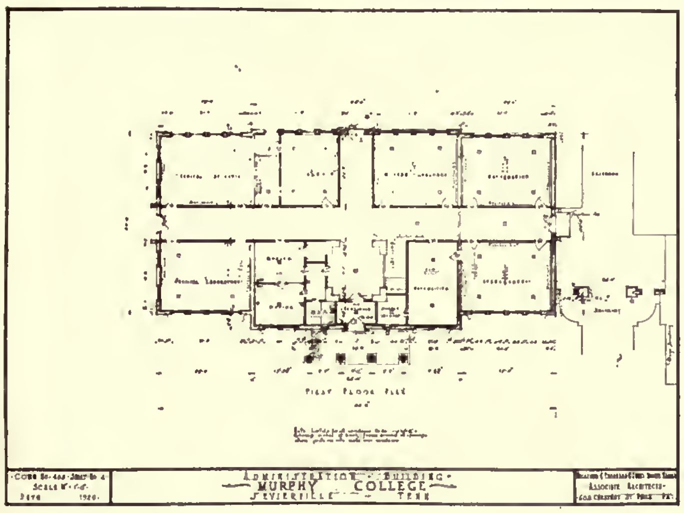
Plates XLV – LX Yellow page 116

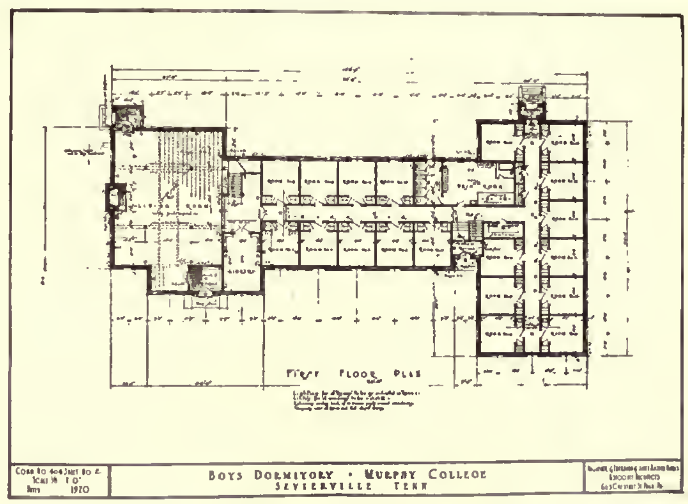
ENTRANCE, CHRISTMAS TOWER, EMMANUEL CHURCH, BALTIMORE, MD.

Woldemar H. Ritter, Architect.



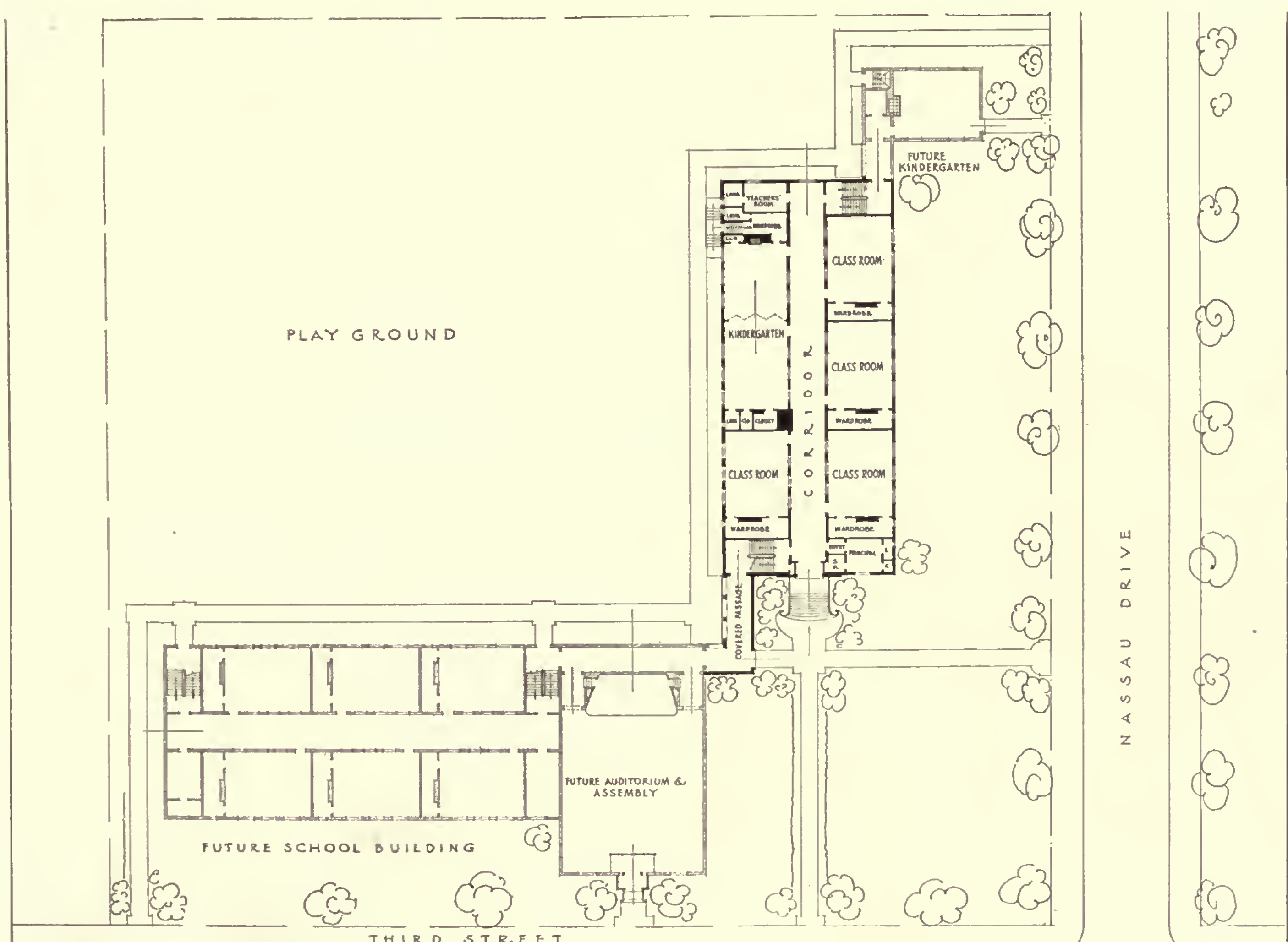
THE CHRISTMAS TOWER, EMMANUEL CHURCH, BALTIMORE, MD. Woldemar H. Ritter, Architect.



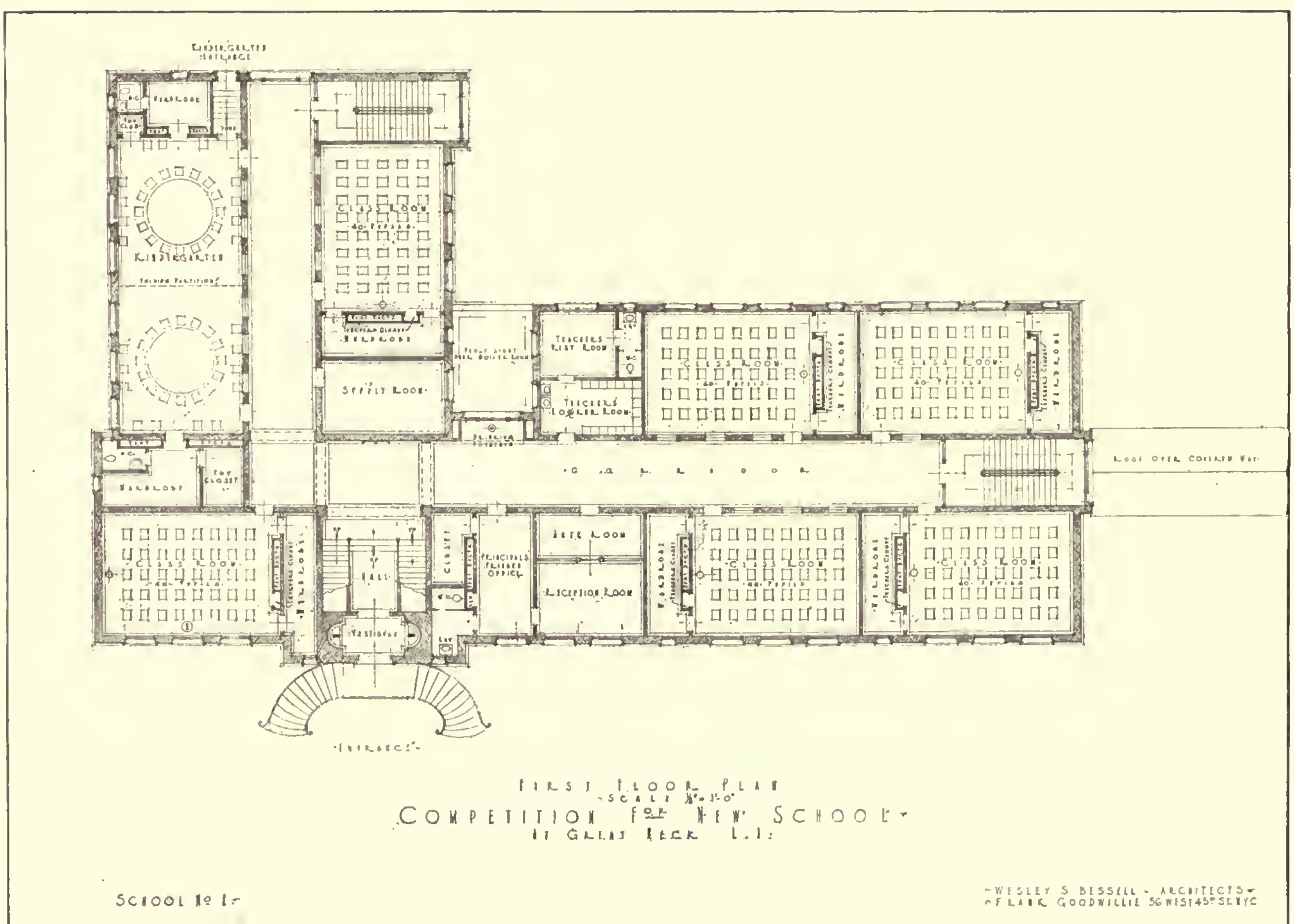


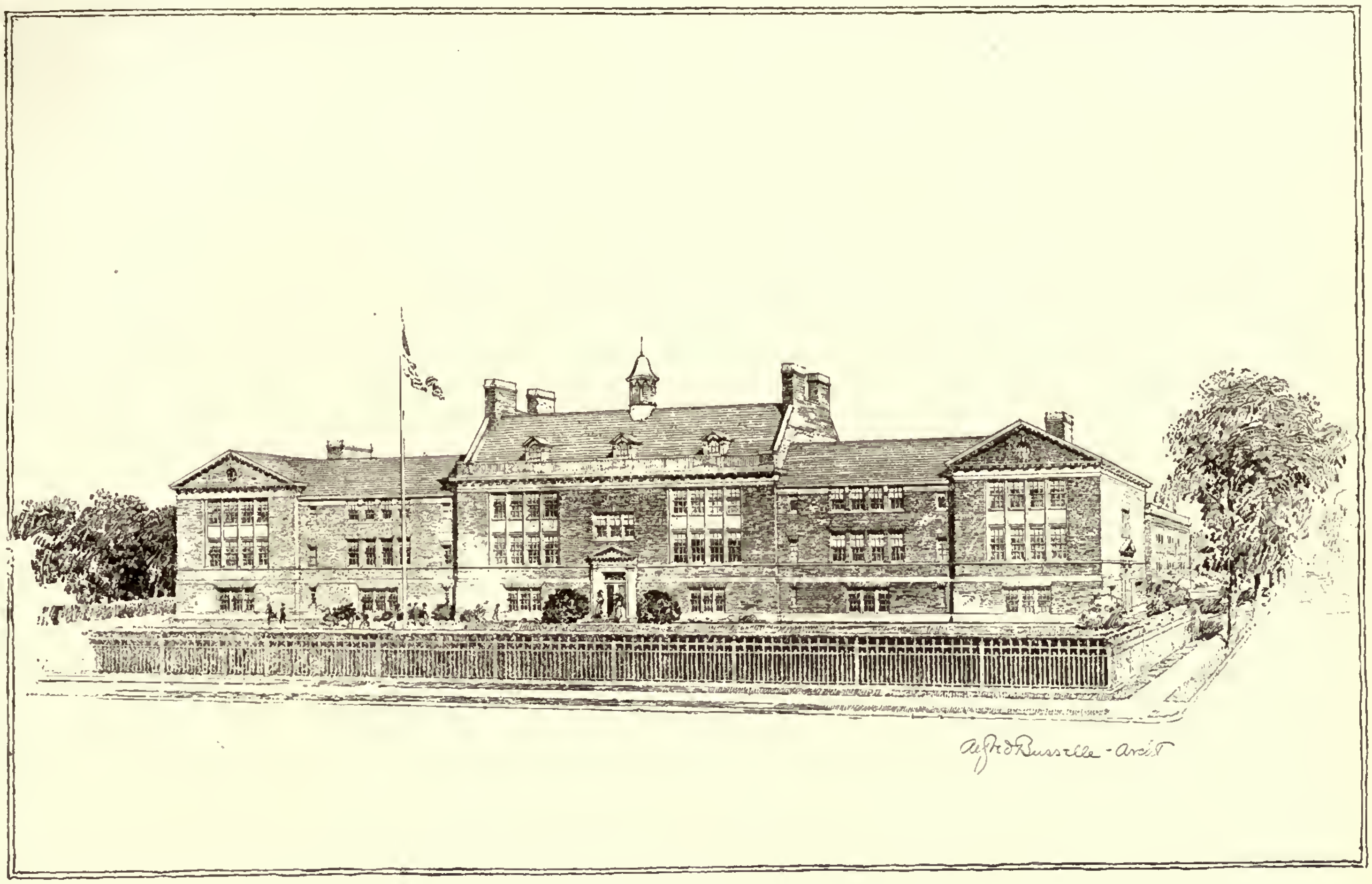
DESIGNS FOR MURPHY COLLEGE, SEVIERVILLE, TENN.

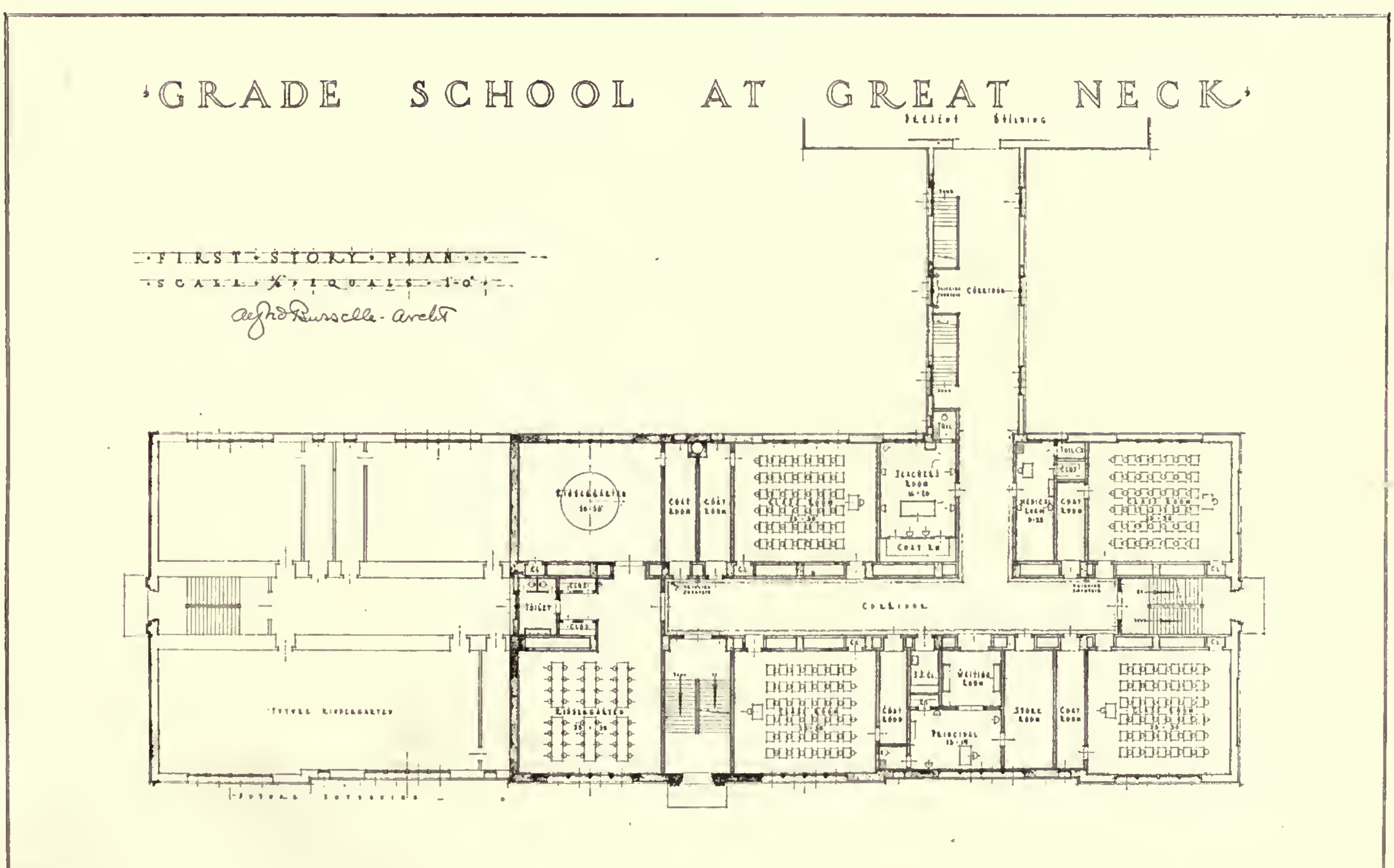
Magaziner, Eberhard & Harris, Architects.



GENERAL LAYOUT FOR PUBLIC SCHOOL #2 GREAT NECK LONG ISLAND
WESLEY S BESSELL - FRANK GOODWILLIE ARCHITECTS 56 WEST 45TH ST N.Y.C.


Kindergarten Entrance
Kindergarten
Class Room 40 Pupils
Supply Room
Teachers Rest Room
Teachers Locker Room
Corridor
Roof over Covered Way
Class Room
Hall
Vestibule
Principals Private Office
Reception Room
Entrance
First Floor Plan
Scale 1/8" = 1'-0"
Competition for New School
at Great Neck L.I.
School No 1
Wesley S Bessell - Architects
Clark Goodwillie 56 West 45th St. NYC

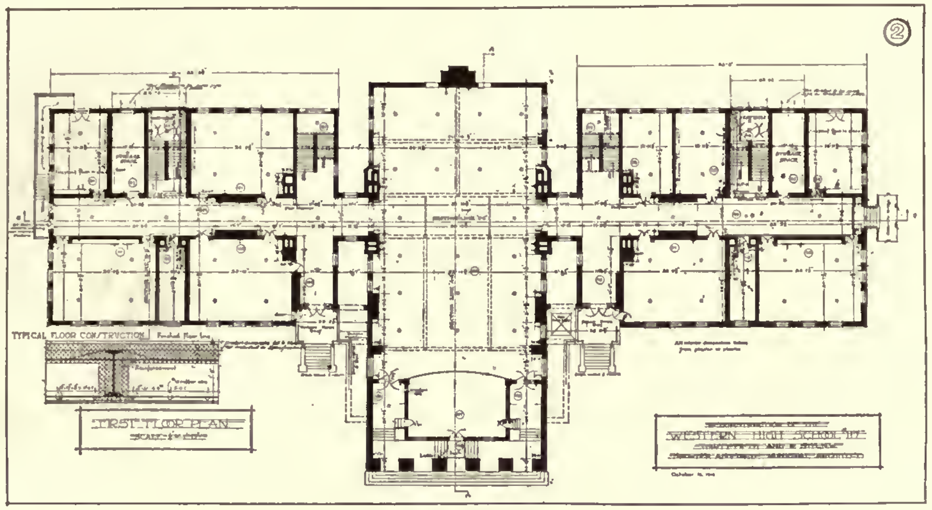


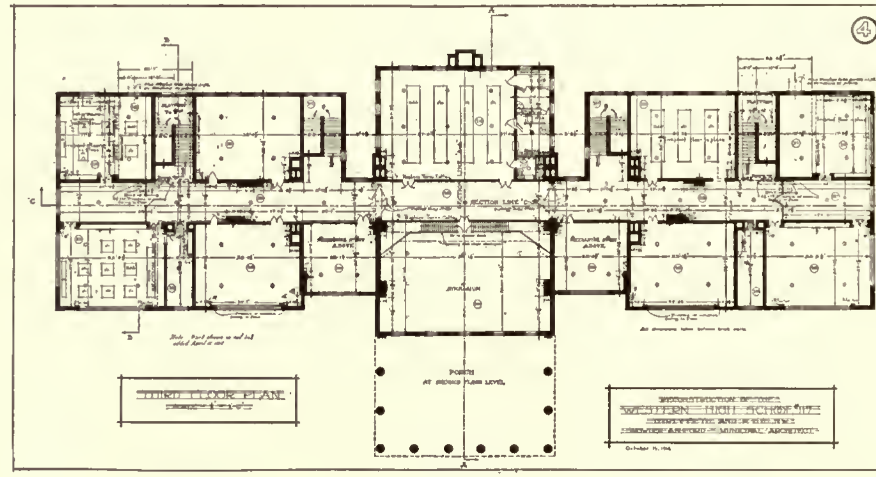


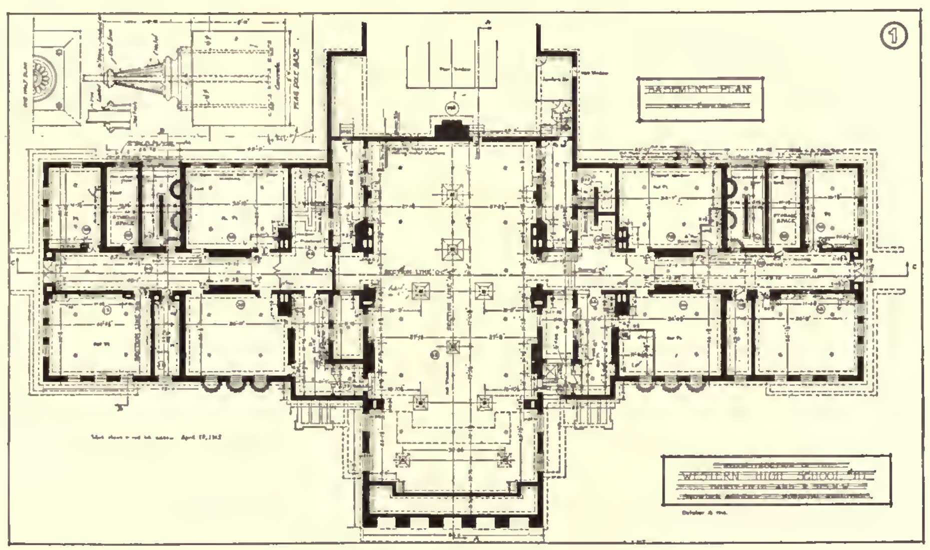
COMPETITIVE DESIGNS FOR NEW SCHOOL No. 1, GREAT NECK, N. Y. Alfred Busselle, Architect.

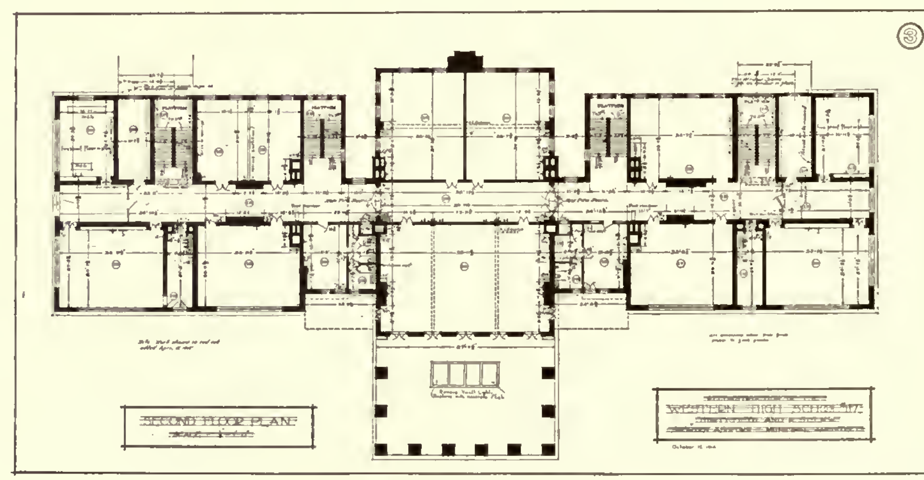
THE WESTERN HIGH SCHOOL, WASHINGTON, D. C.

Snowden Ashford, Municipal Architect.



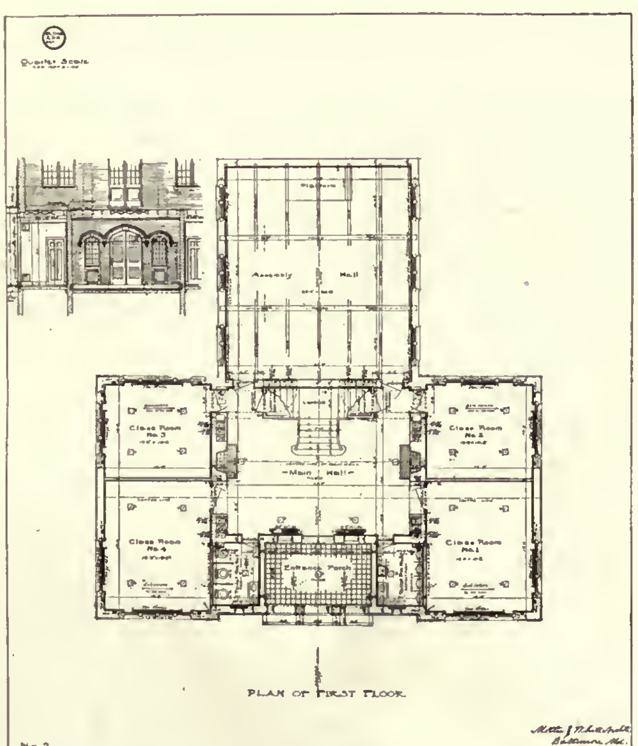


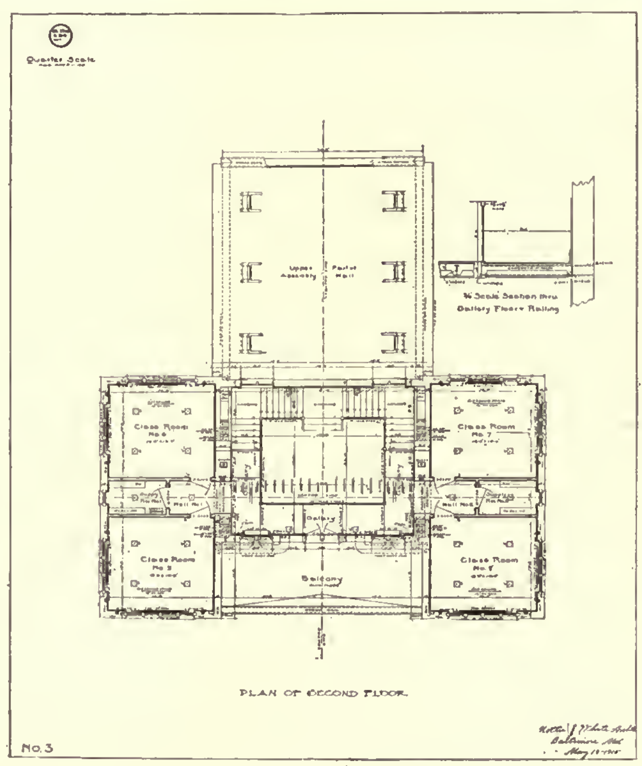




PLANS, WESTERN HIGH SCHOOL, WASHINGTON, D. C.

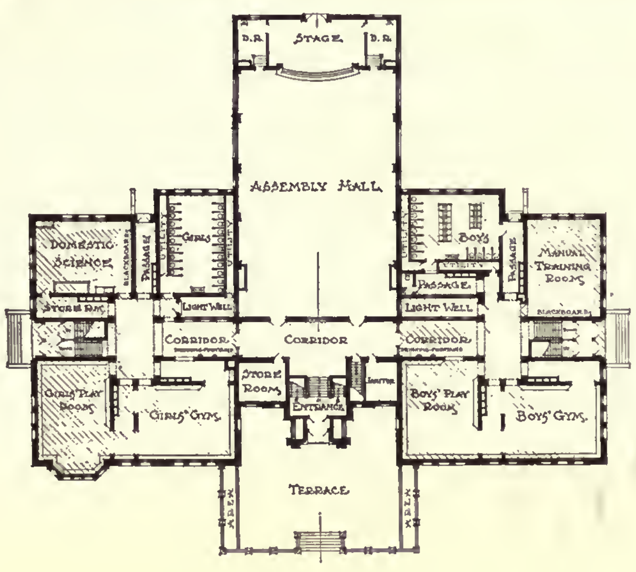
Snowden Ashford, Municipal Architect.

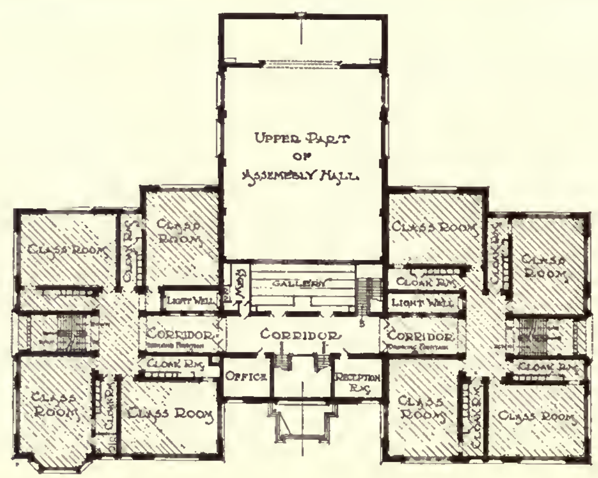


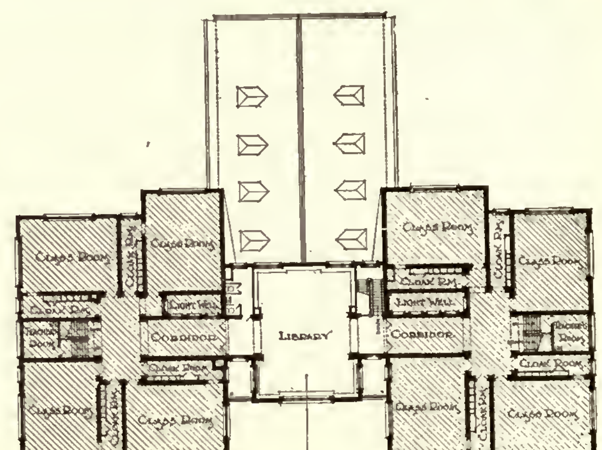


DONALDSON SCHOOL, HOWARD COUNTY, MD.

Mottu & White, Architects.







PARK VIEW HIGH SCHOOL, WASHINGTON, D. C.

Snowden Ashford, Municipal Architect.

CLOISTER IN NEW YORK CITY BACK YARD.
Designed by Francis Howard.

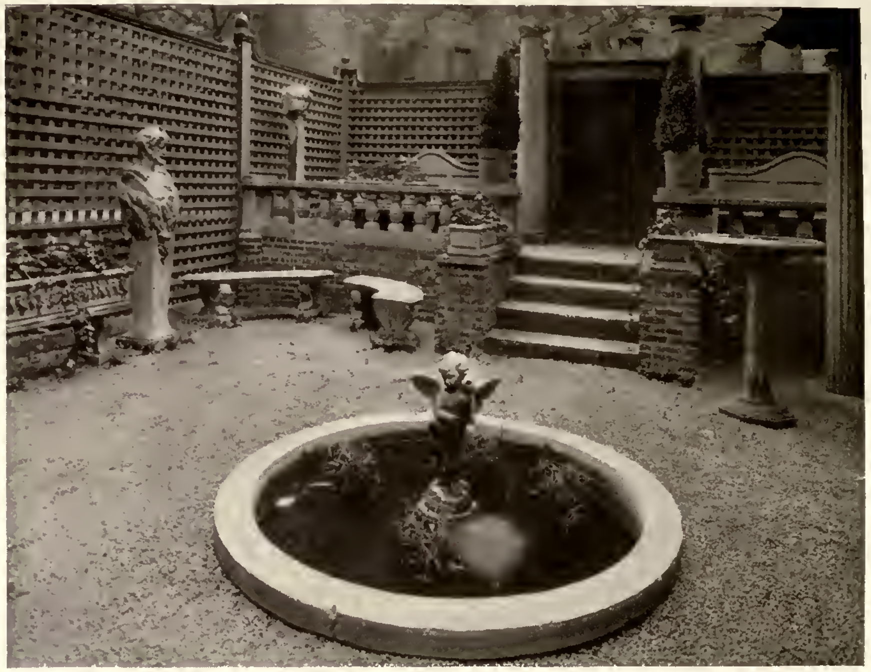
PERGOLA, NEW YORK CITY. Designed by Francis Howard.

TREATMENT OF PARTY LINE. Designed by Francis Howard.

SMALL GARDEN PAVILION. Walter Hopkins, Architect.

SOME CITY BACK-YARD GARDENS.

Back of Mrs. Hardy's house on Chestnut Street, Boston, is a small space which has been utilized as a back-yard garden. Here we find a brick flooring, the red contrasting with the gray of the stone and the white of the trellis. Around three sides a small space has been taken for the use of flowers to give color value, and vines which will eventually cover the trellis. The setting here is painted furniture, the settle being a dark green with bright coloring.

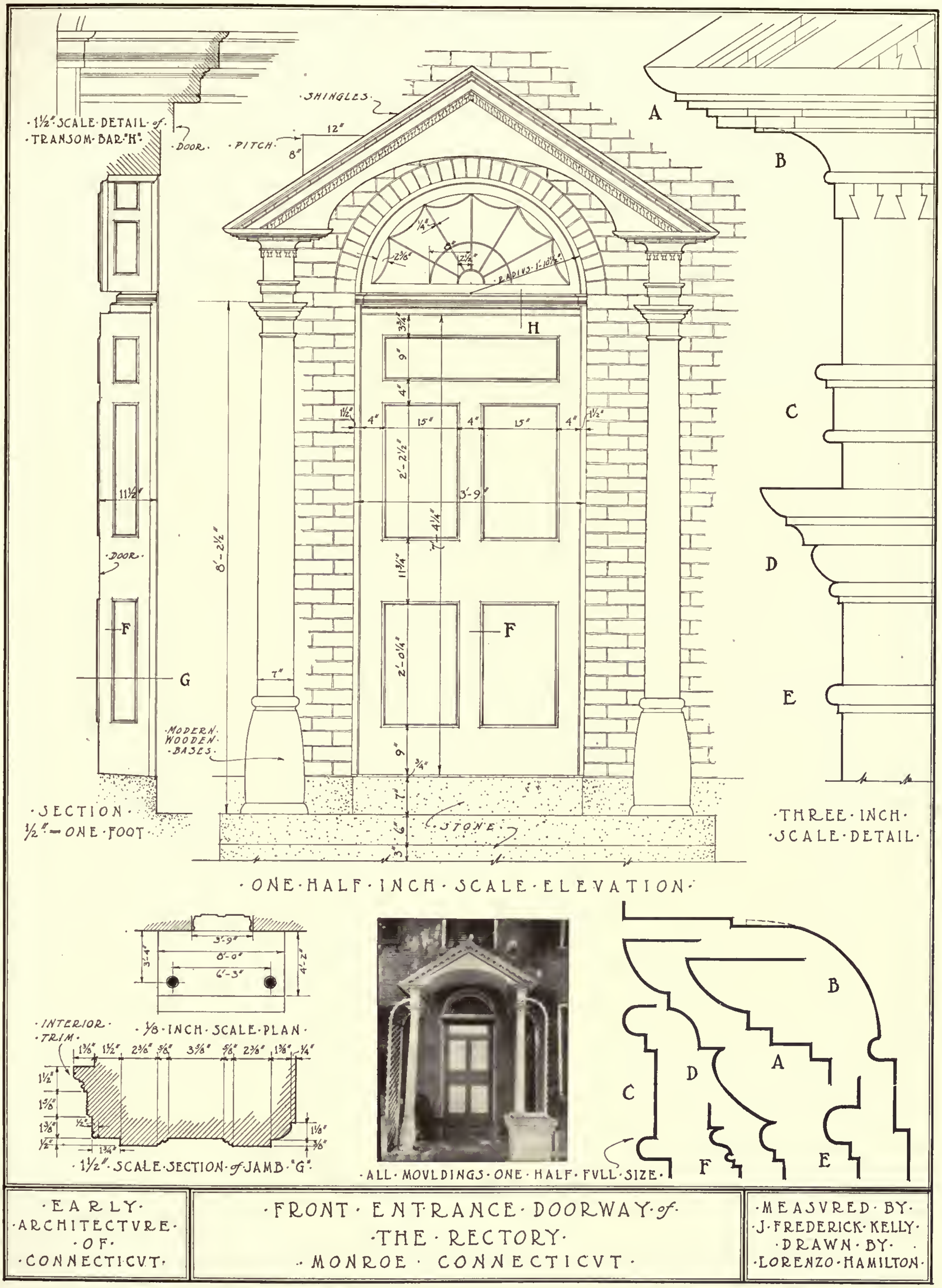


This back-yard garden is at the rear of Brett, Grey & Hartwell's office on Boylston Street, Boston, Mass. The tone colors are green and red, the green being shown in latticework and the red in the bricks laid in white mortar. This back-yard garden is on two levels, the upper one being furnished with seats, thus making it an outdoor living-room; the lower part is devoted to the different ornamentations used in gardens, such as fountains, bird-baths, settles, and statues. To the right is a trellis with fluted columns.

Mrs. Gardner M. Lane has chosen a charming little tea-house at the foot of her lower garden. This is finished in white with green latticework. The furniture is of wood, painted green. The light is furnished by an old-fashioned lantern depended from the beamed ceiling. This is at Manchester, Mass.

Mr. Lester Couch, in his home in Danvers, Mass., has chosen a part of his back yard to make an outdoor living-room. Marble fragments stand inside of the Ionic columns, while flowers add a touch of color.

SOME CITY BACK-YARD GARDENS.


·1½" SCALE·DETAIL·of·
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·DOOR·
·SHINGLES·
·PITCH·
12"
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A
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·RADIUS·1'-10½"·
3'-9"
8'-2½"
·DOOR·
·MODERN·
WOODEN·
·BASES·
·STONE·
·SECTION·
½" = ONE·FOOT·
·ONE·HALF·INCH·SCALE·ELEVATION·
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·1½" SCALE·SECTION·of·JAMB·"G"·
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·THE·RECTORY·
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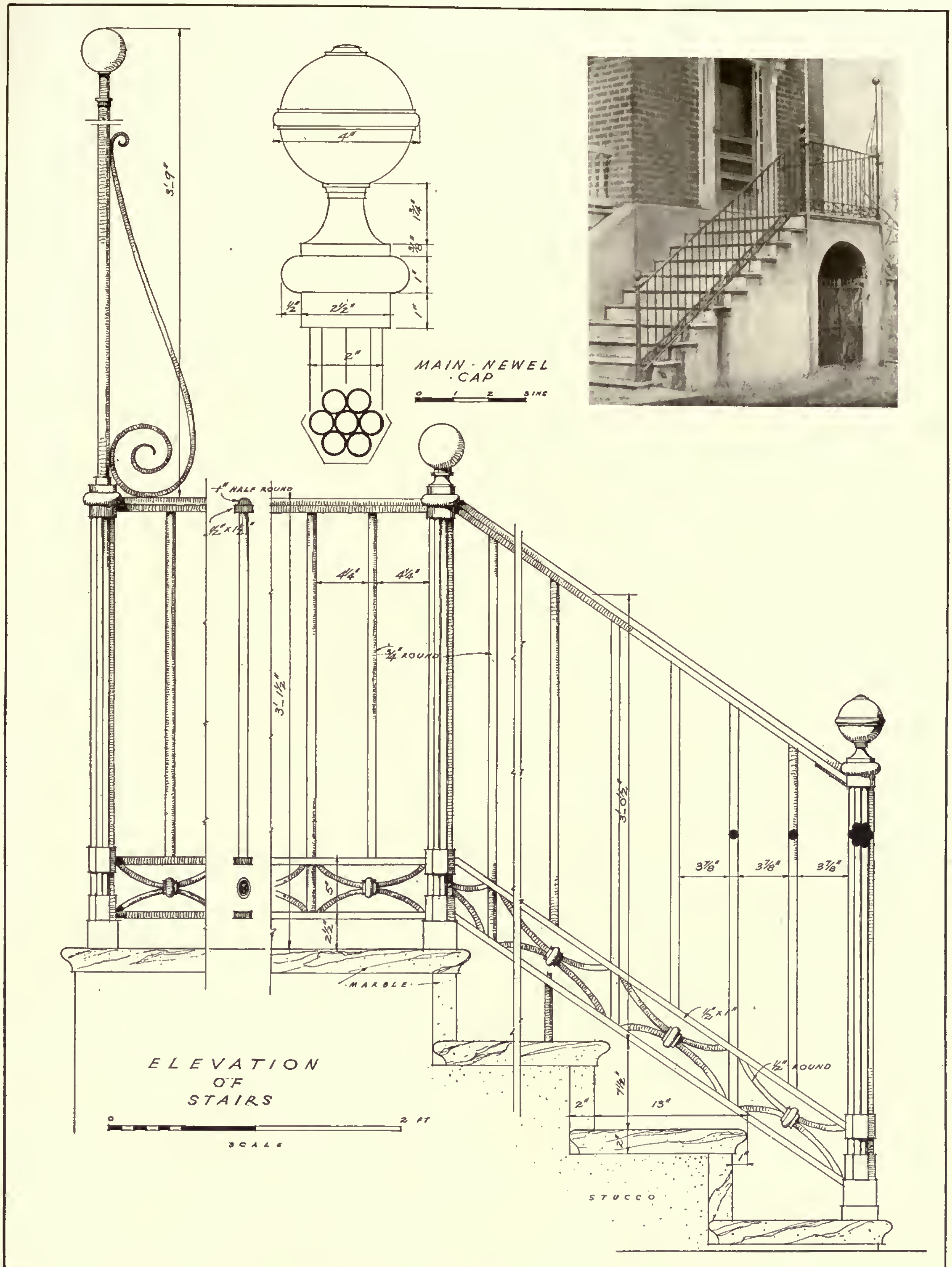
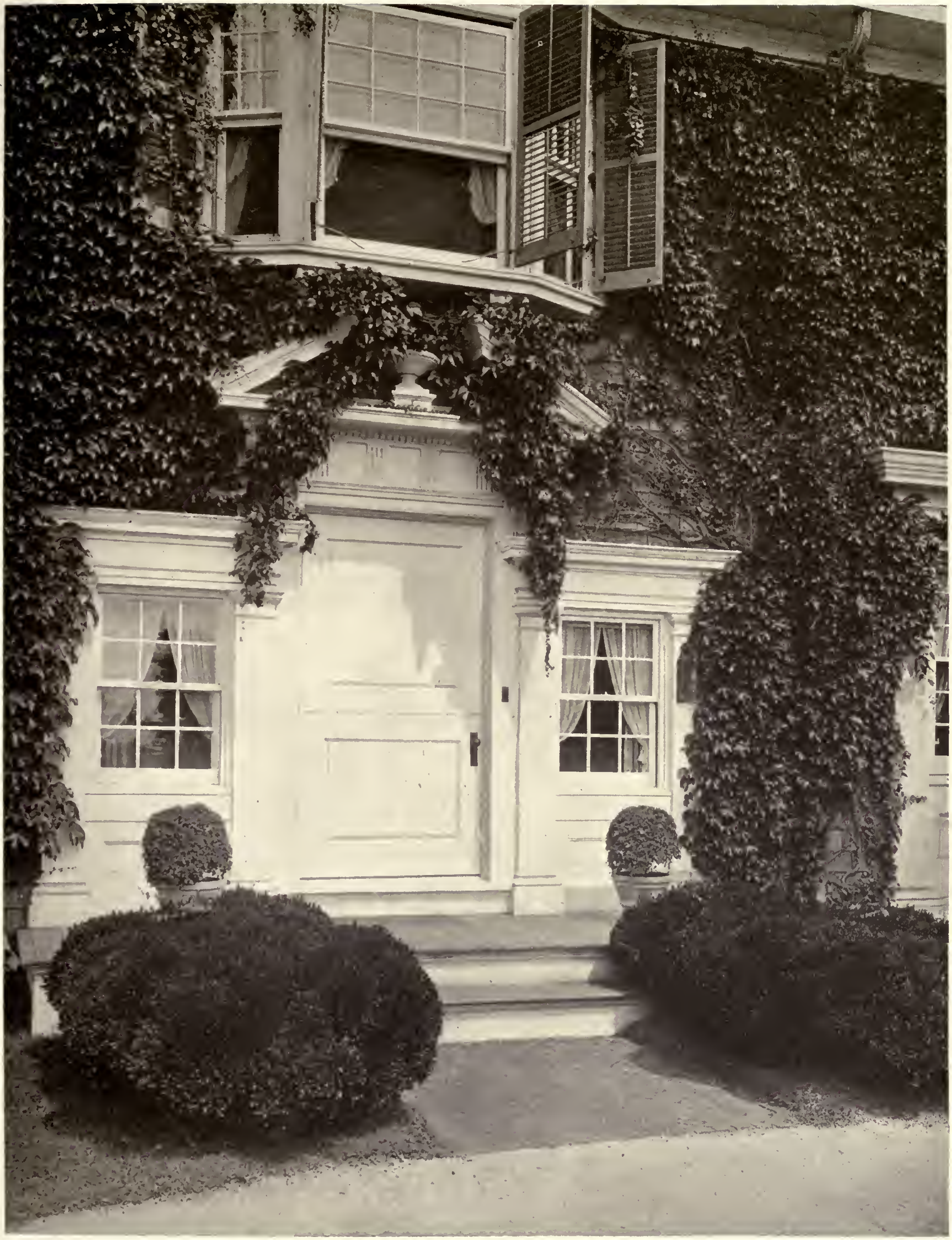


EARLY ARCHITECTURE OF SOUTH · CAROLINA ·	· WROUGHT · IRON · STAIRS · · ON · THE · DR PARROT HOUSE BEAUFORT · S · C ·	MEASURED BY DWIGHT · JAMES BAUM DRAWN BY · VERNA COOK · SALOMONSKY



HOUSE, MRS. L. T. DYER, SOUTHAMPTON, LONG ISLAND. F. Burrall Hoffman, Jr., Architect.

LIVING-ROOM.

HALL.

F. Burrall Hoffman, Jr., Architect.

HOUSE, MRS. L. T. DYER, SOUTHAMPTON, LONG ISLAND.

House, Mrs. L. T. Dyer, Southampton, L. I. F. Burrall Hoffman, Jr., Architect.

The Corinthian Order

By Egerton Swartwout

I HAVE shown in a previous series of articles on the classic orders of architecture that the development of the Corinthian order in Greece was due to the demand for an order which would be suitable for circular structures. The Greeks had used the Doric for some circular exteriors, but even with a relatively large radius the order was unsatisfactory, because the square projecting abacus contrasted badly with the curves of the entablature and its use was impossible in the necessarily reduced radius of the interior. The Ionic would have been even worse. The Corinthian, on the other hand, was admirably suited to circular work: it was a four-sided cap; the abacus, though inscribed in a square, was not straight-sided but curved, and was relatively much thinner and of less projection than the Doric; in fact, the use of the Corinthian for this class of work was a patent exhibition of common sense in design.

The most interesting and perhaps best-known example in Greece is the charming little monument of Lysicrates in Athens, one of the finest examples to be found in all architectural history of the development of an order for a special location. The peculiar arrangement of the volutes and of the leaves and the curves of the abacus are wonderfully conceived so as to harmonize with the sharply circular curves of the entablature when seen from below. In fact, a better cap for the purpose cannot be imagined. There is one other point which is especially worthy of note: the suppression of the usual fillet and torus at the necking. The actual necking is missing and only a sinkage is left; but the necking must have been originally of bronze, probably gilded and ornamented in high relief. The flutes do not finish in the usual manner, but are gathered into a leaf formation at the top. By these means the cap is virtually a continuation of the shaft, and the sharply circular line of the necking does not conflict with the curves of the entablature above, as would have been the case if the necking was normal in form. The effect is charming and the detail superb; but it is a small order designed for a very particular purpose; it cannot be used as a large order in stone, or, rather, it should not be. It has unfortunately been so used, but the effect is bad. This order and that of the Erechtheion should not be adapted.

It is quite palpably apparent that the cap of the little Lysicrates order is reminiscent of metal forms. This is evident from the detail of the volutes and from the curious and unusual rosettes on the leaves, which might represent some bronze method of fastening the leaves to the bell of the shaft, but there are earlier examples which are decidedly lithic in form and which were undoubtedly developed because of the necessity of an order which would be slighter in proportion even than the Ionic, and which would have a four-sided cap of small projection. Such columns probably existed in the interiors of some temples, noticeably in one instance in the axial column in the interior of the temple at Bassæ. It is, therefore, idle to assume that the Corinthian as an order had its origin in a metal form. Its origin was as above indicated, and its development in Greece was along lines of circular work.

There are other examples in Greece than those above cited, but not many. There is an interesting type in the interior of the Tholos at Epidaurus, also a circular structure, but the best-developed example is that of the temple of Jupiter Olympius at Athens. The temple itself was completed by the Romans, but the cap is undoubtedly Greek, and probably formed the prototype of the great orders of Rome. In fact, the Corinthian is distinctly a Roman order, and, unlike the other orders, attained its perfection not in Greece but in Rome. It is pre-eminently an imperial order, and well suggests the pomp and majesty of Rome, although it has not the simple monumental quality of the Doric, nor the grace and charm of the Ionic. Although it is slighter in proportion than the others, it is not weak or delicate. On the contrary, even with a column height of 10 diameters, it is remarkably virile and robust. The assumption of weakness in that proportion is one of the commonest mistakes in modern times. The columns of the temple of Vesta at Tivoli, which are relatively small, only a little over 23 feet in height, are about the most robust of Roman examples, being 9.46 diameters high; but this proportion is undoubtedly influenced by the location, for the temple is situated on the edge of a steep rocky ravine, and the columns seen in silhouette against the sky appear much slighter than they really are. The order of Mars Ultor, about the largest Roman order, has a column height of over 57 feet, and is slightly less than 10 diameters high, the actual proportion being 9.87. Jupiter Stator, 48 feet high, has a proportionate height of almost exactly 10 diameters. The circular temple of Vesta in Rome, about 33½ feet high, is nearly 11 diameters high. There is, of course, no definite rule. It is not a matter of size, for, as shown above, the largest and practically the smallest orders, Mars Ultor and Vesta Tivoli, both have a more robust proportion than the normal, which may be assumed as 10. I have tried many proportions in studies and in the model, and have used different proportions in actual work, but I have come to the conclusion that 10 diameters is the best in most cases. A heavier proportion is apt to be clumsy and does not seem to add any feeling of strength; in fact, it does not look strong, but fat. This clumsy feeling is enhanced in those cases in which the cap is proportioned to the diameter of the column and not to its height, a very serious error, which I will shortly take up.

I don't know just how the idea has become prevalent in the last fifteen years or so that Corinthian columns should be less than 10 diameters high. In the good old days we always made them 10, taking the order straight from Vignola, and getting away with it nicely. Nothing very skilful about it; no originality and very little thought; but the results were generally good. Later there grew up a distrust of our old friend, and Vignola was shelved, and some of us invented new and strange variations which, unfortunately, were often built, and in fireproof materials. Nothing short of a Zeppelin's visit or a Bolshevist uprising would help matters. A portico, for instance, would be drawn out painstakingly 10 diameters high; a critic would say that it was too skinny, and that we must make those poor columns more robust, and we would add the width of a line to each column, and feel much better satisfied. Another critic would appear and say that if there was one thing more than another to beware of, it was a weak, slender column, and urge us to put more power into it. And after this had gone on for a few weeks, the paper was pretty well worn out, but we had a row of fine, sturdy columns of almost Doric proportions. I think, too, that the rendering had a good deal to do with it. A column of 10 diameters when rendered looks very thin and meagre, because the outline of the column counts in with the dark background, and it is consequently necessary to make the columns about 9 diameters to look well in the drawing. It is the old story of paper architecture all over again, and there are, unfortunately, many melancholy examples of this paper architecture which badly mar buildings which are otherwise architecturally good.

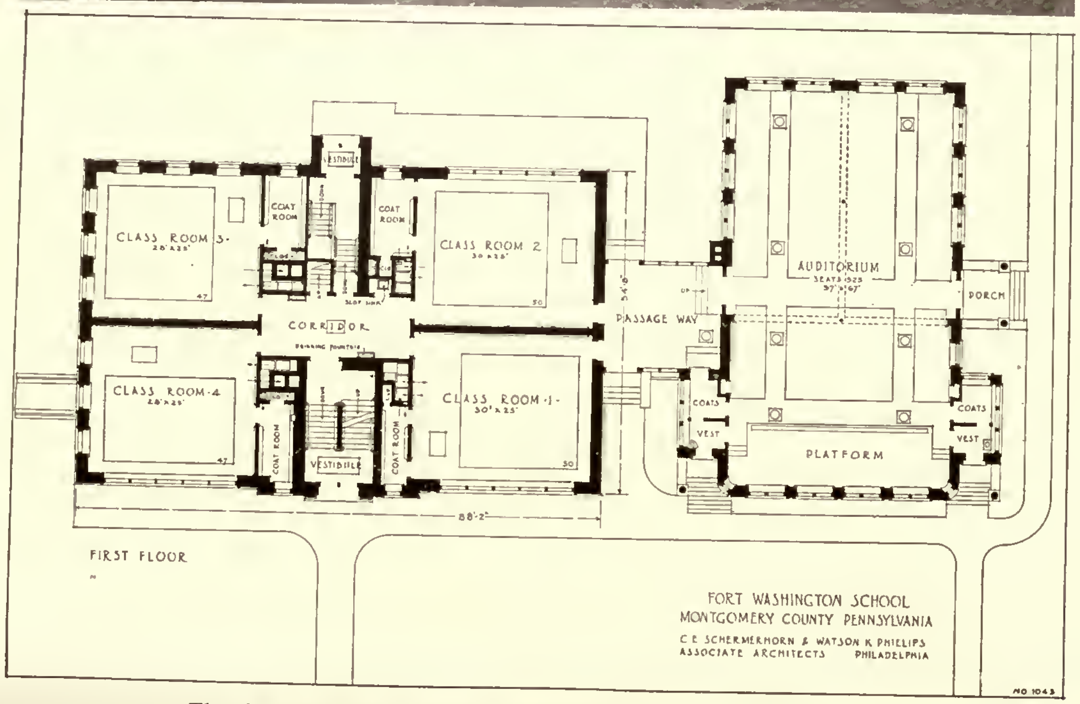
I have spoken of the proportioning of the cap to the diameter of the column instead of to the height. This is a most prevalent and serious error, and it generally happens in this way. The caps that are to be found in the restorations are usually supplied with modular dimensions, the module being in most cases the lower diameter of the column. In Vignola always, and in the other books usually, the shaft is supposed to be 10 diameters high, though there is often no shaft dimension given. The architect has made his shaft, say, 9 diameters high. The module he uses is consequently much larger in proportion to the height than the one in the plate, and the result is that a cap proportioned to a graceful shaft is placed on a squat, sturdy column. The effect is bad. A fair-sized column has the effect of having lost 2 or 3 feet of its height. It is easy to test this by eye. Hold something in front of the base of the column and your eye will instinctively place the location of the base 2 or 3 feet below its actual location. One of the most unvarying proportions in the Corinthian order is the relation of the height of the cap to the height of the shaft. In Jupiter Olympius, Jupiter Tonans, and the Pantheon the proportion is 11.2 per cent, although the proportions of the shaft vary from 19 half-diameters in the first instance to 20.50 in the second, the Pantheon being 19.51. Jupiter Stator drops slightly to 10.9 per cent, that is to say the proportion of cap to shaft, and the extreme is found in Vesta Tivoli, which is 10.3 per cent, although this is a special instance in a peculiar location, as before noted. Only one cap, that of the frontispiece of Nero, is over 12 per cent. Vignola's proportion is 11.5 per cent, which he adopted doubtless as a mean figure of the caps with which he was familiar. Any proportion between 11.2 and 11.5 will probably give the best results under normal conditions. I think the proportion of Jupiter Stator—10.9 per cent—is a little too low. I used this proportion on the main order of the Missouri State Capitol; in point of fact the order was within an inch or two of the exact height of the Jupiter Stator order, and I have always felt the cap was just a little chunky. But the point I want to emphasize is that the cap should be considered in proportion to the height of the column, and not to its lower diameter, and that this proportion is generally constant in classic examples. If for any particular reason, as in the case of Vesta Tivoli, it was deemed essential to make the columns more sturdy, the Roman architect retained the relative height of his cap; the shaft was more sturdy and the cap naturally more chunky; a perfectly rational proceeding. Expressed in definite figures, in an order 20 feet high, based on the proportions of Vesta, the cap would be 2.06 feet high, and the lower diameter or module would be 1.08 feet. Now if the cap should be laid out according to Vignola, using the modular dimensions in relation to the lower diameter, the cap would be 2.48 feet high, .42 of a foot, or over 5 inches higher than the Vesta cap; or, expressed proportionately, about ⅙ higher. It is strange that such a self-evident proposition as this proportion of the cap should be so often ignored, but there are numerous examples that will occur to everybody, and they can be seen even in monumental buildings otherwise excellent.

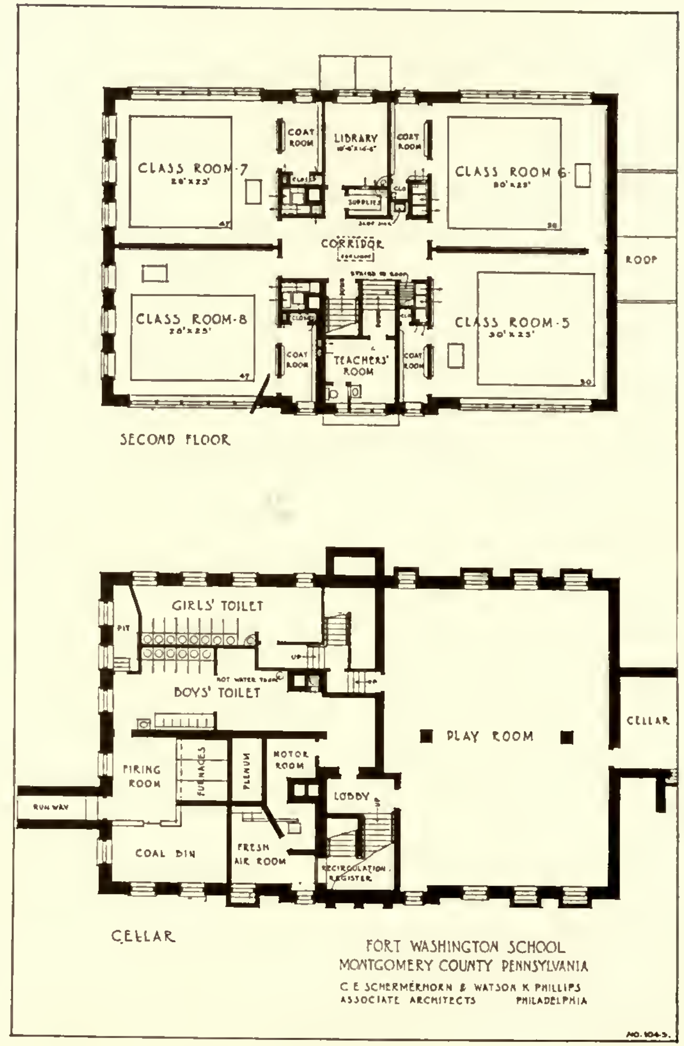
It seems trite to say that if the shaft is heavy in proportion, the cap should be heavy, and if the shaft is light and thin, the cap should be long and slender. It is A, B, C stuff; the veriest beginner would scorn such a statement; and yet the mistake happens, and happens often, and it generally happens in this way. The column is drawn in the original sketch at about the normal proportion with a cap of normal height. It is decided to thicken the column, and this is done without changing the height of the cap. So far so good; but when larger-scale drawings are made the draftsman never thinks of following the smaller-scale drawing. He takes the lower diameter if it is figured, or scales it carefully if it is not, and using this as a module goes blithely on his way, with the results I have above described. It is interesting to note that the colonial architect was thoroughly aware of this principle of the relative height of the cap, and invariably followed it when he reduced the column from a lithic to a wood proportion. He kept the height of the cap relatively as it was in stone, reducing the abacus and the mouldings to the smaller scale of the column, and putting into the necking the distance gained by this reduction.

As to the Corinthian cap itself, it is apparently the most complex and certainly the most difficult cap of all the orders to detail and model. I say apparently complex because its complexity is more imaginary than real. In principle it is simple, and is, as I have shown, merely an ornamented variation of the Doric. An abacus forming the termination of the shaft is logically and constructively joined to the shaft in a more graceful and decorative way than in the Doric. That is all there is to it. It is true the abacus has become relatively unimportant and is not straight-sided but curved, and the echinus of the Doric is lengthened into the bell of the Corinthian, and this bell is further ornamented by leaves, and the corners of the abacus are supported by volutes, but it is the same principle of the adjustment of a round to a square. This principle must be continually kept in mind by the architect and by the modeller, for the cap has such powers for complexity that it is the easiest thing in the world to complete a model which is stunning in the shop but confused and shapeless in its final location. As in all orders, but perhaps particularly in this, the size and location are of paramount importance in the determination of the detail. It should go without saying that the larger the cap and the farther away it is from the eye, the simpler should be the detail, the clearer its outline; in fact, in an order over 40 feet the outline is the whole thing. It must be remembered that the leaves must follow and echo the shape of the bell; in point of fact they are the bell, because the latter is so hidden by the applied leaves that it is scarcely visible at all. Now in order that the leaves may give the firmness of outline requisite at a distance it is necessary that they should be on one circular plane, and that the foliations of the leaf should cut below the surface of this plane, but that nothing should stick up above it. This principle is an essential one in all curved ornamented surfaces. This can be easily proved by inspecting a model with the sun on it, but can also be appreciated as a matter of common sense. On any surface circular in plan the sunlight catches and emphasizes any projections beyond the normal face of the curve. If these projections are slight and are also numerous, the points of light merge into the general light and shade of the surface as a whole, just as the projections of the moon's surface on a photograph. But if, however, they are relatively few and of considerable size and projection, they catch an undue amount of light, and the surface as a whole becomes confused and uncertain. It is precisely for this reason that it often happens that caps detailed by a mere beginner and modelled by an inexperienced modeller are often astonishingly good in execution, while a carefully studied model, beautiful in detail, will be confused and unmeaning when cut in stone and placed in position. The beginner takes Vignola and follows it slavishly, and the modeller follows this careful drawing; the foliations of the leaves in the drawing resemble a bunch of lady-fingers, and in the model are mere scratches on the surface; but by this very simplicity, which seems to us almost childish, a big effect is obtained.

