PENCIL POINTS

JULY
1933

AN ILLUSTRATED JOURNAL for the DRAFTING ROOM
35 CENTS A COPY

Pencil Points, published monthly by The Pencil Points Press, Inc., at 258 Atlantic St., Stamford, Conn. Publication office, Stamford, Conn. Editorial and Advertising Offices 330 West 42nd Street, New York, N. Y. Yearly subscription $3.00, single copies 35 cents. Entered as second class matter, March 10, 1930, at the Post Office, Stamford, Conn., under the Act of March 3, 1879. Volume XIV, No. 7. Dated July, 1933

PENCIL POINTS
Volume XIV July, 1933 Number 7

Nailing a Rumor

It has come to our attention that a rumor is being circulated in New York to the effect that Ralph Reinhold, head of our company, advised a certain employer of draftsmen that "he would be foolish to pay his men more than twenty-five dollars a week." Such a rumor is false and malicious and will be so recognized by anyone who stops to think about it.

The whole staff of PENCIL POINTS and Mr. Reinhold in particular have constantly and consistently been true friends to the drafting fraternity and have championed their cause on so many occasions and in so many ways that it would be ridiculous to think of any of us doing otherwise. We have always taken the attitude that the draftsman was to be considered not a mere employee but a responsible assistant to his principal and that he should be so treated. He is entitled to a fair wage measured in proportion to his degree of contribution to the success of the architectural enterprise upon which he is engaged.

The whole setup of the profession is based on a relationship between architect and draftsman which is so different from that existing in almost any other field that it has often caused comments of admiration from laymen. The camaraderie and friendship that permeates the organization of the architect is based on a real community of interest and a true professional attitude. Every draftsman looks forward to the time when he will be able to practice on his own, and the right kind of architects, who are fortunately in the majority, take pains to train and instruct their men in all branches of professional activity. It has long been the practice of many firms to assist the fledgling architect, just graduated from their drafting room, by turning over to him a small commission or so to start him in business. The practice of taking younger men into partnership is so common as hardly to need reference.

Would it not be extremely illogical and contrary to nature for PENCIL POINTS, or anyone connected with it, to intrude into this fine relationship anything that would tend to precipitate a wage struggle in which architects and draftsmen would be lined up against each other instead of side by side in mutual cooperation for the advancement of the profession? Furthermore, since PENCIL POINTS is directly dependent for its existence upon the welfare of both groups, who make up our subscription list in about equal numbers, why in the name of common sense should we do anything to hurt or offend any of our good friends? None of us has made any such statement as is being attributed to us, and our efforts are being directed now as always toward the improvement of the financial condition of all classes of our subscribers. The absurdity of any other policy should be patent.

Rumors are insidious things, hard to combat. We believe, however, that we have made a sufficient number of friends during our thirteen years of serving the profession to aid us in refuting this one.

THE EDITORS

FROM A DRAWING IN PEN-AND-INK AND WASH BY C. WESTDAHL HEILBORN

"MARKET SCENE, SEVILLE"—STUDY FOR AN ETCHING

Composition in Architectural Rendering

By Natt Piper

The average architectural rendering so often violates the most elemental rules of pictorial composition that I want to persuade the men who produce these sketches to make a more thorough study of the subject. They need it. Some may not know the lack of good composition in a picture is comparable to a faulty foundation under a building—but I assure you that it is! The invisible network of grillage; the hours spent in calculating stresses that bear upon footings are tremendously important for the success of the building. So is the study of properly placed areas, masses, line and color to form the underlying design-structure of either the pleasing sketch or the more formal rendering. Without a secure foundation the building will fail and for lack of composition the architectural rendering is pictorially mediocre.

While it may be true that neither the delineators nor the draftsmen who make Sunday sketches particularly care to be classed as artists, yet their work, especially architectural renderings, will be seen by many persons. Among these will be individuals versed in art principles who will immediately detect—and usually broadcast—glaring mistakes in composition. Even the layman, who would define "composition" as a short prose essay or the creation of the musician, will be unconsciously irritated by violations. These facts alone are two fine arguments for further study in the fundamentals of composition.

After the outline perspective is made or the outdoor subject has been selected, the first stage in developing the successful work is a study of possible pictorial structures for, assuredly, there can be more than one devised from the material at hand. A common tool available at this stage is the thumb-nail sketch. Experienced men will make several of these diminutive preliminary studies before committing themselves to any one composition. Items imaginatively tabulated as good material by the delineator or seen rather perfunctorily in the outdoor subject are now graphically arranged, designed, and integrated into a logical relationship to fit harmoniously within the margins or within the boundaries of the frame. Nature in a rare moment may have done this perfectly for the Sunday sketcher. The renderer, however, is entirely dependent upon his knowledge of what is good and what is bad in pictorial composition.

As a second step, and this may appear to be a bit incongruous, it is then vital to conceal or obscure an all-too-obvious design-structure. In doing this one resorts to the use of implied lines, suggestion, subtle patterns, and repeats in color and value. Optical illusion plays its part too—a greater part than is ordinarily realized—for, after all, any picture is but an illusion. Then evident signs of labor must be removed. To do this, the master employs a bold, free-and-easy, and apparently spontaneous brushwork or technique.

Most certainly, no one should blame the beginner for worshipping at the technique shrine, though we must admit his adoration should be limited to those works which display something deeper and more intellectual than sparkling technique. Mere technique, in this sense, is nothing but digital virtuosity! Neither should the amateur be too sharply criticized if, blinded by its brilliancy, he also considers the express tempo of a forceful execution to be the uniform speed at which some admired master-delineator has always worked. To attain speed in one's work is fine and the rendering usually is the better for it; to have developed a splendid technique is finer, and more useful; but, truly, they are only garments to clothe the composition. Believe me, the really fine renderer has spent many hours in study and practice; he makes many thumb-nail sketches or calls upon experience gained by solving hundreds of similar problems before he tosses out the sketch that is so spontaneously handled or the composition that appears to have been carelessly thrown together.

We must also keep in mind the fact that the man who does the rendering is generally the same fellow who designed the building or who has carried the outline perspective to its final rubbing, or both. He is familiar—too familiar—with every projection and every molding. This intimacy blinds him to the importance of the larger aspect of his work—the creation of a picture. His attention is not focused upon pictorial composition but upon accurate depiction of this architrave or that balcony. Naturally and unwittingly he offers, in his sketch, a confusion of detail and interest by overemphasizing irrelevant parts; he delineates dancing reflections upon wet sidewalks and forgets he is trying to "sell" something far removed from reflections. His sketch cries aloud for unity as well as other major elements that together make the good composition.

One of the most usual errors seen in architectural renderings is inclusion of great areas of sky or of distance or of a too large and attractive foreground. To be positive and important the principal object should "crowd" or fill the frame. If it is made too small it is not only dwarfed but the sky area or the foreground becomes a battleground, so to speak. For, in the opinion of the novice, large areas that do not "work" add nothing to pictorial interest. So he stirs them up,

FIGURE 1

Too much interest in the sky area has minimized the importance of the residence.

inanely, into a strenuous activity (Figure 1)* and they labor as dramatic demonstrations in storm clouds, phenomenal sunsets, or growths of rare exotic shrubbery.

It is decidedly bad to surround the principal object with vivid contrast and accents that are attention-compelling in their own right. To emphasize the principality and force the domination of the main object—the building, in the case of the rendering—it is not only necessary to make it fairly large but to place it somewhere near the center of operations and avoid much detail outside of this central area (Figure 2). In other words vigorous color, sharp contrasts in values, and intricate involved rendering should not be used too near the margins for the supporting detail but should be reserved for use in depicting the main object. If imposing size in the finished picture is required, the outline perspective of the building must be made sufficiently large to dominate the scene positively. To improve proportions, if the length of the building makes an awkwardly long subject, either a title panel may be included or sky and foreground can be left untouched to count negatively. If a tall subject is the feature, one way that proportions are corrected is by fading the rendering away to the edges by vignetting.

FIGURE 2

The frame should have been a horizontal rectangle; the edge detail is too important; the building is incorrectly placed.

Another irregularity often seen is the one, for example, where a huge tree spreads its trunk, most irreligiously, over an interesting doorway of the new church building (Figure 3) or the sketch with a tree that heavily stands guard, altogether too close to each of the vertical edges. These time-honored arboreal symbols are monotonously disturbing. The single tree cuts the rendering into two distinct parts and a mechanical difficulty is encountered by the delineator when he tries to lay an even wash or an equal tone value upon the walls of the building bisected. The sentinel trees, with their rigid backbones and meticulous uniforms of skilful technique, attract too much attention from the middle part of the picture because, obviously, to "register" as trees in that particular plane (Figure 4) they must necessarily be quite specific as to detail and value in branch, foliage, and shadow.

While we are talking about trees I wonder if you have ever accurately projected, in your outline perspective, a tree shadow across the middle distance or over the foreground. If you have, you learned that, in place of the customary shadow mass which seems to stand vertically upon edge, the true shadow was only a thin line! And do you know it is "bad form" to depict a tree with both its crown and the bottom of its trunk clear outside the frame? The top and the bottom, or at least one of them, should be within the margins (Figure 5). If they are not, the eye actually seems to step backward trying to find the picture plane in which the rest of the tree must lie.

The silhouetted tree near the center not only divides the subject into two parts as stated but, much worse, it is a bad offender in setting up thereby two focal points instead of one. This absolutely destroys unity.

The idea of spreading the single tree, or many trees, over the face of a rendering must have been originated by some worthy

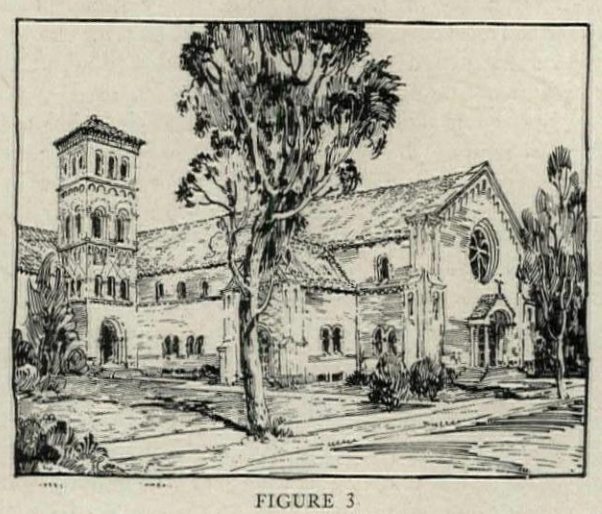


FIGURE 3

The tree that cuts one picture into two competing centers of interest.

**Mr. Piper informs us that in making his sketches to illustrate common errors found in the composition of architectural renderings he has tried to overemphasize the faults he has seen. To show "What not to do" is the purpose of his drawings.*

FIGURE 4

Sentinel trees have become altogether too commonplace!

delineator who discovered, when he established planes of distance by use of this device, that he added a valuable third dimensional feeling to his sketch. But the majority of renderers who habitually copy this symbol use it unintelligently. In their hands it is only another one of those misused technical tricks out of the bag. The assembling of a lot of tricks can never make a good pictorial composition.

FIGURE 5

Both trees have their origin entirely outside of the picture plane.

Before going on to the next paragraph I wish to make it clear that throughout this article I refer particularly to the average, more or less two-dimensional architectural rendering rather than to the abstract, imaginative, or decorative sort of thing. This kind of picture, because it must be studied at length to appreciate fully its beauty—if any—is not adapted to the architectural delineator's need. His work must tell a story more quickly.

While renderings and sketches of the type I am discussing must conform rather closely to realism, the delineator, in arranging the components of his picture, must arbitrarily group these parts so an evident invitation is given the observer's eye to survey the ensemble. When the invitation is accepted, the eye must be led, not too deviously, to the principal subject and then be induced to survey the whole composition before visual interest flags. This lead-in may be accomplished through a succession of objects or areas using the principles of perspective; through values or colors in sequence or in pattern and through the use of line. This does not necessarily mean an uncompromisingly straight line.

Line, in this sense, may be definitely a line like the line found in black and white mediums or can be suggested or broken in its continuity. A line or a line movement can be made to function through contrasting edges of values and colors along boundaries of areas or can be a judicious combination of some of the above methods. But, in any case, the proper "invitational" lead-in for the architectural subject is the one which is open and unobstructed to the lower edge of the frame. A logical lead-in is impossible if the foreground is cluttered with a rough and tangled growth of brush or if a bulky hedge sprawls between the principal object and the lower edge (Figures 1 and 6). These are obstacles for the eye—and the mind—to crawl over and the purpose of the picture is defeated by such obstructions.

Generally speaking, the sequence of eye travel in a pictorial composition is about as follows: First, along the lead-in to the principal element; second, a full survey of this; third, a more or less circuitous viewing of the supporting detail; and finally, along an edge, the eye should find some way of leaving the picture fully satisfied. The most usual exit is in the upper part of the picture through the sky. If the sky is not free from detail an opening between clouds or tree tops serves admirably, provided that leaving through this opening is the *last* thing the eye is required to do. In some compositions the sequence of eye travel can be so directed that it naturally and continuously revolves about inside the frame. Then an exit is neither required nor is it desirable. Though too sharp a division cannot be drawn, this type of structure comes more under the decorative or abstract phase of composition. But in any case, when used, the exit should not be

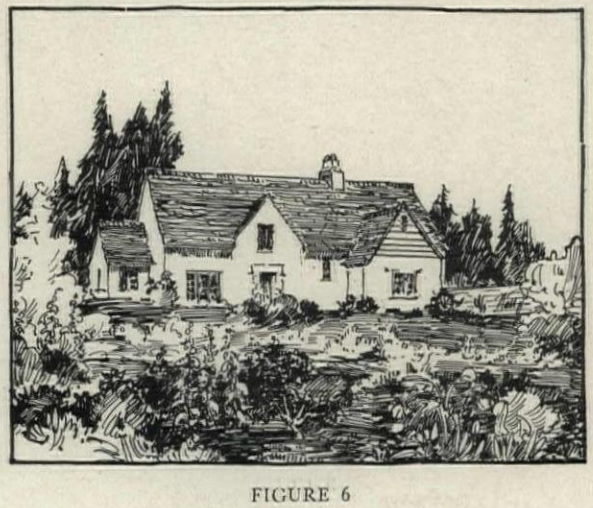


FIGURE 6

A logical lead-in is impossible when the foreground is cluttered with tangled shrubbery.

made more powerful than its final position warrants, for in that event the eye of the observer would leave the frame precipitously before completing its survey.

There is no greater attraction for taking the eye out of the frame than a downward sweeping diagonal or a dynamic zigzag line which originates some distance away from the side and leaves the frame on one of its vertical edges (Figure 7). All lines that tend abruptly and finally to carry the eye too soon out of the frame should be suppressed. Similarly the arrow-shaped boundaries of an area, or two lines in this shape that meet exactly at an edge or which, if prolonged, would meet immediately outside of a margin are likewise temptations for the eye to leave the frame too soon. Sometimes, however, there are opportunities to make the eye leave the picture temporarily. That is, to provide another line or attraction to snap it back into the frame. This may be desirable for where it can be done it adds interest.

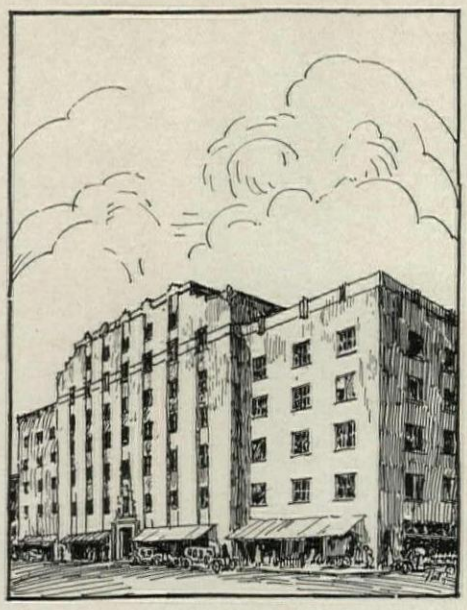


FIGURE 7

Downward sweeping lines that lead the eye out of the picture; half and half division of light and dark.

Incidentally, although it does have some bearing upon composition, there are sometimes found weird accidentals that have crept in; trees that spring up sturdily from roofs, or objects unduly prolonged in their contour by poorly placed adjacent detail. In Figure 1, to illustrate, I purposely placed one line, in indicating a cloud edge, so that it awkwardly prolongs the edge of the highest gable. On the other side a gable comes in direct line with another cloud line and also with the tops of the trees. Below, I lined in two corners of the house wall exactly to meet divisions in the hedge. These lines—among other things—did not help the looks of that particular sketch!

No distinct line or line movement should occur close to and parallel to an edge. If one *must* have a Lombardy "poplar," and it appears necessary that it be placed close to one of the vertical edges, see to it that the tree is rendered so as to break severe line continuity. Curbings and car tracks, seen across the lower part of so many drawings, could be depicted at a slight diagonal instead of with horizontal lines. Straight level lines actually form hurdles for one to jump over if they are too numerous in the foreground. Cloud lines seem most logical when they do not closely parallel the upper edge.

When the designer works out the façade of the building that he later will render, his mental processes function, consciously or unconsciously, according to recognized fundamental theories that govern architectural design. When he falls down in the rendering he has either forgotten, or he has *never understood*, that these fundamentals practically parallel the same theories he should have used in the designing of his picture-structure—his composition. Take for an example the quality, balance. No designer would think of locating dark weighty fenestration on one side of an entrance in contrast to the other side which he has weakly pierced with small windows. That is, he wouldn't unless some miserable owner told him he must! Yet we find the same fellow heavily brushing in a dark mass (Figure 2) with no thought but what the high lightweight value on the other side of his rendering will look all right—somehow!

Not only should the whole composition be in perfect balance—be static—but all of its parts should be bal-

FIGURE 8

Radiating lines direct the eye abruptly to the left and away from the architecture.

