PENCIL POINTS

VOLUME II OCTOBER 1921 NUMBER 10

TRANSMUTATION

THE dream of the alchemists of olden times, who carried on weird experiments in an effort to transmute base metals into gold, may never come true, but even more wonderful transmutations are in progress all about us—in the field of human thought. Impressions, sensations and bits of information are constantly entering the minds of men, being changed in form and nature and finding expression. The composer of music, influenced by a sunset, the sight of a beautiful cathedral, or a glimpse into the depths of a human heart, transmutes his impressions into music, the sculptor, the painter, or the architect, hearing the music, perhaps, transmutes its motif into a statue, a picture, or a building. Sometimes these transmutations are recognized, the source of inspiration is known. Often, however, the countless impressions we constantly receive react one upon another in our minds, and some of them are pigeon-holed for years in an out-of-the-way corner of the brain—consequently we seldom realize or can trace the source of our inspirations, motives and opinions, the things that give life to our work and that shape our courses in our relations with those about us.

As a matter of fact, we are penetrated from all sides by influences. Each of us lives in a focus of powerful influences. The more we see, read and hear, the more rapidly we accumulate impressions—if we are not of the hard-shell variety—self-centered and self-sufficient.

The most direct inspiration is found, of course, by the architect in works of architecture. Though the inspiration to be derived from the study and contemplation of great works of architecture is of inestimable value, the inspiration that comes through the transmutation of influences from outside the field of architecture are infinitely greater, because they are the very substance of our lives. The man who has been acted upon by the influences of music, painting, and sculpture, by the illuminating phrases of great writers, and by sympathetic contact with his fellow men, has a power to put into his work—whether it be architecture or railroading—that the man of narrow experience can never have.

It is because of the importance of these influences that the man who would be a good architect should secure as liberal an education as possible, be interested in many things besides the study of architecture, and rub elbows with the world.

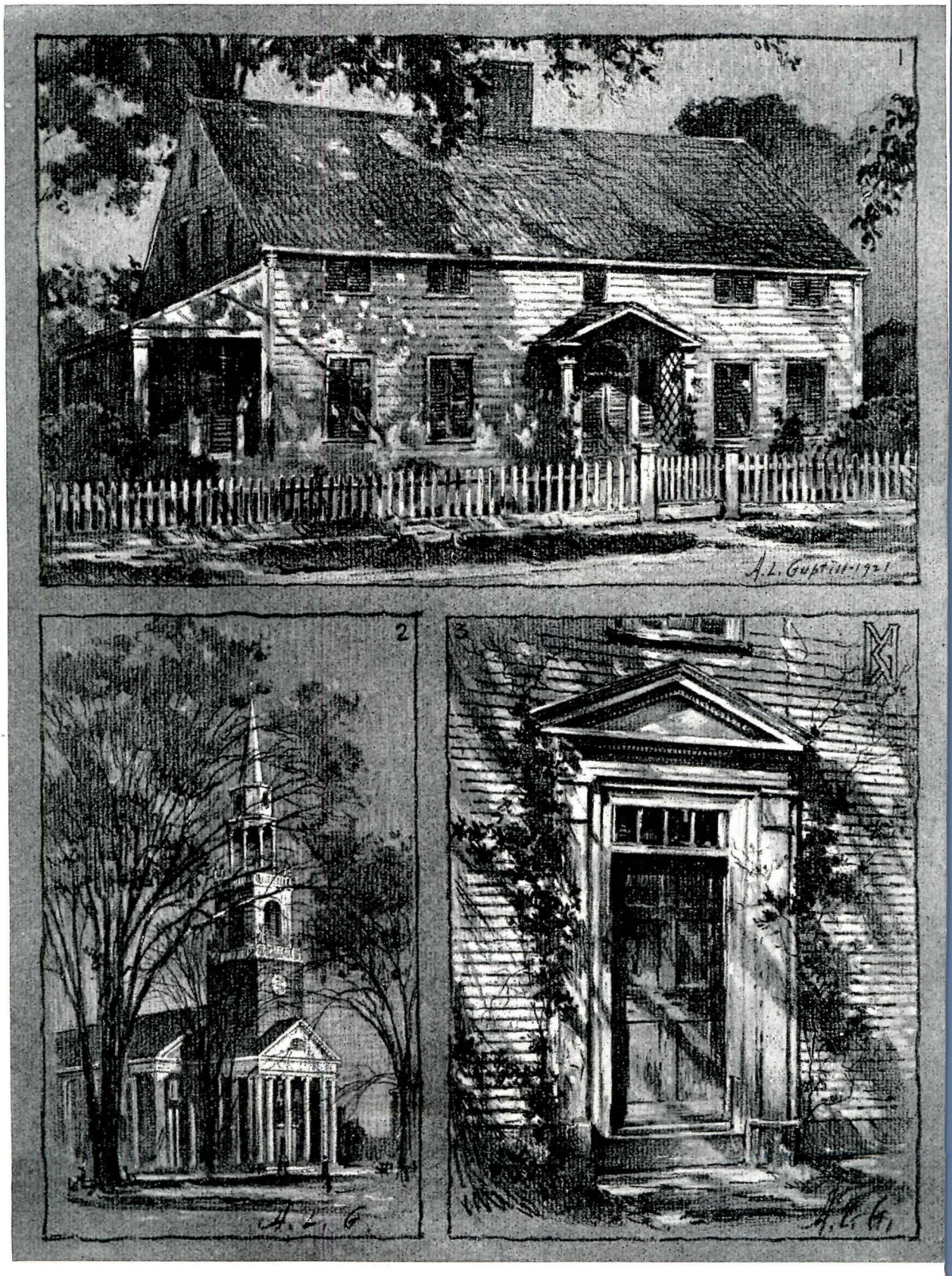
The broader a man's interests and sympathies, the better able he is to understand the great works of architecture which he studies—for all great architecture is an expression of life.

Though a thorough knowledge of the history, theory and practice of architecture is absolutely necessary if a man is to express himself effectively in terms of architecture—his work will be of little value if this is all he has—if he has little or nothing to express. A knowledge of rhetoric, and an extensive vocabulary, among other things, are needed by a public speaker, but with all these, he will not be worth listening to if he has no message, if his talk lacks the element of human sympathy. It is very much like that with architecture. The good work, new as well as old, is expressive, it is filled with the spirit of the period, a sense of the purpose of the building and the personality of the architect; it has human qualities, such as, strength, charm, tenderness, refinement, dignity, as well as beauty. In architecture, as in everything else, *the man is the thing,* and everything that tends to make him bigger, stronger, more responsive and sympathetic improves his work.

PRIZES FOR SKETCHES

A COMPETITION for prizes to the amount of Two Hundred Fifty Dollars for the best sketches submitted in accordance with the conditions printed in full on another page of this issue, is now open. The prizes are donated by Mr. Birch Burdette Long and the competition is being conducted by the publishers of PENCIL POINTS.

The competition is open to everyone excepting architects maintaining their own offices and professional renderers, as defined in the conditions. The judges have power to pass upon the eligibility of any entry in accordance with the spirit of the competition, the purpose of which is to encourage sketching particularly among draftsmen and students. Sketches submitted must have been made during the year 1921. The competition closes at noon, November 30, 1921. Read the full announcement of the competition elsewhere in this issue and snap into it.



Sketching and Rendering in Pencil. Figure 38.

SKETCHING AND RENDERING IN PENCIL, PART XV

BY ARTHUR L. GUPTILL

In this series of illustrated articles, the first of which appeared in the issue for August, 1920, the technique of pencil sketching and rendering is being taken up step by step, carrying the architectural draftsman or student through a systematic course of study which has been gradually developed and put into practice by Mr. Guptill in his classes at Pratt Institute, Brooklyn, New York City. The illustrations are not merely copy plates, but each is drawn to illustrate some principle of composition or some suggestion for technique given in the text. Although these plates are primarily intended to assist the student in freehand work, they will prove helpful as well to those making pencil renderings of subjects prepared instrumentally.—ED.

MENTION pencil sketching or rendering to the average individual and he immediately conjures up in his mind a visualization of the making of the customary type of drawing such as we find in common use, done on white paper, as a rule, and with ordinary graphite pencils. This is only natural, for a large majority of sketches are done with these mediums and in this way, and it is because of the frequency with which they are found that so much has been written in previous articles of this series referring especially to this everyday sort of representation.

There is, however, another class of work which comes within the scope of our subject yet which differs in many respects from the type just mentioned, and which, in so differing, offers so many opportunities for variety, both in the selection of materials and in the technique employed, that it finds special favor among those who prefer to break away from the commonplace and exercise their abilities in a less restricted field,—one which offers, in fact, unlimited opportunities for individual expression. For it is our present purpose to describe briefly some of the uses of papers of various tints and shades; to touch upon the employment of wax crayons, lithographic pencils and the like; to point out also a few of the advantages of colored pencils, and most important of all, perhaps to describe some of the many successful combinations of two or more media, such as pencil tinted with water color, water color touched up with pencil, and colored crayon accented with brown ink.

A glance at the appended list (on page 35 concluding this text) which shows some of these combinations, will emphasize the futility of even attempting an adequate exposition of our subject within the limits set us, but if the student desires to acquire a more complete knowledge of some of these inexhaustible possibilities for obtaining effective results, let him study such examples as he finds available, and then take his own tinted papers and his pencils and colors and work out for himself such ideas as make the strongest appeal to him.

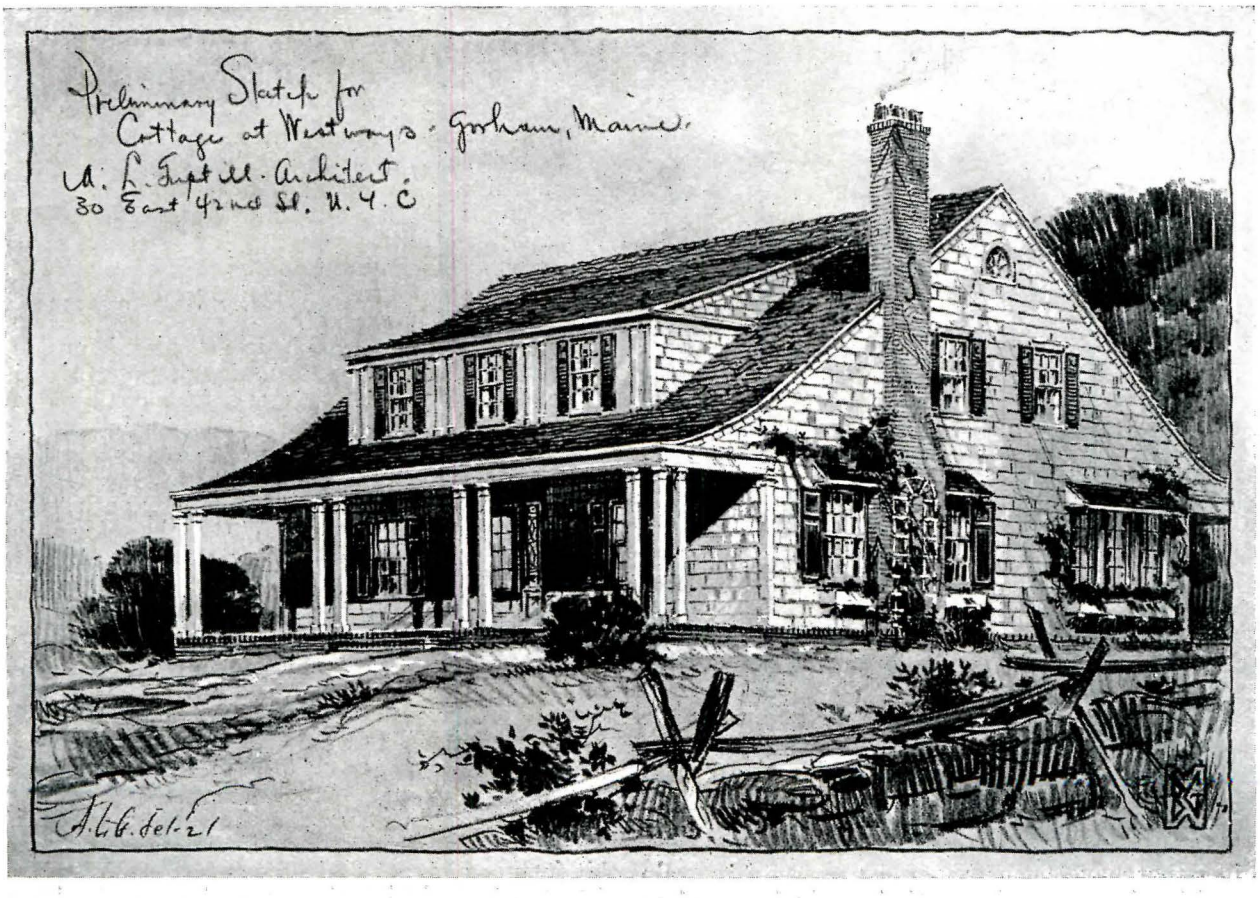
First of all it is well to learn what the market affords in the way of materials for such work for too many artists are ignorant of the numerous kinds of pencils and crayons and papers and the like that have been prepared to serve him. So multitudinous are these offerings, in fact, and so varied, that to recommend any particular ones here might handicap rather than help, for it is best for each student to experiment with all these things himself. As an instance of the wealth of drawing materials at our disposal, inquiry of any large dealer in artist's supplies for black pencils and crayons alone will bring out many sorts, each having its individual characteristics and uses. Some give a shiny and some a dull tint or tone,—some are easily erased while others smear and smudge when rubbed or are practically indelible. There are those which offer resistance to water, too, and others so soluble as to blur or wash off under its application. Then again, the extreme softness of some prevents a firm line while in others brittleness makes a sharp point impossible. Now just as these pencils vary, so also do the numerous colored ones, hence considerable testing is necessary if one desires to ascertain their possibilities and limitations, but once such a knowledge is obtained and along with it a reasonable facility in handling, it will be realized that notwithstanding these differences each kind of pencil or crayon, whether black or white or colored, is capable of serving a useful purpose. It is not only in pencils and crayons that we find a wide diversity, however, for papers are multifarious also, and in addition to the numerous kinds both white and colored especially prepared for artists, wrapping paper, cover papers, mat stock and the like are used, even wall paper of some sorts occasionally finding favor. The beginner increases his difficulties, however, if he selects papers which do not permit of considerable erasure. In this connection attention is directed to the fact that erasers have individual characteristics, also, and some which prove satisfactory on certain papers, or for erasing some grades of pencils or crayons, are useless with others, so here again personal experimentation is desirable, seeking all the time for ideal combinations of pencil, paper and eraser.

Now in order that the student who is accustomed to working in the usual manner on white paper may become acquainted gradually with these materials and methods which are new to him, it is suggested that as a first step the same pencils and technique be employed as for this familiar type of drawing, but with some tinted paper such as cream or buff or light gray substituted for the customary white. This brings in little that is different yet the effect gained is often very interesting, and if one cares to go a bit further and the subject seems to suggest it, a few touches of high light may be added with a white pencil or crayon or with Chinese white or some similar water color. Do not forget, however, that water color causes thin paper to wrinkle

and buckle out of shape unless mounted and injures or destroys the gloss of glazed paper, though there is a difference in the appearance of various white pigments when dry, some being flat or dull and others shiny.

As the ordinary pencil line has more or less gloss, some artists prefer, especially when using pencils in connection with other mediums, to employ such kinds as give a dull effect. It is advisable then for the student to become familiar with these, so as soon as fairly satisfactory results have been obtained with the usual pencils on the tinted paper, it might be well, before attempting any of the more difficult combinations, to try out, first on white and later on tinted paper, the various black pencils and crayons, making, perhaps, on each sheet of paper used several comparative sketches, for by so doing one can most easily learn the adaptability of each particular pencil to the paper and to the subject represented. Then when numerous experiments have been made with the black pencils on various papers try colored pencils. As their use leads to new difficulties it is best for the beginner to confine his attempts to one or two colors, using a red or brown tone, for example, making an entire drawing with the one pencil. Surprisingly pleasing results are frequently obtained in this manner, the effect being somewhat similar to that of the red chalk drawings often made by the old masters. Whereas white paper may be used for this work, lightly tinted sheets will do nicely too, offering again the opportunity for added highlights if they are felt to be desirable. Though charming sketches are found in which pencils or crayons of many colors have been employed the beginner should bear in mind that unless he has had training in color harmony or has an excellent innate color sense, the difficulties of combining the various hues will be far from negligible, especially if the paper is not white. For this reason it might be better for him to first turn his attention to some of the more simple combinations of mediums, such as pencil and a wash of monotone. Some of his old drawings might be utilized to advantage in this connection, treating them in different ways. Take one of these, for instance, and run a light wash of yellow ochre or Naples yellow or some other simple tint uniformly over the whole thing, bringing the wash to an even edge a quarter of an inch or so outside the margin line all around. The effect will resemble to some extent that obtained by using paper of a

(*Continued on page* 34)



Sketching and Rendering in Pencil. Figure 39.

RENDERED PLANS AND RECORD DRAWINGS, PART I.

BY FRANCIS S. SWALES

TO THE layman with a comprehension of drawings the most interesting presentation drawing is a plan. The elevations may be willingly left to the architect, but the client will try to understand the plan and know that it fulfills his needs. The ordinary representations understood by the builder and used for working purposes do not seem to serve adequately the purpose of explaining themselves to those who are uninitiated in the conventions of the drafting room.