One reason for the general confusion of outline in the modern cap is the prevalent custom of modelling only one-quarter or one-half of the cap, and another reason is the size of the model and its consequent warping. As I have indicated in a former article, every order should be modelled complete—cap, shaft, base, and entablature—at a scale which would be convenient to handle; not so large as to incur the danger of warping, and yet large enough to measure with great exactness. For the Corinthian order this model should be at a scale large enough to make the cap not less than 8 or 9 inches high, or if this size should be too large to handle in the shop or too expensive, it would be just as well to have the entire order modelled at 1½ scale, or even at ¾-inch scale if the order is a large one, and then have a separate scale model of the cap alone with a small portion of the shaft. The object of the model of the entire order is, of course, to study the proportions of the shaft and of the cap and the relation of the cap and shaft, and also the relation of the column as a whole to the entablature. The necessity of the larger-scale model of the cap is the absolute impossibility of criticising a very large model in the clay. The cap of a large order may be 5 or 6 feet high and will generally be seen not less than 60 feet away. Very few modelling-shops are equipped to handle such a large model, and in very few, indeed, could you get farther away than 20 or 30 feet. Then, too, in such a large cap the cast has to be made in sections. These warp considerably, and it is almost impossible to put these sections together so that the cap is perfectly symmetrical; the centre at top and bottom is almost certain to vary, and it is extremely difficult for the carver to point from such a model. It is also a hopeless task to measure or check it. In my opinion, therefore, a large-scale model is an absolute necessity. This model should be made from a careful but not necessarily a finished drawing, but a drawing that shows clearly the outline of the whole cap from the front and also on the diagonal, together with a plan of the abacus. No detail of the leaves, etc., is necessary if the modeller is experienced, but the shape of the leaves and their height and projection should be carefully shown. It may be asked from what source is this drawing to be made. Well, from any source you please; Vignola, if you like, from Despouy, from your own experience; but the modeller must have some information to start from.

(To be concluded.)





The old school building was converted into an auditorium for school and community uses and connected with the new school by a covered passageway.

Quads for Public Schools

By Wesley Sherwood Bessell

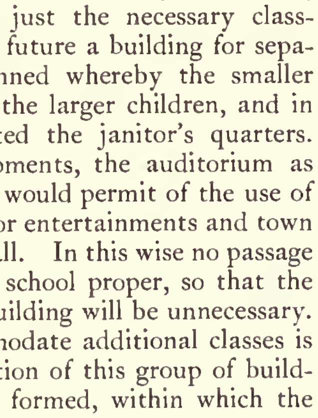
IN the study of the public-school problems the development of general plans and layout for interesting groups and grouping of buildings into quads and other interesting masses seems to have been untouched as yet by the architects who are making a specialty of school architecture.

With this thought in mind School No. 2 at Great Neck, Long Island, has been developed so that in the future, upon the completion of the entire group of buildings, there will be a semblance of college or preparatory schools, rather than the every-day set buildings which we commonly see in our communities.

The plan as laid out for Public School No. 2, Great Neck, contains in its major building just the necessary classrooms for present needs. In the future a building for separate kindergarten has been planned whereby the smaller children may be separated from the larger children, and in the same building will be located the janitor's quarters. Continuing with further developments, the auditorium as planned is a separate unit, which would permit of the use of this building by the community for entertainments and town activities requiring the use of a hall. In this wise no passage need be maintained through the school proper, so that the lighting up of the entire school building will be unnecessary.

A future building to accommodate additional classes is also planned. Upon the completion of this group of buildings a semiquad will have been formed, within which the playgrounds will be located.

In School No. 1 the same thought has been uppermost in the development of this building. The main entrance has not been centred, and the entire plan has been thought out along the lines of flexibility for future extension and additions. This building likewise is so planned that any additions made will only tend to create a more interesting school layout and will likewise develop a college feeling rather than the ordinary public-school appearance. The present high school, which was built some time ago, has formed the basis for this idea and is connected with the new school by a covered way.



The type of architecture used in the new buildings has for its inspiration the Georgian period, using a selected common brick for the main external walls, and a slate roof with fireproof floor construction throughout, with all the modern up-to-date school equipment.

Domestic Quality in School Design

By Alfred Busselle

THERE is probably no problem in an architect's practice that more calls for the quality of fitness of the design to express an emotional idea than that of the schoolhouse. If, as we claim, each building tells a story and creates a distinct impression, surely there can be no wider or more important field than that which so nearly affects the forming minds of children. It is not desirable, from any point of view, that children should spend much of their lives in buildings which are only distinguished from factories by the presence of the American flag, or which are of a grandiose type—wholly exotic.

It is, of course, right and proper that children should be acquainted with and influenced by monumental buildings, of which there should always be photographs upon the walls, and attention should be called to others which may be about them. But the inner life of the child and the inner influence of the school should be related to those of the home. When he leaves home in the morning he should go to a building which expresses intimate and homelike relation, the sort of relation which the modern teacher endeavors to carry on in the classroom.

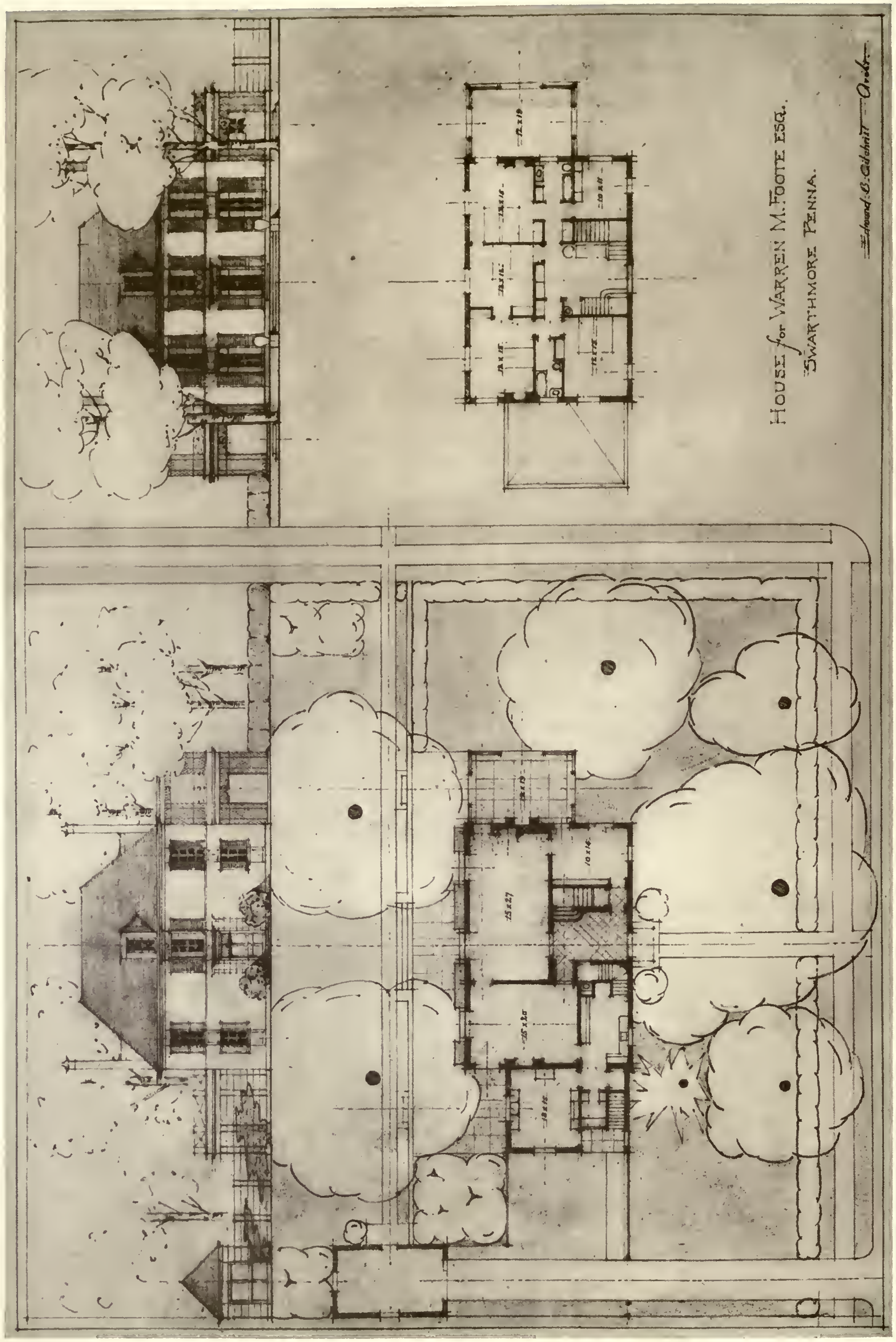
Architects, in designing schoolhouses, have too often, and I might almost say generally, worked along the easiest lines and have been taken up by the consideration of cubic feet of air, number of changes per minute, square feet of glass area, etc., and have lost sight of any spiritual factor in their problem. The architect, in attacking a school problem, often first transforms himself into an engineer, and afterward clothes the machine in such scanty architectural drapery as may allow him with reasonable grace to write "architect" on the drawings.

In our residential work we find our ancient American examples, all up and down our Eastern country, still the most expressive of domestic quality, still the closest linked to the homely virtues. If we have, and we do have, definite ideals of the sort of homes in which simple culture may most happily dwell and grow, surely it should be possible to carry these ideals into the larger opportunities of the schoolhouse.

Of course some schoolhouses are of enormous size and of necessarily limited area. In these cases the thoughts expressed would apply more largely to the interior than to the exterior of the buildings. I am speaking of the usual moderate-size building with reasonable amount of ground. In such cases it is possible to impart something of the domestic character and associate it closely with our best American tradition without sacrifice of mechanical efficiency or excellence of plan.

Special emphasis is laid upon the traditions of the early building along the Atlantic seaboard, because it is the principles of the Fathers of the Republic which we are endeavoring to instil into our alien races.

The design shown, Plate L, which was prepared in competition for a medium-size grade school, is an attempt to apply these thoughts. As always, the plan was the first consideration, but it is hoped that the outside will show that it is not really necessary to forget the home in the school.


HOUSE for WARREN M. FOOTE ESQ.
SWARTHMORE PENNA.
Edward B. Gilchrist — Archt.

The Christmas Tower, Emmanuel Church, Baltimore, Md.

Woldemar H. Ritter, Architect

Reredos.

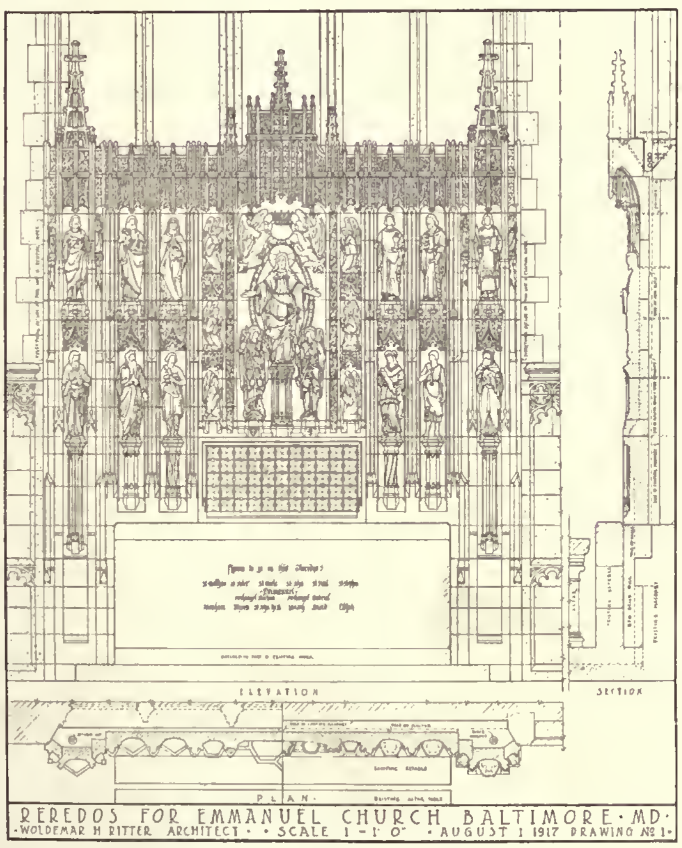
THE style of the tower is continental Gothic, so familiar in old Flanders. The problem was complicated by the double necessity of providing ample vestibules, and at the same time avoiding a tower too massive for the church.

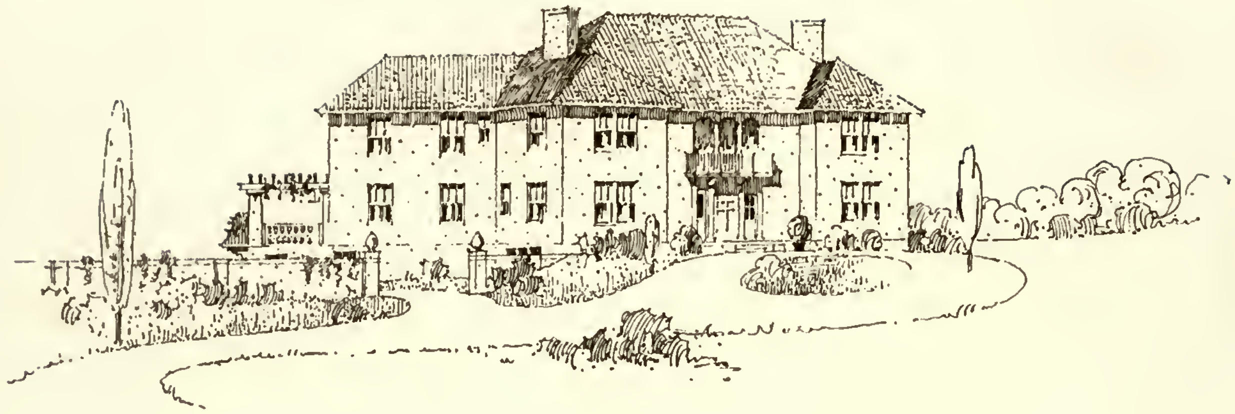
At close range the centre doorway becomes the dominant feature and is conspicuous for the richness of its carving. It represents the Christmas story, carrying out the name of the tower. Surmount ng the arch of the great west door are five figures, the workmanship of Mr. John Kirchmayer, the well-known carver from Oberammergau, who has done so much of the distinctive ecclesiastical work in this country, and who is responsible for all the carving recently executed in Emmanuel Church, including the reredos. Mr. Kirchmayer has given us of his very best, and has entered sympathetically into all Mr. Ritter's plans. The figures represent the Virgin Mary holding the infant Christ, as the central Christmas group; on either side St. Anne, the mother of the Virgin, and St. Joseph, and again these are flanked by an old and young shepherd. Immediately below the archway, in little niches of their own, are the exquisite figures of eight child angels playing on musical instruments, suggesting the heavenly choir. Just above the door, in the carved woodwork, stands the Child Jesus, with the arms of the parish at his feet, and below, running across the arch, the message of Christmas: "Peace on Earth, Good Will Toward Men."

The vestibule is one of the most spacious in this part of the country, and on its walls is the memorial tablet associating the tower forever with the name of Ida Perry Black. Above the three doorways through which the congregation enters the church itself are the carved figures of six great missionaries—St. Paul, St. Augustine, St. Denis, St. Gallus, John Elliott, and Bishop Brent. Half-way up the front of the tower stand the three heroic figures of the Magi in their niches, looking calmly down upon the passing traffic, and holding their gifts of gold, frankincense, and myrrh. The tradition regarding the wise men has been carefully looked into; their names, according to this tradition, were Melchior, Caspar, and Balthazar. They represent the three continents, Europe, Asia, and Africa, and are supposed to be twenty, forty, and sixty years of age.

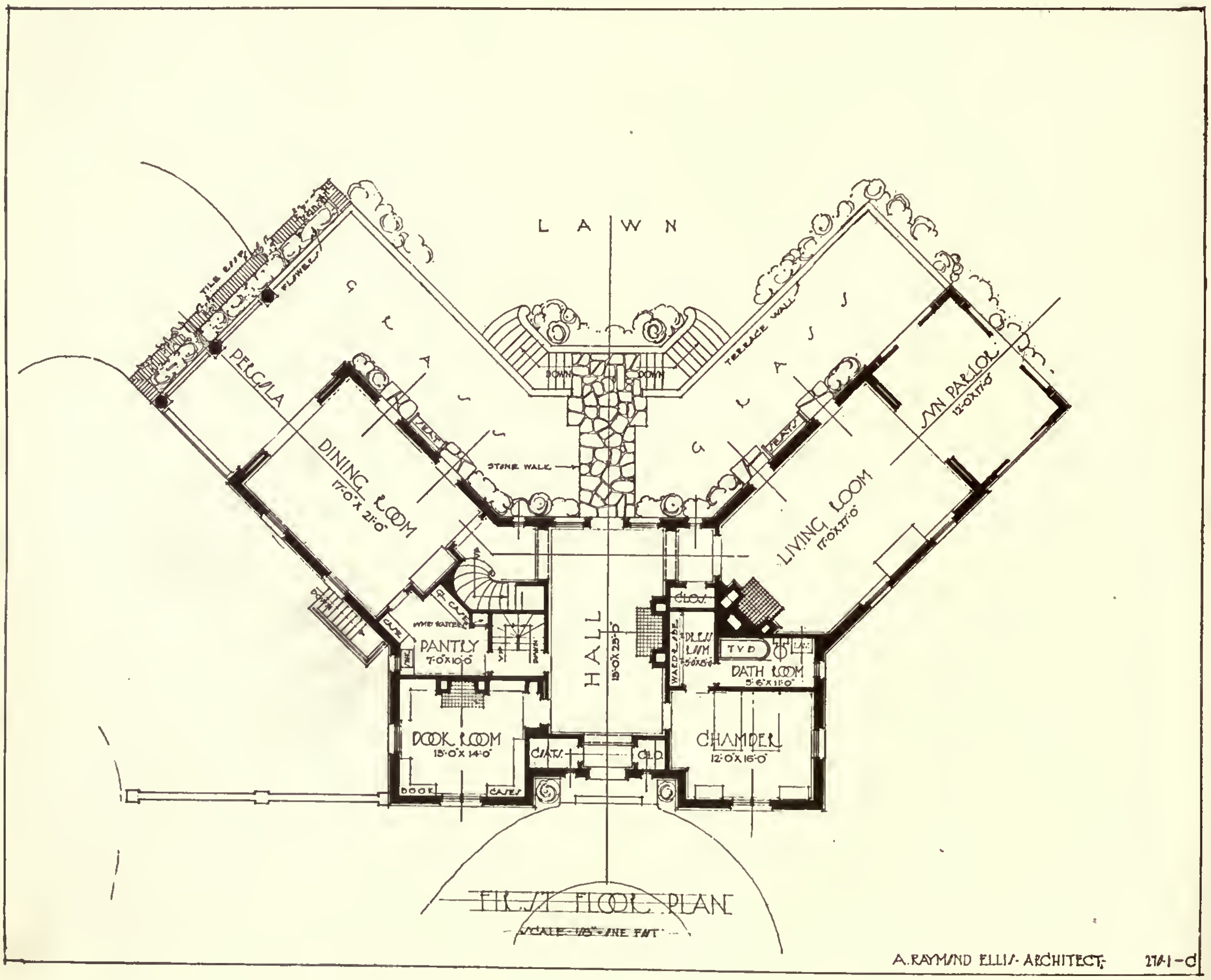
The tower is crowned by a gallery of pierced stone and surmounted by a pinnacle which, in the Middle Ages, represented the head of the stone stairs leading to the platform. This pinnacle has caused a great deal of comment, and it may be well to state here that it was placed there, in the first place, to break the regularity of the crest of the tower, and, in the second place, to suggest to the eye that the tower will eventually form part of a group of buildings which will include the new parish house. This slight elevation at the top assists in binding the projected buildings together into one composition.

We are glad to commend here not only the skill and faithfulness but the enthusiasm of the two hundred men who worked on the Christmas tower. They were deeply interested in the construction of the building, and entered into the spirit of the mediæval guilds, giving their very best. In spite of the severity of the weather, scarcely a day passed without some work being accomplished. We wish we could name them all individually, from the contractors, who sympathetically carried out this complicated and unusual structure with great ability, and the stonecutters, who demonstrated their skill in handling this difficult problem in a most effective manner, down to the humblest laborer, who did the necessary rough and arduous work under trained direction.

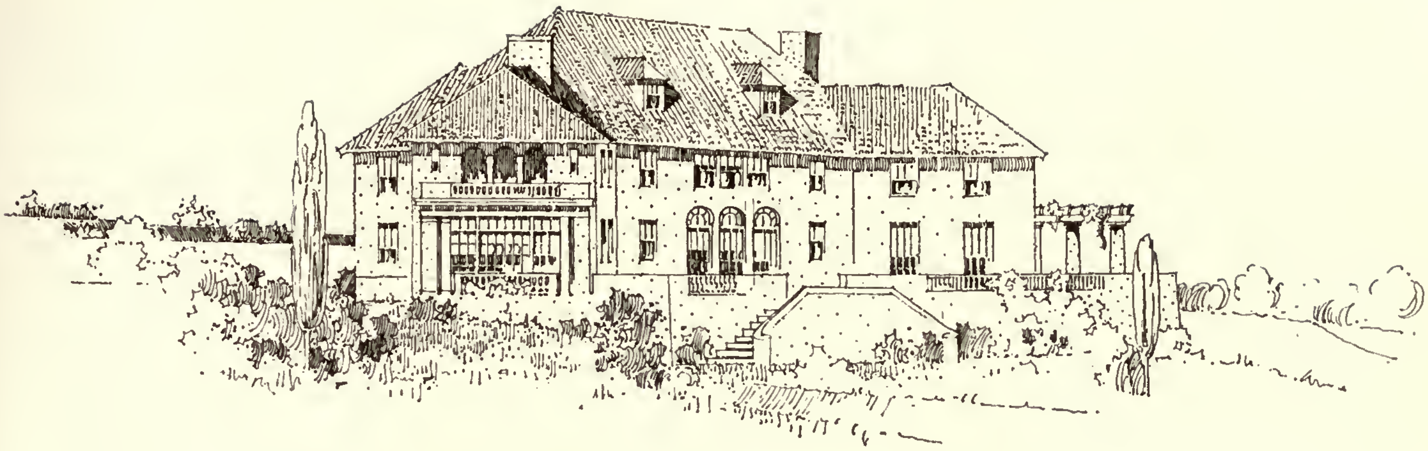




ELEVATION



DESIGN FOR RESIDENCE.



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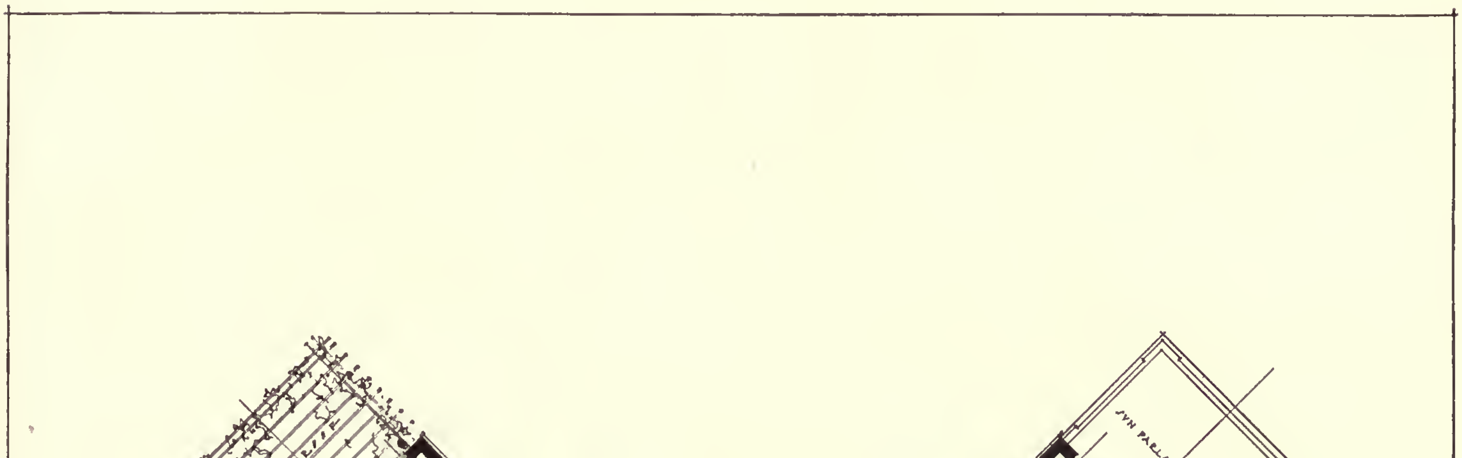


DESIGN FOR RESIDENCE.

Construction of the Small House

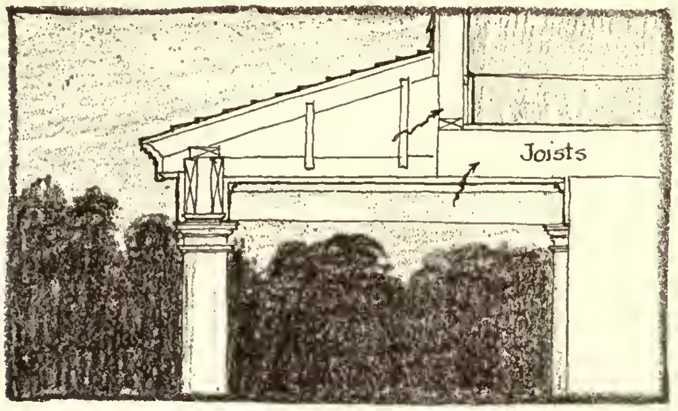
By H. Vandervoort Walsh

Instructor in Architecture, Columbia University

Article VIII

POOR METHODS OF CONSTRUCTION EMPLOYED BY UNSCRUPULOUS BUILDERS

IT would be an endless task to list and describe all of the possible faults of construction which an unscrupulous builder might use in the erection of a small house, and, indeed, it would result largely in rehearsing all of the details of good construction, and then reversing them, showing that instead of doing the correct thing it was done quite the opposite way. But there are certain obvious and glaring faults of construction which are employed by speculative builders with one purpose in mind, namely, to reduce the cost but maintain a good appearance.



Where The Cold Air Gets In

An intentional and clever disguise of poor construction is, at heart, the dishonest thing against which this article is written. The defects of construction which are either the result of ignorance or unskilled labor, while they are bad enough, are not malicious, but those defects which are intentionally planned are simply systems of stealing, and they are usually found in the so-called speculative house, which the unwary public buys in preference to securing an honest house, designed by an architect. And it is this system of dishonest construction that makes the speculative house seem, on the face, cheaper than the honest house.

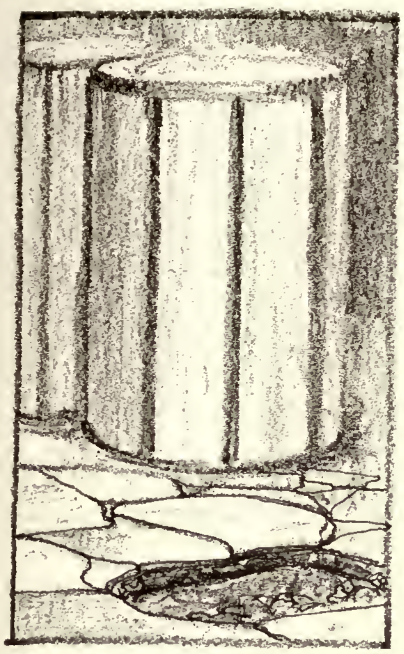
Indeed, it is the whole intention of such dishonest methods of building to make the house seem, on the face of it, substantial, good-looking, and honest, but to hide beneath the glamour of its exterior weaknesses of structure which will cause all kinds of failures after a few years of standing. So long as the house stands together until the builder has sold it to some unsuspecting buyer, that is all that interests him.

In observing some of these dishonest methods of construction it is well to keep in mind that they will appear on the exterior well done, but that their faults are hidden, and intentionally planned to reduce the cost for the builder.

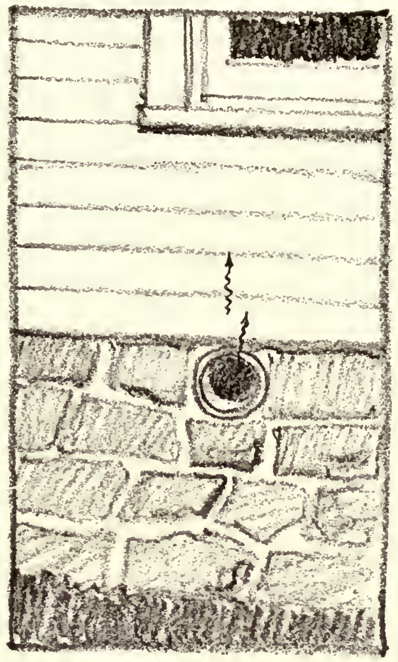
In order to systematize our observations along these lines let us imagine a house which we will inspect in an orderly fashion. We will begin with the cellar and proceed upward to the roof. This house is an ordinary frame dwelling upon a stone foundation.

Entering the cellar-door, the first thing we notice is that at the base of the stairs leading to this door is a puddle of water left from the last rain-storm. Upon inquiring concerning it we learn that in every rain-storm, and especially during the winter when the ground is frozen, the surface water flows down the steps, collects in the areaway in front of the cellar-door, and overflows the sill into the cellar itself—all because the builder had omitted a drain-pipe in the centre of this area to save money. Becoming interested in this matter of drainage we look around at the areas under each of the cellar-windows and find that the drains have been omitted from these, and that a few broken pebbles were thrown into the bottom to give the impression that the water could drain off into the soil, and all this to save money and deceive the buyer. Inspecting the ground around the foundation wall we notice that about each leader the earth has been worn down by dripping water, as though the leader had backed up and the gutter had overflowed. Inquiry shows that such is the case in every rain-storm. Apparently the outlet for the leader has been stopped up, so, in order to find out whether this is true, we need to remove the lower section of the leader from the terra-cotta pipe to look into it, for often it becomes clogged at this point with leaves and dirt. Breaking away the cement joint and pulling gently upon the sheet-metal leader we suddenly find that it crumbles in our hands, and that the leader consists of a coat of paint holding a few particles of rust together. Yes, cheap, thin, so-called galvanized-iron leaders to save money and deceive the buyer! But continuing our search for the stoppage we poke our cane into the section of terra-cotta pipe projecting above the ground which received the leader, and find that it stops short. Twisting it around to remove the material which seems to block the pipe we find, much to our surprise, that the entire section of terra-cotta pipe breaks off, and then looking closer, we find that this pipe does not connect with a cast-iron drainage-pipe leading to the plumbing system or to a dry well, but had merely been stuck into the ground to give this appearance and to save money and deceive the buyer. No wonder the leader backed up and the gutters overflowed in a rain-storm!

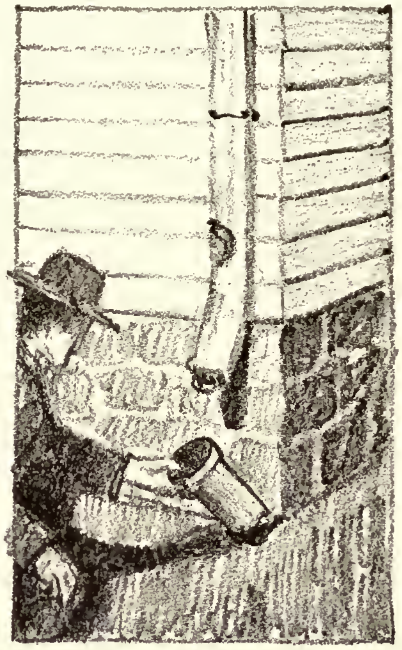
By this time we have become very suspicious of the house, so that when we finally go down into the cellar our attention is attracted to a section of the cement floor near the furnace where the large ash-cans are standing. The top surface has cracked under the weight of the cans, and it appears to be in thin slivers of cement. Leaning down and prying under one of these cracked pieces with a knife, a thin slab of concrete, about a quarter of an inch thick, is lifted up from the floor, and beneath this slab we find about 2 or 3 inches of tamped ashes, and then dirt. We marvel that this floor has lasted even as long as it has with so much water running into the cellar in damp weather. Think of it, 2 inches of ashes and a quarter of an inch of cement mortar on the top, when the correct method of building is to lay about 6 inches of cinders for a foundation, then 3 inches of concrete on top of this, and finally a top coat, 1 inch thick, of cement mortar over all.



The Poorly Made Floor



Fresh Air Inlet Under Window



The Fake Leader

Looking up from the floor we are rather impressed by the clean, whitewashed effect of the walls of the cellar, and one would hardly believe that it was a damp one, but around the windows and at certain points in the wall the whitewash is streaked with black, as though water had leaked in. Going over to these places in the wall it is quite evident that during the winter and damp season water has soaked through these crevices. Poking around with a penknife we are amazed at the ease with which the knife penetrates the mortar between the joints of the stones. Working at it a little harder with the knife soon shows that if the cellar were a prison it would not be very hard to scratch one's way out through that wall. Suddenly, without warning, one of the stones in the wall drops out onto the floor, and we get a view of the construction within. For certain, it is one of those stone walls built up with two faces, not bonded together, except by mortar which seems to be made up of mud and a small trace of lime, which lime has disintegrated with the constant dampness to which it has been subjected. A piece of the mortar we find can be crumbled easily in the hand. This is evidence of the employment of the cheapest kind of labor for the masonry work and the cutting down of expense in using poor materials. We only have to look closely to see that there is developing a long diagonal crack in the wall, and we can imagine that if the contractor built so poor a wall above the ground, the chances are that there is no footing beneath it. Near at hand a large bulge is noticeable, and when we hit it with a hammer the whole thing has a rotten sound, for the inside face is bulging inward from the load upon it and the uneven settling of the foundations.

Looking up now at the neatly whitewashed ceiling we cannot help but be suspicious of the plaster beneath the surface, so going over to that part of the ceiling above the smoke-pipe leading from the furnace to the chimney we jab our cane against it, and, as we expected, a big slab breaks off and crashes to the floor, revealing partly charred wooden lath beneath, which have been baking in the heat rising from the smoke-pipe, and which would eventually catch fire. Examining the plaster very closely we observe that in addition to being a very thin coat it has no hair in it to act as a reinforcement for the plaster key which held it to the lath base.

But being rather inquisitive about the construction hidden behind the plaster, and having broken some of it down, the removal of the few lath is worth the look behind them. And there we see the girder which supports the floor-joists resting upon the chimney instead of on a special pier or column. This saved the contractor the cost of the pier or the column, but the owner would probably loose his house some day by fire creeping through the joints of the brick-work of the chimney to the ends of this wooden girder, for it was quite evident that the mortar used in the chimney was not much better than that used in the wall, and it is well known that lime mortar disintegrates under the action of hot gases from burning wood.

Turning our attention now to other parts of the cellar we notice that in the floor of the laundry a place had been broken into, and upon inquiry we find that this hole was dug by the plumber in repairing a stoppage of the system of drainage-pipes under the floor. It seems that the contractor had omitted placing any clean-outs in the pipes which he had laid under the cellar floor, and the owner's wife by accident, in pouring a pail of wash water down the water-closet in the cellar, had allowed a rag to go down with it which clogged up the system, so that the waste from the kitchen sink began to back up into the laundry tubs. As there was no way to get at the pipes, the plumber in cleaning out the system was obliged to break through the floor and cut out a hole in the pipe to run a wire through to the clean-out on the house-trap. The contractor who built the house had saved about fifteen dollars in omitting this clean-out, but the owner lost fifty dollars in plumbers' bills before he repaired this defect.

Another defect was also found by the owner in the system of water-supply. There had been installed only one shut-off cock for the entire building, so that whenever a new washer had to be placed upon a faucet on any fixture the entire system had to be turned off. As most of the faucets throughout the house were of very cheap design, this had to be done very often, until one day the owner had turned the main shut-off cock once too often for its strength and the handle broke off. He was obliged to call in the plumber to turn the water on again, as well as install a new shut-off cock.

Questioning the owner further, we learn that a disagreeable odor of sewage enters the dining-room windows during the summer months when all the sash are open, but as he admits he knows little about plumbing, he isn't sure of its cause, but he thinks it comes from a pipe which opens directly beneath one of these windows. When we investigate we find that it is the fresh-air inlet of the plumbing system of the house. The contractor had saved money on piping by carrying this to the nearest outdoor point, which happened to be directly under the window of the dining-room, so that whenever any water-closet was flushed in the house a puff of foul air was blown out of this pipe in the most convenient place for it to enter the house if the windows were open. Instead of spending the extra money for piping to carry this fresh-air inlet well away from any windows, the contractor had put in the shortest length possible.

After looking at this pipe we glance at the porch near by and notice that it is beginning to sag. So crawling under the porch we find that instead of masonry piers under the porch columns, there are wooden posts driven into the ground, and that not only have these begun to settle under the weight but also have rotted away considerably near the ground, where they are subject to dampness. While we are under here we notice that the floor-joists are small, 2-by-4 inch timbers, and have sagged a great deal because of their extreme scantiness for the span over which they are placed.

In fact, as we walk up on the porch it vibrates under our weight, and when we enter the house we notice the same weakness, only to a slightly less degree. The owner says that in the beginning the floors were stiff enough, but that this weakness had been getting worse each year. It is evident that there is faulty bridging and too small timbers. Probably, in the beginning the nails of the upper flooring helped to stiffen the beams, but as these became worn in their sockets, the joists lost this additional strength. This lack of proper-size framing timbers saved the builder money but would cost the buyer a pretty penny some day.

But we are astonished at the excellent appearance of the floors, for by this time the things that are good are more surprising than the things that are bad. Then it occurs to us that of course the floor would be good, for this is part of the house which is visible and helps to catch the buyer's eye. But later, when we go up-stairs, we notice that the floors are not so fine, but are the common flat-grained boards which sliver off and catch in your shoe if you scuffle. The owner also points out the kitchen as one of the biggest fakes he has seen. It has an oak floor, and when he had bought the house he had been deeply impressed with the luxury of having an oak floor not only in the dining-room but also in the kitchen. But he is not so keen now, for with constant scrubbing the cheap varnish and filler had come off and the pores of the oak have been exposed, so that now the floor is the greatest catch-dirt ever invented, and to make matters still worse the oak had been poorly seasoned, the boards had shrunk, the cracks opened, and there is no underflooring below to prevent the dust and dirt from sifting through these cracks from the hollow space between the floor-joists. The owner says he is about to install a new floor. He also admits that the varnish which gave such a fine surface to the dining-room and living-room floors when he first saw the house was so poor, and scratched so badly, that he had to have the floors completely done over.

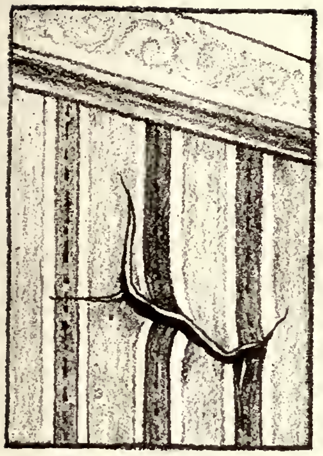
Glancing around at the walls of the living-room and the dining-room we notice that the wall-paper has cracked in a number of places, pulled up, and curled away. It is supremely ugly and unkempt, and we remark about it to the owner. He says that he is completely discouraged about it, that he has tried everything to make the wall-paper stay down, but that as soon as the winter comes on, the steam-heated air on the inside and the cold air on the outside seem to draw the paper up and away, pulling the surface of the plaster with it. He has glued large pieces of paper which have curled up in this manner back into position again, but the plaster was so weak that as soon as the paper began to peel off, the top layer of plaster pulled away with the paper. In fact, examining one example of this, we observe that the paper which had sprung loose from the wall has underneath it a thin coat of plaster about a sixteenth of an inch thick, showing that the glue had fastened the paper to the plaster, but the plaster itself had given away. This type of plastered wall is the result of using cheap materials, and it is another evidence of the extremes to which contractors will go to save money and deceive the buyer.

As we pass by one of the pockets into which the sliding-doors roll we feel a draft coming out of it, and we question the owner whether the house is cold in winter, and he admits it is worse than we suspect. He informs us that it is especially cold on the second floor in those rooms where the floors project over the porch. We ask him whether he has noticed any drafts coming in through the cracks around the base-boards and trim, and he points to these cracks, showing us bits of cotton which he has plugged into them. We suspect that what is the trouble is the omission of sheathing-boards over the studs between the roof of the porch and the ceiling-joists where this roof intersects with the house wall, and also the failure to fill with cinders the space between the floor-joists of the projecting part of the room which extends over the porch. That this is true the owner admits, for he had noticed it while repairing a few shingles on the roof of the porch. The contractor had saved a little money by this trick, and no one could tell that he had done it by merely looking at the exterior.

This same line of inquiry leads us to ask the owner about the heating-plant, and we find that the house cannot be properly heated. We therefore suspect that the radiation is too small, so we calculate the required size of a radiator for one room, and find that the one actually installed is too small. Yet, as the owner says: "When I bought the house, how was I to know that there was not a large enough heating-plant?"

We inquire then whether he has any trouble with the fireplace, which we presume he must use to help out on cold days. He admits he cannot keep it from smoking badly. So we go over to it and run our hand up into the throat to feel around, and find that there is no smoke-chamber, and, what is more, the flue is only about 4 inches by 8 inches, and is not even lined with terra-cotta flue tile. We inform him that he will never have a good fireplace draft until that chimney is rebuilt, and that the size of the flue looks more like the vent for a gas-log than anything else.

We then went through the house noting as many defects as we could, which were beginning to make their appearance. For example, we find that all the doors are badly sagging, showing that the blocking has been omitted from the back of the jambs where the butts are screwed on. The putty in the windows is crumbling out, as though it were clay. All the thresholds are of soft wood and are wearing badly. The trim in many places was springing and twisting, due to the use of cheap and poorly seasoned wood and



THE DEFECTIVE PLASTER

THE LOCK THAT NEVER STAYS CLOSED

the omission of enough nails. Some of the door-stiles are made of two pieces which have opened up at the joints and left ugly cracks. All the stairs squeak badly, indicating that they had been poorly built. Some of the balusters have worked loose and rattle in their mortices, and the hand-rail shakes when it is grasped.

We notice a number of stained ceilings, and inquire about the roof. We are informed that it has leaked badly in the valleys, where the tin is not wide enough to prevent the water which runs down one slope from washing up under the shingles of the adjoining slope and over the edge of the flashing tin of the valley into the house. We learn also that the shingle roof of the porch, which has a very slight incline, continually leaks, and looking out upon it we notice that the shingles are set nearly 7 inches to the weather instead of less than 4 inches, as they should be for so small a pitch.

We notice that it has leaked around the windows, and observing the top of the trim on the exterior, note that there is no flashing over it to throw off the water flowing down from the clapboards. While we are examining the windows the owner volunteers to tell us about his experience with the windows on the second floor. After he had bought the house he found that only one window in each bedroom had any weights and sash-cords in it, and that he had to buy these for all the other windows when he discovered it. He says he never thought of trying each window before he purchased the place.

Just then we happen to be looking at the lock on one of the doors, and we spy one of those back-handed locks which never holds the door closed and which always catches and keeps one from closing the door unless the knob is turned. It is a right-hand lock placed upon a left-hand door. We recognize in this the contractor's efforts to use up all the second-hand odd bits of hardware which he possessed.

By this time we find ourselves so disgusted with the sharp tricks of dishonest building that we call a halt at looking farther, but we feel quite convinced that there is a real difference in quality between such a speculative house and the honest house of an architect's designing, and, what is more, we feel convinced that there is a real reason for the architect's house costing more in the beginning than such a house, but that in the end the cheap speculative house is the most costly proposition which a buyer can invest his money in.

Announcements

New Directory and Market Data Book.—Crain's Market Data Book and Directory of Class, Trade, and Technical Papers, now on the press, promises to be of unusual interest to advertisers generally and users of trade and technical papers in particular. It not only lists all of the business publications of the United States and Canada, giving circulations, rates, type-page sizes, closing dates, etc., but supplies a market analysis of each trade, profession, and industry. Thus the reader is given the basic facts of each line in which he may be interested, including its buying power, buying methods, character of requirements, etc. The volume, which is bound in cloth and contains nearly 500 pages, is published by G. D. Crain, Jr., 417 S. Dearborn Street, Chicago.

The Iron Products Corporation of 90 West Street, New York City, have purchased the capital stock of the Molby Boiler Company, Incorporated, of 101 Park Avenue. The following officers have been elected: G. A. Harder, president; R. R. Rust, vice-president; Stephen Barker, secretary and treasurer. Mr. G. A. Harder is the president of the Iron Products Corporation. It is the intention of the new company to equip a plant which they recently purchased at Mount Union, Pennsylvania, for the exclusive manufacture of Molby boilers. It is their purpose to specialize the magazine-feed down-draft type of boiler, not only increasing the output, but to develop the market for the boiler in all fields of low-pressure heating. Mr. E. C. Molby, the founder of the Molby Boiler Company, Incorporated, will continue as general manager of sales for the new company.

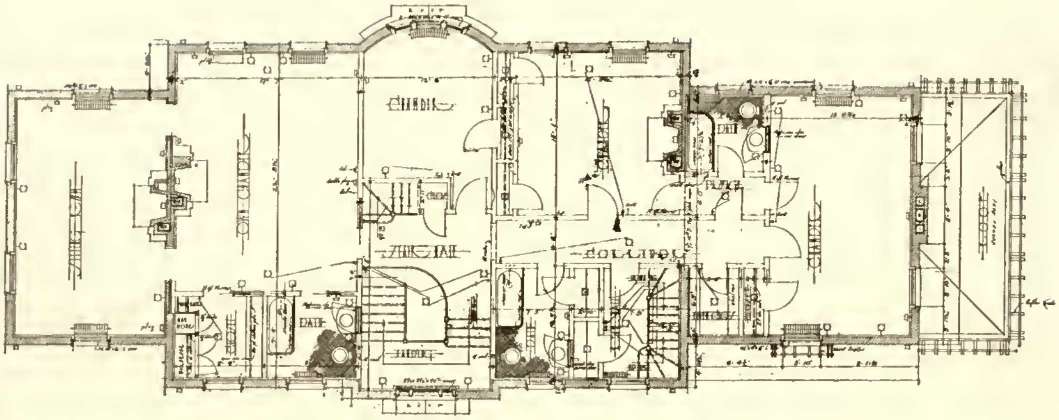
Dwight P. Robinson & Company, Incorporated, engineers and constructors, of New York, have recently opened branch offices in Montreal in the Dominion Express Building. Alexander C. Barker, vice-president, is in charge of the office. The company is a consolidation of Westinghouse, Church, Kerr & Company, Incorporated, and Dwight P. Robinson & Company, Incorporated.

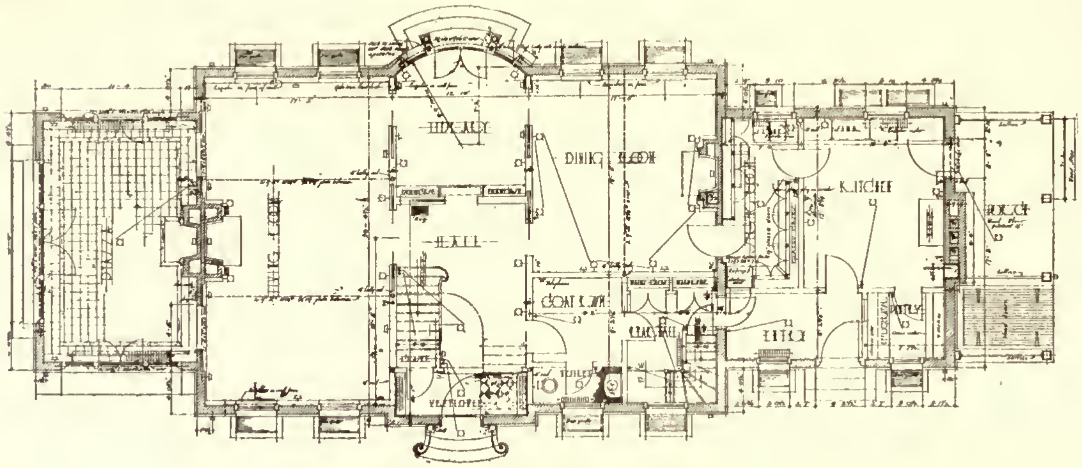
The firm of Peuckert & Wunder, 310 Chestnut Street, Philadelphia, has without change of personnel moved its offices to 1415 Locust Street, where the new telephone numbers are Bell: Spruce 4500, Keystone: Race 5100, and the new name Clarence E. Wunder, Architect and Engineer.

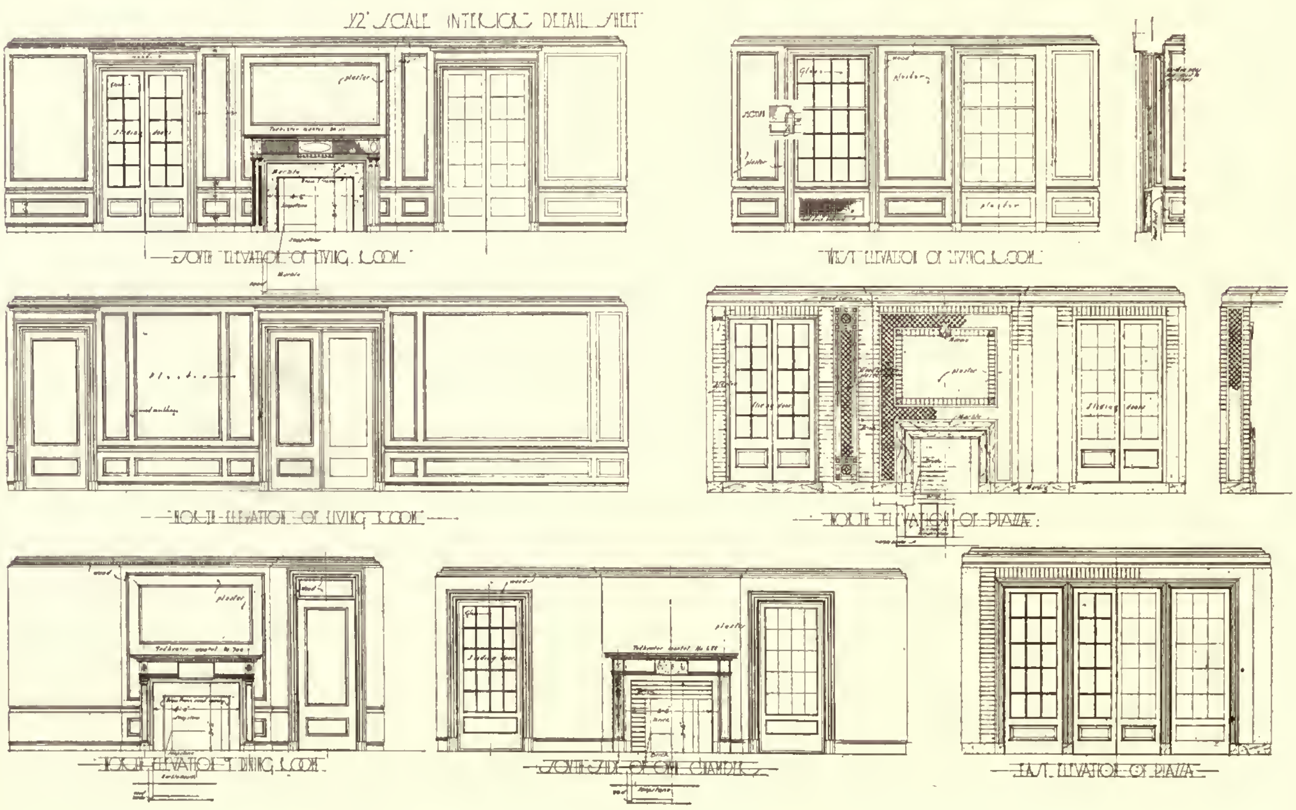
Mr. C. Howard Crane, of Detroit, Michigan, announces the opening of a New York office, at 562 Fifth Avenue, under the direction of Mr. E. M. Mlinar, formerly with Thomas W. Lamb, of New York City. Samples and catalogues requested.

Leonard Schultze and S. Fullerton Weaver, C.E., have formed a partnership for the practice of architecture, under the firm name of Schultze & Weaver, and have leased, through Douglas L. Elliman & Co., the entire seventh floor of the Elliman Building, 17 East 49th Street. Mr. Leonard Schultze has been associated for the past twenty-two years with the firm of Warren & Wetmore, architects, and Mr. S. Fullerton Weaver, C.E., has erected and owned many of the most prominent apartment houses on Park Avenue, and has been largely instrumental in the great development of that section.

Clement W. Baker, president of the Waynesburg, Ohio, Board of Education, wants to secure specimens of foreign as well as American woods for use in the manual training department. He is especially interested in samples of foreign woods.







PLANS AND DETAILS, HOUSE FOR MRS. JOHN AVERY INGERSOLL, HARTFORD, CONN.

A. Raymond Ellis, Architect.

EAST ELEVATION

WEST ELEVATION

PERSPECTIVE AND ELEVATIONS, HOUSE FOR MRS. JOHN AVERY INGERSOLL, HARTFORD, CONN.
A. Raymond Ellis, Architect.

Concrete Construction

By DeWitt Clinton Pond, M.A.

FIFTH ARTICLE

IN the last two articles the loads on columns were determined and the design for the columns was explained. There was nothing complicated about the calculations, and once the loads were determined the design was a comparatively simple matter.

In this article the design of footings will be discussed. The footings under the interior columns will be investigated first, as these are somewhat less complicated than the continuous footings under the wall columns. The footing under column 59 is a square, pyramidal footing, and, if the calculations given in the fourth article of this series are referred to, it will be found that the load brought to it by the column is 1,465,000 pounds, or 733 tons. Assuming that the load of the footing itself is 67 tons, the total load on the soil is 800 tons. If the soil is good for 4 tons per square foot, the area of soil under the footing must be 200 square feet. The footing will measure 14 feet 1 inch square. If the considerations taken up in Article XVI of "Engineering for Architects" in the October, 1916, number of ARCHITECTURE are born in mind, the following calculations will not need much explanation.

The upward pressure per square foot of the soil, which will produce bending and shear in the footing, will be 733 tons divided by 200 square feet, or 3.66 tons. The net area of the base of the footing, exclusive of the area directly under the column, will be 200 − 10.5 = 189.5 square feet. Multiplying this area by the unit pressure it will be found that the upward shearing force will be 189.5 × 3.66 = 693.6 tons, or 1,387,000 pounds. The column section in the basement story is 3 feet 8 inches, or 44 inches in diameter, and its circumference is 138.23 inches.

As it is usually the punching shear which determines the depth of a footing, the depth will be determined on this basis first.

With the shearing value of concrete taken as 150 pounds per square inch, the shearing force as 1,387,000 pounds, and the circumference of the column as 138.2 inches, the depth can be determined by the following calculations:

$$138.2 \times \tfrac{7}{8} \times d \times 150 = 1{,}387{,}000$$
$$d = 76.5 \text{ inches}$$

As it is customary to allow 4½ inches under the steel, the actual depth will be 76.5 + 4.5 = 81 inches, or 6 feet 9 inches.

By referring to the footing plan, shown in Fig. XI, it will be noted that the footing for column 59 is marked *D* and that it is the only one in the section of building under consideration that is so marked. However, in the general plan of the entire building there are several footings which are very similar to the one under consideration, and these are all designated by the letter *D*. The reason for doing this is obvious. It is desirable to have as many similar footings as possible in order to save form work and a considerable amount of calculation. Therefore, when loads, column diameters, and soil conditions are found to be practically the same, a single design is made to apply to as many footings as possible.

In many cases, however, the loads are not exactly alike, but vary slightly. Confronted by this condition the designer simply takes the heaviest load found in the group of similar columns and designs his footing for this load. In the *D* group of footings it was found that there was one carrying a column that had a load slightly greater than that of column 59, and the footing was made 6 feet 11 inches deep. The additional cost of excavating 2 inches would be slight and the cost of concrete would be counteracted by the saving of steel. As the footing grows deeper, the steel becomes lighter. Therefore, in the footing schedule, Fig. XII, it will be found that the depth of the footing is given as 6 feet 11 inches.

By referring to this schedule it will be seen that all the dimensions for the footing are given. At its base it measures

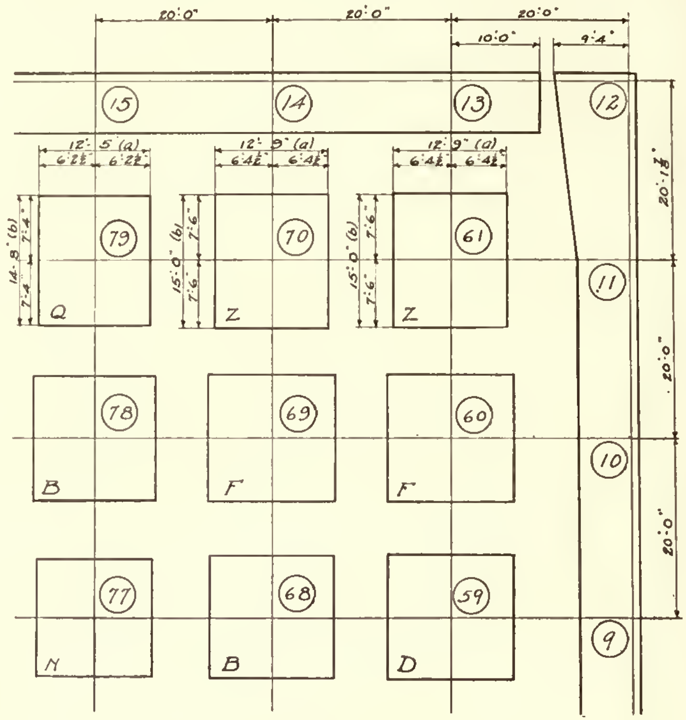


FIGURE XI

14 feet 1 inch square. It is 6 feet 11 inches deep, and the area at the top is 4 feet 2 inches × 4 feet 2 inches, which is a square with sides 3 inches longer than the diameter of the column. With these figures before one it is possible to check the weight of the footing in order to determine if the assumed weight of 67 tons is correct. The formula $V = d/_6 \times (A_1 + A_2 + 4A_3)$ can be used, and by multiplying V—the volume—by 144 pounds the weight of the truncated pyramid of concrete will be found. By adding this to the weight of the prism of concrete at the base of the pyramid the total weight of the footing will be found to be approximately the same as the assumed weight.

d will equal 6 feet 11 inches minus 6 inches, or 6.41 feet.

A_1—the area at the top—will equal 4.16 × 4.16 = 17.35 square feet.

A_2—the area at the bottom—will equal 200 square feet.

A_3—the intermediate area—will equal 9.12 × 9.12 = 83.17 square feet.

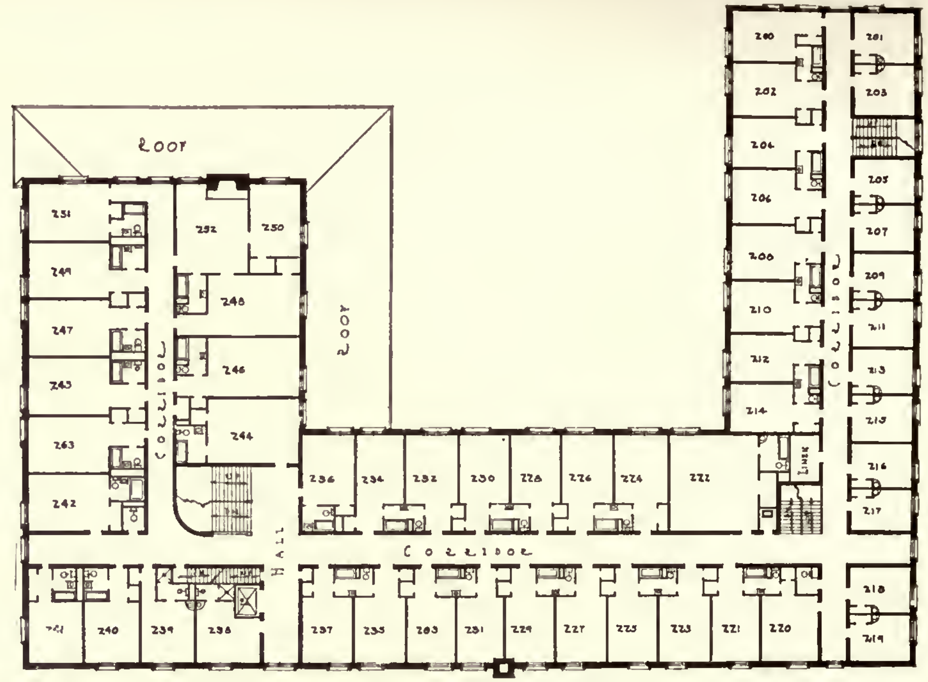
$V = (6.41 \div 6) \times (17.35 + 200 + 4 \times 83.17) = 1.07 \times 550 = 588.5$ cubic feet.