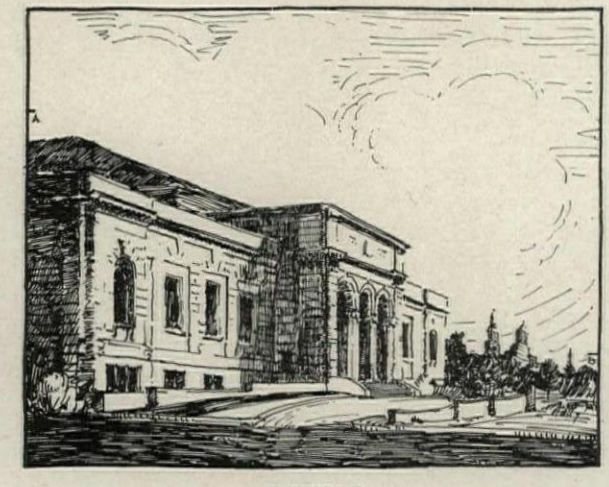


FIGURE 9

Diagonal and equal division of values; lay your ruler across from A to B.

anced. Each line in the picture calls for another—an opposing line—to balance it or to act against it, force against force. The rather long roof of a country clubhouse proves to be the most dominant line in the sketch. To keep this forceful roof line in its place—so that it does not slide to one side—a line in the sky detail, or an implied line in the clouds, is placed in a contrary direction—a complementary line, if you please. This is comparable to the enhancement of color by the use of its complementary, or equilibrium secured in engineering by perfect balance of negative and positive moments.

In its simplest form, rhythm is repetition of lines in the same direction, or areas of like shape, or colors of the same hue recurring in different parts of the picture. Rhythm adds an æsthetic quality to architectural sketches. We know they are apt to be rather stiff and formal, but by use of rhythm—by repetition of the same note—the sketch can be made to dance a little faster. To be inconspicuous and yet effective this repetition must come in differing doses and partake of a feeling of perspective spacing. Rhythm is supplanted by monotony if color of exactly the same hue and intensity is used, or if lines of the same length and weight occur regularly spaced throughout the design-pattern. Imagine a preponderance of horizontals in the center of interest together with others in all parts of the entourage and in the sky area. You can realize that with these horizontals the picture can be nothing but flat and spiritless.

Lines that radiate from the central point of interest are of great value in focusing the eye upon the object to be stressed. To visualize a perspective with a single vanishing point will prove this. But radiating lines sometimes sneak into a composition which lead the eye away to one side of the picture without regard for the proper focal point (Figure 8). One can more readily detect this and other errors of like nature in the compositional structure if the sketch be either inverted or turned sideways and studied for a moment in that position.

Neither lines, areas of color, nor masses with greatly differing values should be finally woven into the composition fabric if they divide or appear to divide the picture into halves, vertically, horizontally, or diagonally (Figures 7 and 9). The most cursory survey of the inverted sketch will likewise bring this fault forcibly to notice.

I may be altogether too presumptuous when I assume that anyone reading this should be told to compose a subject that is horizontally inclined within a rectangle which will be viewed in a horizontal position and a taller vertical subject within a rectangular frame to hang vertically. Yet some one has to tell them! And my conscience is clear and I am cheered inwardly as I remark that we all have seen too many renderings wherein horizontal subjects were "sardined" between the walls of a rectangle to be displayed vertically. This mistake made, too, by good men—men who should *think* beyond the end of their busy pens!

In conclusion let me say I have been actuated in writing this by thinking to provide *constructive* criticism of the average architectural rendering. I have written it for the benefit of those readers who feel a lack of "something" in their work and yet cannot place their own finger upon the spot. I am sure, if they have mastered their chosen medium to the extent that it no longer handicaps them, that faulty composition may prove to be the weak link in the chain. Of course you will realize that this article does not pretend to teach one *how* to render! For the persons who would learn more about methods of attack I would recommend either a good class or a study of the many books upon the various mediums.

FROM A PENCIL RENDERING BY HARRISON JOHN OVERTURF

PROPOSED SCHOOL BUILDING—GEORGE WELLINGTON STODDARD, ARCHITECT

"VENICE"—FROM A FOUNTAIN PEN AND WASH DRAWING BY CARL WESTDAHL HEILBORN
MADE WITH INDIA INK AS A STUDY FOR AN ETCHING

Figures and Finance for the Architect

By Robert Lee Henry, C. P. A., L. L. B.

Editor's Note:—*This is the third of a series of discussions by Mr. Henry, who is recognized as one of the foremost authorities on the financial phase of the architect's work. He will answer on this page hereafter, in addition to writing a regular monthly article, all questions where a Certified Public Accountant can be of assistance. Inquiries of this nature are invited. Letters directed to Mr. Robert Lee Henry,* PENCIL POINTS, *330 West 42nd Street, New York City, will receive prompt reply. If a question is of general interest it will be published, unsigned, together with Mr. Henry's comments. Mr. Henry has been closely allied with the Architectural Profession for a long period of time and at present, under the auspices of the New York Architects' Emergency Committee in connection with its program of "made work," is actively engaged in the supervision of the preparation of a Uniform System of Accounting for Architects.*

Our courts of law admit books of account into evidence, when properly presented. Accounts between parties to a business transaction are usually settled by reference to entries made in books and in ordinary business affairs it is a common occurrence for one party to give full faith and credence to the entries recorded on the books of the other.

Unfortunately for the Architect, in matters concerning the collection of his accounts, he has neglected this phase of the education of his client. Accordingly, too few practitioners are able to collect their commissions on the strength of their bookkeeping entries.

There is a reason for the existence of this condition. Heretofore, the Architect worked for a fee based upon a fixed percentage of the cost of the project and the Architect's production costs did not constitute a basis for his charges. Since the client made the disbursements for the project to the Contractor, the client kept the more accurate record of project costs. As for the Architect, he usually filled in the stub of his approval certificate book, and, in case of a controversy with the client, the client's cash records usually governed. It was generally conceded that the books of the Architect were slipshod and unreliable.

The modern tendency of the Architect is to base his fee upon his own actual production cost plus certain allowances for overhead and time spent by the principals. Regardless of the "allowances" it is now a necessity to compute properly and record Actual Production Costs. How else can bills for services be actually prepared?

It will probably take some time before the client can be educated to impose full faith and credence in his Architect's books, due to the old adage that "an Architect is the poorest of bookkeepers." The clean-cut recording of financial facts is the only method whereby this confidence can be obtained and the traditional disparagement of the Architect's business ability forever dispelled.

Question:—We would appreciate your advice regarding the opening of a new set of books.

One of our partners insists that we conduct our business on a Cash basis and another requests that the Accrual system be used. They both state that each system worked out well in the firm with which they were formerly connected.

The remainder of our partners have no preference b would like to learn something about both. Also, whi system do you prefer?

Answer:—As a preliminary step towards the creation o a Uniform System of Accounting, a series of questions were evolved which tended to disclose intricacies of the various methods of accounting in vogue at present. One of the questions, "Do you keep your books on a cash or accrual basis?" brought forth a great deal of discussion and argument.

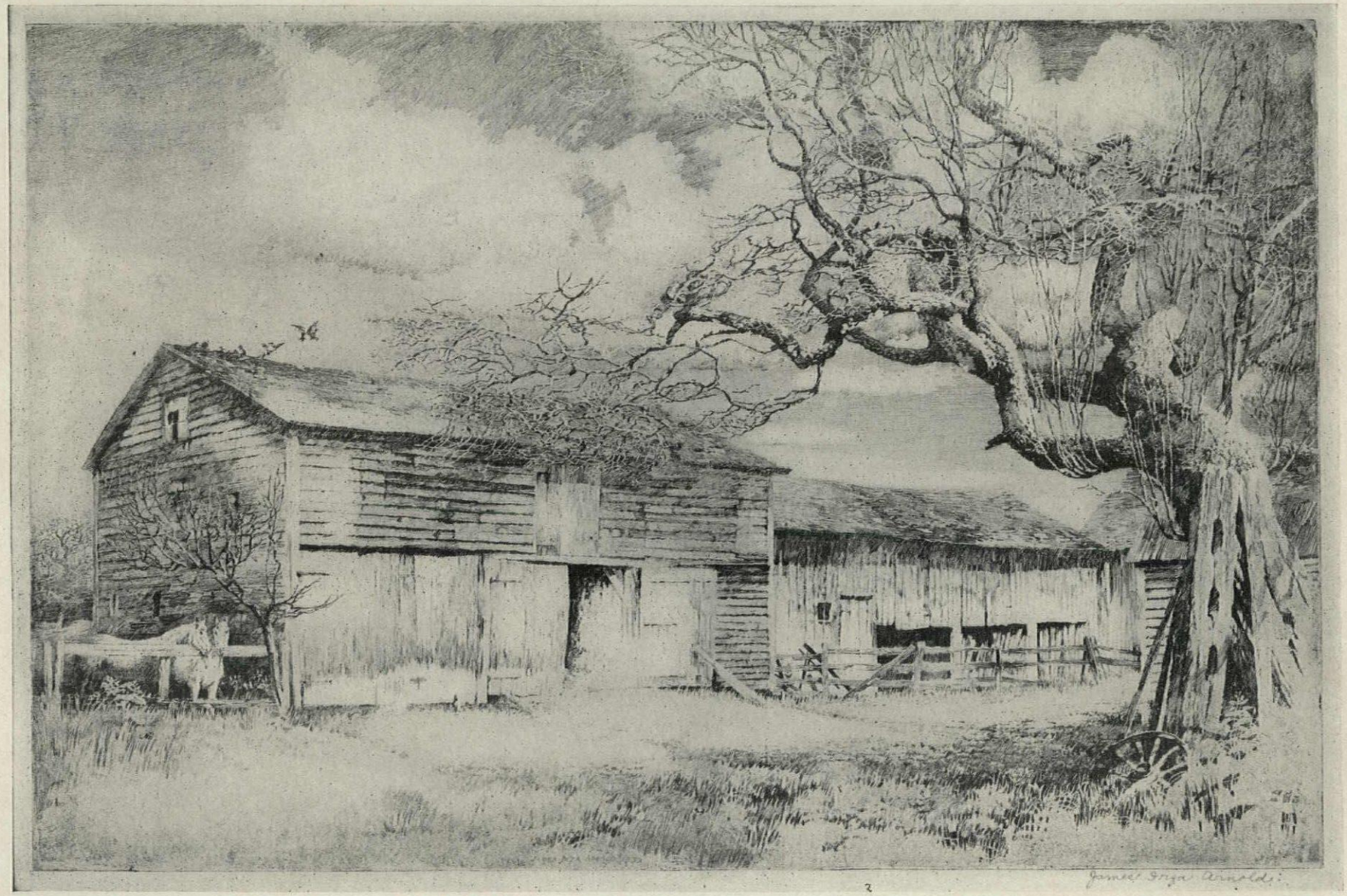
In the first place a great many of the offices visited did not know the difference between a Cash system and an Accrual system. Those that could distinguish between the two did not seem to know the basis for their preference.

Before expressing a preference for either method it is essential to understand the basic principles of both.

The Cash system, as its name implies, deals only with entries concerning money or currency either in banks or on hand. Entries are not made until money is actually paid or received. The date when the transaction was legally consummated has no bearing on the subject.

The Accrual system recognizes the fact that certain expenses are incurred and that certain income is earned each day but payment therefore can be made only at certain, sometimes distant, intervals; also, that certain kinds of expenses are paid and certain kinds of income are received in advance of the day to which they are incident.

To the layman, a cursory inspection of the Cash system seems to indicate that it is easier and less troublesome. However, on closer examination, it is readily discernible that the Accrual system is decidedly superior. The record of Cash transactions, while vitally important, does not completely reflect the financial transactions incident to the business. On the other hand, the Accrual system provides for all legal and technical implications as to time and equities. Furthermore, while it may appear to be advantageous to file Income Tax Returns on a purely cash income basis, it becomes unpleasant and financially burdensome in a year when collections from clients are large and normal and surtax rates high.



"THE OLD RED BARN"—FROM AN ETCHING BY JAMES IRZA ARNOLD

Readers of PENCIL POINTS *are familiar with Mr. Arnold's pen-and-ink drawings which were made the subject of an article in the issue of November, 1930. He has only recently gone in for etching and this is his third published plate. The original print measures 14" x 9½".*

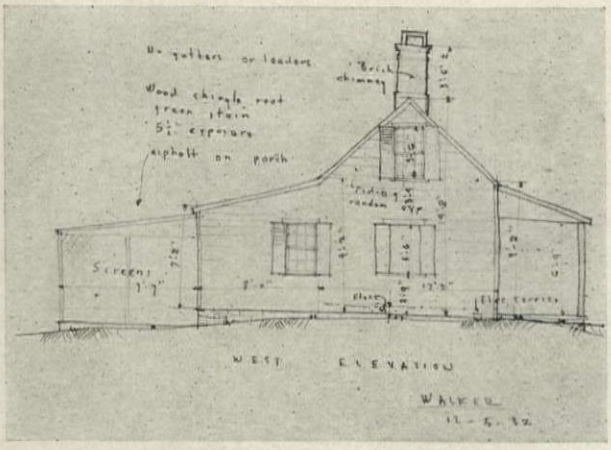
Measure for Measure

Alterations Require Accurate Information

By Burton Ashford Bugbee

Architects are doing a good bit of measuring these days, it seems. The alteration job, which in the Coolidge era was despised of man and often relegated to the office boy's spare moments, is now welcomed with open arms by our best people. The profession is spreading the gospel of modernization —showing that rearrangement of existing structures, or mere replacement of equipment or finish may be good investments, even in lean years. Perhaps for the first time since their student travel days, many architects are now crawling about, pad, rule, and tape in hand, engaged in the somewhat grimy task of measuring up.

The first requirement in any alteration job is of course an accurate survey of existing conditions. If the original working drawings of the structure are available they will be a great help; but, alas, sad experience admonishes that they are not to be trusted too completely — there's many a slip (intentional changes or accidental) 'twixt the plan and the brick. Usually when an alteration job heaves into view, it becomes the duty of someone to hunt up a six-foot rule and the steel tape, put on some old clothes and sally forth. (Old clothes are a very wise precaution: the dust, grime, and projecting nails that lurk in most old buildings seem diabolically planned for the ruination of gent's furnishings.)



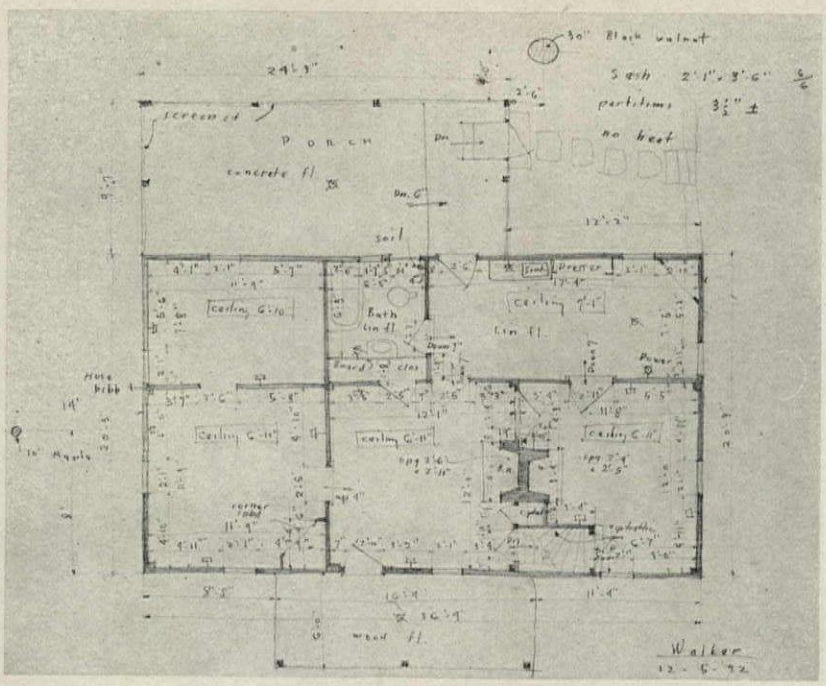
FIELD NOTES FOR ELEVATION

It often happens that the fellow measuring up his first job—or his fifteenth job, for that matter—returns to the office with smudged face, dirty but triumphant, bearing sheets of paper covered with a perfect maze of cryptic lines and cuneiform inscriptions, only to suffer a sad shock when he gets to work with unyielding T-square and scale. The second floor turns out to be three feet longer than the first, the living room is either 12′-10″ or 14′-4″ wide (depending on which row of figures one adds up), the kitchen chimney is notable for the extreme vagueness of its location, and there's no dimension whatever to be found for the stair well! Most of the grief that is suffered in the process of measuring up is due, of course, merely to carelessness or lack of forethought. But there are a few principles, taught by harsh experience, which seem to reduce the possibility of error—hence this article.

Before beginning to measure, it's a good idea to study the beast from all angles, to get the relation of the parts to the whole. Walk around it, and through it. In a country house job, it's well to locate the points of the compass, the general lay of the land and the arrangement of the entourage. At first glance it might seem unnecessary, but the measurer soon learns that one of the greatest of time savers in the actual task of measuring is to have beforehand a distinct mental picture of the building, the disposition of rooms and principal features. So take a good look around.

The next step (no measuring yet) is to make a rather careful sketch plan (or elevation, or section, or whatever) in proportion. Establish the general outlines first and fill in the details later, just as one would in sketching, taking care to keep the proportions reasonably exact. With a free-standing building the outline of the plan is probably best determined from the exterior. The principal interior divisions should be located with some care, with openings and projections in scale. Don't begrudge the few extra moments spent in doing this sketch with considerable precision; it's bad medicine trying to put dimensions on a drawing which is askew and out of proportion. On the plan already drawn (assuming it's a plan) before doing any measuring, decide what figures will be needed and put in dimension lines just as one would on a working drawing—a complete set to comprise every needed dimension. At this stage, it is possible to do this systematically and neatly; the actual measuring then becomes a merely mechanical process of filling in figures.