Speaking of a plan of the new cathedral at St. Paul and referring to the ordinary poché a prelate asked: "Why do architects always show the trenches instead of the walls?" The illusion was obvious when mentioned; but it had never occurred to the writer; and an examination of many plans failed to produce evidence that it had occurred to many other architects or draftsmen. The point raised was, of course, the familiar one that to the ordinary eye black recedes beyond and white projects from the average plane. A blue print is consequently, "more natural" than a drawing in black lines on white paper. But the blacked-in plan has become a fixture and to make it more intelligible to the client some form of rendering is added.

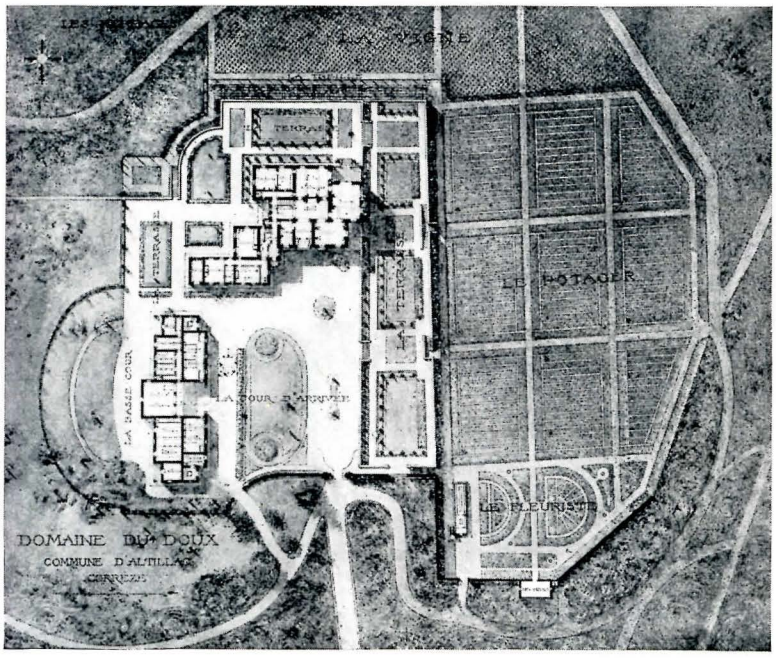


Figure 3. Domaine du Doux. J. L. Pascal, Architect.

The only permissible indication to "doll-up" the drawing of an industrial or business building is that of toilet fixtures and the floors or ceilings of elevator lobbys which are not subject to change. Conservation of drafting skill might often be studied in connection with residence work in the matter of omitting centre lines, dimensions and areas of rooms until the stage of working drawings is reached. The English system of placing a graphic scale on the drawings, giving the floors a wash of yellow, and showing the wall sections in a color indicating a given material—as, yellow for frame; red for brick; blue for stone; gray for concrete, etc.—is elementary, simple and up to a point commendable. It puts it up to the client to measure the sizes of rooms. Usually he is too lazy to do so, and the plans escape with fewer changes than with us. Such drawings are not pleasing in appearance. They must hurt the sensibilities of the artist; but they have the merit of giving the answer to the client's wife's question, "Which is the inside and which the out-of-doors."

The point at which English indication often falls down is not only that of pleasing appearance but also in a complexity produced in attempts to make the drawings look "busy," by inking in all the geometrical working lines, showing ceiling forms and floor patterns indiscriminately on the same plane (Figure 1). The common mistake of draftsmen is to presume that the rendered plan must first of all be a work of art in itself—that it must be a decoration rather than a means to an end—which, it should be obvious, is the converse of the case.

Which is the "inside" and which the "out-of-doors," should be made apparent at a glance; but the best way to accomplish the purpose presents some problems for study with each different kind of building and different kind of location. Thus in the case of a country house it will usually be sufficient to render the surrounding grounds and leave the plan of the house—the "inside" at least without coloring (Figure 2).

How much should be shown must depend on whether the drawing is desired for prompt action or permanent record. The former being the usual case with us, a kind of rendering understandable to the client and which can be quickly produced is the requirement. (Figure 2). The illustration shows a plan made by drawing the house plan on the surveyor's tracing, making a negative print and from that a blue-line print, then rendering the grounds with colored crayons and rubbing to a general tone with

finger tips. Below the rendering the old roads through the site were visible, and the alterations in planting were also made clear. Technically, of course, such representation is, evidently, not comparable with that of the charming drawing of the Domaine du Doux, by Pascal (Figure 3). The latter, however, was a drawing for record purposes made to show everything as actually executed on the estate and intended as a reference document. To the ordinary untrained eye the tonal differences between the "inside" and "out-of-doors" are barely sufficient to assure the understanding of where the house leaves off and the terraces and walks begin. Another point to bear in mind is, that a drawing such as Figure 2 can be produced in as many hours, almost, as weeks are required for one like Figure 3. The latter type of rendering is justified for final purposes but not for ordinary presentation of tentative ideas.

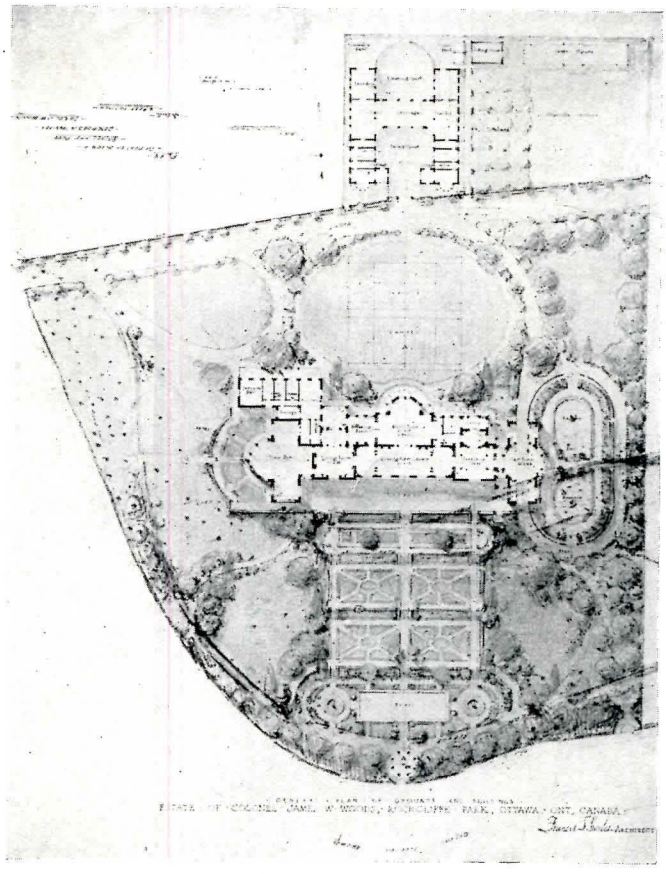


Figure 2. Rendered Plan of a Canadian Estate, Francis S. Swales, Architect.

Note—In the installment of this article which will appear in the next issue, Mr. Swales will discuss many different methods employed in the making of rendered plans and record drawings, illustrating his points with interesting examples by some of the ablest men of the Ecole des Beaux Arts, Paris. Mr. Swales's wide experience in the making of rendered drawings under the conditions of everyday practice, places him in a position to write interestingly and helpfully on this subject.

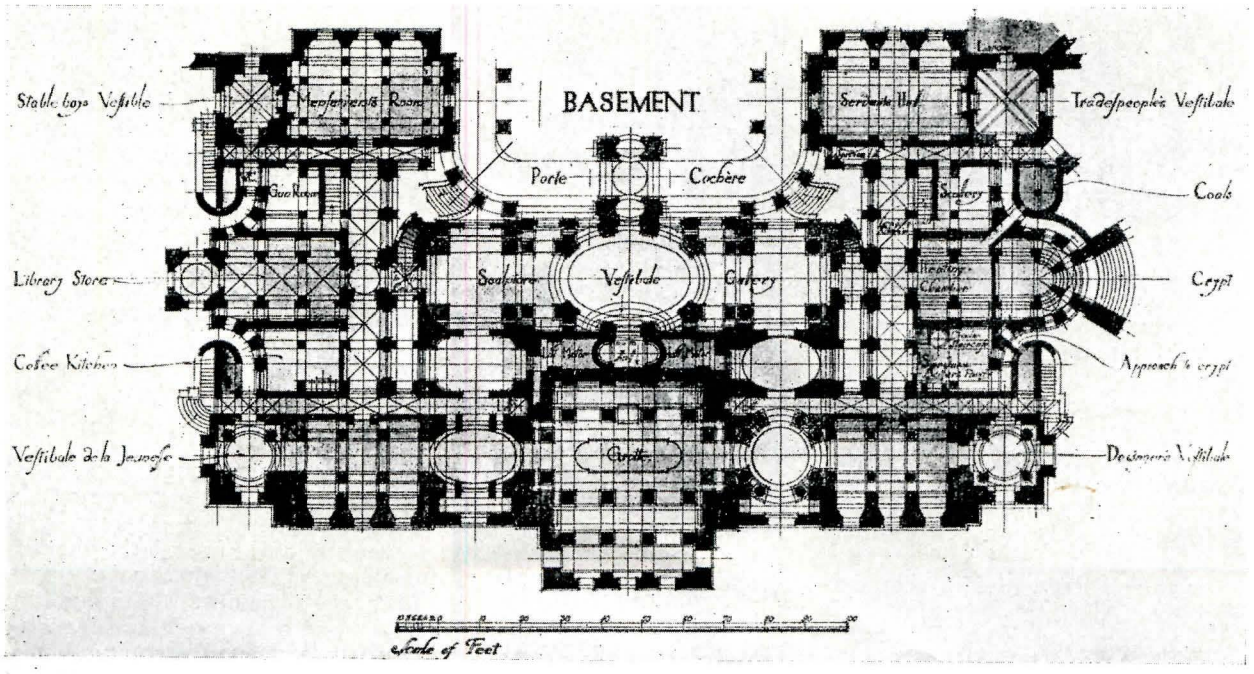
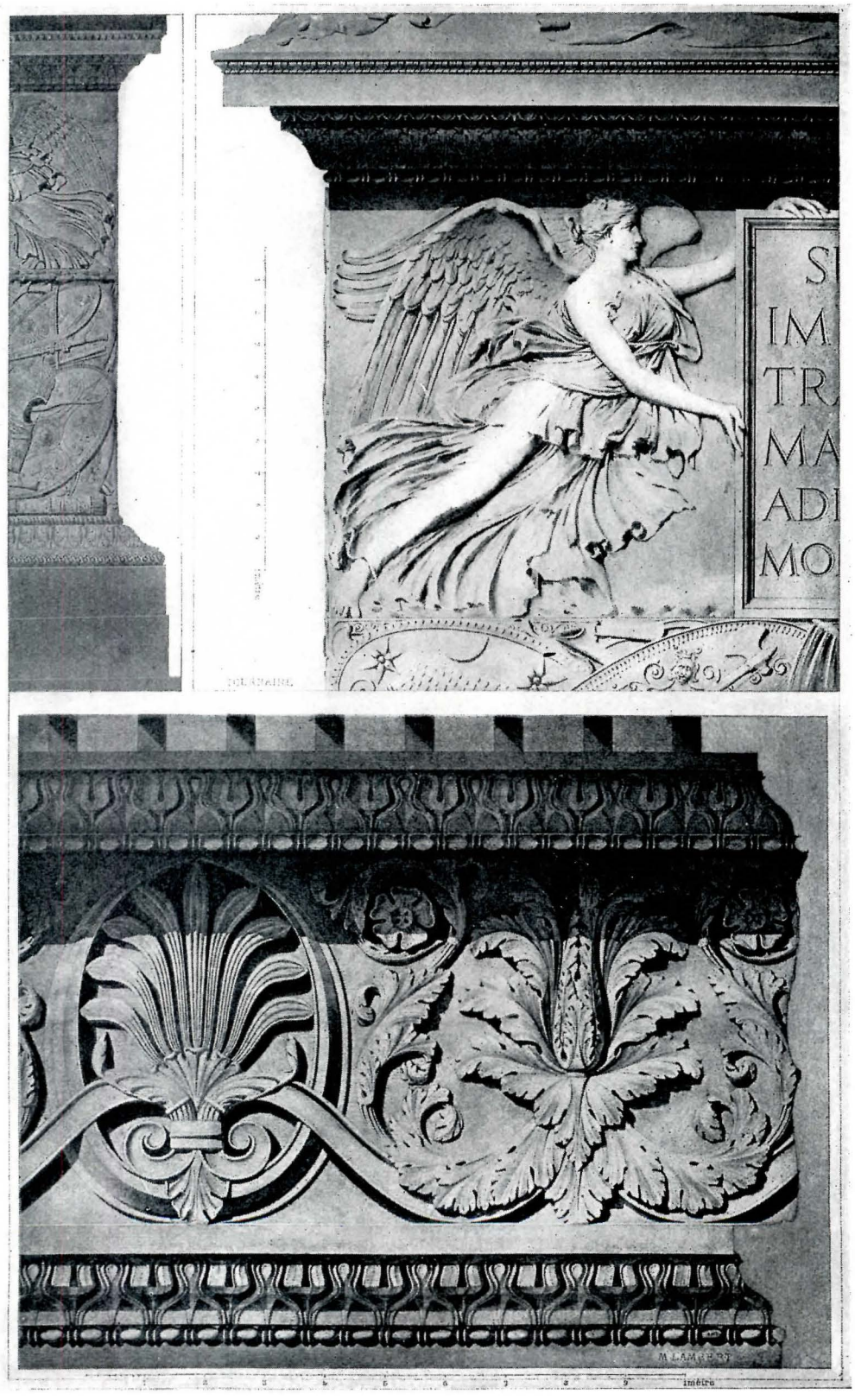


Figure 1. A Nobleman's Mansion, (Design for the Gold Medal Competition, R. A. Schools, 1909) by Adrian Berrington. From "The Builder," London.



FRAGMENTS FROM THE FORUM OF TRAJAN

RESTORATIONS BY J. A. TOURNAIRE AND M. LAMBERT

FROM H. D'ESPOUY'S "FRAGMENTS D'ARCHITECTURE ANTIQUE"

The details from the Forum of Trajan shown in the plate reproduced on the other side of this sheet are characteristic of the noble works of architecture which adorned this great quadrangle. The Forum of Trajan was surrounded by a great portico. The Column of Trajan rising to the height of 115 feet, and surmounted by a pedestal and statue bringing the total height to 132 feet, dominated the forum.

CHARCOAL DRAWING BY SCHELL LEWIS, DETAIL OF A MUSEUM

CHARLES A. PLATT, ARCHITECT

The drawing reproduced on the other side of this sheet is one of the charcoal drawings made in the office of Mr. Charles A. Platt for the purpose of studying the detail of buildings in the process of designing. These drawings are not intended as presentation drawings to show to the client. They provide a rapid and effective means of studying the design, for they can be made quickly and they present the character of the detail especially well.

PENCIL SKETCH BY OTTO F. LANGMANN, A BIT OF LOWER NEW YORK FROM WEST STREET

In the sketch reproduced on the other side of this sheet Mr. Langmann has recorded the impressiveness of the present-day architecture of lower New York, an impressiveness that is enhanced by the old-time buildings in the foreground. This sketch is one of a series which Mr. Langmann has made of interesting groupings of New York buildings, old and new, approaching his subjects in much the same way that the travelling student of architecture sketches buildings and groupings abroad. The sketch reproduced here is in lithographic pencil on white paper.

STUDY OF HEAD BY TABER SEARS FOR MURAL DECORATION IN GRACE CHURCH CHOIR SCHOOL, NEW YORK CITY.

YORK & SAWYER, ARCHITECTS

The strong study of a head reproduced on the other side of this sheet from Mr. Taber Sears's drawing is an unusually interesting example of technique. It is one of the detail studies made in the course of preparing a beautiful painting for Grace Church Choir School, New York City. Mr. Sears's paintings of religious subjects are especially fine in conception and embody much of the spirit of Mediaeval times.

THE STUDY OF ARCHITECTURAL DESIGN

WITH SPECIAL REFERENCE TO THE PROGRAM OF THE BEAUX-ARTS INSTITUTE OF DESIGN

CLASS B. PLAN PROBLEM. PART I.

BY JOHN F. HARBESON

In this series of articles, which began in the January issue, Mr. Harbeson is explaining the method of working and how to get the greatest benefit in following the program of The Beaux-Arts Institute of Design. It is not intended as a substitute for personal instruction and criticism. The "Analytique" was treated in preceding issues.—Ed.

WHEN a student has received the required values in the "Analytique," or when he has done such work in that class as to feel qualified to advance, he will take the Class B "Plan" problems. In this class the study of a plan of a complete unit is begun, although the work is not confined to plan, and the study in elevation is continued, and in some problems—interiors — study is made largely by means of sections.

The "elements" of architecture, which formed the basis of programs in the analytique competitions, are now but incidentals in a larger study. There is, indeed, a great difference in the work in the two classes, and it is for that reason that I suggested that the student advance from the one to the other only after having received a sufficiently good award in the Analytique to justify his feeling prepared for bigger work.

Let us see what these differences are, using an example of each for illustration, Figure 96, a Mausoleum being the Analytique, and Figure 97, a Yacht Club, being the B-Plan problem. These are each excellent pieces of work of their class.