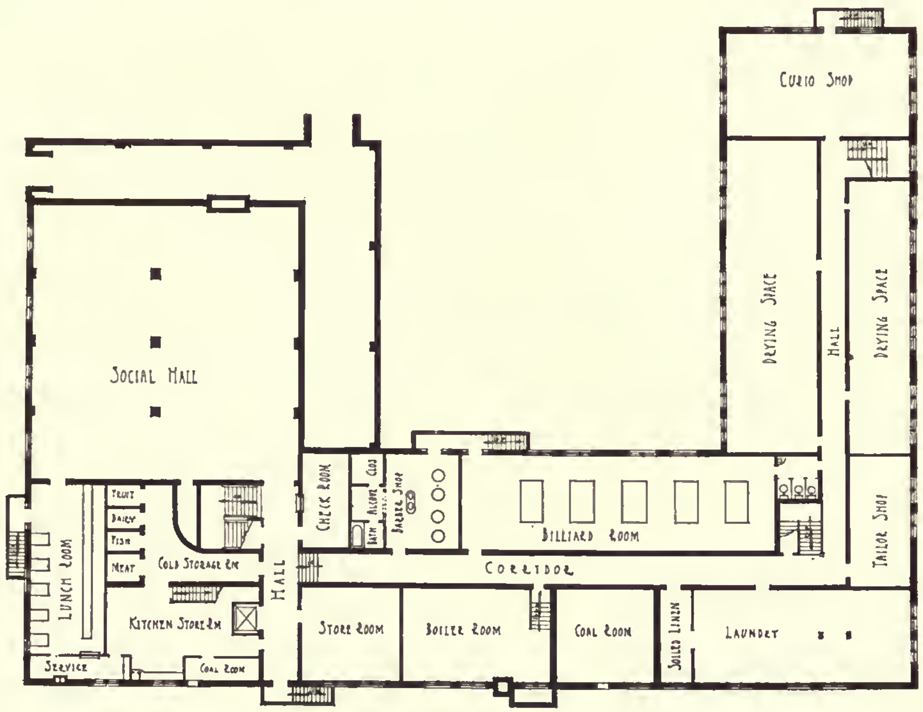
The volume of the prisms at the base will equal 200 × .5 = 100 cubic feet, and the total contents will be 688.5 cubic feet. The weight will equal 99,144 pounds, or 50 tons. The assumed weight was 67 tons, and therefore the design is safe. There might be a slight economy in assuming a lighter weight of footing, but the figures given above are accurate enough.

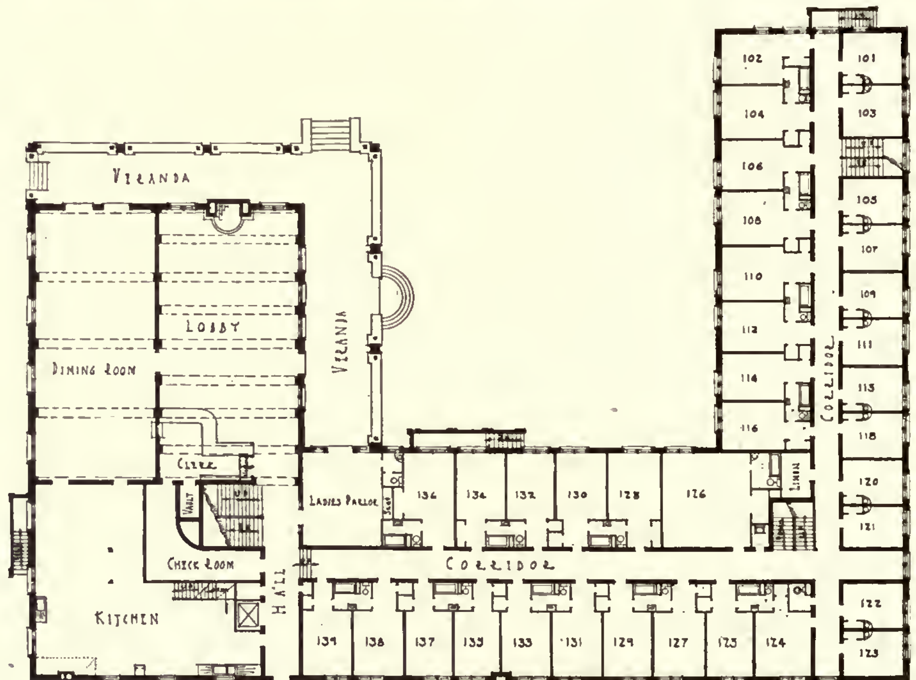
Practically the entire building will be made of material produced locally. The foundation is of the red sandstone taken from the old Tithing Office and wall; the brick were moulded by hand out of the clay taken from the basement excavation, laid in mortar of lime burned in kilns just at the edge of the town; the lumber was sawed from the logs of the Dixie-Sevier National Forest. The building was designed by a local architect, the construction is being handled by a local builder, and practically all of the work will be done by local artisans.

The stock was subscribed by the people, many of them paying for the same in labor, produce, and in other ways—following the ideas of their pioneer forefathers in the "putting over" of public enterprises.

When it is taken into consideration that this great task was accomplished during the panic of 1920, it will stand out as one of the most interesting things that will be seen by the tourist in his travels.



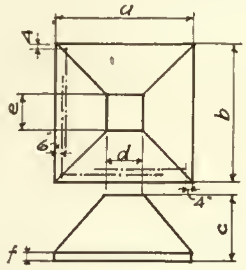




DESIGNS FOR CEDAR CITY HOTEL, CEDAR CITY, UTAH.

Randall L. Jones, Architect.

The next step is the determination of the number of ¾-inch square reinforcing bars needed in the footing. First the bending moment in the footing must be found. The equivalent square will have a side equal to seven-tenths of the diameter of the circular column, or $3.66 \times .7 = 2.56$ feet, which equals 2 feet 6¾ inches. The trapezoid, assumed for the determination of the bending moment, will have a base 14.08 feet long, a side parallel to the base 2.56 feet long, and



Column	Load	Size a	Size b	Size c	Size d	Size e	Size f	Parallel to a No	Parallel to a Size	Parallel to a Length	Parallel to b No	Parallel to b Size	Parallel to b Length	Bonds
59	1.465.000	14'-1"	14'-1"	6'-11	4'-2"	4'-2"	6"	24	¾"□	11'-0	24	¾"□	11'-0"	
60	1.526.000	14'-3"	14'-3"	6'-8"	4'-4"	4'-4	6	26	¾"□	11'-2"	26	¾"□	11'-2"	
61	1.465.000	12'-9	15'-0	5'-7"	2'-11	5'-2"	6"	29	¾"□	9'-9"	23	¾"□	12'-0"	
68	1.441.000	13'-10	13'-10	6'-8"	4'-2"	4'-2"	6"	23	¾"□	10'-9"	23	¾"□	10'-9"	
69	1.508.000	14'-2"	14'-2"	6'-8"	4'-4"	4'-4"	6"	25	¾"□	11'-0"	25	¾"□	11'-0"	
70	Same as 61													
77	1.273.000	13'-2"	13'-2	6'-8	3'-10	3'-10	6	19	¾"□	10'-5	19	¾"□	10'-5"	
78	1.418.000	13'-10	13'-10	6'-8"	4'-2"	4'-2"	6"	23	¾"□	10'-9	23	¾"□	10'-9"	
79	1.311.000	12'-5"	14'-8	5'-3"	2'-11"	5'-2"	6"	27	¾"□	9'-6"	21	¾"□	11'-9"	

FIGURE XII

an altitude of 5.76 feet. The central rectangle will have an area of $2.56 \times 5.76 = 14.74$ square feet. The two triangles will have a combined area of 33.18 square feet. The pressure per square foot has been determined as 3.66 tons per square foot, or 7,320 pounds, and the upward pressure on the rectangle will be $14.74 \times 7{,}320 = 107{,}900$ pounds, and on the two triangles 242,880 pounds. The moments will be $107{,}900 \times 2.88 = 310{,}750$ foot-pounds, and $242{,}880 \times 3.84 = 932{,}660$ foot-pounds, and they will total 1,243,410 foot-pounds, or 14,920,920 inch-pounds.

$$S = \frac{14{,}920{,}920 \times 8}{78.5 \times 7} = 217{,}200$$

$$217{,}200 \div 16{,}000 = 13.57 \text{ square inches}$$

As ¾-inch square rods are to be used, their area will be .5625 square inches, and there will be needed 24 bars.

Although the calculations given above are not complicated, they can be given in a more simple form. The reader will have no difficulty in observing how the factors of the previous paragraphs are used by engineers.

$$\begin{aligned} 2.56 \times 5.76 \times 7{,}320 \times 34.26 &= 3{,}710 \\ (5.76)^2 \times 7{,}320 \times 69.12 \times .666 &= \underline{11{,}190} \\ M &= 14{,}900 \end{aligned}$$

$$\frac{14{,}900 \times 8}{78.5 \times 7} = 217$$

$$\frac{217}{16} = 13.5$$

$$\frac{13.5}{.5625} = 24$$

The above calculations were carried out in units of thousands of pounds, or *kips*, a common practice among engineers.

In the footing schedule, Fig. XII, there is one item which has not been investigated and this is the length of the steel bars. It is customary to extend the bars 40 diameters beyond the column, or, in the case of square bars, a distance equal to 40 times the length of one side. In the present case the bars are ¾-inch square bars and the distance which they will extend beyond the column is 30 inches. As the column has a diameter of 44 inches, one-half this diameter is 22 inches and the distance from the centre line to the end of the bar is 52 inches, or 4 feet 4 inches. On the other side of the centre line a different condition governs the length of the reinforcing bars. On this side it is customary to have the bars run within 4 inches of the outside of the footing. The footing is 14 feet 1 inch square, and one-half of this dimension is 7 feet approximately. Deducting 4 inches from this leaves 6 feet 8 inches. By adding 6 feet 8 inches and 4 feet 4 inches the length of the bars is found to be 11 feet.

The bars are set alternately so that one bar will be 4 inches from the right side of the footing and the next will be 4 inches from the left side. In no case, however, will a bar project less than 40 diameters beyond the column.

This completes the design for the footing under column 59. The next footing is the one under column 60, and this, it will be noted by referring to the footing plan, Fig. XI, is designated by the letter *F*, as is also the one under column 69. These are similar and there are two other *F* footings in the general plan. Column 60 brings the heaviest load to the footing—1,526,000 pounds—and this will be used in the design.

The column has a diameter of 3 feet 10 inches.

The area of earth to be covered will be determined on the same basis as was used in the case of column 59, except that the weight of the footing will be taken as 50 tons. The total load of column and footing is 813 tons and the area is 203 square feet. The footing is therefore 14 feet 3 inches square. The unit upward pressure is 7,517 pounds per square foot. The net area of the footing is 192 square feet and the shear will be $192 \times 7{,}517 = 1{,}443{,}264$ pounds. The circumference of the column is 144.51.

$$144.5 \times \tfrac{7}{8} \times d \times 150 = 1{,}443{,}300$$

$$d = 76.1 \text{ inches}$$

The over-all depth will be 80.6 inches, or 6 feet 8 inches, and the next step is to find the number of ¾-inch square bars needed for reinforcement. The equivalent square is 32.2 inches square, or 2.68 feet, and the distance from the edge of the square is 5.79 feet, or 69.5 inches.

$$\begin{aligned} 2.68 \times 5.79 \times 7{,}517 \times 34.75 &= 4{,}050 \\ (5.79)^2 \times 7{,}517 \times 69.5 \times .666 &= \underline{11{,}600} \\ & 15{,}650 \end{aligned}$$

$$\frac{15{,}650 \times 8}{76.1 \times 7} = 235$$

$$\frac{235}{16} = 14.7$$

$$\frac{14.7}{.5625} = 26$$

The footing under column 60 will cover a soil area measuring 14 feet 3 inches. It will be 6 feet 8 inches high. The top of the footing will measure 4 feet 4 inches on a side, as each side is 6 inches greater than the diameter of the column.

There will be 26 ¾-inch bars placed in each direction, and they will be 11 feet 2 inches long.

The footings under columns 61 and 70 will be considered together, as they are exactly alike. It will be remembered that the design of these two columns was discussed in the fourth article of this series and that they were found to be rectangular columns measuring 2 feet 2 inches by 4 feet 2 inches at the first story. In the basement the dimensions increase to 2 feet 5 inches by 4 feet 8 inches, and the load on the footing is 1,465,000 pounds. The area of soil to be covered will be found to be 195 square feet if the weight of the footing is taken as 50 tons. It will be necessary to find a rectangular area of soil, having sides which will project equally in both directions beyond the column, and which, when multiplied together, will give an area of 195 square feet. Largely by trial it will be found that by adding 5 feet 2 inches on all sides of the column the resulting rectangle will measure 12 feet 9 inches by 15 feet, and will cover an area of 191 square feet.

The load brought to the footing by the column is 1,465,000 pounds and the pressure in an upward direction of the soil, which will cause sheer and bending, is 1,465,000 ÷ 191 = 7,670 pounds per square foot. The net area of the footing is 191 − 11.3 = 179.7 square feet. The punching shear is 179.3 × 7,670 = 1,376,500 pounds. The perimeter around the column is 170 inches.

$$170 \times d \times \tfrac{7}{8} \times 150 = 1{,}376{,}500$$
$$d = 62 \text{ inches, or } 5 \text{ feet } 2 \text{ inches}$$

The total depth of the footing will be 4½ inches more than this, or 5 feet 6½ inches. To have the dimensions in even figures the depth will be considered as 5 feet 7 inches.

The calculations for the determination of the steel needed for the reinforcing under these rectangular columns is very similar to those given above for the footings under circular columns.

The dimensions of the rectangular column are 2.41 feet by 4.66 feet, and the footing projects 5.16 feet beyond the column in all directions. The rectangle on the *a* side will measure 2.41 by 5.16 and that on the *b* side will measure 4.66 by 5.16 feet. The triangles will have legs 5.16 feet long.

The calculations for the steel parallel to the *b* side are given below:

$$\begin{aligned} 5.16 \times 2.41 \times 7{,}670 \times 31 &= 2{,}960{,}000 \\ (5.16)^2 \times 7{,}670 \times 62 \times .66 &= \underline{8{,}400{,}000} \\ & 11{,}360{,}000 \end{aligned}$$

$$\frac{11{,}360 \times 8}{62 \times 7} = 210$$

$$\frac{210}{16} = 13.08$$

$$\frac{13.08}{.5625} = 23$$

By carrying through similar calculations it will be found that there will be needed 29 bars parallel to *a*.

The lengths of the bars are determined by the projection of 40 diameters beyond the column on one side and within 4 inches of the edge of the footing on the other.

By referring to the footing plan it will be seen that the footings under five columns have been determined. There are still three other interior footings to be investigated, but as these offer no new problems the design for them will not be undertaken in this article.

The design of the exterior footings will be investigated in the next article.

Announcements and Catalogues Received

Catalogue of "Power Transmission Machinery," from the A. & F. Brown Co., engineers, founders and machinists, Elizabethport, N. J.

"Housing Plans for Cities," published by The Southern Pine Association, New Orleans. A summary of the housing plans of various institutions of practical and suggestive value.

"One Hundred and Twenty-Fifth Anniversary of Bird & Son, Incorporated. A Graphic Record of a Manufacturing Enterprise Extending Throughout a Century and a Quarter Under the Guidance of Three Generations of Massachusetts Paper Makers." Bird & Son, East Walpole, Mass.

The Evanston Sound Proof Door, Irving Hewlin, Evanston, Illinois, send us an interesting illustrated pamphlet regarding their product.

"Annual Magazine Subject-Index, 1919." A subject-index to a selected list of American and English periodicals and society publications. Edited by Frederick Winthrop Faxon, A.B. (Harvard). Compiled with the co-operation of librarians. Boston: F. W. Faxon Co. This book is especially valuable for its references to the subjects of art and architecture, and because it contains a record of periodicals not included in the usual periodical indices.

Clinton MacKenzie, architect, of 15 Broad Street, Newark, N. J., has published a book on "Industrial Housing." Mr. MacKenzie writes from practical experience, and the illustrations showing plans and elevations include work with which he has been identified in various places.

The firm of Mauran Russell & Crowell, architects, announce that William F. Wischmeyer and W. Oscar Mullgardt have become associates. Mr. Wischmeyer and Mr. Mullgardt have been with the firm for many years and their loyal co-operation and effective service have brought them the esteem of friends and clients, who will be glad to know of the new relationship thus established.

Lynch Luquer, architect, has removed his office to 819 15th Street, N. W., Washington, D. C., and would like samples from material-men. His Boston office is at 9 Cornhill.

Bernard Wiseltier, landscape architect, has opened offices at 15 East 40th Street, where he will engage in the practice of his profession. Mr. Wiseltier, who is a Cornell University graduate, a member of the American Society of Landscape Architects and of the Architectural League, was for a long time with Vitale, Brinckerhoff & Geiffert.

Geo. Mort Pollard, architect, wishes to announce the removal of his office to No. 250 West 14th Street, New York City.

The architectural practice formerly carried on under the firm name of Bollard & Webster, 520 Paxton Building, Omaha, Neb., will be conducted in the future by James R. Webster at the same address.

Clinton Paine Greer announces the opening of temporary offices at 2209 Roslyn Avenue, Baltimore, for the practice of architecture. Catalogues and samples requested.

The Milwaukee Corrugating Co., Milwaukee, Wis., are sending out a circular of their new expansion corner bead. The exclusive feature of this is the use of expanded diamond mesh reinforcement on the wings or webs instead of practically solid members, as heretofore generally used.

John P. Kingston & Son, architects and engineers, Worcester, Mass., whose offices were in the district included in the recent destructive fire, have opened new offices in the Park Building, and shall be glad to receive catalogues, samples, etc.

Mr. Robert O. Derrick, architect, formerly with Murphy & Dana, architects, New York City, has been admitted as a partner to the firm of Brown & Preston, architects and engineers, of Detroit. The firm has been incorporated under the name of Brown, Preston & Derrick, Architects and Engineers, J. Martin Brown, President, Robert O. Derrick, Vice-President, and Martin A. Preston, Secretary and Treasurer. Mr. Wm. E. Irving, for some time connected with the firm, has been made Director of Business Promotion. The present offices will be retained at 406–407–408 Empire Building, Washington Boulevard at Clifford Street, Detroit, Mich.

Alexander B. Trowbridge and Frederick Lee Ackerman desire to announce that the partnership of Trowbridge & Ackerman, architects, has been dissolved. Mr. Ackerman will complete the unfinished work of the firm, and will continue the general practice of architecture at 25 West 44th Street, under the name of Frederick Lee Ackerman, architect. Mr. Trowbridge will continue his services as consulting architect to the Federal Reserve Board, Washington, D. C., and to the Federal Reserve Bank of New York, with offices at 120 Broadway, New York. At the expiration of this engagement he will open new offices for a specialized practice as consulting architect.

It is with regret that we announce the death of George U. Rehfuss, past vice-president and for many years an active member of the T-Square Club of Philadelphia.

Frank H. Day and Harry E. Bolton announce the opening of an office for the practice of architecture at 24 North Main Street, Gloversville, N. Y. Catalogues and samples are requested.

Hoggson Brothers regret very much that through an error the name of the architect who designed the Citizens National Bank of Alton, Illinois, was not mentioned in the March issue of ARCHITECTURE. The Citizens National Bank of Alton, Illinois, was designed by L. Pfeiffenberger & Son, Alton, Illinois.

Herbert S. Green has opened an office in Saltillo, Mexico, Apartado 250, and will be glad to receive catalogues and data regarding building materials.

Wells Brothers Construction Company, Monadnock Building, Chicago, send us an interesting report on the much-discussed question of "What Is the Best Form of Building Construction Contract?" "What Is the Real Objective in a Construction Contract?"

The American Radiator Company announce a third reduction on the price of their products.

Every architect and, indeed, every one concerned in building will find the "Portfolio of Working Specifications and Detail," issued by the Bishopric Company, of value. It is an established fact that in the past four years in all kinds of labor there has been a depressing amount of inefficiency and carelessness, and in the use of products, unless specifications and directions are laid down as to how materials should be used properly and effectively, it is very difficult for the architect or owner to protect or obtain the results they are seeking.

We are in receipt of two valuable publications from the Structural Service Bureau, Philadelphia, Chapter 3 of a Series on Structural Slate, "Stairways," and Chapter 5, on "Toilet Inclosures." They are illustrated with drawings of structural details. The Structural Slate Company, Pen Argyl, Pa., are the producers.

THE AMERICAN SPECIFICATION INSTITUTE.—As heretofore produced specifications have been largely the product of individual effort, and as such vary in many features that can be conventionalized so as to be common to all. Owing to a present lack of means for collecting and distributing information concerning specifications and the writing thereof, there is a needless duplication of study, research, and labor on the part of specification writers. Practically all other professions are so organized that the interchange of knowledge is effected with resulting improvement in the quality of production and professional standing. It is to improve the conditions affecting the writing of specifications and to benefit by organized effort that the American Specification Institute is organized. This organization is intended to be national in scope and invites co-operation of all those interested in specifications. Address the American Specification Institute Rooms, 1144 American Bond and Mortgage Building, Chicago.

The National Council of Architectural Registration Boards, 3230 W. Monroe Street, Chicago, has sent us their Circular of Advice No. 2, "General Statement with Reference to Examinations," of interest to every member of the profession.

McKim, Mead & White advise us that the entire credit for the remarkably fine acoustics of New York's new Town Hall are due to Mr. Clifford Melville Swan, acoustical engineer.

From J. B. Lippincott Company, Philadelphia, we have received three additional volumes in their useful "Woodworker Series." We have already mentioned the volume on "Carpentry for Beginners." The new volumes are "Woodwork Joints"—full information as to the uses with clear, practical suggestions, illustrated, for the making of every joint that may be needed; "Fretwork, Fret-Cutting, Inlaying and Overlaying," covered advanced as well as elementary methods; "Staining and Polishing," including "Varnishing and Other Methods of Finishing Wood, with a Complete Index of 1500 References." These are useful and practical as well as handy little books.

Murphy & Dana, architects, announce that R. H. Dana, Jr., and J. Duncan Forsyth have withdrawn from the firm, and that the three remaining members will continue the practice of architecture under the name of Murphy, McGill & Hamlin, 331 Madison Avenue, New York City; Union Building, Shanghai, China.

George C. Winchel, consulting and designing engineer, announces the opening of offices at 304 Everett Building, Akron, Ohio. Clientage is solicited pertaining to engineering service of rolling-mills, rubber plants, industrial equipment and buildings, medium and heavy machinery design.

Damon, O'Meara & Hills, architects, are now operating offices in suite 1123–1124, Merchants National Bank Building, St. Paul, Minn., and 19 East Mason Building, Fort Dodge, Iowa.

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ARCHITECTVRE

·THE· PROFESSIONAL· ARCHITECTVRAL· MONTHLY·

Vol. XLIII. CONTENTS No. 5

MAY, 1921

TEXT PAGES

PLATES AND ILLUSTRATIONS

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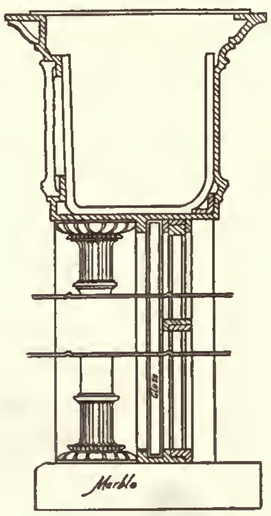
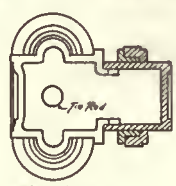
Entered as Second-Class Matter, March 30, 1900, at the Post-Office at New York, N. Y., under the Act of March 2, 1879.

Architectural and Structural Shapes

Fifth Avenue Office, Guaranty Trust Company, New York; Cross & Cross, Architects; Counterscreens fabricated by the Gorham Co. Architectural Bronze Dept. from extruded shapes and mouldings manufactured by The American Brass Company.



Vertical Section Thro Counterscreen.



Plan Section.

Shaded portions show application of extruded shapes.

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FOUNTAIN IN THE HOME OF JOHN J. RASKOB, CLAYMONT, DELAWARE.

Charles Keck, Sculptor.
McClure & Harper, Architects.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLIII MAY, 1921 NO. 5

Comments on Housing

By William F. Thompson

I SHALL endeavor to outline briefly the old and new methods of housing, which can be divided into the following classes:

(*a*) Housing in large cities.
(*b*) Housing in small industrial cities and towns.
(*c*) Housing in suburban centres in or near large cities or industrial centres.

(*a*) Housing in Large Cities

Before the enactment of the tenement-house law in large cities (which in this State became a law March 20, 1909) the housing conditions of the majority were deplorable—the usual cold-water flat four, five, or six stories high, twenty-five feet wide, sixty feet deep; narrow, dark halls; narrow and steep stairways; absolutely no ventilation, and four families on a floor. The sanitary condition of these houses was such that the owners might have had an interest in the local undertaker and the nearest cemetery. Disease was spread because of the conditions as stated above. The morals of every one, speaking in a general sense, were not of the highest, and the effect of those that stayed at home as well as those that went forth to furnish bread and butter was most depressing.

Usually those living under conditions herein mentioned worked some years ago from seven in the morning until six at night—under similar conditions of squalor and dirt. If their job was outside and if it rained or snowed they got wet. During the summer if it was outside, it was hot, and they were uncomfortable. There were no facilities at home for bathing freely, consequently they became both mentally and physically unfit—pessimistic individuals, like a shuttle going from their home to their shop or factory and back again at night. This for a period of ten, twenty, thirty, or forty years constituted their life, and they died, and their children followed in their footsteps and naturally became hardened. What would seem to people living in a different environment a terrible state of affairs, to these people was perfectly natural; as is known, a human being becomes accustomed to that which he has.

It is well known that these so-called cold-water flats were the best investment one could have, since they required practically no repairs, there was no heating-plant to get out of order, practically no plumbing, and some poor unfortunate was allowed rent free, perhaps, to keep the place in order, and the owner, in order not to see the way he was deriving his income, would hire an agent to collect the rentals.

(*b*) Housing in Small Industrial Cities and Towns

In the majority of the smaller cities, from my observation, there are perhaps one or two rows of flats which are the beginning of the more citified aspect that the town is to take later on, but for some unknown reason they usually are looked down upon in a community made up principally of one and two family houses, so that naturally the rentals are lower, and the poorest and most unfortunate of that community's population find shelter under the roofs of these tenements.

The conditions as described under (*a*) apply here, except that there are perhaps large areas of unoccupied ground around these buildings, and for that reason they are perhaps a little more livable; but the yards are usually filled with tin cans, newspapers, and little heaps of ashes. Some of the people, having a little more respect for their domicile, carry their rubbish off to the side a distance of ten or fifteen feet, which usually goes to make up an excellent rubbish-like garden.

The rest of the people in these smaller cities live in small one-family or two-family houses, and the people who need the help, which the various housing committees are endeavoring to supply, are those who can just about make ends meet. The houses that they hire are nine times out of ten those discarded by their more fortunate brothers and sisters who, having advanced another peg, have moved farther out and have left, perhaps because of the encroachment of stores or factories, these houses behind them, and often these buildings being neglected for a short time become ramshackle affairs.

It is human to imitate, and since all of the houses in the section in which we are interested have deteriorated more or less, people arriving and moving into this section look around and find that their house is just about as good as the next fellow's, so they make no effort to improve it, and as it deteriorates about the same percentage every year, there is really no appreciable notice taken of this.

Consequently you have the same condition from this sort of housing that you have from the one described under (*a*); that is, dissatisfied, pessimistic individuals just walking a beaten path to and from their work.

(*c*) Housing in Suburban Centres in or Near Large Cities or Industrial Centres

Under this heading we will take up the nearest approach that has been made in the past to the solution of the housing problem; namely, the real-estate developments ten, fifteen, or twenty miles out of town, where the average worker resides under very much better living conditions. This type of development has not been successful for several reasons.

1. Very often the transportation was poor, and the man who worked hard all day had no desire to pack into a crowded street-car and travel for three-quarters of an hour. He therefore preferred the ramshackle affair within walking distance of his work.

2. The real-estate shark had cheated some one whom this man knew, and therefore he would not take a chance, not being sufficiently informed as to the contents of contracts, etc.; that is, if he had any desire to purchase. But usually the first reason is the main one, and is what you will find is given by most men of this class.

3. A great many of these developments were started with the very fine idea of helping the working man and his family, or the business woman, but when the development got under way they could not keep within bounds, and consequently the houses would cost twelve thousand dollars and fifteen thousand dollars, which naturally was beyond the means of the average person, and it immediately became a joke as far as the working man was concerned.

4. There is one more point. Very often a man could purchase property very cheaply, or a house in or very near the shadow of a factory. After putting into it hard-earned savings of perhaps twenty years, he finds within the next five years, just when he is beginning to appreciate his little home, that he is forced to sell to the factory because he no longer can have his children play in the atmosphere of the factory, since it is daily crowding him out.

This has its effect upon the other workers, and they decide that since the so-called working-man's houses cost fifteen thousand dollars and twenty thousand dollars—which is beyond them—and that if they buy near a factory they will be crowded out, they therefore decide to rent and move as may be required to allow for the expansion of business.

The solution of this is the zoning law, which I believe is now operating in most of the large cities, and in the newer cities that are planned all this is taken into consideration originally; that is, a certain area is marked off for factories, for railroad-yards, for wholesale section, for retail section; certain streets only are allowed to have stores, certain sections only allowed to have garages, gas-works, etc., and so on. In the restricted or residential sections they allow only dwellings, schools, libraries, museums, hospitals, and railroad passenger-stations, which means that a person purchasing a house in the right zone can live his entire life in this house without being crowded out by the demands of business. This, as you can see, is what is needed, inasmuch as it is a permanent policy and not, as formerly, one that fluctuates for various reasons. In other words, there is a beautiful little settlement. Everything is fine. Suddenly the railroad decides to run a spur from the main road off to some particular factory. Immediately this spur goes through the section, it deteriorates, and finally becomes a ramshackle village.

Now to get down to brass tacks, all that I have said I know to be true, and if the business man would only appreciate that it is a matter of dollars and cents to him in exactly the way his employees are housed, he perhaps would have long ago realized the folly of allowing such a condition to exist.

Great strides, however, I believe are being taken now to correct this deplorable condition, and small houses economically constructed are being built that are within the reach of the working man. This takes care of one group, a man and his family.

The single man usually can find a place either by boarding with a family or in a boarding-house, or in a reasonable hotel, or somewhere, and as he is practically no bother or trouble, he readily finds accommodations for himself.

The girls and women, however, who are alone do not find it quite so easy to find desirable quarters in which to live. I have read recently in a paper a little discussion on this matter, and several boarding mistresses have written in stating their reasons for the preference given to men over women. The men, they claim, were no trouble; came in and went out and never asked any special favors; never asked for the loan of an iron or the use of the laundry; never changed their rooms around, all of which women, who are the natural home-makers, which is an inborn characteristic, like to do. This is perfectly all right in their own homes, but, as you can see, it makes more work for the lady of the boarding-house, and she therefore resents it.

There is one more point, and that is remuneration. A man will very often pay more because he can, and if what they say is true, that he is less trouble, then from a financial point of view it is to the landlady's advantage to accept him in preference to women.

Now the great question is, what are we going to do about housing the women? A woman has a perfect right to select a career, to go out into the professional or business world and make her own way. She has got to live, just the same as any one else, and in my opinion the big problem is the housing of girls and women, and this extends from the very largest cities to the very smallest towns.

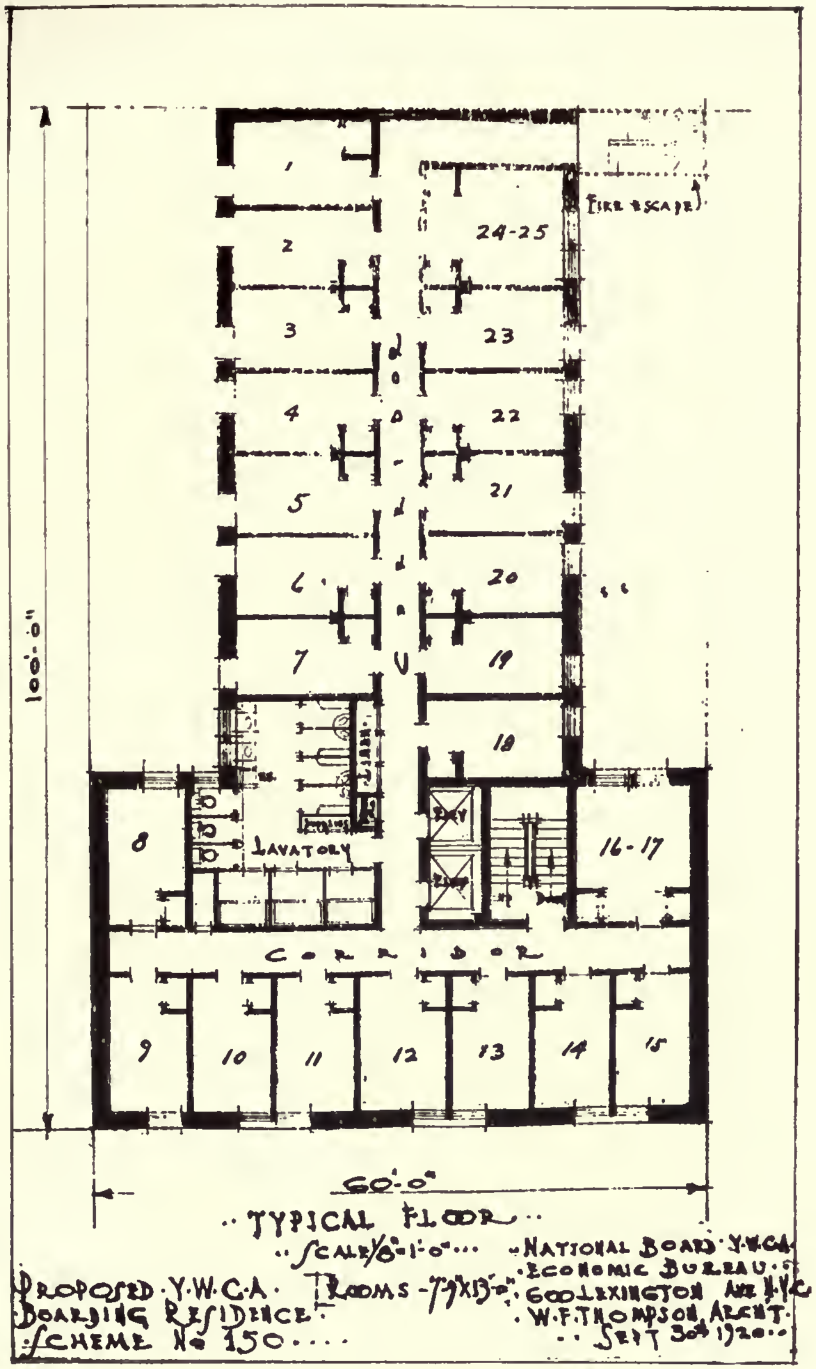
There have got to be housing facilities for those who work in or near a certain city or town. There should be accommodations for the travelling woman, and there should also be in the very poorer sections—which no matter what we do will always be with us more or less, but let us hope less—housing that will take care of some one who has been stranded and is practically out of funds. This sort of building placed in various small communities would be a very good outlet for some wealthy man to do some good in the world.

We therefore appreciate that some constructive programme must be produced for the proper housing of women, and the rates must be reasonable, and also there should be a return on the total amount of money invested, instead of the old way of having wealthy men or women donate so much money for the construction and equipment of a building, and then making up each year by subscription the deficit which the building has incurred.

The budgets shown were prepared to prove that money can be invested at a small return (4 per cent), and at the same time do a great service in helping to solve part of the housing problem.

In one instance the rate is ten dollars per week with two meals a day and three meals on Sunday. This is for the type *B*, or non-fireproof, building, which is built out ten or fifteen or twenty miles from a city but on a direct rapid-transit line. The other is for a fireproof building in or near a large city, eight stories high, and the rate here is eleven dollars a week for the same accommodation as explained above.

You will probably say that some of the girls cannot afford any more than six dollars a week or even five a week for room and board, and that that is the reason a great many of the boarding homes have shown a deficit. And in this you are right. But if we continue to aim to help the girl who can only pay five dollars or six dollars a week, we are defeating our purpose. By that I mean that if we can show financiers that we can carry on our work in a business-



Budget for proposed Boarding Residence Near New York City
October 1st, 1920.
William F. Thompson – Economic Bureau

Three story non-fireproof building

Cost of Building Complete		B. Maintenance		C. General Expenses	
1. Land 180 x 125 (40¢ sq. ft)	$10,000.00	6. Light and Fuel	$ 5000.00	14. Salaries and wages	23,000.00
2. Building 3 stories (460,000 cubic ft)	190,000.00	7. General Tax 80% of 200,000 at 2½%	4000.00	15. Food	26,000.00
3. Equipment	45,000.00	8. Water Tax	850.00	16. Laundry	1,800.00
4. Contingent Allowance	5,000.00	9. Insurance (Fire Liability–furnishings etc.	2000.00	17. Administration Expenses	1,200.00
5. Architect's Fee 6% of 235,000	14,100.00	10. Repairs and Replacements	2000.00	18. Miscellaneous Expenses	500.00
Travelling expenses, etc.	900.00	11. Depreciation and Sinking Fund	4000.00		
		12. Janitors Supplies	500.00		
		13. Engine Room Supplies	750.00		
	$ 265,000.00		19,100.00		52,500.00

160 Rentable Rooms at $10.00 per week average .... $83,200.00 per annum

Interest on Bonds at 4% on A (265,000.00)	10,600.00	
Total of B. and C.	71,600.00	
	82,200.00	82,200.00
Balance		1,000.00

This Building contains – 175 Rooms, Total; 160 Rentable, 15 allowed for Staff and Help.

Budget for proposed Boarding Residence Near New York City
October 1st, 1920.
William F. Thompson – Economic Bureau

Eight Story Fireproof Building

Cost of Building Complete		B. Maintenance		C. General Expense	
1. Land 60 x 100	20,000.00	6. Light and Fuel	5,000.00	14. Salaries and wages	23,000.00
2. Bldg. 8 stories and Roof Laundry 400,000 cu.ft.	280,000.00	7. General Tax (80% of 300,000 at 2½%	6,000.00	15. Food	26,000.00
3. Equipment	45,000.00	8. Water Tax	1,000.00	16. Laundry	1,800.00
4. Contingent Allowance	6,000.00	9. Insurance (fire Liability–furnishings, etc.	2,500.00	17. Administration Expenses	1,200.00
5. Architect's Fee 5% of 325,000	19,500.00	10. Repairs and Replacements	2,000.00	18. Miscellaneous Expenses	500.00
Travelling expenses, etc.	500.00	11. Depreciation and Sinking Fund	5,000.00		
		12. Janitor's Supplies	600.00		
		13. Engine Room Supplies	900.00		
	$ 371,000.00		23,000.00		52,500.00

160 Rentable Rooms at $11.00 per week average .... 91,520.00 per annum

Interest on Bonds at 4% on A (371,000.00)	14,840.00	
Total of B and C	75,500.00	
	90,340.00	90,340.00
Balance		1,180.00

This Building contains – 175 Rooms, Total; 160 Rentable; 15 allowed for Staff and Help.

like way, show a 4 per cent investment to them, and at the same time do good for the girl that can pay ten dollars or eleven dollars a week, are we not helping out this class and doing some good? Whereas if we continue to go to the wealthy people constantly asking for something for which we get nothing in return, we are killing the goose that laid the golden egg.

I believe that eventually a revolving trust fund will be evolved, and that through this, and in view of the inevitable lower material market for building, that buildings will be constructed and run on such economical plan that the rates can be reduced perhaps to average seven dollars to nine dollars a week, and perhaps a little less.

There is one point that I want to mention, and that is that no matter how well planned a building is, no matter how economically it is constructed, no matter how economically it is furnished, the big thing is the management. This is just as important as the economically planned and constructed building, just as important as the location of this building, and with this in mind an effort should be made to institute real training for the executives to manage these boarding residences.

My recommendation for this would be not to have this instruction by means of books or special classes, but by supplying to the best boarding homes now extant women who are desirous of becoming executives, and placing them under the direct control of a competent, practical executive secretary.

Further, before this person is accepted to work for and be trained by this executive secretary, she should be interviewed by a person who is capable of reading characters, so as to be sure that you are not using up the time of your trained executive on some one who will not in the future make good because of not being properly constituted for this kind of work. In other words, a square peg in a round hole very seldom gets anywhere. Therefore, you want to be sure that the right person is trained and is particularly adapted to this particular kind of work before wasting time on it.

In my opinion, if the employer of women would realize that he is paying a very high rate because of inadequate housing facilities, he would put his shoulder to the wheel and make every effort to better housing conditions generally.

If a girl goes to a dingy, cold, ill-ventilated, poorly decorated, inadequately and poorly furnished room, you can imagine her state of mind when she arrives at her place of business each day to perform her various duties. She cannot help (for it is human) taking every opportunity to think of herself and how she can better her condition. While we realize this should not be done during working hours, we also know that self-preservation is the first law of nature. Therefore, a girl thinks all day how it would be possible for her to get another position, to obtain more money, and to move her few belongings to a more desirable room. The employer pays for this, but he has been so short-sighted in the past that he did not realize it.

I believe that, since we have shown how boarding residences for girls and women can be placed on a paying basis, and since I believe the employers will agree that the above description is true (if they will investigate), they will be very anxious to subscribe to building a boarding residence that will enable a girl to go to her place of business each day with her mind free from any thoughts of bettering her condition, because she is satisfied, having a room that is warm and clean, bed-linen clean, color scheme interesting, electric lights instead of an oil-lamp, a cosey, livable, well-appointed living-room in which to receive her men friends, and, in short, beginning to live for the first time. The employer now is also beginning to realize nearly 100 per cent efficiency from this girl, and it is to his advantage financially, and it is to her advantage morally, physically, and mentally. Therefore, this is a true solution of one part of the housing problem.

There is another point I wish to make in connection with the housing of girls in what are known as boarding residences. To begin with, we will see the exterior of a building before we see the interior. I do not mean by that that all of the money should be spent on the beautiful elevation; but I do mean that the building should be inviting. I mean that it should be domestic in its character. I mean that it should speak of hospitality, and that it should not give to the untrained eye the appearance of a mansion, a hotel, a wonderful club building, all of which tend to keep out the very girl whom we are desirous of helping—a simple brick façade, well-proportioned windows properly distributed, the first-story windows perhaps having flower-boxes with nice plants or drooping ivy, and a very simple but home-like-looking entrance; not a lot of Italian marble and tile wainscots and floors and large-arched openings, so that the girl is reminded of going from one office-building into another—which is wrong.

We will assume that we have the charming, simple, refined entrance and exterior to our building that is inviting. The girl who is not too well dressed is not afraid to go into it, as she would be to go into perhaps the Biltmore Hotel. And now we come to the interior of this building. How shall we design it?

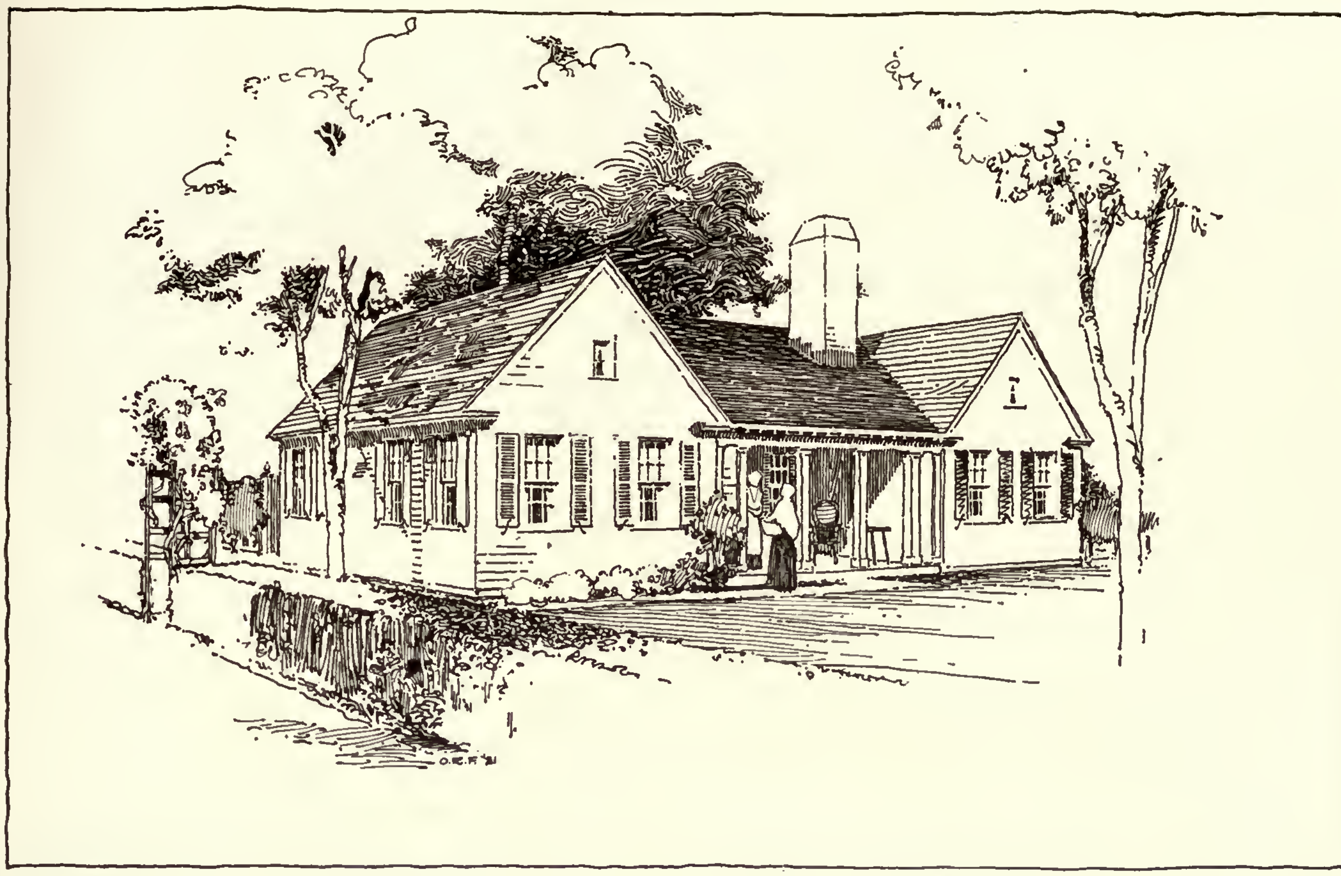
The very greatest thing that we can do is to make it homelike. The proportion of all the rooms should be generally about as are designed for a large residence, and the furnishing of a room should be similar to a residence and not hotel-like.

Another point, and a very important one, is that immediately upon entering the building, if it is of the eight-story type and requires an elevator, the elevators should be out of sight, and a staircase and a fireplace should be in evidence, so as to immediately impress the prospective inhabitant with the homelike atmosphere and keep from her as long as possible the fact that, after all, this is nothing more than a boarding residence.

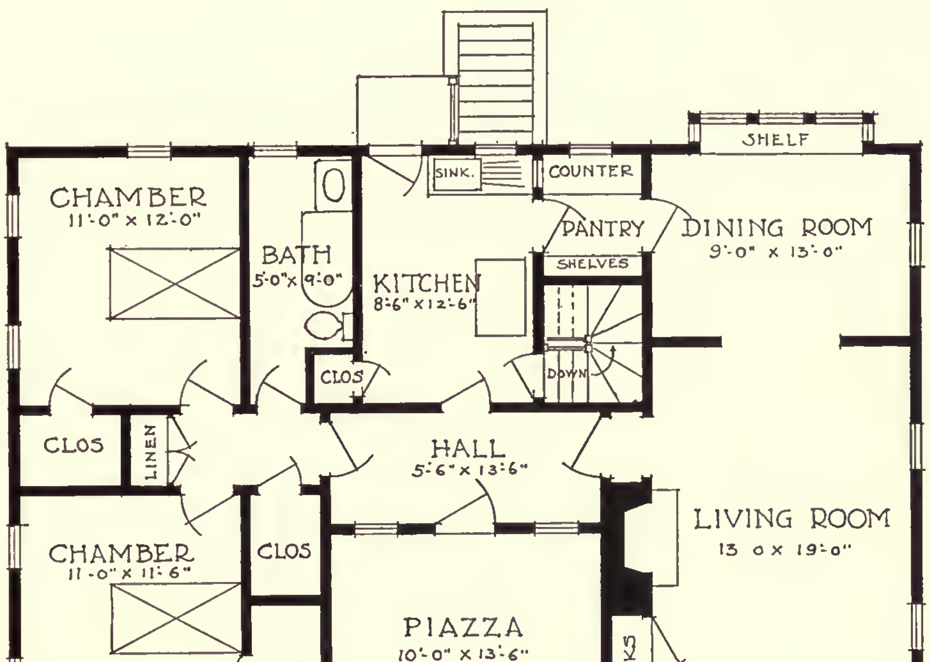
Then again, of course, in order to have the correct atmosphere, it comes back to the executive secretary and her personality. But if the building is designed as described above, a great part of her battle will be simplified, since the stage will be set in the proper way, and she will only have to supply the personal touch which is required in everything.

Early American Doorways—The White Pine series of monographs are invariably beautifully gotten up and admirable in selection of subjects. The one just received, "Comparative Study of a Group of Early American Doorways" from photographs by Kenneth Clark with notes by Aymar Embury II, contains a number of fine old doorways.

In this number is announced a programme for a Three Teacher Rural School with Teachers' Cottage.



The bungalow is not yet built, but four bids received by the architects in March run from $6,965 to $7,328.



·FIRST·FLOOR·

SCALE ¼"=1'-0".

BUNGALOW AT FRAMINGHAM·MASS·

KILHAM & HOPKINS·ARCHITECTS BOSTON·MASS·

A Group of Small Houses

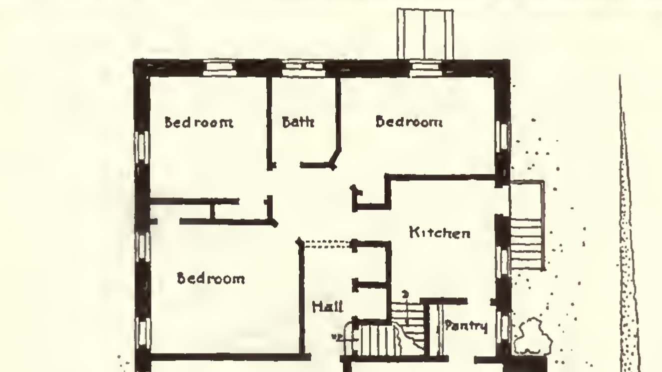
THE elimination of purely architectural features in the modern small house has grown to such an extent, due to the necessity for the most rigid economy in cost of erection, that the average building of to-day, costing from $7,500 to $15,000, must depend almost entirely upon the simplicity of its color scheme and the proper use and distribution of openings.

Several years ago, when conditions of cost were so much better, a house costing such an amount of money allowed with it the possibility of including as a part of the building features of design which under the spur of to-day's prices must be left out, for the cost of such features must be carefully counted in order to provide the requisite spaces and practical requirements.

This has brought about, therefore, an entirely different point of view toward the average house of that size, and the architect has had to change completely his method of designing and planning so as to fit the house to the purse. This has been exceedingly difficult, and more often than not the sacrifices entailed have caused the house to lose its attractiveness from the architectural point of view. This has been unfortunate. A firm of Philadelphia architects has succeeded in designing houses not only within the stipulated prices, but as well have preserved their architectural interest.

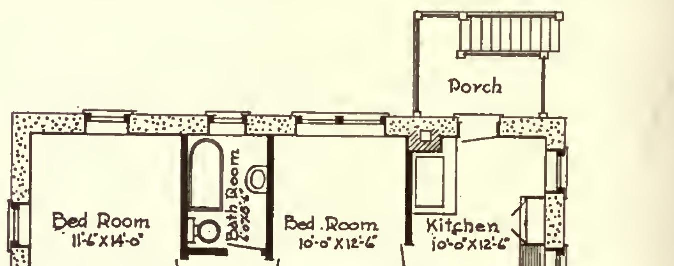
Philadelphia is noted for the many successful types of small houses which have been evolved by its architects. Those illustrated herein, from the office of Boyd, Abel & Gugert, are successful, both from the point of view of the design and arrangement. Even under to-day's prices these houses are within the pocketbook of the average owner. They are not extravagant in any way.

The stone bungalow at Narberth for Mr. Walker A.



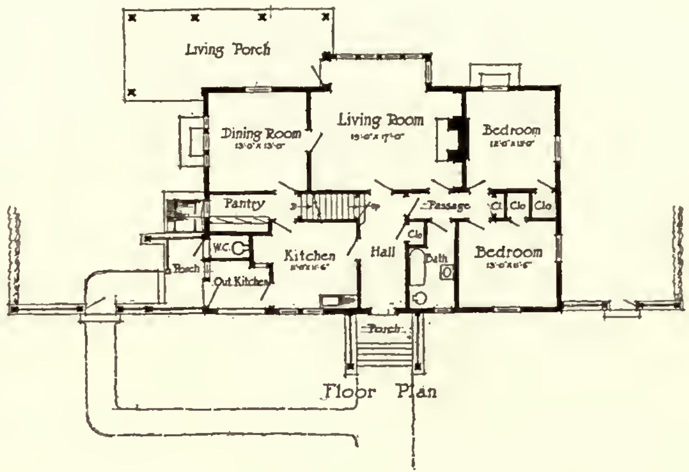
First Floor Plan

Bungalow, Walker A. Fox, Narberth, Pa.



Bungalow, R. H. Johnson, Wayne, Pa.

Bungalow, Mrs. E. G. Anthony, Wayne, Pa.



Fox is situated practically on the crown of a hill, and the problem was to avoid exceptional height, so as to not only fit its location but not to overpower the surrounding houses, all of which are on lower levels. The entire living and sleeping quarters of this bungalow are on the first floor with a convenient arrangement as to kitchen and pantry. The exterior facing is of stone with the woodwork painted white and with a dark-green slate roof.

The bungalow at Wayne, Pa., for Mr. R. H. Johnson was fitted into the side of a hill, advantage being taken of the slope so as to give access direct to the basement, where the laundry was placed. The exterior walls are faced with a stone of a soft, dark rusty-brown color, which was obtained in the neighborhood, and pointed with wide white joints. The shingle roof was left to weather naturally.

The house at Wayne, Pa., for Mrs. E. G. Anthony was designed for a problem of different sort. It was laid out as a servantless house, with all living and sleeping quarters on the first floor, the second story being used for storeroom purposes only. The entire exterior facing and the roof were red-wood shingles, left to weather to a natural soft dark brown. The exterior woodwork, with the exception of the window-frames, was all stained a dark brown to match shingles. A wood fence was carried across the front of the house, giving privacy to the ground space in the rear, where the main living-room and porch were also placed.

The three houses at Wayne, Pa., for Fallon & Harris have approximately the same amount of space in each house. They were built in the neighborhood where it was impossible to duplicate houses with success, and it was necessary to design four houses of similar requirements and different exteriors, but yet erected and salable for approximately the same prices. To accomplish this, stone, plaster, and clapboards were used in combination with shingle roofs. The woodwork was all painted white, the difference of design and color being left to the material and to the arrangement of the openings.

The house at Narberth for V. D. Abel is a combination of stone whitewashed to the second-story line with rough plastering above. The roof is of a rough graded and variegated slate. The entire house is informal and conforms more to the farmhouse type of architecture for which Pennsylvania is famous.

The house for Mr. Wm. T. Harris at Narbrook Park is perhaps the smallest of the entire group, the minimum amount of space for living requirements of to-day having been provided in order to bring the cost to the lowest possible point, and yet there has been no sacrifice of design from the exterior, which is sufficiently attractive to bring it away from the stereotyped small house.

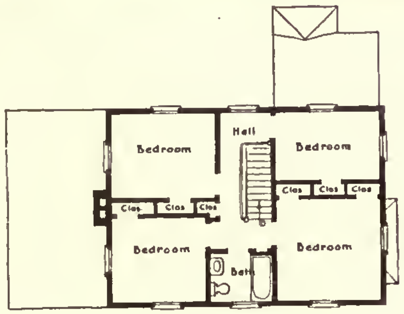
The house in Narbrook Park for M. N. Collins is an unusual type. Located on the side of a hill, it was possible to open one full side to a large sweep of lawn, while at the same time giving the living-room the full benefit of the prevailing summer breezes. The dining-room has French casement doors opening to an outside terrace. The base of the house to the first floor window-sill is of brick, above that plaster with a roof of red tile. The whole scheme makes an exceedingly pleasant contrast, and affords a pleasant background for the planting around the house.

Summer Session at Columbia

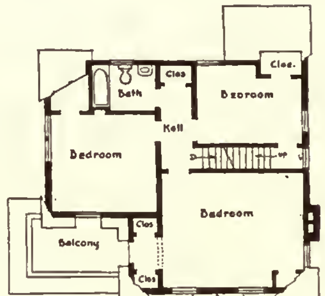
THE experiment in training students of architecture with three dimensional models has proved so successful in the regular work of the Columbia School of Architecture that courses in technic of model-making will be given under the summer session, which begins on July 5 and continues for six weeks, and for which an attendance of more than 12,000 students is expected.

The classes in the technic of model-making will be given in the evenings so that students who are occupied in work during the day will be able to attend. Harold V. Walsh, instructor in architecture at Columbia, will give the course, which is one of a large number of summer courses in architecture.

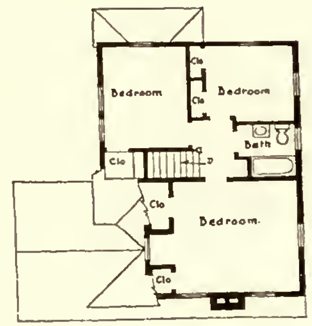
Courses in shades and shadows, perspective, pencil drawing, advanced design, water-color drawing, charcoal drawing, elementary design, elements of design including the application of orders, domestic architecture, antique and life drawing, and a course in the fundamental technic of architectural drafting as practised in the average office are among those offered for the summer semester. Credit toward the degree in architecture for students who have satisfied the entrance requirements will be given all students completing the architectural courses. The courses are also open to all qualified students without examination.



Second Floor Plan



Second · Floor · Plan



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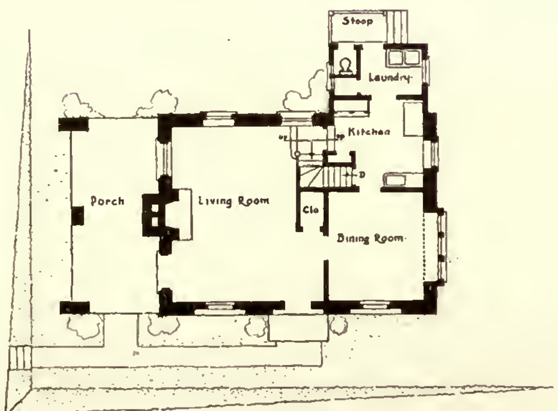

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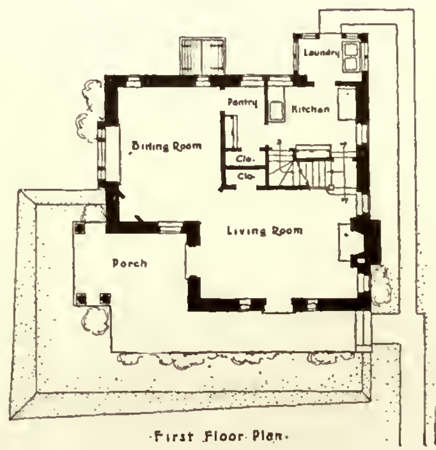
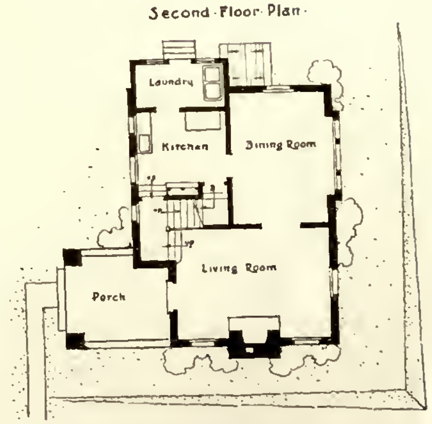


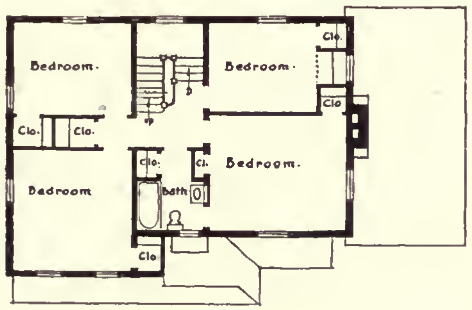
· First Floor · Plan ·



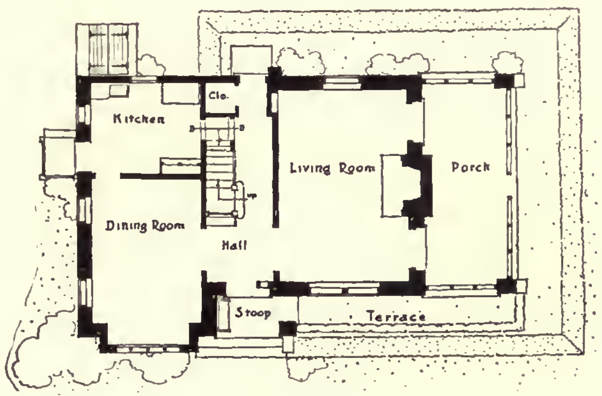
· First · Floor · Plan ·

THREE HOUSES FOR FALLON & HARRIS AT WAYNE, PA.

Boyd, Abel & Gugert, Architects.

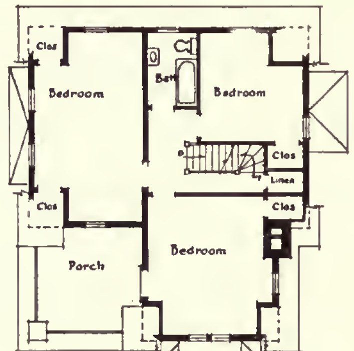


·Second·Floor Plan·

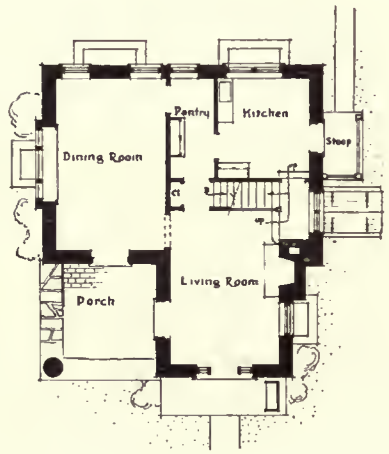


·First·Floor·Plan·

HOUSE, VICTOR D. ABEL, NARBERTH, PA.