A few words about equipment might be well at this point. In general it's largely a matter of habit and personal preferences—the best tools are those one is accustomed to using. A fifty-foot steel tape is almost a necessity for any but the smallest jobs, with a four-foot or six-foot rule for shorter dimensions. Probably more satisfactory than the wooden folding sectional rule is the Farrand flexible steel type—a thin strip of spring steel, slightly curved in cross section, which curls up handily, all six feet of it, or as much as one



FIELD NOTES FOR A PLAN

wishes, into a two-inch cup-like holder; it is flexible enough to bend around sharp corners and slip into tight places, yet will cleverly hold itself rigid if desired. In general it's a great boon to the measurer: it does everything but write down the figures. A few drops of light oil rubbed onto the tape and rule will keep them in good shape. If they should get rusty they can be polished with a bit of fine emery cloth and a little oil.

To work on a clipboard is handier than a notebook which is hard to manage with a rule or tape in one hand. With a pad of paper or several sheets mounted on a clipboard, the general outlines of a sketch will be transferred to the sheet underneath, if one bears down with ordinary pressure when drawing. This is very convenient when, for instance, more than one floor is to be measured: by merely pencilling in the transferred ridges one has another plan layout. Some measurers are devotees of graph paper: but personal experience seems to show that the ruled lines are confusing in the maze of lines and figures which usually find their way into a measured drawing.

Every measurer has the experience, early in his career, of arriving on the scene only to find the doors locked and the nearest key far away or nonexistent. What to do? All our Sunday school training cries out against housebreaking, yet in this case the end justifies the means. I have found few buildings which cannot be entered by some mild form of burglary. There always seems to be one window unlocked (try the cellar windows especially) or a door somewhere can be found to yield to a skeleton key. Of course it's a waste of time to work on a Yale-type lock. Pins may be removed from hinges, or a knife blade used to push back a lock bolt. In cases of stern necessity a pane of glass may be removed neatly by cutting out the putty, and a window catch released. This experience will be most helpful if one later decides to take up housebreaking or such as a serious profession.

The ideal measuring party consists of two persons — one to handle the tape and call out the figures, the other to make the drawings and direct operations; in using the tape it's convenient to have one person to hold the free end, the other to take the readings. With two people, especially a pair who have worked together before, a job can be finished in jig time. It's unspeakably handy to have a partner to give one a leg up to get at an overmantel, or to help with the cussing when something goes wrong. But more often than not, measuring up must of necessity be a one-man job; the only real problem is the handling of the steel tape by oneself. Tapemakers have recognized this difficulty and have provided a hook or a pin at the free end on some tapes; but personal experience has discovered a more practical device in the common glass-headed push pin, which can be stuck in almost anywhere to hold the loop of the tape.

Consistency is a jewel in measuring as in all else. By adopting a certain technique and sticking to it under all conditions, one's actions become mechanical and less subject to error. For instance, it is well at the outset to decide to take all window widths from pulley stile to pulley stile, all window heights from bottom of sash to top of sash. Such a standardization not only makes for clearness but also automatically gives the sash size, which is valuable if sash are to be matched or replaced, as often happens. Stairs should always be measured from face of wall to outside of string, not to handrail or nosing unless there's good reason for so doing, and it is so noted.

It goes without saying that the value of a set of measurements depends upon the accuracy of each individual figure—one wrong dimension may throw the shadow of doubt over the size of a whole room or façade. But even when the utmost pains are taken, minor mistakes may creep in, so it's important to take check dimensions wherever possible. Besides individual measurements on each portion of a room, for instance, take the overall dimensions as a check. One way of guarding against cumulative error is to hold the end of the tape at one corner of a room or a façade, for instance, and take readings to each desired point from that corner, instead of measuring each part by itself. Don't depend too much on memory—it's bad business to jot down a figure without indicating clearly just where it applies. And don't take measurements of various parts separately, and trust to memory to show how they fit together—that way lies sorrow, especially if one doesn't work up the notes while they're still warm. Put all possible information on one sheet;

if division is necessary be sure to make a key plan tc indicate relationships.

When one is to work up one's own measurements, a system of shorthand may be evolved to save time and space—6P 2′-6″ x 6′-8″ would indicate a six-panel door of that size; B.H. on a fireplace would mean brick hearth—any abbreviation which is clear and easily remembered. If, however, one is taking measurements for the use of someone else, it is obvious that nothing must be left to the imagination. Not only must dimensions be given fully, but it must be clearly indicated between just what points the figures read. And of course it's important that all figures and notes be legible and orderly. The measurer can learn much from the neatness of the surveyor's notebook.

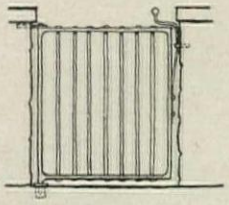
The fullness of data taken is a matter of judgment, and depends upon the intended use. In general, the voice of experience says that it's better to err on the side of completeness. It's sometimes difficult to foresee on the job just what dimensions will be needed; and it's very sad to get back to the office and then be willing to trade a couple of eyeteeth for the location of a chimney. Certain dimensions seem especially easy to overlook: the length of stair wells, the location of the first riser of a stair, the position of dormers on a roof, projection of chimney breasts, size of fireplace hearths, ceiling heights. When they're missing it usually means a trip back to the job, or some tall guessing, both of which are regrettable. Be very cautious about taking things for granted. It's dangerous to assume that a façade is necessarily symmetrical, or the walls of a room parallel. Old buildings, particularly, are likely to be as full of subtleties as the Parthenon: I have found Connecticut farmhouses whose walls bowed like the hull of a ship, although the oak structure was still as sturdy as the day it was pinned together. As many as half a dozen different sized sash are often discovered in one house.

Besides mere dimensions, much other data is required for the alteration job. Materials and plumbing fixtures must be indicated, the type of finish, the condition of structure and equipment. One must note where the electric service enters the building, the location of heat risers, soil pipes, radiators, electric outlets, all the mass of information which ordinarily appears on a complete set of working drawings and which will be affected by the proposed changes.

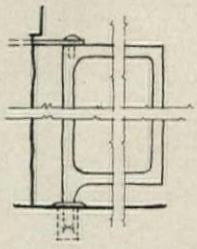
It is well to augment measurements and notes with a liberal use of the camera. There's nothing like a set of snapshots to revive one's flagging memory and show the relation of the parts to the whole. The late Kenneth Clark, whose photographs and measured drawings have added so much to our knowledge of Early American work, once told me of an ingenious scheme he used in measuring inaccessible portions of a building, such as church steeples. Working from a photograph, he merely reversed the usual system of perspective projection; he located vanishing and measuring points, and by use of portions of known size, he was able to determine all dimensions with considerable exactness. In cases where absolute accuracy is not needed—for instance, in doing preliminary sketches for the alteration of a façade—a clear photograph will often give all the data needed, and careful measurements may be postponed till after a scheme has been established.

Measuring up has another important application besides preparing an alteration job. It has long been recognized that one of the best ways to get an understanding of an architectural style is to make measured drawings of representative monuments of that style. From the time of Stuart and Revett, architects have found inspiration in the best work of the past; we have all heard of the great French *Prix de Rome* men devoting years to the production of those marvelous drawings now collected in D'Espouy. Probably most of us have made sporadic efforts at recording things which pleased us. In America it was only after the publication of such works as *The Georgian Period*, that appreciation of our Colonial style began to awake. Even after nineteen years of *The Monograph Series*, we are only beginning to gather adequate data to estimate our architectural heritage, especially in the field of domestic and minor public buildings. There is still vast opportunity for research in certain regional phases of Early American—we're fairly familiar with Salem, and Philadelphia, and Charleston, but there's almost no systematically collected data on the early houses of Vermont, or the fascinating Classic Revival in Central New York. And there is glorious untouched material in our domestic architecture of the Seventies, the Eighties, and the Nineties—the American Victorian period which, in its chaster moments, often achieved real charm. We are now seeing a revival of Victorianism in dress, interior decoration, even in thought; we seriously need someone to take rule and camera in hand, and demonstrate that, architecturally speaking, the mustache-cup era was not utterly barbaric.

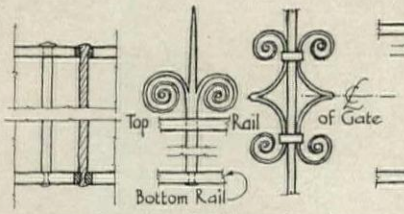
Making measured drawings is a pastime highly to be recommended. Besides taking one into the open air, besides providing all manner of curious adventures and contacts, it lays a firm base for architectural appreciation. The same principles outlined above also apply here; but emphasis is placed on the surface, not the structure. Contour of mouldings and ornamental detail must be carefully reproduced. In taking profiles a strip of soft copper is very useful—it may be bent over the moulding, and tapped into quirks until it assumes the exact contour. Then trace it on paper and a precise full size profile is the result. A plumb line is also a handy item of equipment to get projections of a series of mouldings, for instance. By securing it to the point of greatest projection, one may measure back and locate the projection of any part.



An extremely simple gate holding interest because of the excellence of it's making.

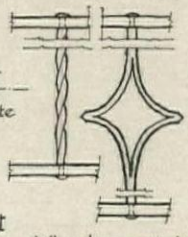


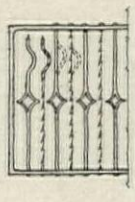
Note well rounded inner corners & square outer corners of welded frame.



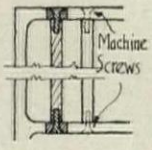
Simplest & least expensive method of installing bars. Top & bottom of frame drilled-Bottom of bar shouldered. Both ends headedover.

Possibilities of enrichment without affecting the basic simplicity of assembling this gate. Such ornament as on right can be added after gate is assembled.

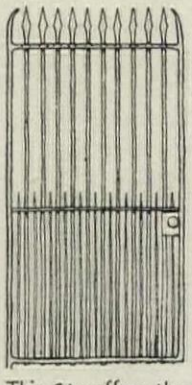




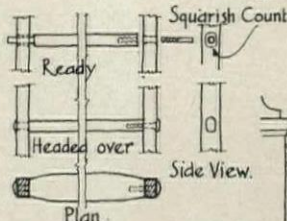
When bars are twisted or ornament is integral part, shoulder bars at both ends. While excellent design, this costs slightly more to do. One method is to bend bars to permit insertion of top shouldered rivet. Bottom rivet is inserted & when bar is straightened, top rivet finds it's place. Heating bars for this purpose is legitimate use of "welding" torch.



This method of attaching bars to a frame is to be condemned as the poorest, weakest & most commercial way. It is a poor tradesman's resort - ugly, lacking in taste, inexpressive & showing no joy of material. The addition of a top bar - as sometimes made - only confesses the weakness.



Specifications often demand that where one member passes through another they be "spot welded". This practise, besides being unnecessary is uncraftsmanlike & ugly, involving the misuse of the torch - an attempt to clean up & hide what has been done (usually by mechanical means) & considerable extra work.

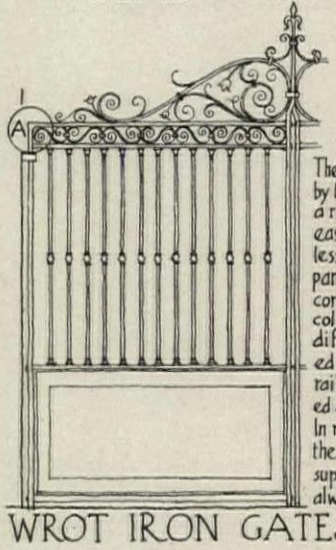


Lock rail being wider than gate frame, it was frankly tapered to frame width at junction. One end of rail was shouldered - other end tapped to receive threaded bolt which was afterwards headed over.

This gate offers the problem of a welded frame which must accommodate a lock rail & must "pass" vertical bars with "spear heads". The hole required to pass a vertical is of such a diameter that, if drilled, insufficient material for strength would be left in frame. The holes in the top rail, therefore, were punched which eliminated no material & gave a pleasing swelling. The lock rail was made sufficiently wide to permit safe drilling & as the bottoms of verticals were shouldered for riveting, drilling of bottom rail was safe. An interesting & logical variation in the rails was thus achieved. Frank, easy, assembly - reducing cost. Lock rail could be shouldered both ends & inserted as shown in right upper corner.

Brief inspection of this gate will reveal that, although elaborate in design, it embodies exactly the same structural principles as described above

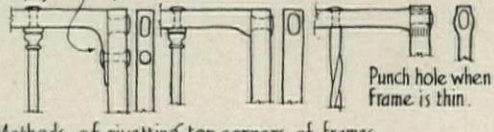
SOME ASPECTS OF WELDED GATE FRAMES.



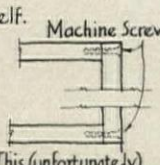
The problems offered by this gate suggest a rivetted frame for ease of assembly & to lessen expense. The iron panel requires square corners. Ornamental collars on bars offer difficulties in welded frame. The lock rail may be shouldered at both ends. Note: In rivetted frames the upper corner on supported side should always be welded. See (A)

WROT IRON GATES - PART 1

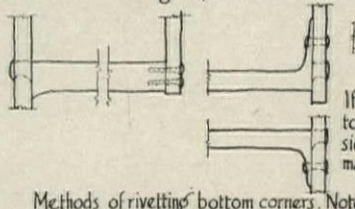
Old work often employs two separate rivets. It is better to form tenon from bar itself.



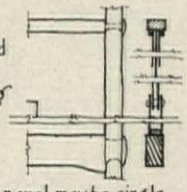
Methods of rivetting top corners of frames.



This (unfortunately) common practise should not be tolerated.



If frame is required to be flush on one side, punch swelling may occur on one side only.



Methods of rivetting bottom corners. Note: a frame is much strengthened if bottom bar is wider than other frame members. All rivets & tenons should start from shoulder with generous curve for strength.

Sheet iron panel may be single or double - held between strips or attached to secondary frame.

SOME ASPECTS OF RIVETTED GATE FRAMES

B.H.

Wrought Metalwork, 2—Gates

By Bernard Heatherley

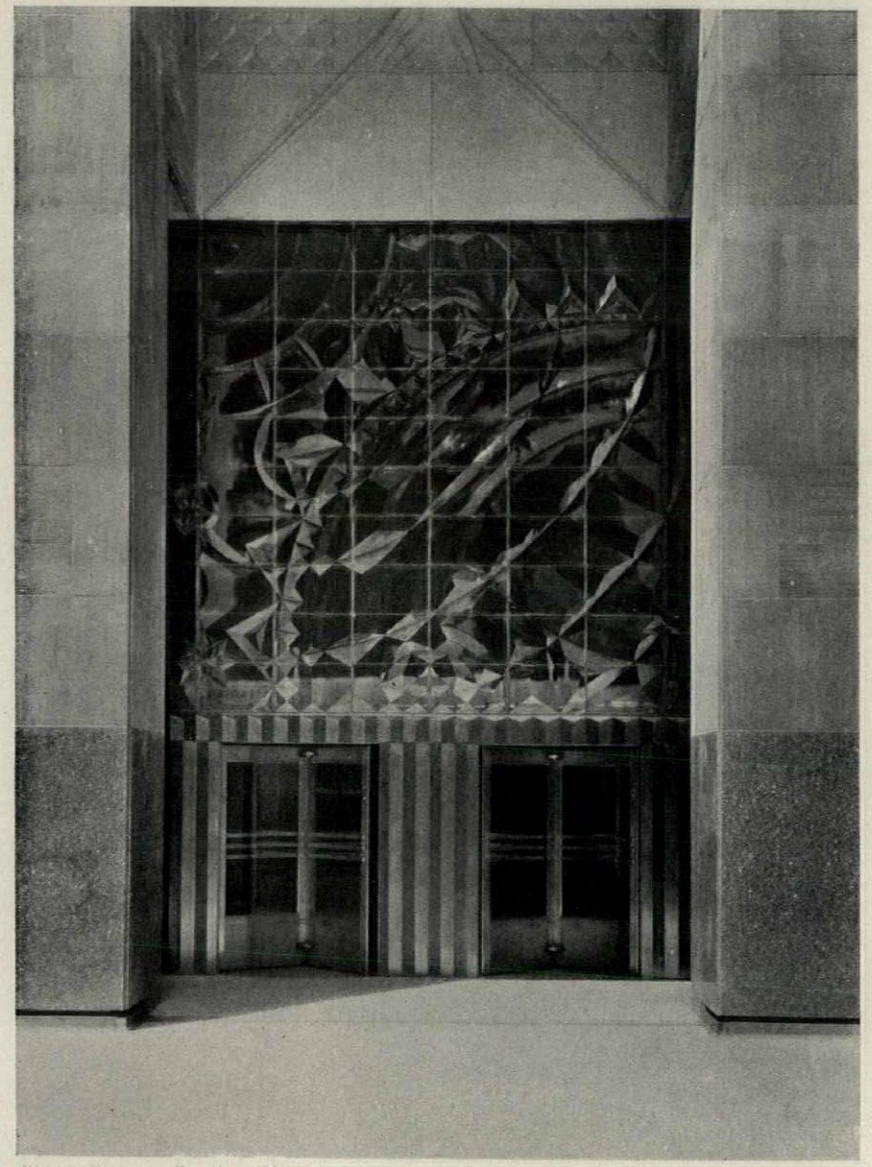
The design of a wrought iron gate involves many principles that are applicable to wrought ironwork in general. Gates, like locks, are for honest men. The determined scoundrel can always find his way past them—in time. But, whether a gate is designed for the utmost in protection, whether it is to show the honest man that he has reached the limits of his legitimate peregrinations, or whether its purpose is to invite by showing the way through a barrier, there are certain constructional requirements to be observed in order that it shall remain a homogeneous and properly functioning thing. Regardless of any shaping of the top, a gate presents the problem of making a movable rectilinear form, supported at one of its sides.

Our gate frame will be strongest when made from four pieces properly welded at the corners. To bend it from one piece of material would result in weakness unless excessive work were done on it. The welded corner overcomes, better than all other methods, the chief danger in gate construction; namely, sagging. If, however, a gate is very heavy or is much longer than it is high, the possibility of a slight sag should be recognized and the horizontal members given a small inclination upwards away from the supports. Then, when hung, the sag will bring the horizontal members to a level below which they will not sink. Æsthetically and structurally, gate frames should be welded only on the anvil. Economically, a little more expense may thus be involved, depending on the general design.