In the first place the plan problem is presented at a smaller scale. This means that drawing, as applied to a careful representation of mouldings, etc., will play a much less important part than in the Analytique, and that "indication" will play a greater part. Of this there will be further mention; it should be said here, however, that this will emphasize the value of ability to draw "freehand," and that any training that will develop this ability, whether it be by tracing documents rapidly or by sketching from nature, or drawing from "life," will be immeasurably valuable to the Class B man.

Then, too, the plan required in the Analytique is usually very simple, sometimes, as in Figures 1 and 3 (February is-

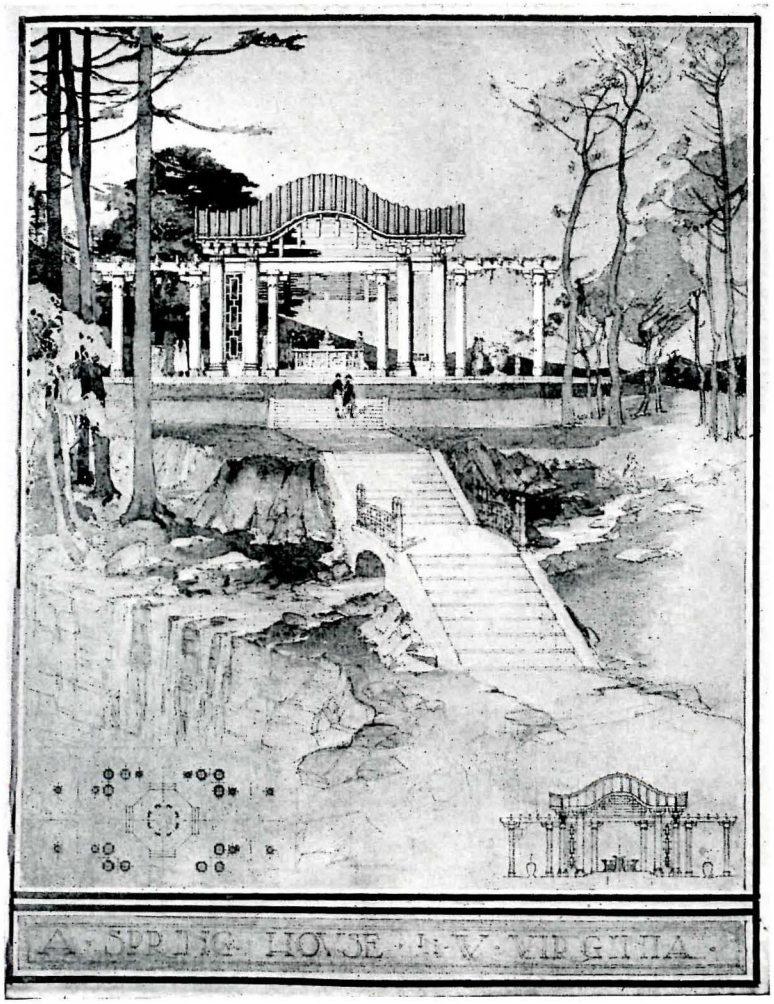


Figure 99. Class B. Problem, "A Spring House," R. Bailey, Cornell University.

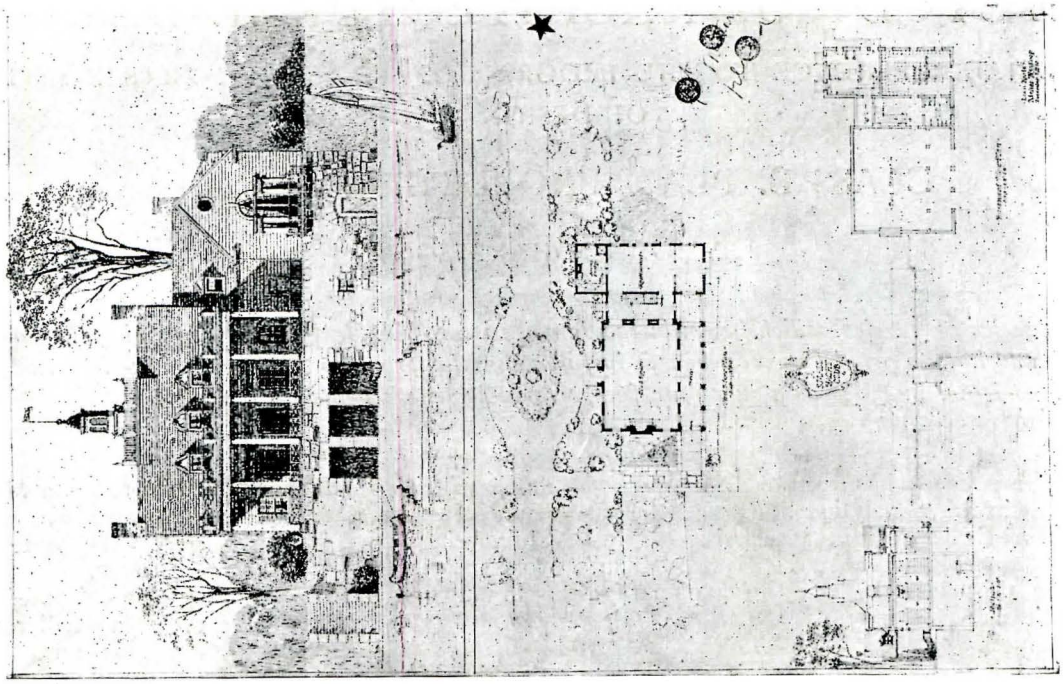


Figure 97. Class B. Problem. "A Yacht Club."
Louis Kurtz, Atelier Wynkoop.

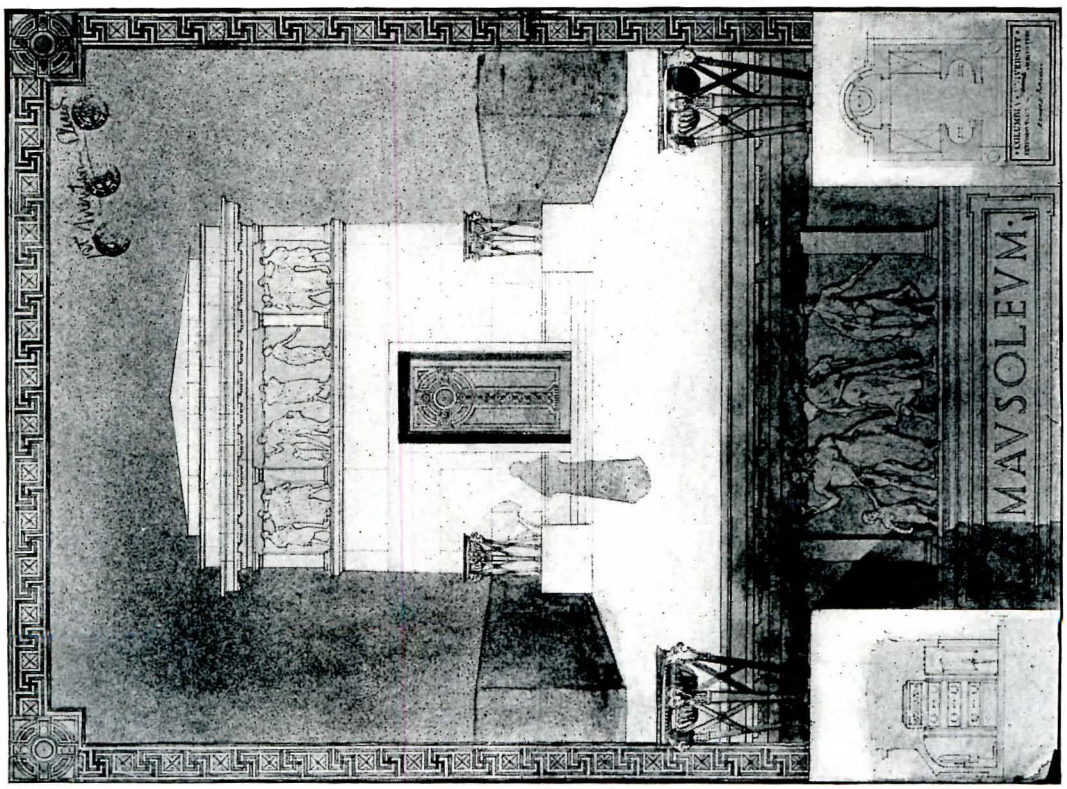


Figure 96. Analytique. "A Mausoleum." E. Kronish, Columbia University.

sue) simply a section of a single wall with openings in it; the plan of the Class B problem is usually a grouping of several rooms, as in this case, or of other "units" of plan, as in Figure 98, where some of the elements are unroofed. In short we might say that the Analytique is almost a study in two dimensions, while the plan problem is a study in three; that for the Analytique the principal studies were made in the dimensions of length and height (i.e., elevation), while for the B Plan problems the first and determining studies are made in the dimensions of length and width (i.e., plan), the third dimension of height not being of primary importance until the plan has been brought to a possible solution. This means a difference from the very beginning of the problem, from the esquisse; the esquisse becomes even more of a mental training than before, for the limited time in which it is made, a "scheme" must be found, the author's suggested solution to a given problem.

To do well a B Plan esquisse one must learn the essentials of planning a small composition. The program given calls for certain requirements; there may be only one, or there may be many ways of satisfying these requirements. *Any arrangement of forms may be considered a solution if it answers the requirements of the problem.* If it does not do this it is not a solution, no matter how clever in indication, nor how clever the arrangement of forms into what appears to be a "beautiful plan." A solution of one problem usually cannot be taken bodily and made to do service as the scheme for a different set of requirements, and when documents are used for a study of scheme and plan arrangement, the program of the example should be read at the time the plan is examined.

The program calls for elements of different size and of varying importance; it stipulates the size or shape of ground that may be used. The student makes his own grouping of these elements. The making of an esquisse is a rapid fire process in which one must depend upon well-trained habits of thought, so that one does instinctively certain things that have become recognized as good. To do these things instinctively one must be trained in general principles: these one may think over and study beforehand, between problems; at the time of taking the esquisse there is no time for such general study; one must depend then on training.

Of these general elementary principles as to planning an arrangement of architectural units I will mention:

1. Size, and scale. In the Analytique we learn that some elements, such as steps and balustrades, vary only slightly in size. For work in Class B plan one should know the size of a number of good examples of rooms of various kinds of small façades, and of "circulations," that is, lobbies, corridors, loggias, etc. These will furnish a standard by which the requirements of the program may be fitted. Thus, if the program calls for a *large* lobby, we realize that it should be larger in size than the usual examples, larger in scale and in treatment. We should also know, from the study of documents, how many "motives" can be put in a given length of façade; how many arches in a loggia, of a certain length; how many openings in so much wall, etc. We shall in a later article go further into this question of sizes and of scale.

2. "Character" in the "parti" or scheme as well as in the treatment of façade. Will the program be better suited by a formal or an informal scheme? It may be symmetrical and yet informal, as in Figure 99, or it may be unsymmetrical and formal. The unsymmetrical informal scheme, as in Figure 97, or the symmetrical formal scheme as in Figure 100 are more usual. In any event the solution of a problem must be fitting in character.

3. "Parti" or Scheme. This is, of course, the most important item in design, and it is to learn something about "parti" that one takes the B Plan problems; in other words, in studying each problem one is learning how to approach later ones, how to take the esquisse for them; for at the time of taking the esquisse it is the working of one's own brain, training and memory, that must be relied upon. In the next paper I shall have something further to say of "parti" and plan composition. At present I shall only say that the necessary qualification of a "parti" or scheme is that it shall satisfy all the conditions of the program; that the scheme shall "work" is absolutely essential. I would point out here, however, that having made a bad esquisse, one which on study proves to be an unsatisfactory solution, there is nevertheless a great value in carrying the problem through to a finish. It is much harder work than studying with a good esquisse, and the constant need for ingenuity to counteract the bad qualities of such a scheme, to make a workable solution, from an unworkable esquisse, without incurring an H. C. for change from esquisse, is a real training for the problems of office work, where site, questions of construction, or the idiosyncracies of a client frequently prevent an easy "parti" and call for a display of ingenuity.

4. Open-mindedness. In order to develop ability in arriving at a "parti," one must be willing to try all possible schemes, and not be satisfied with the first that suggests itself and seems to meet all requirements. Figures 101 and 102 are different solutions of one program; they each satisfied all conditions. The proper attitude in making an esquisse for any problem is to visualize all possible solutions, and then to choose the best; or if, no one stands out as such, as is the case in simple problems, then to choose that solution which is most interesting to the student, as its development will tend to make him use his best talents.

5. Indication and the meaning of "Mosaic" in plan composition. How these effect the conception of a "parti" and may be used in making the studies for an esquisse will be spoken of later.

For the B Plan problem, as for all problems, a schedule should be made out as suggested for

(*Continued on page* 37)

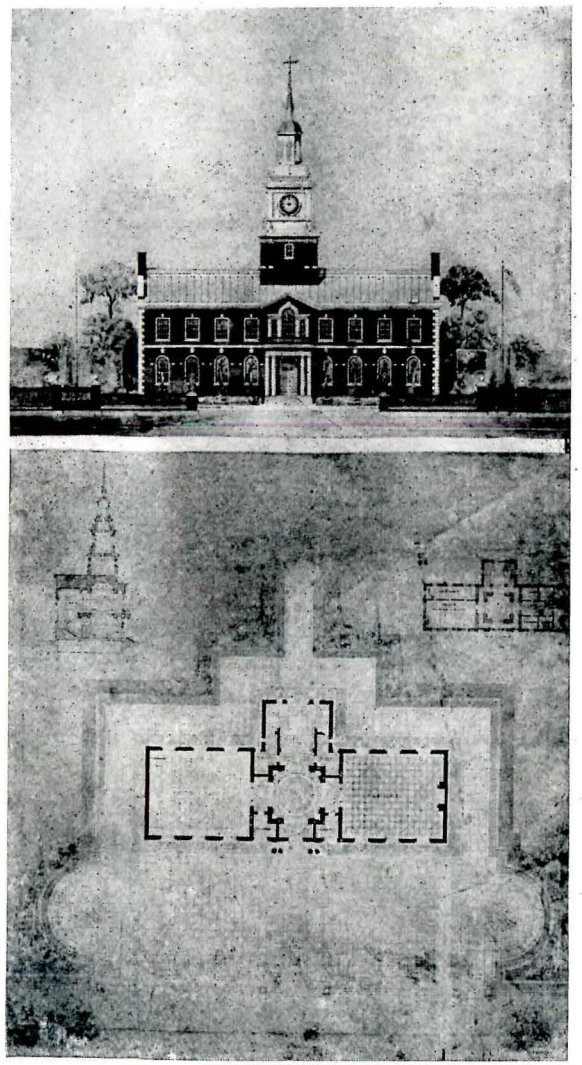


Figure 100. Class B. Problem. "A Building for a State Historical Society." J. Weston, Atelier Hirons.

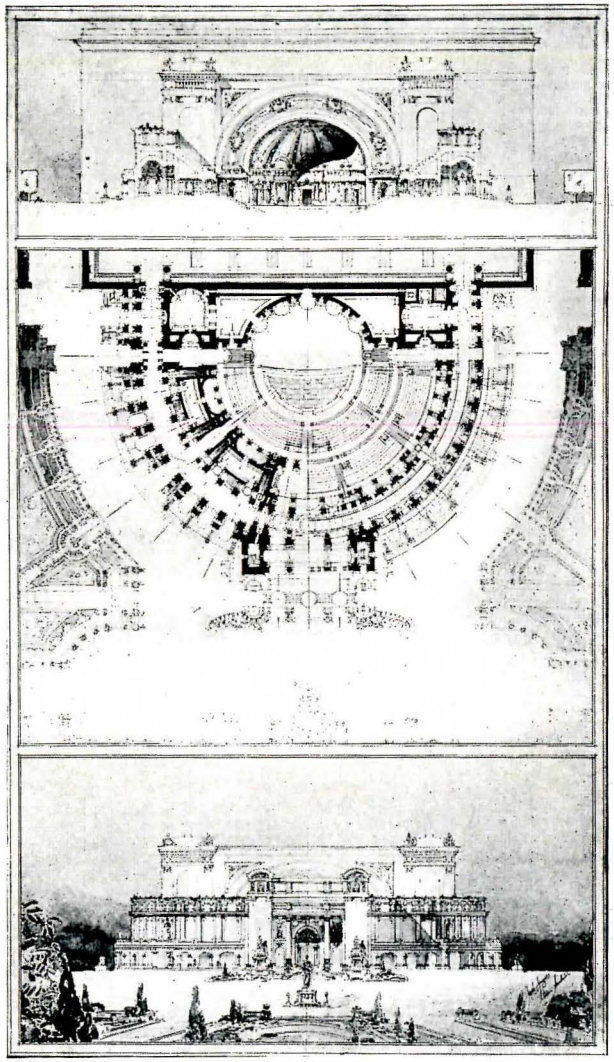


Figure 98. Class B. Plan Problem. "An Open Air Theatre." Jack Sanger, Atelier Hornbostel.