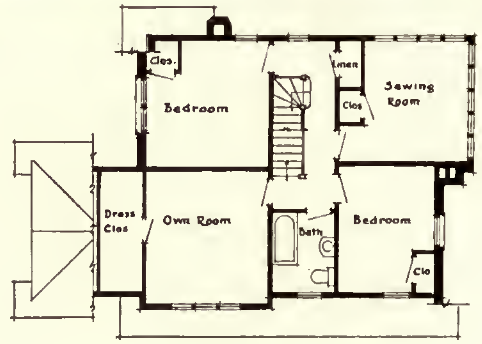
Second Floor Plan



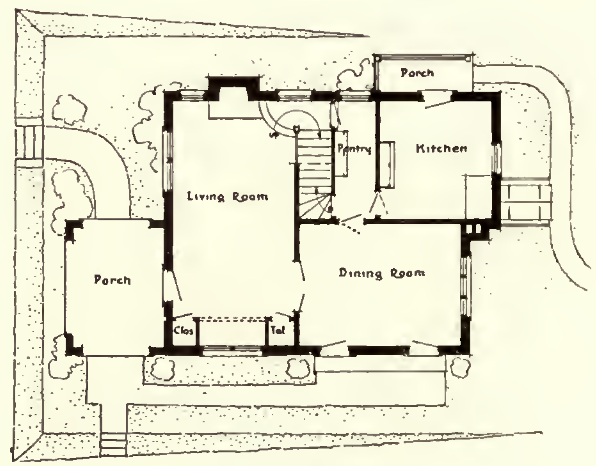
First Floor Plan

HOUSE, WM. T. HARRIS, NARBROOK PARK, PA.

Boyd, Abel & Gugert, Architects.

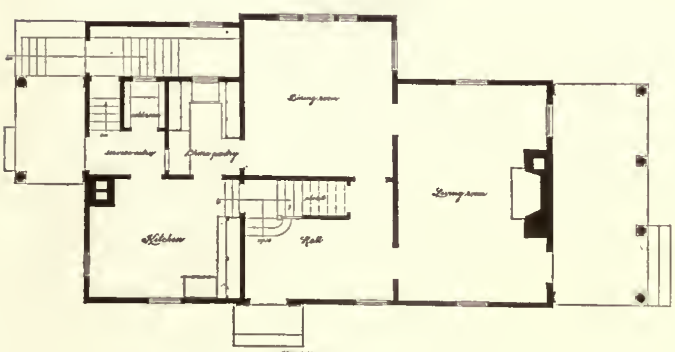


Second Floor Plan

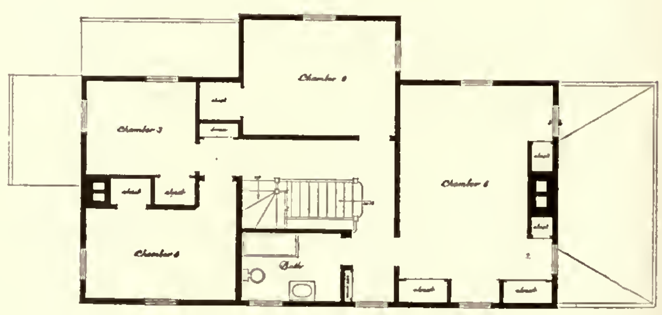


First Floor Plan

HOUSE, M. M. COLLINS, NARBROOK PARK, PA.



First floor plan



Second floor plan

Editorial and Other Comment

Money and Building

WE wish it were possible to compile some statistics regarding building and costs that would have the convincing value of definiteness and permanency. Abundant figures are available regarding current costs of materials, but they are current only, and no prediction can be made with any certainty regarding the future. The news of the material market as a whole is about as uncertain and as speculative as the daily reports of the stock-market, and values are about as problematical when it comes to investing real money with a view to a stable income.

One thing is very evident with regard to building, needs no comment on our part beyond the mere reference to the fact, capital is standing pat, waiting for a break in present prohibitive costs. We have often referred to the part that labor plays in the matter, there's the rub, apparently.

The crux of the situation seems to be the utter lack of foresight upon the part of labor to realize that if there is to be little building, there is to be little work. The logic of situation seems so obvious that we are quite sure that the intelligent labor element are perfectly aware of the condition, and we believe ready to remedy it, in the only way possible, if the bosses would only permit.

The bosses do not suffer, their salaries are paid, and the big boss receives a salary that we should think would make many skilled workmen wish they might go back to the old freedom of individual initiative.

The New York Trust Company has recently expressed some views that are impressive by their truth, and we wish they might be read by the labor-union chiefs:

"Neither banks nor others with capital to lend are going to lend it for this purpose so long as building is not believed to present a safe or profitable investment, and this will be true as long as excessive costs prevail.

"A house, the materials for which alone cost $3,000 in 1914, would now involve a cost for materials of $6,600. To this rise in prices of material must be added the increase in labor cost of construction since 1914. Not only is the high cost of building holding up operations by making prospective builders wait for lower prices, but it is responsible for the belief that at present prices building is not the safe and profitable investment that it should be to invite capital."

Small Houses

WE are publishing a number of small houses in this number, and we shall continue to publish many during the summer and fall.

In looking about the country we are rather surprised at the number of houses that are going up, considering the question we have dealt with above. If costs could be prognosticated with any certainty, we should very soon see ten small houses building where now there is one.

It isn't a question of people not wanting to build but of not being able to build. There are thousands of men in our cities ready to own their own homes the minute they can see the way to finance them. City rentals, especially in apartments, are a thing enskyed, and but for restrictive legislation in New York State, the last penny would be the only limit. It has been a get-rich-quick game with owners of tenement property of all kinds, and the man of modest earnings has suffered most.

Thousands who visit the Own Your Own Homes Expositions will be among the first to avail themselves of better conditions. Thousands whose business demands their presence in cities in order to be conveniently near their places of employment are beginning to think that there is "no place to go but out." But the congestion in commuting-distance suburbs is almost as great as in the city, and a feeling of rebellion and bitterness against profiteers, be they capitalists or workmen, was never so much in evidence.

Some of us who have watched the influx of foreign labor during the past ten or fifteen years, and a few who have in the past seen thousands march down Fifth Avenue on some May day, with the red flag as their emblem of loyalty and not a word of English to throw at a dog, are inclined to exclaim: "My country, O, my country, wake up, shut down the gates!"

The Architectural League Show in Retrospect

WE may not quite agree with the critic who said there was nothing to find fault with, that the show was perfectly organized and a marvel in every detail, but as we did say in an editorial last month, we think it was the most distinguished exhibition in the history of the league.

Never before did sculpture have such a fine showing and the murals were, with exceptions, as usual, worthy of serious consideration. We like to believe that we are on the way to a revival of public interest in mural decoration, and that they are going to be closer to and more expressive of our new national ideals.

Certainly there are more and more of the younger men among our painters who are showing an aptitude for mural work. Our old masters still dignify and ennoble their calling, but we must be prepared to meet new times with new ideals and methods, while still respecting the fine tradition established by the older men.

Draftsmen and Reading

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By David B. Emerson

IT is unfortunate but true that the great majority of young draftsmen and technical-school graduates are poorly read. The fact was very forcibly brought home to the writer recently when in conversation with two young men who were recent graduates of technical schools he was surprised to learn that neither of them knew who Augustus St. Gaudens was, and yet both were ardent admirers of Stanford White, but had read so little that they did not know the name of the sculptor who collaborated so many times with White, and had been his friend and boon companion for so many years. Now, it is not the province of this short article to prescribe a reading course which is to make every draftsman a well-read man. That is too big a problem and too difficult, and, besides, President Eliot has already given us the "Five Foot Shelf." There are, of course, any amount of books that are valuable and the reading of which will help the young man, but time is also valuable, and the study of architecture is, in itself, a man-sized job. Still, the great necessity is to avoid one-sidedness and to acquire a general knowledge, most particularly a knowledge of the history of architecture and the allied arts; also to gain the critical and analytical view which will enable them to judge the arts with which they are associated.

Probably one of the best methods of assimilating the history of art and architecture is the study of general history—to learn of the times when art and artists lived. The young man who knows the history of Greece, Rome, and Byzantium is far better able to appreciate the history of the art and architecture of those countries than one who merely knows the five orders and the countries in which they had their origin. One who has read the history of the Middle Ages and the Renaissance will appreciate Gothic and Renaissance architecture far more than one who merely knows the styles, and knows nothing of the life and times that gave them birth.

There are a few books, however, which will help wonderfully to broaden the view and enrich the mind of the young draftsman, and which are not so dull and dry that the reading of them is a task and must be taken up as so much labor toward a given end, as much of what is studied in the schools amounts to. One of the most instructive and interesting books dealing with art, more particularly with painting but applicable to all of the arts, is Sir Joshua Reynolds's "Fifteen Discourses," easily read in fifteen hours, and very well worth the effort. Mr. Whistler's "Ten O'Clock" can be easily read in less than an hour, and it will be an hour well spent.

To gain an insight into the art life in Italy in the sixteenth century there is no book better than the "Memoirs of Benvenuto Cellini," after which one should read Symonds's "History of the Renaissance." To learn of the life and history of the Middle Ages and the art and philosophy of that period there is perhaps no book which gives a better and clearer insight into the spirit of those times than Henry Adams's "Mont St. Michel and Chartres." "Mediæval Architecture," by A. Kingsley Porter, is without a doubt the most scholarly history of the architecture of that period. Ralph Adams Cram's "The Gothic Quest" and "The Substance of Gothic" are also both of them very excellent studies on the subject, and, like everything which Cram writes, they are very readable and very interesting.

The reader can learn much that is interesting and instructive of the art and artists of Italy from the thirteenth to the sixteenth century by reading the biographies of the greater and better-known artists in Vasari's "Lives of the Most Eminent Painters, Sculptors, and Architects," and omitting many of the lesser ones who are of no particular interest and whose work is practically forgotten. Vasari, although often inaccurate and sometimes unfair, is interesting, and in practically all cases his estimate of the men and their work is correct. To properly enjoy Vasari the writer would advise the casual reader to avoid reading the footnotes, as they detract from the pleasure of reading the author's version, and are only valuable to those who are making a deep research on the subject. Kenyon Cox's "Concerning Painting" and "The Classic Point of View" are pleasant and instructive reading, and give a good critical analysis of that branch of art.

These few books are only a very small part of what has been written on art and architecture, but are suggested as they are not only instructive but interesting, and are a very good start in forming the habit of reading, which unfortunately seems to be rapidly becoming a lost art. It is unnecessary to say that with the specialized reading it is necessary to do some general reading as well, as an architect should be a broad-minded, well-informed man, and every really brilliant architect whom the writer has ever known was a well-read man; and as draftsmen are potential architects, draftsmen to succeed must read, and read to remember and not read to forget.

Book Reviews

THE BOOK OF BUNGALOWS. By R. Randall Phillips, editor of *Our Homes and Gardens*. Charles Scribner's Sons, New York.

The bungalow has come to mean especially a house that provides a series of rooms all on one floor. It is the ideal small house for those who want to minimize household cares, and it can be made a little or a large house, of picturesque outward aspect and of cosey and compact interior arrangement. Many things are built, however, in the name of bungalow that "become a piece of architectural Turkish delight—made banal with embellishments of a monstrous fretwork kind."

While Mr. Randall's book deals with English bungalow types only, he shows a number of designs that are adapted for all countries. He points out the fact that the bungalow is not necessarily a cheap house; in fact, a large roof may bring the cost to equal that of a two-story house. He discusses the matter of "Planning and Design," "Methods of Construction," "Equipment," "Furnishing."

There are a number of large and small examples shown with elevations and plans—built of wood, stucco, brick, half-timber.

The book contains practical suggestions for both architects and laymen. It is interesting to note that where gas and electricity are available American inventions are not overlooked, and where they are not available cooking needs are meet by the new oil-stoves, "most of them of American manufacture."

HOW TO PLAN, FINANCE, AND BUILD YOUR HOMES. A book that has grown out of the work of the Architects' Small House Service Bureau of Minnesota; contains over a hundred illustrations of houses and plans. It is published for the Southern Pine Association, New Orleans, by the Architects' Small House Service Bureau of Minnesota, Inc.

The bureau was formed for the purpose of making the professional skill and trained ability of architects available for the small-home builder. The American Institute of Architects and its committee recognized the fact that the small house or home building of this country was being done in a more or less "hit or miss" fashion, and that the architect had little or nothing to do with it, and they believe that the Architects' Small House Service Bureau idea is the solution, as was shown by their indorsement. Credit is due to the Southern Pine Association for believing also that this was the solution, and for making it possible for the Minnesota Bureau to present its completed service at such an early date.

Plates LXI – LXXVI follow page 148

SALESROOM, CAMMEYER BUILDING, 677 FIFTH AVENUE, NEW YORK.

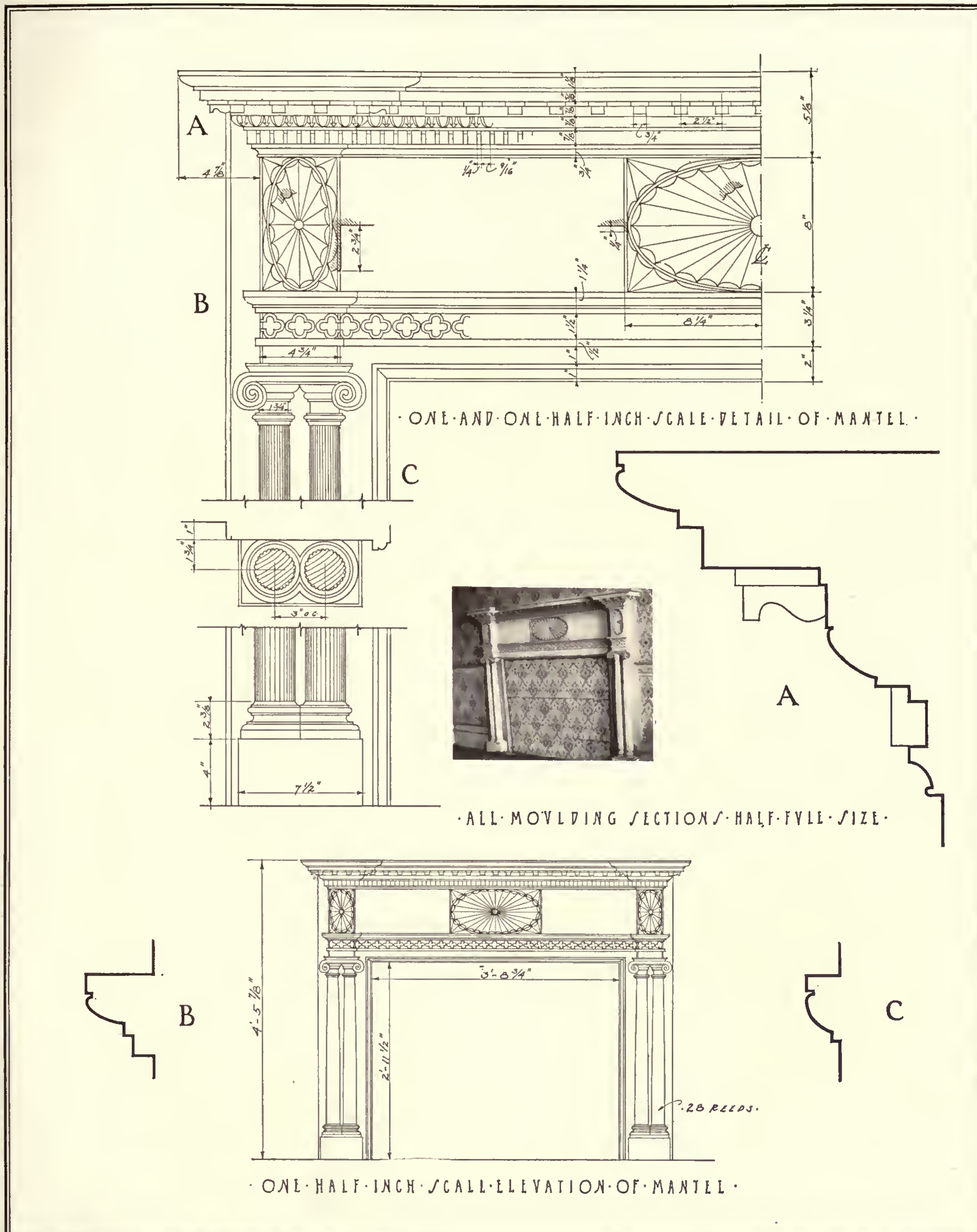
W. L. Rouse and L. A. Goldstone, Architects.

CAMMEYER BUILDING, 677 FIFTH AVENUE, NEW YORK.

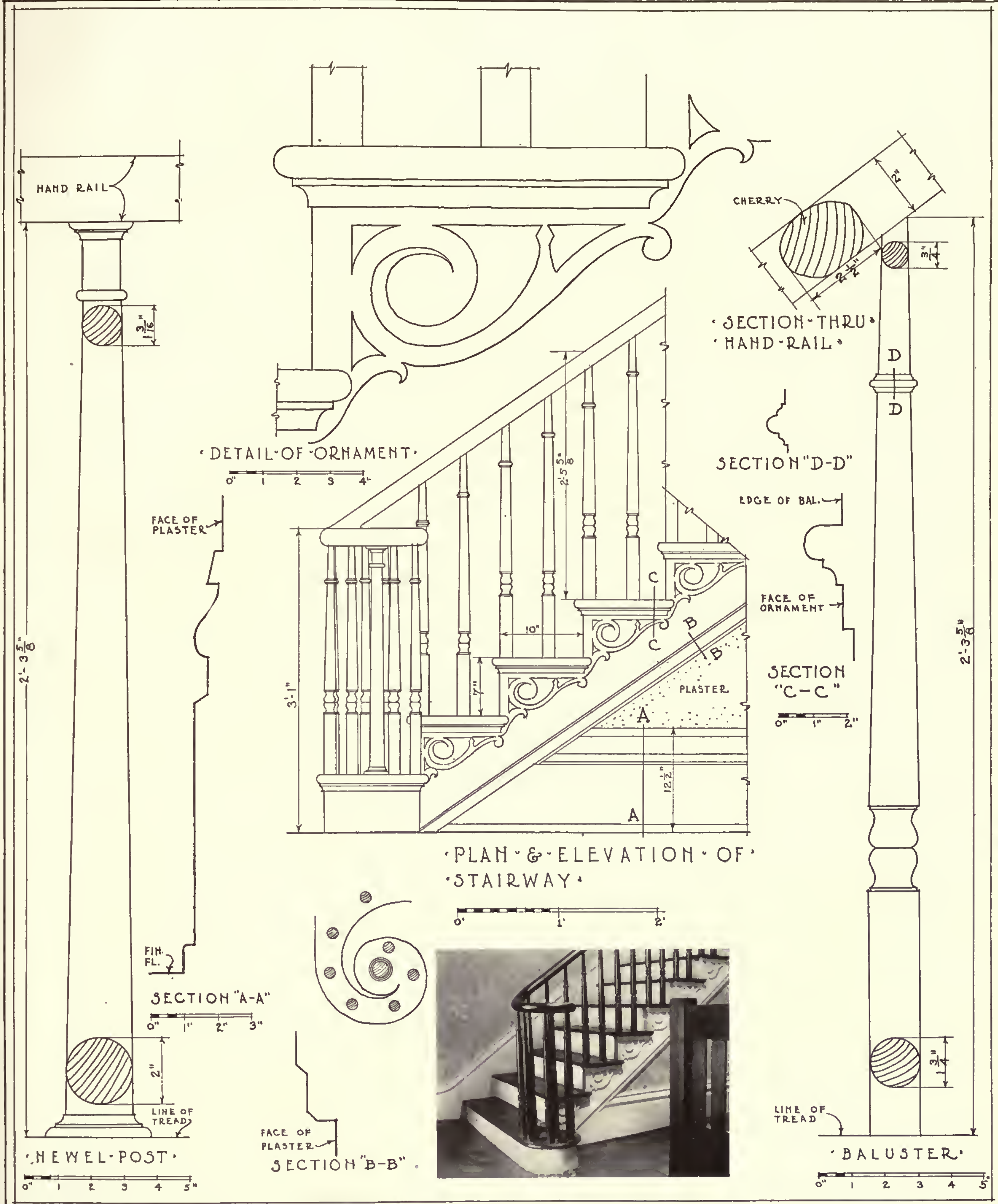
SALESROOM.

W. L. Rouse and L. A. Goldstone, Architects.

MANTELS IN SALESROOMS, CAMMEYER BUILDING, 677 FIFTH AVENUE, NEW YORK.
W. L. Rouse and L. A. Goldstone, Architects.
(GRINLING GIBBONS CARVINGS.)



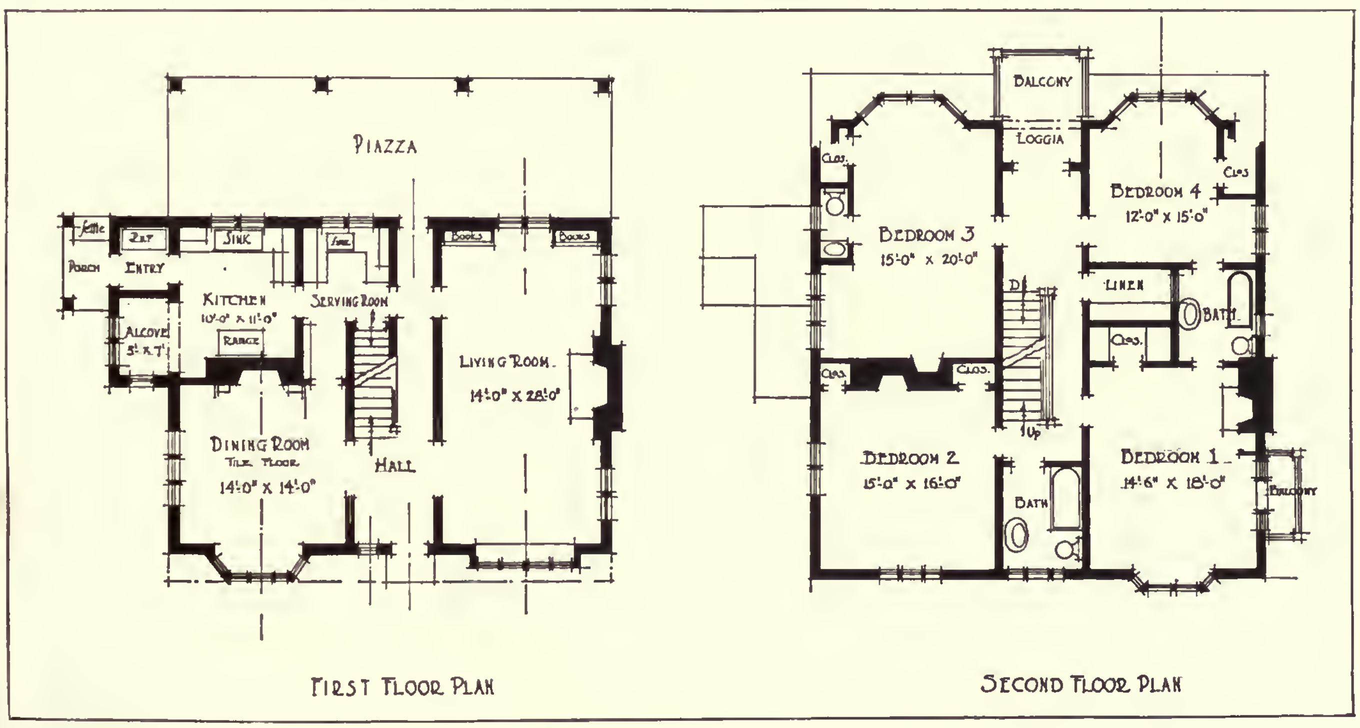
EARLY · ARCHITECTURE · OF · CONNECTICUT ·	MANTEL · *in the* BASSETT HOUSE · HAMDEN, · CONNECTICUT ·	MEASURED AND DRAWN BY · J · FREDERICK KELLY ·



EARLY COLONIAL ARCHITECTURE OF THE OHIO VALLEY	STAIRWAY IN THE OLD WILSON RESIDENCE NEWARK OHIO	MEASURED & DRAWN BY Daniel W. Weiny

HOUSE ON THE TURNPIKE, NEWBURYPORT, MASS., FOR MISS ANNE M. PAUL. Lois L. Howe & Manning, Architects.

LIVING-ROOM, TOWARD HALL.



HOUSE ON THE TURNPIKE, NEWBURYPORT, MASS., FOR MISS ANNE M. PAUL. Lois L. Howe & Manning, Architects.

LIVING-ROOM.

DINING-ROOM.

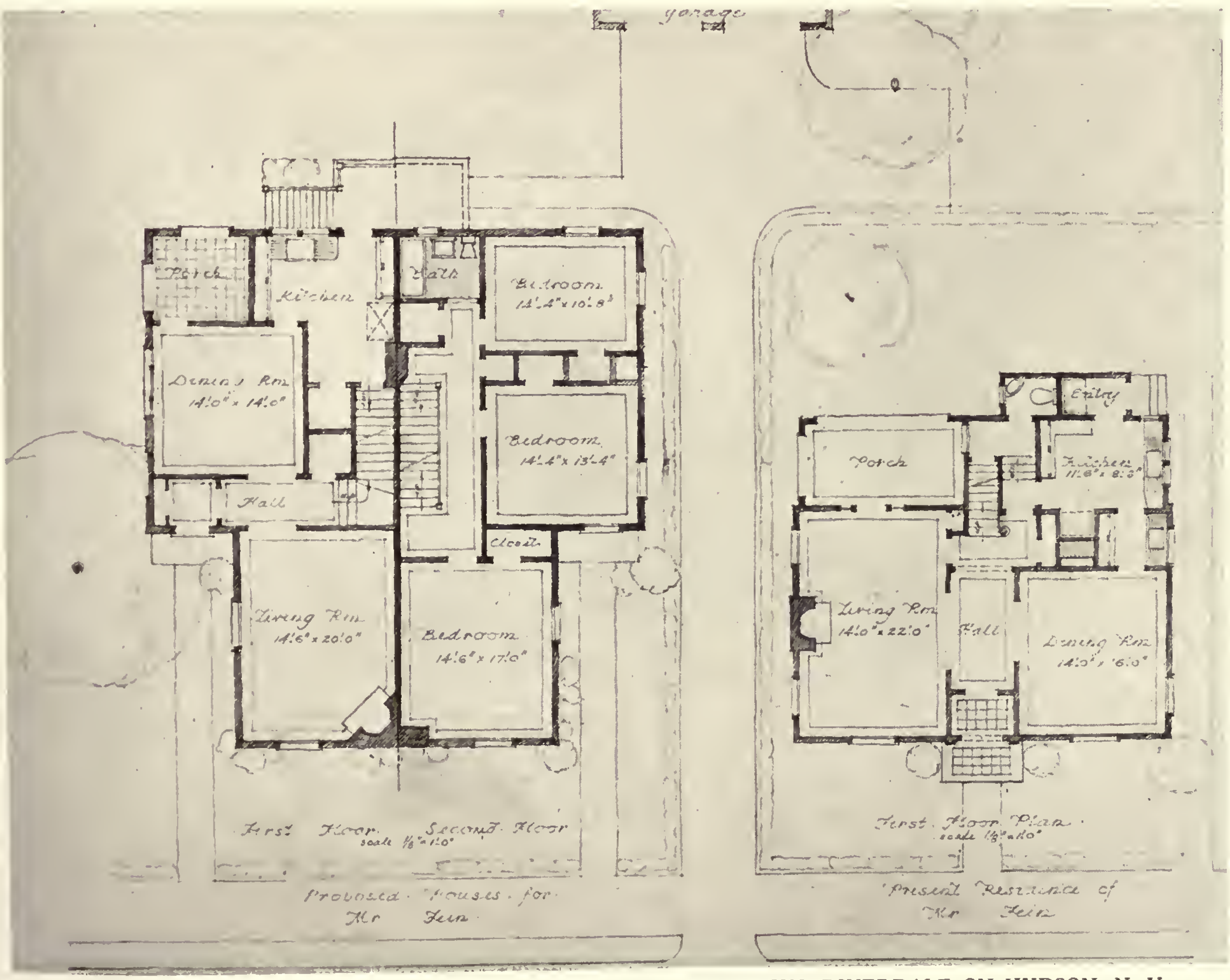
Lois L. Howe & Manning, Architects.

HOUSE ON THE TURNPIKE, NEWBURYPORT, MASS., FOR MISS ANNE M. PAUL.

HOUSE, ROBERT FEIN, RIVERDALE-ON-HUDSON, N. Y.

Dwight James Baum, Architect.

DETAILS.



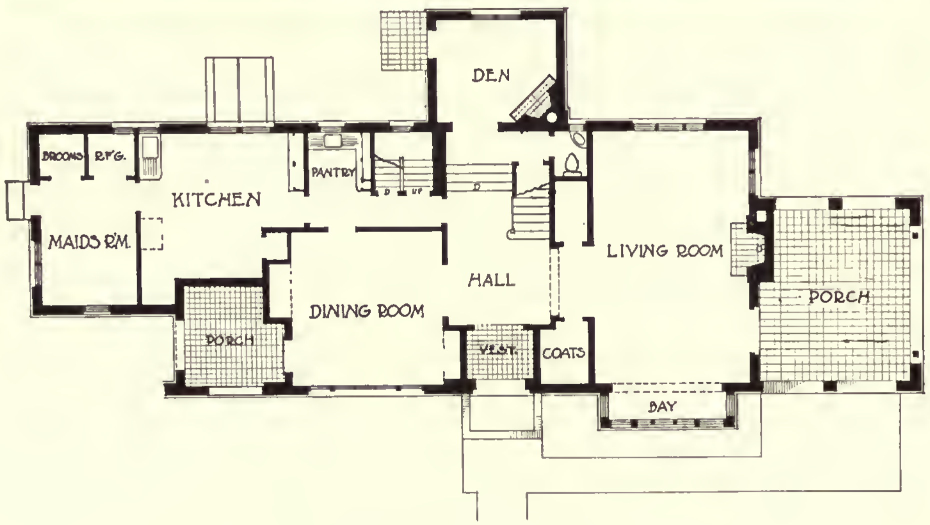
PROPOSED DOUBLE HOUSE ADJOINING PRESENT HOUSE ROBERT FEIN, RIVERDALE-ON-HUDSON, N. Y.
Dwight James Baum, Architect.

DESIGNS FOR DOUBLE AND SINGLE HOUSES FOR ROBERT FEIN, RIVERDALE-ON-HUDSON, N. Y.

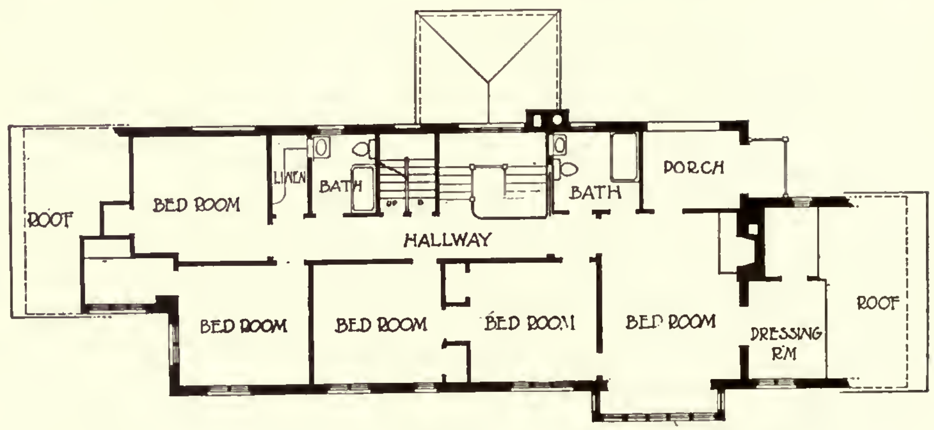
Dwight James Baum, Architect.

HOUSE, MELVILLE G. CURTIS, CYNWOOD, PA.

Edward Buehler Delk, Architect.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

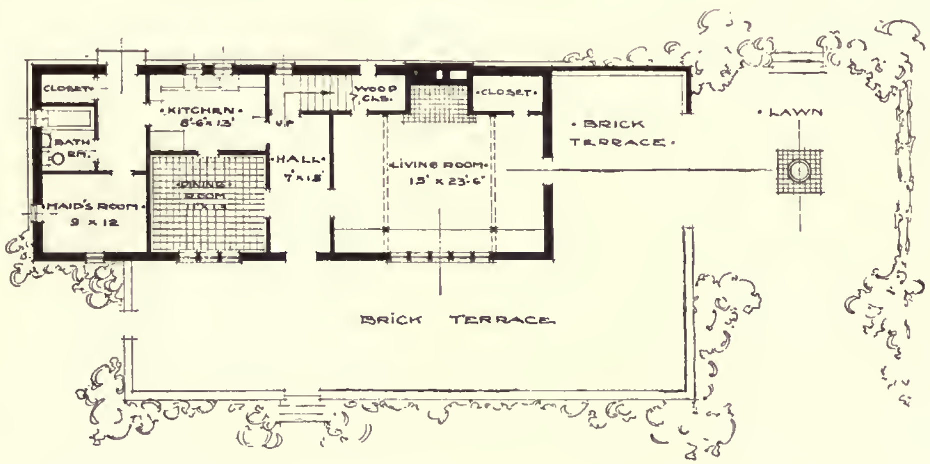
HOUSE, MELVILLE G. CURTIS, CYNWOOD, PA.

Edward Buehler Delk, Architect.

HOUSE AT SANTA BARBARA, CALIF. E. W. Neff, Architect.

HALL.

LIVING-ROOM.



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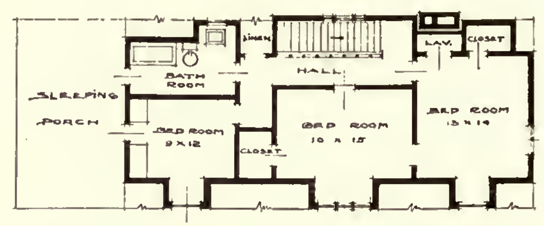
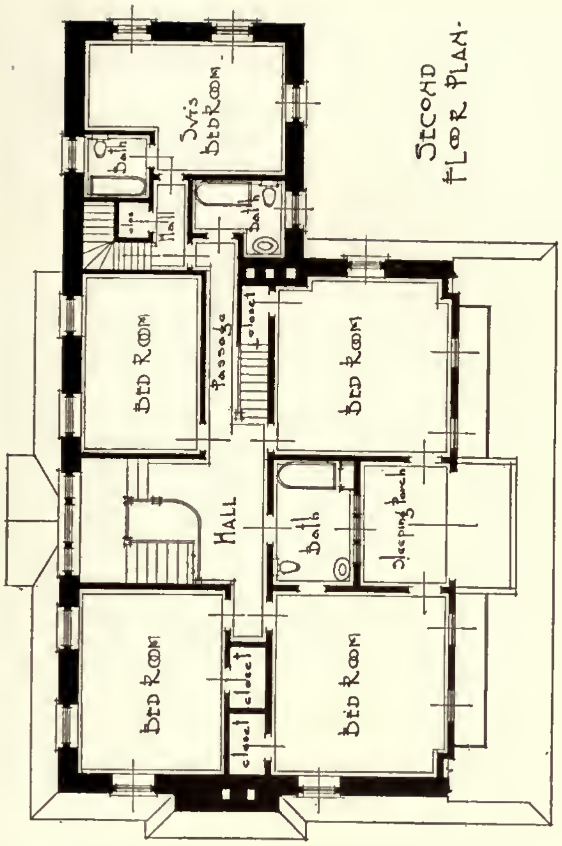


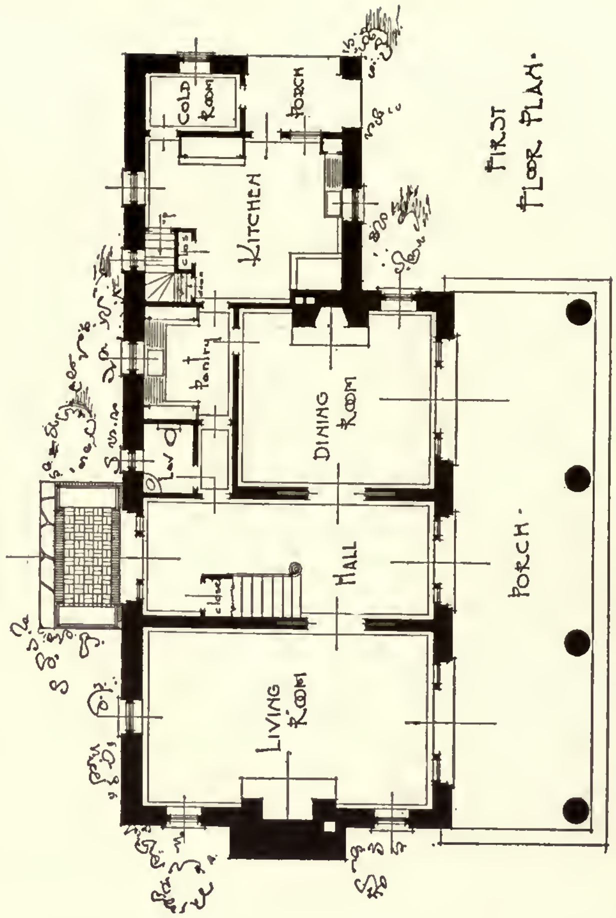
SECOND FLOOR PLAN.

HOUSE AT SANTA BARBARA, CALIF.

E. W. Neff, Architect.

HOUSE AT GERMANTOWN, PHILADELPHIA, PA. Carl A. Ziegler, Architect.





Carl A. Ziegler, Architect.

HOUSE AT GERMANTOWN, PHILADELPHIA, PA.

New Materials in Small-House Construction

From an Address by Leslie H. Allen of Fred. T. Ley & Co.

THE principal new materials used recently for wall construction are concrete blocks, tile, monolithic concrete, unit concrete, frame and stucco, and gunite.

None of these materials is exactly new, but they have not come into general acceptance. Some features of them will be new to many of those who are studying these problems.

The tile wall has been used in many places, the best jobs being of tile construction covered with Portland-cement stucco on the outside and plaster on the inside. Such a wall is not wholly satisfactory, as it does not give a perfect insulation to the interior of the house. In order to insure good insulation the inside has to be furred and lathed before plastering, and the extra cost of doing this is sufficient to wipe out its advantages. Further advance in tile construction has been the burning of tile with a surface or texture that does not have to be covered with plaster. Various forms of tapestry textures have been used for this purpose. This is slightly less expensive.

Although concrete blocks have been used largely for cellar-wall construction, they have not been used very much for superstructures. The average concrete block is porous and not satisfactory for the walls of dwelling-houses. A steam-cured or a wet-process block is much denser and practically waterproof, and, if furred and plastered on the inside, makes a satisfactory wall. Construction of this kind has been used in Morgan Park, Duluth, and the rebuilding of Halifax, Nova Scotia, with marked success. The concrete block being a large unit is difficult to treat architecturally in the design of a small house, but some of the work above referred to has shown that this block has been satisfactory.

The "Hydro-Stone" concrete block used at Halifax is a steam-cured wet block, made under pressure, and gives satisfactory results. It has a continuous air-space, but the insulation is not perfect, and it is doubtful if this method would be perfectly satisfactory unless furring and lathing are used with the plastering.

A good deal of attention has been given the last few years to the building of small houses in monolithic concrete. A large number of patented systems have been introduced by enthusiastic inventors, but very few of these systems have appealed sufficiently to the average contractor to make him desire to use them. Most of the monolithic houses built have been built by employers of labor in large factories, who, familiar with the possibilities of reinforced concrete in factory construction, have desired to see its advantages worked out in dwelling-house construction. Two or three of the systems now on the market enable concrete walls to be built for a price slightly exceeding frame construction, and one system gives a hollow concrete wall with a continuous air-space and perfect insulation that compares very favorably in cost with any other method of construction, and in this case the lathing can be omitted for interior plastering.

No way yet has been found of producing satisfactory surface for concrete walls in houses of this kind, and all the successful developments, so far, have been covered with Portland-cement stucco.

In several cases cinder concrete has been used instead of the usual concrete with stone for aggregate. Where cinders are used they should be hard, well burned, and well screened—and under such conditions have proved quite successful and economical.

Stucco has been used in very many cases where frame construction was still desired but a more permanent outside covering was wanted. A frame house covered with stucco needs to be exceedingly well braced in order to secure a satisfactory result. A good many unsatisfactory jobs in stucco are traced to the use of wood lath instead of wire lath, and many more to a lack of understanding on the part of workmen in the proper methods of mixing and applying Portland-cement stucco. Two companies have recently put on the market a preparation of stucco in which magnesite forms the base instead of Portland cement, and this material, though more expensive in first cost, is more easily applied, and, being absolutely waterproof, can be used with a wood lath with satisfactory results. Wood lath in combination with tar paper, known as "Bishopric Board," has been successfully used with this form of stucco without requiring sheathing underneath, and, provided the framing is properly braced, this form of wall covering is no more expensive than shingles or clapboard and has the advantage of not needing periodical painting.

Portland-cement stucco shot with a cement gun onto wire lath is another method of covering the outside of house walls. It has been used in two or three places with success. The difficulties attending the use of the cement gun are such that it is not probable that this method of placing stucco will come into general use.

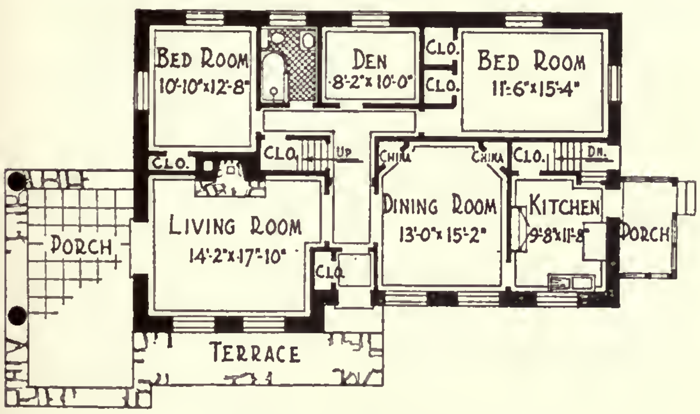
The use of adobe, sun-dried brick in parts of California is of interest. Where climate permits this is an economical wall material for one-story structures.

The standard roof covering in country districts of wood shingle bids fair to be soon supplanted by the asphalted felt shingle with slate coating. These shingles are made of a heavy felt saturated with asphalt with crushed slate rolled top surface, and can be purchased singly or in strips of four or in rolls (the best method is apparently the strips of four). These shingles are undoubtedly fire-resisting to a greater extent than the wood shingle, although they cannot be classed as fireproof. The lighter weights have a tendency to curl up, and the slate surface is liable to wash off some of the poorer makes. The heavier makes of asphalted felt shingles, made with a good quality of asphalt, appear to be perfectly satisfactory, although until they are tested by the lapse of time it cannot be stated with certainty that these will be as durable as the wood shingle.

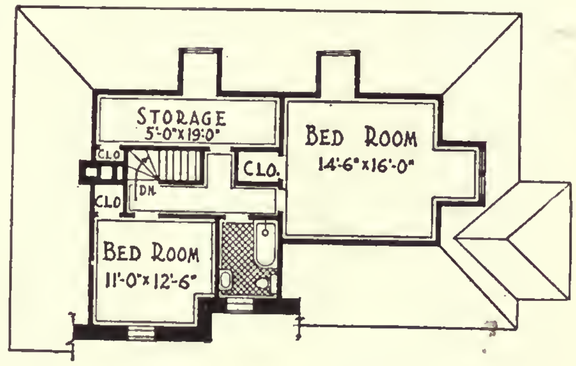
It is not generally known that the cheaper grades of slate cost very little more than felt or wood shingles. Probably the reluctance of the small contractor to introduce another trade (the slater) into the building of a house has hindered the use of this kind of roof. We have used this slate roofing (sea-green slate) on many recent housing jobs, at an extra cost not exceeding fifty dollars per house, to the great surprise and extreme satisfaction of the owners.

The asbestos slate (not to be confounded with the asphalted felt shingle) is somewhat more expensive, comparing more nearly in cost with the better grade of slate. It seems to be difficult to get a satisfactory color in this material; but apart from this, they seem to be entirely satisfactory.

In the framing of floors there is very little change to report. Some firms are attempting to introduce so-called "metal lumber" (joists made of pressed steel) to replace wood-joist construction. The cost, however, is considerably in excess of wood construction, but this method has been used in apartment-houses that, under the building laws, were required to be built of fireproof construction.



FIRST FLOOR PLAN

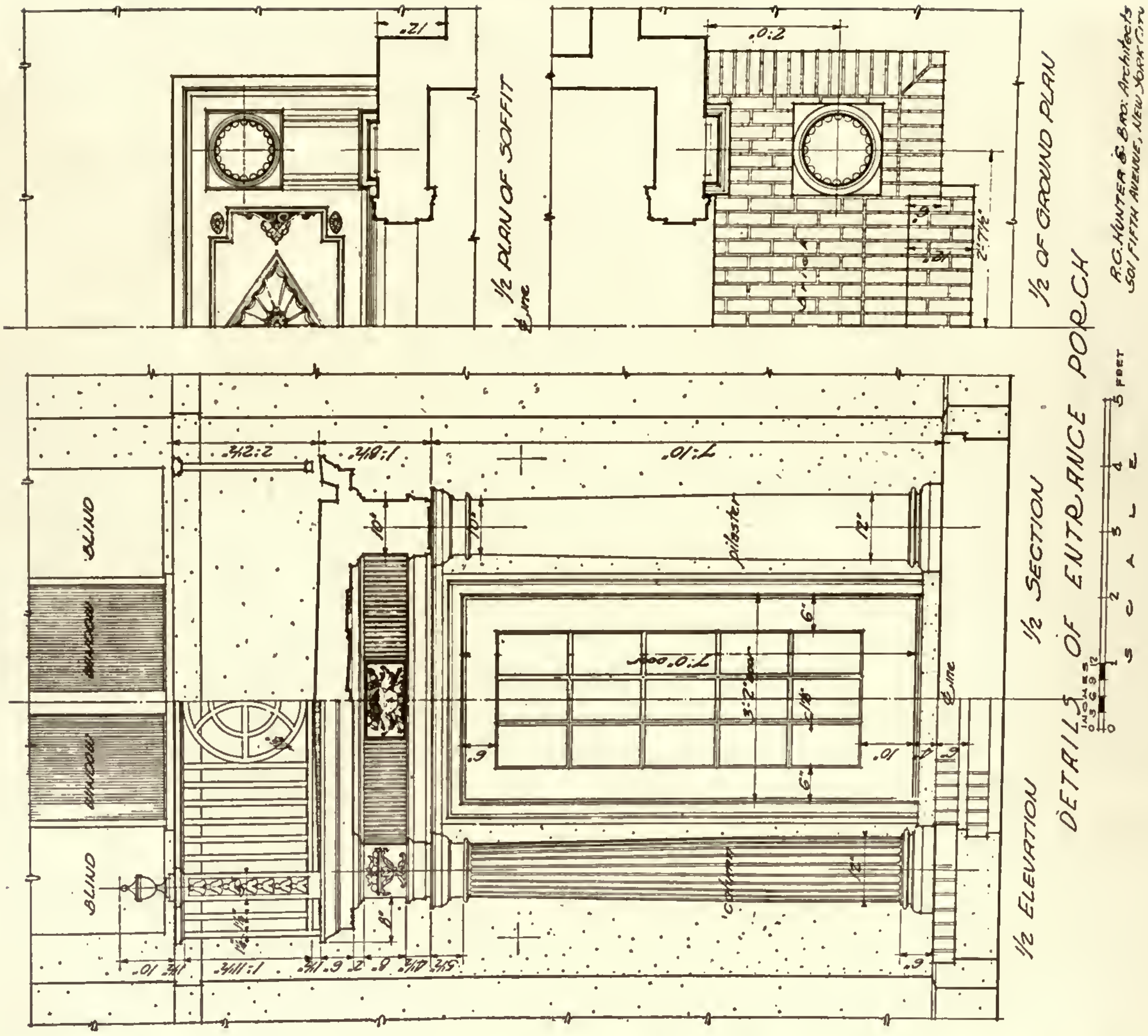


SECOND FLOOR PLAN

HOUSE, ROBERT L. BEATTY, NARBERTH, PA.

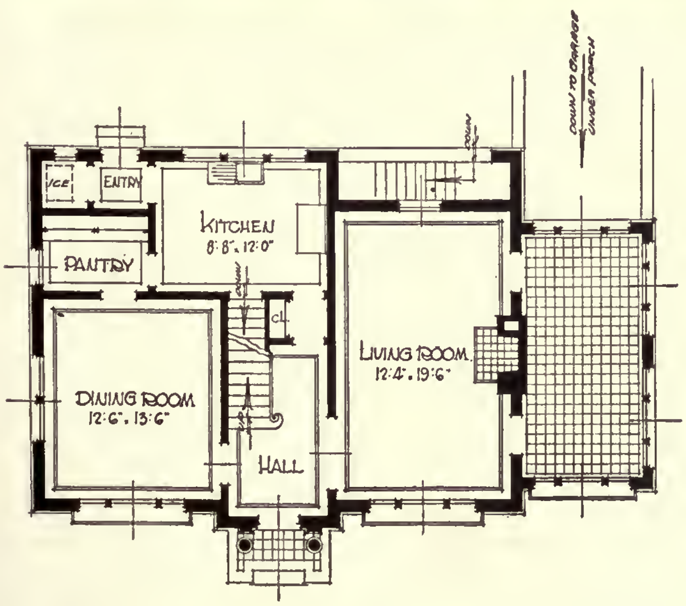
Wallace & Warner, Architects.

One of the items that adds considerably to the cost of a house and delays its progress is the interior plastering. The bringing in of wet plaster into a house, especially in winter and spring time, is a disagreeable job, and adds considerably to the difficulty of completing the house, and any substitute for plastering that would prove entirely satisfactory would be welcomed everywhere. Various forms of wall-board are on the market for this purpose. It has been found, however, that the wall-boards made of wood-pulp are not satisfactory for permanent construction. There are, however, two makes of gypsum wall-board on the market. These are formed of gypsum about ¼ inch to ⅜ inch thick, covered on both sides with a heavy well-sized paper. One of the firms putting this wall-board on the market has patented a rounded edge-board which allows of a plaster joint to be run, giving a perfectly flat surface suitable for painting or papering. We have used this on several houses with satisfaction and considerable saving in expense.



R. C. Hunter & Bro., Architects.

HOUSE, G. R. STEINERT, HACKENSACK, N. J.



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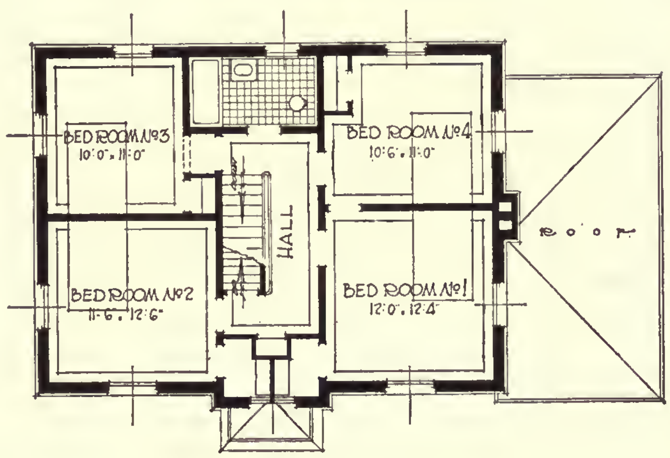


SECOND FLOOR PLAN

HOUSE, G. R. STEINERT, HACKENSACK, N. J.

R. C. Hunter & Bro., Architects.

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, School of Architecture, Columbia University

Article IX

ESSENTIAL FEATURES OF GOOD PLUMBING

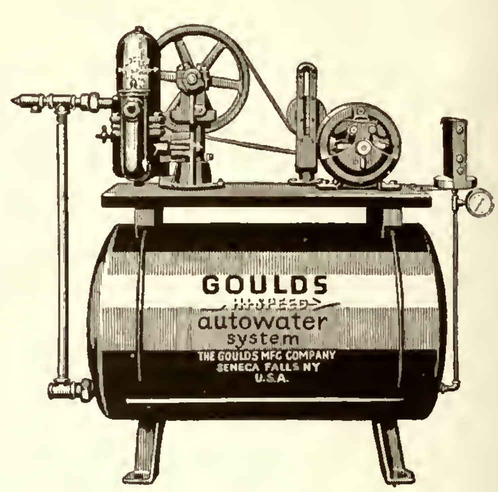
The Problem

THERE are three things which will affect the plumbing system of the small house; namely, the existence or non-existence of municipal plumbing codes under which the structure is erected, the existence or non-existence of a public sewer, and, finally, the type of water-supply, whether it is public or private.

If there are no plumbing codes to follow, it is sometimes possible to save money on the plumbing; but unless the specifications are very rigid, there is danger of poor work being installed. By saving money is not meant installing cheap material, but eliminating certain features which most plumbing codes require and which are not essential in producing the best possible type of plumbing system. For example, in most cities the ordinary traps which are required under each fixture to prevent the sewer-gas from returning into the air of the house, after the waste water has drained out, must be equipped with back-vent pipes in order to eliminate dangers of siphonage. The cheap S trap without this back-venting will siphon out, that is, loose its water-seal by atmospheric pressure pushing the water out of the trap in its attempt to fill a vacuum created by the discharge from a water-closet on the floor above. By back-venting these traps, as shown in Figure II, this danger of siphonage is reduced, and, therefore, most codes have adopted this regulation requiring back-venting. But to-day the market offers certain traps which are claimed to be non-siphonable and which do not require this back-venting, with the consequent result of reducing the cost of the equipment. Most plumbing codes have not changed their old regulations, for many authorities do not yet believe in the possibility of a non-siphonable trap, and so require the use of the back-venting system. Consequently, wherever the small house is constructed within the jurisdiction of these laws, the plumbing will cost more than where the non-siphonable trap can be used without the elaborate system of back-venting.

Likewise, wherever there is a public sewer, the problem of sewage disposal is simple and cheap; but if the house is not located near any such public convenience, special methods must be designed for the destruction of the waste matter. The best type of such devices is the septic tank with the small subsurface irrigation tile, through which the partially purified material from the septic tank is distributed under the ground for complete purification by air and bacteria. The other method of disposal—pouring the sewage into a cesspool—is to be deplored, unless there is possibility of an early construction of a public sewer, and no drinking-water is secured from the premises.

The third consideration which affects the plumbing system of the small house is whether it can draw upon a public water-supply, or whether it must secure its private supply from a well or a near-by stream or lake. A private source of supply generally means the erection of a storage tank. The best type of tank for this purpose is the pneumatic tank, which is installed in the cellar, and not in the attic, as with the old-fashioned tank. The water is pumped into this tank, and the air which filled it is trapped by it, so that the more water that is pumped into the tank, the more compressed becomes the air. This cushion of air gives enough pressure to force the water to any fixture in the house.



Speed autowater system. Capacity, 180 gallons per hour for pressure of 43 pounds or elevation of 100 feet.

Simplest Type of Drainage System

In Figure I is represented the simplest type of drainage system that can be installed in the small house, but since it uses non-siphonable traps and no back-venting, it will not be possible to make use of it in all cities or towns which have plumbing rules prohibiting it. The average small house does not have room for more than one bath, a kitchen-sink, a set of laundry-tubs, and a toilet for the servant, generally placed in the cellar. For purposes of economy, it is essential to place all of these fixtures on the same main soil-line, which extends vertically from the house-drain in the cellar through the roof. If the bathroom is so located that the vertical line which serves its fixtures cannot serve the kitchen-sink or the laundry-tubs, then a special waste-line must be carried up and through the roof, which is extravagant of material. As this waste-line will be only 2 inches in diameter, it is necessary to increase its diameter to 4 inches before projecting it from the roof, since it may become clogged in the winter with frost. But the main soil-line is 4 inches in diameter and needs no increaser on it. The main-house drain is also made 4 inches in diameter, and is generally laid under the cellar floor with a pitch of ¼ inch to the foot. At the junction of the vertical soil-line with it, and also at any other point where there is a marked change in direction, the house-drain should be equipped with clean-out holes, covered with brass screw-caps. Just where the house-drain leaves the house a house-trap is installed, and back of this a fresh-air inlet to permit the circulation of air in the system. The foundations should be arched over the house-drain where it passes through them, so that any settlement of the masonry will not come upon the pipe and cause it to be broken.

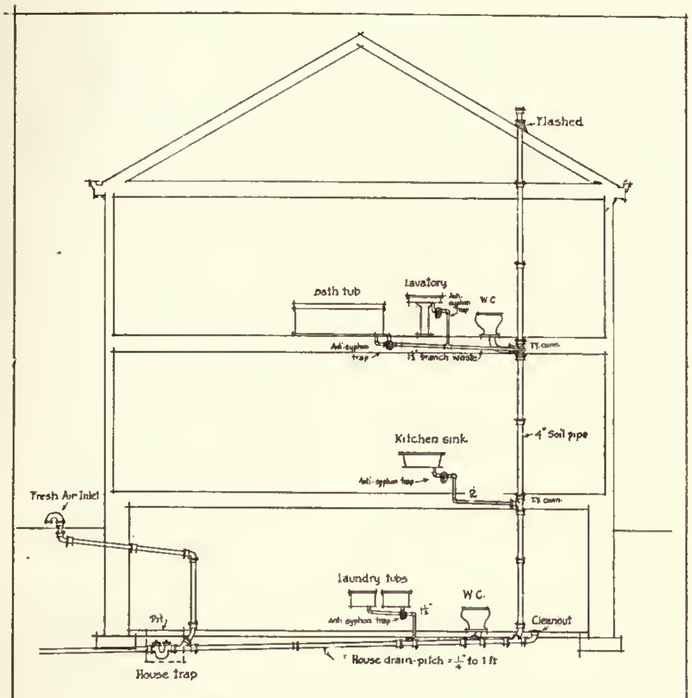


FIG1 -PLUMBING SYSTEM USING ANTI-SYPHON TRAPS-

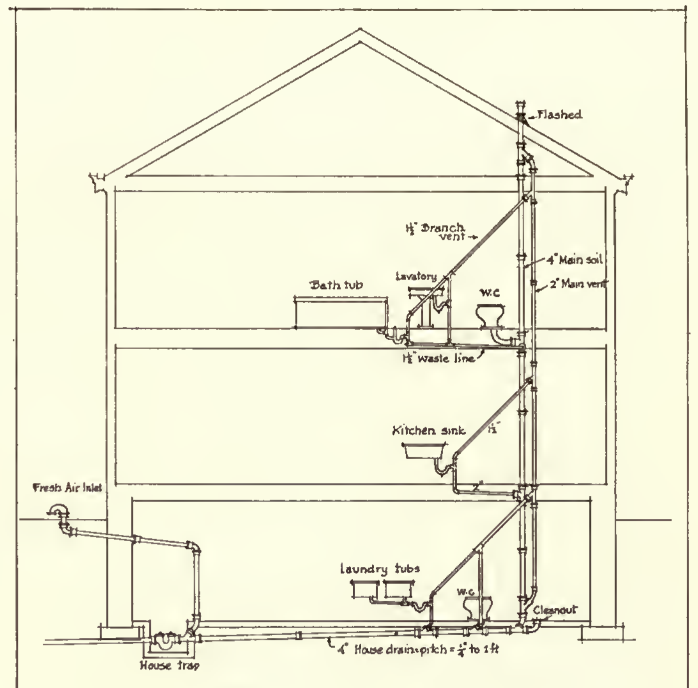


FIG.4 -PLUMBING SYSTEM USING BACK-VENTING

The material of which the house-drain, soil-line, and waste-line are made is usually cast iron, and of a grade known as extra heavy. The joints are the bell-and-spigot type, which are stuffed with oakum and then closed tight with 12 ounces of fine, soft pig lead for each inch in diameter of the pipe. Branches are usually of galvanized wrought iron or lead, but lead is limited in length and is not considered very good, although the term plumbing originated from the Latin word for lead. The common limitations upon the length of branches of lead pipe are: 8 feet for 1½-inch pipe, 5 feet for 2-inch pipe, 2 feet for 3-inch pipe, 2 feet for 4-inch pipe. The parts of the branch pipes which are visible are generally made of brass nickel-plated. The joints between lead pipe and lead pipe, and between lead pipe and brass pipe, are made by the common wiped joint. Joints between lead pipe and cast-iron pipe are made by first wiping the lead pipe to a brass ferrule and then stuffing and caulking this into the cast-iron pipe. The joints between wrought-iron pipes are made with the screw joint, and between wrought iron and cast iron with the screw joint, but inserting into the cast-iron pipe a section of malleable cast iron which has been threaded.

The usual sizes for branch wastes from the fixtures are as follows: for water-closets 4 inches, for bathroom-tubs 1½ inches, for lavatories 1½ inches, for kitchen-sinks 2 inches, for laundry-tubs 1½ inches, and when in sets of three 2 inches. The size of the waste from the bathroom-tub can be increased to 2 inches with great advantage, if the additional slight expense is not objectionable.

The vertical soil-lines should be supported at each floor by metal straps placed under the hub and fastened to the floor-joists. It is very important to properly flash the base of the projecting portion of the soil-line above the roof. Wherever the branch soil-line to the water-closet is connected, a short TY connection may be employed in order to avoid the projection of the parts of the pipe beyond the plane of the ceiling in the floor below. However, no short TY connections should be made in any horizontal pipes.