There is ample precedent for tenoned or rivetted gate frames. The factors deciding whether a frame shall be rivetted rather than welded would be; requirements of strength, the general design and ornamentation and, possibly, financial considerations. A design employing a number of bars with punchings, or with integral collars and other ornamentation, or with a number of horizontal members forming bands, would be most easily made with a rivetted frame. Such rivetting must be done with great care and skill. The rivet (or tenon) must leave the shoulder with a generous curve and there should always be plenty of material about a rivetted point. In some cases a rivet can approach a rectangular section—set vertically—thus gaining much strength. The actual process of heading over rivets and tenons, in material as heavy as the average gate requires, is usually best done hot. For ease, then, heat must be taken to the material and a legitimate use of the torch is indicated. But, regardless of how excellently a frame may be rivetted together, rivetting will seldom adequately supplant the weld at the upper corner of the supported (pivoted) side.

Correct design makes all parts of the gate of practical value and the arrangement of parts within the rivetted frame can be made to brace and stiffen it to a strength equalling a welded job. This is illustrated in the accompanying drawing of a gate with a solid panel in the lower portion. This panel effectively triangulates the corners. It is a common modern practice to "reinforce" such corners with stock angles—especially where the panel is double—permitting the angle to be concealed. In fact, there are cases where the angle forms the sole connection between the vertical and horizontal members, being screwed or rivetted to both. This is very bad. The forces acting on the angle catch it at its weakest in this position. Whilst it may hold the members together—if carefully treated—its resistance to sag is negligible. Another point is involved. If the material specified is Swedish or Refined iron—for the sake of its resistance to corrosion—stock angles are not to be obtained in these irons and a steel angle is likely to be substituted. Therefore, at one of its most vulnerable points the gate will be relying upon a weaker joint and a more corrosive material than at any of its other parts. This aspect should be considered in connection with mouldings and similar work. A design including stock mouldings and shapes should not be called for in Swedish or Refined iron since these shapes are not (yet?) made in these materials and the price of making them at the forge would be prohibitive. If such shapes are required, an unscrupulous ironworker will probably supply them—not mentioning that they are soft steel. Your conscientious craftsman, however, will point out not only that these shapes are not to be had in the material specified, but that their use is seldom in good taste or expressive of the material. He will then show an iron interpretation of these forms such as can be simply made in the iron desired. The reinforcement of corners by angles can be made effective by forging corner angles with sections suited to resist the stresses put upon them. A simpler reinforcement would be a triangular plate of metal, rivetted to the frame—but a well rivetted frame seldom needs reinforcement.

The emphasis laid on structural features, above, may seem to divorce these considerations from design in its decorative sense, but the reverse is the case. These very structural points are very decorative in themselves and the simplest gate embodying them—allied with good proportion—will be a thing of beauty; whilst all the flower and leaf or scrollwork or grotesques cannot impart beauty to a gate which ignores them. Ease of operation, compatible with good craftsmanship, has also been stressed because it results in an obviousness that is one of the most essential qualities of good wrought ironwork and is so pleasing as to establish the tenet that to wonder how a piece of work was made is to condemn it. The points of fine workmanship brought out and illustrated cannot be expected for the price of commercial work nor realized by machine shop methods, but are indispensable for good work.



Photos Courtesy Corning Glass

VIEWS SHOWING GLASS SCULPTURE FROM EXTERIOR OF BUILDING IN DAYTIME AND AT NIGHT

ENTRANCE TO RKO BUILDING, ROCKEFELLER CENTER, NEW YORK—SEE TEXT OPPOSITE

Reinhard & Hofmeister, Corbett, Harrison & MacMurray, Raymond Hood & Fouilloux, Architects

Glass, A New Sculptural Medium

By Eugene Clute

As a work of art and as an achievement in an unusual material, the great glass wall, or screen, in Rockefeller Center is an outstanding feature of that remarkable building project. This wall of glass, which is moulded in relief with a sculptural design modeled by Lee Lawrie, is in the main entrance to the principal building of the group, the seventy-story RCA Building. It fills the entire space at the rear of the entrance loggia, extending from side to side and from the row of revolving doors to the ceiling of the loggia. It is 55 feet wide by 15 feet high and is composed of 240 rectangular blocks of glass each 18 inches by 28 inches and of an average thickness of about 3 inches, cast in relief in 84 different moulds and fitted together to form the design. The maximum thickness is 4¼ inches and the minimum in the deepest points is 1¼ inches. The blocks vary in weight from 70 pounds each to 115 pounds each, and the total weight of the glass is about 13 tons. The joints are made with a transparent cement. Steel bars back of the vertical joints reinforce the glass work against wind pressure and give it rigidity.

The entrance loggia, which is recessed, is reached through a row of three tall square-topped openings, the central one of which is about 14 feet wide, while the flanking openings are about 13 feet wide. The depth of the loggia is approximately 14 feet. The central opening is 37 feet high, that is, ten feet taller than the openings at either side of it. In the upper portion of this opening is a sloping surface of limestone, like the exterior walls of the building, that extends backward and downward to the rear wall of the loggia. Upon this slope is sculptured, in high relief, the main motive of the decoration, an impressive representation of Wisdom ordering the Universe, a venerable bearded figure drawing the orbits of suns in space with a huge compass, one leg of which rests upon a star as a center.

The cosmos, or universe, is represented in the moulded glass of the portion of the screen directly below this figure, and continues the subject matter of the stone sculpture. This sculptural glass panel represents a great stride forward both in the creation of abstract design and in the adaptation of glass to the highest type of architectural use, namely, the execution of detail for the principal focal point in the design of a monumental entrance. The architects of Rockefeller Center, Reinhard & Hofmeister; Corbett, Harrison & MacMurray; and Hood & Fouilhoux, and the sculptor, Lee Lawrie, had the daring vision of a glass panel entrance. The producers of the glass, through the evolution of a new technique of manufacture, have successfully translated the idea into a finished reality.

Around the star in the upper left-hand corner of the main panel, there are quarter circles, between which are radiating lines, giving a sense of rotation. Orbits, shown in perspective as slanting ellipses, are below and to the right. A comet-like form sweeps upward and to the right. It is given vibrancy and the effect of progression by the graduated facets of which it is composed. Larger facets at the lower right reinforce the impression of rotation and there are star forms here and there. These mingled forms are not only the components of a highly decorative composition, but they convey a very real sense of the movement of countless heavenly bodies in their appointed courses and the thought of the marvelous organization of the cosmos of which our Earth is but a relatively unimportant member.

Facets are everywhere in this huge glass panel, giving life, movement, and ever-changing aspects to the design. Where they catch the light they appear pure white against adjoining areas that are in warm grays—crisp geometric forms against soft tones that hold elusive patterns. There are concave surfaces and convex surfaces, too, that contribute beautifully graded tones. Taking a step, or even moving one's head a bit, brings a whole new set of effects with the new point of view. These things are true whether the glass is seen from within or without, by day or night. The play of light upon the reflecting surfaces at different angles, the *miroitement*, is fascinating and when the sun strikes upon the facets, they blaze with light. The glass is clear, transparent, with a faint golden tint that appears only when the facets are seen at certain angles, then it produces patterns in gold-and-white.

The thought of the central group is amplified by the designs carved in stone upon the smaller sloping surfaces at the tops of the side openings and in the comparatively simple designs of the glass panels below them. Over the right-hand opening into the loggia, is a representation of Light, a female figure appearing over the edge of a cloud bank, with radiating lines in the background. Below this, the glass screen shows the ancient sun symbol intimately combined with the horizontal fluting that covers this panel from side to side. Over the left-hand opening is a sculptured male figure leaning forward from above a cloud, shouting with hands at the sides of his open mouth, and carved arcs of concentric circles represent the sound. Below this figure the sound motive is repeated in the center of the glass panel, against the wide horizontal flutes.

This glass screen effects a transition from the solidity of the stone exterior to the space of the interior. It enriches and beautifies the area above the doors, while it does not obstruct the light as other methods of treatment do to a greater or less degree. On the contrary, the fluted surfaces of the glass direct the light inward, diffusing it pleasantly and increasing the illumination. Furthermore, it has proved to be soundproof to a remarkable degree. It is a practical as well

as a decorative feature that ties in with the sculpture, which is to be polychromed by a new process, with colors that sink into the stone, and gilded accents.

The problems involved in the production and fabrication of this large screen of glass with its sculptural enrichment were many and serious, but they have been solved and a new technique has been made available.

The architects and the sculptor desired to secure, in glass, a degree of relief such as is obtainable in stone and to develop to the full extent the characteristics of glass. In order to do this, it was necessary to build the wall, or screen, from sections of glass of unusual thickness and size, so joined that the appearance of a single piece of glass would be approached. The first major difficulty arose from the great differences in thickness in the various parts of the design. This was overcome by the adoption of a type of glass that hardly expands and contracts at all under even the widest changes of temperature, a pyrex glass the coefficient of linear expansion of which is only .0000032 for each degree of temperature change between 19 degrees and 350 degrees centigrade. A special schedule of annealing procedure for the units of this screen was also established and checked by means of an optical testing apparatus which reveals to the inspector even the slightest residual stress. Each of the blocks was subjected to this test. The large size was fixed by the size of the flutes called for by the scale of the design.

Since the central panel, representing the cosmos, has a nonrepeat design, seventy different cast iron moulds had to be made in which to cast the glass blocks for this panel alone. The remainder of the screen called for eighteen more different cast iron moulds, including those for the sound wave motive and the sun motive, the side panels being largely composed of horizontal fluting, made up of blocks repeated from a single mould, and the vertical ribbing of the portions back of the piers being also repeated from a few moulds.

All of this was worked out at the plant of the glass manufacturers, from a one-quarter full-size model in plaster made by the sculptor. A full-size model in plaster was made at the shop, and divided into the 240 units which make up this colossal piece of glass work. Nothing of anywhere near this scale had ever been attempted before, so this was all pioneer work.

How to unite these blocks was another problem. The cement used must not only have a strong adhesion to glass, be colorless and transparent, but must also have a refraction index approximately the same as that of the glass if the joints were not to be made unduly prominent. Vinylite, a synthetic resin, was chosen. It was applied in all of the joints, both vertical and horizontal. These joints are extremely thin, very strong, and do not break up the design. They show just enough to preserve the plane of the wall and give it architectural character.

Photo Courtesy Corning Glass

GENERAL VIEW OF MAIN ENTRANCE, RKO BUILDING, ROCKEFELLER CENTER, NEW YORK

SHOWING SCULPTURE IN STONE AND GLASS BY LEE LAWRIE

Changes in Architectural Education

By E. Raymond Bossange*, F. A. I. A.

A new architecture is in the making. Plans for civic centers, great public improvements, housing projects, new types of buildings to fit modern conditions, and the replacement of obsolete buildings will give the architect with a creative imagination many opportunities in the future. New methods of construction and materials require new forms and motives. Moreover, increased public appreciation of form, color, texture, and ornament will demand the services of an architect in that large proportion of buildings now entrusted merely to the engineer and the contractor. The failure of many ventures that were purely utilitarian in character proves that the public insists on emotional appeal. Hence we shall need young architects who are masters of artistic composition, construction, and materials, and who, because of their youth, have a sympathetic understanding of the modern problems.

In preparing men to meet these new conditions, the great importance of a broad fundamental training should be insisted upon, and even in advanced work the training should be kept as general as practicable. There is a very special reason for doing this at the present time.

During periods of flux such as the present, certain careers are crowded, while others offer wider opportunities, and entirely new ones are created. Thus, the advisability, and indeed the necessity, of later change should be faced and provided for in education. The traditional way of training for architecture should, of course, develop the student for the design of buildings of many varied types. In these days particularly, however, he should be given an opportunity to specialize in his advanced work, if he is so inclined, in the field of interior architecture and decoration. Another field that should be made available to him is that of housing, tenements, private dwellings, hotels, apartments, and garden cities. If he should appear to be stronger in construction courses than in design, he would perhaps better be directed into the field of architectural construction and should be given the foundation to become a builder, a promoter of building ventures, or a producer of building materials.

There are two major dangers in specialization; that the choice of the specialty will be made by an immature student after inadequate consideration, and that the technical training will be too narrow. These faults can be met by deferring the selection of a major field until after at least two years' work. Many advanced courses should be taken by all students, and design should be taught in the same spirit in all majors, although the subject of the problems may differ. It is a great advantage if the student is given ample opportunity to compare the various fields and to test his own capabilities before limiting himself to one of them. When it is possible to carry on courses in painting, sculpture, and decoration under the same roof with those in architecture, it enables the student to feel and appreciate the relation of the arts to each other. It facilitates changing from architecture to one of the other arts or crafts if a specific aptitude develops, or if circumstances make such a change desirable. Such coordination enriches the student's life, broadens his sympathies, and helps him to understand varied human needs and how they can be satisfied.

It has frequently become necessary here, and is a general custom in Europe, for the architect to supervise, not only the design and construction of the building, but even the furnishing of it down to the smallest details. The creation of a course in the use of form and color gives a basis for development of artistic ability not only in architecture but also in the decorative arts and crafts in allied fields. Pencil, pen, and charcoal drawing, water color, oils and other color media, modeling, and, in addition, materials such as wood, metal, and glass may be used in creating compositions and designs. A method of teaching by which the student is freed from inhibiting timidity and given facility in creative design has been successfully tested with a selected group of New York University students and several members of the Architectural League of New York during the current term under the brilliant leadership of Dr. Eugene Steinhof of Vienna. By giving expression to similar ideas in different media without the narrow restriction of separate classes, the student learns to choose the best method of representing a particular problem. By contact in open atelier with other students including those following painting, sculpture, and decorative design curricula, he has the inspiration of a varied artistic atmosphere.

Even in the past, although no special effort was made to provide a broad experience in composition and design, many architects have had marked success in the other arts such as painting, decoration, scenic design, modeling, and crafts. By giving emphasis to such fundamental training, the ability to take advantage of other opportunities will be even greater, and those who fail to obtain work as architects may find another outlet for their talents.

The architect today is in great danger of being divorced from his proper sphere by too much insistence upon the surface treatment of buildings, thus relegating him to the role of "building beautifier." His proper function is that of designer of complete and æsthetic structures. To fill this requirement, in the future he must concentrate on the new types of construction in order to use the elements of his structure in an æsthetic,

*Dean, College of Fine Arts, Director Department of Architecture, New York University.

intelligent, and economic manner, and to make full use of modern improvements.

Construction, therefore, should be coordinated with other subjects more closely than in the typical architectural courses of the past. Work in the elements of architecture, instead of being a survey of the orders and other isolated features, is of greater value if taught as an integrated study of architectural forms based on the major types of construction, including the modern. The developments of different types of construction and their influence in producing architectural forms in the past should be emphasized. Criticism of the design problems by a construction critic insures buildable *projets*, and a number of problems, including the thesis, should require carefully studied construction plates and the solution of mechanical details. We hope that in the near future, the Beaux-Arts Institute of Design will simplify as much as possible the presentation of *projets* and require construction details instead. In the construction courses, the theoretical matter should be applied to a number of buildings completely worked out from *projets* done by the students under the jurisdiction of a design critic, and throughout all the work the student should apply his technical knowledge in a practical manner.

Too much effort cannot be made throughout the curricula to give reality to architectural subjects. At the very beginning, a course in the physical and æsthetic properties of materials should be offered to make the beginner materials-conscious. This should not be done simply by lecture but should be accomplished by the observation and handling of actual products, by classroom demonstration, by visits to manufacturing plants and to showrooms such as that of the Architectural Samples Corporation in New York, and by inspection of materials in place in both exterior and interior of some of the great modern buildings. This gives the student a realization of substance, indispensable to a full comprehension of later work in history, design, and construction. In the history courses, the character and meaning of material needs to be constantly stressed.

An increased use of models in many courses encourages greater appreciation of solid form, and designing in clay and plaster so as to develop a sense of the third dimension should be required for many problems. Models also should be freely used to test the masses when the design has been developed. We trust that the Beaux-Arts Institute of Design next year will not only permit but encourage the presentation of photographs of models to illustrate the designs.