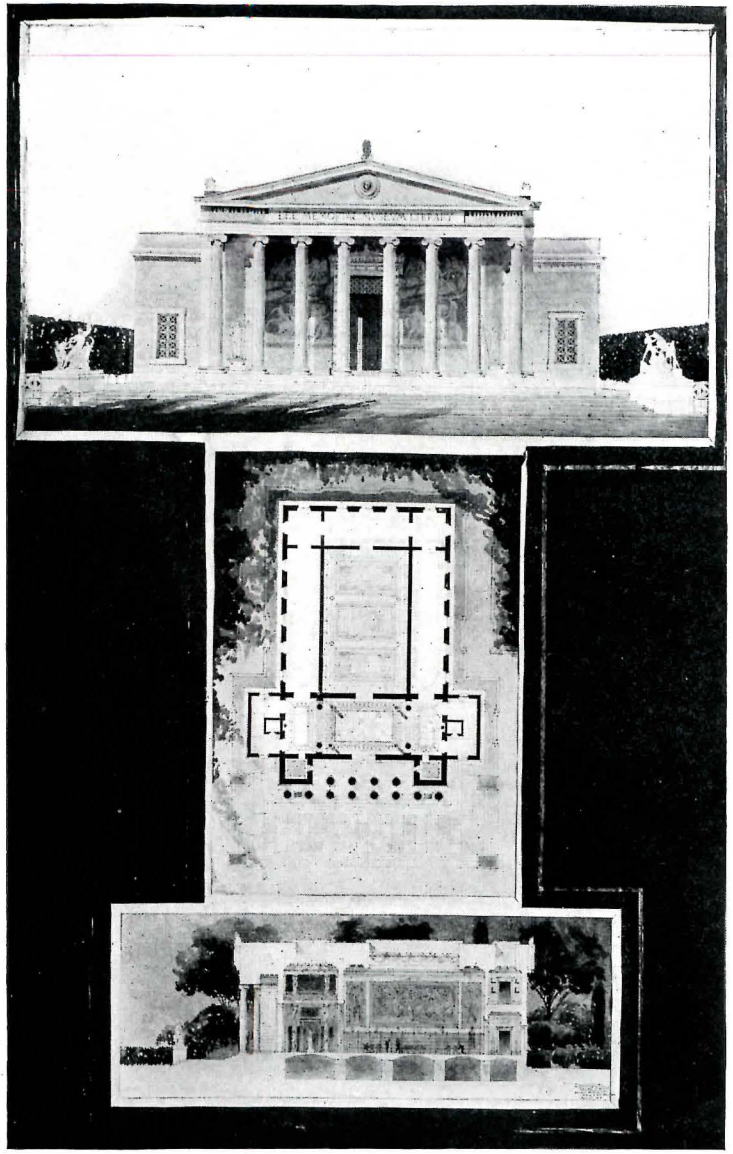


Figure 101. Class B. Problem. "A Small Memorial Art Library and Museum," E. Eastcourt, Atelier Hirons.

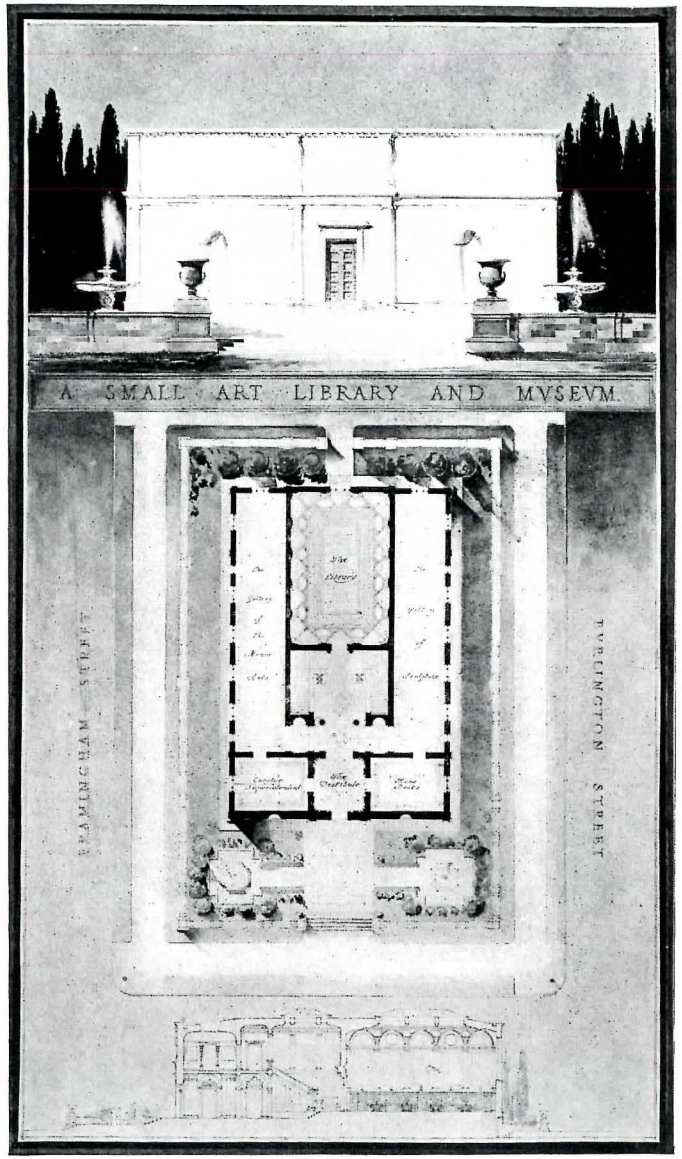
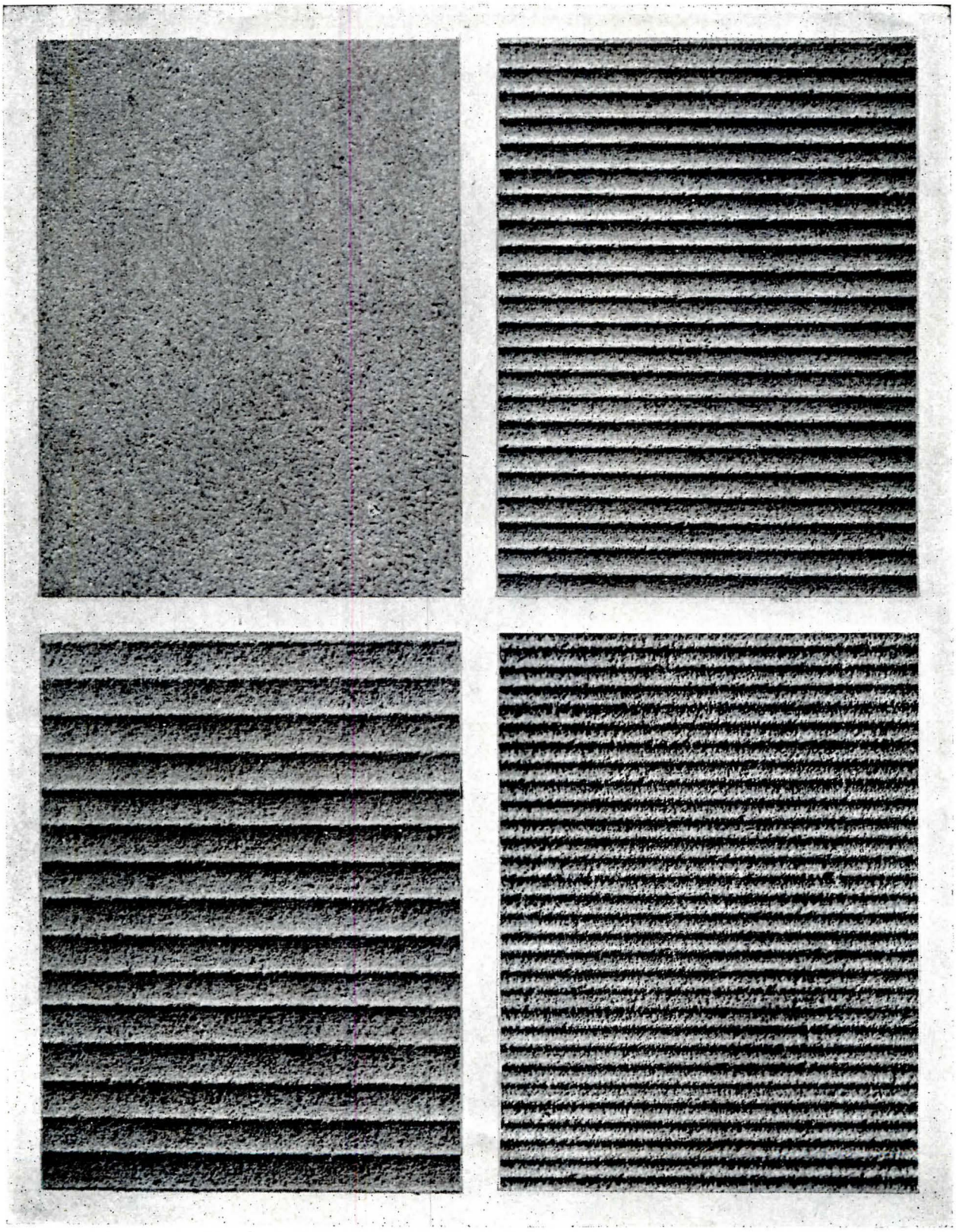


Figure 102. Class B. Problem. "A Small Memorial Art Library and Museum," L. Williams, Columbia University.



Full-size Photographs of Finishes on Indiana Limestone: Upper Left, Sand and Water Rubbed Finish; Upper Right, Machine-Tooled, Six Bats to the Inch; Lower Left, Machine-Tooled, Four Bats to the Inch; Lower Right, Machine Tooled, Eight Bats to the Inch. *See page 25.*

ARCHITECTURAL DETAIL PART VI

BY JOHN VREDENBURGH VAN PELT

This is the sixth instalment of an article in which Mr. John Vredenburgh Van Pelt, formerly Professor in Charge of the College of Architecture, Cornell University, Architecte Diplomé par le Gouvernement Français, and author of "Essentials of Composition," will discuss the designing of good architectural detail and point out the means by which the ability to produce good detail can be developed. Reproductions of detail drawings from some of the best architectural offices will accompany this article and the publication of this series of drawings will be continued after this discussion of the subject has been completed—making a valuable feature of this journal indefinitely.

THE surface treatment of building material is the most rudimentary form of detail. Although works on building construction have touched upon the tools and methods used in dressing stone, I know of no comprehensive review of the subject from the purely artistic point of view and to furnish a study that will be useful to the detailer and perhaps to the older architect is the aim of this article and will be that of a succeeding article. An excellent description of building stones is contained in Merrill's "Stones for Building and Decoration."* The book gives an indication of the stones available for different localities, important when we remember that their hardness and formation should influence both texture of finish and detail.

The three varieties most serviceable for building in the United States are granite, sandstone and limestone. As processes of manufacture progress, granite, especially in the vicinity of its quarry, if broadly and appropriately detailed, is daily becoming more available for all kinds of architectural use. It still costs more and perhaps always will cost more than sandstone or limestone. The classification of limestone includes marble, so that for the purpose of our present investigation it will be more convenient to redivide our stones into three new groups, first granite, second limestone and oolitic limestone, third marble. From this it will not do to conclude that all sandstone is like all limestone, but the finishes appropriate for the best grades of oolitic limestone are also proper for most of the better sandstones. There is even more variation among the different kinds of sandstone than between it and the limestones that cannot be called marble.

Sandstone is merely an agglomeration of particles of sand, usually cemented together by some other material, sometimes adhering only on account of the great pressure to which they have been subjected. Much of it is harder than the usual grades of oolitic limestone, an advantage, perhaps, from the point of view of durability, a great disadvantage from the point of view of working. Some of the sandstones are almost as hard as granite. Sandstone usually has a high absorptive capacity and this tends to make it disintegrate in a climate where repeated freezings and thawings obtain. It is not as subject to the attack of acid or acid fumes as is limestone. Limestone producers hold that a slight reaction to acid is good because it enables the stone in a smoky city, to release the soot and grime and so endows the building with a self-washing quality after it has reached a certain stage in the weathering process.

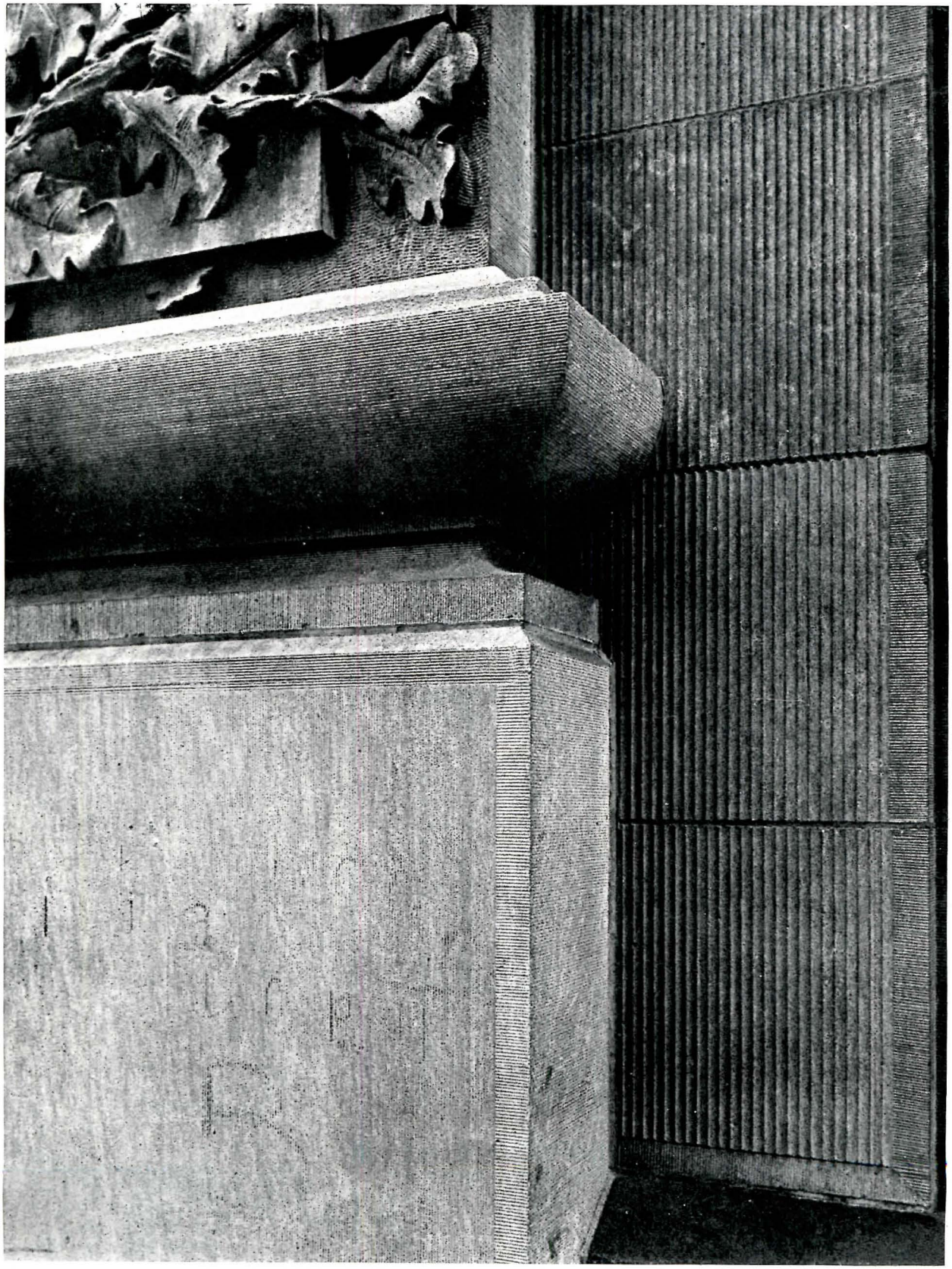
**John Wiley & Sons, New York.*

Personally I do not object to a certain amount of "patina" and I question whether any material would not become black in a great centre of manufacture where soft coal is burned.

As sandstone and limestone, taken together, offer such a large group, we cannot do better than begin our study with them, diverging as occasion offers in comments and comparisons of which the harder, but coarser granite or the finer grained, if somewhat harder marble will be the subject. As I found the other day that a colleague who holds degrees from several colleges did not know the meaning of "oolitic," it may be pertinent to explain that it implies the stone is made up of small, round concretionary grains that have become cemented together to form a solid rock. These little grains resemble the roe of a fish, the name coming from the Greek word for egg. Marble is crystalline limestone. Travertine is a limestone deposited by running streams or springs and occurs in all grades from a light, flaky composition to the compact rock imported from Italy. Fossiliferous limestones are made up wholly or in part of the fossil remains of marine animals. There are many other geological divisions, but noting the above is sufficient for our purpose.