A very important economical consideration should be noted in laying out the arrangement of the bathroom fixtures in this connection. The horizontal branch soil-lines and waste-lines must be carried through the floor construction, and they should be so arranged that they can run parallel with the floor-joists; otherwise deep cuts will have to be made in them. In the case of the branch soil-line it is essential to place the water-closet as near to the main soil-

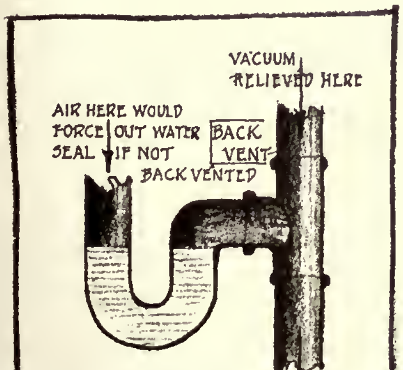
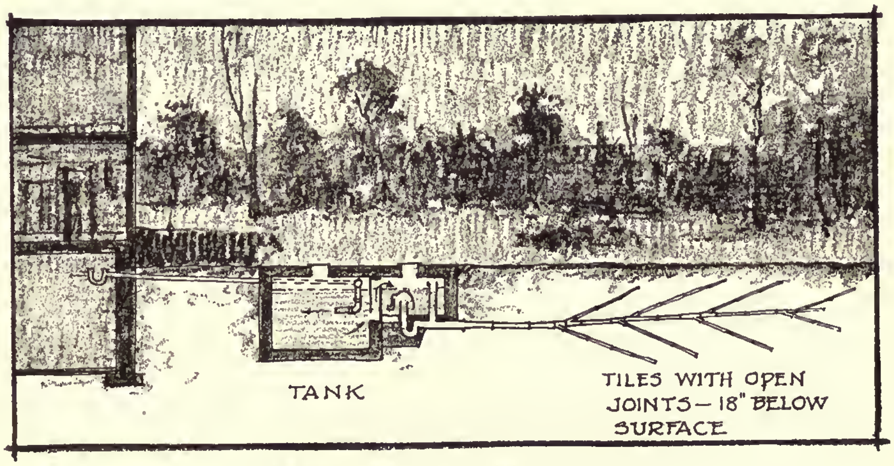


FIG. 2



— FIG. 3 - SMALL SEWAGE DISPOSAL PLANT —

stack as possible, for with a 4-inch pipe the joists must be framed around it rather than be cut, since so deep a gouge would weaken too much the strength of them. A similar consideration must be given to the framing in stud partitions which are bearing the loads of the floors above, for too deep cuts in them, to allow for the passage of pipes, will weaken them greatly. In this connection it ought to be noted that an ordinary 4-inch soil-pipe cannot be carried in a stud partition made with 2 x 4 studs, since the outer edges of the joints of the pipe will project beyond the face of the plaster, and for this reason some convenient place should be planned for them in closets, or 2 x 6 studs should be used in the partition through which they are run.

The More Complicated Back-Vent System

The essential parts of the plumbing system remain the same as described above, but each trap is considered to be siphonable, and must be prevented from loosing its water-seal by this action through the use of back-venting pipes. Whenever, then, there is an unusual amount of semivacuum created in the pipes by the discharge of some fixture above, the outside air-pressure can relieve it by passing through the back vents rather than by forcing out the water-seal in the traps. The usual type of trap employed is the modified S trap with the small TY connection to give what is known as continuous venting. Formerly the vent was taken off from the crown of the three-quarter-S trap, which applied the air too near the surface, causing excessive evaporation and, due to its position, danger of clogging, but with the continuous system of venting, the waste-pipe appears as a continuation of the vent-line, and the trap enters into its side through a TY fitting.

The size of traps should conform to the size of waste-pipes, and usually the size of the branch vents is about the same size as the waste-lines. However, there are special conditions where this varies. For venting the water-closet trap, it should be noted that the vent is not taken from the trap which is contained within the fixture itself, but is taken from the upper side of the bend (usually of lead) where the fixture is joined with the piping system, and is 2 inches in diameter.

Where there are two fixtures, such as the lavatory and the bathtub, with 1½-inch branch vents coming from the traps, these may be joined into one main branch vent, which need not be more than 1½ inches in diameter. The pitch of the branch vents entering into the main vent should be at an angle of about 45 degrees, so that all rust scale will drop down into the fixture outlet and be washed away.

The main vent, which runs parallel with the main soil-line, needs to be only 2 inches in diameter, and should be branched in at the bottom and the top to the main soil-line, as shown in the drawings. The material of which both main vent and branch vent is made should be galvanized-iron piping.

The fresh-air inlet, the house-trap, the clean-outs, and all other parts of the system are the same as was shown for the simpler method of plumbing.

Rain-Water Drainage

The small house need not drain off its roof-water into the plumbing system, if the plumbing code does not require it. The simplest and easiest method to dispose of it is to collect the water in gutters and lead it down the water-spouts into pipes which terminate in a dry well in the ground. Small roofs over porches and back doors need not even have the leaders, but spill the roof-water out onto the ground where a stone has been placed to prevent the undermining of the surface of the lawn by the wearing action of the water stream.

In outlying city districts where the sewers have not yet been installed it is customary to carry the roof-water in pipes below the level of the sidewalk to the gutters of the street, or to a leaching cesspool which is independent of the cesspool used for sewage disposal, and which is practically the same thing as a dry well, for the bottom is made with gravel through which the rain-water seaps off into the surrounding soil.

Wherever the rain-leaders must be connected to the drainage system of the house, the sheet-metal leaders are inserted into cast-iron pipes called shoes at the base, which in turn are trapped on the inside of the cellar wall and connected with the house-drain. It is always best to try to trap a group of leaders to one trap rather than use a separate trap for each leader.

Tests and Precautions

There is nothing very complicated in the plumbing system of the small house. Certain sanitary precautions should be observed in arranging lines, however. For example, the termination of the main soil-line should not occur near a dormer or other window, nor should the termination of the fresh-air inlet be located in the cellar wall under a door or window. The system when completed in the roughed-in form should be tested for leakage by filling it with water, and when all the fixtures are connected and every part of the system is supposed to be in working order, either the peppermint or the smoke test should be used to detect any further possible leakage. The peppermint test consists in pouring hot water and 2 ounces of oil of peppermint into the top of the system from the roof, after all the fixture traps have been filled with water, and then detecting with the nose where the leaks are. If the smoke test is employed, a smoke machine is best. Old oily rags and tar paper are burned in the machine, which has its flue connected with the fresh-air inlet, and the smoke is pumped through the system until it appears escaping from the soil-line extension on the roof. If there are any leaks, the odor and the smoke stain will attract attention to them, and if the water-closet traps in the bowls are defective, the yellow stain of the smoke will make it very evident.

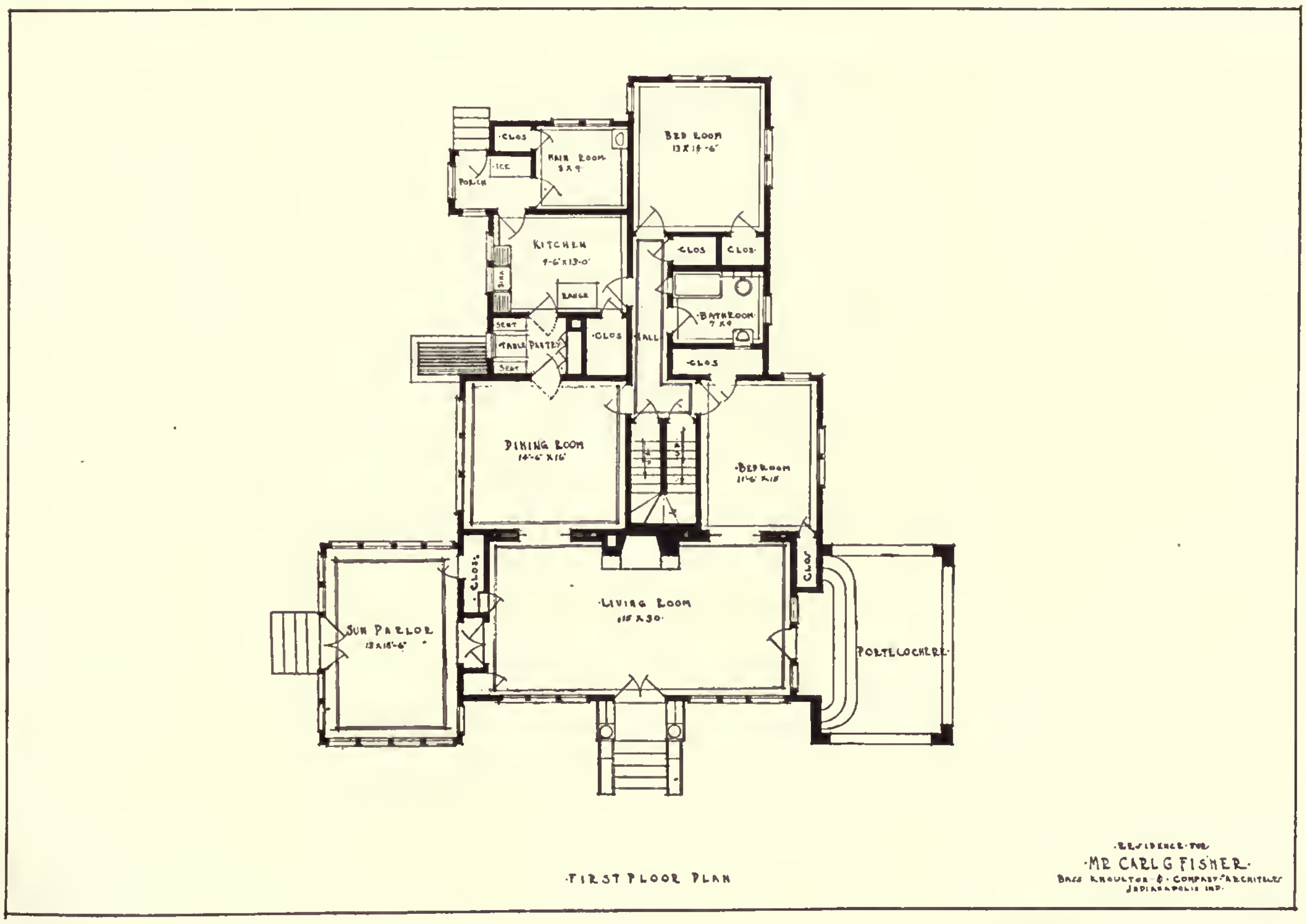
Refrigerator Connections

The drainage from the refrigerator should never be directly connected with the drainage system of the house. If the plumbing code requires any connection at all, the usual arrangement is to drip the ice-box water into a lead-lined tray which has a pipe at least 1¼ inches in diameter that carries the water down to the laundry-tubs in the cellar and spills it into them. On the other hand, if there are no plumbing regulations, it is best to drain this water off into a small hole in the ground into which has been thrown gravel, and this will permit the water to soak into the surrounding soil.

Water-Supply Pipes

If there is a city supply of water, the small house should have a main supply-line from the water-main in the street of at least ¾-inch diameter, but this does not give the service that a larger pipe, say a 1¼-inch pipe, does, for often with the smaller pipe, if the water is being drawn in the kitchen, none will be secured from the faucets in the second-floor bathroom. The kitchen-sink should have a service pipe of at least ¾ inch, the tubs the same, and the lavatory ½ inch.

(*Continued on page* 158.)



BUNGALOW, CARL G. FISHER, INDIANAPOLIS, IND. Bass Knowlton & Co., Architects.

(*Continued from page* 156.)

All service-lines should be compact and as direct as possible, and long horizontal runs under floors should be avoided. Hot-water supply-lines should be kept at least 6 inches from cold-water lines. There should be a shut-off at the entrance of the supply-line to the house, at the base of all vertical risers, and under each fixture. To avoid water hammer, it is best to take all faucets off the sides of the termination of pipes, rather than from the ends, for in this way an air-cushion can form, relieving the pounding action of the water in the pipes.

Supply-lines should never be run in the corners of buildings where they are in danger of freezing, and they should be kept out of the exterior walls of houses as much as possible for the same reasons. The packing of pipes where they pass through the floors will often prevent freezing caused by cold drafts around them.

Hot-Water Supply

It is generally accepted to-day that the most convenient method of securing hot water in the small house is with the instantaneous type of gas-heater, connected with a boiler for storage purposes, but capable of delivering water directly into the pipes without passage through the boiler, when a sudden demand is made upon it. These gas-heaters have a system of Bunsen burners which heat the water as it passes through a series of copper coils, and generally the water is warmed to a temperature of 100 degrees in one passage. They are automatically controlled, so that when the temperature of the water goes below a certain fixed standard the gas-burner is lighted by a small pilot-light until the proper temperature is reached, when it is shut off again.

Although these heaters are arranged to deliver hot water directly from the coils, yet if they had no boiler to store up the water, much larger heaters would be required than necessary. For storage purposes, then, a 40-gallon boiler is satisfactory for a residence with one bath and one kitchen, and if there are two baths a 50-gallon boiler is needed. The usual location of the boiler and heater is in the cellar.

However, where there is no gas to be used, the coal-heater must be employed—either the tank-heater or the water-back in the kitchen-range. The latter was the usual old-fashioned method of heating the water, and the boiler was located alongside of the kitchen-range. The size of the water-back was proportioned on the basis of 2 square inches of heating surface to each gallon storage capacity in the boiler. The tank-heater is a special coal-burning stove, designed for both serving as an iron-warmer and a water-heater, being usually placed in the laundry in the cellar. Another method of securing hot water, which is not recommended, is to place heating coils in the furnace. This obstructs the fire-pot, chills the fire, overheats the water in cold weather and underheats it in warm weather, and does not operate at all during the summer.

Fixtures

The modern bathroom fixture may be made of one of three materials: true porcelain, earthenware, or enamelled iron. The true porcelain fixtures are the heaviest, the most durable, and the most expensive. The material is non-absorbent and white in color, and the surface presents a gloss which is in reality a form of glass. When it is chipped, the fracture shows the material below as white, and a drop of ink will not be absorbed by it.

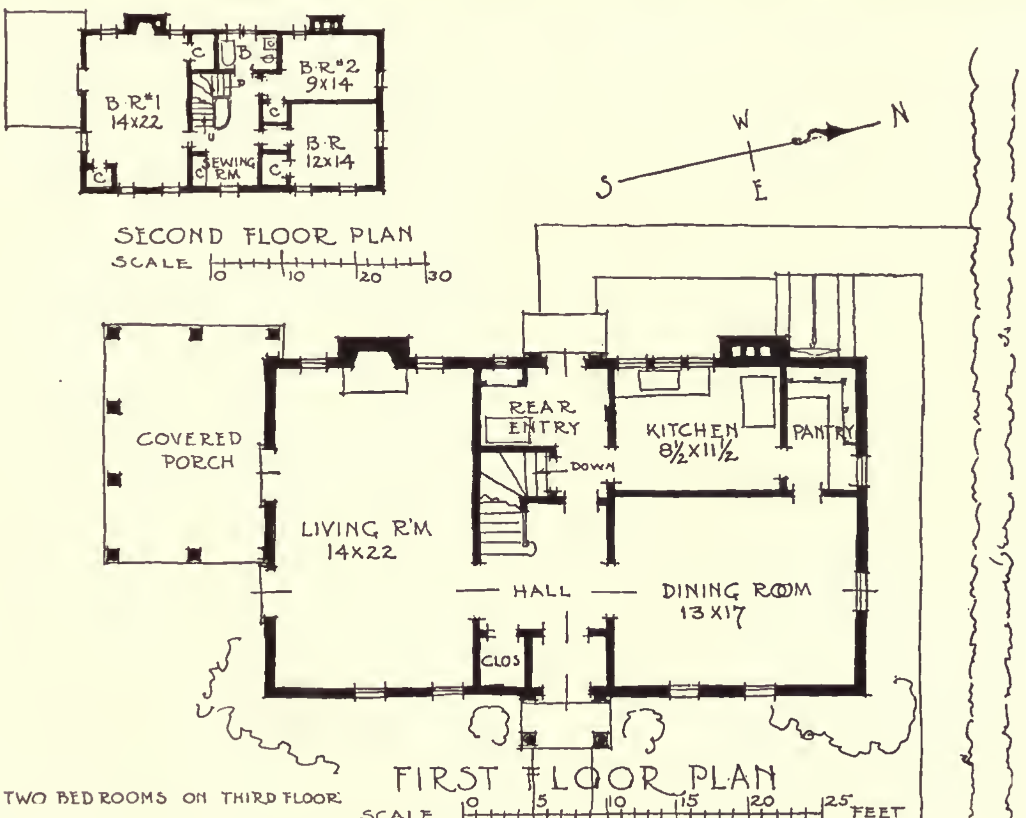
In imitation of the porcelain fixture are made earthenware ones, but which are in no way to be compared to the true porcelain, although a casual glance at them would lead one to think that they were porcelain fixtures. However, a chip from the surface will reveal the yellow and porous texture of the earthenware below the glazed surface. The glossy white surface in time stains and becomes covered with small hair-cracks, unlike the porcelain fixtures, and for this reason they are not as sanitary nor as durable. They are cheaper than the true porcelain fixtures, but this material should be avoided in water-closet bowls, but is admissible for use in tubs and lavatories.

Gas water-heater.

The enamelled-iron fixtures are considered by most to be superior to the earthenware fixtures, since they do not craze, are lighter, and generally more durable. The quality of this ware can be judged by the absence of roughness, blisters, bubbles, and spots, and freedom from hair-cracks and peeling. Bathtubs of the modern type made of enamelled iron have the rich appearance of porcelain fixtures, since the sides are also covered with enamel, unlike the old-fashioned types, which had the interiors lined with the enamel and the exteriors painted with white paint.

The mechanical operation of the various fixtures is so well standardized that not much choice is given between the catalogue of one firm and another. The best type of water-closets are the siphon, the siphon-jet, and the converging jets, the latter being a more modern development, which has eliminated the noise of the siphon action and yet which accomplishes a quick and rapid flushing action. The lavatories which are most commonly specified are of the pedestal type, although the modern tendency in sanitary bathroom design is to eliminate as far as possible all junction of fixtures with the floor, for it is here that dirt and stains develop. Such arrangements carried to the extreme would require a sun bathtub, a lavatory without legs, and special compartment for the water-closet, but this would be absurd for the small house. However, the built-in bathtub is far superior to the old-fashioned tub which stood upon legs, and under which all manner of dirt could collect.

We often hear the remark that no wonder the cost of living to-day is so much higher than it was with our ancestors, who knew nothing about the clean, tile-lined bathrooms with porcelain tubs, white and glistening lavatories with all the cold and hot water needed, while in the old days the wooden tub, set up in the kitchen near the range, was good enough for the Saturday-night bath, and the tin pan, filled under the hand-pump outside on the back porch, was good enough to wash the hands in each morning. But although the modern bathroom and the modern plumbing system is an economic burden to the small house, it is doubtful if we shall ever see the day when it is abolished in order to cut down on the cost.



HOUSE #7 FOR C·E TRENHOLM – STONE ESTATE
STANLEY B PARKER ARCHITECT BOSTON – (T 7)

A Housing Operation in Hartford, Connecticut

Zion Street tract. Developed by Hartford Home Building Association, Inc.

THROUGH the initiative of local manufacturers and business men working through the Hartford Chamber of Commerce there has been brought about the largest single home-building project that the city has ever known. Estimating the average family at five persons, the results attained in the construction of two hundred and one houses will accommodate about a thousand persons, and the success of this experiment will, doubtless, inspire the completion of the entire building programme, with further expansion as conditions necessitate.

Hartford's experience with the problem of an increasing population and a decreasing supply of rentable houses has been unique. In the first place, other cities turned their factories to war products that were more temporary than Hartford's. Few cities made their peace-time readjustment with the minimum of friction and delay that obtained there. There was no outpouring of workers when the war ended. There was no great strike to drive them away. The soldiers flowed back and the workers remained and they all clamored to be housed. The problem was acute.

During the winter of 1919–20 the Housing Committee of the Chamber of Commerce held frequent meetings and secured statistics of the building operations in progress during the preceding spring, summer, and fall. On the recommendation of the committee the directors formed a corporation known as the Hartford Home Building Association, Inc., and capitalized at $1,500,000, subscribed by one hundred and ten representative firms, including every branch of the city's business life. During this time building costs had risen far above 1914 figures. Land was purchased in different sections of the city, specifications issued, and contracts let.

The most advanced site is the one developed at the Zion Street tract. The bulk of houses built are six-room. They are built in pairs, separated by a brick fire-wall, independent flues, cellars concreted and subdrained, slate roofs and hardwood floors, high-grade plumbing and electric lighting, hot-air furnaces, set tubs in the basement, gas-range and hot-water heater in the kitchen, screens and shades complete. A few houses facing on Zion Street are brick veneer; the balance are either stucco, clapboards, or shingle finish.

Need of Better Lighting in Country Homes

THE New York State Health Department has found that while 21 per cent of country school children have defective vision, only 5 per cent of city school children are so afflicted. One might naturally expect the reverse to be true. The smoky atmosphere, the tall buildings, and the lack of sunlight in many interior rooms in cities often make artificial light necessary during many hours of the day. For all that, investigation has revealed the fact that city school children in general have stronger eyes than do those in the country, probably because of the superior lighting which city school children enjoy in their homes. But poor lighting conditions need not obtain for the rural family. Very good lighting can be secured from practically every kind of illuminant if proper attention is given to the subject. The result will be fewer headaches and stronger eyes.

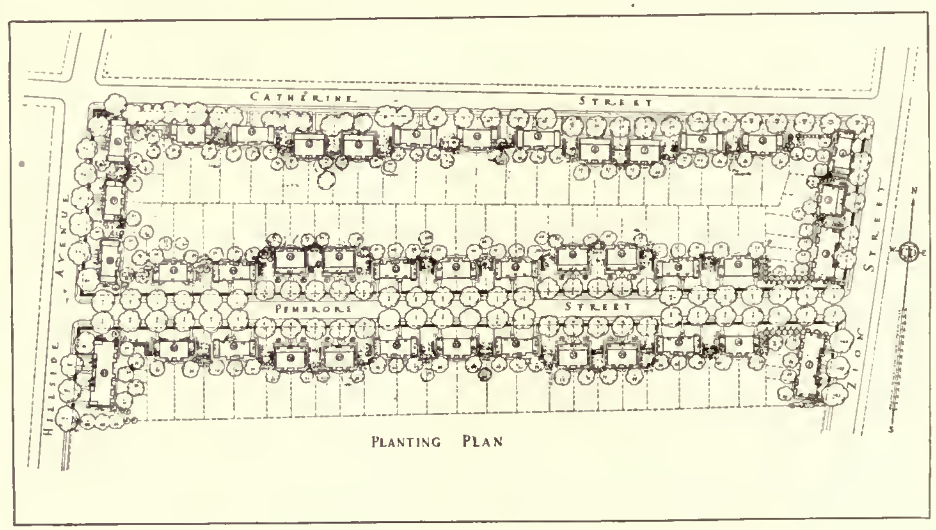
There is a growing realization of the fact that good illumination is as much a necessity as are pure water, fresh air, and proper sanitation, and that the effect of poor lighting, whether natural or artificial, reacts strongly on the health. Poor light makes for neglect of cleanliness, for what is not clearly seen will not be thoroughly cleansed. Poor light increases the strain from forms of work that tax the eyes and thus makes the work more difficult. Nor can we ignore the effect of nervous depression upon even normally healthy persons when working for long hours amid gloomy surroundings. They become morose and their health eventually suffers. In the treatment given in the best modern sanatoria great stress is laid upon the value of abundant sunlight.

The country home should be well lighted not only because light safeguards the eyes but because a well-lighted home is attractive and fosters a cheerful disposition. Proper attention paid to the lighting of a home may help solve the problem of keeping young men and women on the farm. Just as a moth is attracted by the light of a candle, so young people are drawn by good lighting. Abundant light in their own homes where they may read in comfort, or play games, will contribute largely to their staying at home evenings. The depressing atmosphere of many a dimly lighted country home has no doubt been a substantial factor in driving its young people to seek residence in the brightly lighted towns and cities.

HOUSE No. 1. FIVE-FAMILY GROUP.

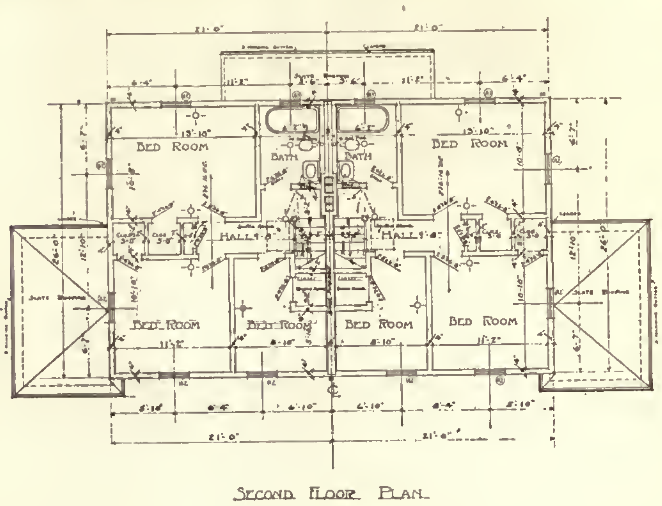
HOUSE No. 2. FOUR-FAMILY GROUP.

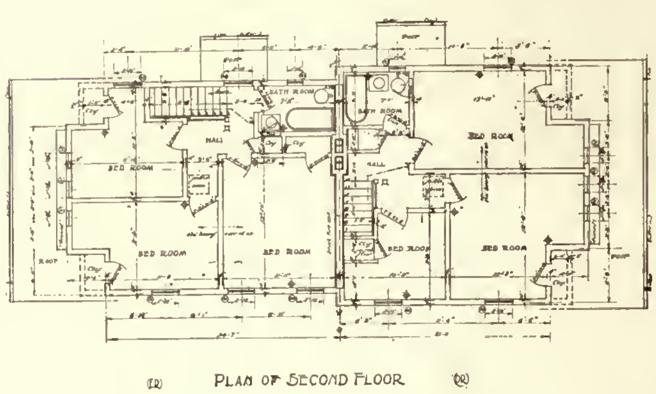
HOUSE No. 3. TWO-FAMILY GROUP.

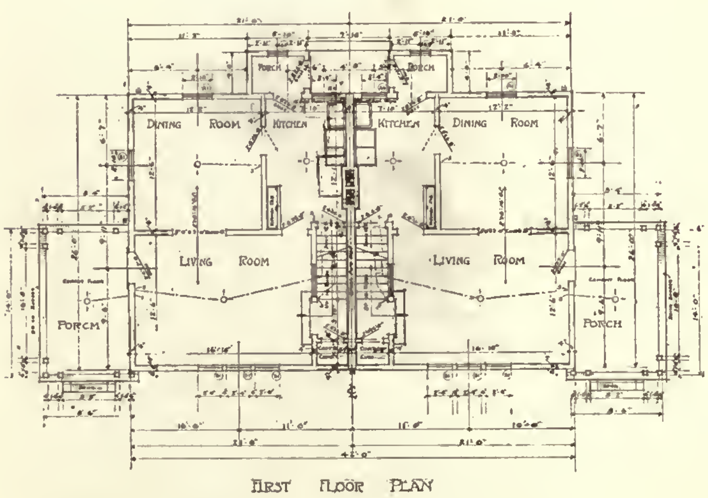


D. S. Douglass, Architect.

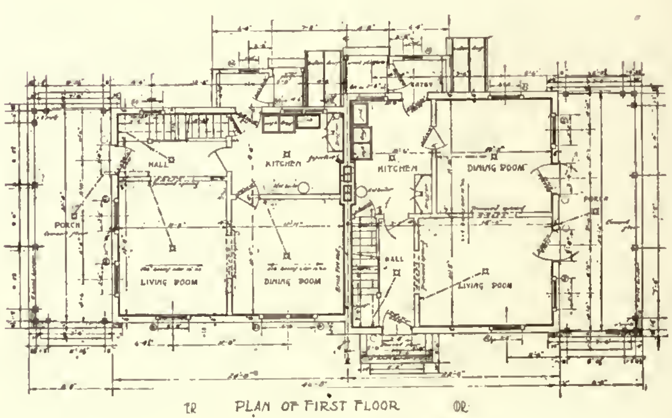
ZION STREET TRACT, HARTFORD HOME BUILDING ASSOCIATION, HARTFORD, CONN.







PLAN, TYPE H-HR.



PLAN, TYPE DR-ER.

TWO-FAMILY GROUP

ZION STREET TRACT, HARTFORD HOME BUILDING ASSOCIATION, HARTFORD, CONN.

D. S. Douglass, Architect

TYPES OF TWO-FAMILY GROUP. ZION STREET TRACT, HARTFORD HOME BUILDING ASSOCIATION, HARTFORD, CONN.

D. S. Douglass, Architect.

The Corinthian Order

By Egerton Swartwout

IN making the model the modeller should turn the outline of the leaves with a revolving template; it is useless to turn the bell and apply the leaves to it. As I have said, the bell exists only in principle; it is the outline of the leaves that counts. I have already explained the principle governing the detail of the leaves; if that principle is followed the detail can be what you like, but generally the stiff, formal, regular leaf looks better than the freely modelled one. The principal thing is the shape and outline and the lip at the top. This last is very important; if it is too large and fat it becomes entirely too prominent and cuts up the cap badly in the sunlight. Of course on the scale model all the detail of the leaves need not be shown, but the shape and outline and the size of lip should be carefully studied; the volutes and the abacus should be carefully modelled and their projection altered until the outline is exactly right. It is extremely important that there should be no confusion on the finished model; every detail should play its rational part, so that the cap can be easily read at a distance. If it can be, it is a good cap, no matter what the detail is, provided the outline is good; but if it is confused and shapeless, it is a failure, no matter how beautiful may be the detail. I venture to say that for one good cap there are one hundred poor ones. Nor can it be taken for granted that all the classic examples are good. Their average was undoubtedly higher than ours because they gave more attention to detail than we do; but there were some that must have been badly confused, if we can judge from the restorations. In their present state, unless, indeed, they are too badly mutilated, they probably look better than they did when they were completed. This is a point which I will take up later in connection with the entablature.

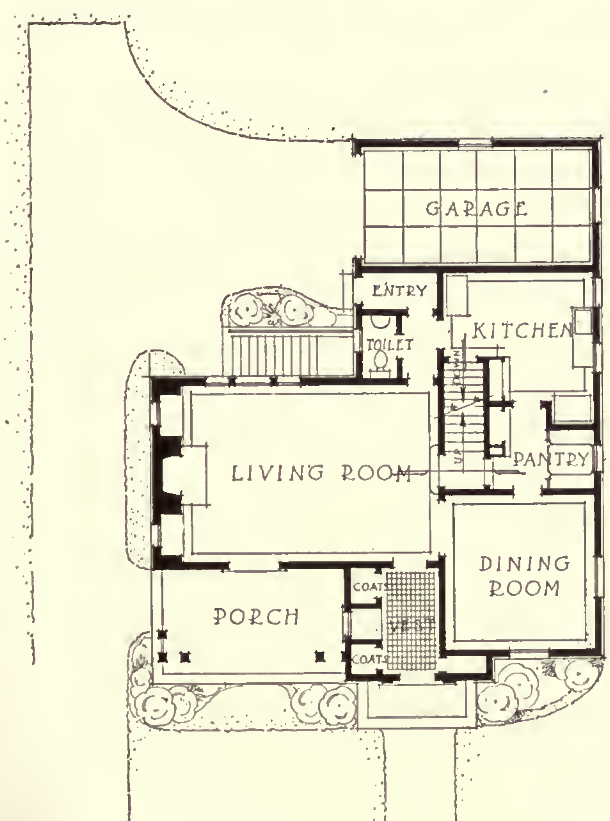
Reverting to the model of the cap: The use of the large-scale model is then to study the outline of the cap and the relative size and importance of the details with a completeness that is impossible in a fragmentary portion of a large cap. I need not add in this connection that the scale model must be a complete cap finished on all sides, or at least on three sides. This scale model, accurately cast, with an exact axis through it, forms the basis of the large full-size model. If it is, say, at ¼ full size it may not be necessary to make a complete full-size model if the work is to be carved by competent men. (It is presupposed that the final form of the cap is in stone, but naturally the same principles will apply to any material with proper regard, of course, to its limitations.) Fragmentary models could be made of the various parts, taking the size and projections, with Chinese fidelity from the small model. In fact, in whatever form the full-size model is made, it must be merely an enlargement of the scale model. It would be, in my opinion, much easier for the carvers to work from the small model than from the large one, particularly if one was a multiple of the other. The small model would not warp, and the measurements could be determined more accurately, and the fragmentary models could be used for the detail. I must admit here that I have never tried this method, that is to say, I have always made complete full-size models in addition to the scale models, but I have had so much trouble with measurements from large models that I feel this scheme is the better of the two.

One word more in regard to the leaves: It should be borne in mind that the leaves should always echo the form of the cap, whether it is a column or a pilaster. The large leaf at the corner of a pilaster, for instance, is naturally bent at right angles up as far as the lip. Now it is evident that the lip cannot be bent at right angles, nor at the same time should it be on a 45-degree line to the front and sides of the pilaster. I am now speaking of the line of the face of the lip. I have noticed an example lately where this was done to a very pronounced degree, and the effect was very bad. The lip of the corner leaf and of the leaf above it under the volute were very prominent—too prominent entirely to my way of thinking—and the 45-degree line formed by these lips was very disturbing. The leaf under the volute can be divided; in fact, it usually is so treated, and half could come under each side of the volute; but the lip of the corner leaf below has to be humored, and more nearly bent at right angles than on the 45-degree line.

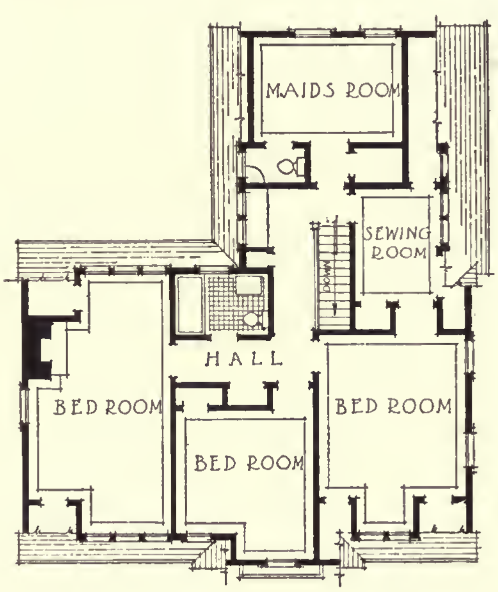
The entablature of the Corinthian order differs chiefly from that of the other orders in that the cornice is greatly increased in importance; in fact, the cornice is as much the most important feature in the Corinthian as the frieze is in the Doric and Ionic. In their endeavor to make the cornice the real crowning feature, it is probable the Romans went too far; the cornice is a wonderful conception, but the projection is excessive, generally, when seen across the corner. It is apt to detach itself a little from the frieze and architrave below it. This excessive projection is particularly noticeable on a pediment; the fact that the corona does not carry across the pediment but is used only on the rake seems to accent the projection. Few if any of the classic works are in a sufficiently preserved state to show this, but it is noticeable in the restorations, and is particularly evident in actual construction. I have noticed it often, and especially in one instance in which I know the classic example was accurately followed.

These classic examples are, of course, of infinite variety and of greatly varying proportions. The Roman architect allowed himself much more freedom than did the Greek. The general proportion of entablature to column remains quite constant, but the relation of the various parts of the entablature to each other is alike in no two cases, nor is the proportion of the brackets and dentils at all standardized. "Unfettered by the restrictions which the triglyphs placed upon the Greek architect, his Roman brother gave free rein to his fancy, and the abundance of slave labor made possible a wealth of detail that was denied to his less-powerful and less-opulent neighbor." This exuberance of detail has been the subject of much criticism by those writers who hold Greek as the only true classic architecture, and can see no good in any Roman work. It is perfectly true that compared to the Greek Doric the Corinthian seems unduly elaborate, but it is also true that the order as a whole is wonderfully harmonious, and that the wealth of detail of the entablature is the natural result of the elaboration of the cap. Just as the carved anthemia in the necking of the Erechtheion cap established the scale of the entire order, so the detail and scale of the Corinthian cap establish the scale and the amount of detail in the entablature. Here

(Continued on page 166.)



· FIRST · FLOOR · PLAN ·



· SECOND · FLOOR · PLAN ·

HOUSE FOR IRVIN HOME DEVELOPMENT CO., AKRON, OHIO.

Albert Houghton Good, Architect.

(*Continued from page* 164.)

again is a perfectly self-evident principle, so evident that it seems as if no one could possibly ignore it, and yet there are to be seen everywhere elaborately carved Corinthian caps upon plain shafts and surmounted by simple moulded entablatures. It is done so often that one almost loses sight of the incongruity of it. A Corinthian cap fully detailed calls for a shaft either fluted or in some material more elaborate than the rest of the order—highly veined marble or granite that by its richness or figuring will be in scale with the cap—and it also calls for an elaborately detailed entablature. I don't mean that it is always necessary to adhere to the modillions and dentils of Vignola; an entablature can be very elaborate and in perfect harmony with a Corinthian cap without either of them; the examples left by the Romans show us that, but if the order is to be used at all it must be used in a logical and harmonious manner.

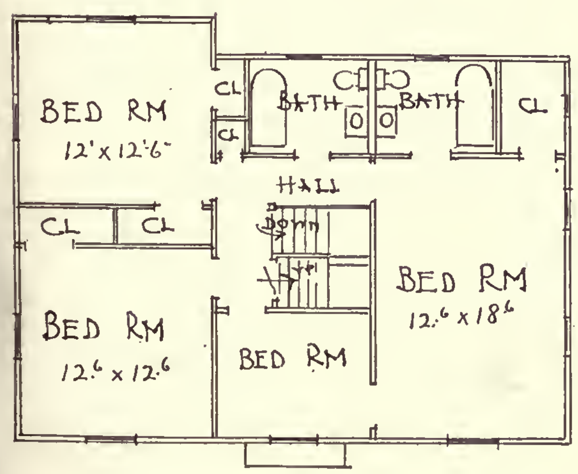
And in this connection it is a curious fact which, so far as I know, has never been commented on, if indeed it has even been noticed, that many, if not all, of the Corinthian entablatures of the classic period are not in scale with themselves; that is to say, the dentils and modillions are really at a much larger scale than the rest of the ornament, except perhaps the ornament in the frieze. This statement may seem revolutionary, but I am sure it's true. I first noticed it some years ago when I was executing a large Corinthian order which I took straight from one of the most celebrated Roman orders. I had quite a time with that order. It was a portico in stone and at a very large scale. Following the advice of various critics and against my own better judgment, I gradually increased the diameter of the columns on the drawing until they were about 9 diameters high—even then I was told they were too weak, but I had them modelled that way at one-quarter full size. They did not look very well in the model, but I thought it was because of the unusual size; they looked like and were about the size of porch columns on a country house, and it was not until some months later I came to the conclusion the proportion was all wrong. By that time I could not experiment any longer, so I resolved to take the order of Jupiter Stator as straight as I could, being influenced not only by my admiration for it but also by the fact that the height of my columns was within an inch or two of the actual height of the classic example. Of course no two books of reference agreed on the exact proportions, although the variance was slight, but I took the mean of all the plates and followed the original as closely as could be done. The detail was very carefully studied from the plates and from the photographs. In the modelling-shop the scale of the detail seemed enormous. Some very interesting comments were made on it by other architects who visited the shop and the consensus of these comments was that the detail was brutal in the extreme, and I was solemnly warned to reduce the scale of it. I was tempted to myself, but I didn't. I stuck as closely as I could to the original, and when the stone was carved and in place you could hardly see the detail at all; although the undercutting was deep, the surface seemed merely scratched, and it was not until the dust had settled on the carving for a year or more that the detail could be actually distinguished. The whole thing bothered me a lot. It was evident, of course, that the scale of the detail was too small, or perhaps I should say the detail was too close; it really amounts to the same thing, and yet it was practically a reproduction of a celebrated Roman example, scale and all.

I was in the Metropolitan Museum one day, and in the architectural section I was attracted by the large casts of Roman entablatures that hang upon the wall and which are in duplicate, one cast showing the entablature as it exists now, and an adjoining cast showing the same thing restored. There could be no question of the accurateness of the restoration; the original was in a sufficient state of completeness to show exactly how the detail was expressed; the casts were colored alike, so it was a very fair representation of how the entablature looked when first erected and how it looks now. It was most astonishing. I had seen the casts often, but never thought of comparing them critically from the standpoint of design. There was no comparison. The thing as it exists now, weather-worn and broken, was infinitely superior to its original state. At first I discounted that somewhat, as it is usually the case that age gives a certain charm to any piece of sculpture or architecture, but in this case I was not looking at the original but at plaster-casts, and the more I analyzed it the more I became convinced that the reason the old cast looked better was because it *was* better; there was a unity, a harmony, about it that was entirely lacking in the new. I became determined it was chiefly a matter of scale. In the first place, what gave the scale or set the pace, as it were, to the entablature? Why, the modillions and the dentils, of course. You can cover a modillion with the most delicate ornament, but you can't change the scale of it in its relation to the entablature when seen in its proper location. It projects two feet and a half and is a foot wide, say, and when you see a row of them in the entablature they all stick out two feet and a half and are a foot wide, and no amount of detail can change that, and seen in the sunlight the front of each modillion counts white against a dark space somewhat broader, and the little leaves and things on it don't count at all, except to give texture and a certain play of light in places. Beneath these modillions are the dentils—again an alternate white and dark treatment—and these dentils by their simplicity and regularity count fully as powerfully as the modillions, and they both count well with the great simple shadows on the cap. But the detail on the mouldings is quite different. In the restoration the eggs and darts between the modillions and the dentil course, although large and deeply undercut, are so close to the sheaths and to each other that seen from below there are no pronounced blacks or whites; the mould is a dull gray. On the cast as unrestored, however, the sheaths have in many places dropped off the eggs entirely, or have been so broken that the eggs count almost as strongly as do the dentils, and the similarity of scale is restored. The same thing is true of the other mouldings; fragments have been broken off here and there, and the detail, though increased in scale, takes on a sparkling, lace-like effect, a very rich effect, infinitely superior to the original state.

What, then, is the remedy for new work? Will we have to wait a dozen centuries or so for time to come to our aid, or will we put a large hammer in the hands of some earnest soul and let him go to it? Neither, I hope. We will have to simplify the detail, widen it, get more effect of light and shade, and wherever possible lose the absolute regularity of it. This latter is important. The modillions and the dentils are regularly spaced or approximately so, and if the ornament on the mouldings is opened up so that the repeat counts strongly, there would be a series of horizontal rows of ornament, all with a definite repeat. This would be most unfortunate; it would be worse than the Roman treatment. I think the detail could be handled in the model so various irregularities could occur occasionally, or the detail could be studied in a series of irregular shadows that would be large in effect but would be without the mechanical repeat.

(*Continued on page* 168.)

GAY AND PROCTOR-ARCHITECTS-BOSTON-MASS.



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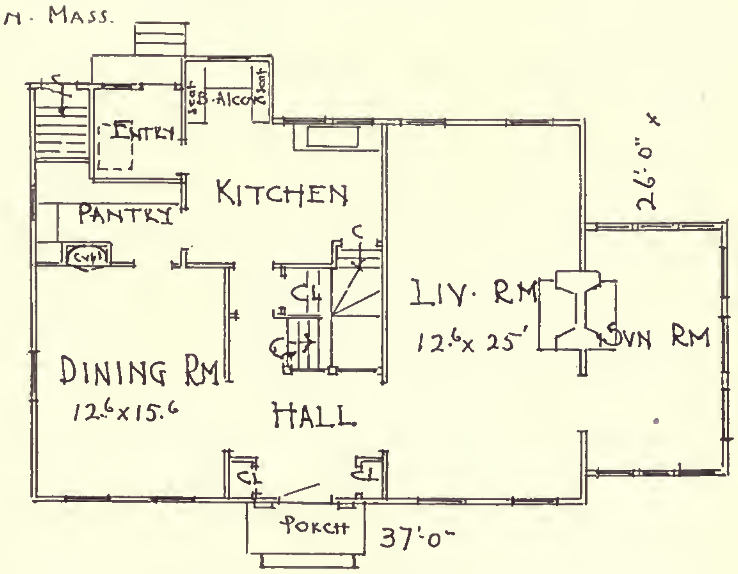


· FIRST · FLOOR

E. B. GRABOW, WINCHESTER, MASS.

(*Continued from page 166.*)

This is difficult, I know, but it can be done. Of course it should be understood I am speaking entirely of monumental orders at a large scale. On a small order, that is to say below 30 feet in height, the detail is so near the eye, and the modillions and dentils are so small actually, that the difference in scale is not so noticeable.

In previous articles I have spoken of the relation of architrave and frieze faces, and of their relation to the pilaster or other support below, and also have gone into the treatment of frieze ornament on the corners. All these points and principles apply equally to the Corinthian order; perhaps I should say they apply particularly to the Corinthian order because the cornice is so large and of such great projection that the greatest care has to be taken to retain in the entablature the conformity to the line of support, which is absolutely necessary to its continuity. A very common fault in the Corinthian entablature is a break in the outline at the intersection of the cornice and frieze; the cornice sometimes does not seem part of the entablature; the transition is too abrupt. This is particularly the case if the frieze is unornamented. It often helps this condition to tilt the frieze forward slightly, not so it is noticeable, of course, and it also helps to have a rather considerable bed-mould under the dentil course. This feeling of detachment of the cornice from a plain surface below was noticed by the Romans, for in some cases in which a cornice resembling a small Corinthian cornice is used as an impost there is placed beneath it a small frieze with a roll-mould below, which it serves as a starter for the cornice and connects it with the plain surface of the impost.

There is one point in connection with the corona which deserves attention. If the corona is ornamented, it is absolutely important that the ornament lose its projection as it nears the lip of the mould. In other words, the line of the fillet at the top of the corona must not be broken by any projecting ornament directly below it. This mistake is common. In many cases the corona is ornamented with a leaf motive, and the tip of the leaf curls over in a sort of lip. This forms a succession of little projections which catch the sunlight, and gives a most unpleasant and irregular line to the top of the cornice.

THE END

Should Architects Advertise?

By Gerald Starkey Glenn

UNTIL comparatively recently it was contrary to the code of ethics of the American Institute of Architects for its members to advertise, the idea being that the buildings themselves were the architect's means of becoming known and of gaining prestige. It was thought that the architect who advertised placed himself on a par with the medical quack as compared with the physician, who does not advertise. Under certain conditions the above argument might hold, but it must be understood that there is advertising and advertising, just as there is "archeetecture" and architecture.

It is the function of advertising to educate, to enlighten, to promote true progress. No human achievement great or small is carried forward into successful execution without some form of advertising. Paul Revere, as he dashed on his midnight errand warning the inhabitants of the coming of the "Red Coats," was advertising. Every time two persons converse or correspond, some fact or thing is advertised. Such advertising, however, is disorganized and inefficient.

There is an idea with many that to advertise means to employ "scare-heads" and exaggerated and distorted facts in the hope of inveigling people into buying. There was a time, not many years ago, when such methods were rather prevalent, but within the last decade or so advertising has made long strides toward serving just and truthful ends in frankly promoting legitimate business. There are to-day strong influences being brought to bear for truth in advertising by the more important advertising organizations and by the reputable magazines and newspapers. *Printers' Ink*, the leading advertising magazine, has waged a strong campaign for truth in advertising.

The point that decides as to whether architects should or should not advertise may be brought out by frankly answering this question: Can architects best serve the interests of the community by advertising or by not doing so? It should be the answer to this question, rather than an artificial code of ethics based on false premises, that should decide the matter.

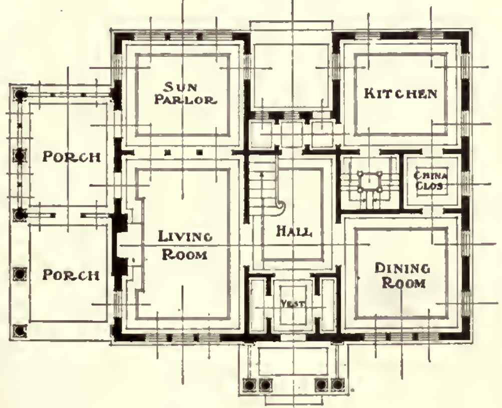
True ethics in the profession is vital to its proper growth and conduct, and there are many times when professional ethics should be more strictly observed than is the case; ethics that are based on a sense of justice and *esprit de corps*. There are men in the profession, members of the institute, who do not hesitate to win a client away from a fellow practitioner by belittling him, and yet these same men hold up their hands in horror at the mere suggestion that they should "be so unethical" as to advertise. It is only right to observe punctiliously the true rules of fair play, to be gentlemen through and through, but we must be manly men and not affected posers. It is very easy, especially for a temperamental character—and architects to succeed must possess temperament—to become affected, egotistical, and Bohemian; and it is this faction that most vehemently expresses disdain for advertising. It is becoming ever more clearly recognized that an architect must be not only an artist and constructionist but also a sound business man.

The principal function of advertising is to bring together those who have goods or services to sell and those who are in need of them; to inform the latter as to the benefits to be derived from such goods or services and to thus create a desire for them; in brief, to sell goods. If the goods or services have merit it is a distinct benefit to the public to advertise them. It may therefore readily be seen that true advertising, far from being in any sense unethical, is a manifestation of charity, or true ethics, in that it is performing a service no less beneficial to the public than it is to the advertiser.

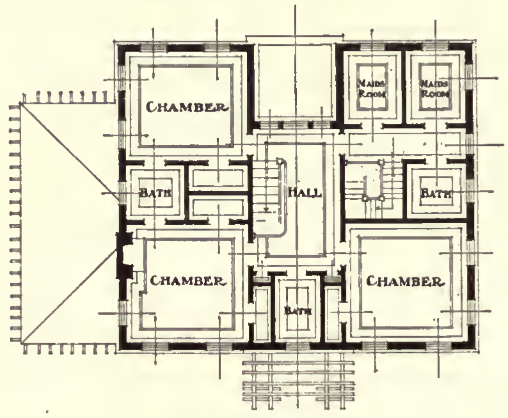
It is a well-known fact—painfully well known to the architectural profession—that architecture is little understood, and therefore does not get proper recognition. It is con-

(*Continued on page 170.*)

HOUSE AT DEDHAM, MASS
FOR W. H GRAY JR
JAMES PURDON ARCHITECT BOSTON



FIRST FLOOR PLAN



SECOND FLOOR PLAN

(*Continued from page* 168.)

sidered to be, by the larger part of the general public, a luxury; very pretty and desirable for the wealthy, but easily dispensed with unless one is rich. The function of the architect is supposed to be to make buildings beautiful, and nothing more. He is supposed to be extravagant and impractical. It is little wonder then, with such prevalent misconceptions, that there are many buildings on which no architect is employed.

How are people to be made to appreciate the value of good architectural services? How are they to learn to realize the great educational value of genuinely beautiful and conveniently planned buildings and homes, especially upon the minds of the young? How are people to learn that the services of a competent architect insure a more durable, more efficiently planned building, and is not an added expense, but the means of keeping the cost of the building down by making every dollar spent bring one hundred cents' worth of building, and thus saving the amount of his fee many times over?

A number of years ago the American Institute of Architects appointed an educational committee to overcome these misconceptions and to educate the public to a true appreciation of architecture and the services performed, but how could a committee which did not believe in advertising hope to accomplish the desired ends? Articles were written on the subject, but, for the most part, they appeared in the technical architectural magazines. The youngest man in the advertising profession could have told them that to reach their public they must use the papers and magazines that that public sees. Had properly written advertisements, by men who understood both architecture and advertising, been run in the general magazines, as well as in the architectural magazines, in the daily newspapers, yes, and even on street-car cards and outdoor signs, a great deal of good would have been accomplished. Everybody would, in time, learn to appreciate the architect and his services.

Education in architecture, as in many other matters, is a slow growth. It is impossible for the average man who grows to middle life in ignorance of its meaning to, when he contemplates building, be educated to its meaning in a few weeks; even if he happens to come into contact with a good architect. The general public must have it properly, and continuously, brought to their attention in order that its fundamental principles are as well implanted in the public mind as is a knowledge of foods, phonographs, and automobiles. Advertising has brought about a generally prevailing correct idea as to the good points and desirability of these and many other products and services, such as those of the engineer, the builder, building materials, and so forth, and has thereby benefited mankind. The fact that builders and engineers advertise, while architects do not, is largely responsible for the frequent elimination of the latter and the usurping of his functions by the former two.

The American Institute of Architects has now declared that it is permissible for its members to advertise, but the majority, not sufficiently understanding good modern advertising practice, are slow to make use of it, so firmly has the old notion been implanted.

The function of advertising is to sell goods. This may sound unpoetical as applied to architecture, but architecture is a business as well as an art, and if the business got better attention the fine arts side would profit immensely. In order to sell goods, the advertising must be sympathetic to and in harmony with the goods advertised. Advertisements of an architect's services must be refined, artistic, and dignified as to language, typography, layout, and illustration. If the advertisement possesses these characteristics they enhance and ennoble his profession, are the means of providing more people with really worth-while buildings and at less expense, and brings richer rewards to the architect.

Architects can ill afford to continue to be as aloof and exclusive in their attitude to the general public as they have been in the past. Such an opinion has lately been expressed by a number of the leading men in the profession. An architect certainly has no right to refuse to avail himself of legitimate means of publicity, and then complain because the public do not flock to his studio, nor pay him a fair fee.

Architects owe it to themselves, to their profession, and to the public to advertise.

The American Federation of Arts

ART as an active force in American progress will be the key-note of the Twelfth Annual Convention to be held in the Corcoran Gallery of Art, Washington, D. C., in May, by The American Federation of Arts, a national organization for the advancement of art in America, consisting of two hundred and sixty-three chapters in forty States of the Union and with offices in New York and Washington, as well as centres in California and Nebraska.

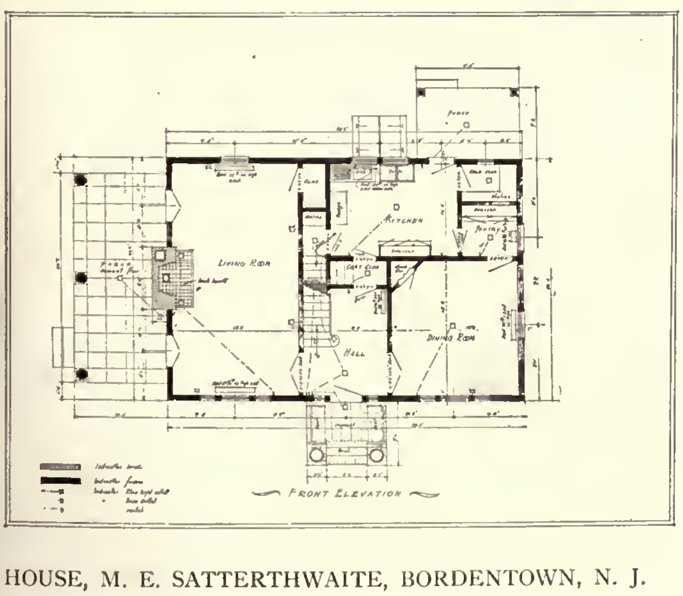
Special sessions will be devoted to Art and the People, Art Education, Art Museums, Professional Art Problems, and The Artist's Point of View.

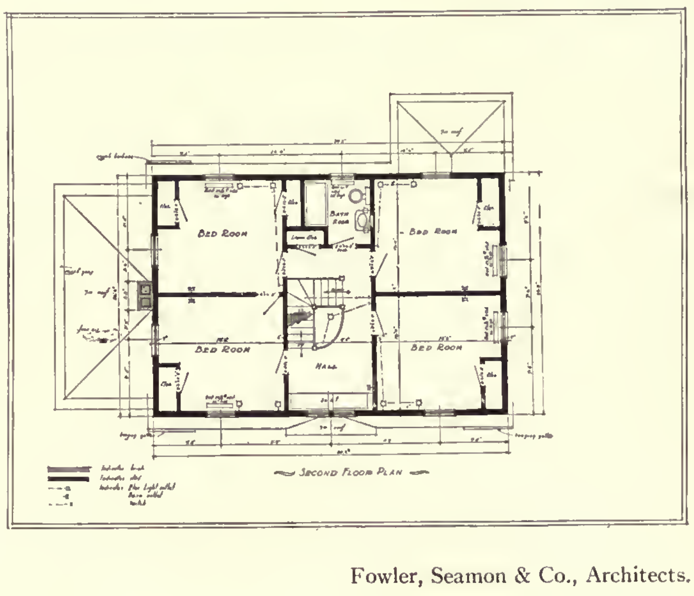
Under Art and the People there will be a demonstration by Ross Crane of The Better Homes Institute, which is operated by The Art Institute of Chicago, and addresses on "Art in State Fairs," by L. M. Churbuck, director of the Art Department of the Massachusetts State Fair; "Art in the Public Library," by Miss Mary Powell, of the Art Department of the St. Louis Public Library; "Art in the Schools," by Allen Eaton, of the Sage Foundation, and on "The Alliance of the Arts," by John F. Braun, president of the Philadelphia Art Alliance.

Various speakers will discuss "The Artist's Point of View," among them Herbert Adams, sculptor and trustee of the Metropolitan Museum of Art; J. Monroe Hewlett, architect and scenic artist, late president of the Architectural League of New York; George Harding, illustrator and official war artist of the United States on the West Front in 1918; John Taylor Arms, etcher, of New York City, and Albert Kelsey, Philadelphia architect.

Various matters of vital interest as professional difficulties will be discussed, among them the copyright law as related to art, art writing in books and magazines, and promotion of sales of works by American artists.

A special exhibition will be opened at the Corcoran Gallery consisting of examples of British craftsmanship of the present day, a collection brought to America through the efforts of the Detroit Society of Arts and Crafts, and the delegates will inspect the Whistler Collection at the Library of Congress, assembled and presented to the nation by Mr. and Mrs. Joseph Pennell, etchers and writers on art.





HOUSE, M. E. SATTERTHWAITE, BORDENTOWN, N. J.

Fowler, Seamon & Co., Architects.

Announcements, Etc.

Why Many Architects Are Prematurely Gray

By McCready Huston

MRS. T. WADLEIGH GREEN, wife of the client, determined to be considered: She owns a spinning-wheel and a genuine Windsor chair, inherited from her Aunt Maria; therefore, she wants to build an American Colonial house around them. Although the lot is only thirty-eight feet wide, she cannot understand what the architect says about the impossibility of using a long axis toward the street.

T. Wadleigh Green, client: He wants a brick house like one he saw from an automobile while driving around Los Angeles. He has drawn a picture of it from memory to give the architect an idea. He does not object if some of Mrs. Green's Colonial designs are embodied with his.

Mrs. Green's mother: She makes her home with her daughter and has in mind her own house, built during the Greek classic revival. Has not interfered yet but thinks the architect is an impractical fellow. "What you need is a good building contractor with some sensible ideas of his own," she has been saying.

Mrs. Green's daughter: Wants an English-cottage style and a flower-garden where she can give her callers tea. She has done some figuring, but after allowing for the cottage and garage, has been able to find only fifty square feet for her garden.

Mrs. Green's friends: They bring in magazines showing "cute" houses on the bungalow order that are just "too dear for anything."

We are in receipt of the "Year-Book of the New Society of Architects, 1920–21." It is a book of great value to every practising architect, containing information of a practical kind upon such matters as the "Registration of Architects in the State of New York," "The City Building Code," "Plumbing Rules," "Mailing-Chute Regulations," "Building Zone Resolution," "The Tenement-House Law." It affords a very complete reference for the various details of up-to-date city building.

Every architect will welcome a copy of the handsome catalogue of the "Architectural Interior and Exterior Woodwork Standardized" published by the Curtis Companies, Clinton, Iowa. And we are sure that they will be pleased to receive the attractively illustrated pamphlets "Restful Rooms" and "The Center of Your World." All of these are admirable examples of good taste in advertising.

The catalogue of the American Ventilating Company, Pittsburgh, American-Larsen Suction-Ventilators, contains specific information regarding the special value and usefulness of these ventilators.

The Arden Gallery, 599 Fifth Avenue.—Mrs. John W. Alexander and Mrs. James C. Rogerson have had a gratifying attendance at their recent interesting exhibitions.

Clients of Mr. Reginald Johnson, the well-known California architect, whose office is in Pasadena, have no difficulty in understanding the plans that he submits. Instead of showing them merely a prospective drawing, Mr. Johnson submits a clay model of the proposed home as it will appear in its landscape environment.

Frank H. Day and Harry E. Bolton announce the opening of an office for the practice of architecture at 24 North Main Street, Gloversville, N. Y. Catalogues and samples are requested.

Technical Pamphlet No. 8, from the Truscon Laboratories, Detroit, contains a discussion of why concrete requires waterproofing, and the properties that an integral waterproofing must possess to operate effectively with the natural properties of concrete. It will be sent upon request to any of our readers.

The display rooms and offices of the American Encaustic Tiling Company, Ltd., have been removed to 16 East 41st Street, New York City.

Gillis & Geoghegan advise us that their new pamphlet, "Ash Removal Equipment," is ready for distribution, and will be sent free upon request.

Greatest efficiency in the operation of G & G Telescopic Hoists can be secured only by the installation and use of several inexpensive auxiliaries. The relation of these to the whole is explained and freely illustrated in a pamphlet entitled "Ash Removal Equipment," by Gillis & Geoghegan, 540 West Broadway, New York.

Specification writers who must determine the proper model ash hoist to install under a given set of conditions will find their work simplified by the use of a recently prepared formula. Unlike most rules, this one has been constructed from the results of practical experience in the manufacture and installation of hoists for all types of buildings over a period of many years.

The New York branch of the Fulton Company, of Knoxville, Tenn., manufacturers of the well-known line of Sylphon Temperature Regulators, Packless Valves, and Steam Specialties, have recently moved from 1476 Broadway to larger and more convenient quarters in the Hudson Terminal Building, No. 30 Church Street, New York City. They have also been successful in securing new and larger quarters for their Chicago branch in the recently completed Wrigley Building on Michigan Avenue, moving from their former location at 175 W. Jackson Boulevard.

Ross & McNeil, architects, New York, announce that on or about May 1 they will remove their office to the Masonic Hall, No. 46 West 24th Street, Room 1528.

Townsend, Steinle & Haskell, Inc., architects, have removed their offices to No. 8 West 40th Street, New York City.

We acknowledge with pleasure the receipt of a handsomely illustrated book from Stone & Webster, Incorporated, entitled "A National Landmark." It presents the splendid buildings of the Massachusetts Institute of Technology, of which Welles Bosworth was the architect. The book is a fine example of dignified and efficient publicity.

It is with the most sincere regret that we announce the death of Mr. William Willet, of Philadelphia, famed for his beautiful designs for stained glass. With Mrs. Willet he designed some of the best-known memorial windows of recent years.