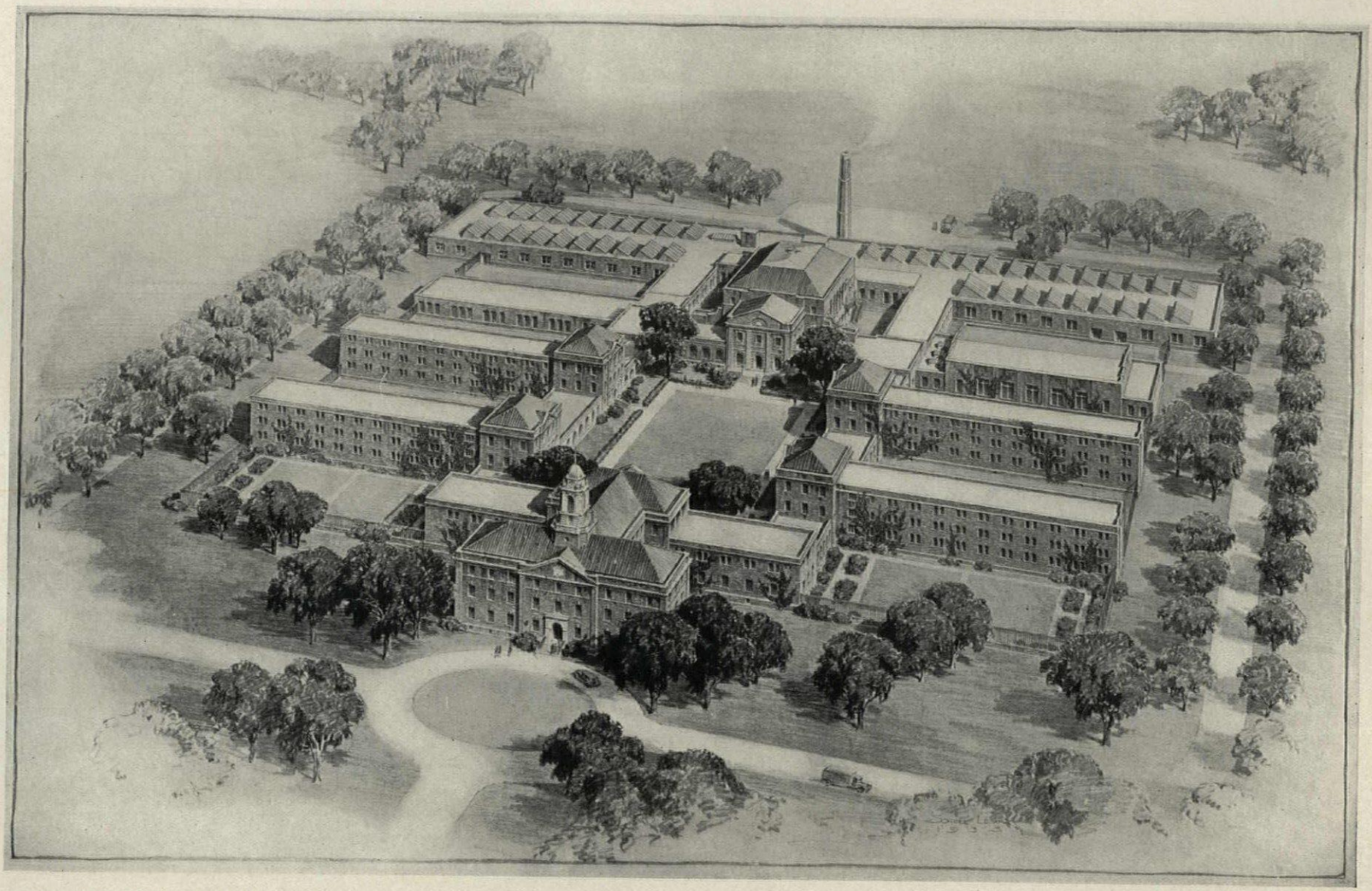
In courses in architectural history, while the consideration of construction and the nature of materials are essential, the fact should never be forgotten that the fulfilling of man's physical requirements does not by itself solve the problem. Even the modernists now admit that the study of form should follow the solution of function, but before either form or function comes the human conception of the problem. Building becomes architecture only when man's desire for order, balance, form, color, and texture is aroused and satisfied and when these elements are made an integral part of the structure. Architecture may be defined as the dramatization of a system of construction. A building must first be conceived in this spirit, not for a machine but for a human being in whom ideals are vital. Then the trained artist, making use of his mastery of construction and materials and his ability to derive inspiration and suggestions from them, proceeds to express his conception. The architect has never been more free to dream than he is today, because he can count on new methods of construction and new materials to make possible the realization of his concepts.

Although in much modern work conditions force originality and creation upon us, it must be recognized that there always will be demands for works of a traditional character, for the proper design of which an understanding of periods and the evolution of forms is necessary. Such work cannot be well done unless adaptation is carried to the point of making the work answer modern needs, and that also requires creative ability.

The study of the great masterpieces of the past and an understanding of the spirit and conditions they expressed is the soundest method for stimulating creative imagination. Great importance should be attached to the study of history for its cultural value, for the training of taste, and for valuable information for modern application. The student should be trained in history not to supply him models for imitation, but as a source of inspiration.

This is one of the most significant periods in the history of architecture. It is comparable in importance to the Greek and the Gothic periods. Before this phase of architectural development is over, we may produce a third great architectural system. Changes produce opportunities. A new language and vocabulary will have to be created. New masses, forms, and proportions, a reinterpretation of scale, a new system of ornament, decoration, color schemes, and textures must be conceived. To do this we must produce broadly trained architects with imagination and originality.

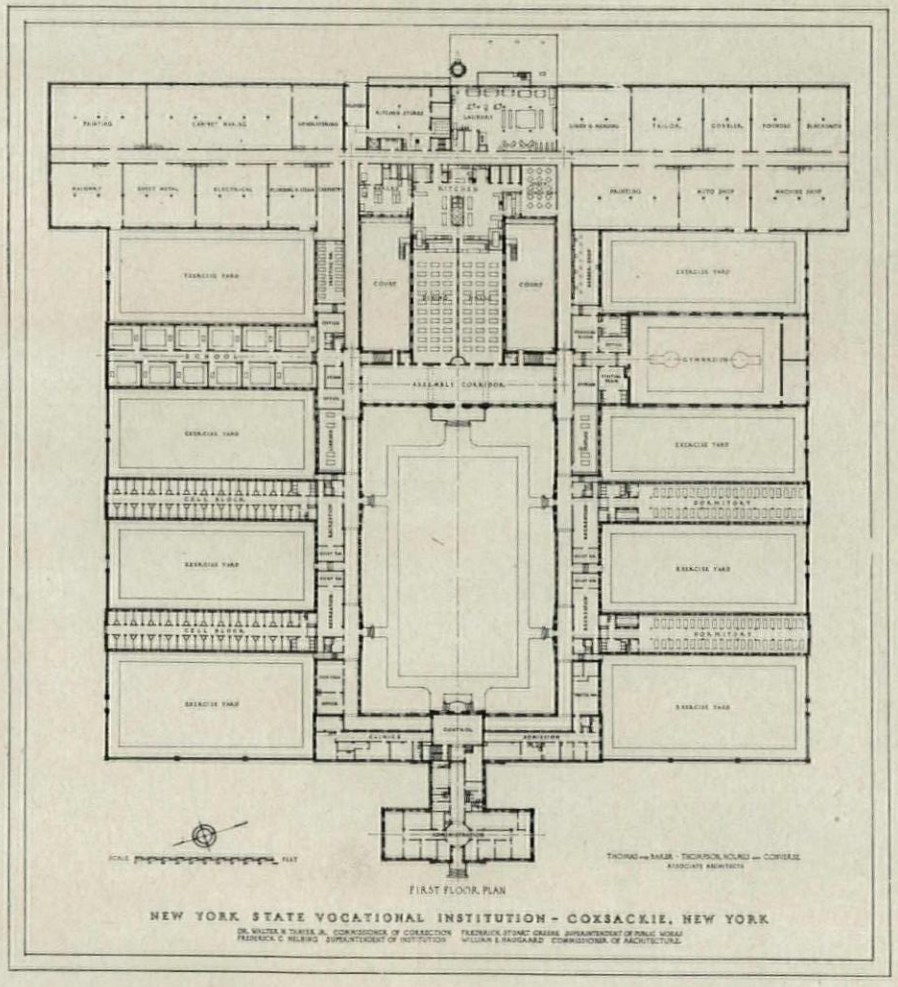
Have we prepared our students so that in time they will be able to solve these new problems? The task of the educator has never been more complicated. The educational system that served well for the last one-half century must be changed. The new system of training must be worked out in the midst of constantly changing conditions, incomplete experiments, and long before new standards have been established. That we must not crystallize too soon is evident, and it will be long before a satisfactory curriculum is again established. We must go deeper for our inspiration than we did a generation ago when a simple adaptation of forms and a gentle evolution in style seemed satisfactory. During the transition we must use the same fundamental principles that produced the Greek and Gothic architecture. It would be folly not to make use of all experience.

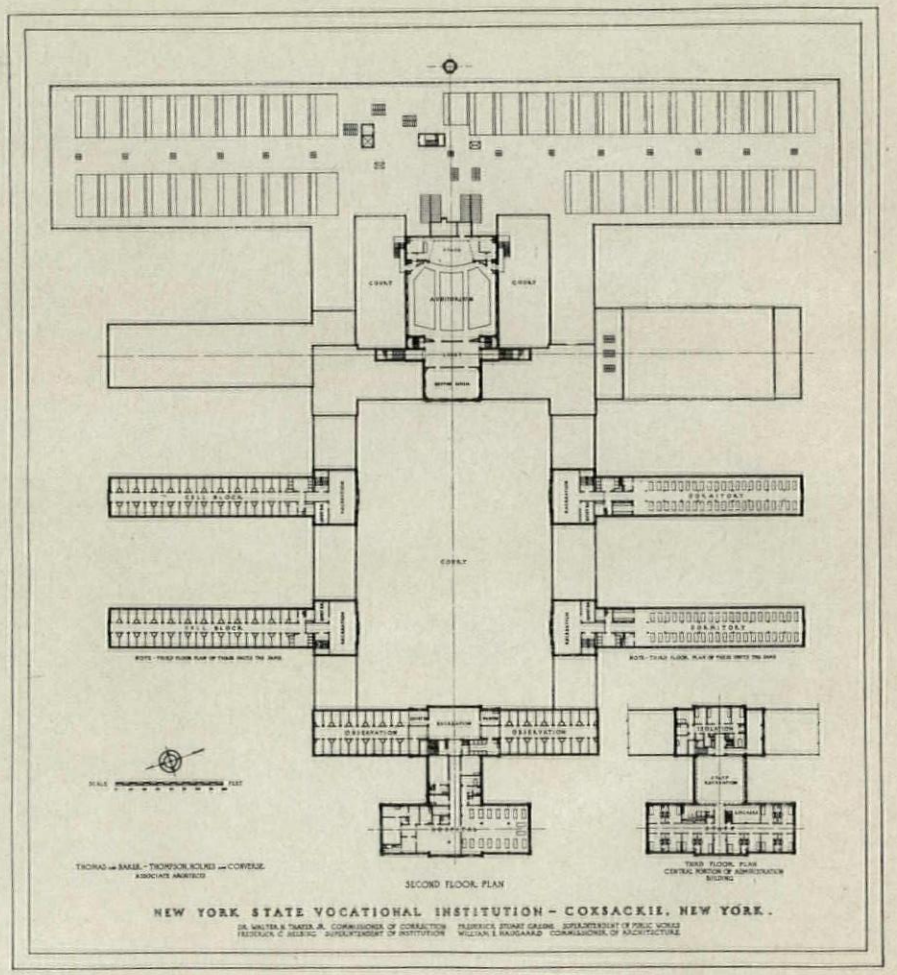


PENCIL RENDERING BY SCHELL LEWIS

NEW YORK STATE VOCATIONAL INSTITUTION—THOMAS & BAKER—THOMPSON, HOLMES & CONVERSE, ARCHITECTS

Compare with winning competition drawings shown on pages 634-636, September, 1932, issue.





REVISED PLANS, NEW YORK STATE VOCATIONAL INSTITUTION, COXSACKIE, NEW YORK

THOMAS & BAKER—THOMPSON, HOLMES & CONVERSE, ARCHITECTS

It will be interesting to compare these plans with the competition plans shown on page 635 of PENCIL POINTS *for September, 1932.*

Ripley's Recipes, 2

By Hubert G. Ripley, F. A. I. A.

"Sumer is iccumen in,
Lhude sing cuccu;
Groweth sed and bloweth med
And springth the wude nu.
Sing cuccu!"

—Anon.

The Mint Julep

When Zeus the Cloud-gatherer, and the ox-eyed lady Hera, from whose ambrosial tresses shone grace abundantly, held their famous conference on the crest of Gargaros high above the slopes of many-fountained Ida, "the divine Earth sent forth fresh new grass." (See the Iliad of Homer, done into English prose by A. Lang; Book XIV.) This was an extra special occasion and an extra special grass called *Mentha Viridis* was produced. Ever since that prehistoric occasion this particular grass has been held in veneration, though only in comparatively recent years has it achieved its ultimate destiny as the foundation for the Mint Julep. "The mint julep," says Professor Jerry Thomas, "is peculiarly an American beverage, and in the Southern States is more popular than any other. It was introduced into England by Captain Marryatt, where it is now quite a favorite. The gallant captain seems to have had a penchant for the nectarous drink, and published his recipe in his book on America. We give it in his own words: 'I must descant a little upon the mint julep, as it is, with the thermometer at 100 degrees, one of the most delightful and insinuating potations ever invented, and may be drunk with equal satisfaction when the thermometer is as low as seventy degrees. There are many varieties, such as those composed of claret, Madeira, etc., but the ingredients of the real mint julep are as follows. I learned how to make them, and succeeded pretty well. Put into a tumbler about a dozen sprigs of the tender shoots of mint, upon them put a spoonful of white sugar, and equal proportions of peach and common [?] brandy, so as to fill it up one-third, or perhaps a little less. Then take rasped or pounded ice, and fill up the tumbler. Epicures rub the lips of the tumbler with a piece of fresh pineapple [vid. the sazarac, Griswold et als.] and the tumbler itself is very often incrusted outside with stalactites of ice. As the ice melts, you drink. I once overheard two ladies talking in the next room to me, and one of them said, "Well, if I have a weakness for any one thing, it is for a mint julep!"—a very amiable weakness and proving her good sense and good taste. They are, in fact, like American ladies, irresistible.'

"A Georgia paper recently speaking on this subject says: 'Probably the old-fashioned julep is in its decadence as a public drink, but it does not follow that the art of constructing this famous Southern refresher is lost. On the contrary, we have knowledge of several old-fashioned gardens where the mint bed under the southern wall still blooms luxuriantly; where white fingers of household angels come every day about this time of year and pluck a few sprays of the aromatic herb to build a julep for poor old shaky grandpa, who sits in the shady corner of the verandah with his feet on the rail and his head busy with the olden days. In such a household the art is still preserved. With her sleeves rolled up, the rosy granddaughter stirs sugar in a couple of tablespoonfuls of sparkling water, packs crushed ice to the top of the heavy cut-glass goblet, pours in the mellow whiskey until an overflow threatens and daintily thrusts the mint sprays into the crevices. And the old man, rousing from his dreams, blesses the vision which seems to rise up from the buried days of his youth, and with his gay nose nestling peacefully in the nosegay at the summit of his midday refresher, quaffs the icy drink, and with a long-drawn sigh of relief sinks back to dream again until the dinner bell sounds its hospitable summons. The mint julep still lives, but it is by no means fashionable. Somehow the idea has gotten abroad that the mint ought to be crushed and shaken up with water and whiskey in equal proportions. No man can fall in love with such a mixture. Poor juleps have ruined the reputation of the South's most famous drink.' " (The Bon Vivant's Companion, or How to Mix Drinks, by Professor Jerry Thomas. Edited by Herbert Asbury, New York and London, 1928.)

According to the best authorities obtainable, the mint julep originated in Georgia. Like many great inventions, it is related that its discovery was accidental. The story goes that one of the Oglethorpes, or perhaps it was an Enraughty (the record is a bit confused here as to just who it was, or the precise date), awoke one morning, after a wild night on the moors, with a splitting headache, a parched tongue, and an extreme sense of disfavor and irritation against the whole world and everything therein. The goddess of chance had been unkind to him the previous evening. He had imbibed heavily of the Planters' punch, added to which the lovely Clarissa, to whom he was passionately attached, had danced and flirted outrageously the whole evening with the dashing young Compte d'Estourvilles, a visitor from the French frigate "Hanneton," one of Admiral Dumouriez fleet, you know. Young James called faintly for Pompey, his devoted servitor, to bring him a life saver. Now Pompey, a white-haired old colored retainer who had served three generations of Oglethorpes (or Enraughtys), had Cherokee blood in his veins, and, suspecting the young master's plight, recalled that the Indians frequently used a certain fragrant herb as a stomachic and antispasmodic in cases

of gastrodynia. In the brook between the Smokehouse and the ice shed, the herb grew in profusion. Pompey had gathered a bunch of this "grass" and skillfully blended it with cognac. As the bottle was nearly empty, he added peach brandy to make it of goodly strength, and packing the goblet with ice, set it against a large cake to keep cool until the awaited summons came from the blue room. Young masters always had the blue room in those old Southern mansions until the Chatelaine arrived, after which the young people moved into the pink room.

Carefully depositing his tray on the night table beside the bed, Pompey drew the curtains and let in a few rays of sunshine and the fresh odors of the garden. Young James, opening one eye with difficulty, saw a sight that caused him to sit up, not without sharp pains in the back of his neck however. The silver goblet, the treasured heirloom that once graced the board at Westbrook, Godalming, country seat of Sir Theophilus Oglethorpe, father of Bolingbroke's "Fanny," had become incrusted with a heavy frost and the fragrance thereof was even as when Hera of the golden throne stood on the peak of Olympus, ambrosial, soft, and of a sweet savour that went right through from heaven to earth. A deep draught and the throbbing in the young man's temples ceased; when the cup was finished, his whole outlook on life was altered as if by magic. The world seemed a pleasant place, after all. Ever since that day the Georgia Mint Julep has been a solace and a comfort to mortals, even as Dionysus, son of Semele of the fair tresses, whom the Greeks called "Iakchos."

Professor Thomas says that the following is the genuine method of concocting a Southern mint julep, but whiskey may be substituted for brandy if preferred: Put about twelve sprigs of the tender shoots of mint in the tumbler (a large bar glass), add one teaspoonful of white powdered sugar, having previously dissolved it in a little water [with all respect to the master, we should prefer a lump of crystallized sugar], then three-quarters of a wine glass of peach brandy and the same amount of cognac, and lastly, fill up the glass with shaved ice. Stir with a spoon but do *not* crush the mint. Just think, Eph used to make a julep like that in the old days, for the modest sum of twenty-five cents! *Quousque tandem abutere patientia nostra, O Prohiberes?*

In another recipe—"a julep fit for an emperor," he says—made much the same way, a dash of Jamaica rum is added, and the glass dolled up with slices of orange, berries, and small pieces of pineapple—the whole sprinkled with powdered sugar. The Only William, whose julep we do not stand with wholeheartedly—though we have a high regard for most of his recipes, particularly the "Life Prolonger"—says that you may add a rosebud and a spoonful of ice cream!

Now that the authorities are duly acknowledged, in all humbleness we should like to place on record our own particular favorite, the result of a certain experience and considerable experimentation.