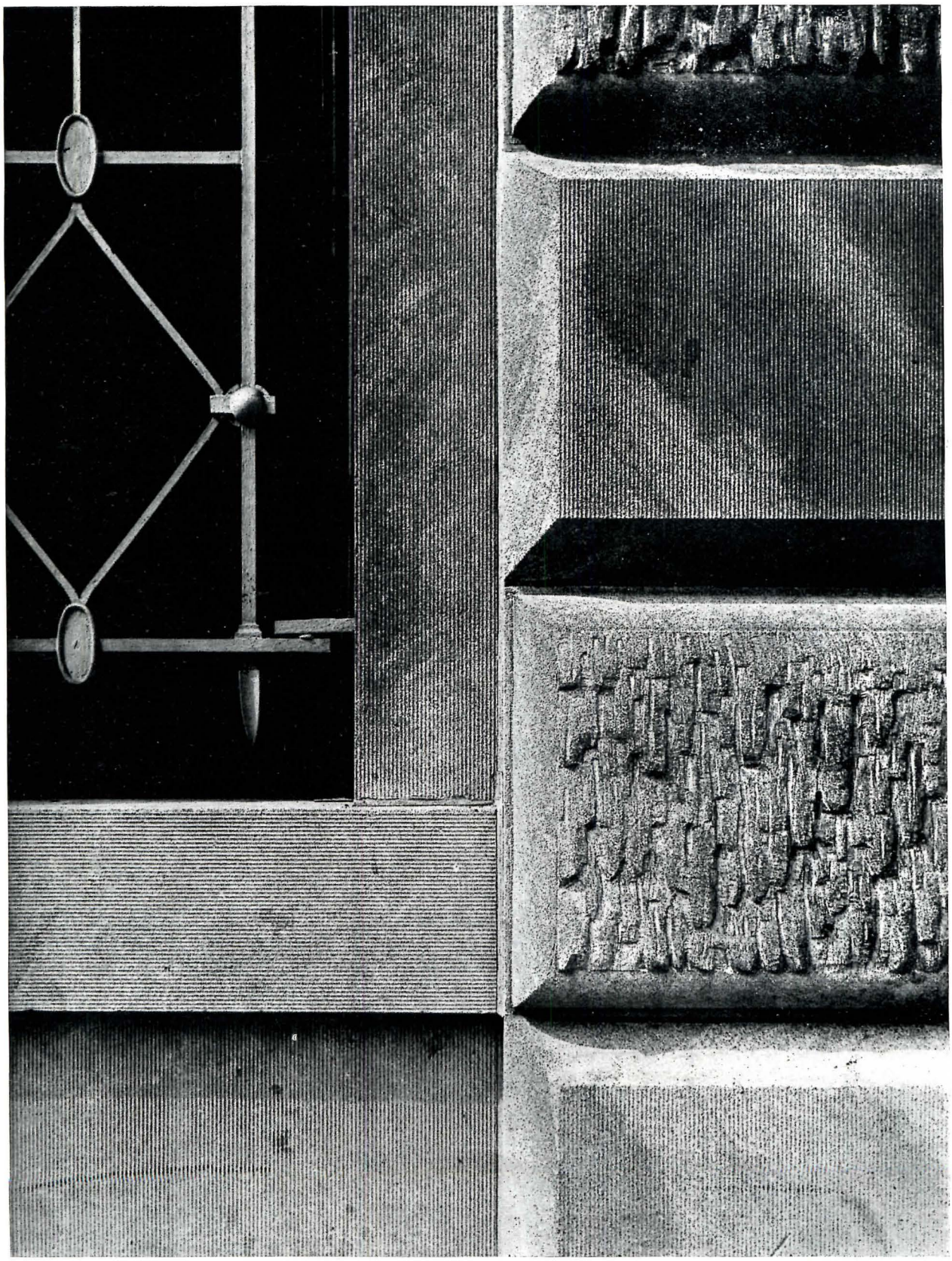
Generally speaking, there are three grades of oolitic limestone, buff, variegated and blue. They come from different levels of the quarry, the buff being softer and nearer the top, the blue, a cold grey, harder and at the bottom. Variegated is a mixture of the two. Buff, not quite as warm in color as French Caen stone, has been the most prized; but the very evenness of its tone makes it less lively in effect than its cheaper kin, "variegated" or "mixed." A good example of the latter can be seen in the Postal Life Building by York & Sawyer, on the southeast corner of Fifth Avenue and 43d Street in New York. Another excellent stone about as hard as the Indiana or Bedford oolitic is the "Bowling Green" which Cram, Goodhue & Ferguson used for St. Thomas's in New York. It has a warm grey color; but as mentioned last month, the difference in the appearance of the individual stones of St. Thomas's is due more to the surface than to the stone itself. There are good limestones in Kentucky and of course good stone is found in other parts of the country. Furthermore all of these stones occur in different varieties from coarse grain to fine, and this should influence the design and finish.

The proper size of stone courses is influenced by habit as much as by the size of the quarry stratification. Indeed, different quarries of otherwise identical stone vary widely in block sizes. In



Close-up Photograph Showing Tooling of Stone. Detail of Grand Central Terminal, New York City, by Warren & Wetmore, Architects.

Close-up Photograph Showing Tooling of Stone. Detail of the Union Club, New York City. Designed by Cass Gilbert and John Du'Fais, Architects.



Close-up Photograph Showing Stone Tooled in "Stalactite" Effect. Detail of Apartment House at 410 Park Avenue, New York City. Julius Harder, Architect.

antiquity, enormous masses of stone were cut and piled in monuments that have outlasted the wear of centuries. In later times lack of the countless slaves employed in this work and only slight improvements in methods of handling heavy blocks, brought about the use of much smaller pieces of building stone. This crystallized in France during the Renaissance and subsequent periods of the seventeenth and eighteenth centuries, so that a thirty to forty centimeter stone course became almost a habit. Italy remained freer and the Strozzi Palace in Florence has courses of 68 to 69 centimetres high, about 2 ft. 3 in.

The great danger of making stone courses too high is loss of scale, for habit has induced an impression of size. A good average for modern limestone is 16 in. to 18 in. The height of stratified beds in our best quarries and present day methods of quarrying and sawing, might permit 30 in. without extra expense. Some of the apartment houses along upper Fifth Avenue are built of blocks fully as large as that—not to their advantage. One of these has narrower courses in the height of the lower story and markedly wider ones above, suggesting a heavier and stronger construction at the top of the building than at the bottom. The designer did not show great ability in working out his detail. On the other hand a neighbor of the building just referred to has stone courses that are about 12 in. high—a cute little doll's house. Doubtless the draftsman in each case thought he was being original. Although originality dominated by knowledge becomes genius, without it, it becomes a prevalent type of American architecture.

The joints of plain, coursed limestone ashlar are usually about a quarter of an inch wide and may be even thinner. In protecting the joints, the architects of the Renaissance, and of the time of the Louis of France, made great use of rustication. The simplest is the square-cut joint, when it is usual to find the build and bed joints alike. The Palazzo Pietro Massimi of Rome, shown in Letarouilly, Vol. 3, plates 280-288, has a square joint space inset a little less than an inch and 1⅛ in. wide, the course being just a little over 13 inches high. The residence of John Innes Kane on the northwest corner of Fifth Avenue and 49th Street, New York, McKim, Mead & White, architects, has a course 16½ inches high with joint rebate 1⅝ in. horizontal, 1 9/16 in. vertical, the inset being ½ in. It is interesting to note that in a structure designed for New York City, where the buildings are larger and the prevailing scale larger, McKim, Mead & White have adopted a wider stone course than was used in the Massimi Palace. Environs and the actual size of a building must influence its scale to some extent.

Moulded joints are a development of the foregoing, a chamfer at the outer edge of the joint a common form. This is often used in horizontal lines only. The objection to exaggerated *bossages* is the artificial effect that usually ensues. After all, stone joints are a practical requirement of the structure and as long as the dressing of the block partakes naturally of the qualities of the material and seems an incident appropriate to its vocation the result satisfies. As suggested in last month's article, a wall or pier supports because the several pieces bear one upon the other. Large projections with deep indentations above and below destroy the sense of support that is the inherent quality of the material and perforce appear irrational and displeasing. This is the objection to simple rounded *bossages* when the curve of the stone is excessive. Those of the Gotham Hotel, Fifth Avenue and 55th Street, New York, are acceptable; but reach the limit of good taste. There the flat of the joint is three inches wide and the projection of the *bossage* three and a half inches. The actual joining of the stones occurs at the top of that flat incut, as it should, to prevent water from attacking the mortar.

The objection to vermiculated work and to "frozen water" and stalactite effects is also the result of suggestion. A strong stone eaten away by decay or maggots is a paradox. In a fountain or grotto the picturing of frozen water and stalactites may be excused as an appropriate decorative suggestion; but some of the later French work looks theatrical and unreal. The building on the southwest corner of Park Avenue and 55th Street, shown on page 28, is restrained and may not be displeasing to many of my readers; still one wonders why every other stone should drip and run unless it is intended to inform us that it was built on one of New York's sultry summer days. Apart from the question of appropriateness, this building shows an agreeable rustication of both chamfered and curved varieties contrasted with some six bat tooling. The chamfers are planed, the flat of the joint about one-half inch wide, the full projection of the *bossage* two inches.

As a final recommendation, do not overdo the heaviness of rustications. That this is not a personal prejudice is evidenced by a comment contained in a letter written from Washington, D. C., by an authority on building stones. He says, "I note that the rustication of ashlar in the lower stories of Cass Gilbert's Treasury Annex has a depth of only about three-eighths of an inch and that, you know, is a wonderfully fine limestone building. Many architects have a tendency to make the depth of rustication too great, particularly for buildings that are otherwise fine in scale. It is often made an inch where a half to three-quarters would be better." Of course, he is here referring to the square-cut rustication. On the Union Club, Fifth Avenue and 57th Street, New York, designed by Cass Gilbert and John Du'Fais, see page 27, the courses are 17 in. high, the rustications have a projection of two inches, the radius of the curve is apparently between 1¾ in. and 2 in., the narrow offset or shoulder at the main wall around the stone ½ in. and the flat space of the joint between these offsets 2½ in.

In its manufacture limestone is first sawed from the block by a saw made from a soft iron plate, the crack being fed with sharp sand and water. This

(*Continued on page 32*)

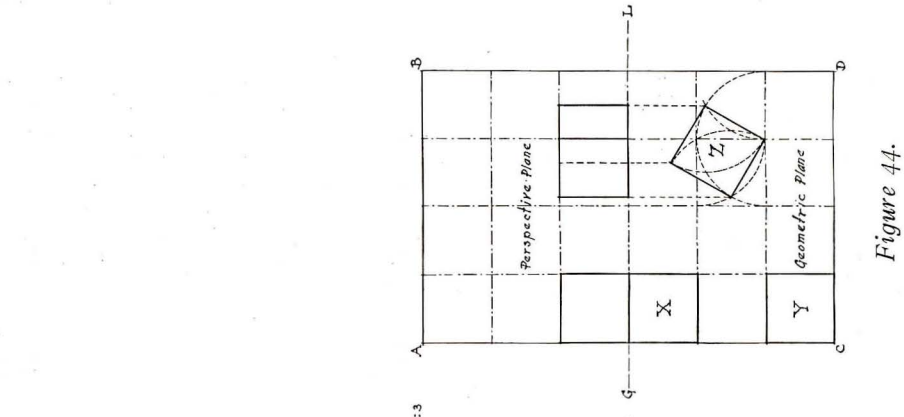


Figure 44.

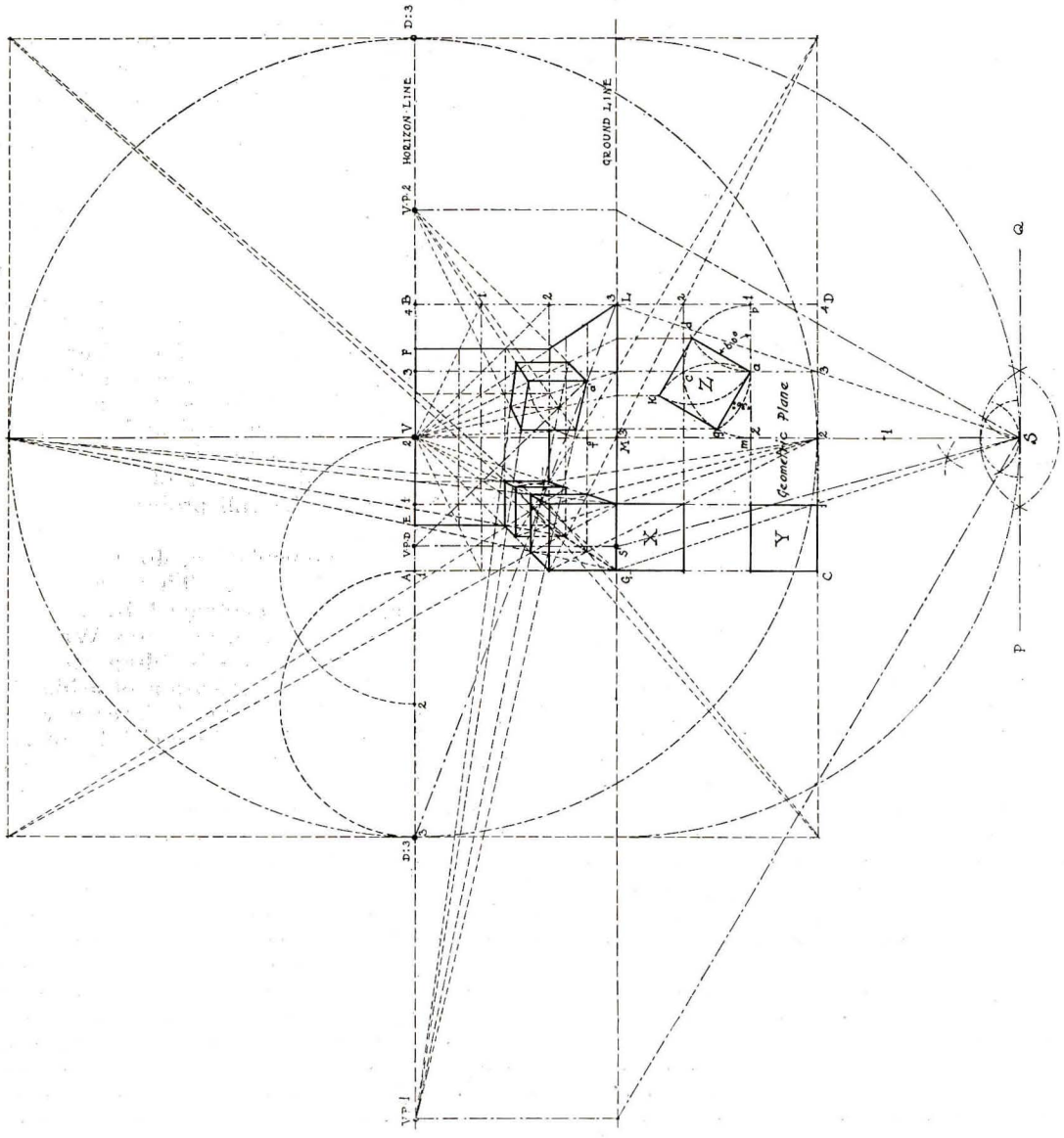


Figure 43.

PERSPECTIVE DRAWING, PART XVII

BY PAUL VALENTI

THE diagrams shown here serve a two-fold purpose, and explain the full operation of sighting objects in the picture plane located both normal to this plane and at an angle to the same as shown in Figure 43. The full operation is given for the benefit of the beginner. The complete elimination of these operations will be given in a subsequent issue and at an appropriate time when the student will be better capable of understanding. The diagram in Figure 43 should be drawn at a fairly large scale, and is constructed as follows:—With a radius of about 4½ inches, center in point *V* and describe a full circle and enclose same within a square. Through the center draw the vertical and horizontal axis, the latter representing the Horizon Line. On this line at 1/3 the distance *V D* ÷3 on either side of the central point *V*, construct the transparent plane *A B G L* below the Horizon Line, consisting of 12 squares. See Figure 30 of a previous issue. Upon line *G L* which is the ground line, construct the geometric plane *G L C D* also consisting of 12 squares, as shown in Figure 43. In Figure 44 is given a direct elevation of the picture plane in *A B G L* and of the geometric plane or plan in *G L C D*. Upon this plan it is proposed to locate three cubes *X, Y, Z*, the first two normal to the picture plane and the third at an angle as shown both in Figures 43 and 44.

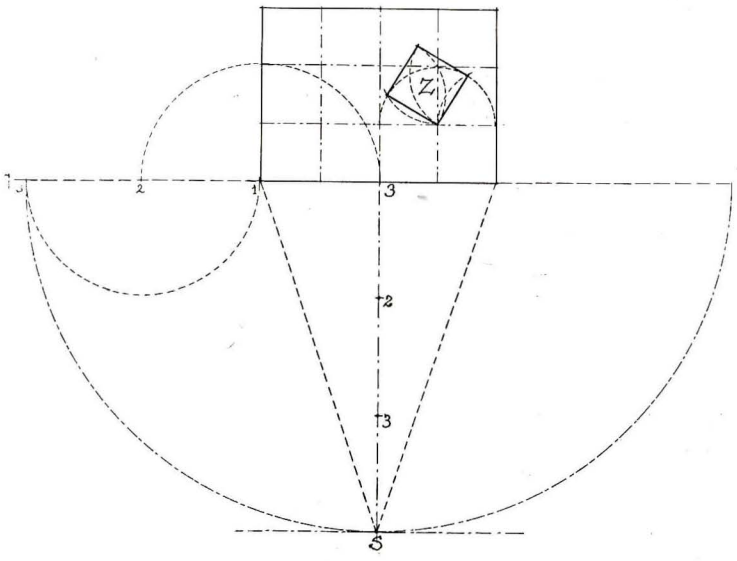


Figure 45.