The Misses Parsons' Residence
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Delano & Aldrich
Architects

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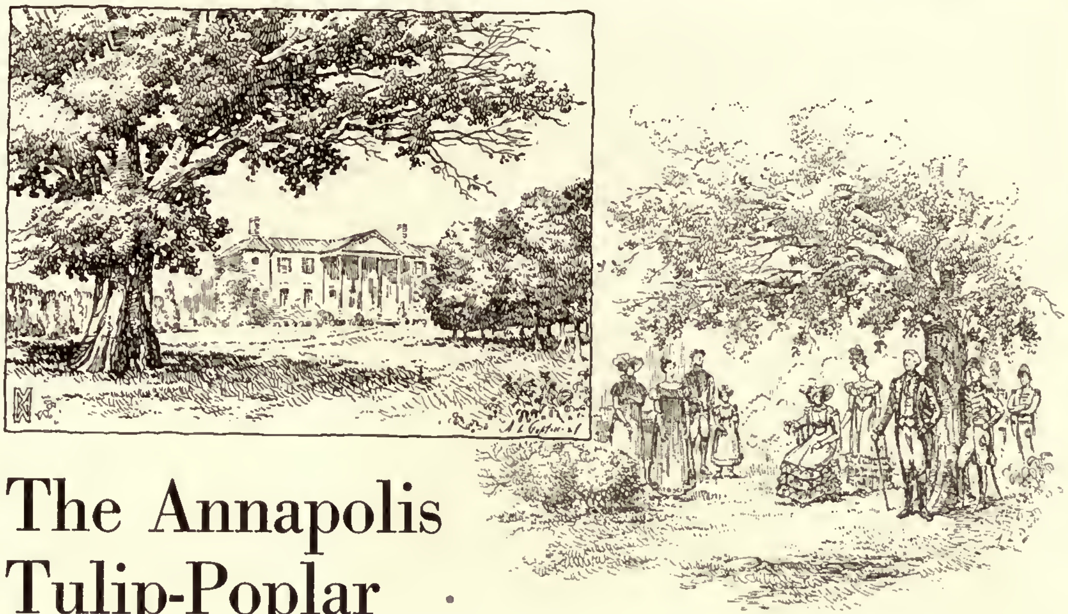

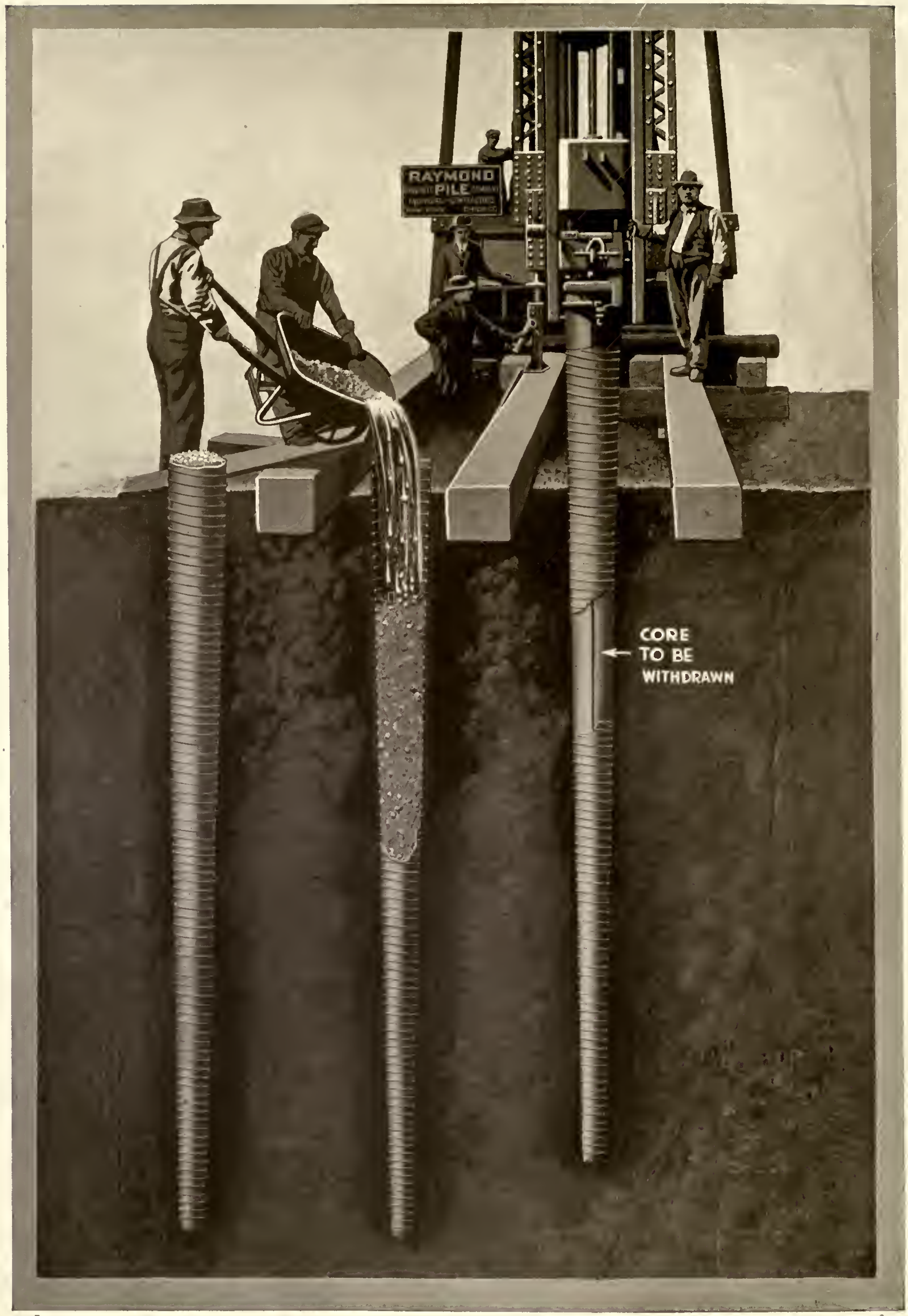
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ARCHITECTVRE

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Vol. XLIII. — CONTENTS — No. 6

JUNE, 1921

TEXT PAGES

PLATES AND ILLUSTRATIONS

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Entered as Second-Class Matter, March 30, 1900, at the Post-Office at New York, N. Y., under the Act of March 2, 1879.

BATTLE OF WILSON'S CREEK. BY N. C. WYETH.

Mural Decoration for Missouri State Capitol. Tracy and Swartwout, Architects.

ARCHITECTVRE
THE PROFESSIONAL ARCHITECTVRAL MONTHLY
VOL. XLIII JVNE, 1921 NO. 6

The Modern Conception of Baroque Architecture

By Albert C. Phelps
College of Architecture, Cornell University

FROM A LECTURE GIVEN AT THE METROPOLITAN MUSEUM OF ART, NEW YORK


Rome, Vatican, Scala Regia (1663-1666), by Lorenzo Bernini.

DURING recent years there has been a marked change, almost a revolution, in the attitude of not a few toward Baroque architecture. Indeed, it is but a further step toward a complete understanding and appreciation of Renaissance and Post-Renaissance works.

Not only Ruskin's "foul torrent of the Renaissance" theory, but also the presentation of the Renaissance by historians whose judgment was distorted by Victorian prejudice, has prevented many from acquiring a sympathetic appreciation of numerous impressive and delightful buildings. That the style had serious weaknesses cannot be denied, but that its defects should so long have obscured its many fine qualities is difficult to understand.

The origin of the term Baroque need not detain us, so long as etymologists, as well as historians, are unable to agree as to whether the word was derived from the Latin *verruca*, "a wart," which, in its corrupted form, *barocca*, was applied by jewellers to a misshapen pearl, or from the Greek *βάρος*, signifying weight, heaviness, or *παρᾶ χοπος*, that corresponds to mad, delirious. The word Barocco appears in seventeenth-century Italian as a philosophical term, and a century later it passed into the vocabulary of art with this definition: "A pretentious and eccentric style that came into vogue at the end of the sixteenth and lasted throughout the eighteenth century"; or, "A capricious style prevalent in Italy from 1580 to about 1760"; or again, "The style which for two centuries heaped together all the products of the three kingdoms of nature."

In approaching the study of Baroque architecture, as of any other style, it is of much importance that we assume a sympathetic rather than an antagonistic attitude, to attempt to visualize the customs and costumes of the time and to understand the ideals of the people. Professor Corrado Ricci has well said in his book upon Baroque architecture and sculpture: "Nor must the historian overlook the psychological relation between Baroque Art and the society that produced it, a society of conflicting faults and virtues, of heroism and debasement, of scientific initiative and of superstition; full, in a word, of contrasts and contradictions, of bombast and exaggeration, but sustained by the conviction that there was still much beauty to discover in the domain of art, much truth in that of science, much goodness in that of philosophy."

What are the characteristics of Baroque architecture? Some will reply: "Bigness of scale, barrenness of detail." Others will say: "Overelaboration, incongruous combinations of decorative elements, and a restlessness or intentional feeling of movement in composition." Again, we are told that pure classic forms were adopted by one group of architects and grotesque elements by another, and that the one group, by its austerity and pedantry, drove the other to the extreme; or that the license of one school disgusted and confirmed the purism of the other.

It is, in a measure, helpful to divide the late Renaissance or Post-Renaissance into these two groups, but the classification will not strictly hold, for neither of the great purists, Palladio nor Vignola, was free from the "Baroque corruption," and Bernini, one of the most extreme offenders, from the standpoint of purism, produced the most austere and classic work of the time, viz., the colonnade in front of St. Peter's.

It is best, perhaps, to think of Baroque architecture as that of a period in Italy, from about 1580 to 1760, and to attempt to appreciate its merits and defects by the examination of some of its most representative monuments. There are certain characteristics common to practically all works, whether austere or elaborate. Bigness of scale is almost universal, amplitude of plan, and a general breadth of treatment, even though details may be overwrought or of more than questionable taste. A disregard of structural propriety has been urged against the style, but the works were generally mechanically stable; the designers were contented with this and concerned themselves especially with other problems.

As with most architectural styles, the origin of Baroque architecture is difficult to discover. Compositions incorporating most, if not all, of the elements of Baroque are to be found in the declining Greek art, as in the great Altar of Zeus at Pergamus. In the temples at Baalbec and in Diocletian's Palace at Spalato, as well as in the so-called Temple of Neptune at Rome, one sees again bigness of scale, curious, sometimes grotesque, details, and something of the bombast and ostentation that are frequently cited as peculiar to the Baroque.

Some historians of the Italian Renaissance have called attention to the fact that the earliest Renaissance artists were often influenced by the later and debased classic works. At any rate we have even in such charming designs as the Prison at Brescia and the Porta Capuana at Naples elements that reappear in seventeenth-century art.

Rome, St. Peter's, Tabernacle (1627–1632). Design by Lorenzo Bernini.

A notable work of the sixteenth century, cited by some writers as the first evidence of the Baroque, is the pedestal of Cellini's Perseus in the Loggia dei Lanzi at Florence. Unquestionably we have here all the riot of imagination and disregard of academic rules, coupled with a splendid sense of decorative propriety, that belong to Baroque art.

In an attempt to fasten the credit or discredit of the origin of the "Baroque corruption" upon one man, Michael Angelo has been cited as responsible. And beyond doubt one can see in much of the work of that great creative artist the incarnation of the Baroque ideal. In the Sistine Chapel, with its painted architecture and splendid contorted figures, in the New Sacristy and the vestibule of the Laurentian Library at Florence, in the Porta Pia, the Capitoline Buildings, and the Dome of St. Peter's at Rome, one sees the struggle for varied expression of a great soul.

In the works of his followers the ideal of the master may be obscured but it does not die. In Maderna's work on St. Peter's, both external and internal, along with the forced scale, the distorted and questionable detail, and the garishness of parts, the spirit is preserved, and we are brought, at least figuratively, to our knees in admiration of the unity and power that can so affect the mind of man.

We may regret Borromini's restoration of St. John Lateran, but in the façade of Sta. Agnese in the Piazza Navona he has produced a seventeenth-century masterpiece.

In Fuga's façade of Sta. Maria Maggiore one appreciates the restrained expression of rhythmic movement, the legitimacy of which may be questioned, but the splendid result of its daring application here is difficult to condemn. One wonders, indeed, why this idea of rhythmic movement that appears as such a commendable feature in the façades of mediæval churches should, in Baroque architecture, be so sweepingly denounced by unsympathetic critics.

How can one briefly arrive at a comprehension of the genius and estimate the works of Bernini?—a man of tremendous power and versatility, incorporating in his works the splendors and conceits of his time, producing an unbelievable number of projects of a high order, and again stooping to tricks that, with all their cleverness, are hard to justify.

His tabernacle in St. Peter's has been ruthlessly condemned and, on the other hand, commended by frequent more or less direct imitation. Whatever its faults, I doubt if its critics could easily conceive a more fitting climax for the gorgeousness and power of this great interior.

Behind stands the Chair of St. Peter, with its too facile handling and all the startling paraphernalia of Counter-Reformation art.

His monument of Pope Urban VIII is a strange combination of noble restraint and ambitious striving for effect. In spite of the richness of the dark marble, the figure of the Pope in the attitude of pronouncing benediction is dignified and appropriate. Beneath, the skeleton climbing out of the sarcophagus, displaying on a banner the name and title of the deceased Pontiff, introduces an unpleasant note; while the beautiful sensuous figures of Virtues on either side illustrate both the taste of the time and Bernini's too facile handling of the female form with marble draperies.

The colonnade enclosing the *piazza* in front of St. Peter's is unquestionably Bernini's greatest architectural work. Its gigantic simplicity and vast dimensions strike one immediately, but a closer study reveals subtleties of detail—as the increase of the diameter of the columns in each range from the centre outward—that suggest the infinite refinements of the Parthenon. Above the entablature are sixty-two energetic statues, so characteristic of the period, and we are assured that twenty-two of them are due to the master himself.

Alongside the *piazza* is another great work of Bernini, viz., the *Scala Regia*, or Royal Staircase. It forms the monumental approach from the *piazza* to the Vatican, and is a clever treatment of a perfectly straight corridor with a gentle slope and diminishing width. Bernini utilized this latter feature to increase the perspective effect, and in the middle he introduced a small landing where the necessary light was obtained. The coupled columns and the barrel-vaulted ceiling are ingeniously arranged to prevent any effect of distortion. As with some of Michael Angelo's works, this staircase led to absurd and theatrical effects in compositions erected by Bernini's imitators.

Any consideration of Baroque works at Rome must include the great Church of the Jesuits by Vignola and della Porta. The front, by the latter artist, exhibits with restraint the features that characterize many later church

Rome, S. Trinita del Monte.

façades, both in Italy and the North. It is a screen, not entirely related to the structure behind, and here treated soberly as compared with most of its successors. The interior is magnificent, broad and spacious, evidently adapted for preaching to a large congregation. It is, perhaps, the finest product of the spirit of reform in the Church, the so-called Counter-Reformation, espoused and promulgated so enthusiastically by the Jesuit Order.

Among the multitude of domes based more or less directly upon that of St. Peter, the finest is, perhaps, that of San Carlo al Corso, built early in the seventeenth century.

Many of the finest palaces of Rome belong to the Baroque period and, in general, they maintain the quiet dignity of the early sixteenth-century works, although amplitude and convenience of plan are more in evidence, and fine staircases, charming vistas, and too clever perspective effects are frequently introduced. In marked contrast with these moderate designs is the riotous, fanciful detail of the Palazzo Zuccari, built as early as 1586, and designed by its owner, a sculptor, Federico Zuccari. The doorway is surmounted by a gigantic grotesque figure that is neither fish, flesh, nor fowl, and the detail of a window upon the front is equally startling.

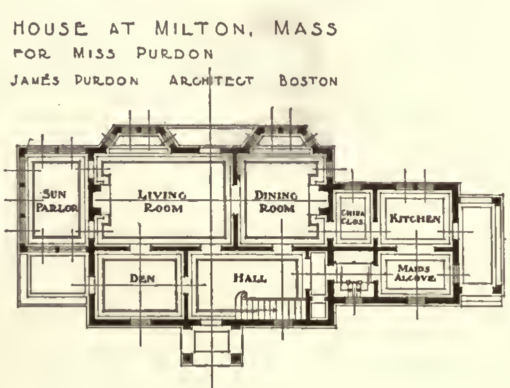
While sepulchral monuments were assuming the form of personal memorials, often of a triumphal order, the morbid and horrible representation of Death or of the dead, that appears in late Gothic works, persisted, with few of the relieving features of that earlier art. The Gisleni Monument in S. M. del Popolo may be an extreme example, but is nevertheless fairly typical.

A great impetus was given to the formal and artistic treatment of streets and public squares, and although we may not accept the assertion that town-planning originated with the Baroque movement, far more was accomplished during this period than formerly. We have already seen the square in front of St. Peter's; another fine work of the sort is the *Piazza del Popolo* where the two churches of St. Mary serve so admirably to beautify the square and as terminations of the blocks enclosed by radiating streets, and not far distant is the *Piazza di Spagna* with the magnificent Spanish Staircase rising from Bernini's fountain, in the shape of a boat, to the Church of the Trinity on the Pincian Hill.

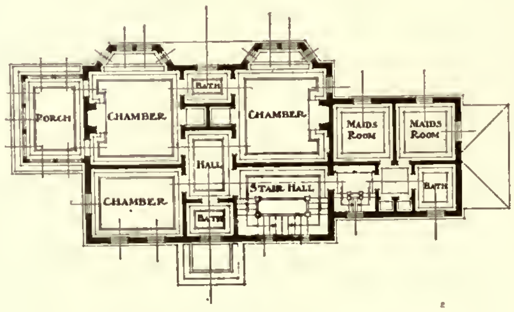
Fountains almost innumerable were erected and are unsurpassed as examples of the Baroque expression; the culmination at Rome is, of course, the Fountain of Trevi.

Space will permit but a passing reference to the Italian villas, but one must recall that most of the important works of this sort belong to the Baroque period and are spontaneous expressions of the spirit of the style. The Casino of the Pope in the Vatican gardens is a charming work by the same artist as the Villa d'Este at Tivoli. The cascade of the Villa Torlonia at Frascati is but a suggestion of the wonderful garden architecture there. The Villa Lante at Banaia is another delightful design. The loggia of the Palazzo Ginnetti at Veletri illustrates the appropriate architectural treatment with plastic detail, so frequently found in the casinos, and the interior of the stables of the Villa Morosini at Altavilla indicates the magnificence and luxury afforded beast as well as man at this time of sumptuous living.

(To be concluded.)

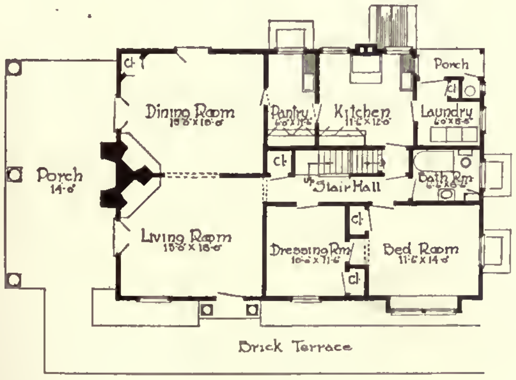


FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE, MISS PURDON, MILTON, MASS. James Purdon, Architect.



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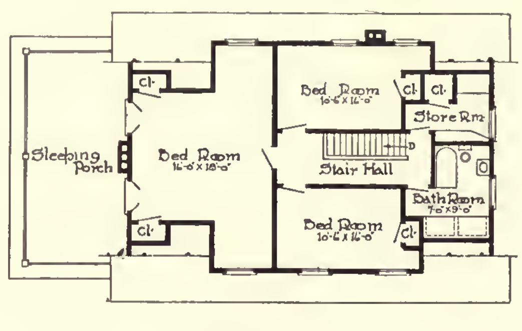


SECOND FLOOR PLAN

HOUSE, F. A. CANIZARES, WAYNE, PA. Boyd, Abel & Gugert, Architects.

A New Type of Cafeteria Building

By Richard P. Wallis

F. E. Wallis & Son, Architects

South elevation, bell-tower, Nela Park, Cleveland, Ohio (showing cafeteria.)

THE new Cafeteria Building now approaching completion at Nela Park, Cleveland, Ohio, for the National Lamp Works of the General Electric Company marks a somewhat radical departure from the customary method of housing the dining service at an industrial plant, and for that reason should be of interest to architects, engineers, and manufacturing executives interested in a happy solution of the dining-service problem.

Nela Park is the home office of the National Lamp Works, manufacturers of Mazda Lamps, and consists of a group of office-buildings and laboratories located in a suburb of Cleveland on the brow of a hill overlooking Lake Erie. At the time of the inception of Nela Park a comprehensive programme was laid out for both architectural and landscape development. This was to insure a policy consistent with securing the best working conditions for the large number of people employed at this plant. One of the principal features of this programme has been the construction of a separate building to house the dining service. Meanwhile this service has been assigned to space intended primarily for other purposes.

As has been the case at Nela Park, so is it in many industrial plants. The dining service, both in its design and location, has been secondary and accidental. The psychological benefit to employee of changed surroundings during the noon-hour is known and appreciated, but is sometimes difficult to achieve, because the only available space usually consists of office or factory floor area similar in character and design to the space occupied by the employee during the balance of his working day. Cafeteria managers have been greatly handicapped in their work by these limitations.

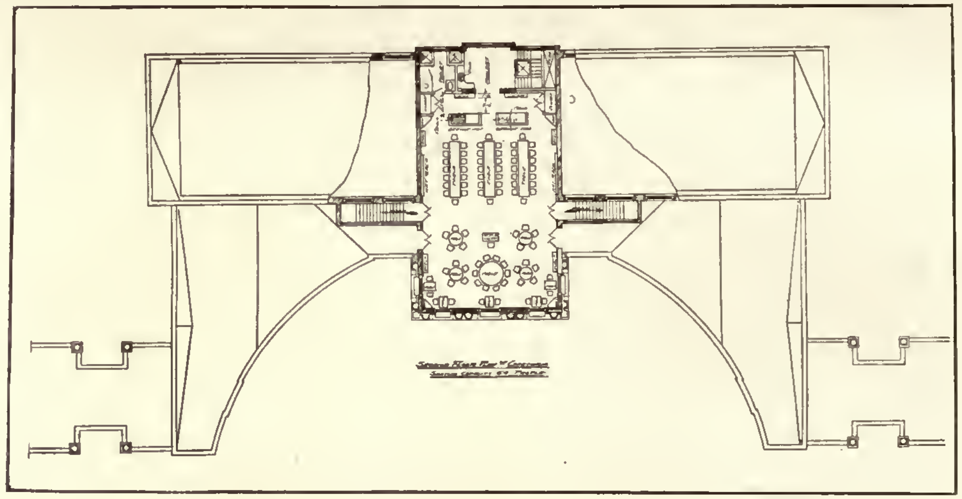
Soon after the close of the war, as conditions seemed favorable, the architects were instructed to prepare working drawings for a Cafeteria Building to be the centre of a group of three buildings facing on the million-gallon-storage pool. The problem of providing suitable surroundings for the dining service was to be approached unhampered by space conditions or predetermined location. The design and service were to be primary and its location especially selected as that best fitted for cafeteria purposes.

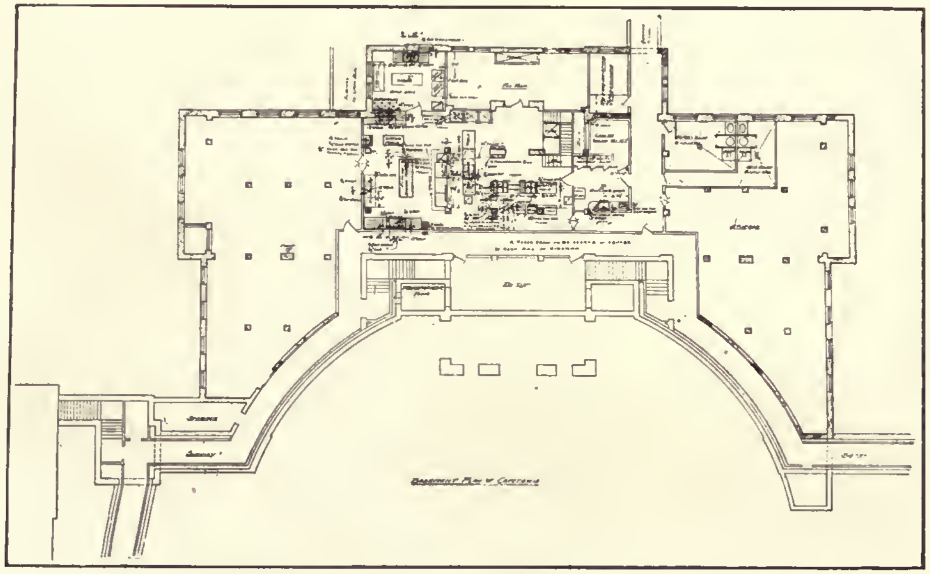
The exterior design is Georgian, to harmonize with the surrounding buildings, yet the treatment is individualistic and distinctive. The walls are of tapestry brick laid in English bond emphasized in spots by Indiana limestone. The greater part of the exterior is plain brick wall and window-openings. Its charm is due primarily to its simplicity and carefully proportioned mass. The composition of the mass is striking, yet is entirely utilitarian in that waste space is reduced to minimum and every square foot of floor space is put to use.

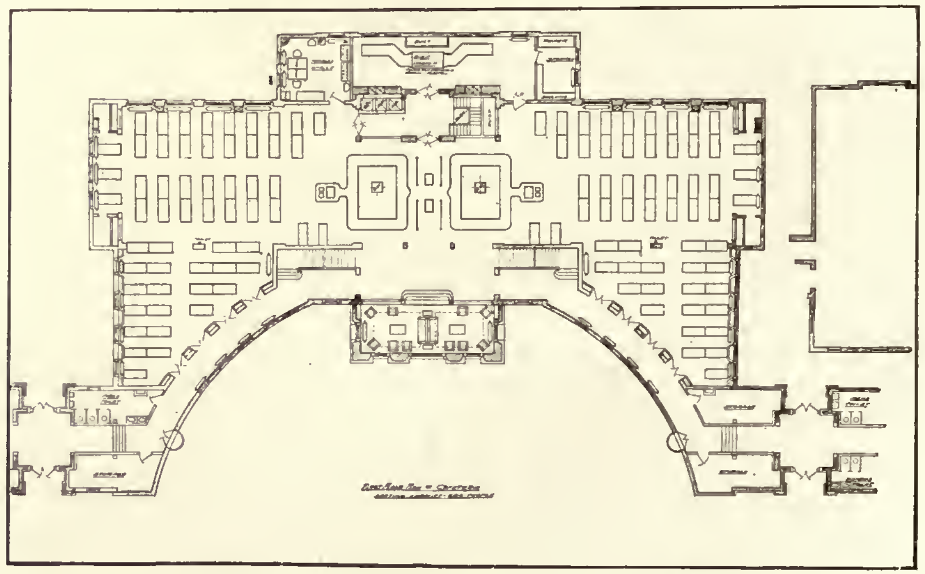
The bell-tower, carrying the Westminster chimes that toll the quarter-hours, is the dominating feature, rising to a height of seventy-two feet above the pavement. The pool pavilion, carried on piers resting on the pool bottom, is surmounted by a bronze group by Robert I. Aitken symbolizing the triumph of light over darkness, for at Nela Park are devised ways and means for producing "the way to better light."

The Cafeteria Building is connected with the buildings on either side by means of ligaments or gates. These are one story in height, simple in design, and form the only grade entrance to the Cafeteria Building. When the landscape work is completed there will be a sunken garden between the building and the curved road immediately to the south. This garden will be enclosed on the road side by a stone wall surmounted by an iron fence.

NORTH ELEVATION OF CAFETERIA BUILDING (SHOWING POOL PAVILION).







CAFETERIA BUILDING AND PLANS, NELA PARK, CLEVELAND, OHIO.

F. E. Wallis & Son, Architects.

The building contains basement, first floor, second floor, and tower. In the basement are located storage-rooms, refrigerator-rooms, fan and machinery rooms, kitchen with its various appurtenances, and café. The service entrance to the building is by means of a tunnel at basement level extending underneath the roadway to a sidewalk elevator located in the adjacent operating building. In this manner supplies are brought in and refuse removed entirely screened from the notice of those using the cafeteria. This method of taking care of delivery prevents the nuisances common to the rear of most eating-places and helps preserve the reputation of "The Best-Kept Plant in America."

The kitchen, together with bake-shop and butcher-shop, is ventilated artificially, removing all smoke and odors of cooking. The walls are tiled and a composition flooring laid in order to make it possible to maintain a high degree of cleanliness. Food is prepared in the kitchen on both gas and electric ranges. The fumes from these ranges are carried off through a double hood located directly overhead which is connected to the ventilating system, and finally exhausted into the atmosphere above the roof level. The kitchen equipment consists of stock-kettles, bain-maries, hot tables, sinks, plate-warmers, and other articles necessary to a well-appointed cafeteria kitchen. A complete dishwashing plant is also installed here. In the bake-shop directly off the kitchen are an electric bake-oven, gas-stove, cabinet, sink with hot and cold water, refrigerator, and large central table. The butcher-shop opens off the other end of the kitchen and contains sink, electric meat-grinder, meat-block, various vegetable and meat coolers. Approximately two thousand and two hundred square feet of the basement is devoted to storage space. This space is located at the west end of the basement near the end of the service tunnel, so that all incoming material is handled with the least amount of labor. Locker-rooms and toilets with shower-baths for the use of the cafeteria employees are provided in a convenient location. The portion of the basement at the east end of the building is to be devoted to a café or coffee-shop. Table service will be provided for those employees desiring it and willing to pay a slight increase in cost over the cafeteria service located on the main floor. This room is to be attractively finished in pine panelling stained with an orange shellac, and will be furnished with tables and chairs of a similar finish. Worked into the panelling will be five booths each capable of seating six persons. The rest of the tables will be placed around the room at the columns supporting the cafeteria floor. These tables are to be provided with hinges so that some or all of the tables may be swung up and secured to the wall when the floor space is needed for dancing. Individual table ighting will be provided in addition to the general overhead-lighting system. This room will have a seating capacity of approximately fifty people and an area of about two thousand and six hundred square feet, or about fifty-two square feet per person. The semicircular subway extends from end to end of the building and connects to the contemplated subway system underneath the two ligaments or gates. This passageway serves not only for purposes of internal communication, but gives direct access to the cafeteria and restaurant above from the adjacent buildings for use in inclement weather.

The cafeteria service is located on the main floor, and has an area of about eight thousand and four hundred square feet. There are two counters located symmetrically on the main axis of the building, each serving two lines of people, the four counters in all serving thirty-two people per minute. Service to the counters from the kitchen below is by means of four electrically operated dumb-waiters. Of these, two are located inside of the counter space and are used for emergency replenishing of supplies during the rush hours. The other two are located in back, underneath the bell-tower, and together with the automatic passenger-elevator and service-stairs form the main means of stocking the counters during the periods between the rush hours. The counters are identical in construction and have both hot and cold connections for preserving the desired temperature of the food.

The mass of the building is of such shape that the two wings on each side of the counters are a story and a half in height. These are lighted on the south walls by high windows. On the north side extend triangular gibs, or horns, one story in height. Across the centre of the building and on the main axis the space containing the service-counters is one story in height, caused by the floor of the restaurant above projecting down into the cafeteria space.

The space allotted for cafeteria purposes has a capacity of six hundred and eighty-four persons, which gives a unit area of 12.5 square feet per person including passageways, counter space, seating space, etc. The tables are thirty inches wide and are arranged with a space of three feet between. Two feet of table length is allowed per person. A width of five feet has been maintained for all aisles. The tables are of wood finished in mahogany with vitrolite tops and porcelain feet. The chairs are of bent-wood, also finished in mahogany.

The interior walls are painted in two shades of browns. A heavy plaster cornice extends along both sides of the story-and-a-half portion at a height of twelve feet from the floor. The floors and base of this entire room are of composition, colored a dark gray. This composition floor is resilient enough to be comfortable under foot, and yet is damp and vermin proof, two very necessary attributes in a building of this character. All woodwork is of oak filled and stained somewhat similar to the trim in the adjacent buildings.

At each end of the story-and-a-half portion are balconies, each containing a projection picture-machine. The side-walls of the restaurant where it cuts into the cafeteria space serve as screen. These picture-machines may be used either for entertainment or instruction.

The question of traffic has received considerable study, and unnecessary crossing of lines and congestion have been eliminated. On clear days the people enter the building through the two gates, pass through the semicircular passageway on the pool side of the building to the central portion, from whence some continue on to the counters, and others go either up or down stairs to the restaurant or café. Those entering the cafeteria pass through the counters into the table space on either side. When they have finished eating they pass out into the semicircular passageway again, and out the same way as they entered. When future plans are realized and the general subway layout is complete it will be possible to reach the cafeteria from any building at Nela Park through the subway in the basement without being exposed to the weather. When it is remembered that Nela Park has a decided northern exposure, and that there is nothing between it and Lake Erie to break the force of the winter wind, this subterranean means of approach will be highly appreciated. On the south side contained in a one-story wing are the cafeteria manager's office, dishwashing-room, and storage-room. The dirty dishes are collected on rubber-tired trucks and are wheeled into the dishwashing-room, where they are washed and stacked away for future use. Sinks for washing the silver are also located in this room. This service is screened from the cafeteria by means of two sets of swinging-doors.

One of the interesting features in this building is the experimental show-window located on the curved passageway just inside the east gate. Here has been built into the wall a typical street show-window seven feet six inches high by ten feet wide in which studies are made of various types of window-dressing. This is conducted by the publicity department, and the results of these experiments are at the service of all dealers selling Mazda Lamps or using them in their window displays.

The rendezvous, or trophy-room, is located in the central wing opposite the counters and extends out over the pool. It is at a somewhat higher floor level and is reached by broad wooden steps. Here are kept various trophies won by teams of the National organization. It is furnished with chairs and benches and serves as a congregating-place during the noon-hour.

The entire cafeteria space is artificially ventilated, the fresh air being brought in from the outside, washed and reheated to proper room temperature before being blown into the room through the registers. The foul air is exhausted by a separate system and is blown up through the roof. This continual interchange of air insures an absence of disagreeable odors. The cafeteria space as well as the rest of the building is heated with hot-water radiation brought in from the mains in the pipe tunnel. Toilet facilities are located at either entrance. The artificial lighting of this cafeteria space is accomplished by the use of Ivanhoe Ace fixtures suspended from the ceiling in a symmetrical layout, giving an average illumination of about six-foot candles on the working plane or table-top.

The restaurant, or managers' dining-room, is located on the second floor, and occupies a space approximately thirty-five feet by fifty-six feet directly over the counters of the cafeteria below and causes the low ceiling previously mentioned. This structure is carried on seventy-two-inch concrete beams spanning the counter space below. This room is intended, like the café in the basement, to provide table service to those desiring it and willing to pay a somewhat higher price. Access to this room is at the pool end, and is by means of stairs ascending from the semicircular passageway. The service is at the opposite end and is composed of the continuation of the same dumb-waiter, push-button electrical elevator, and stairway that serve the cafeteria.

The room is finished in oak panelling in simple design to a height of eleven feet. Above this extends the clear-story painted in old ivory with ornamental plaster cornice extending around the entire room. This plaster cornice serves a dual purpose, as it conceals the supply-duct that conveys fresh air to the registers located in the four corners. A row of windows along each side and the pool end of the clear-story admit considerable daylight. The pool is viewed from this room through five French windows, each with a stone balcony.

The table arrangement provides for sixty-four persons and is arranged in units of two, five, ten, and sixteen persons to a table. The room has an area of about two thousand square feet or a unit area of about thirty-one square feet per person. The furniture for this room is of special design, to be in harmony with the panelling. There are two counters at the service end, one hot and one cold. China and linen closets are provided, and in the pantry a sink so that the silver used in the restaurant may be kept separate. Toilet facilities are also provided for on this floor.

On either side next to the doors to the head of the stairs are doors opening onto the roof of the one-story portion of the cafeteria. This roof is tiled and has a parapet wall, and is suited to be used in summer weather for additional tables.

Located over the service end is a projection picture-booth. Above this booth is the fan-room that ventilates the restaurant, and above that the room in which is housed the clock machinery which strikes the chimes.

Cool drinking-water is provided on all floors by means of a circulating water-system. This system is operated by cooler and pump located in the basement, and also extends to the adjacent Treasury Building. Indiv dual germ-proof fountains spouting in a parabolic stream are provided in the kitchen and the corridor space in the basement, and special fixtures in the café and cafeteria.

The china used in the cafeteria is special, and is made individualistic by a small representation of the north elevation of the Cafeteria Building burned on the rim of the plate.

With all of the varied service furnished in this building the number of operators is small, only about forty-five people being employed in the operation of preparing and serving food.

Charleston Doorways

A Series of Measured Details, Beginning in This Issue

By J. A. Altschuler

TO find the great charm in Charleston doorways is not difficult. It is difficult to trace the source of most of the lesser ones, of which these drawings are examples. It is known, however, that most of Charleston's fine old residences were built by contractors, who came over from England, bringing their trained mechanics and artisans, their brick and other material, and there remained to give to Charleston and the neighboring country its charming colonial homes.

The spirit and character in these doorways lies in the original and appropriate detail and pleasing proportions. In them we see a great deviation from the pure and stereotyped classical parts, cornices, mouldings, and details, which unfortunately is true of our modern attempts at much colonial work we see about us.

Great freedom is shown in the cornice. The various parts are considerably lightened in comparison to the classic —the architrave given less height, the frieze more height, and the cornice less height and more projection. Altogether, with the refinement of detail and mouldings, it gives one the feeling of genteel domesticity greatly pleasing to the eye.

Doorway, 55 Church St., Charleston, S. C.

Doorway, 301 East Bay Street South, Charleston, S. C.

The mouldings are all hand carved, the detail and ornament cut in the wood or planted on all with skill and painstaking care, and the mouldings chosen to be ornamented show the proper artistic skill and restraint in their relation. The doorway of No. 301 East Bay Street South is an extreme example of overornamentation, though by no means lacking in interest. This is the only example of its kind in Charleston, and is somewhat crude in its carvings, especially the flute pattern in the pilasters, which is jagged and uneven, and plainly shows the untrained hand of the artist. Not many of the original doors are in place. Constant use for generations in most cases has outworn them, and they have given way to more or less modern doors, which only serve to mar the general effect of the doorway.

See Plates LXXXVI, LXXXVII, LXXXVIII.

Doorway, 39 Bay Street South, Charleston, S. C.

A Louis XV Panelled Room

THROUGH the further generosity of J. Pierpont Morgan the Metropolitan Museum of Art has recently acquired the woodwork of a room of the period of Louis XV. The panelling has been installed on the second floor of the Morgan Wing. In its original position the woodwork probably made the four walls of a room, but the exigencies of installation have necessitated a three-sided arrangement with the omission of the alcove enframement which is on exhibition close by. It is impossible to say just what the original arrangement was, but the presence of an alcove, about ten feet in width, would suggest that it was a bedroom.

Courtesy of the Metropolitan Museum of Art.

Editorial and Other Comment

6,000,000 Homes

WE are told that 6,000,000 people in the United States own their own homes. Probably a million of these have been acquired within the past few years, for thousands who were renting had to buy homes in order to keep a roof over their heads—it was generally a case of buy or get out. Even so, in many instances the interest on the purchase prices amounted to less than rent and the home question was settled. The more homes owned the better for the owner, the better for the country. Nothing has done more to further unrest and prevent the assimilation of the great mass of aliens than the constant shifting of population. A nation of homes is a nation unified. Look at France! England has realized the home factor as a powerful element in restoring industrial peace, and she is making sacrifices to meet the demand.

No subject discussed at the recent Convention of the American Institute of Architects was of greater importance than the one of small houses.

"The architect, if he is to maintain his position as the designer and supervisor of buildings, must pay attention to the problem of the small house, the home of the family of small income and simple tastes."

The Need for Practical Idealists

OF course architecture as a profession, "if it is to get anywhere," to use the parlance of the practical man, must be something besides a nice job for a man of taste, interest in the arts, and a competence. We have listened in at many conversations in the last four or five years, where the chief argument was that the trouble with the architect was that he hid himself behind his more or less artistic office furniture and some prints of famous antique buildings, expecting clients to come in and be thrilled by these evidences of culture. There is a lot of truth in this sort of sarcasm, and sooner or later it sinks in and we hear from it.

There is always a certain element in any profession who take the profession for the guinea stamp, overlooking the fact that it isn't the stamp that gives value, but the metal upon which the stamp is put. We hear a lot of vague talk about living up to our ideals; but how seldom we come upon a clear and convincing statement of the significance of these ideals. What are our ideals? Are they pure abstractions, mere states of mind, nothing more than a condition of over-wrought sensations, emotions out of which come but a collocation of mere words?

We are all forced by circumstances to take stock of ourselves now and then, and many of us have seen the light in these late years, and found that if we are to have the confidence of our associates we must manifest our so-called ideals in pretty tangible ways. At the recent convention of the Institute there was amply shown the new attitude toward the practical aspects of the profession of architecture, there was no lack of practical discussion, of practical and invigorating criticism; and, too, there was talk of ideals, and these were practical in that they expressed those qualities of character and moral stamina without which the practical man is usually a failure.

We confuse the cant of idealism with the real thing. It is the practical idealist we need, the man with vision united with knowledge and the power to do. There are in architecture, as in the painter's art, men who belong with the vorticists and the cubists, but neither architecture nor art should be judged by their ways.

St. Peter's could never have been built by a mere idealist, and our greatest Gothic monument to trade, our cathedral of business, the Woolworth Building, bears testimony to the modern world of the practical genius of its architect and his associates.

Getting Better

BUILDING conditions are improving, there is a very marked advance shown in the demand for new construction, and the prospects grow more encouraging as the season goes on. The only thing that threatens a setback is the attitude of labor. The greatest demand is for places for people to live, residences and apartment-houses. In New York the new ten-year tax-exempt law is helping a great deal and there is renewed activity on all sides. There are blocks and blocks of houses in all our cities that might be profitably made over into garden apartments. Some of these that have been done have been notably successful from every point of view.

In New York State building contracts have increased something like 70 per cent over previous months.

According to local figures, builders in the New York metropolitan district are filing plans for more than 1,000 homes a week, including houses and flats.

How Politics May Spoil Good Design in School-Building

DRAWINGS have recently been submitted for a new large high school in Hartford, Conn., which recalls certain facts connected with a previous high school built in that city some few years ago, which developed a condition of considerable importance to the profession. It does seem as if some sort of concerted action on the part of the institute might have improved the quality of mercy possible in such cases, but we believe the difficulty remains and may even appear again in this later undertaking. It is this:

The plans for the previous high school were selected by invited competition conducted by the late John M. Carrere before an appropriation for the building had been made, but the money finally voted was only enough to erect about two-thirds of the building.

This is a very common occurrence, to say the least, and the situation a very natural one. But the law is such that a commission having in charge public work can contract for no part of a building for which funds are not in hand. This applies equally to work of the architect. The commission having in charge this school could only employ the architect to produce working drawings for the portion to be built. Of course, if the case had been one of insufficient funds for a building that it was hoped to completely finish, the plans could and would have been completed and paid for, even though it developed that only a part could be undertaken, but, in the case in point, the project went before the voters of Hartford as asking money for a part of the building. Hence, by law the architect's services had to be limited to this part, with the result that the building was later completed under a second appropriation and, due to a political turnover, under a new commission, who thereupon employed another architect.

The injustice here is apparent, but even so in certain styles the result might have had an added element of interest. This building, however, was symmetrical, with a centre and two wings, and the later architect merely reproduced the wing that existed, the design of another architect which had been fairly won in competition as a complete building and had been restudied and presented as such in many sketches, both plan and exterior, but for which no compensation had been given on the cost of this wing.

No architect could, under the conditions, do otherwise than plan the building as a whole. The first commission must have a complete knowledge of what the whole is to contain, and of the appearance of the whole when done, so that even if the architect were not so disposed he could hardly avoid making complete sketches.

Not only this but, furthermore, the initial performance must include adapting the part to be built so as to arrange for much that will ultimately go into the finished building. All this the architect is not paid for, if he fails to secure his reappointment, but also hands on as a gift to his successor in enforced generosity.

If the original commission had continued the building, the promises they naturally and freely made to cover this situation would doubtless have been kept, but they were powerless to commit the city, and the architect's case rested on the uncertainty of their succeeding themselves, which, of course, in municipal politics is a very uncertain basis.

The purpose in reviewing the history of this case—and there have been many others like it—is to ask if in some way the law cannot provide a way for a commission to procure their design entire before proceeding, even if only a partial appropriation is made.

According to present law, no commission should be bound by their predecessors, but unless some way can be found to bind them to a design, the time spent to perfect the design for any comprehensive scheme is not only done at some architect's expense, but is very likely to be a loss to the community for which it is created. Indeed, this is the real evil in their freedom of contract, that a good design or a comprehensive plan of future development may be disregarded for reasons quite petty, political or personal, by the succeeding commission.

Obviously the law as it stands is good in those opposite cases where a project has been unworthily or inconsiderately begun. Anglo-Saxon common law assumes innocence and insists that guilt must be proved. But the law binding commissions is like French law in that it would appear they are assumed to have made a failure of the business, and must be ever ready to give way to honest men. But is it fair that the law should stand thus when certainly the majority of undertakings are entitled to the presumption of their being well and honorably handled? The seriousness and integrity of those in positions of public trust has greatly increased, and architects also doubtless bring to bear a better training and more serious devotion to attaining something really worth while, yet our laws are better suited to the times of the Tweed ring.

Why not, therefore, have the law so amended as to allow a commission to make plans with scope and proper regard for the future and pay for them, no matter whether the whole or only a part of the money is voted, so long as the voters see the scheme presented in its entirety, and so know that in voting a part they are also pledging their support to finish the job in due time, leaving, on the principle of the recall, a way by which the plan can be changed or abridged when circumstances warrant, that is to say, when cause is shown that there should be a change.

Though several years have elapsed since this high school was built and the injustice of what took place was very generally recognized, the new one is about to be undertaken, with a possibility of the same situation arising, for here again one notes a programme of competition frankly admitting that the Assembly Hall and Gymnasium features must await a further appropriation. Yet the competing architects are asked to design the whole building, prepare for comprehensive and orderly growth (as they should be) and yet must trust to the chance of politics for the realization of their design and remuneration for their labor.

Summer Session in France

Season of 1921, June to September, New York School of Fine and Applied Art

THE persistent demand by architects that interior decorators shall better understand the essentials of architecture, by the interior decorators that students shall be given a more thorough professional training, by a more cultured public taste demanding that there should be a greater measure of harmony between the purpose and process of these two professions, is the fundamental reason for the establishment of this school. Its chief purpose is a fuller and richer understanding, a more thorough professional training, and a closer correlation of architecture and decoration as they are associated in modern life.

For further details concerning the school, address the Secretary, New York School of Fine and Applied Art, 2239 Broadway, New York, N. Y.

Plates LXXVII – XCII follo. page 184

APARTMENT-HOUSE, BRONXVILLE, N. Y.

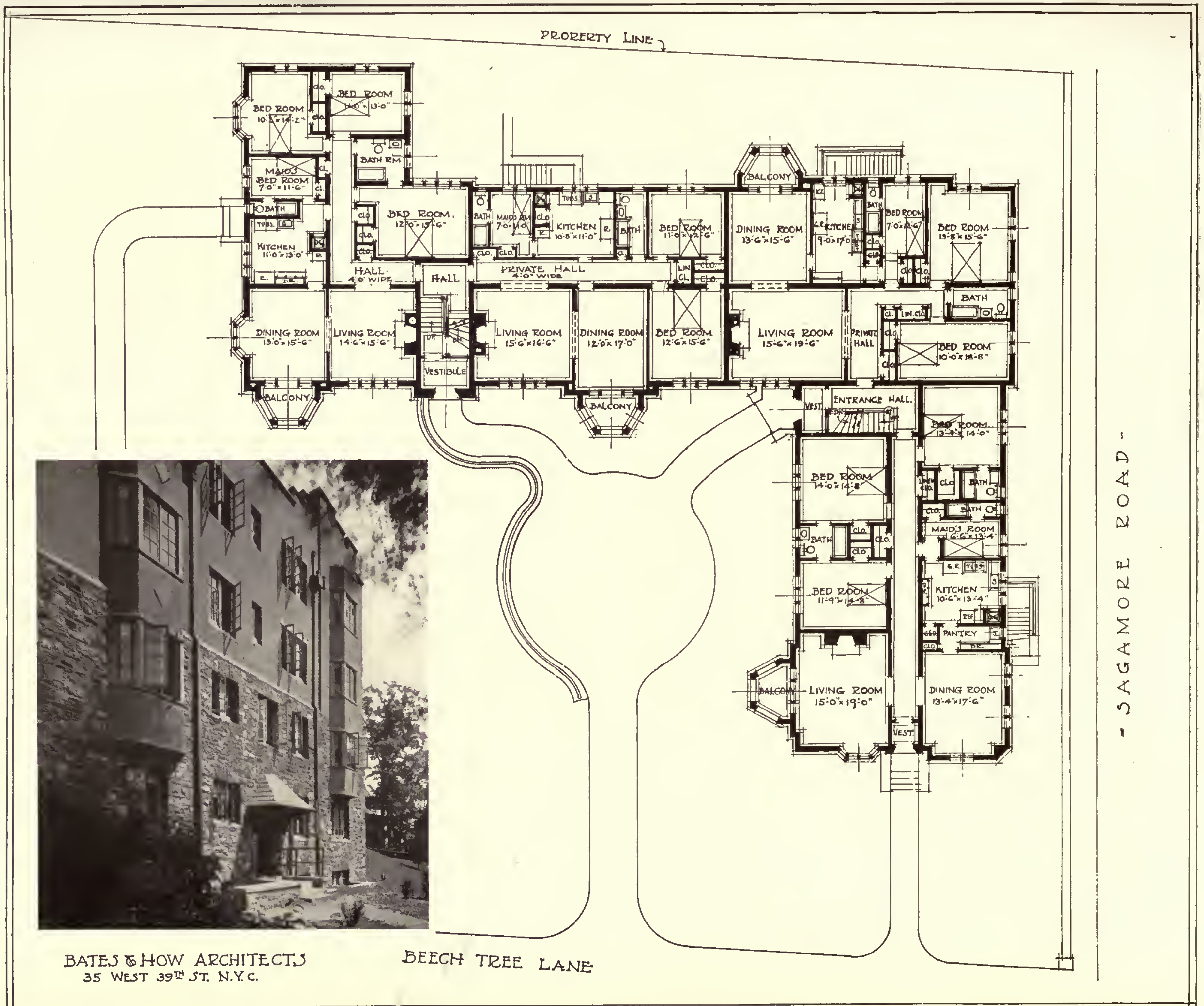
Bates & How, Architects.

VIEW FROM SAGAMORE ROAD.

THE COURTYARD.

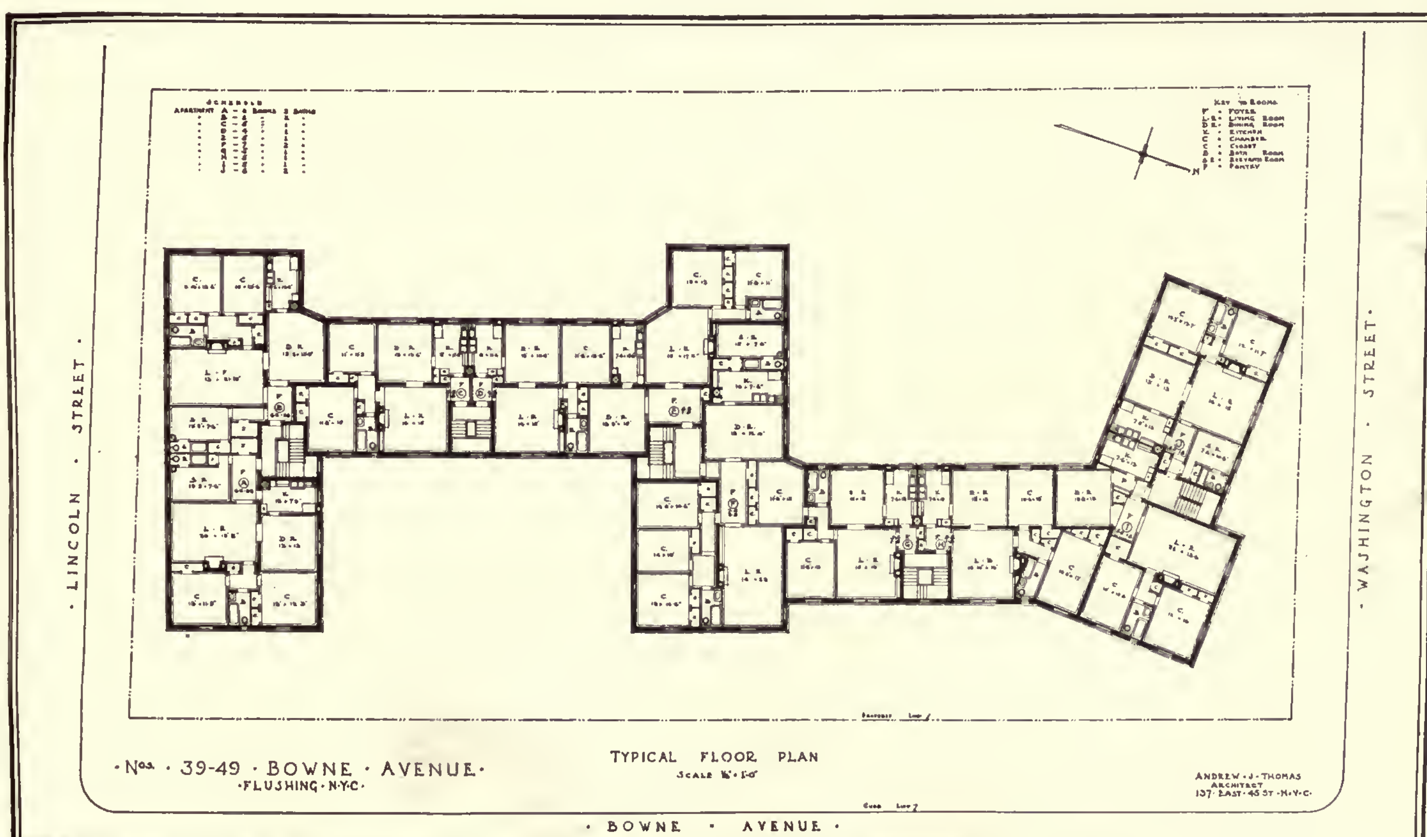
Bates & How, Architects.

APARTMENT-HOUSE, BRONXVILLE, N. Y.

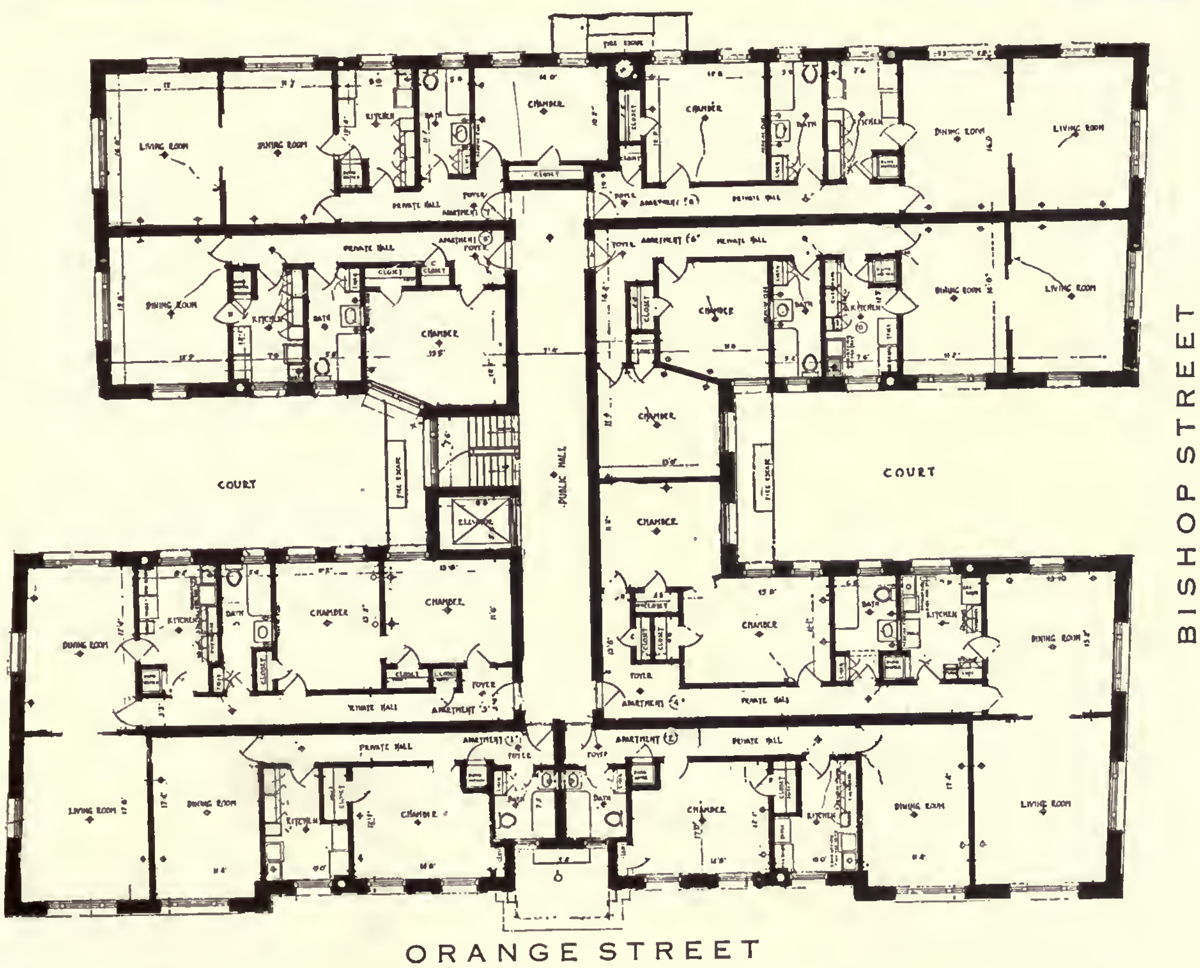


PLAN AND DETAIL, APARTMENT-HOUSE, BRONXVILLE, N. Y.

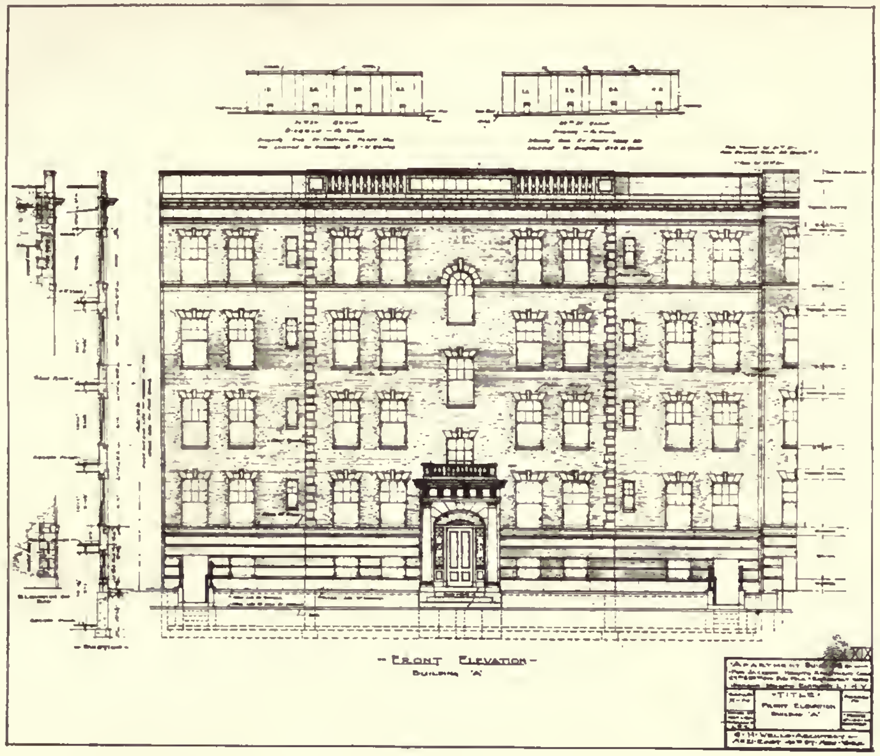
Bates & How, Architects.

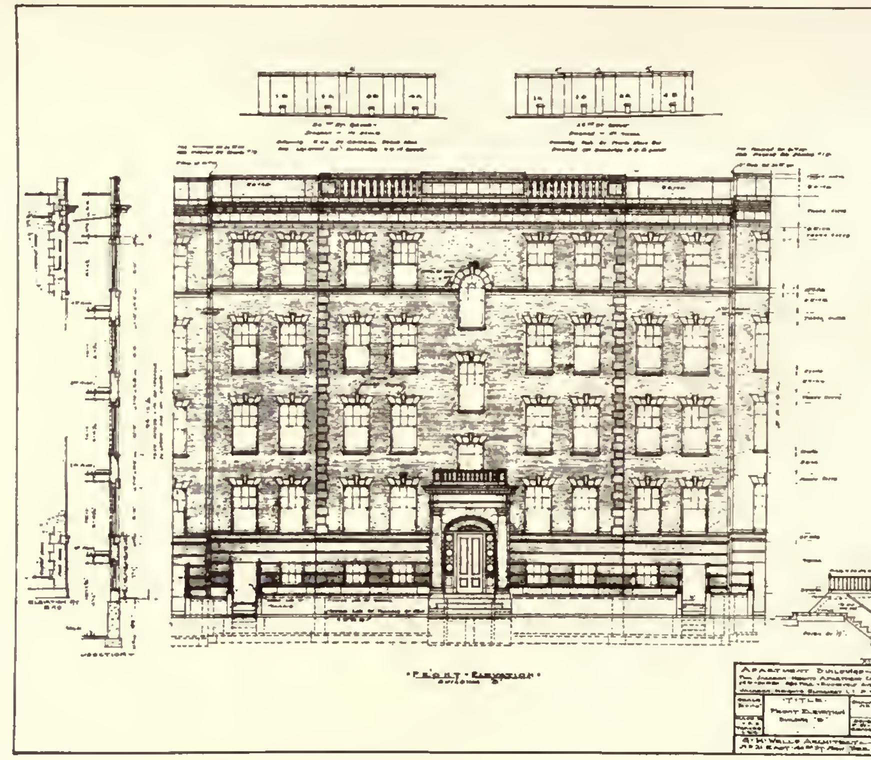


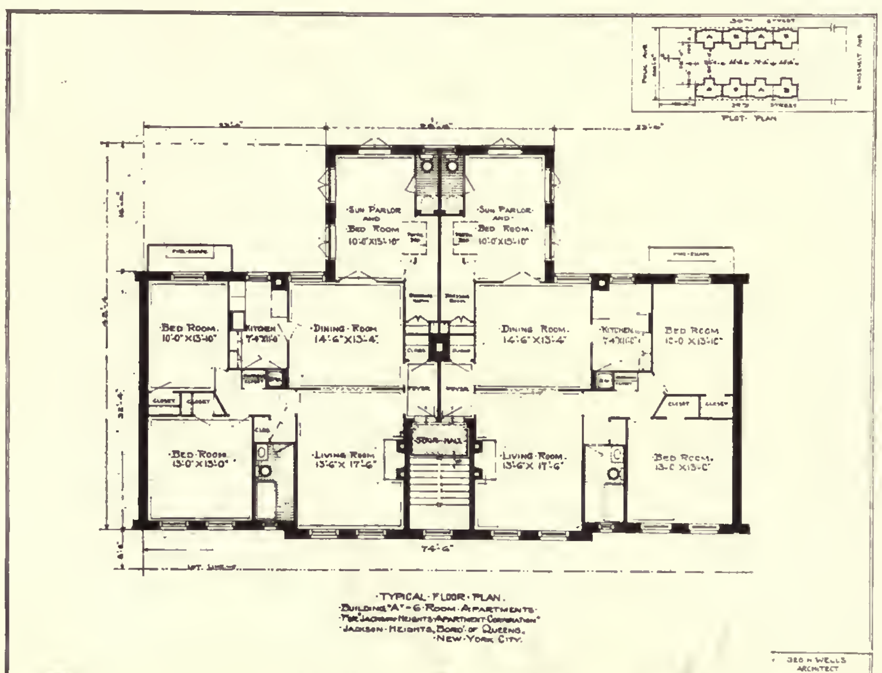
DESIGN FOR APARTMENT-HOUSE, FLUSHING, N. Y. Andrew J. Thomas, Architect.