In the first place I believe that the Mint Julep bears the same relation to all other mixed drinks that ægis-bearing Zeus does to all the other gods. One cannot make a good julep without good liquor. Even the Olympic flavor of incense-bearing mint will not disguise the meager virtues of common whiskey. In the old days we used Fennell's Old Fashioned Pot Still Rye, aged in Port wine barrels since 1869. In 1913 it cost $2.50 a quart, 25c a drink, an unusual price for the time. It is unwise to attempt to make more than six or eight juleps from the contents of one bottle, as its measure of capacity must not be strained, even to accommodate an extra guest. Best break out, with what fortitude you may possess, another one from the old cache under the cellar stairs. Then your mint must be fresh, young, and tender like "Zephirus, eek with his swete breeth," the ice, pounded to almost a powder in an ice bag and put in the ice box to keep "dry," the sugar, granulated, and the glass of the largest size, sixteen to eighteen ounces if possible. A silver mug or tumbler holding from a pint to a pint and a half is ideal, in fact the "scholiast" considers a silver container absolutely essential. It's a good scheme to make up a dozen or so and pack them away in the ice box, where great globules of ice will form on the outside of the frost, and the mint bouquet stands up like the myrrh trees on Hatshepsut's terraced temple of Der-el-Bahri. Now as to the method.

In each glass or goblet, place a few small sprays of tender young mint sprigs. (The plural is employed here, for nobody wants to make just *one* Mint Julep.) A big spoonful of granulated sugar is sprinkled on the mint and gently pressed on the leaves. Just a little water is added, not over a spoonful, to dissolve the sugar. Next stir in four or five ounces—there are thirty-two to a quart, be it remembered—of the finest rye or Bourbon known to man. Fill the glasses half full of ice and stir gently, then pack them as full of ice as it is possible to pack them. Insert goodly bunches of mint on one side and a thin slice of lemon on the other. Put them close together in the bottom of the ice box and throw a handful or so of powdered ice against and all over them. And those who liken it not to the glittering dew that drops from the golden cloud that shrouds topmost Gargaros, the highest crest of Mount Ida, speak wingless words.

Here & There & This & That

We pause at this point to drop a tear or two over the loss of our capable, faithful, charming, and (we are tempted to add, so why not?) beautiful associate, Elizabeth L. Cleaver, better known to readers of this department as E.L.C. As women will do, she succumbed at last to Cupid's darts and stepped out last October and married Mr. Thomas Kearney, a likeable young man who is now combating a tendency in some circles to refer to him as Mr. Cleaver. This month she decided that the duties of wifehood were increasingly interfering with those of editorship and so, regrettably as far as we are concerned, withdrew from our office family. With her go our best wishes and, we are sure, those of innumerable HERE AND THERE fans.

PARIS PRIZE IN ARCHITECTURE

The Paris Prize in Architecture was awarded this year by a jury of the Society of Beaux Arts Architects to George Frei, a 22-year-old student of New York University. Second place was awarded to Adrian Waldorf, also of New York University; third place to H. Gnerre of the Atelier Lloyd Morgan; and fourth place to L. W. Smith of Princeton University. It is noteworthy that the winners of the first three places were all coached by Lloyd Morgan, who has been teaching design at New York University during the past year.

587 students took part in the first preliminary this year, representing 37 cities throughout the country. The eight finalists were required to design a monumental group of buildings to be located in Washington to house a hypothetical National Banking Board.

The Jury of Award included Whitney Warren, Henry R. Shepley, Arthur Ware, Chester Aldrich, Ely Jacques Kahn, Egerton Swartwout, Otto R. Eggers, John W. Cross, Electus D. Litchfield, Louis Ayres, and Joseph H. Freedlander, chairman. The drawings submitted by the prize winner, together with those placed second and third, will be reproduced in an early issue of PENCIL POINTS, accompanied with the report of the jury and an article by Lloyd Morgan.

PARIS PRIZE IN SCULPTURE

On June 12th, at the Beaux-Arts Institute of Design, New York, a Jury composed of prominent architects and sculptors met for the purpose of awarding the Tenth Paris Prize in Sculpture and other Annual Prizes.

The subject this year for the Paris Prize in Sculpture was: "Monumental Group for an Art and Industrial World's Fair." The group to be composed of three figures depicting the progress made in Art and Industry in the last fifty years.

The Paris Prize was awarded to Walter Yoffe of 2464 Washington Avenue, New York City. Mr. Yoffe is 22 years of age and has been a student in the Sculpture Department of the B.A.I.D. for the past two years. He was formerly a student of sculpture at Cooper Union.

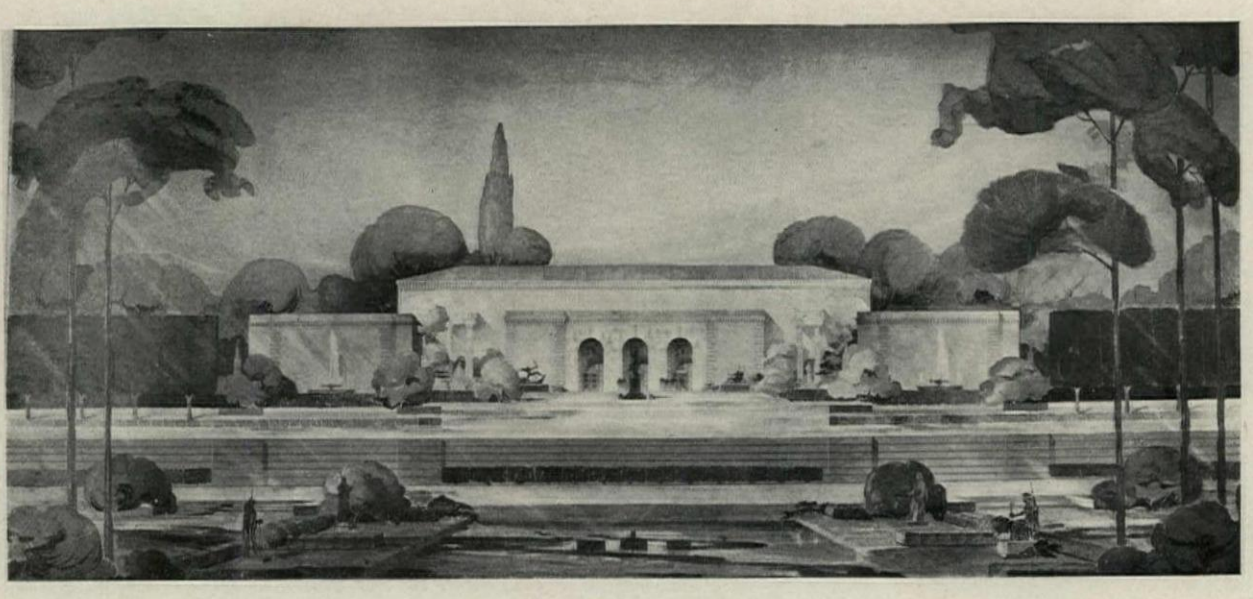
Seventeen models were submitted in the final competition. In addition to the Paris Prize giving $1,200 for one year's study in Paris, the following honors were awarded: 2nd Place, Silver Medal and $100 to Paul Diana; 3rd Place, Bronze Medal and $50 to John Amore; 4th Place, First Mention Placed and $25 to Otto G. Dallmann; 5th Place, First Mention and $10 to Milton Hebald; 6th Place, First Mention and $10 to Ray Wever.

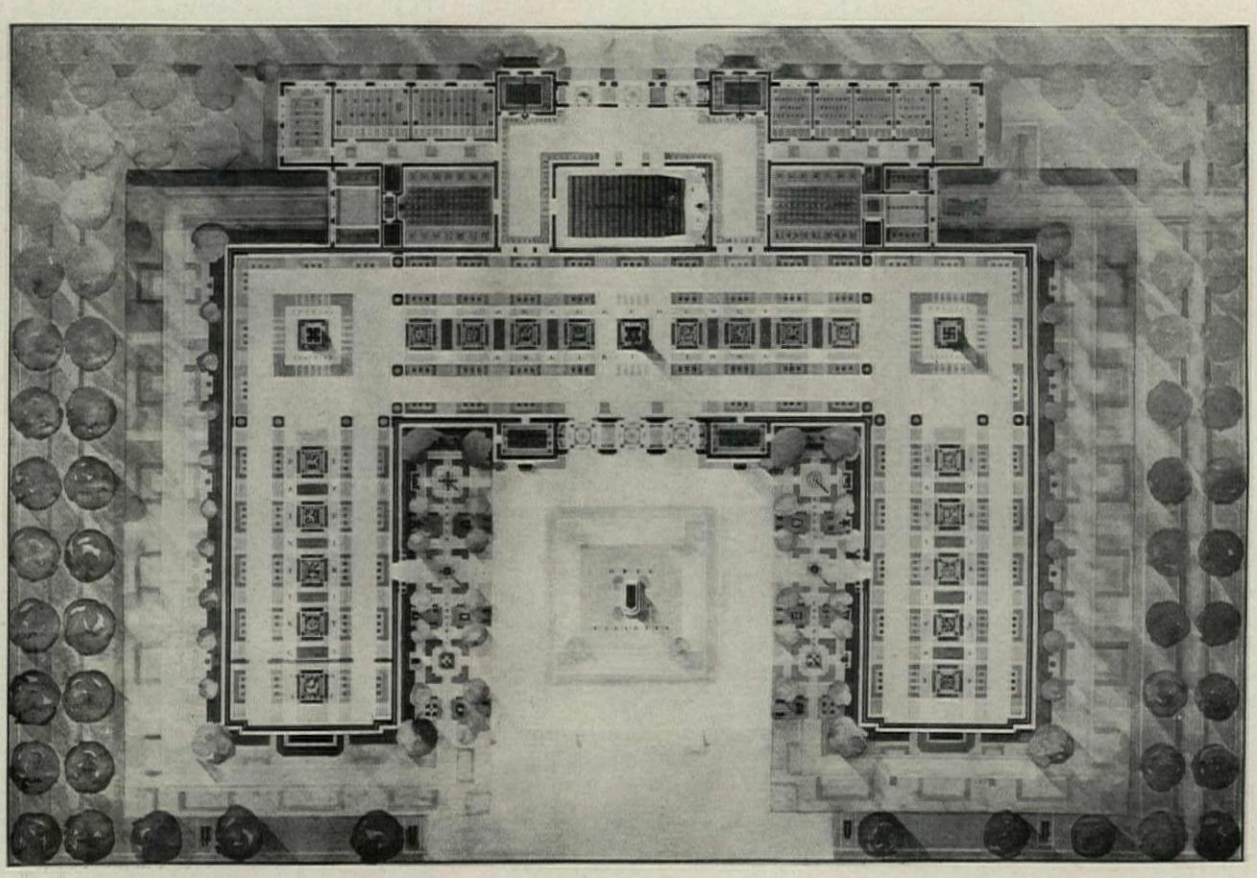
In Architectural Ornament, the season was ended by an important competitive design, entitled: "A Grille Panel" in the Georgian Style, which was the occasion for the following honors: 1st Prize, Silver Medal and $100 to Joseph Laikauf, Jr.; 2nd Prize, Bronze Medal and $50 to Joseph A. Campo.

Other Annual Awards were as follows: Trustees' Prize, $50 for the best ornament during the year, to Andre Arata; Silver Medal and $50 for the best composition during the year, exclusive of the Paris Prize, to Walter Yoffe; Bronze Medal and $25 for the second best composition during the year, exclusive of the Paris Prize, to Ray Wever.

The following constituted the Jury: Gaetano Cecere, Robert G. Eberhard, Ulric H. Ellerhusen, Paul Fjelde, John Flanagan, Joseph H. Freedlander, Ernest W. Keyser, Lee Lawrie, Edward McCartan, Charles G. Peters, Henry R. Sedgwick, Albert Stewart, Adolph A. Weinman.

PEN AND INK SKETCH BY HILBERT DUNING, CINCINNATI, OHIO

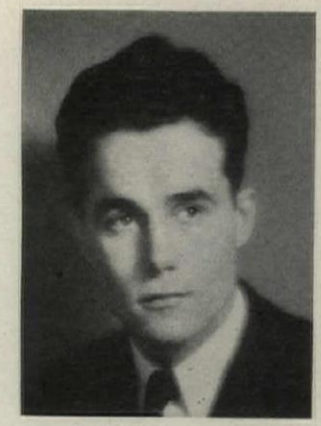




PLAN AND ELEVATION OF WINNING DESIGN FOR "AN EXHIBITION GALLERY," BY KENNETH NELS LIND

COMPETITION FOR THE FRANCIS J. PLYM FELLOWSHIP

FRANCIS J. PLYM FELLOWSHIP



KENNETH N. LIND

The Francis J. Plym Fellowship in Architecture has this year been awarded by the University of Illinois to Kenneth Nels Lind of Rockford, Illinois. The plan and elevation of his winning design are shown on page 322. The value of the Fellowship is $1200 to be used toward defraying the expenses for one year's study in Europe.

The problem was to design *An Exhibition Gallery* and the program read as follows:

A patron of the arts has given to his Alma Mater a sum of money to erect a building for the exhibition of all works of art and archæology of the university. The character and style of the building is left to the discretion of the designer, but attention is called to the fact that a style of architecture has been adopted by the institution and that the building program has been well advanced. In the interest of the harmony of the developments the designer should adhere to the character of the existing buildings.

SITE: The site is level, 300 feet north and south, by 500 feet east and west, bounded on the south by a boulevard 100 ft. wide, with minor streets on the other three sides.

REQUIREMENTS: A. An Art Gallery, about 7500 square feet in area, which will house the permanent collection of painting and small works of art, with two smaller galleries for the display of student work and traveling exhibits.

B. A Gallery of Sculpture, about 10,000 square feet in area, so planned as to permit the display of the exhibits in chronological sequence.

C. The Archæology Exhibit, of about 15,000 square feet in area, which will consist of a hall of sufficient height to house large specimens. In addition, there will be smaller rooms or galleries to house displays.

D. Provide space for open air exhibits of a few notable fragments of architecture and sculpture. This space may be in a garden court or courts, or may be displayed in the entourage of the building.

E. At least four small lecture rooms for students of art and archæology, of approximately 600 sq. ft. each.

F. A small lecture room to accommodate 250 people. This room should be so located as to be available to the public without opening the whole building.

G. Director's public and private office, approximately 1000 sq. ft. A conference room for the Board of Directors, 1000 sq. ft. A Secretary's office to accommodate five people, 600 sq. ft. A vault and file room.

Workrooms for collecting exhibits; packing and shipping rooms; a vault; a curator's suite; a public and a private office. The necessary conveniences for the operation and control of the building must be provided.

Kenneth Nels Lind, winner of the twentieth competition for the Francis J. Plym Fellowship in Architecture, was born in Rockford, Illinois, in 1909. He was graduated from Rockford High School and entered the University of Illinois to study Architecture. At the close of his senior year he received a scholarship to study at the Lake Forest Foundation for Architecture and Landscape Architecture during the summer of 1931. Here he won the Condé Nast American Traveling Fellowship to study American architecture and gardens for a period of twelve months. Mr. Lind feels that his study at Lake Forest has been very beneficial and wishes to extend his appreciation to Mr. Chester B. Price and Dean Everett Meeks for their instructive criticisms.

During the past year he has been instructing part time and studying in the Department of Architecture at Illinois. He was also a finalist in the Rome Prize Competition this year.

Mr. Lind wishes to express his appreciation for the kind assistance and inspiring criticisms of Professor Arthur Deam. He also wishes to express his sincere gratitude to Professor L. C. Dillenback, and to Dean Rexford Newcomb and Professor L. H. Provine.

He is a member of Scarab, Gargoyle, and Sigma Tau honorary fraternities.

EDWARD L. RYERSON FELLOWSHIPS

After careful consideration of the work of all of the candidates, the Jury appointed for the purpose this year awarded the Edward L. Ryerson Fellowship in Architecture to Henry P. T. Tideman of the University of Illinois, and the Edward L. Ryerson Fellowship in Landscape Architecture to Leroy S. Augden of Ohio State University. Honorable Mentions in Architecture were awarded to Earl F. Cleland of Ohio State University and Richard Scott Smith, also of Ohio State University. Honorable Mentions in Landscape Architecture were awarded to James H. Brooks, Jr., of Ohio State University, and to Kenneth R. Cougill, of the University of Illinois.

The Jury was very much pleased to find that the previous work and record of the students selected for the award were entirely consistent with their work on this problem.

Designs were submitted by twelve Architects, two each from University of Illinois, Iowa State College, University of Michigan, Ohio State University, University of Cincinnati, and Armour Institute; also by ten Landscape Architects, two each from University of Illinois, Iowa State College, University of Michigan, Ohio State University, and University of Cincinnati.

The Jury consisting of David Adler, Ernest A. Grunsfeld, Jr., Ralph E. Griswold, Mrs. Tiffany Blake, and Walter S. Brewster, Chairman, commented upon the general excellence of the free-hand sketches submitted by the contestants. The Jury remarked especially the water colors of Kenneth R. Cougill, Henry P. T. Tideman and Anthony J. Del Bianco, all of the University of Illinois.

The competition for these Fellowships is held annually by the Foundation for Architecture and Landscape Architecture at Lake Forest, Illinois.

EXHIBIT OF ARCHITECTURE BY WOMEN

The Women's Architectural Club of Chicago opened its international exhibition of the work of women architects on June 1, on the second floor of the General Exhibits Building at the Century of Progress. Exhibits have been received from Sweden, Scotland, England, Germany, and Czechoslovakia as well as from all parts of this country. All women architects and architectural draftsmen visiting the Fair this summer are urged to register at the Women's Architectural Club booth.

SCHERMERHORN FELLOWSHIP AWARD

For designing a group of exposition buildings atop the Palisades of the Hudson River "to illustrate the history and present achievement of American architecture and of the arts associated with construction," Hyman Roche of 2798 Webb Avenue, New York, was awarded, early in June, the F. Augustus Schermerhorn Fellowship of the Columbia School of Architecture.

Under the terms of the fellowship, available only once every three years and worth approximately $1,875, Mr. Roche will study and travel in Europe for a year. His work will be directed by the Faculty of Architecture, with the American Academy in Rome acting in an advisory capacity.