After finding the back wall as was indicated and explained in Figure 30 of a previous issue, proceed to find the perspective of the cubes *X, Z* and *Y*, which is very easy if the diagram is followed carefully. In the case of the cube *Z*, after the angle has been established in the geometric plane by centering first in point *a* and describing one-half circle, use the same radius and centering first in point *b* describe arc of circle *ad* and second, centering in point *c* (which is the intersection of a vertical from point *a* and arc *m b*) describe arc *a g*. Uniting intersections *d* and *g* with point *a* we obtain two sides of the square or plan of the cube. Centering consecutively in points *d* and *g*, again with the same radius, describe the two arcs of circle that converge in point *K* and uniting points *d* and *g* with point *K* we shall obtain a perfect square at an angle of 30 degrees on one side and consequently of 60 degrees on the other, to the transparent plane. See Figure 43. In the case of cube *Z*, in this figure, the opportunity is afforded in finding the vanishing points of the sides which are at an angle to the transparent plane. To do this the following operations are required: Centering in point *M* on the ground line, with a radius equal to that used in describing the large circle, describe one-half circle below ground line *G L* as shown in Figure 43. This gives us the exact distance between points *M* and *S* as is represented by the radius formerly found. At point *S* construct an angle to line *P Q* equal to that represented by the two sides of the cube in plan located in the geometric plane in Figures 43 and 44, using the same construction for this angle as was used above. Continue these lines which are exactly at 90 degrees one to the other, corresponding to two sides of the square or plan of the cube, until they intersect the ground line *G L* and from these intersections raise two perpendiculars respectively to the Horizon Line at which intersections will be found the *vanishing points* of the eight sides respectively of cube *Z*. Follow carefully the bisecting of this angle of 90 degrees at point *S* uniting this point with point *S'* on the ground line, thence a vertical to Horizon Line where Vanishing Point of diagonal for cube *Z* is found. In order to find the perspective of this cube, first find point *a'* in perspective plan which is very easy to determine if the squares have been previously laid out as suggested. From this point *a'* conduct straight lines first to vanishing point V. P. I and V. P. II in the perspective ground plane. From points *g, k* and *d* respectively raise perpendiculars intersecting the ground line at points *g', k'* and *d'* from which points conduct straight lines to the vanishing point *V*. From points *g''* and *d''* conduct straight lines respectively to Vanishing Point No. 2 (V. P. 2) and find plan of cube *Z* in perspective At point *a'* raise a perpendicular equal in height to radius *a'f* and from this point repeat the operations

(*Continued on page* 36)

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DALLAS ARCHITECTURAL CLUB.

THE picnic which closed the summer season of the Dallas Architectural Club was a complete success. Kidd Springs was selected as the scene of activities and an afternoon of swimming and boating was indulged in, followed by a spread that had only one regrettable feature; that the capacities of the forty-odd members of the party was not sufficient to properly deport that which immigrated in the lunch baskets.

The club has now returned to the regular business meetings and direct action is being taken toward a Fall and Winter season of real accomplishment. An exhibition of the work of Texas architects is being planned for an early date. One of the D. A. C's incomparable burlesques is in progress.

THE ST. LOUIS ARCHITECTURAL CLUB.

THE St. Louis Architectural Club season 1921-22 will be opened Thursday, September 22. On the program for the first evening are an exhibition of sketches by the summer sketch class and other invited pencil-pushers; a talk by Mr. Waters, the manager of a large electrical equipment manufactory in St. Louis; and the usual exhilarating music and refreshments.

In anticipation of an enlarged student body in the night school, the club's Atelier has been repainted, repaired and rearranged with new tables and lighting system. The Atelier season will be opened the first week in October with an anticipated enrollment of from forty to fifty students.

ARCHITECTURAL DETAIL

(*Continued from page 29*)

gives a rough texture with parallel lines and offsets, some of which may, if desired, have a width of an eighth of an inch, done with care, much less. The stone is often rust stained as the saws remain wet over night. If steel filings are used for the grinding material in place of sand, this rust color is increased. Both the uneven texture and color are attractive in picturesque work, Gothic or Country House architecture, and they are the cheapest finish possible.

Next comes a rubbed sawed finish, excellent for the Rustic Buff or any coarse variety of stone, showing to better advantage the shell formation in fossilized deposits. It is obtained by rubbing the stone with sand and water as it comes from the saws.

The planer or "smooth" finish, as its name implies, is the result of running the stone through a planer without hand work other than removal of very pronounced tool marks. It is the standard finish furnished when no other is specified and while it is called "smooth," shows lines and texture resulting from irregularities in the machine. Where a really smooth finish is required, wet process sand rubbing should be specified. See the full size photograph on page 24. It has the advantage of offering less lodgment for soot and smoke deposits. Limestone may be honed for interior work and some of the harder grades of uncrystallized limestone will take a polish; but it is not wise to essay this with stone softer than marble or granite; the polish will not last.

The more usual machine tooled finishes are four, six and eight bats to the inch, shown on page 24. They are appropriate for all plain and straight moulded surfaces although in the two finer ones, the lines cannot be seen above the first story and the four bat disappears at a height of twenty feet. Some designers like to see tooling on plane surfaces run horizontally; but this is not customary and it collects more dirt. If tooling is run across the direction of narrow bands the expense is increased. Note how appropriately the lines change in the photograph already described and shown on page 28. Narrower tooling is sometimes used for special purposes and a wide two bats or half-inch "fluted" tooling has been much in vogue in New York for large buildings as it shows to a height of thirty or forty feet. Wide tooling is very effective when used as a panel that contrasts with a narrower tooling. At a great height a very wide fluting may be effective provided there is no loss of scale. Furthermore rustication itself becomes texture at a distance where the field of vision embraces a large area. A convex two bat, or wider, machine tooling can be run but is not popular, probably because the shadow lines are less sharp. In two bat or wider tooling the lines should be matched so they will superimpose in different courses. A good example of eight bat contrasting with two bat is to be seen on the Grand Central Terminal of New York, designed by Warren & Wetmore, shown on page 26. Notice where different courses of the two bat are imperfectly set that the effect is less agreeable. The eight bat border perpendicular to the direction of the main tooling undoubtedly ran up the cost, but is justified by the panel effect. The borders are 1½ in. wide. The carved course shows an attractive hand-finished background that we shall discuss next month.

Tooling on the Union Club entrance, page 27, is six bat, the big mould being planed and probably rubbed. The cross tooling on the projecting band of this door frame was perhaps not expensive as it could be set in the planer; but the cross tooling of the narrow fillet that rebates behind it must have been comparatively costly. Naturally, where a machine cannot reach a mould, the work has to be done by hand.

In the foregoing we have talked only about machine work. In the next issue we shall take up a review of the hand finishes and show some interesting examples in St. Thomas's, the University Club, and other masterpieces of building whose beauty and charm are wonderfully enhanced by the texture of the surfaces that enter into and form an integral part of the design.

UNIVERSITY OF PENNSYLVANIA ARCHITECTURAL ALUMNI OF NEW YORK.

THE luncheons of the "Pennsylvania" Architects will be resumed on October 6th, at 12:30, in the Café Boulevard, on 41st St., near Broadway. The luncheon announced for Sept. 1st in the last issue of PENCIL POINTS was called off because so many men were away. No cards were sent out.

The luncheon on Oct. 6th will be followed by an election of officers so it is important that every member should be on hand if possible, and the secretary should be notified as usual, at 1123 Broadway, Room 1007. Telephone, Watkins 9200.

Issues of PENCIL POINTS *previous to March, 1921, are out of print.*

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LLOYD MORGAN.

LLOYD MORGAN, who won the Paris Prize awarded by the Society of Beaux-Arts Architects as the result of the competition recently closed, had graduated from Grammar School and had about a year and a half to his credit in High School when he first took up drafting in High School, evenings. He graduated from a two-year architectural course at Pratt Institute, Brooklyn, New York City. He took a summer course at the University of Pennsylvania, Philadelphia, Pa., and a summer course at the Massachusetts Institute of Technology, Boston, Mass. He took a one and one half year course at the University of Pennsylvania, where he studied under Mr. Van Pelt. He returned to New York City and was employed by Dennison & Hirons, architects, working in the Atelier Hirons nights. Mr. Morgan attributes his success in winning the Paris Prize largely to the training he received in that office and in the Atelier. While under Mr. Hirons he won the Warren Prize.

Mr. Morgan served during the war in the 79th Division, 309th Infantry. He was wounded at Grand Pre and admitted to the hospital at St. Dennis. When he was well enough to be about the Army called for draftsmen to work on maps. Later he studied in France under the Government in the courses arranged by Mr. Lloyd Warren for men in the A. E. F. He then entered the Atelier Laloux, in Paris. While at the Atelier Laloux Mr. Morgan had the opportunity to "nigger" for Grand Prix men. He assisted M. Carlus in the making of drawings for the Grand Prix. Mr. Carlus won. Mr. Morgan then worked with M. Carlus on the competition of next importance of the Ecole des Beaux Arts, the *Concour Roux*. This M. Carlus also won, the first time in the history of the school that a winner of the *Grand Prix* also won the *Concour Roux*. Mr. Morgan also assisted such men as Haffner and Grapin on their important problems in the school.

On his return home, Mr. Morgan was encouraged to try for the Paris Prize and he won. He expresses deepest gratitude to Mr. Hirons for the training and encouragement given him, also an appreciation of the help received from M. Laloux and from the spirit of his French comrades. He especially appreciates the spirit of his comrades of the Atelier Hirons.

MODERNIST ART

CONSIDERABLE interest was recently aroused by an anonymous protest against the exhibition of "modernist art" held at the Metropolitan Museum of Art. The fact that those who prepared the circular sent to various publications did not see fit to attach their names to it naturally makes one disinclined to give much weight to the protest. It is a symptom of the recurrent conflict between the progressives, or radicals, in art and the conservatives. Usually neither side is entirely in the right, but the liberal policy of the Museum seems to have been commendable. Given enough rope, the fakirs and sensationalists will hang themselves. The earnest men only will make a lasting impression. It seems safe to rely upon the common sense of the public in this matter.

LECTURES UNDER THE COLUMBIA INSTITUTE OF ARTS AND SCIENCES.

A SERIES of lectures on art and architecture have been arranged under the Columbia Institute of Arts and Sciences, the program for whose ninth year has just been announced. The first of the lectures will be given on October 19 when Professor L. A. Loiseaux will lecture on "Gothic Spain." Professor Loiseaux will discuss "Moorish Spain" in another lecture on October 26.

Richard F. Bach, Associate in Industrial Arts of the Metropolitan Museum of Art, will give two illustrated lectures, one on "Industrial Arts and the Democratic Ideal," and the other on "Home Furnishings and the People—What They Want and Why They Don't Get It." Henry Warren Poor will discuss "Some Great American Artists" in his lecture on November 9.

Two lectures on Egyptian Art will be given by Mrs. Bernice Cartland Richardson, assistant in the Department of Egyptian Art, Metropolitan Museum of Art; and Mrs. James Walcott Haslehurst will give two illustrated lectures on Italian Art. "Some Great French Cathedrals," will be shown in an illustrated lecture by Martha A. S. Shannon, lecturer of the Boston Museum of Fine Arts.

William M. Ivins, Jr., Curator of Prints at the Metropolitan Museum of Art, will present an illustrated lecture on "French Black and White of the Last Hundred Years"; and Edith R. Abbott, also of the Metropolitan Museum of Art, will give two illustrated lectures on Art.

A series of monthly lectures in cooperation with the Archaeological Institute of America, of which Dr. James C. Egbert, director of University Extension at Columbia, is president, will be given during the year. Prof. R. D. Perry of Columbia; Dr. N. C. Nelson of the American Museum of Natural History; Prof. Helen H. Lazer of Hunter College; Dan Fellows Platt, and Dr. Stephen B. Luce are among those who will lecture.

PERSONALS

H. VAN BUREN MAGONIGLE, Architect, is now abroad travelling through France and Northern Italy. He will return to New York about the middle of October.

H. V. YARUS, Architect. has opened an office at 201 Bute Street, West, Norfolk, Va.

F. ALTON CLARK, Architect, has removed his office from 169 Meadow Street to the I. O. O. F. Building, Maple Street, Naugatuck, Conn.

JOHN J. KLABER, Architect, has removed his office to 103 Park Avenue, New York City.

DAVID PODOLOFF has opened an office for the practice of architecture at 865 Chapel Street, New Haven, Conn.

TOURISON & BETTS have opened an office for the practice of architecture in the Land Title Building, Philadelphia, Pa.

H. RAFAEL LAKE, Architect, has opened an office in the Balboa Building, San Francisco. Mr. Lake is a graduate of the Massachusetts Institute of Technology and for the past few years has been connected with the office of Cass Gilbert, Architect, New York City.

SKETCHING AND RENDERING IN PENCIL, PART XV.

(*Continued from page 7*)

similar tint with the one exception that the pigment will have a tendency to soften the lines of the pencil, removing more or less of the gloss, and so "fixing" the lines that they will smudge less easily than before. Another scheme is to apply a wash of gray of a tone somewhat like that of the pencil lines themselves to such portions of the drawing as need to be toned down or pulled together. A sky may be grayed, for instance, in order to increase the contrast of a building against it, or a lawn may be simplified by passing a wash from one end to the other, and not only are such results often very pleasing but time can frequently be saved by thus combining the wash work with the pencil as it is much quicker as a rule to cover a surface with the brush than with the smaller point. Pencils can be used very often in drawing fine detail and the brush then taken up for the larger work, or if this larger work has been done with the pencil but the values seem too light or complicated they may be toned to the desired depth or satisfactorily simplified by wash. For such work ivory black, lamp black, neutral tint, sepia, india ink or any such pigments will do or a gray can be mixed by combining two or more neutralizing colors.

Now just as tints of monotone can be used in connection with pencil work so can tints of several hues, in fact the author has found that a great demand exists among the architects for such renderings as they afford an opportunity for a suggestion of the colors of the building materials and the surroundings, thus adding greater interest and value. As a rule a drawing to be so tinted is completed in the usual manner in pencil and then very transparent washes of the desired hues are flowed over the various parts. When using this method there are several points worth remembering, and one is that the color should be applied in very light tints rather than in more nearly its full intensity for the result should count primarily as pencil work, with the tints of secondary importance, and much of the charm is lost if the colors do become so conspicuous as to compete with the pencilling for supremacy. If such prominent color is desired it is better to make the usual sort of water color drawing and be done with it, so subordinating the pencil that it becomes in itself almost negligible, serving simply as a guide for the color work. Another point is that when tints are to be used, whether of monochrome or varied colors, it is well to first flow one or two washes of clear water over the entire paper, for this will remove the shine of the pencil to a large extent, thus insuring greater harmony between the pencil strokes and brush work, and will at the same time act as a cleansing agent removing superfluous pencil dust and preparing the paper surface for the subsequent tints. Again, as some tints are quite transparent and others rather opaque, a careful choice should be made, the transparent ones being generally considered best for this sort of work. As the chief objection made to tinted pencil drawings is that the shiny lines and dull washes have dissimilar characteristics, it is better, when it is known in advance that washes are to be applied, to select one of the special pencils that gives a dull instead of a glossy line, thus avoiding any unpleasantness from this source. As some pencils such as the lithographic ones offer little resistance to water, however, they are hardly suitable for such work, so if a new kind of pencil is used, tests should be made beforehand to make sure the line will stand washing.

This brings us to another method of combining pencil and color, one which is perhaps less commonly used but which offers at the same time opportunity for excellent results, especially in the making of quick sketches. In this method the object pictured is outlined in pencil in the usual way and washes of water color are added, much as would be done in making the regular sort of water-color sketch. When the general tones have been thus obtained, a pencil which will give a dull line is selected and used for adding accents and finishing touches:—usually this is black but sometimes one or more colored pencils prove more effective. These need not of course be proof against water as they are not employed until the surface is dry. The two delightful sketches of interiors by Mr. Otto R. Eggers in PENCIL POINTS for April, 1921, Plates XIV and XV, were touched up with lithographic pencil after the washes were applied, thus illustrating the method just described. A similar method offers a means of improving such portions of water color renderings as become muddy, losing their crispness and directness, for under such conditions a few touches or accents of colored pencil or crayon or pastel often do much towards overcoming the difficulties and securing the desired effect. There are, in fact, numerous ways of combining water color and colored pencils pleasingly, washes being sometimes applied over the pencil work, in contrast to the method just mentioned. Occasionally ink lines are added to these others, in fact very effective results can be obtained on tinted paper by sketching in the forms with brown ink, next adding a few washes of color, finally touching up the whole with crisp strokes of black or colored pencils.