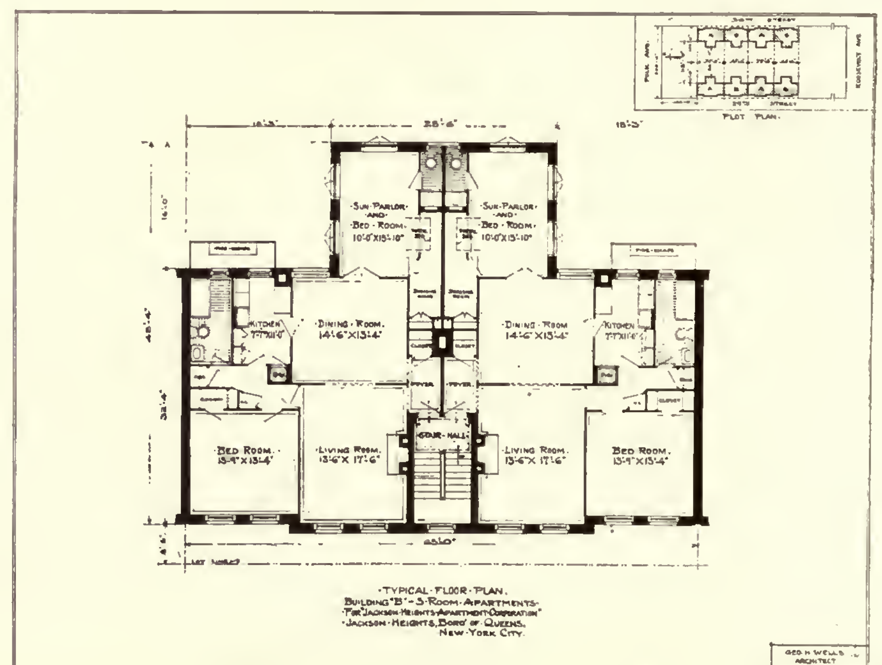


APARTMENT-HOUSE, NEW HAVEN, CONN. Jacob Weinstein, Architect.



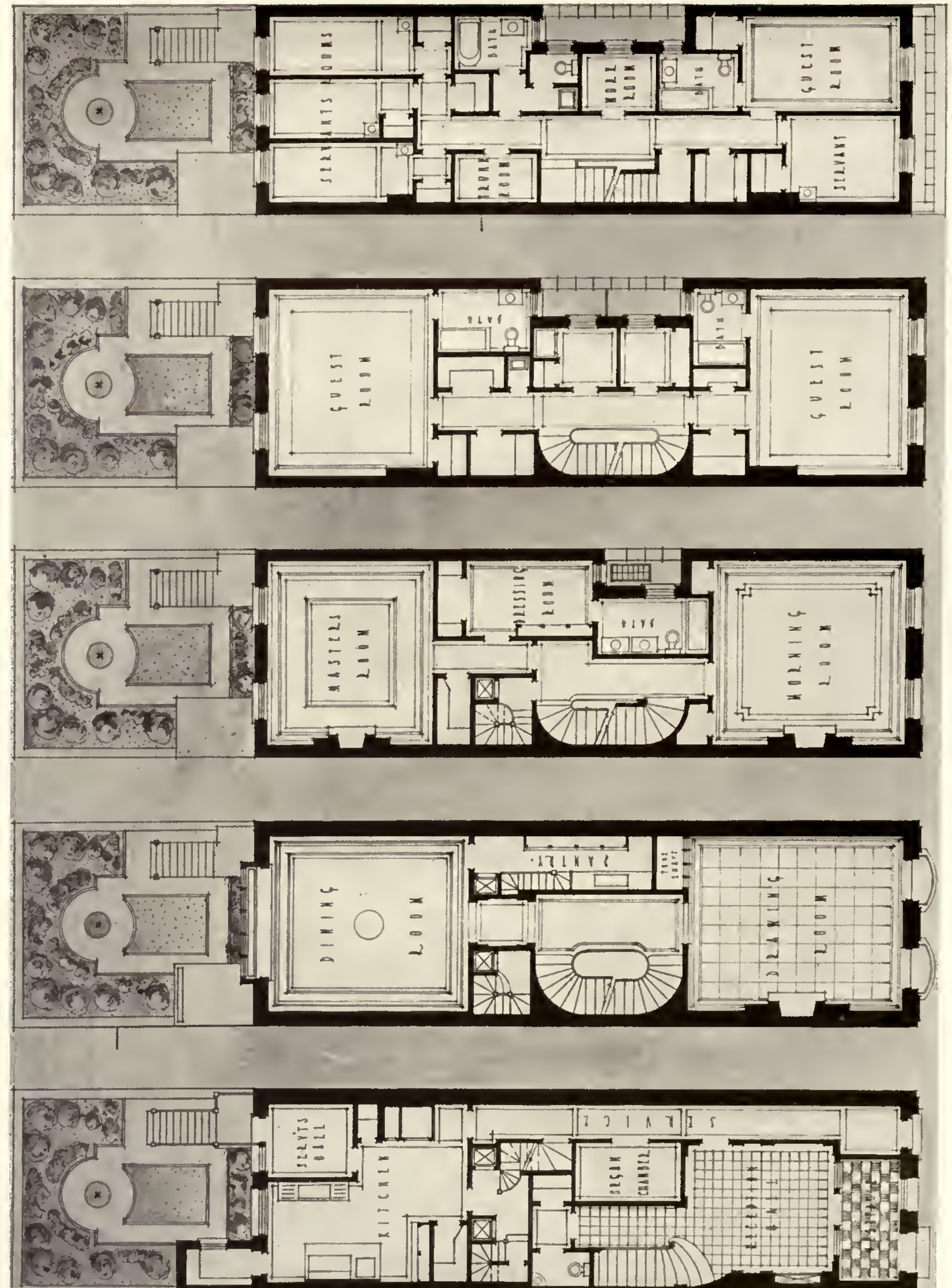






TWO TYPES (4 AND 5 ROOMS) FOR APARTMENT-HOUSE GROUP, BOROUGH OF QUEENS, N. Y.

Geo. H. Wells, Architect.



HOUSE AND PLANS, G. PAGENSTECHER, 21 EAST 70th STREET, NEW YORK.

Rogers & Haneman, Architects.

DRAWING-ROOM, HOUSE, G. PAGENSTECHER, 21 EAST 70TH STREET, NEW YORK.

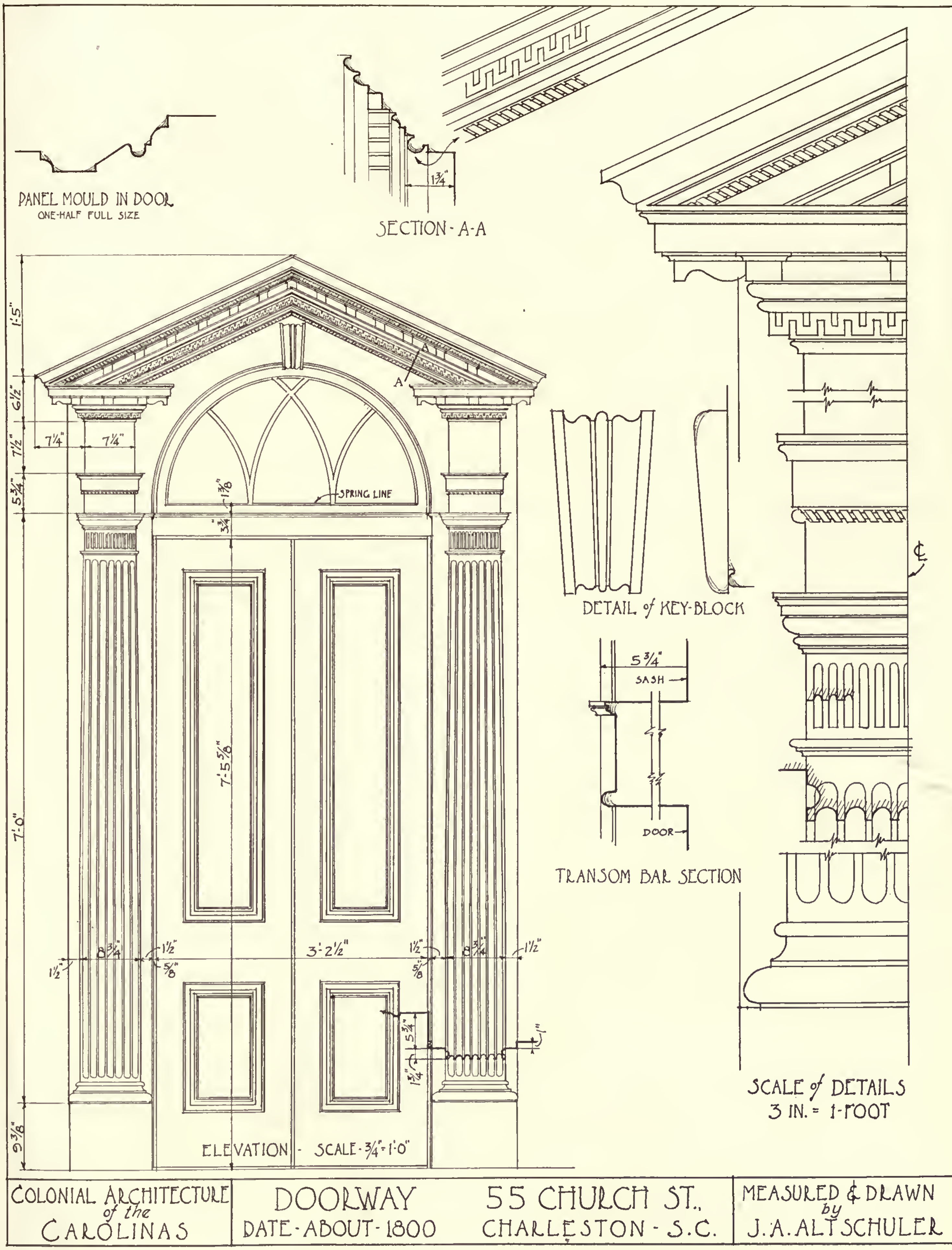
Rogers & Haneman, Architects.

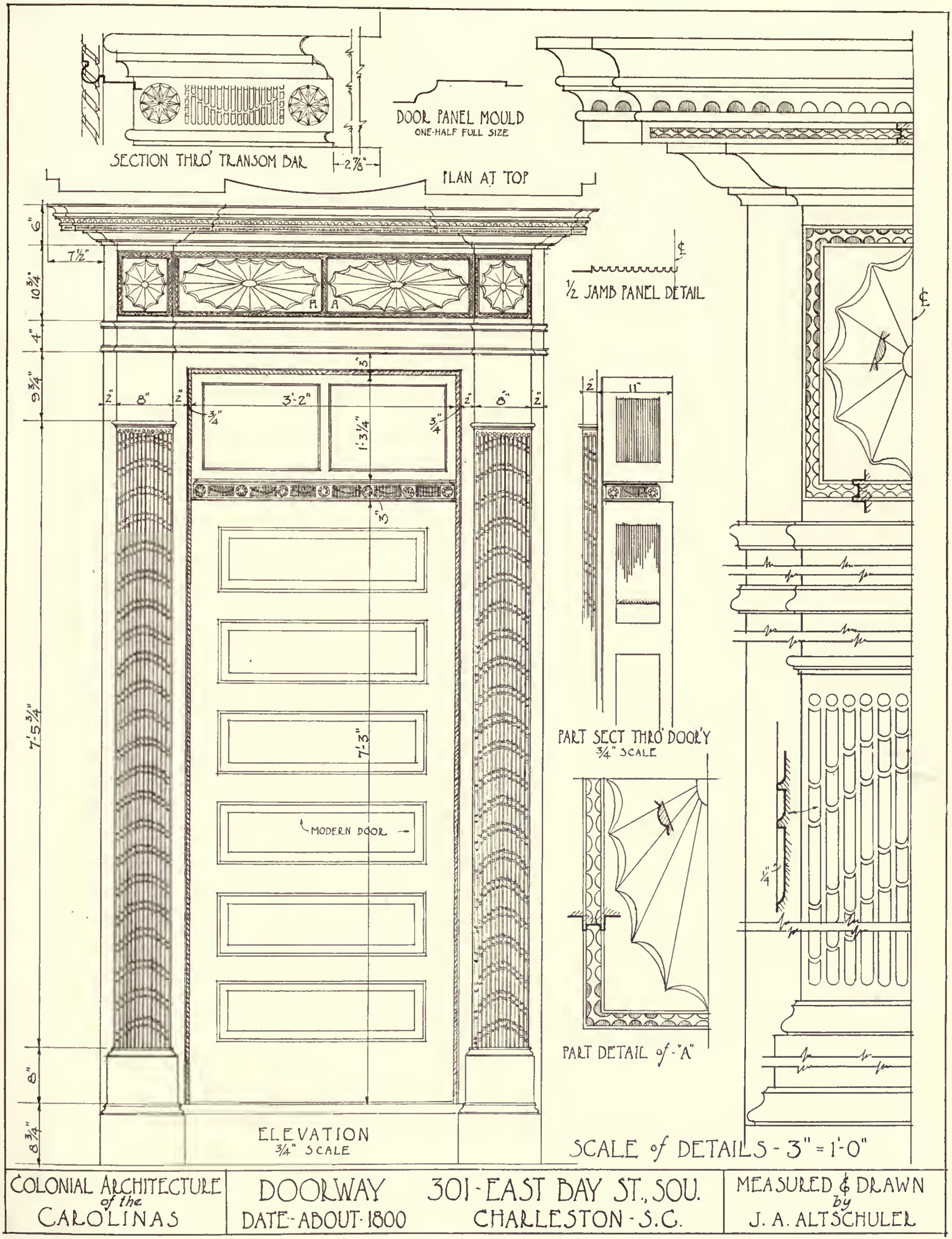
DINING-ROOM.

HALL AND STAIRCASE.

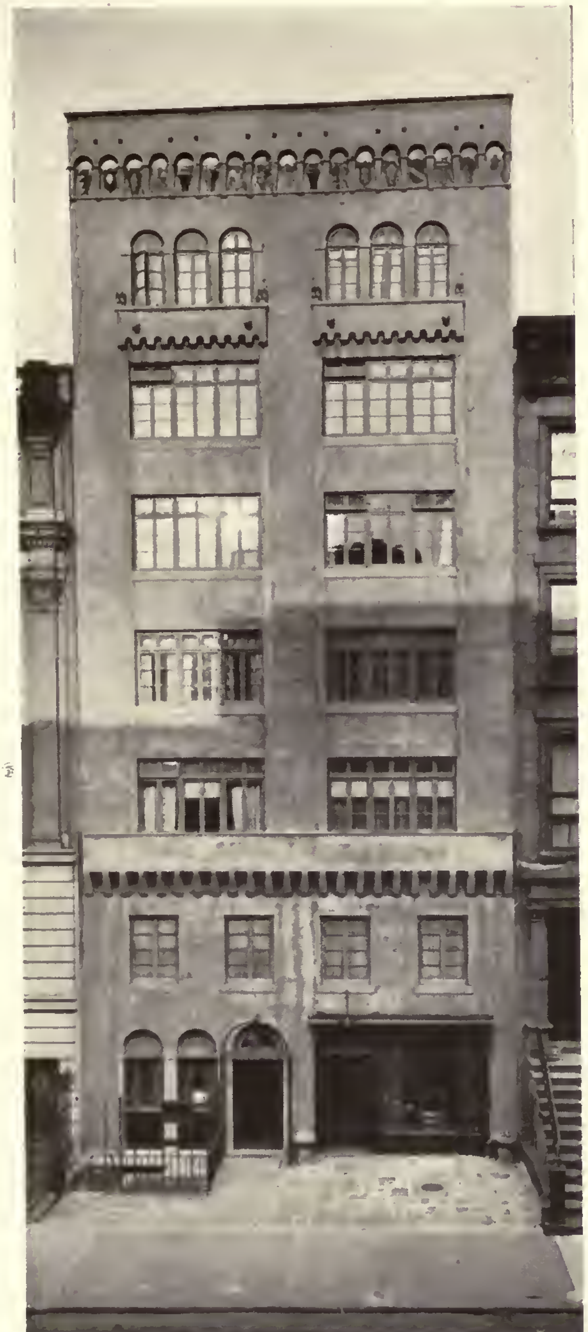
Rogers & Haneman, Architects.

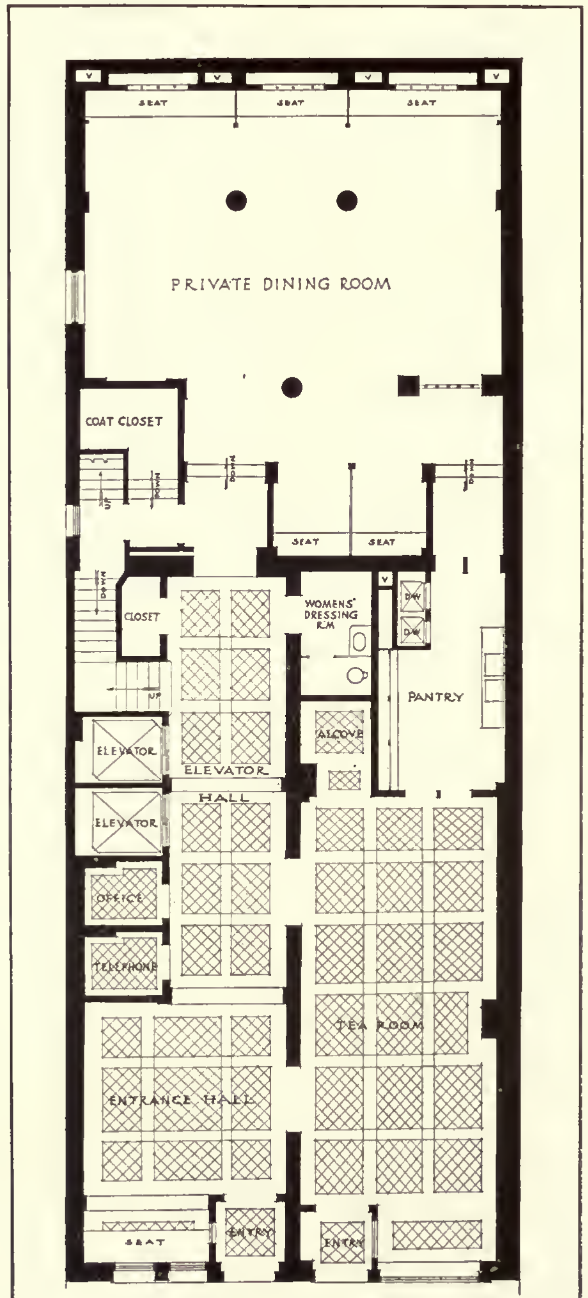
HOUSE, G. PAGENSTECHER, 21 EAST 70TH STREET, NEW YORK.


PANEL MOULD IN DOOR
ONE-HALF FULL SIZE
SECTION-A-A
DETAIL of KEY-BLOCK
TRANSOM BAR SECTION
SASH
DOOR
SPRING LINE
SCALE of DETAILS
3 IN. = 1-FOOT
ELEVATION - SCALE-3/4"=1'-0"
3'-2½"
7'-5⅝"
7'-0"
1'-5"
COLONIAL ARCHITECTURE of the CAROLINAS
DOORWAY
DATE-ABOUT-1800
55 CHURCH ST.,
CHARLESTON - S.C.
MEASURED & DRAWN by
J.A. ALTSCHULER

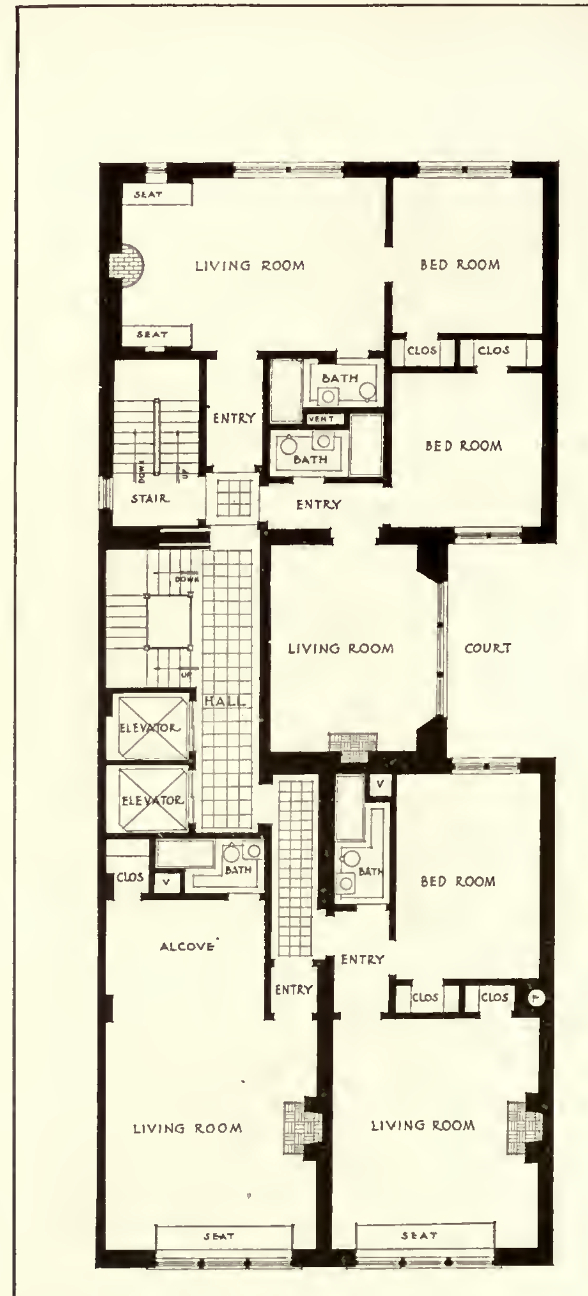

SECTION THRO' TRANSOM BAR
DOOR PANEL MOULD
ONE-HALF FULL SIZE
PLAN AT TOP
1/2 JAMB PANEL DETAIL
PART SECT THRO' DOOR'Y
3/4" SCALE
PART DETAIL of "A"
MODERN DOOR
ELEVATION
3/4" SCALE
SCALE of DETAILS - 3" = 1'-0"
COLONIAL ARCHITECTURE of the CAROLINAS
DOORWAY
DATE - ABOUT - 1800
301 - EAST BAY ST., SOU.
CHARLESTON - S.C.
MEASURED & DRAWN by J. A. ALTSCHULER


SECT. E-E
SECT. C-C
SECT. B-B
SCALE· ONE-HALF FULL SIZE
SECT·A·A
SCALE-3"=1'-0"
1 3/4"
SECT. D-D
1'-10 1/2"
8 3/4"
5 1/2
3 1/2
3 3/4
4 1/2
3"
7'-1 3/4
7'-7"
1 3/4
SPRING LINE
3 1/4
6"
7"
4"
3'-6 1/2"
9 7/8
ELEVATION SCALE-3/4"=1'-0"
SECTION SCALE-3/4"=1'-0"
DETAIL-SCALE-3"=1'-0"
COLONIAL ARCHITECTURE of the CAROLINAS
DOORWAY DATE·ABOUT·1800
39-BAY ST, SOUTH CHARLESTON - S.C.
MEASURED & DRAWN by J.A. ALTSCHULER





FIRST FLOOR



TYPICAL FLOOR

STUDIO APARTMENTS AND TEA-ROOM, 23–25 WEST 51ST STREET, NEW YORK (ALTERED BROWNSTONE FRONT).

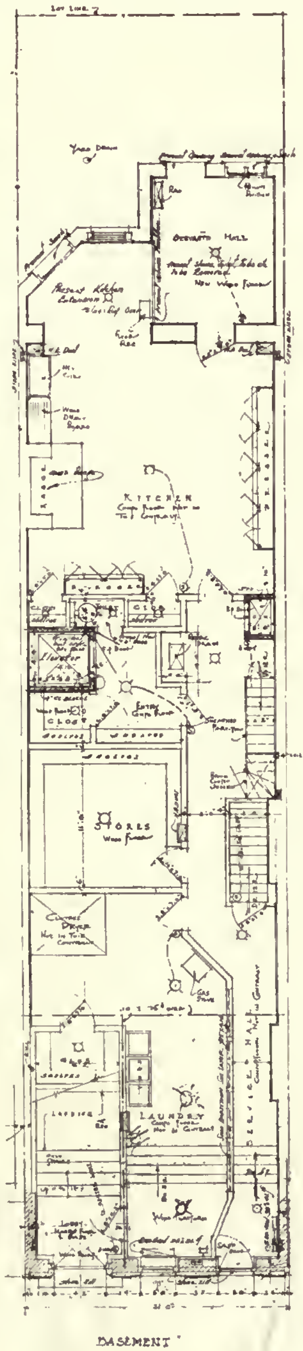
Frank Goodwillie, Wesley S. Bessell, Architects.

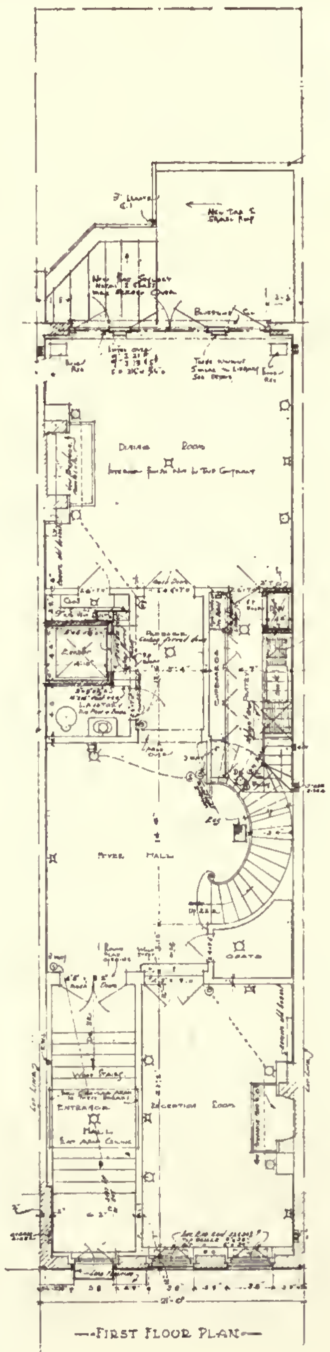
PRIVATE DINING-ROOM.

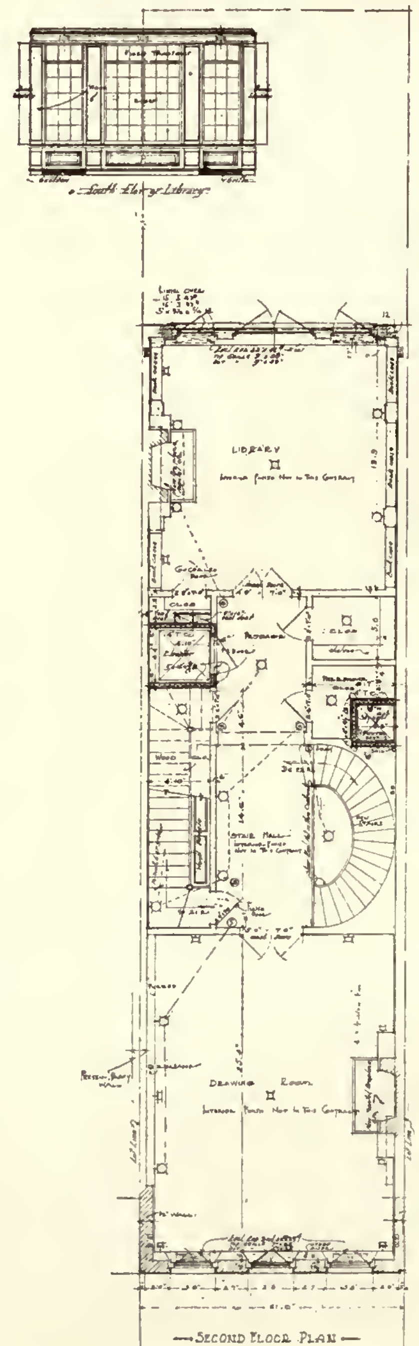
ELEVATOR HALL.

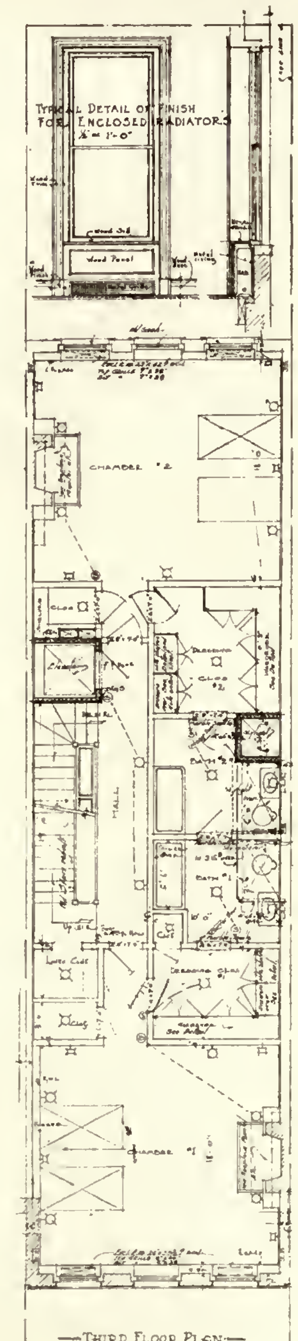
Frank Goodwillie, Wesley S. Bessell, Architects.

STUDIO APARTMENTS AND TEA-ROOM, 23-25 WEST 51ST STREET, NEW YORK.









HOUSE AND PLANS, E. G. CORNELL, 24 EAST 64TH STREET, NEW YORK.

Mott B. Schmidt, Architect.

RECEPTION-ROOM.

BOUDOIR.

LIBRARY.

DINING-ROOM.

Mott B. Schmidt, Architect.

HOUSE, E. G. CORNELL, 24 EAST 64TH STREET, NEW YORK.

The Home of E. G. Cornell

Mott B. Schmidt, Architect

THE entrance at the street level has a door opening into the service-hall at the foot of the wide staircase which leads to this hall on the first floor. This hall has walls finished in warm ivory glaze. The finely balanced curve of the staircase and its wrought-iron balustrade are interesting.

The little reception-room opening from the stair-hall is of the Victorian period. The walls are glazed in putty tones with gray-green moulds, the rug is gray-green and the window draperies of gray-green taffeta topped by cornices of carved and gilded wood.

The drawing-room is Georgian in feeling. The walls are glazed in pale yellow and the antique Chinese rug has a deep yellow ground with figures in blues and rose. These colors are repeated in the striped satin draperies at the windows and in the coverings of the wing-chair and sofa.

In the dining-room soft rose-red tones predominate in the Oriental rug and the antique velvet chair coverings. The walls are of gray finished plaster; the tapestry in verdure colors with rose tones in the border. The walnut furniture is reproduced and adapted from antiques of François I days. The hand-made sideboard and chairs show the influence of the French Renaissance in the detail of the hand carving.

The library, flooded with sunlight from the many windows, has walls finished in ivory, a rug of old-gold tones and gold gauze-glass curtains. The mantel in this room is black marble reproduced from a design by Adam.

Entrance hall and staircase.

Drawing-room, house of E. G. Cornell, 24 East 64th Street, New York. Mott B. Schmidt, Architect.

"Battle of Westport." Mural decoration for the Missouri State Capitol. By N. C. Wyeth. Tracy and Swartwout, Architects.

The Fifty-Fourth Annual Convention of the American Institute of Architects at Washington

THE convention was held this year in the auditorium of the National Museum, perhaps better known as the Smithsonian Institution. From many points of view it was one of the most important meetings in the history of the Institute.

From President Kendall's address, a presiding officer with tact and graciousness in keeping with the ideals of the profession that he so ably represents, we gather that there is to be no letting down of the high standards that have always governed the members of the Institute. There was never a time when these standards were more needed.

I record with pride and appreciation that the topics we discussed and the things that interested you were the dignity and worth of our profession and the opportunities for public service which are offering themselves to us in this present time.

I saw architects spending their money and their time, using their abilities to the utmost, that the man with little money may have a well-planned, thoroughly built home within his means.

I have seen competitive designs by hundreds sent in for nominal or no compensation, to the same ends.

Men of eminent ability have gone into public service in their cities and towns, have assumed professorships in our colleges that meant living upon a tithe of what their skill, exercised in architectural practice, would have earned for them.

Our Boards have been officered by architects who gave not only their splendid abilities, but their time, and paid their own expenses, amounting to many hundred dollars, for what?—for their own gain or reputation? No, but in order that a great service to the Working Man, to the employees, or to the public might be done—and done well—and fair play and good faith between men and men might prevail.

In one Western city some of the architects are seeking hiding-places and planning ruses, lest an appreciative public force them into the mayor's offices.

These conditions I find, in greater or less measure, from Atlantic to Pacific, and it is, I believe, a sign of an appreciation which, although tardy and long delayed, is coming; and which we, as trained and efficient men, may receive, if we will but show ourselves worthy and willing to make the necessary sacrifices.

These things, however, are not to be attained simply by the practice of architecture. There must be joined thereto a sense of our responsibility to our communities and to the people among whom we live. To some of us it will mean the nation, to others our State, to many only our city or our town. According to our ability and our opportunity will the requirement be and the responsibility.

We are facing a future for the profession, whose opportunities are almost unlimited. The country faces a need for buildings, unprecedented in amount. Housing and business make demands such as we have never known before and will not see again, unless, which God prevent, another World War shall again paralyze all beneficial enterprise.

Grateful communities all over the land desire to honor their dead and commemorate the service of those who dared all and returned. All that art can command, that skill can combine, that good design and inspiration can produce, is demanded for these symbols of gratitude. Who shall produce them if we do not?

I know of a combination of stone-cutters, such as years ago would have been ready to furnish volunteers, carved at parade rest, full life-size, in unlimited numbers, which in these days turns to the Institute and organizes a well-conducted, properly paid competition (if any competition can be called well paid) in order to set up in their city a dignified and artistic monument to the soldiers of that place.

Commissions charged with erecting great memorials, costing millions, write to ask the Institute to advise them how to select suitably qualified men to design and supervise their buildings.

Who, to-day, plans to produce a home, a worthy business building, a public building of almost any grade, without the advice and assistance of an architect? We can hardly realize that a different state of affairs once prevailed, when, to quote one of the elders of our profession, Mr. George C. Mason, who has written most interestingly of the early days of the profession in this country, "the prospective employer applied to a builder for advice as to who was the best architect for him to employ," or, ignoring the architect altogether, commissioned the builder to proceed without an architect. . . .

We welcome these new members, we are proud and gratified to have them with us, and we hope for a still further increase in the future. With from ten to fifteen thousand persons claiming to be architects in the country, we must have a larger membership if we are to be a truly representative body.

Our standards, our ideals, are to-day the recognized standards for the profession, and we ought to be able to enroll those who believe as we do in our fellowship.

There were many important matters discussed, and among them, from our point of view, none were more vital either to architects themselves or the country at large than the matter of small houses. The Architects' Small House Service Bureau of Minnesota, Incorporated, has led the way, and their book and the exhibition of elevations and plans at the convention made an encouraging and significant exhibit.

The small-house problem covers a wide territory, both physically and geographically. It should cover houses of from two or three to six primary rooms, of one or two stories, with or without basement, for all sorts of soil and climatic conditions. Therefore a competition covering only two or three conditions could, if it were otherwise advisable, help but a small portion of the desired goal.

THE SMALL-HOUSE PROBLEM

The solution for the small-house problem and all the difficulties in connection therewith as cited up to this point is found, I believe, in The Architects' Small House Service Bureau, as indorsed and sponsored by the American Institute of Architects. It provides complete architectural service for the home builder at a price he can afford to pay, and becomes valuable because it costs something. It also pays the architect a good return for the time and labor he expends on the work and so becomes of lasting interest to him. It provides the local touch and knowledge necessary for the greatest economy in building. It is a perfectly simple solution of the business problem in connection with getting out ready-made plans by professionally trained men. It brings the small builder in direct communication with the architect, and by so doing will "educate the public" by actually doing the work and showing the public that the profession is all that it knows it is, but has not yet been able to demonstrate.

To make good on any such programme or claim as mentioned above, the Architects' Small House Service Bureau must give not only a good service, but one such as has never been dreamed of before. It must produce plans and details that have the minimum of waste in them. It must use the stock forms of millwork that are on the market and must improve these as time goes on. It must provide accurate quantity surveys to enable costs to be arrived at easily. It must aid in improving the ideals of the home owners of these United States as time goes on. It must be of value in every conceivable way that an architect can and should be for his clients and his community. It must simplify the home-building problems so that home building will again take the place in this country that it deserves. It must help in all the processes of building a home from the first inception of the idea of a home to the choosing of the lot of ground, the financing, the selection of the plan, the choosing of the contractor, the beautifying of the grounds. It can and should be a great factor in making this a homogeneous home-growing nation.

That this is the solution of the small-house problem has been very clearly demonstrated by The Architects' Small House Service Bureau of Minnesota. However, unless we go further the attempt will ultimately fail. No purely local group of architects can solve the puzzle for the entire country. They cannot know and meet conditions over a country so vast as the United States. So has arisen, according to the programme laid out by the committee on small houses one year ago, The Architects' Small House Service Bureau of the United States, Incorporated. The Minnesota Bureau has reorganized itself, revised its certificate of incorporation and its by-laws and become The Architects' Small House Service Bureau Northwestern Division, Incorporated. All its rights and title to the name, "The Architects' Small House Service Bureau," to the trade-mark, and to the entire idea have been turned over to the U. S. Bureau, which in turn has licensed the Northwestern Division as a Regional Bureau for carrying on the work.

In drawing up the certificate of incorporation of the Central or National Bureau, The Architects' Small House Service Bureau of the United States, every precaution has been taken to prevent the possibility of its ever becoming dominated or controlled by any section of the country or by any of its Regional Bureaus. It must of necessity be always impartial and national. Therefore, it has been made possible for the American Institute of Architects, is the one great national impartial body of architects, to entirely control the policy and actions of the Bureau at any time it may desire without being in the slightest degree implicated financially. This matter is thoroughly covered in the certificate of incorporation of the U. S. Bureau, copy of which is attached.

A Standard certificate of incorporation based on that of the Northwestern Division, carefully drawn up after two years of actual experience in the carrying on of Bureau work, is also attached. It will be necessary for each Regional Bureau to employ the best counsel available to see that nothing in its charter is in discord with the laws of its particular State. Before incorporating, its final form of certificate must be submitted to the U. S. Bureau for approval.

The national Bureau, called the U. S. Bureau, to distinguish it from the Regional Bureaus in this report, will have no actual work of production of plans to carry out. Its part in the work will be purely that of an executive and guide for the Regional Bureaus. All arrangements for sales on a national basis, for books of plans for national trade organizations, for national publicity, etc., will be made to the U. S. Bureau. It will assign the work to the different Bureaus, will see that no duplications are made, that everything is thoroughly standardized and up to the standard of the Bureau Service.

Acting within the scope of the instructions of the Board of Directors, as well as within the resources at the command of your Committee, it has throughout the past year rendered such advisory service to promoters of memorial projects as occasion offered. In the majority of instances the inquiries that have come to your Committee have included requests for designs or illustrations suggesting typical solutions of memorial problems, and in response your Committee has forwarded the literature issued by other organizations as directed by the Board of Directors in the absence of similar publications on the part of the Institute.

WAR MEMORIALS

The conditions which have held in abeyance many building operations have in like manner prevented the development and realization of memorial projects, besides which your Committee has had occasion to note an abatement of popular interest in the subject. This apparent recession of the wave of enthusiasm that followed the armistice, and the unfavorable building conditions have had the advantage at least of diminishing the number of hastily considered memorial structures, and at the same time have extended the opportunity for more careful study of the many memorials that are still under serious consideration.

In the opinion of your Committee the activities of the Institute and other associations in this field have been of far-reaching educational value, and it is of interest to note that to some extent at least this has reacted upon the manufacturers of stereotyped forms of memorial works toward the betterment of designs offered where not already influenced or controlled by municipal art juries and commissions where such exist.

The qualifications for membership in State Societies are more liberal than in the Institute. In States having Registration Laws the usual requirement is that an applicant be a Registered or Licensed Architect engaged in the honorable practice of his profession, although in certain States Registration is the only requirement. The method of election and requirements for admission are simplified.

STATE SOCIETIES

The Principles of Practice and Canons of Ethics adopted by State Societies are variable, although many have adopted verbatim the documents formulated by the Institute.

The activities of State Societies are confined largely to questions of local concern affecting the practice of architecture in the particular locality; to the education of their own members in ethical and practical subjects; to matters of Legislation, Law enforcement and business, and to informing the Public upon the value of architectural service, to the individual and the community.

In States where State Societies have been in existence long enough to make their influence felt it seems evident that not only is the relationship between members of the profession more friendly and their actions toward one another more ethical, but also that the general quality of work produced by architects' offices has been higher, with a consequent improvement in the character of the buildings produced. Laws governing the construction and sanitation of buildings seem to have been more intelligently formulated and more closely observed.

It seems evident that in practically all but one State where Chapters of the Institute and State Societies exist that a helpful spirit of co-operation prevails and that members of Chapters are, in large numbers, also members of the State Society, and that these members take an active interest in the administration of the Society.

Your Committee has collected data showing the existence of sixteen State Societies having a reported membership of approximately two thousand (2,000). It is possible that other Societies exist that may not have come to the attention of this Committee.

The accepted period of the college course is four years, and it is erroneously thought by the general public that an architect may be educated in this period. It is this prejudice that must be dispelled, for it is now agreed by both the practising and the teaching members of our profession that this period is not adequate. How can this best be done?

EDUCATION

In the architectural schools generally it is customary to offer two options, one in design and one in construction. Does not this tend to create the impression that architecture is something apart from construction?

Is there anything in the construction option that should not be regarded as essential for the Master's Degree in architecture?

The Committee is convinced that standardization of teaching in architecture is not to be desired; each school, each master must be free. There are, however, certain principles that may be discussed with advantage.

It has been found that the uniformity and sequence of programmes as issued by the Beaux Arts Institute of Design has the great advantage of bringing a great number of students into competition on the same problem and enabling them to see in one exhibition a great variety of solutions made under various masters. Could the programmes used by the different schools be the same?

In the judgment of school problems, a stable basis of judgment is to be desired, and yet the usual method of making up the jury from the members of the faculty alone is perhaps not quite right. Can a fresh point of view be satisfactorily introduced into the judgments by inviting practising architects to act with the regular faculty.

In this connection, concerning the drawings submitted for judgment, would it be well to adopt the principle that all drawings must in their entirety be made and rendered by the students?

The Committee has considered the various methods of instruction in the important subject of office practice. Practical experience in an office is often not easy to secure for all the students. This is essentially a subject in which the practitioner can aid the teacher. The Committee will therefore be glad to receive constructive suggestions.

As a result of the referendum to Chapters the Committee received reports from eight Chapters which may be briefly summarized as follows:

CONTRACTS

All but one opposed any increase in the basic rate, including the Chapter that made the proposal last year. Two Chapters opposed any change in the schedule at all. One Chapter suggested the need of a circular giving "a complete schedule of fees based upon the 6 per cent minimum standard rate and covering full service, partial service, and special service." One Chapter proposed provision for a retainer fee, making the basic rate for alterations 10 per cent, and some further less important changes. Three Chapters favored the two principal changes regarding inclusion of engineering services, and service as a construction manager.

FIRE PREVENTION

We suggest that architects generally interest themselves in assisting in the securing of needed amendments to existing building codes. We are of the opinion that no greater field of service exists than the stimulation of intelligent interest and effort looking toward the standardization of building codes. This problem requires a correct statement of principles that may be most properly made by the architectural profession.

We believe that now is the proper time to revise building codes generally, and remove from them all unnecessary restrictive requirements. For example, the building codes of most large cities at present do not permit of the use of the newly developed hollow brick wall, the scientific use of hollow tile, the proper use of the concrete building block and other types of construction which have been recently developed and which, if permitted, will result in quite materially reducing the cost of construction of the so urgently needed housing.

Attempts have been made in some cities to very greatly reduce the fire limits so as to permit the construction of the most flimsy forms of buildings. If building codes were properly amended so as to permit of the proper use of fireproof and fire-resisting materials, small houses may be constructed with walls of fireproof or fire-resisting materials at approximately the cost of timber and lumber.

Your committee is of the belief that, if architects generally will actively interest themselves in these matters, that not only will much good be accomplished by the securing of cheaper construction that will not in any way increase the fire hazard or modify the sanitary features of buildings, but will have a tendency to stimulate that class of construction which is now so urgently needed.

COMMUNITY PLANNING

It may be permitted to direct attention to a matter of very special interest to architects, and which seems to be well proven by this town plan; that apart from a matter of ethics or economics the designer must be unhandicapped by excessive land values if he is to even partially succeed in his task. The control of land entails the choice of site and surroundings and when these things are the tools and not the master, the spirit of creation is set free. It is evident that when the major questions are decided by those whose conception of architecture is that of a more or less important cog in the machinery of investment the craft of building cannot rise above mediocrity. Furthermore, that unless the art of community planning reposes upon the foundation of workable economics it can be nothing but a sounding phrase.

In the past city planners have paid too much attention to psychology, conforming their reports to the supposed prejudgment of their clients. They have reasoned that self-stultification is justifiable if some small good can result. They forget that the first duty of the professional man is to tell the truth to those coming to him for advice, unmindful of the consequences which such frankness might have to himself.

Regulations for the simultaneous employment of architects by one client:

COMPETITIONS

"The Institute recognizes the right of an owner to purchase unlimited professional service on a basis of adequate remuneration and control. To allow Architects to render such service while safeguarding the profession from the admitted evils of unregulated or ill-regulated competitions, the Institute has adopted the following regulations:

"In the furtherance of desirable publicity, no Architect shall submit sketches or render service until he has procured from the owner or his duly authorized representative a statement either that he is the only Architect being employed for this service, or if another is being employed, the terms of that Architect's employment, which terms must be specific, inclusive, and adequate.

"In the event that an Architect is being already employed and the owner wishes to employ still another on the same project, the Architect requested to render such additional service must at once notify in writing the President of the Chapter. He shall state the terms of his employment by the owner and the name of the other Architect or Architects being employed on the project.

"The terms of employment of all Architects employed simultaneously on a given project must be at least as favorable to those who are engaged subsequently as to those originally engaged.

"It shall be the duty of the President at once to notify the Architect first employed by the owner and all others simultaneously employed by him as to the names of those employed and the terms of their service.

"Violations of these regulations in any essential particular may be reported to the President as unprofessional conduct."

REGISTRATION LAWS

Any citizen of the United States or any person who has 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 a certificate of registration or for such examination as shall be requisite for such certification under this Act: but before receiving such certificate this applicant shall submit satisfactory evidences of having completed the course in a high school or the equivalent thereof, as may be approved by the American Institute of Architects, and of having subsequently thereto completed such courses in mathematics, history, and languages as may be prescribed by the Board of Examiners and Registration of Architects. In lieu of such examination the Board may accept satisfactory diplomas or certificates, from institutions approved by the Board, covering the course of subject-matter prescribed for examination.

(Note.—Inasmuch as State laws may vest the power of establishing standards of education in the Board of Examiners or in a State Department of Education, and that the provision that the standards of the Institute shall govern may make reciprocity difficult or impossible, the nominating in the law of such standards of education requires the most careful consideration.)

Section 21: Upon complying with the above requirements, the applicant shall satisfactorily pass an examination in such technical and professional subjects as shall be prescribed by the Board of Examiners and Registration of Architects. The Board may, in lieu of examination, accept satisfactory evidence of any one of the qualifications set forth under subdivisions (a) and (b) of this Section.

(a) A diploma of graduation or satisfactory certificate from an architectural college or school that he or she has completed a technical course approved by the American Institute of Architects, together with and subsequent thereto of at least three years' satisfactory experience in the office or offices of a reputable Architect or Architects.

The Board may require applicants under this subdivision to furnish satisfactory evidence of knowledge of professional practice.

(b) Registration or certification as an Architect in another State or country, where the qualifications prescribed at the time of such registration or certification were equal to those prescribed in this State at date of application.

(Note.—If these laws are to have any material value, it is important that registration be based on a high standard of education, and that registered Architects be competent.)

The principal object of the Law is to give the Board of Examiners power to be certain that every man who uses the title of "Architect" is well qualified.

The standard of technical education for Architects approved by the American Institute of Architects is the only one which might be looked to as binding upon all States and there is no duty which the Institute has to perform which is more important in fixing and improving the standard of education of the architectural profession. Such standards will change from time to time and the widest kind of flexibility embodied in a statute will be the most desirable. Any absolute standard, even the most advanced, would soon become obsolete.

Among the especially interesting and constructive papers were "The Fundamentals of Town Planning," by Mr. John I. Bright, and "Planning High Buildings for Narrow Streets," by Mr. Harvey W. Corbett. Mr. Bright referred to the differing problems presented, to the rent question, site value in relation to population, the necessity for control of boosting methods, regulation of areas with regard to light and air, traffic control, etc.

With diagrams and a map of Philadelphia he gave an analysis of existing conditions and told of ways that the city might be improved to meet modern conditions.

The only question that I could ask is: "Is it worth while?" If it is worth while, why can we not do it? Have we arrived at the point in our civilization where we deem a thing worth while but we say we cannot do it because somebody has got to make some money; we would like to, it is worth while, we see the city is choking to death; people are losing more money every year by interruption of traffic; the costs are mounting; the land values are going out of sight; the whole thing is becoming a nightmare and yet we cannot do it because—well, our civilization has not found the answer—unwilling to disturb the present economic system. If that is so, all right; let us accept that and let us go on as we are now going on; but if we want this it is quite possible that we could do it.

Mr. Corbett, one of the architects of the now famous and beautiful Bush Building on Forty-second Street, New York, said:

I was somewhat worried when I was given this subject for discussion, "Planning High Buildings for Narrow Streets." I was afraid it might be turned into the form of a question: "What shall be done to an architect who plans high buildings on narrow streets?" [Laughter.] I was afraid I might be sentenced to a life of hard labor in the lower story of one of these high buildings, where sunshine never by any chance penetrates and there is no such thing as natural light.

Architecture, we are told, is an expression always of the people of any given period. I sometimes wonder if our present New York architecture is an expression of the New York people. Certainly, as you come up the Bay, especially as you come in a steamer from the other side, and get your first view of New York, it is an impressive and imposing sight. I think that probably the American people are impressive and imposing people.

But as you get farther up the river and get a side view on New York, there seems to be a certain amount of jazz in outline, and I am afraid that if you get a side view of the New York people you find the same amount of jazz. [Laughter.]

Perhaps the most characteristic feature of the American people is given in that old-fashioned expression of "putting up a bold front." We, as architects, do a great deal of that. We put up bold fronts. We do not put up sides and backs and tops to go along with those bold fronts. [Applause and laughter.]

A foreign architect whom I asked once to give me an opinion of his visit to New York as concisely as he could, said: "Streets without end. Fronts without sides. Signs. Pent-houses and tanks." [Laughter.]

Now, carrying this idea further, of architecture as an expression of a people, I think that our present architecture is a very clear-cut expression of our present democracy. It is a democracy in which there is so much freedom that every man is free to do exactly as he pleases, without the slightest regard to his neighbors; and the conditions under that form of democracy have been carried to such an extent in New York City that we have been obliged to create a law making it impossible for that kind of thing to continue.

He made interesting comment on the new law, and of the effect of the set-back on new construction. His talk was illustrated with examples of our towers of business. Mr. Fenner remarked that the New York law was not all they would like it to be, but was perhaps the best they could get.

Mr. Boring's remarks on his view of Washington from the Capitol should bear fruit:

When I first came down to Washington on Monday I took the opportunity to go to the Capitol to see the wonderful view of the Monuments to Washington, to Grant, and to Lincoln. I got upon the terrace, the highest point. I could see the back of Grant's hat; I could see two smoke-stacks equidistant on the axis, and between that the Washington monument; but I could not see any way whatever to get to the Lincoln monument.

Now, I believe it will come; we are going to have that avenue opened and clean out those greenhouses and those other things that are in the road; but it has not come soon enough. What I should like to see is for all of you architects who are going to go from here out through the country and spread these ideas, to try to impress upon your men that you send to Washington the necessity of carrying out that great plan which was the motive, or at least the first general enthusiasm, aroused for this idea. [Applause.]

Two talks illustrated with lantern slides of more than ordinary interest were Mr. Klauder's, on "Recent American Collegiate Architecture," and Mr. Howe's, on "The Minor Architecture of France."

Mr. Robert D. Kohn read a valuable report on "The Congress of the Building and Construction Industry," and Mr. Ernest J. Russell the report on "The National Board for Jurisdictional Awards."

On the evening of May 12 there was a formal opening of the National Architectural Exhibition, showing representative work by various chapters of the institute from all over the country.

The exhibition was one of great interest. Gold medals were awarded to Reginald D. Johnson for the best residence, to Cram, Goodhue & Ferguson for the best church, St. Thomas's, New York, and to George C. Nimmons, of Chicago, for the best industrial building.

At the session, later in the evening, there was an address by Herbert Hoover, in which he gave his views concerning the federal attitude toward wage and price fixing.

Attempts to settle wages or labor disputes on a national basis, the secretary declared, usually result disastrously for labor and industry alike. Conspiracies to maintain prices and corrupt bargains with labor he indicated as something to be dealt with by "continuous and vigorous action by the authorities. There will be no restoration of confidence in industry until this is accomplished," said the secretary.

He further outlined the readjustment of the building industry along the lines of changes in governmental methods of dealing with industry.

"The excess profits tax creates speculation and waste, blockades free dealing in property, and the higher ranges of the income tax drive capital out of building investments because of our national failure to secure income taxation of State, municipal, and national securities," he said.

To effect helpful financial changes the secretary urged amendment of the banking laws to permit national banks to apply savings accounts to mortgage purposes, and the larger application of insurance money to mortgage purposes.

The establishment of a department of public works to bring about uniformity of purchasing supplies and materials for the construction and upkeep of government buildings throughout the country occupied a prominent place in the discussion throughout the day, and a resolution to this effect was adopted.

ELECTION OF OFFICERS

The present officers, with the exception of Robert D. Kohn, of New York, who was nominated for second vice-president, were re-elected. Mr. Kohn succeeds Charles A. Favrot, of Louisiana. Officers re-elected were Henry H. Kendall, president; William B. Faville, first vice-president; William Stanley Parker, secretary, and D. Everett Waid, treasurer. Three new directors were elected: L. P. Wheat, of Washington; Charles A. Favrot, of New Orleans, and George E. Bergstrom, of Los Angeles, Cal.

The convention closed with a dinner at the Chevy Chase Club.

Altered Brownstone

By Wesley Sherwood Bessell

Frank Goodwillie—Wesley S. Bessell, Architects

Panels in tea-room.

YEARS back New York City was infested with a blight, now known as the "brownstone era." This blight has been handed down to the present generation of architects as an heirloom. It has existed as a nightmare to the profession who have had to face these monotonous rows of brownstone buildings. During the past few years, however, we have seen that these apparent obstructions in the pathway of progress presented interesting problems to be solved in the way of reconstruction and rehabilitation of these monotonous fronts. The problem has opened up new avenues for thought and evolved from nonentity an asset of a truly beneficial character. Many of our side-streets are being transformed into the category of interest and beauty. The pressing need for new homes has made opportunities for the architects to rid us of the brownstone monotony and give us instead new elements of the picturesque in both design and color.

The building at 23–25 East 51st Street, just completed, is an example of what may be accomplished in the way of such an alteration. One of the outstanding features of New York architecture has been the lack of color contrast, and still the atmospheric condition is one that lends itself readily to a more colorful play on the façades of this city. Carrying this idea to a practical and material end, color has been incorporated on this façade in a pink stucco finish, mottled to show a decided weathering. The application of additional color was made by way of an ornamental fresco applied in the arched cornices and in the lunettes over the two lower windows on the main floor. This color work was applied after the manner of the old Italian method—put on when the stucco on the surface of the finished wall was still in a wet state. The same method of color application was carried out throughout the interior, and it gives a warmth obtained in no other manner. It is especially effective where rough-textured plaster walls predominate throughout an interior.

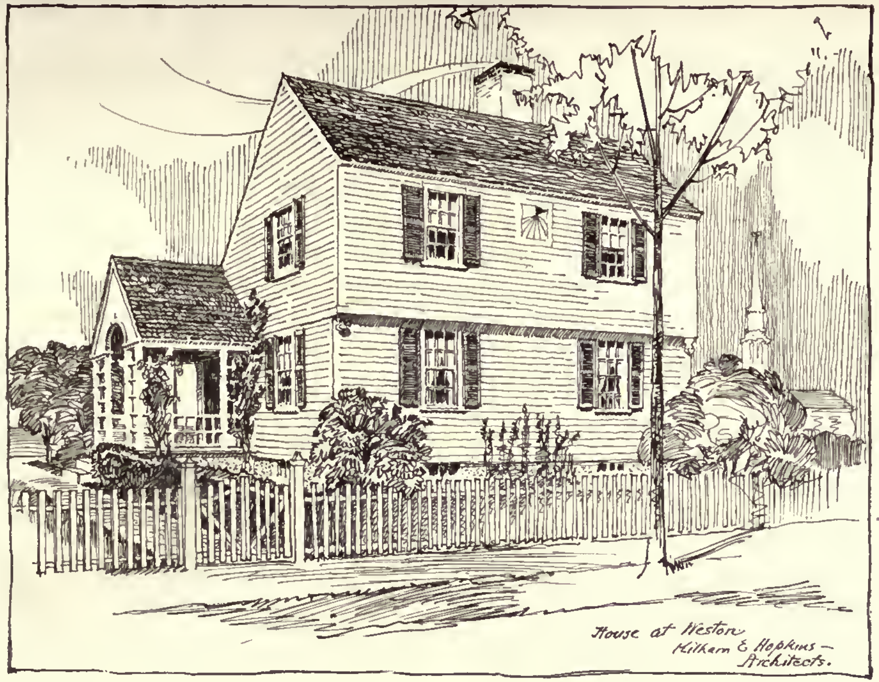
The building is designed to be a combination tea-room and studio apartment, with the tea-room arranged so as to make an eating-place for the occupants of the building. Panels on the walls of both tea-rooms are allegorical in design and of a color combination that gives a tapestry suggestion.

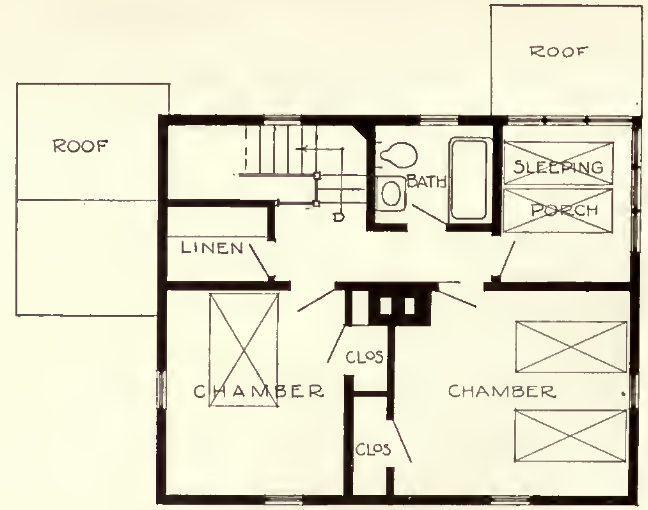
The front tea-room contains three panels, and the rear tea-room is decorated with three lunettes set in a recessed wall, the Italian landscape idea being carried out in the mediæval character suggested by the main façade.

The building is seven stories in height, with two elevators, answering the requirements of the occupants of the studio apartments in the above floors. These apartments contain a large living-room, with bedroom and bath, and also an honest working fireplace.

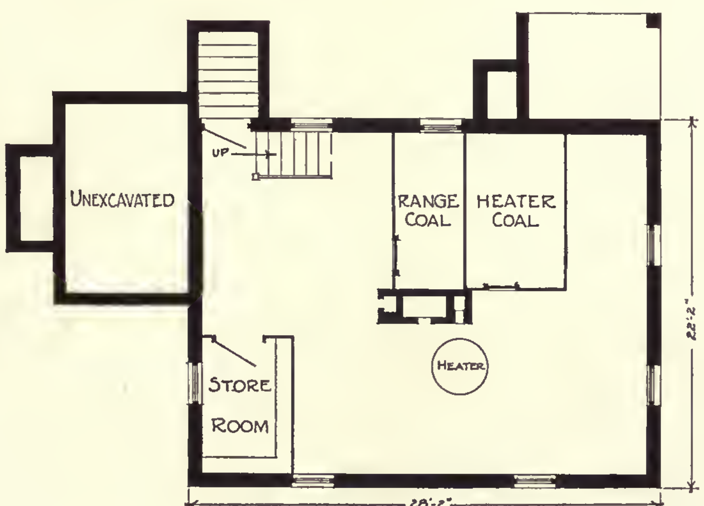
Street entrances to apartments and tea-room.