An honorary award for second place in the competition went to Daniel Chadwick, a senior, of Jamaica, Long Island. Max Roche, a School of Architecture graduate in the class of 1931 and a brother of the winner, placed third.

Hyman Roche was graduated from Columbia University in 1932 with the degree of Bachelor of Architecture. On his graduation he was awarded the Fontainebleau Scholarship of $500 by the Beaux-Arts Institute of Design and studied at the Fontainebleau School of Fine Arts.

The jury of award included D. Everett Waid, Ralph Walker, Egerton Swartwout, and Dwight James Baum.

CITY PLANNING COURSE AT M.I.T.

In recognition of the growing need for long-range professional planning of towns and cities, a comprehensive course in city planning will open next fall at the School of Architecture of the Massachusetts Institute of Technology. The new course represents one of the first major efforts of educators to meet the complex problems arising from haphazard municipal expansion.

At the same time, announcement was made of a new scholarship in city planning, created from funds of the Carnegie Corporation, which will entitle a graduate of the new course to a year's research study in this country or abroad. By means of an additional grant from the Corporation, a valuable program of research will be undertaken next year in the Institute's architectural department.

Such vital community problems as slum clearance, the adequate housing of industrial workers, and improved traffic circulation will be studied in the new course. In response to the growing public demand for healthier, safer, and more beautiful communities, the city planner will work to effect both art and economy in public works, as well as a permanent harmony between buildings and their surroundings.

An increased general interest in the construction of moderately-priced homes is reflected in plans for special study of this important problem. Constituting another large phase of the work will be long-range planning of public parks, playgrounds, streets, and highways.

In a series of lectures by eminent members of the city planning profession, such authorities as John Nolen, Thomas Adams, Robert D. Kohn, and Clarence Stein will discuss various technical and cultural aspects of municipal development. While based primarily on a knowledge of architecture, the course will include principles of such fields as engineering, sociology, economics, and law.

Studies in practical design will be coordinated with lecture courses in highway construction, water supply and waste disposal systems, and other engineering problems. A survey of European civilization will consider some of the cultural and artistic backgrounds of modern life.

The course will be offered as a two-year option to students who have completed three years of architectural training, and will lead to the degree of bachelor of architecture in city planning. It has been developed with the aim of equipping graduates with a technical knowledge and breadth of outlook sufficient not only to understand the causes behind present unsatisfactory conditions of city building, but to arm them with methods of thought and work which will ensure an analytical attitude toward the problems of today and tomorrow.

The three preliminary years of architectural study will form a sound cultural and professional background for the more specialized work in city planning. The two years' time will be largely devoted to a major course in design and another in the theory and practice of city planning. The former is similar in method and content to the corresponding subject in architecture. The latter is of a comprehensive nature, including vitally essential material which, though perhaps handled earlier in a number of small courses, is believed today will assume added significance in the proposed closely knit unit.

NEW OFFICERS FOR NEW YORK CHAPTER

Ralph T. Walker, of the firm of Voorhees, Gmelin and Walker, has been elected president of the New York Chapter of the American Institute of Architects.

Other officers chosen by the New York Chapter follow: vice president, Frederick Mathesius, Jr.; secretary, Eric Kebbon; treasurer, Daniel P. Higgins; recorder, Christopher La Farge.

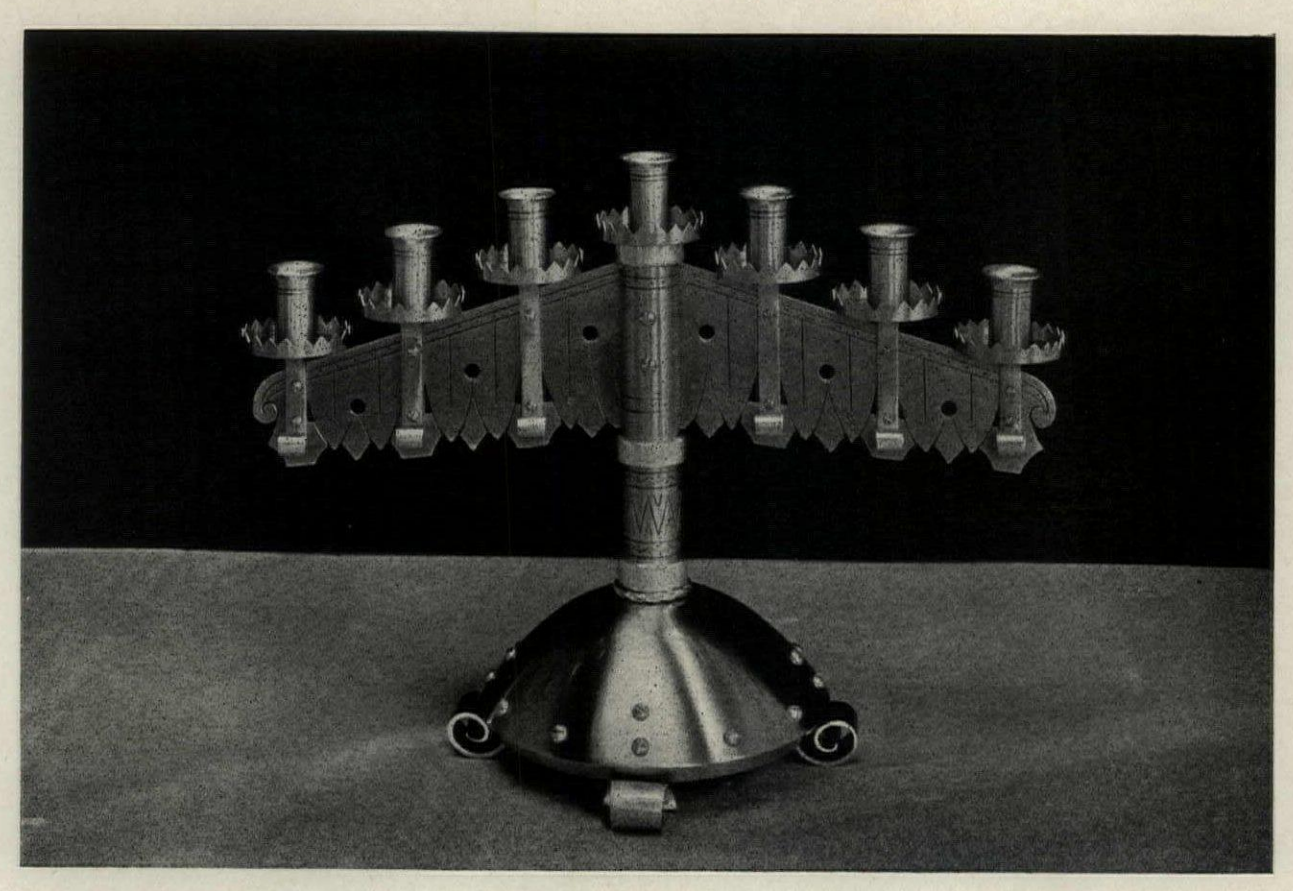
William Gehron and Stephen F. Voorhees were named to the Executive Committee. They will serve until 1936. The Jury for the Chapter Medal of Honor, awarded annually, will be composed of Louis Ayres, John Mead Howells, Hardie Phillip, Philip L. Goodwin.

Committees were named as follows: Committee on Nominations—Thomas H. Ellett, Benjamin W. Morris, Harvey Stevenson; Committee on Professional Practice—Lindley M. Franklin, Gerald Holmes, Robert B. O'Connor; Committee on Fellows—Robert D. Kohn, Chester H. Aldrich.

SAN FRANCISCO ARCHITECTURAL CLUB

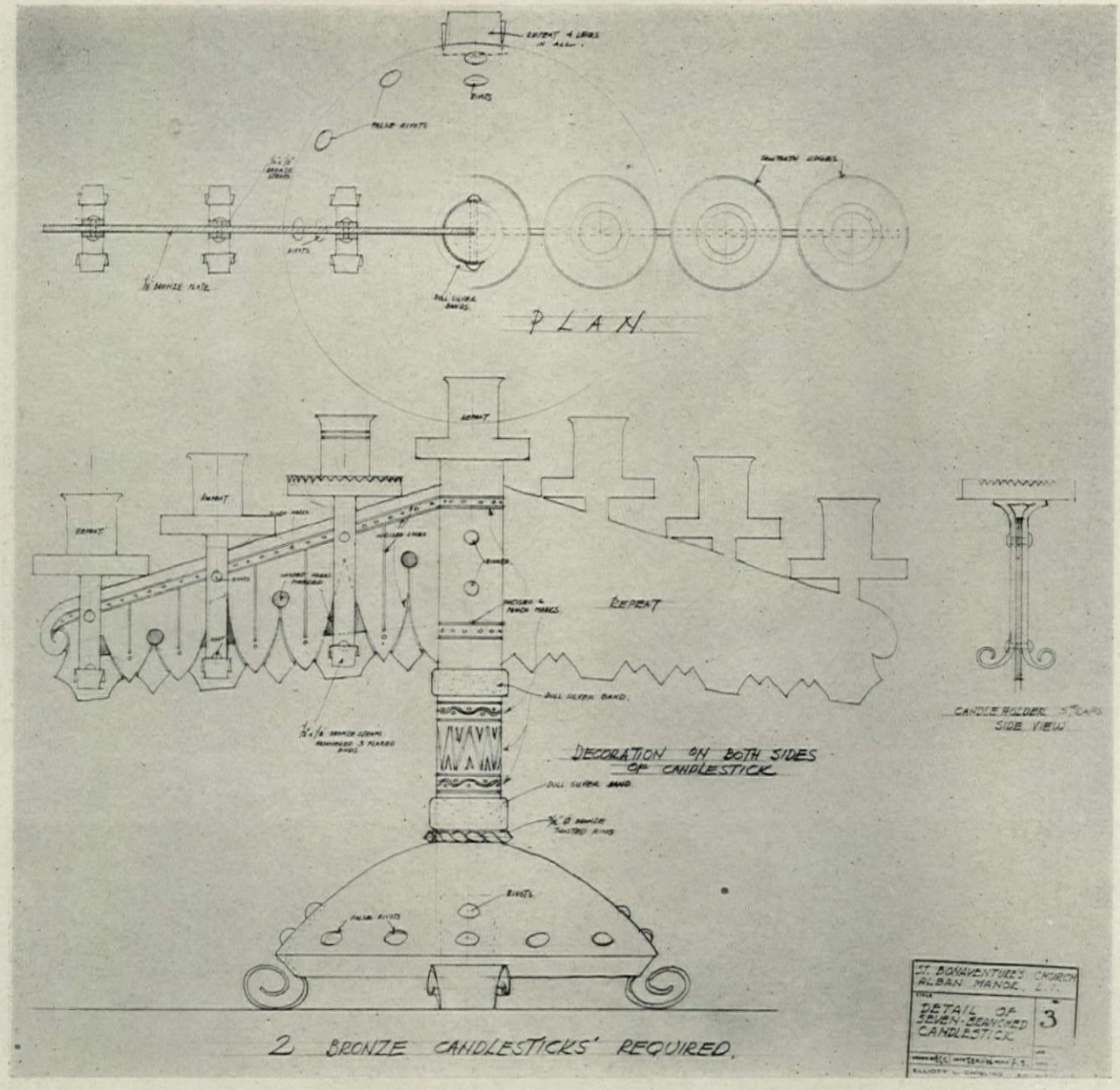
Donn Jackle, President of the San Francisco Architectural Club, reports on the activities for May: "The May meeting, a night set aside for something different, was held for the benefit of those who in the old days, kept S.F.A.C. going merrily along, and was called Old-timers' Nite! A program which left nothing to the imagination was provided by smiling Edward Counter, chairman of entertainment for the year. It consisted of several reels of a most wonderful trip through the South Seas; intriguing, fascinating, and casting a spell over the entire audience. Real live dancing beauties were provided. They swayed and danced to soft rhythm as we sailed from one island to the next. Intermissions consisted of dancing by the chorus, and the chairman of refreshments, Otto Hintermann, provided the grand finale in the form of a huge barrel of foamy suds along with a repast in the Club Buffet. A huge success and by far the largest meeting ever held in the Quarters!

"On Sunday, May 21st the Annual Picnic at Oak Cove Park! A whole grove to ourselves; a large crowd and a peppy orchestra. The annual contest, the baseball game between the Architects and the Engineers of the Club was held, the Engineers again the victors and holder of the big silver cup for another year."



ALTAR SET OF CANDLESTICKS FOR ST. BONAVENTURE CHURCH, ST. ALBANS, L. I., N. Y.

DESIGNED BY ELLIOTT L. CHISLING, ARCHITECT



FROM FULL-SIZE DETAIL OF SEVEN-BRANCHED CANDLESTICK
FOR ST. BONAVENTURE'S CHURCH, ST. ALBANS, LONG ISLAND, NEW YORK
Elliott L. Chisling, Architect

THE ARCHITECTS' CLUB OF CHICAGO

The Architects' Club of Chicago is planning to have its quarters at 1801 Prairie Avenue open to members of the building profession and to maintain a registration service for architects, contractors, material men, engineers, etc., who may be visiting in Chicago during the Exposition.

The Club is offering a special membership during the World's Fair period, which provides certain privileges, among them, a headquarters for the companies or firms represented in the membership. For instance, take the X Company purchasing a membership for the local representative, the Architects' Club of Chicago becomes the social and business headquarters of all visiting members of the X Company throughout the United States.

In addition there will be many programs in an attractive feature throughout the summer, including golf outings at Westward-ho Country Club, some fifteen miles west of Chicago. Visitors are invited to these outings.

BOSTON ARCHITECTURAL CLUB

At the annual meeting of the Boston Architectural Club held on June 6th, Isidor Richmond was re-elected president; William P. Jenks, Jr., vice-president; and Charles G. Loring, treasurer.

The Club is distinguished all over the United States for the extraordinary influence it exerts upon architecture. The Club is a source for study and encouragement under favorable conditions for students from states as distant as Pennsylvania and Michigan, even California. Many of these students after study at the Boston Club enter the architectural schools at Massachusetts Institute of Technology, Harvard, and Princeton; in fact Harvard and Tech maintain an intimate relationship co-ordinating the work of the Club with that of their architectural schools.

The Boston Architectural Club was founded in 1889, its chief inspiration then being the late Professor Warren of Harvard and Clarence H. Blackall. From an extremely

Modern Air Conditioning, 2

Various Types of Equipment

By Harold L. Alt

If cooling is not to be used, its future installation in most cases should be provided for by installing apparatus which can be so utilized if desired in connection with the possible later arrangement. The apparatus necessary for cooling may be summed up in the list comprising a preheater, dehumidifier, reheater, fan and motor, and the duct distribution system all arranged in the order named. In a case where cooling is only a future possibility, some sort of a dry air filter should be installed in front of the preheater to use in the hot humid days in summer when the addition of moisture by the air washer would only aggravate the conditions. The length of the room required to contain this apparatus will usually run about 25 feet where the dry filter is not used and about 30 feet with the addition of the filter. If the ceiling is not less than 10 feet high the width of the room should be c.f.m./3,500 plus 8 to 10 feet. Thus an equipment to handle 35,000 c.f.m. (as determined by the heat to be removed and previously explained) would, for cooling, require a room 25 feet long and 35,000/3,500 or 10 feet plus 8 to 10 feet or 18 to 20 feet wide to house the equipment exclusive of the refrigeration plant. A typical layout for a conditioning room is given in Fig. 8.

Were cooling only a future possibility then the room should be made the same width but about 30 feet long in order to include the air filter. A higher room would permit the width to be reduced slightly but not the length. Flue and duct spaces must be provided between the sections to be cooled and the apparatus room, with velocities ranging from 1,000 f.p.m. at the fan down to 200 f.p.m. at the outlet in the room. A recirculation flue also must be provided on the same velocity basis but handling only about ¾ of the air supplied. A fresh air intake of size adequate to furnish the entire air supply also should be incorporated to connect to the inlet end of the apparatus room. A floor drain and small water supply—say ¾ in. to 1¼ in.—should be included in the apparatus room arrangement.

Air Filters

The air filters used where cooling is only a future possibility may be of any character so long as they do not involve air washing with water. Oil filters of the revolving type frequently are used for this purpose and dry air filters of the cell type are quite satisfactory if the variation in pressure loss in the air passing through the filter does not reach extremes between the clean and foul limits of the cells. All dry cell filters have a lesser resistance when first placed in operation than they have after they are partially filled with collected dust and a filter whose resistance between these limits varies the least will unsettle the air quantity handled to a smaller extent than one which has a greater rise in resistance as it becomes fouled.

One of the most popular types of dry air filter consists of a steel framework in which units approximately 24″ x 24″ x 3″ thick are set, these units being filled with a mat made up of glass threads tightly compacted and through which the air is drawn. The dust efficiency of this filter is claimed to exceed that of the air washer and the friction is no greater if the filter is properly serviced by having the units replaced as fast as they become loaded with dirt. These filters may be constructed with a flat face, zig-zag, or in any other form suitable for space conditions available and the cost of replacements is very nominal.

The Preheater

The preheater is the heater which takes the outside air and raises it to a temperature above freezing so as to have no possibility of freezing the water in the humidifier during cold weather. Some designers omit this heater and temper the incoming air by mixing the recirculated air with the fresh air in sufficient quantity to bring the temperature of the mixture above the freezing point. In very cold climates it has proved expedient to use a preheater and even in milder climates it generally is included as part of a first class installation. Originally the "pipe coil" heater was used for heating air in the old hot blast systems; then the cast iron indirect heater was placed on the market and pipe coil heaters to a large extent were abandoned for use in public building work; later the extended fin copper indirect heater was developed and now is employed in many installations. There is no doubt that copper surface heaters involve materially less weight and somewhat less space than the cast iron heater, just as the copper radiator or convector is more compact and lighter than its equivalent in cast iron, but some engineers feel that the very bulk and lag in heating up and cooling off is an advantage in a preheater owing to the fact that the automatic controls will act less frequently and so make it a practice to use cast iron surface for this type of heater.