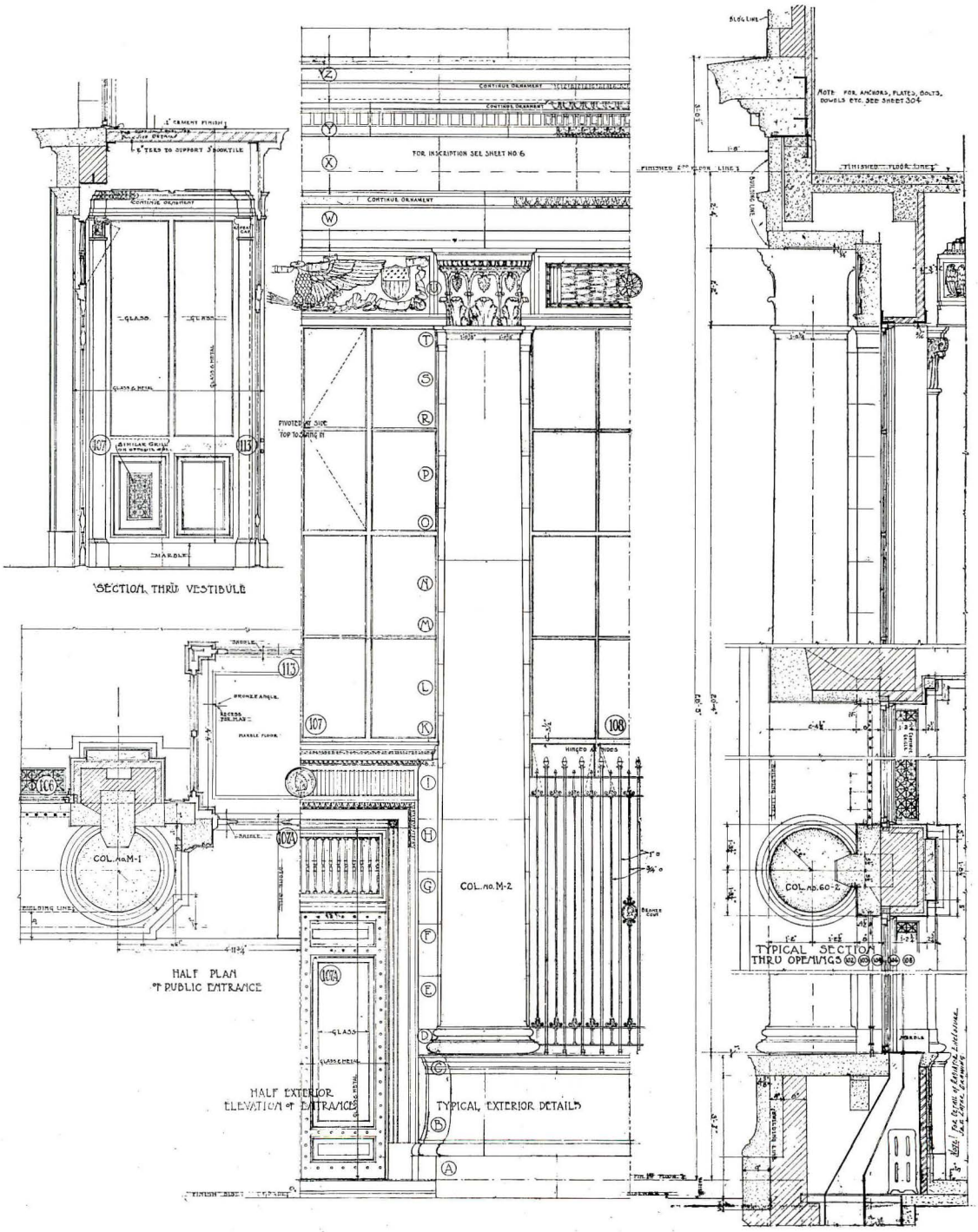
Colored pencils alone produce pleasing results also, especially if used on tinted paper or board, and a very satisfactory combination is gray or buff board, brown ink, one or two colored pencils and a white pencil or Chinese white.

So numerous are the possibilities of thus employing several mediums in one sketch that we cannot hope to describe them all here,—in fact, words fail to convey an adequate impression of such subtleties of tone and color, so we must leave the student to perform his own experiments and arrive at his own results. Before closing, though, just another word regarding papers and some of the mediums best suited to special surfaces.

The kidfinished bristol board such as we have previously recommended for pencil work takes light tints nicely and does not warp badly if the entire surface of the sheet is first wet with water. If it should buckle out of shape in spite of this precaution it may be thoroughly dampened after the rendering is entirely completed and put to press for a few hours between two drawing boards held together with weights. Thin drawing papers are best if mounted before the washes are applied. Then even if they do wrinkle somewhat as they are dampened they will dry back into shape. Some grades of tracing paper are excellent for wash work if floated or stretched beforehand, or if used without stretching they permit of interesting results of another kind, for if quite thin, colored pencils may be effectively used on the back of the paper, just as is frequently done in preparing house plans, thus permitting the color to show through, or delicate tones of pastel may be rubbed on the front, accented with as many pencil lines as seem necessary. Another useful fact is that regardless of how white in appearance tracing paper may seem to be, Chinese white will always stand out against it distinctly, hence it is useful for highlights. One of the most effective kinds of quick sketches is made by first outlining the masses with brown ink on tracing paper, next pencilling the darker tones in black or such a color as conditions seem to demand finally adding Chinese white on the lighter portions. Brown ink is recommended for such purposes rather than black as the lines seem less hard and mechanical and harmonize because of their color with the other mediums and at the same time better represent the hues of such materials as brick, tile, timber work, etc., which are often of a color similar to that of the ink itself.

The illustrations accompanying this article show some of the combinations here described but it should be understood that in the processes of reproduction the effect of the originals is somewhat changed, this being especially true of the tints of the papers on which the drawings are made. The three sketches on Figure 38 were all done by the same method on a charcoal paper of a greenish gray hue. This paper was allowed to represent the middle values while the dark tones were made with a black pencil which was purchased as one of a set of colored pencils. The white was done for the most part with pencil, too, being added gradually as the work progressed, but as it proved difficult to keep the point sufficiently sharp for the finer detail some finishing touches of Chinese white were done with a brush, especially in the drawing of the church. The

(*Continued on page 36*)



Exterior Details of Building for The Guaranty Trust Co., at 25 East Sixtieth Street, New York City, Cross & Cross, Architects

PERSPECTIVE DRAWING, PART XVII.

(*Continued from page* 31)

as was done in the ground plane, and uniting the four points thus found above with the corresponding intersections below you will find that you have constructed cube *Z* in perspective in its exact relation to the picture plane, according to the conditions prescribed in the geometric plan of Figure 44 and with its relation to the other two cubes *X* and *Y*.

The object of this diagram is *not* merely to find the perspective of three cubes, but it is obviously applicable in mass to three structures if the scale is reduced, in this case located *below* the horizon line, possibly indicating a bird's-eye-view. Two of these structures are normal to the transparent plane and the third at a determined angle with it. Care should be taken in this example by the beginner as to how the vanishing points are established so that in subsequent lessons the elimination of these points and operations outside the picture plane, or plane of our operations, may be better understood. The two lines meeting in each corner of the square enclosing the large circle forming the radius or area of our operations show that the diagonals of cubes *X* and *Y* converge exactly in these points.

Figure 45 is drawn to show in detail the relation and distance of the station point *S*, or the point at which the observer stands and the picture plane, this distance being as is usually the case 3x½ the width of the picture. See Figure III, Part I.

ARCHITECTURAL CLUB OF NEW HAVEN.

THE OFFICERS and members of the Architectural Club of New Haven and architects of the state and of Massachusetts dined at the Garde Hotel, Tuesday evening, September 13th, as the guests of the Association of Metal Lathe Manufacturers. About fifty members of the club were in attendance and there were also present quite a number of representative architects and structural engineers from Boston and Holyoke, Massachusetts, and from Hartford, Bridgeport, New London, South Manchester, Shelton, Mount Carmel and other places in Connecticut.

Mr. C. H. Grannatt of Chicago, representing the association, gave an interesting and instructive address on the advantages derived from the use of metal lath in the construction of houses and other buildings. Moving pictures which followed increased the effectiveness of the address.

Theodore O. Appel, president of the Architectural Club of New Haven, presided and expressed the appreciation of the club and their fellow architects from the surrounding states for the enjoyable evening and thanked Mr. Grannatt for coming to New Haven to give this educational and valued lecture.

SKETCHING AND RENDERING IN PENCIL

(*Continued from page* 34)

size of the original sheet is 9¾" x 13½". Figure 39 was drawn on a light gray mat board, being first laid out instrumentally from the plan at a scale of 3/16" to the foot, then rubbed down with an eraser and rendered with a black pencil giving a dull line. Two washes of water were next applied, brushed well into the pencilled portions each time, as the lines had a tendency to resist or shed the water. Then washes of ivory black were added to the roof, shutters, foliage, etc., and to the shadow tones, after which Chinese white was applied sparingly for the high lights. The white should always be the last thing used in such a case, as it is almost impossible to pass any washes over it without causing messy results. This whole sketch was very quickly done as it measures only 7½" x 10½".

The list below is given to show at a glance some of the uses of pencil and some of the most effective combinations of various mediums as used in conjunction with it, and though it is by no means complete it may suggest to the student some ideas for his own experiments.

1. Black pencils or crayons of various sorts on white papers.
2. Black pencils or crayons with washes of gray added.
3. Black pencils or crayons with washes of color added.
4. Black pencils or crayons on tinted papers.
5. Black pencils or crayons on tinted papers with highlights added.
6. Black pencils or crayons on tinted papers with washes of gray, with or without highlights.
7. Same as "6" but with washes of color.
8. Colored pencils or crayons on white or tinted paper.
9. Same as "8" combined with wash or color.
10. Combinations of black, white and colored pencils or crayons on white or tinted paper.
11. Same as "10" with wash or color added.
12. Combinations of pencils with ink or with ink and wash or color on white or tinted paper.

FIFTIETH ANNIVERSARY REUNION AT CORNELL UNIVERSITY.

THE Semi-Centennial of the College of Architecture of Cornell University and the inauguration of Dr. Farrand will be combined in a single big event October 21-22, 1921.

Dr. Farrand will be inaugurated Thursday and will preside at the formal opening of the College Anniversary, Friday, October 21, at 11 o'clock.

The balance of the program includes a luncheon at the Country Club, an afternoon of outdoor recreation, a smoker and informal reception for Dr. and Mrs. Farrand, a football game, dinner, parade, and an evening stunt by the undergraduates of the College. The detailed program will be announced as soon as acceptances are received from the principal guests.

It is probable that on this particular week-end there will be considerable pressure on Ithaca's housing facilities. Men can be accommodated in the fraternity houses. Family parties will be more difficult to provide for, but an effort will be made to arrange for accommodations. The Committee now needs to know as nearly as possible how many to provide for.

So far Miss Steele has received some interesting photographs, programs and other material illustrating the life of the College at various periods. Alumni who have good material should send it in now, addressed to Miss Ellen I. Steele, Librarian of the College. She will acknowledge receipt and will return the material when the exhibition is taken down, provided contributions are marked with name and address.

The exhibition of work of the alumni, which is under the charge of Professor L. P. Burnham, will be most interesting, but more material can be used than has yet been promised, anything representative of the work or avocation of the alumni; paintings, sculpture, batik, architecture, etc.

AMERICAN DRAWING INSTRUMENTS

ONE of the industries that developed, as a matter of necessity, in this country during the war, is the manufacture of drawing instruments. With the resumption of international trade this industry is in need of adequate protection against foreign competition. The encouragement of such industries in this country is a matter of great importance. It means more than protecting the investments of the men who put their money into the business in the emergency, it means more than preserving a business asset for the country—it means having the skilled workmen to call upon when needed for indispensable special service in the National defense. A realization of the situation should ensure prompt and adequate protection. American manufacturers who pay good wages to American workmen must be protected by a sufficiently high duty on imported drawing instruments in order to compete here at home with foreign makers who pay relatively much lower wages.

THE STUDY OF ARCHITECTURAL DESIGN

(*Continued from page* 19)

the Analytique. Certain new elements will now have to be considered in its formation. The section and plan are much more ambitious in size than in the Analytique problems, and if a color rendering is to be made, a certain amount of daylight should be provided for this purpose, as yellows can not very well be judged by artificial light. This usually means that the Saturday afternoon and Sunday before the problem is due are set aside for rendering, the nights of those days being utilized for finishing the drawing of the section, usually presented more simply than the other drawings, and for the more mechanical parts of rendering.

For the time spent in studying the problem, a first portion should be set aside for studying the scheme, developing the plan until it is a workable solution of the problem. When this is attained, the elevation, section, and plan should all be carried forward by turns, so that they will be consistent with each other, until near the end of the problem, when the most important drawing (the one which is so indicated by a reading of the program) may be advanced more rapidly so that advantage may be taken of any "niggering" that can be had from others in the Atelier. If an effort is made to work a schedule for the first two or three problems, the method will prove its value in the later ones.

AMERICAN ACADEMY IN ROME

FROM a letter recently received by C. Grant La Farge, Secretary of The American Academy in Rome, from Gorham P. Davis, Director of the Academy, we quote the following: Architect Chillman and Landscape Architect Griswold are travelling in Northern Italy. Sculptor Jones is in Rome, working on his fountain; he has recently modelled a delightful head of a woman, which strongly shows the influence of his Greek trip,— he has offered it to the Academy to give to donors—he is, likewise, making copies of the stucco reliefs in the Borgia Apartment of the Vatican. Painter Lascari is in Venice. Architect Smith is drawing out the Temple of Zeus at Olympia, as his first year's work—he spent some time at Olympia this spring, obtaining data. Sculptor Cocere is in Rome at work upon his fountain figure. Paintor Ciampaglia has his copy of a portion of one of the maps at the Vatican well under way, and is helping Sculptor Jones in the work in the Borgia Apartment.

The Visiting Students in the School of Fine Arts have also been active. Architect Hendrick from Harvard has a thesis on the Colosseum almost finished. Musician Rolfe from Yale is now on the water, returning with two attendants to his parents; he is on the "President Wilson." Architect Sternfeld winner of the Paris Prize, has finished his measured drawing of the "Cathedral at Civita," Castellana, and is now in Florence en route for America. He is a strong man and an enthusiastic worker. Architect Rubin, Stewardson Fellow, has finished his plan of the Campidoglio and is also in Florence—his drawing is an excellent record of that interesting square. Architect Oxhandler, the McKim Fellow of Columbia, recently arrived, has already measured the Palazzo Cancelleria.

In the Classical School, Miss Wadsworth has just finished her work on "Roman Stucco Reliefs," and she is now preparing to return to America by way of France and London. Mr. Bryan is hard at work in Rome. Miss Chubb left some time ago. She was to return to America through France and England.

We have made three trips with the Students. (1) Prince Giovanni Torlonia allowed us to see, by special permission, his famous collection in Trastevere of over six hundred pieces of sculpture. The new Director of the French Academy and his Students and the Director of the British School and his Students went with us. (2) I took a party of our men to Hadrian's Villa. (3) We all made a trip to the Colosseum to study certain stucco work which is not accessible to the general public.

Two Trustees have visited us. Mr. Vitale stayed here four or five days. He was present at our Fourth of July dinner, making a good speech—after dinner we adjourned to the gardens of the Villa Aurolia, where the Declaration of Independence was read and where we had fire-works and refreshments. Mr. Vitale has rented an apartment in Rome for next winter, which will be pleasant for us.

Mr. Boring and Mr. Lamond spent two weeks at the Academy. Mr. Boring has arranged to open a Department of Musical Composition on October 1st, and there were many other matters which he went into very thoroughly and about which he will report at length to the Board of Trustees. Mr. Lamond seems to me the "right man in the right place." If anyone can develop musical composers, I believe it is he.

Mr. Blashfield is in Lucerne, Switzerland. But he writes me that the heat has been too much for him, and that his doctor will not allow him to come to Rome, much to our disappointment. There is a batchelor's apartment in the Main Building which we hope to see occupied some winter by Mr. Blashfield as the Milet Professor.

Professor Kelsey, who has been revising his book on Pompeii all winter, has left for America.

Mr. Wilkins has resigned. He has done much to put the administration in Rome on an excellent footing—he leaves us an office with nothing but good men in it. Mr. Davico, Mr. Wilkins' able assistant, has been made "Secretary."

One of the desirable lots between the Main Building and Rome has been offered at a fair price to the Academy (Mr. Boring will report to the Trustees about this matter). There are surely two other lots in the market and I hear that two more are probably in the market. If someone would only tell us to buy them, a part at least of our view of Rome would be protected for ever.

A party of one hundred and sixty American University women passed through Rome not long ago. They were on their way to Ravenna to place a bronze wreath (modelled by Former Sculptor Jennewein) on the tomb of Dante, in connection with the six hundredth anniversary of the great poet's death. We gave them a reception at the Academy, which I trust will help to make the Academy and its aims a little better known.

FIFTH AVENUE TOWERS COMPETITION

MORE than 130 designs for the permanent traffic signal towers which are to replace the present temporary structures on Fifth Avenue were submitted from artists and architects from all over the country in the prize competition conducted by The Fifth Avenue Association. So numerous were the designs submitted that the Association will not be able to decide upon the winning set of plans for another week or ten days, according to announcement made recently by Chairman C. Stanley Mitchell of the Traffic Towers Committee.

The entire committee was extremely gratified at the unexpectedly large number of designs submitted as well as at the unusual excellence of so many of them, was the statement made by Eliot Cross, architectural advisor to the committee, following the preliminary examination of the plans.

The committee spent an entire day in their first examination, at the expiration of which they had been able to narrow the contest down to fourteen designs from which the winning plans will be chosen. Mr. Cross stated that the committee would meet every day in an effort to decide the contest.

The architect whose design is finally decided upon as the best from the standpoint of practical use as well as of architectural beauty will be awarded $500 and will also be given the supervision of the construction and erection of the five towers on a fee basis. The author of the second best set of plans will receive $300 and there will be a third prize of $200.

The new traffic towers are to be constructed by The Fifth Avenue Association and erected on Fifth Avenue as a gift from the Association to the City. The city, through the Board of Estimate, has already accepted the gift, with the provision that the design as finally determined upon be approved by the Municipal Art Commission.