Entrance hall.

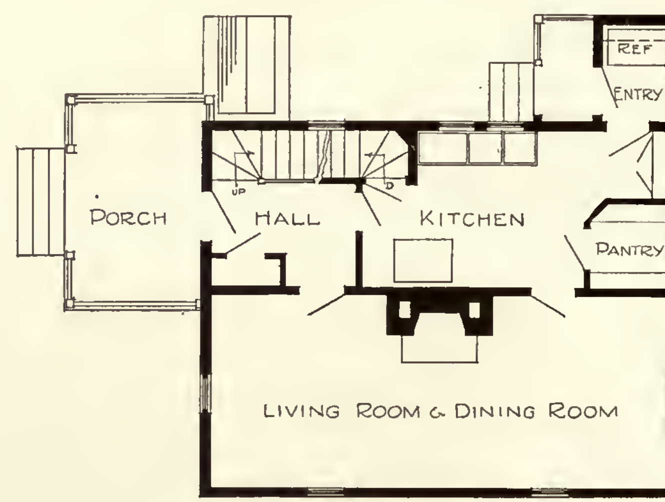




SECOND FLOOR PLAN



BASEMENT PLAN



FIRST FLOOR PLAN

HOUSE, MR. THOMPSON STONE, WESTON, MASS. Kilham & Hopkins, Architects.

The cost of this house, including a one-car garage but not including the architect's regular commission, was $7,335. The house was built last summer at cost plus a fixed sum, the contractor finishing the work at substantially the amount of his original estimate.

Construction of the Small House

By H. Vandervoort Walsh

Instructor in Architecture, Columbia University

Article XX

METHODS OF HEATING

System Adapted to the Small House

THE heating problem for the small house was for our ancestors a very simple mechanical device, consisting, as we all know, of either the fireplace or the stove. The former method still has a charm which we are not willing to dispense with, although we do not depend upon its efficiency to do the actual work of warming, but install some more complicated system, such as a steam-heating plant, to perform the practical work. A fireplace has a sentimental and intellectual warmth that no radiator can supply.

Even the stove has a certain fascination for many, recalling cold wintry nights when the family sat about the red-hot casting, the women knitting and the men burning their shoe-leather and smoking. Some advocates of the stove are so energetic in their arguments concerning the efficiency of this method of heating, that one almost doubts the defects which lead inventors to manufacture other devices. But the housewife knows the labor of shovelling coal into three or four stoves, knows the great clouds of hot, fine ashes which rise into the atmosphere and settle upon the shelves, the tops of picture-frames, and the polished surface of the piano.

And the inventor saw the tired, worn look of the housewife, removed the stove to the cellar, installed tin pipes from this central heater to the various rooms, and then waited for applause and purchasers. It seemed so simple, but it did not solve the problem entirely, for when the wind blew from the north into the windows, it pressed out the warm air from the exposed rooms, forced it down the pipes up through which it was supposed to come, and then rushed it up the flues on the south or warm side of the house, overheating this part and leaving the cold rooms of the house unheated. The drum of the furnace over which the air passed to receive its warmth from the burning coal would leak every time fresh fuel was added, for the odor of coal-gas became very evident throughout the house. Moreover, the heat was very dry and unpleasant, so that water-jars had to be set about to moisten the air.

Then came the inventor again with a new device, a steam-boiler, pipes to distribute the steam, and radiators to give off the steam to the room. Here at last was a method of heating which would supply warmth in the cold parts of the house, even under the windows, through which the chilliest air penetrated. But the sizes of the radiators were calculated to heat the house to 70 degrees when it was zero outside, although the average winter day was much warmer than this. In this way the occupants of the house were cooked with an excess of heat during moderate weather, for there was no way to regulate the amount of heat given off from the radiator; it either was filled with steam, giving off its maximum quantity of heat, or else it was empty and cold.

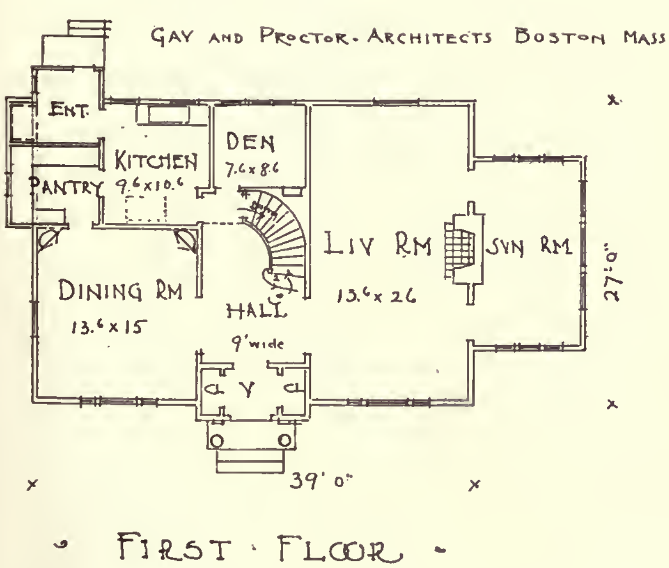
To meet this difficulty presented by the steam-heated radiator, the hot-water system was developed. Instead of distributing heat with the medium of steam which under low pressure was fixed at one temperature, heat was circulated by hot water from the central boiler. The temperature of this water could be regulated for mild weather by lowering the fire. However, since the hottest water was cooler than steam, it required larger radiators and more piping, so that the initial cost of a hot-water plant was more than that of a steam system.

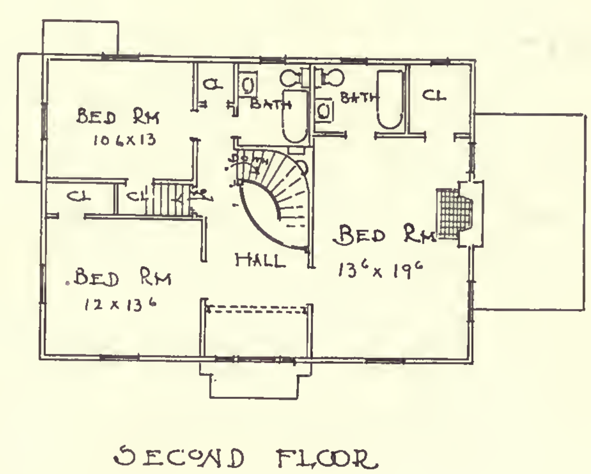
In order to overcome the disadvantages of the inflexible steam-radiator, inventors finally developed the so-called "vapor-vacuum" system of steam-heating. In this equipment the air was driven from the entire length of pipes and from the radiators by the pressure of the rising steam from the boiler, and forced through a special ejector which closed when the steam came in contact with it, preventing the return of air into the interior. Thus when the pipes and radiators were filled with steam (there being no air left), no pressure was set up to resist the circulation of the water vapor, and when the hot steam condensed in a radiator to a thimbleful of water, more steam was drawn in to take its place, for no air could enter the pipes. In this way the quantity of steam delivered to the radiators could be regulated by a special valve with a varying number of ports, and by turning the valve to a certain position enough steam would be permitted to enter the radiator to keep it half full, or by shifting the valve to another point enough steam would enter to fill the radiator to three-quarters of its capacity. In fact, the requisite amount of steam could be admitted to the radiator to balance the speed of condensation and retain whatever level of steam in it was desirable. Thus the steam system became at once a flexible system of heating, and could meet the changing requirements of the weather.

A further development of the hot-water system then came about. In this device the radiators were made to contain water, but the heat was circulated through the pipes by means of steam. This steam was poured over the surface of the water in the radiator and transferred its heat to it. According to the quantity of steam poured over the water, the latter could be heated to various temperatures. Of course the water in the radiator was the medium for distributing the heat outward from the radiator itself.

Still another improvement was made upon the hot-water system by introducing the principle of the closed expansion tank. In the ordinary system the water is allowed to expand at the top through an expansion tank, so that the actual pressure on the water of the system is atmospheric. Under this pressure the temperature of the water cannot be raised to more than 212 degrees Fahrenheit, for beyond this it boils and changes to steam. However, in the closed-tank system a so-called heat-generator is added on the line leading to the expansion tank which, by means of a column of mercury, is capable of adding 10 pounds more pressure than the atmosphere to the water in the system,

(*Continued on page* 194.)





HOUSE, J. M. PRINGLE, WINCHESTER, MASS.

Gay & Proctor, Architects.

(*Continued from page* 192.)

and thus raising the boiling-point to about 240 degrees. This generator is so designed, however, that, although it adds this greater pressure to the water, yet the natural expansion of the water in the system is permitted through it in case of emergency. By permitting the raising of the temperature of the water, the size of radiators can be cut down 50 per cent, which, of course, reduces the quantity of water needed and permits a quicker heating of the system when the fire is started. Thus a saving of fuel is accomplished and the disadvantage of the ordinary hot-water system is eliminated; namely, the long time required to get hot water in the radiators after the fire is started in the morning from its banked condition of the previous night.

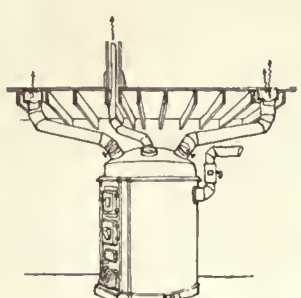
However, the genius of the inventor was not at rest on the problem of warm-air heating, for he discovered that what he needed in this system was to abolish the flues, which he once thought were essential, and use but one register and one flue. This is called the pipeless furnace. A register is employed which has an outer and inner section. The outer section permits the cold air from the house to pass down through it and over the drum of the furnace. The inner section of the register permits this hot air to escape upward and through the house by natural distribution. Thus the hot air rises from, and the cool air settles back into, the furnace without utilizing flues. The circulation of this system was found to be superior to the older method and very much cheaper to install. In fact, it is the cheapest of all systems of heating. It is especially adapted to the small, low-cost house.

To reduce the cost of hot-water heating, and make it also available for this class of small house, the manufacturers produced another type of water heating-plant. In this device the water-heater was installed in one of the rooms of the house, like a stove, but the exterior was designed to serve as a hot-water radiator for the room in which it was placed. From this heater, pipes were taken off to distribute heat to other radiators, located in adjoining rooms. The principle remains the same as the former system; the only difference lies in the reduction of cost by eliminating the boiler from the cellar and utilizing it to heat the room in which it was placed.

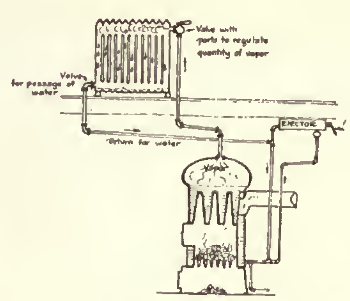
Other attempts to improve the mechanics of heating have been more along the line of perfecting the operation of valves or the utilization of other fuels than coal. Gas-radiators have been tried, but they are so expensive to operate in most parts of the country that they are hardly suited to the needs of the small house, and many designs caused so much water of condensation upon the walls, due to the burning of the gas, that the decorations were ruined. Electric heaters, too, are not within the pocketbook of the average person owning the small house. Fuel oil-burners also have been devised to take the place of the coal-grate. Wherever oil is cheap enough to permit their use, they are great labor-savers, since they eliminate all the shovelling of coal and handling of ashes.

Briefly, then, the available systems for the heating of the small house are:

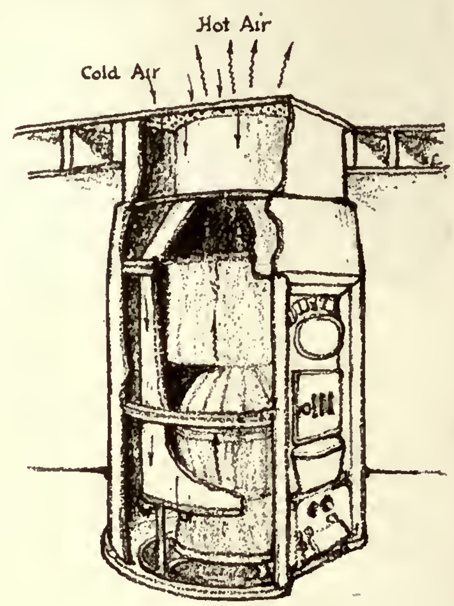
(*Continued on page* 196.)



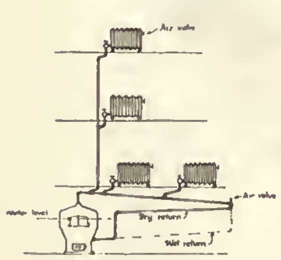
Warm-Air Furnace with Pipes



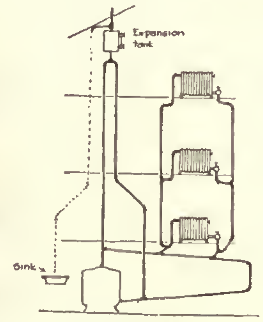
Simplified diagram of Vapor-vacuum system



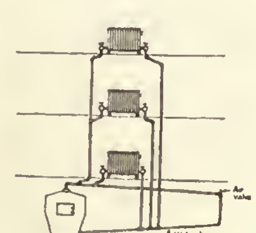
Pipeless Furnace



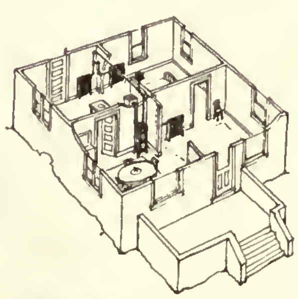
Steam Heat — One-pipe



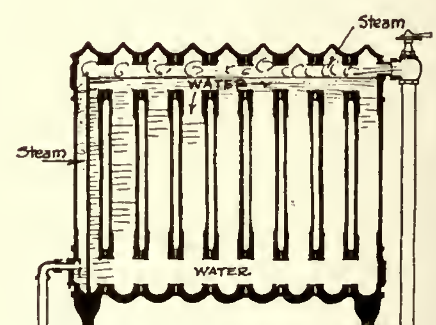
Hot Water Heating



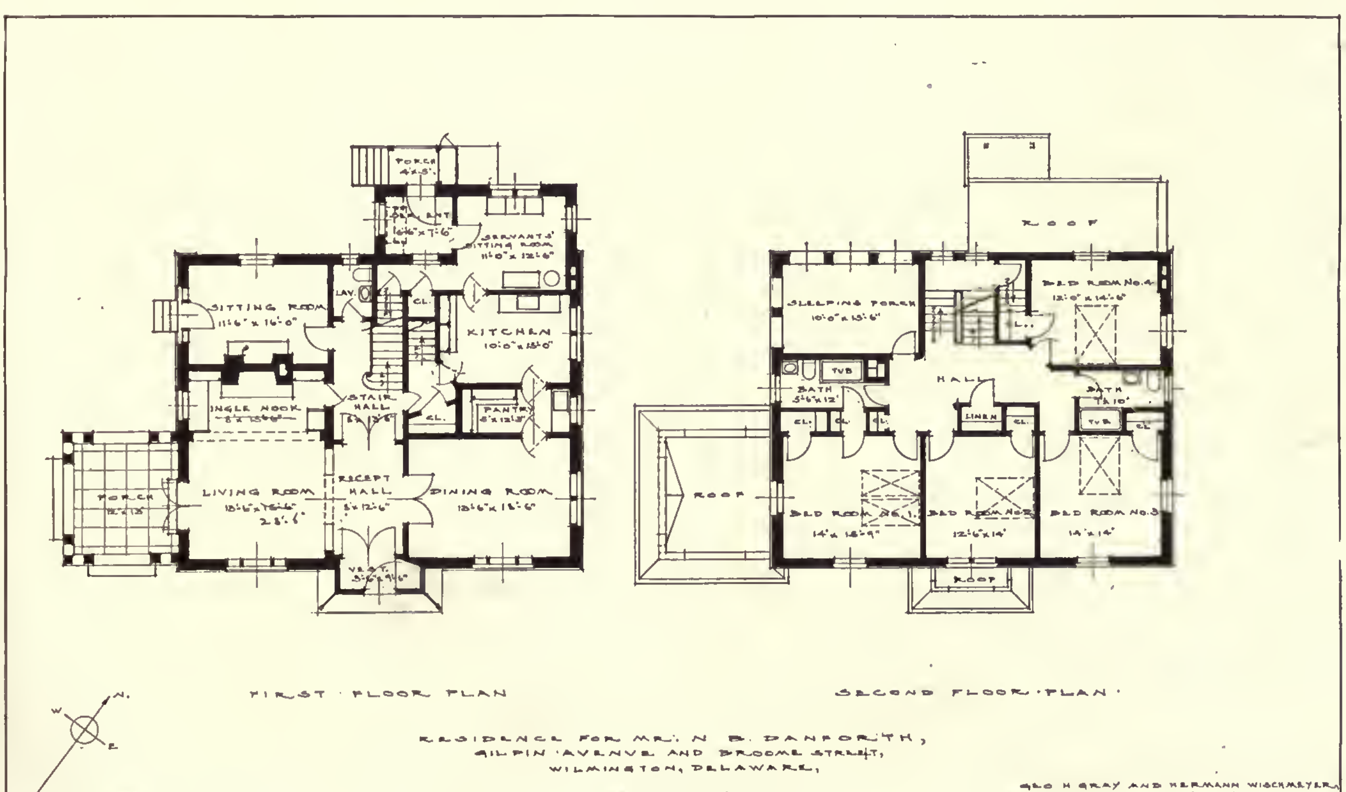
Steam Heat — Two-pipes



Hot Water Heating — Boiler in Dining Room



Hot water radiator heated by steam


PORCH
SERVANTS' SITTING ROOM
SITTING ROOM
LAV.
KITCHEN
INGLE NOOK
STAIR HALL
PANTRY
PORCH
LIVING ROOM
RECEPT HALL
DINING ROOM
VEST.
ROOF
SLEEPING PORCH
BED ROOM No. 4
BATH
HALL
LINEN
ROOF
BED ROOM No. 1
BED ROOM No. 2
BED ROOM No. 3
ROOF
N.
W
E
S
FIRST · FLOOR PLAN
SECOND FLOOR · PLAN ·
RESIDENCE FOR MR. N B. DANFORTH,
GILPIN AVENUE AND BROOME STREET,
WILMINGTON, DELAWARE,
GEO H GRAY AND HERMANN WISCHMEYER,
ARCHITECTS, 1417 STARKS BLDG, LOUISVILLE, KY.

(*Continued from page* 194.)

Hot-air—a. Furnace with flues.
b. Furnace without flues.
Steam—a. Ordinary gravity system.
One-pipe.
Two-pipe.
b. Vapor-vacuum system.
Hot-water—a. Ordinary open-tank system.
One-pipe.
Two-pipe.
b. Closed-tank system.
c. Special open-tank system with boiler used as radiator.
d. Patent system using water in radiators but steam for circulation.

Methods Employed in Calculating the Required Size of Heater

The basis of calculating the required size of any one of the systems previously mentioned is to assume that a certain temperature of heat is to be maintained when the weather is zero, and then by means of the laws of heat transmission estimate the quantity of heat lost per hour from the house. The amount of heat lost per hour is, of course, the quantity which the heating system must supply. Knowing this, a system is installed which is capable of supplying this heat loss.

In such devices as the warm-air furnace the required size can be computed directly to meet the heat loss, but where radiators are used the required sizes of these must first be determined to offset the losses from the rooms in which they are installed, and then the size of the heater must be estimated to supply sufficient heat to the radiators and to make up for the losses of heat through the distributing-pipes.

The usual temperature to which the small house is heated when it is zero outside is 70 degrees Fahrenheit. It is then assumed that a certain quantity of heat is lost through the walls of the house by radiation and convection and conduction, and another quantity lost by the leakage of warm air out through the window-cracks. (The quantity of heat is measured in British thermal units, called B. T. U.'s.)

To understand the manner by which heat is lost through the exterior walls, it is necessary to know the meaning of radiation, convection, and conduction.

By standing before an open fire the heat given off by radiation can be observed by shutting it off with a piece of paper held between the face and the fire. This is the transmission of the heat through the ether, and is similar to the transmission of light, since this heat will pass through glass, like light.

Convection of heat is illustrated by heating air in one place and transferring that air to another place, where it will give up its heat to surrounding bodies.

Conduction of heat is illustrated by heating the end of an iron rod and noticing that the heat will eventually be transmitted along the length of it to the other end.

The heat within a house escapes from the interior to the colder atmosphere of the exterior through the walls by radiation, through the glass windows and the substance of the walls by the convection action of the warm air of the interior giving up its heat to the interior face of the wall and the cold air of the exterior extracting this heat from the exterior face and carrying it off, and also by the action of conduction of the materials of which the wall is composed.

The quantity of heat lost is measured by the number of B. T. U.'s lost through one square foot of the wall each hour. As the window-glass loses heat through it more quickly than the wall, it is necessary to calculate this separately. The process, then, for estimating the heat loss from a room is as follows:

1. Estimate the number of square feet of exposed wall surface in the room, including windows.
2. Subtract from the above the area of the windows to find the net wall area.
3. Multiply this net wall area by the number of B. T. U.'s which the wall loses per square foot of surface for each hour.

These factors are given in the following table:

Type of wall	Zero outside and 70 degrees inside Number of B. T. U.'s lost for each square foot of wall surface each hour
Brick wall, furred and plastered:	
8″ thick	16.1
12″ thick	14.0
Frame wall, sheathed, clapboarded, and plastered	19.6 (with building-paper use 16.1)
Hollow-tile wall and concrete and stone have factors about the same as for the furred brick wall	

4. Add to this the number of B. T. U.'s lost per hour through the windows. This is determined by multiplying the area of the windows by the heat loss in B. T. U.'s per hour for each square foot of window, which is 78.8 for single windows, and where storm-windows are added it is 31.5 B. T. U.'s.
5. This total sum is the number of B. T. U.'s lost through walls and windows for each hour.
6. To this must be added the heat lost by leakage through the window-cracks. This is secured by measuring the length of window-cracks on the side which has the greatest length of crack and multiplying this by 168, or the number of B. T. U.'s lost each hour for each linear foot of window-crack. For very tight windows reduce above to 84.
7. The total of all the above gives the number of B. T. U.'s lost each hour from the room when the outside temperature is zero and the inside is 70 degrees Fahrenheit.

Knowing the quantity of heat lost per hour, a radiator must be installed which will supply this amount per hour. As the average steam-radiator supplies about 250 B. T. U.'s per hour from each square foot of its surface, the number of square feet required for a radiator to be installed in the room can be found by dividing 250 into the number of B. T. U.'s which were found to be lost from the room each hour.

A hot-water radiator gives off about 150 B. T. U.'s per hour for each square foot of surface, so that the radiator is generally nearly twice as large as the steam-radiator.

Knowing the required number of feet of radiation for the radiator, the proper size can be selected from the manufacturer's catalogue.

By lumping the total number of square feet of radiation for all the radiators throughout the house together and adding 35 per cent to this to make up for loss through pipes and underrating of boilers, the size of the boiler can be selected from the catalogue to fit this need.

To estimate the size of a warm-air furnace, the total quantity of heat lost from all the rooms of the house should be calculated in the same way, and then 25 per cent added to allow for cold attics and exposure. This quantity should then be multiplied by 2.4 and divided by 8,000 to find the number of pounds of coal which will be required to be burned per hour. By dividing this amount by 5, the grate area of the required furnace can be found, and the correct size selected from the manufacturer's catalogue.

Concrete Construction

By DeWitt Clinton Pond, M.A.

SIXTH ARTICLE

IN the last article the design of the interior footings of the partial plan of the 395 Hudson Street Building was investigated, and it was found that the methods outlined in previous articles were used in the actual design of these footings which now form the foundations in place under the columns of the largest reinforced-concrete building on Manhattan Island.

The foundations under the exterior columns are known as continuous footings, and, although many of the considerations involved in their design have been discussed in other articles, there has been no investigation of exactly this type of foundation. The first difference between the design of an exterior footing and an interior one is that the dimensions of the first type are limited by the building-line. In New York, at a distance 8 feet below the sidewalk, the designer is permitted to have his exterior footing project 1 foot beyond the building-line, although no projection is allowed beyond an interior lot-line. As the building under consideration covers an entire city block, there are no interior lot-lines bounding the plot, and this simplifies the footing design to a certain extent.

All exterior columns were kept back 5 inches from the building-line, as the building was designed with a brick-and-stone treatment of the façades. The allowance was made so that there could be a brick finish over the columns and also to allow for any inequalities in the concrete. The exterior footings could therefore project 1 foot 5 inches beyond the face of the column along the building-line.

Another limit to the dimensions of an exterior footing is set by the actual spacing of the columns on centres. In the present case all columns, except those in the corner bays, are spaced 20 feet on centres in both directions. The length of each footing can be no more than 20 feet. With these conditions understood there can be little misunderstanding of the following calculations:

In designing footings of the type under consideration it is customary to combine the design of several at a time if the loads are approximately alike. Columns 9, 10, and 11 carry about the same loads, and an average load of 987,000 pounds will be taken as applying to the design of all three. The weight of the footing, under each column, will be taken as 90,000 pounds, making a total load on the soil of 1,077,000 pounds. The soil will carry 8,000 pounds per square foot, and the area of soil to be covered is 134.6 square feet.

The footing can be no more than 20 feet long, so the width must be 6 feet 8 inches. The actual area will be 133.3 square feet, slightly less than that given above. The upward pressure of the soil, which will cause shear and bending in the footing—disregarding the weight of the footing itself—will be $987{,}000 \div 133.3 = 7{,}404$ pounds per square foot.

A consideration which might be noted in passing is that the width of the column in the basement story is determined by the width of the footing. In order to have the centre line of the column coincide with the centre line of the footing the inside face of the column is set back from the edge of the footing the same distance as the outside face. It was found that the outside face was 1 foot 5 inches back of the outside edge of the footing, so the inside face will set back this same amount, or, in other words, the width of the column will be 2 feet 10 inches less than the width of the footing. This will make the column thickness 3 feet 10 inches in the basement story. As the width of the column, measured along the building-line, is determined by architectural considerations and is 3 feet 10 inches, this makes the basement section of the column square, measuring 3 feet 10 inches in both directions. This section will carry more than the load imposed upon it, but will be concentric with the footing. The sections above the basement section will tend to produce eccentric loading upon the footing. For this reason the column must be "hooked in" at the first floor, and the method of doing this will be explained when the first-floor construction is designed.

It has been determined above that the upward unit pressure of the soil is 7,404 pounds per square foot. The columns are 20 feet on centres and all—except the corner column, number 12—measure 3 feet 10 inches along the building-line, leaving 16 feet 2 inches in the clear between them. In designing the footing this clear span between the columns will be treated as if it were a beam.

In the case of the interior column footings, the design of which was investigated in the last article, the depth was determined by the punching shear. In the present case the depth should be found on the basis of compression in the lower portion of the footing, and as this compression is due directly to the moment, this must be determined first.

The load on the clear span is found by multiplying the span by the width and by the unit load. $16.17 \times 6.67 \times 7{,}400 = 798{,}000$ pounds. The condition of loading of the footing is shown in Fig. XIII, and it will be noted that the load does not extend over the entire span of 20 feet but only over the clear span of 16.17 feet. This is not exactly correct, but is so close to being correct that it is the method used in practical design. The method of obtaining the moment is by finding the downward moment due to the pressure at the column and subtracting from this the upward moment due to the pressure of the soil.

The downward moment will equal $399{,}000 \times 10 = 3{,}990{,}000$ foot-pounds.

The upward moment will equal $399{,}000 \times 4.04 = 1{,}611{,}960$ foot-pounds.

The total moment will equal the difference between these two, or 2,378,000 foot-pounds.

The footing, being a continuous footing, will act as a continuous beam, and the moment in a beam of this type is two-thirds of that for a simple beam. In order to reduce the above moment to inch-pounds and to the proper moment for a continuous beam it will be necessary to multiply by 12 and by $\frac{2}{3}$. The proper moment in inch-pounds will be 19,024,000 inch-pounds.

The next step is to find the depth. By referring to a previous article in the October, 1916, number of ARCHITECTURE the reader will see how this method was applied to the design of a square footing. The same method applies to a continuous one.

The stress in the steel for a beam 1 foot wide equals $1{,}462.5 \times d$. Also M equals the stress in the steel—S—multiplied by $\frac{7}{8} \times d$.

In order to use the above equations it will be necessary to find the moment for each foot in the width of the footing. 19,024,000 divided by 6.67 will equal 2,852,000 inch-pounds.

$$M = S \times \tfrac{7}{8} \times d.$$
$$2{,}852{,}000 = 1{,}462.5 \times d \times \tfrac{7}{8} \times d.$$
$$d^2 = (2{,}852{,}000 \times 8) \div (1{,}462.5 \times 7).$$
$$d^2 = 2{,}230.$$
$$d = 47.5 \text{ inches.}$$

In order to be sure that this depth will be great enough to resist punching shear it will only be necessary to use the methods outlined in the last article. It will be found that in this case the moment determines the depth of the footing rather than the shear.

The next step will be the determination of the steel in the footing. The total moment has been found to be 19,024,000 inch-pounds. By multiplying this by 8 and dividing by 7 and 47.5 the total stress in the steel will be found to be 457,000 pounds. By dividing this by 16,000 pounds it will be found that 29 square inches of steel will be required and that this area can be made up out of nineteen $1\frac{1}{4}$-inch bars.

Before designing the stirrups for the above condition the design of part of the footing between columns 11 and 12 will be investigated. By referring to the detail of the continuous footing (Fig. XIV) it will be noted that the distance from the centre line of column 11 to the end of the footing is 21 feet $1\frac{7}{8}$ inches. The footing splays out at the end on account of the need of covering a proper number of square feet of soil. The load brought to the footing by column 12 is 781,000 pounds and the load of column 11 is 976,000 pounds, and one-half of this will be carried on the part of footing under consideration. If the weight of the footing itself is taken as 105,000 pounds, the total weight upon the soil will be $488{,}000 + 781{,}000 + 105{,}000 = 1{,}354{,}000$ pounds. As the soil is four-ton—8,000 pounds—soil, the area to be covered must be 171.7 square feet. As stated above, the length is 21.16 feet, and the average width of the trapezoid will be $171.7 \div 21.16 = 8.1$ feet, or 8 feet 1 inch. If the width at column 11 is 6 feet 8 inches, the width at the outer edge must be 9 feet 6 inches in order to have the average width as given above.

The footing is trapezoidal and column 12 sets back 5 inches from the building-line, and its centre line is 2 feet 5 inches back of the edge of the footing, as the column is 2 feet thick. By allowing 1 foot 5 inches from the oblique edge of the footing to the edge of the column at the centre line it will be found that the column will measure along the face of the building 6 feet 4 inches, and that its centre line will be directly over that of the footing at that point.

This is another case in which the dimensions of the basement section of a column are determined by the footing.

There are two methods of attacking the problem of designing the trapezoidal end of the continuous footing. The first is to treat it as a rectangular footing having a width of 8 feet 1 inch and loaded uniformly between the supports. The other is to treat it in accordance with the actual condition of loading and the trapezoidal shape. The last-mentioned method will take considerable time, and in some cases, when the excavation work has been completed and the field force is calling for plans, time is not always available. However, this method is more accurate and should be employed when possible.

The load per square foot of the upward pressure of the soil is found by adding the two column loads and dividing by the area. $488{,}000 + 781{,}000 = 1{,}269{,}000$. $1{,}269{,}000 \div 171 = 7{,}420$ pounds. The clear span between columns is 15 feet 10 inches, and the area is a trapezoid having the shorter side 6 feet 11 inches long and the longer of the two parallel sides 9 feet long. The area is obtained by multiplying the average width—7 feet $11\frac{1}{2}$ inches—by the clear span, and if this is multiplied by the unit upward pressure of the soil the force tending to produce bending will be obtained. $7.95 \times 15.83 \times 7{,}420 = 934{,}000$ pounds.

Fig. XV shows the above conditions.

The centre of gravity of the trapezoid between the two columns is 8.28 feet from the shorter side, and as this side is 1.92 feet from the centre line of column 11, the distance from this line to the centre of the trapezoid is 10.2 feet. The right reaction will be found by the following calculations:

$$(934{,}000 \times 10.2) \div 18.75 = 508{,}000.$$

The reaction at the centre of column 11 can be found by subtracting this from the total load:

$$934{,}000 - 508{,}000 = 426{,}000 \text{ pounds.}$$

The next step is to find the point of no shear, or the point of maximum bending moment. This is usually done by trial, but it can be determined by carefully drawing a shear diagram and measuring the distance to the point at which the shear becomes zero. Such a diagram is shown in Fig. XVI. It will be noted that the shear changes as a curved line. From this it can be found that the point of maximum bending is 7 feet 9 inches from the edge of column 11. At this point the footing is 7 feet 11 inches wide. The trapezoid included between the edge of the column and the point of no shear has an area of 57.4 square feet, and the upward pressure of the soil upon it will be 426,000 pounds, which equals the reaction at column 11. The centre of gravity of this trapezoid is 3.78 feet from the zero point, and the maximum bending moment—taken around this point—will be found to be 2,504,000 foot-pounds, or 30,048,000 inch-pounds. This part of the footing will act as a semicontinuous beam, and this moment must be reduced by one-fifth to have it equal the actual moment, and, if this is multiplied by eight-sevenths and divided by the depth, the stress in the steel will be found.

$$30{,}048{,}000 \times \tfrac{4}{5} \times \tfrac{8}{7} \times \tfrac{1}{47.5} = S = 578{,}000 \text{ pounds.}$$
$$587{,}000 \div 16{,}000 = 36 \text{ square inches.}$$
$$36 \div 1.5625 = 23 - 1\tfrac{1}{4}\text{-inch-square bars.}$$

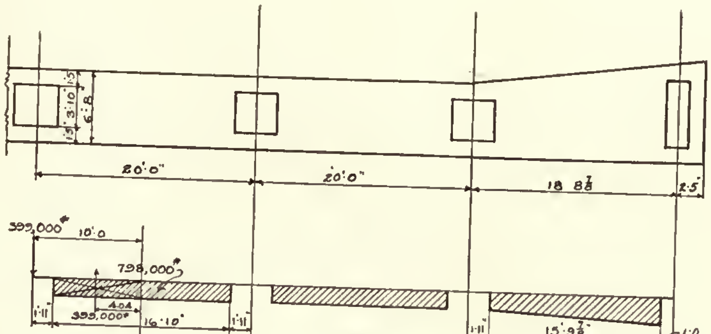


FIG. XIII

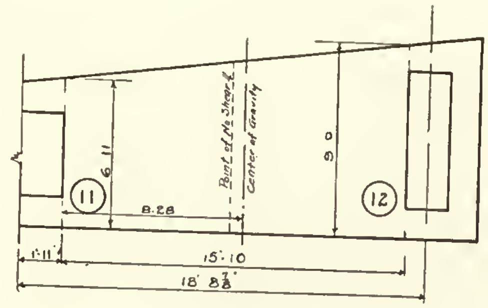


FIG XV

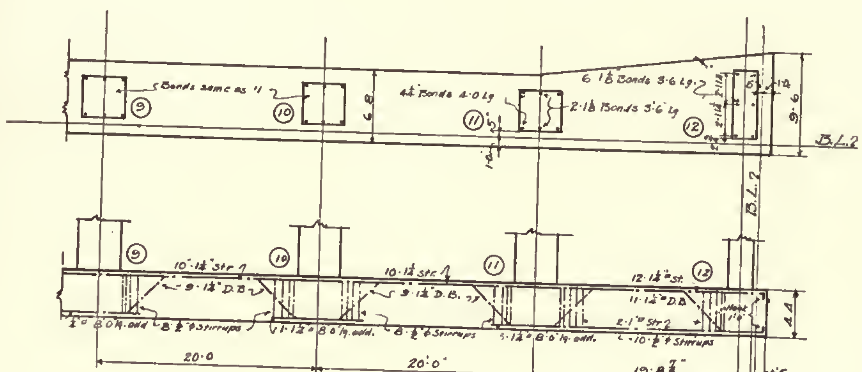


FIG. XIV.

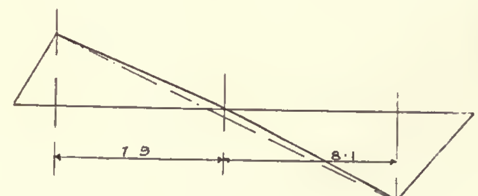


FIG XVI

The above design was carried out on the basis of designing a trapezoidal footing in the accepted manner. The same design could have been carried out by considering the footing as rectangular, having a width of 8 feet 1 inch. Although the reactions in this case would be different, and the point of maximum bending moment would be in a different position, the result obtained by the second method would be very nearly the same as the one already obtained. This second method is much more simple than the trapezoidal footing design.

It will be noted that the stress in the steel was found to be 578,000 pounds. The depth of 47.5 inches was determined on a basis which produced a stress of 457,000 pounds as determined for the part of the footing under columns 9, 10, and 11. If this stress was produced in the steel it would also be produced approximately in the concrete, and the stress of 578,000 pounds might overstress the concrete. To determine if this is the case it is only necessary to multiply the depth in inches and breadth in feet by 1,462.5.

$$47.5 \times 8.1 \times 1{,}462.5 = 562{,}000 \text{ pounds.}$$

If this is the allowable stress in the concrete, it is obvious that it is overstressed 578,000 – 562,000 = 16,000 pounds. The distance from the bottom of the footing to the neutral axis is $\frac{3}{8} \times 47.5 = 17.8$ inches. The steel will be placed $4\frac{1}{2}$ inches above the bottom, and the ratio between the modulus of elasticity of steel and that of concrete will be taken as 15.

$$\frac{13.3}{17.8} \times 15 \times 650 = 7{,}720 \text{ pounds per square inch.}$$

If the steel in compression can be stressed to 7,720 pounds per square inch, it will be necessary to add 2 square inches of steel in the bottom of the footing. This can be made up with two 1-inch square bars.

The next step is the design of the stirrups. Between columns 9 and 10, and also between columns 10 and 11, the upward pressure of the soil was found to be 798,000 and the shear at each column will be one-half of this, or 399,000 pounds. Seven-eighths of the area of the footing at these points is 3,325 square inches, and the shear per square inch is 120 pounds. If 40 pounds is allowed on the concrete, 80 pounds will have to be taken up by the steel. The clear span is 16.17 feet, or 194 inches, and the breadth is 80 inches, and with an average shear to be taken by the steel of 40 pounds the total shear will be $(80 \times 194 \times 80 \times 40) \div 120 = 414{,}000$ pounds. The stirrups are made up of $\frac{1}{2}$-inch round steel, bent so that there will be four vertical legs, and each leg will have an area of .1963 square inches. Four legs will have a combined area of .7852 square inches, and will withstand a tensile stress of $.7852 \times 16{,}000 = 12{,}563$ pounds. If the stirrups alone withstood the shear there would be needed $414{,}000 \div 12{,}563 = 33$ stirrups.

It will be noted that the footing is treated as a continuous girder and that at least one-half of the steel is straight and the rest is double bent. In the case of the part of the footing under consideration there are 9 double-bent bars $1\frac{1}{4}$ inches square having a combined area of $1.5625 \times 9 = 14.06$ square inches. Seven-tenths of this is 9.84 square inches. If one stirrup has a sectional area of .7852 square inches, the bent-up steel will take the place of $12\frac{1}{2}$ stirrups at each end, or 25 in all, and there will be needed 8 stirrups.

The stirrups for the part of the footing between columns 11 and 12 are designed in a similar manner, and the reader may find it profitable to check the number called for.

In the next article the footings for the remaining columns in the partial plan will be investigated.

The New York Society of Architects

THE annual meeting and dinner of the New York Society of Architects took place at the Hotel Astor, Broadway and 44th Street, Manhattan, on Tuesday evening, May 17. The event was a notable one in the society's history.

The officers elected for the ensuing year were: James Riely Gordon, president; Adam E. Fischer, vice-president; Edward E. Loth, second vice-president; Frederick C. Zobel, secretary; Harry Holder, treasurer; Walter H. Volckening, financial secretary.

Mr. Holder's report showed the treasury to be in a highly satisfactory and steadily improving condition. A vote of thanks was passed to the Committee of the Year Book, which is generally recognized as one of the most valuable works of reference published in this country. The newly elected members were Theo. Engelhardt and James A. Boyle.

Mr. Robert H. Kohn, of the American Institute of Architects, addressed the meeting and gave a clear and logical analysis of the situation in the domain of building, as a whole; setting forth the utterly uncertain and almost chaotic conditions with which architects generally have to contend, both as to labor and material. The element of corruption and bad faith enters very largely into these conditions.

Fountain at Exhibition of Architectural League of New York. By the American Encaustic Tiling Co., Ltd.

Apartments at Flushing, Long Island

Andrew J. Thomas, Architect

THIS new apartment-house (see Plate LXXX) combines in unusual manner the advantages of the country with the ease and the convenience of city living. The apartments are the creation of Mr. Andrew J. Thomas, the architect, who has had long experience in garden and country apartments.

One will note the openness of the group, with its long frontage on three streets, occupying, as it does, only 31 per cent of the area of the lot. This arrangement furnishes abundance of light and air and cross-ventilation, and provides everywhere a beautiful outlook over the grounds. One may also notice that there are no long, dark corridors or other waste spaces. Most of the apartments have outside exposure on three sides, and corner rooms are frequent. Each entrance serves only six suites, a feature which adds to the privacy. The arrangement inside could not be improved on for comfort and attractiveness, and one may fairly assert that no country home could offer so much economy o space, and so much ease and convenience of housekeeping.

The rooms are large and are grouped well together, opening into one another easily and attractively, with here and there a glimpse outdoors. Nevertheless, the bedroom portion and service portions are separated from the rest, insuring absolute privacy. The entrance to each apartment is through an ample foyer into a large living-room with open fireplace, with the dining-room opening off, almost as large. In all this arrangement the architect has been careful to preserve plenty of wall space for the placing of furniture and of decorations, which is coming to be so much sought for in American homes.

The service arrangements of the plan will appear to the housewife to be a model of what modern ideas of efficient housekeeping can accomplish. The kitchens are perfectly arranged in every detail, even to pot and broom closets, for ease of operation. Everything is in the right place, with—a detail of great importance—enough table space. The bedrooms are large, well supplied with closets, and in the larger apartments there is a maid's room with a small bath, slightly apart, yet so planned that it may be used as a main bedroom, whenever convenient. The bathrooms are attractively tiled. The construction will be of the most substantial and enduring type, of a kind not usually found in suburban real estate.

The architecture of the apartments is in keeping with the old Long Island neighborhood, the streets lined with elms, an old church near by, and across the street the oldest house in Flushing—all the charm and flavor of a beautiful New England village. Only time can provide such a setting, and appropr ate to it will be the long, low brick walls and white details of architecture, broken into projecting masses and sheltered courts, with a tall portico running between the gambrel-roofed pavilions, and the building setting well back from the line of the street and the foreground of greensward, amply planted with shrubbery and flowers in the old-time spirit. In this picture the apartments will recall an old American mansion, like Mount Vernon in the South, or else one of those famous old American inns, like the Greenbrier at White Sulphur Springs, Va., or the Wayside Inn at Sudbury, Mass.

New Jersey's State Building Programme

By Commissioner Burdette G. Lewis

NEW JERSEY has determined to place her State building construction work upon a much higher plane. The State is no longer content with the serious shortcomings of her building department, which has been handling from a million to a million and one-half dollars' worth of State building work per year, and would be called upon to handle at least twice this annual expenditure if the institutional construction bond bill passed by the last legislature and signed by the governor is finally approved by the voters at the next November election.

The inspections of the Joint Appropriations Committee during each of the past four or five years have revealed conditions of deterioration and faulty construction in State buildings erected or placed in use during the past five years which were shocking. These were found to be due to improper design, faulty construction, and false economy. There is scarcely a single one of these buildings in which the plaster is not coming off all over the interior, due to leaks, which are due to these causes. . .

The office of the State architect was seriously undermanned and the salary paid the State architect was not attractive.

The legislature has met this situation in the following ways:

(1) By abolishing the State Department of Architecture and by transferring its functions to the State Board of Control of Institutions and Agencies and to the State Board of Education; (2) by authorizing these boards to employ various kinds of experts to design and possibly to supervise especially difficult construction work; and (3) by authorizing the State Board of Control of Institutions and Agencies to appoint an Advisory Commission on Plans, Designs, and Construction, composed of not less than six nor more than fifteen residents of this State, two of whom shall be architects registered to practise in New Jersey, two of whom shall be well qualified engineers, and two members who shall be experienced builders. This Advisory Commission is to serve for two years without pay, but its members are to be paid their actual expenses incurred in the performance of their duties.

These results have been achieved through the joint efforts of the New Jersey Chapter of the American Institute of Architects, of the Boards of Managers and Boards of Trustees of the various institutions and State schools, of the members of the State House Commission, consisting of the governor, the State comptroller and State treasurer, of one of the leading newspapers of the State, of the members of the Legislative Joint Committee on Appropriations, and the leaders of both branches of the legislature who have strongly supported the recommendations of the State Department of Institutions and Agencies that it be freed from the necessity of having buildings for the wards of the State planned and erected by the inefficient State Department of Architecture.

Upon the recommendation of Commissioner Burdette G. Lewis, of the State Department of Institutions and Agencies, Mr. Alan B. Mills, of Madison, N. J., has been appointed director of the new Division of Architecture and Construction of the State Department of Institutions and Agencies. Mr. Mills was, at the time of his appointment, assistant construction manager of the George A. Fuller Company; is a registered architect and a civil engineer, holding a degree from the University of Pennsylvania, where two years of his college course was carried on in the mechanical engineering department. Mr. Mills has had wide experience as an architect and as a practical builder. He had full charge of the erection of the Statler Hotel in Cleveland, of the McAlpin Hotel in New York, and recently of the Munson Steamship Building in New York City. He is widely known throughout the East and brings much interest and enthusiasm to the work. Because of his wide experience and because of the opportunities in the building field, it is the confident hope of the State authorities that reputable firms may be persuaded to bid upon State work.

In order to achieve the desired results, the State Department of Institutions and Agencies relies to a considerable degree upon the splendid group of men who have already agreed to serve as members of the Advisory Commission on Plans, Designs, and Construction. Those who have already accepted appointments have for years been residents of this State and are well known throughout New Jersey and the United States. The members who have already accepted appointments are Colonel William A. Starrett, of Madison, N. J., first vice-president of the George A. Fuller Company, who was, during the war, in charge of all construction work for the engineering division of the United States army; J. Otis Post, of Morristown, N. J., member of the firm of George B. Post & Sons, well-known architects; John H. Lippincott, Jr., of Haddonfield, N. J., superintendent of construction for the Turner Construction Company; A. M. Reynolds, of Newark, N. J., chief engineer of the Essex County Park Commission; William O. Ludlow, of Madison, N. J., well-known architect of the firm of Ludlow & Peabody; James O. Betelle, of Newark, N. J., senior member of the firm of Guilbert & Betelle, architects; Walter E. Kidde, of Montclair, N. J., consulting engineer; and Leon Cubberley, architect, of Long Branch, N. J., chief of field supervision for Cross & Cross, architects, of 681 Fifth Avenue, New York City.

After a joint conference with the members of the State Board of Control of Institutions and Agencies at the Robert Treat Hotel, Newark, on May 16, 1921, the Advisory Commission held an organization meeting and selected Colonel William A. Starrett as its chairman, and Miss Agnes L. Mulrey, secretary of the State Board of Control, as secretary.

It was the consensus of opinion that the State Board should employ special architects and engineers to design, and in certain instances to supervise, the more difficult construction work of the State; that a complete map and plan of existing institutions should be made as soon as possible, and that a scheme should be laid out to guide the Boards of Managers, the State Board, and the legislature in determining upon appropriations and construction plans for various institutional buildings in the future; that the staff of the former State architect, which has been transferred to the State Department of Institutions and Agencies, should be utilized to the fullest extent in handling construction, repair, maintenance, and developmental work, and that studies be made of the most available materials and of the best designs for the various types of institutions and buildings for which the State has already made, or in the future may make, appropriations.

Announcements

Mr. F. E. Davidson, of the Illinois Society of Architects, on Advertising

Most architects, in addition to having other attributes, are human, and with the hope that this may reach the eyes of some of those who are so cheerfully misdirecting their energies in trying to reach and influence the architect I suggest that the way to appeal to him is to grant first of all that he is an intelligent being; second, that he has had professional training; third, that he knows the needs of his clients even better than the client himself; fourth, that he is honestly serving his client to the best of his knowledge and ability; fifth, that he is a student and must ever remain a student. Hence, he is always willing to be shown, and will give up hours of his precious time to investigate a new idea.

Advertisers should realize that architects read their professional journals, and that a carefully prepared, brief statement of fact appearing in the advertising columns of these journals is one of the surest methods of calling the attention of architects to new methods and materials.

—*From Judicious Advertising.*

There isn't a reader of this magazine who will not be glad to have a copy of Mr. Emile C. Perrot's paper-covered booklet, "The Groundwork of Architecture or the Study of How Architectural Styles Are Affected by Structural Engineering." It is a clear and interesting summary of the essentials in architectural history. The many illustrations are especially attractive.

Mr. George Grant Mason and Mr. George Simpson Eddy announce that on and after May 2, 1921, their address will be 2 Rector Street, New York.

George A. Bagge announces the opening of an office at 299 Madison Avenue for the practice of architecture under the firm name of George A. Bagge & Sons.

George Bain Cummings, B.Arch., R. A., A. I. A., announces that the firm of Lacey, Schenck & Cummings having been dissolved by the withdrawal of Sanford O. Lacey and himself, he will continue the practice of architecture under the name George Bain Cummings, Architect, with offices at 602–604 Security Mutual Building, Binghamton, N. Y.

Charles Wellford Leavitt, Civil and Landscape Engineer, announces the removal of his offices to 18 East 41st Street.

Leslie H. Allen, who has recently been with Fred T. Ley & Co., contractors, of Springfie'd, Mass., first as an industrial housing engineer and then as sales manager for New England territory, has joined the staff of the Portland Cement Association, 111 West Washington Street, Chicago, as assistant manager of the Cement Products Bureau. Prior to joining the Ley organization Mr. Allen was for twelve years with the Aberthaw Construction Company, of Boston.

The Cheney Brothers, the famous silk manufacturers, were awarded one of the medals in the Arts and Crafts Section at the recent Exhibition of the Architectural League.

Barrett Flashing Block with Flashing installed in brick wall

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IN our sixty years' experience in the roofing business, we have found that a large proportion of the leaks attributed to roofs are in reality due to defective flashings.

Realizing that complete roof-satisfaction was impossible without efficient flashings, we determined, for our own protection, to work out a definite solution of flashing problems.

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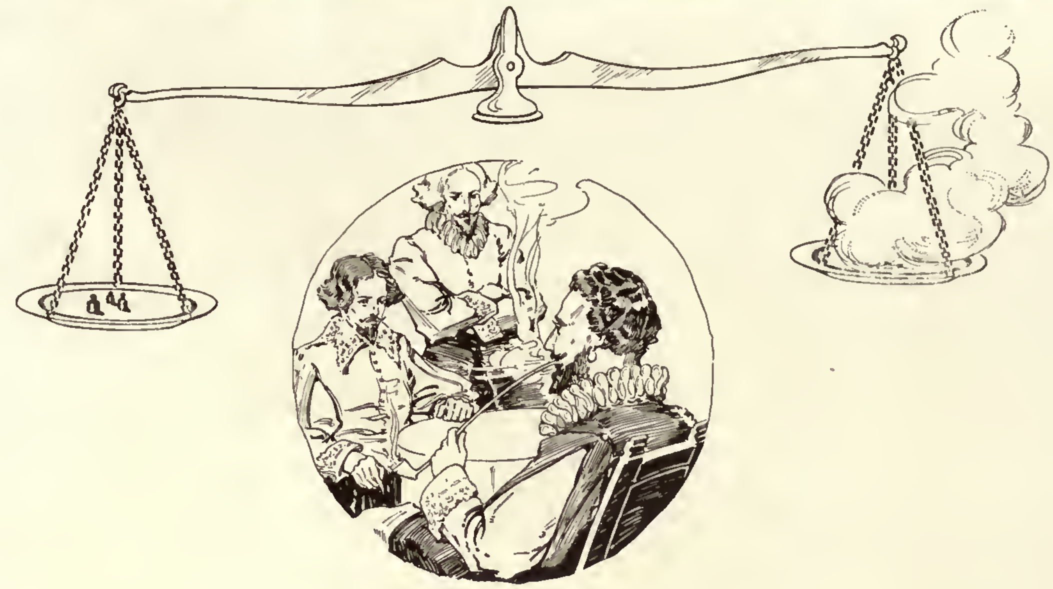
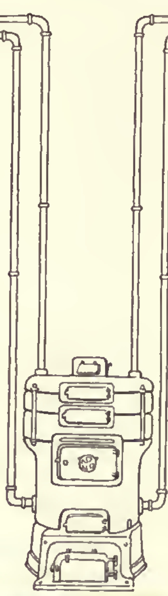


Because Sir Walter Raleigh Could Weigh Smoke We Can Save On Your Coal Costs



OF course, you remember our dear old friend, Sir Walter Raleigh, and how he threw his cloak down to be walked on, every time Queen Elizabeth forgot her rubbers.

It seems, when he wasn't cloaking for Good Queen Bess, he was forever doing something that everybody said couldn't be done.

One Wednesday evening, just before prayer meeting, he declared he could weigh smoke.

To prove it he took a pair of scales and carefully weighed out an ounce of tobacco, which he smoked with deliberation and in high glee.

After which, he as painstakingly weighed the ashes.

Subtracting what the ashes weighed, from the weight of the tobacco, he sure enough had the weight of the smoke.

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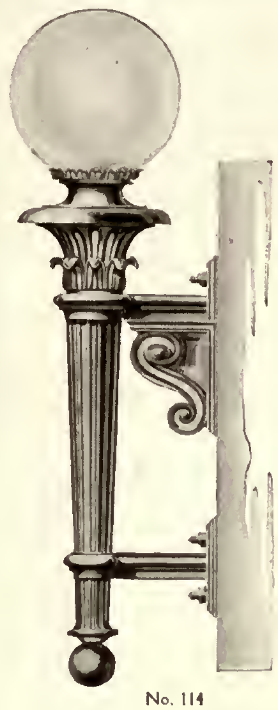

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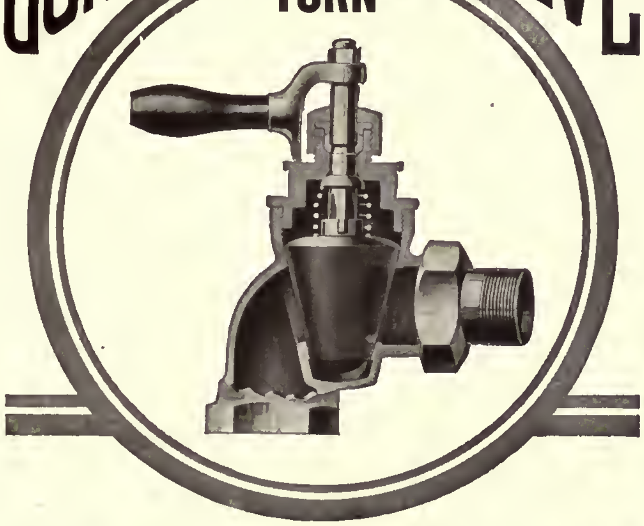

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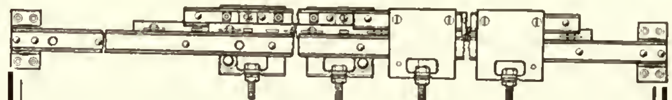

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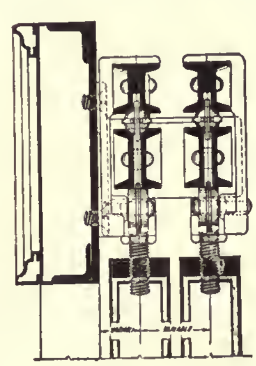

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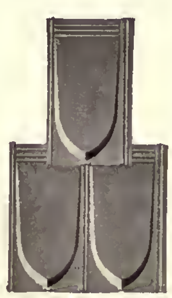

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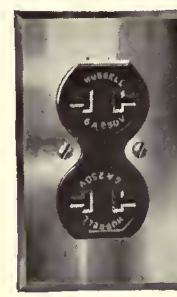

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Best Construction

Rugged and simple construction — nothing to rattle or wear out —nothing to get out of order — it outlasts any other ventilator.

The illustration below shows clearly the distinctive points of construction upon which the greater effectiveness of the American-Larson Suction Ventilator is based.

Vane firmly riveted to top

Vane reinforcement rods heavily galvanized

Spindle welded to reinforcing plate

Heavy standing seams adding strength and rigidity

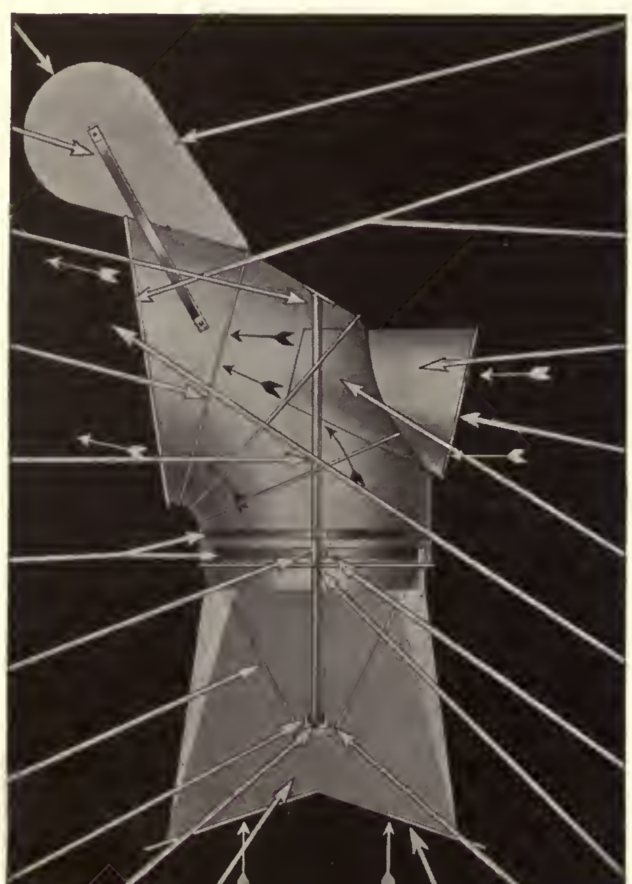
Steel center spindle coated with rust resisting paint

Stabilizing rings on both top and base give concentric action, making top and rod pivot as one

Dustproof and rustproof ball bearing of best quality insures free pivot action and is noiseless

Suspension spider is weather protected and holds step bearing rigid

Graphite step bearing needs no lubrication or attention



Vane keeps ejector presented to outside air currents, prevents back-draft and makes ventilator stormproof and dustproof

Unrestricted area permitting easy discharge without friction

Mouth weather protected offering unrestricted area for exhaust

Ejector tube an exclusive patented feature. The air currents passing through create a suction that makes this the most efficient ventilator

Direction of outside air current through the ejector

Axis of ejector in line with exhaust which is always upward

Line of exhaust upward offering no resistance to upward draft

Easily rotating design of spindle and ball bearings and made of best materials

Design of working parts insures maximum efficiency

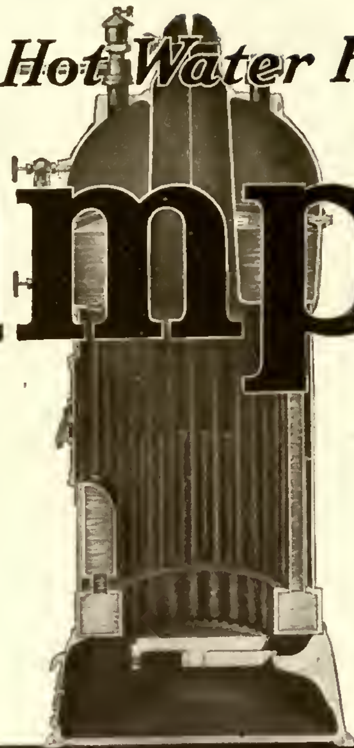
Hardened steel pivot point providing against friction

Base made to specifications and included in price

Flashing flange cut to proper pitch

Noiseless pivoting—is foolproof and requires no attention

"Triumph *Boilers & Hot Water Heaters*"



These heaters are in successful use for heating water in residences, apartments, hotels, barber shops, swimming pools, public institutions, etc. They can also be used for heating radiation.

As Coal Has Risen

in price and become more difficult to obtain, the demand for boilers and hot water heaters that would be economical of fuel and easy to operate, has greatly increased.

That is one reason for the increasing popularity of our "Triumph" line of Boilers and Hot Water Heaters.

They are of the water tube type, thrifty of fuel, durable, safe, and rapid in operation. The illustration shows how every square foot of heating surface is so placed with respect to the fire as to be completely effective.

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Gasteam Radiators ☐
Manhole Covers and Frames ☐
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Lamp Posts and Fountains ☐
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Marble ☐
Steam Fittings ☐

3000 square yards of Armstrong's ¼-inch Green Battleship Linoleum cemented down over felt paper on a wood base in the new offices of Marshall-Wells Company, Duluth, Minn.

Selecting a $10,000 Floor

REACHING a decision on a floor costing ten thousand dollars is not usually a matter of offhand judgment. Before investing this amount, values are scrutinized very, very carefully, for experiments might prove rather costly. It is significant, therefore, that for their new offices the Marshall-Wells Company, large hardware distributors, of Duluth, Minn., selected Armstrong's Linoleum.

Investigation proved to their satisfaction that linoleum was comparatively low in first cost, quiet, comfortable, readily cleaned, and, if properly laid, exceedingly durable. These advantages, and the fact that the upkeep on a floor of Armstrong's Linoleum is practically negligible, settled the question.

No doubt the same convincing data that led to the selection of Armstrong's Linoleum for these offices would be of interest to you. The information has been compiled in a compact and attractive booklet, illustrated in colors. This catalogue contains ideas on modern floor design of value to you. It is sent without cost. Just ask for "Business Floors" on a postal card.

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Armstrong's Linoleum

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