The Dehumidifier

The dehumidifier is simply the old air washer of best type, arranged to cool the air in the hot weather and to humidify the air in cold weather. The air washer, as generally understood, cleans the air by passing the air flow through a mist of water sprays in which the dust particles are saturated and made heavier so that they are carried down to the pan at the bottom, or are caught by impinging on the eliminator plates before leaving the washer. In this process the air picks up moisture to the extent of its capacity at the temperature at which the washing is done and leaves the washer practically saturated at that temperature. When the washing is performed at a temperature around 50°F, the amount of moisture contained in the saturated air is such that, when raised to 70°F in the room, the relative humidity will be almost exactly 50% which is very close to the ideal. If the washing is performed at a temperature around 60°F the moisture contained in the air at that temperature will be considerably more and the relative humidity in the room, when this air is raised to 70° F, will be correspondingly higher.

The effective temperature lines indicate that the same effective temperature can be experienced in a room (a) with a lower dry bulb temperature and a higher humidity or (b) with a higher dry bulb temperature and a lower relative humidity. At the present time there seem to be two

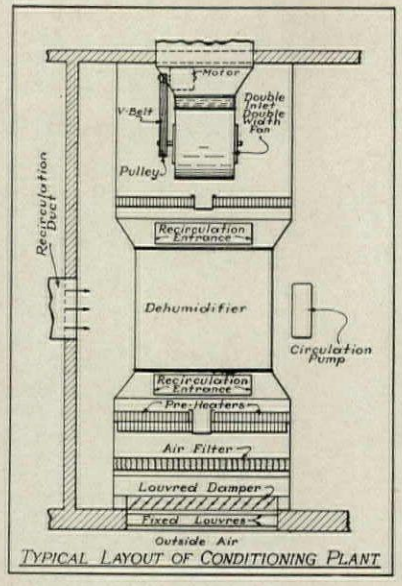


FIGURE 8

schools of thought in regard to these combinations, one favoring lower humidities and higher dry bulb temperatures and the other a higher humidity combined with a lower dry bulb. Both schools are fairly well agreed, however, that humidities less than 20% to 30%, or over 70% to 80%, are both likely to be objectionable. From this it will be seen that the relative humidity maintained in a room, or space, will be governed entirely by two elements; first, the temperature at which the air leaves the dehumidifier and, second, the amount of moisture added to the air in the room.

Now the temperature of the air leaving the dehumidifier will be within a few degrees of the temperature of the water in the dehumidifier and the temperature of the water in the dehumidifier will assume the temperature of the incoming air, less about 5°F due to the evaporation of water when the dehumidifier is humidifying and acting like the ordinary air washer. As soon as the washer water is cooled by any artificial means it no longer approaches the air temperature but, on the contrary, pulls the air temperature down toward that of the water, thus cooling the air. If a portion of this cooling brings the air down to a temperature where the moisture which the air contains is sufficient to saturate it at that temperature, then any further cooling will cause a precipitation of the excess moisture and the air will be dehumidified. As this dehumidifying is a sole accompaniment of artificial cooling the air washer used in cooling air is termed a dehumidifier even though in winter it actually may, and probably will, humidify the air instead of dehumidifying.

Construction of the Dehumidifier

The dehumidifier should be not less than 9 feet long in the direction of the air flow and, if cooling coils are to be installed inside of the dehumidifier, it should be 13 feet to 13 feet 6 inches in length. The free area through the dehumidifier—that is, the width times the height less 16" (owing to the bottom 16" being taken up by the pan for the collection of water) should be such as not to have a velocity of over 500 f.p.m. There should be two rows of spray nozzles, preferredly blowing against the air flow, and a set of eliminator plates on the outlet to catch all the moisture entrained in the air which may have failed to fall into the pan by the time the air is ready to leave the dehumidifier. The circulation pump to rotate the water in the dehumidifier will be required if cooling is to be a future consideration or if coils are to be installed in the dehumidifier. On the other hand, if cooling is to be installed at once and the water is to be cooled in a separate cooler, the circulation pump must be modified to a pump which circulates the water through the cooler and then to the spray nozzles in the dehumidifier.

In some locations the dehumidifiers are made of copper but in other locations the use of copper has proved to be ineffective and some type of rust-resisting galvanized iron is substituted. Good installations generally employ brass spray nozzles, brass nozzle piping, and galvanized cast iron headers for the spray piping. The pan may be made of concrete (waterproofed) if desired, but the galvanized pan is more common as it permits insulating the bottom of the pan and thus conserves on the heat absorption when cooling is in operation. The capacity of the dehumidifier may be made anywhere from 50% to 100% of the total air supplied but 100% permits the use of the dehumidifier during spring and fall days when the outside temperature is low enough to give 50° to 60° F in the incoming air—but only when 100% fresh air is used. Under such conditions all of the air must pass through the dehumidifier and no refrigeration will be required if the dehumidifier has 100% capacity—a condition sometimes overlooked by designers.

The Reheater and Its Purpose

The reheater is used to raise the air from the temperature at which it leaves the dehumidifier up to the temperature at which it is desired to enter the room, with a suitable allowance for the pick-up as the air passes through the piping between the reheater and the room inlet opening. In the summer period when cooling is being carried on, and when the air must pass through uncooled sections of the building, it follows that a slight transfer of heat from the building to the air in transit will follow and the air may have its temperature raised several degrees in this manner especially if the duct lines are long or poorly insulated. A great many cooling systems operate with the tempering of the air, after it leaves the dehumidifier, obtained by by-passing a portion of the incoming air around the dehumidifier without cooling it and by arranging this by-passing to the amount necessary so that the temperature of the mixture, at the time it enters the fan, is that desired.

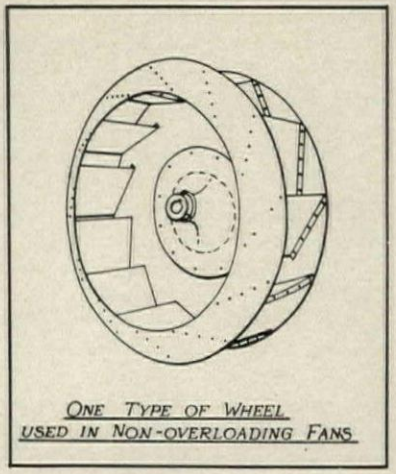
Certain patent rights on this arrangement recently have been upheld in the courts and now, in order to secure competition on installations, it would seem better to avoid this arrangement. Equally good conditions may be secured by passing all of the air through the dehumidifier and not cooling to quite such a low degree, either with or without the use of steam in the reheater during the summer period. During the winter the use of the reheater is absolutely necessary, as the air must be humidified at a temperature between 50°F and 55°F, as previously noted, in order to have the proper amount of relative humidity when heated up to 70°F or thereabouts in the room. Hence, the reheater is used to raise the air up to the desired entering temperature. Usually the reheater is made of the same type of surface as the preheater and, since it handles the same amount of air, a more symmetrical layout usually is obtained by keeping to the same kind of surface as is used in the preheater. Both cast iron and extended copper or nonferrous fin types are used.

Fans Have Changed

The fan used to move the air has made some material steps in advancement in recent years and the non-overloading type of fan is now produced by many manufacturers. This type of fan has two distinct advantages over the older multiblade and steel plate types. In the first place, it is more efficient, requiring less power to move a given amount of air against a given static pressure. The second improvement is that it will not handle enormously increased amounts of air if the static pressure is suddenly removed for any reason or by accident. It was the custom on the

older types of fans to add anywhere from 50% to 100% to the motor horsepower actually required. This was done in order not to have any danger of burned out motors if someone went into the fan room and left the doors open so as to reduce the static pressure on the fan to where the fan would overload itself and the motor.

The new type of fan either has no overload possible, or has its maximum brake horsepower requirement, under any condition, only a small fraction of the normal load as an addition. Motors can now be sized to within very close limits of what the fan actually requires under normal operating conditions without the danger of burning out the motor. Thus, not only is a saving in power received on the actual brake horsepower required to move the fan but a further advantage lies in the fact that the motor is operated at nearer to full load and at a more efficient point so there is less current consumption on the part of the motor even for the same brake horsepower requirement by the fan. A form of wheel used in one make of this type of fan is illustrated in Figure 9.



ONE TYPE OF WHEEL USED IN NON-OVERLOADING FANS

FIGURE 9

Two-speed and Four-speed Motors

Motors have kept in step with the advancement along other lines and, in all places where alternating current is used, a new type of speed control is available in the two-speed and four-speed motor. The two-speed motor is the simpler of the two and is used where major divisions in the amount of air delivered can be employed. If the motor is run at full speed, 100% of the air is delivered but if the motor speed is reduced to half speed approximately half of the air is delivered; consequently, where 100% of the air is required only for short periods and 50% will do for a major portion of the time, the two-speed motor will be the answer—especially as it is more efficient on the lower speed and practically is just as efficient on the higher speed as the constant speed motor with a speed regulator or controller.

If finer graduations in air quantity are desired, the four-speed motor may be substituted, using the three top speeds only. This is for the reason that the four speeds are 100%, 75%, 50%, and 25%, respectively, giving air quantities almost in proportion. Now, for a duct system designed for moderate velocities at full air quantities, the reduction of the air quantity to 25% so far reduces the amount of air available as to render its control somewhat difficult and likely to cause complaints from unequal distribution but, for 50% or over, small likelihood of this difficulty exists. So it is customary to use four-speed motors on the three top speeds giving air quantities of 100%, 75%, and 50%. In the case where a part of the building can be cut off by actually closing off the duct branches to the portion out of service, then the lowest speed may be used with entire safety, as the 25% of the total air delivered will be considerably above 25% of the air for the portion remaining in service, the exact ratio depending on the relative demands of the two sections. The four-speed motor will be practically as efficient as the constant speed motor at full speed and will be more efficient than the variable speed motor with a controller at the lower speeds. Of course, the variable speed motor will produce speeds between the ones supplied by the two- or four-speed motors but it is questionable if this is any material advantage in the ordinary case or if it is of enough advantage to pay for the extra current consumed. In most cases the first cost of the two- or four-speed motor will be somewhat less than a variable speed motor with its necessary controller.

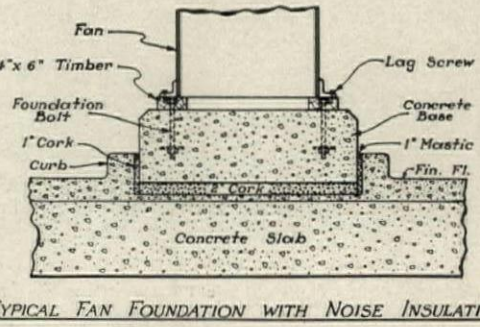
Fan Drives

The leather belt, which for many years was the most popular method of fan drive—outside of the direct connected unit — has largely been replaced today with the V belt drive which cannot jump off of the pulley, requires no great tension to prevent slippage, and gives a high efficiency of transmission. Other special belts also are on the market which are a big improvement over the ordinary old style leather type. First cost has been responsible for the disappearance of the direct connected unit on large sizes of fans but on the smaller fans there is, of course, nothing quite as good as the direct connected unit. It will be found that a non-overloading fan at proper speed, with a motor at a 4 to 1, or 5 to 1, ratio on the pulleys, will give an economical first cost, as well as a satisfactory arrangement to operate on the larger sizes of fans. The direct connected unit will be the best on the smaller sizes.

Sound and Vibration Insulation

The foundation arrangement under fans and motors for a long time consisted of lag screwing the fan and motor to a 4″ x 6″ or 4″ x 8″ wood frame, and the bolting of this frame to the concrete foundation with countersunk bolts passing through a 2″ layer of cork, placed between the frame and the foundation. Oftentimes, a layer of felt was placed under the fan and the bolts into the concrete were provided with lead sleeves and lead washers. A much superior type of insulation used today is that of placing the fan and motor on a wood frame similar to that previously used and the bolting of this frame to a slab of concrete not less than 12″ thick which is set on 2″ of cork with 1″ around the sides and finished off at the top with 1″ of mastic (see Figure 10). A rough rule for the minimum amount of concrete to be used is that the concrete should weigh from three times to four times the weight of the fan and motor. It is important that the fan and motor both be mounted on the same timber frame and concrete slab.

Another type of support is that known as "spring suspension" and involves placing the concrete slab on steel



TYPICAL FAN FOUNDATION WITH NOISE INSULATION

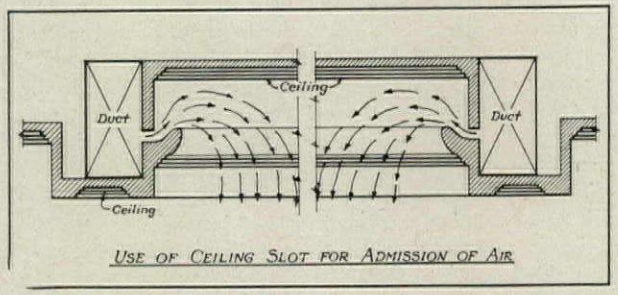
FIGURE 10

members supported on springs which are so arranged as to support the entire load at different points when partially compressed. This is a more difficult thing to do in tight quarters but is a very good type of insulation when it can be accommodated.

The Air Distribution System

The duct system has suffered little change, and what formerly was good practice in design still remains so to a large extent. By this is meant such items as making the throat radius at least equal to the width of the duct, by using moderately high velocities such as 1,000 feet per minute as a maximum down to about 400 feet per minute at the grille or outlet, with a suitable reduction through the opening. The materials from which the ducts and flues can be constructed have increased in variety, now including the common galvanized steel plate, the galvanized copper-bearing steel plate, the galvanized rust-resisting iron plate, and the copper plate either plain or lead-coated. Where cooling is contemplated, either at once or in the future, the duct work is covered with some sort of insulation to prevent the possibility of sweating and to obtain better temperature control of the air. Of course, where the air is carried through unconditioned portions of the building there will be a certain economy in covering the pipes conveying this air to prevent it picking up heat in these areas as far as possible.

Grilles and registers have shown improvement by designs which produce an even velocity over the entire register area even when partially closed off and also equalize the velocity when the pipe delivers the air around an elbow directly to the register. In cooling large spaces the use of registers or grilles is often modified by the substitution of long slots, one or two inches wide and extending around the ceiling, these slots being incorporated into the ceiling design sometimes in connection with the concealed lighting (see Figure 11). This is done with the idea of ob-



USE OF CEILING SLOT FOR ADMISSION OF AIR

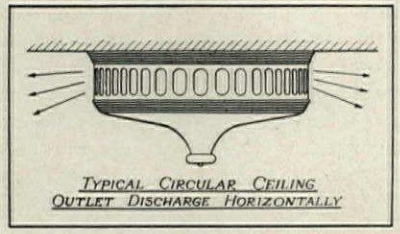
FIGURE 11

taining wide distribution and in order to have the cooler air diffused as much as possible before it reaches the floor below and the people there located. Circular outlets and deflectors also are used to prevent drafts (see Figures 12 and 13).

One system that has been used to a considerable extent is known as the ejector system. In this a line of nozzles is placed across the back of the auditorium high up near the ceiling and the air is shot out of these nozzles toward the front of the auditorium, gradually falling toward the floor as it mushrooms out and diffuses, the return air sweeping back toward the rear along the floor and being exhausted by grilles placed along the rear wall and standing rail.

Refrigeration Equipment

Refrigeration equipment of every description has been used and experimented with in air conditioning. Ammonia systems are very satisfactory but are not considered desirable where a large number of persons are collected together owing to the liability of a panic if any of the gas escapes and finds its way into the room. In many localities the use of ammonia is not permitted for theatre work and in others it is not permitted for any air conditioning unless a brine system is interposed between the ammonia and the air.



TYPICAL CIRCULAR CEILING OUTLET DISCHARGE HORIZONTALLY

FIGURE 12

Carbon dioxide (CO_2) plants were substituted for ammonia on the basis of safety but the high operating pressures made these plants more or less objectionable even though the refrigerant itself was almost harmless and had no objectionable smell when it escaped in small quantities. Then came the centrifugal refrigeration unit operating at a vacuum and using difluro-menthane, a refrigerant which can be stood around in buckets with no danger at all and with an evaporative loss almost as small as that of water. These advantages, combined with the compact arrangement of the equipment, have made this type of refrigeration very popular. Still another refrigerant which claims many advantages is Freon (dichloro-difluro-menthane) which utilizes a piston type compressor but does not go into the high pressures necessary with carbon dioxide and is practically as safe a gas to use as carbon dioxide.

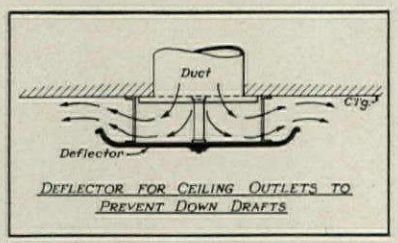
The refrigeration plant and its operation is the factor that makes cooling expensive, since every plant requires electric power, cooling water in large quantities, refrigerant, and expert service to run. It would seem that a cheapening up on this heavy item of expense, both in first cost and in operation, would open the field of cooling by artificial means to an enormous number of buildings now prevented from securing this relief on account of the prohibitive first cost and the worse factor of the prohibitive operating cost.

The steam jet refrigeration machine recently placed on the market by several manufacturers has great possibilities in this direction. It uses nothing but water for a refrigerant, it can be operated on pressures as low as 10 lbs. gauge of steam, it has no moving parts outside of a pump, it does not require a licensed engineer to operate (owing to it not being a piece of moving machinery and also to the fact that it operates at a high vacuum produced entirely by steam ejectors), and it can be run off the boilers supplying the winter heating steam, provided these are steam boilers. While this type of unit has been placed in operation in a few cases where it seems to be giving satisfaction, it is entirely too early to say that it is going to be the answer to the refrigeration question, although it seems to have some very rosy possibilities.

Ozone and Ionizing

Many air conditioning systems now are adding some sort of ozonizing or ionizing equipment in an effort to produce a better quality of air than exists outside of the building, especially if the structure is situated in the heart of a large city or in an industrial center. The ionizer produces

(Continued on page 21, Advertising Section)



DEFLECTOR FOR CEILING OUTLETS TO PREVENT DOWN DRAFTS

FIGURE 13