QUERIES

In this department PENCIL POINTS *will endeavor to answer questions of general interest pertaining to Architecture and allied arts, giving the best available information from authoritative sources. We desire that you feel free at all times to make use of this service, inviting your co-operation in making the department both interesting and valuable. Should you desire an answer by mail, enclose stamp for reply. Address queries to The Editor,* PENCIL POINTS, *Metropolitan Tower, New York City.*

Question—Can you tell me who publishes the book entitled "The Five Orders of Architecture?" C. T. L. *Answer*—There are several books published on this subject, such as Ware's, "The American Vignola," published by The International Text Book Co., Scranton, Pa. Ball's "Five Orders of Architecture," published by the W. T. Comstock Company, 23 Warren Street, New York. "The Construction of the Five Orders of Architecture," by M. T. Hodgson, published by the F. J. Drake & Company.

Question—What is a lamb-tongue mold? H. M. *Answer*—We find that lamb-tongue mold refers to a plane used by carpenters to cut out grooves and is applied to a molding of considerable width as compared to its projection and is symmetrical; its section tapers like a tongue. The term appears to be of indefinite meaning, and is applied by carpenters to a molding like that often seen on a sash bar. It is sometimes made in the United States as an ovolo or quarter-round followed by a fillet worked along the edge of a board.

Question—Will you kindly advise me if you have published in recent years a book similar to the special Hotel Number of *The Architectural Review,* April, 1913, dealing with stores and one dealing with theatres. I have a special Hotel Number and thought I would like to get a number bearing on the subjects as noted above. F. W. R. *Answer*—We regret to advise you that we have not published any special numbers dealing with stores or theatres. We have a book, "Theatres and Motion Picture Houses," by Malloy, the price of which is $3.00. This seems to be the only available book as far as we can determine. *The Architectural Record* for June, 1921 has published an article called "The Newer Fifth Avenue Retail Shop Fronts" by John Taylor Boyd, Jr. This material will be found very useful for design. Various manufacturers can supply you with their literature and detail sheets concerning store front designs, where their construction has been used.

Question—Will you furnish me with information concerning Y. M. C. A. buildings? W. E. L. *Answer*—*American Architect,* Dec. 4, 1918, Feb. 26, 1913, Nov. 10, 1909, *Architectural Review,* Vol. 16, No. 6, *Architecture,* April, 1908, *Inland Architect* and *News Record,* Jan. 1908.

Question—I want to get plans for four-family apartment houses, with center hall for ventilation through building, to be built of brick or tile, estimated cost of building, etc.; if you do not have anything of this kind, please give me address where I can obtain this information. *Answer*—We refer you to photographs and sketch plans of buildings which appear from time to time in the various magazines; and the classified catalog of available early issues of *The Architectural Review* which contain articles on apartment houses. For estimating the cost of building, we refer you to Joslin's "Estimating the Cost of Buildings" published by the U. P. C. Book Company.

Question—Can you inform me if the "Art Amateur" is still being published, and if so, their address? H. E. W. *Answer*—The Art Amateur ceased publication in 1902.

Question—Will you kindly let me know if you have any books on the framework of buildings. M. A. M. *Answer*—For books on the framework of buildings we submit the following references: Kidder, "Building Construction and Superintendence," Part II, Carpenters' Work, Eighth edition; Martin, "Details of Building Construction"; Fair, "Practical House Framing"; Maginnis, "How to Frame a House"; or "House and Roof Framing" and "Roof Framing Made Easy"; Radford, "Framing, House Framing, Barn Framing, Roof Framing," W. T. Comstock Co., publishers.

Question—Kindly furnish me names of any books or articles describing and illustrating Oriental Architecture, especially the Chinese and Japanese styles. Also give me a list of good books on Architectural Composition or Theory of Design, with their publishers. R. F. L. *Answer*—For Chinese Architecture see "The Splendors of Chinese Architecture" in the Asia Magazine, New York, 1917, Vol. 17, p. 278-285; "Chinesische Architektur Kunstwelt," Berlin, 1913, Vol. 3, P. 192-198; "Chinese Architecture"—10 plates. S. W. Bushell, Smithsonian Inst. Annual Report, 1904, p. 677-692; "Die Bankunst der Chinesen," J. Dahlmann, Tokyo, 1913, Vol. 14, p. 117-156; "China's Monuments," Frederick McCormick, Peking, China Monuments Society, 1912, p. 130-188. For East Indian Architecture see—"Examples of Indian Architecture" Amanda K. Coomaraswamy, Visvararma, Series 1, London, Luzac, Publishers, 1914; Journal of Indian Art, Vol. 15, p. 1-112; "L'Art Indien," M. Maindron, Paris, L. H. May, publishers, 1898; "L'Art Indo-Chinois," A. de Pouvourville, Paris, Quantin, Publisher, 1894; For Japanese Architecture see "Constructive Art in Japan," R. H. Brunton, Asiatic Society of Japan. Transactions, Vol. 2, p. 64-86; Vol. 3, Part 2, p. 20-30, Yokohama, 1874-1875; "Impressions of Japanese Architecture and the Allied Arts," R. A. Cram, New York, Baker & Taylor Co., Publishers, 1905; "Japanese Art at the Panama-Pacific Exposition," Jiro Harada, International Studio, New York, 1916, Vol. 57, p. 164-175; "Japan and Its Arts," M. B. Huish, B. T. Batsford, Publishers, London, 1913; "Japanese Temples and Their Treasures," Japan-Panama-Pacific Int. Exposition Committee, Tokyo. The Shimbi Shoin, 1915; "Japanese Homes and Their Surroundings," by E. S. Morse, New York, Harper & Bro., Publishers, 1889; *Architectural Review,* 1920, contains many plates of Japanese Temples. Concerning your inquiry for books on design and architectural composition, we refer you to the following:—"Essentials of Composition," by Van Pelt, Published by the MacMillan Co., New York; "Over the Drawing Board," "A Draftsman's Handbook," Ben. J. Lupschez, The Journal of the American Inst., 1918; "A. B. C. of Architecture," F. E. Wallis, New York, Harper & Bro., Publishers; "Indication in Architectural Design," Varon, W. T. Comstock Co., Publishers, 1916; "Drawing. Designing and Thinking," Ware, Architectural Record Co., Publishers, 1909; "Essentials in Architecture," John Belcher, B. T. Batsford, Publisher, London; "Studies in Architecture," R. T. Bloomfield, The MacMillan Company, publishers, New York, 1905; "The Practical Exemplar of Architecture," Edmund Mervyn McCartney; "The Practical Book of Architecture" by C. Matlack Price, J. B. Lippincott, Publisher.

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THE SPECIFICATION DESK

A Department for Specification Writers

PLUMBING SPECIFICATIONS

By William C. Tucker

SPECIFICATIONS for all work must be written with great care, but those for the modern plumbing installation demand a wide knowledge of principles and of detail.

The sanitary engineer immediately upon receiving his commission to prepare the plans and specifications for a modern plumbing layout for a building operation, be it large or small, must provide himself with complete and most recent issues of the municipal and other laws and regulations, obtainable governing the plumbing and kindred work at the locality where the work is to be erected. The building plans as furnished by the architect are then studied, story by story in conjunction with the plumbing code, and all points in which there may seem to be a disagreement or variance, must be adjusted at once before the work can proceed.

An immense amount of valuable data may be obtained from the several engineering departments of the municipality in which the work may be erected, or from the public utility companies supplying that district. Maps and plans should be freely consulted.

Street Sewers.

The engineer should investigate the system of sewers in the neighborhood of the proposed work. The age and material of construction of sewers should be known, so that when the new work may be connected up, and the extra duty thrown upon it, there may not be the danger of overloading or collapse from the strain, and disturbance from the new connection. Their grade or fall should be such that all material, both liquid and solid may be readily removed to the outfall, so that in time of stress from sudden and excessive duty,—a heavy and continued storm,— there may not be the danger of flooding of cellars, causing heavy damages and interfering with business activity. The depth of the sewer invert below the street level in front of the proposed building must be accurately known and will at once determine the lowest point in the building at which plumbing fixtures may be placed so that they may have direct gravity drainage to the sewer. A new project placed in a developed environment enjoys a certain sense of security over that of one placed in a locality where improvement and changes are constantly taking place. A personal survey of the neighborhood surrounding the new project should be made, noting the general character of the buildings, their age, and standard of construction.

Outside Water Supply.

The outside water supply for the project must be studied. Its source must be such that there may be no apprehension as to its permanent purity and its unfailing quantity. This applies to urban as well as to suburban work. The age, size and material of the street mains must be definitely known, and if old and weak from long and constant use or of small size, endeavor must be made to have present work replaced by that of stronger make and larger capacity, so that there may be no fear of interruption of the normal operation of the project from outside breakdown, causing inconveniences and actual loss and the banking of boiler fires. The depth of the street mains, and their branches must be such that there may be no fear of freezing during a period of prolonged low temperature. The pressure in the mains adjoining the site of the new work, must be accurately known, and a record obtained showing the daily variation over a period of considerable duration, so that the work may be so designed that there may be no inconvenience from any diminution, throwing out of use toilet rooms and apparatus.

Motive Power for Apparatus.

Steam will generally be found to give most satisfactory and economical service as a source of motive power to actuate the various apparatus and mechanical devices in use upon the project demanding such service. When so used its service must be absolutely dependable. If derived from a heating plant which may be in operation only at certain seasons of the year, an auxiliary plant must be provided. High-pressure steam will be demanded for the pumps, compressors and apparatus of similar nature, and most large units. Low-pressure steam may be used for the hot water service, kitchen and laundry equipment.

Electrical energy has many advantages over steam. It is generally available and if not may so be made at very little cost. It is not generally as economical as steam in first cost of installation nor in subsequent maintenance of operation.

Its use is almost ideal for pumps, air compressors, and similar equipment, should the units be small, and the continuous availability of steam in doubt, and its use for small house equipment is to be most earnestly recommended.

The variety of current, its voltage dependability, and other similar definite information must be accurately known, also the distance from the source of supply.

With this data before him and such other information as he can gather the sanitary engineer now directs his attention to the plans of the building and the development of a comprehensive plumbing layout.

Allocation of the Plumbing Fixtures.

The location and number of the plumbing fixture is generally considered first. The minimum number, is usually governed according to type of building; residence, loft, manufacturing, at cetera and also according to number of persons who under fixed conditions may occupy the floor space; by laws and regulations of the municipality in which the project may be erected.

This number the engineer from his extensive experience may decide to be too small and it must be increased so that their use and surroundings may be enjoyed to the best advantage, and comfort of all.

The proper location of the fixtures is important. They must be so placed that they may have excellent direct outside light and ventilation, and must not be assigned to some dark and poorly ventilated space which may not be desirable for general purposes. This applies to residential as well as other types of work.

The position of each fixture or group of fixtures must be such that they may adjoin each other, and not be scattered, and must be directly over each other if possible, so that they may be served from the waste, or soil vent and supply risers from one riser stack, thus greatly contributing to low cost, simplicity of installation and economy of maintenance, replacements and additions.

Riser Stacks.

The plumbing riser stacks of a building are lines of pipes extending from the lowest story to the roof, and consist of a soil or waste, vent and the hot, cold and return circulation supplies usually in one group; the fire standpipe and the leaders, generally separate, but not always. The size and material of the soil, waste and vent risers, and that of the fire standpipes, and the leader risers are commonly determined by the regulations of the municipality in which the work may be erected.

The material of the supplies is generally prescribed by law but not their sizes for given duty, confronting the engineer with a most perplexing problem, requiring wide experience and technical ability.

The number and location of the risers is largely governed by the fixtures to be served and work to be performed and must be definitely determined as soon as possible so that the architect may indicate upon his plans all chases, piers, and other features entering into the masonry construction of the building. All special steel construction for tank supports et cetera spacing in the framing plans for the risers, must be known and given to the steel engineer so that due provision may be made. All work in connection with the other building trades demanded for the plumbing must be anticipated and noted, so that there may be no confusion during the progress of the work, and that it may be carried to completion without delays.

Leaders.

The storm water drainage from roofs must be provided for by special lines of drains. Their size for area of roof to be drained and material of manufacture is usually determined by law. They must not connect directly with the drainage system except by trapped connection at their base, in basement with the horizontal house drains. No vent is necessary.

It is poor designing to drain more than 2500 square feet of roof to one leader. Where the roof is large its drainage area must be broken up, at different points and separate leaders provided. Leader connection with roofs must be made with lead or copper, branches to accommodate expansion and contraction and must have their roof openings protected by brass mushroom gratings, perforated with large rectangular openings.

Fire System.

Common prudence, and usually municipal regulations, require a system of fire protection for each building of large size other than a residence. The system must be complete so that any conflagration in the building itself or any of its neighbors may be met instantly by the inmates themselves or by the local fire department.

There must be provided pumps in duplicate with suction to the house suction tank, cross connected to street water supply, for use in emergency. The pumps must discharge directly into a horizontal system of mains hung below basement ceiling from which are taken branches connecting with the fire standpipes. From the mains are taken six-inch branches with check in each branch working inward and extended to face of building at street, to which are attached brass siamese hose connection for use by the fire department apparatus.

The standpipes must extend for the lowest story to the roof and have valved 2½-inch branches at each story. To each outlet of branch must be attached hose hung from bracket attached to stand pipe. The size of the stand pipes and the material of manufacturer is governed by law, and they must be so placed that all parts of the buildings may be reached by water from a fire nozzle at the end of 100 feet of tested linen hose.

The upper end of standpipes must connect with house tank with check valve working in for emergency use, so that tank supply may be called upon, until arrival of fire department apparatus.

Drainage System.

The general design of the drainage system must be most simple and direct. It must have direct gravity flow to street sewer, with as few bends as possible. Brass screw cleanouts must be provided upon the horizontal runs at all points at which change of direction may occur, so that stoppages may be removed readily. That portion of this work, below the level of the street sewer will have to drain to special sump of steel or masonry, and be lifted by pump or compressed air to the gravity system.

Pumping.

It generally will be found that pumping will be necessary. That section of the work below the street level will naturally be supplied by the street pressure. The street pressure may be found ample to supply certain portions of the work at certain times, but not always. This fear of interrupted service cannot be tolerated, and it will be found good judgment, therefore, to put all work above the street upon tank service. The pumping equipment must be of ample capacity, simple, automatically controlled by pressure regulators, and in duplicate if the unit be small; triplicate if large so that a spare may always be available, in case of emergency. The pumps must be mounted upon piers well above floor level and rest upon metal drip pans, to catch grease and drips, and drain to floor drainage. Pumps must be placed so that there may be ample space for working so that the men may escape injury.

Note—A wealth of detailed information of value in the preparation of plumbing specifications can be found in "The Specifications for the Municipal Office Building," published by the Department of Bridges, New York City, 1891. Copies of this book can be consulted in the Technology Division of the New York Public Library and in many of the larger libraries throughout the country. McKim, Mead & White were the architects of this building and William C. Tucker, author of the above article, was consulting sanitary engineer. The portion of the book devoted to plumbing specifications embraces seventy-seven pages.—ED.

PUBLICATIONS OF INTEREST TO THE SPECIFICATION WRITER.

Any publication mentioned under this heading will be sent free, upon request, to readers of PENCIL POINTS ***by the firm issuing the publication.***

Akoustolith—Data on the absorbing power of Akoustolith, a pure masonry material, and the laboratory findings of tests by the late Wallace C. Sabine of Harvard University are covered in the new booklet just published by R. Guastavino Co., Fuller Bldg., New York. The material has frequently been installed in connection with the regular Guastavino arch construction, but the specification notes included in this book can help the specification writer in his use of Akoustolith in ceiling and wall work. The size of the booklet is 10½x13¼ in.

Timbrel Vault Construction—The distinction between the timbrel and the heavier voussoir arch method of arch and vault construction and the history of Guastavino construction, are given in this interesting booklet, published by the R. Guastavino Company, Fuller Building, New York. The method is outlined, showing its adaptability in construction to modern conditions, allowing the concealment of heating and ventilating ducts and for reinforced construction to take care of heavier loads. The acoustical value of "Rumford" tile, a new factor at the disposal of the architect, and its remarkable sound absorbing power are shown by a graph. The booklet measures 10½x13¼ in.

Kyanize Measured Drawings—A series of twelve plates of notable details of Colonial houses containing details of mantels, china-closets, main stairway, window and doorways. This collection of excellent types of architecture, measured and drawn by Edgar and Verna Cook Salomonsky, is very well presented, on sheets 8x11 inches, showing photographic illustrations, elevations, details and profiles, with dimensions. Issued by The Boston Varnish Co., Everett Station 49, Boston, Mass.

Cabot's Quilt—A book of sample quilt, single, double and triple ply waterproof and fireproofing quilt, with illustrated catalog showing this type of lining which insulates against change of temperature, sound and moisture. Detail drawings for various conditions of construction, for wall, floor and roof insulation are shown with tables. The size is 6x8½ inches, and contains 32 pages. Published by Samuel Cabot, Inc., 141 Milk Street, Boston, Mass.

Slipping and Tripping, the Most Serious Public and Industrial Fire Hazard—Is an interesting booklet by H. Weaver Mowrey, Safety Engineer of the American Abrasive Co., 50 Church Street, New York. The real hazard of slipping and the necessity for effort to eliminate this hazard is outlined. Some of the various causes of slipping and tripping, and unsafe material conditions are given. The problem is explained and the solution is suggested by illustrations, drawings and text. The size of the booklet is 6x9 inches and numbers sixteen pages.

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