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The Approach to Design

By Albert H. Kahn

Editor's Note:—*This is the third of a series of articles in which leading architects will discuss the philosophy of contemporary design. Next month's article will be by Albert H. Fellheimer of Fellheimer and Wagner, New York. We recommend to all designers, young and old, that they read this entire series.*

With the many discussions and varying opinions on modern architecture, with certain results highly lauded by some critics, excoriated by others, the young architect must find himself in a quandary. What road is he to follow?

Time was when basic principles obtained, when a degree of unanimity existed regarding the merit or demerit of at least the work of the past and often of contemporary work, when the study and practice of architecture were carried on systematically, when individuality meant adding to the sum total of that already achieved, when originality purely as such was looked at rather skeptically. Today orderly processes appear to have been abandoned, precedent is shunned, formerly established laws avail no further, the queer and different would seem the all-important aim. The question for the young man must be: "What system is right—the new or the old?"

Architectural history records constant change. Some form of modernism has been in process ever since architecture came into existence. Occasionally there have been radical departures. More generally, however, changes were gradual, following new discoveries or convictions. Today we appear to be working on a "Five Year Plan" for revolutionizing the art of building. Will it prove successful?

It is but natural with the many new methods of building, the new materials developed, the new economic and industrial structure of our day that new forms and new solutions follow. All recognize this, but not all agree as to the proper methods of expressing the new conditions. In any event, we find ourselves at the moment in a state of architectural chaos such as has perhaps never before been experienced. Nor is this the condition in architecture alone. The existing tumult has manifested itself in all the arts, in painting, in sculpture, in music and equally in literature. Periods of complacency are usually succeeded by periods of excess in the opposite direction. For a considerable time we traveled alone quite satisfied as eclectics, then came the War and with it a general upset. Violent changes have taken place and complete readjustment seems still far distant. A new chapter of architectural history is undoubtedly in the making.

This is the day of structural steel, reinforced concrete, copper and glass, of elevators and other mechanical appliances. It is the day of the machine, the airplane, the automobile, and quantity production. That these must find expression in our architecture, which more than any other art has ever recorded important movements, is not to be disputed. But does this necessarily mean that modern architecture must be machine-like, or that the architecture of the past must be abandoned? Is it impossible to adjust such to our modern problems? Some writers would have us believe so. Are they right?

Good taste, sound judgment, laws that have governed the best in architecture heretofore are just as applicable today as ever. Many of those espousing the ultra-modern would have one believe that the employment of precedent, no matter with what intelligence, is only archæology; that a building, to be worthy of consideration, must resemble nothing ever done before; that cold logic must replace all romance; that light and shade, composition, proportion, detail, are all inconsequential; all that is decorative, objectionable. That to be a modern structure it must be box-like, must have the structural element either totally obliterated or else coldly exposed; must have, whether needed or not, vast glass surfaces, in horizontal bands and these preferably carried around the corners; must have flat roofs with pipe rails, no cornices, cantilevered slabs supporting themselves in most baffling manner, and must above all be bald and devoid of ornament. Such is the formula which the new cult would apply to all types of buildings, the workman's cottage, the factory, the power station, the town hall, the school, the commercial building, the hospital, the hotel, the apartment house, yea even the residence and the church, and what is still more amazing the new style is suited not only for one particular country or climate but is proclaimed an "international style," applicable as well in China as in Europe and the United States. Saddest of all is the acclaim accorded the new vogue by those ever eager to laud the different and the bizarre.

I have before me the catalog of an exhibition of

"modern architecture" being held at the moment in this country. Is one to take seriously the flattering comments therein by learned writers? Whatever the practical merits of certain results, would it be possible by the wildest stretch of the imagination to believe either the Lovell House at Los Angeles by Neutra or the Lux Apartment House by Bowman Brothers things of beauty or a joy forever? The one appears as if in spite of its lightness an earthquake had played havoc with it, while the other at least affords amusement in contemplating the interest attaching to the all-glass ends of the bathrooms. Function is, of course, an important element in this new architecture and the function of the bath tubs directly under the windows will no doubt be frequently clearly expressed. May Providence and our common sense save us from such aberrations! It would seem nothing less than insult to the genius of Frank Lloyd Wright to hold him responsible for, or credit him with the inauguration of much of the present new era. For whatever one's opinion of Mr. Wright's work, there can be no question about his constant aim at beauty to which certainly most of this ultra-modern can lay little claim, indeed does not attempt to.

And what about the European exponents of this "international style"? While much of interest and value is being accomplished, there seems little reason for acclaiming the "Dessau Bauhaus," for instance, as outstanding. Is it architecture at all? We may find in this country hundreds of factory buildings, particularly the court or alley elevations where often there has been no attempt whatever at design, just as uninteresting, just as devoid of architectural feeling. Though credited with assisting in some measure the new vogue in the treatment of the modern factory building by clearly expressing what it is and capitalizing on its purely inherent possibilities, I would be the last man to claim the results as anything more than sound engineering unless the problem and the appropriation afforded a more architectural character.

Granted that for straight-forward industrial building the severest simplicity and total abstinence from the decorative have proven a step forward in this particular field, I, for one, certainly disapprove of making all buildings look like factories. I hold that an office building must have a different appearance from an hospital building. Next, that the character suitable for a southern climate is hardly applicable to a northern. Next, that tradition is to be cherished not abandoned. That it is quite possible to do interesting and modern work with due respect for good tradition is eminently proven by the best work in Sweden and for that matter much in our own country. Our Colonial, for instance, is nothing to be ashamed of, even though based upon earlier precedent, and indeed some of the present-day adaptations are quite as modern and certainly as well suited to our needs and surroundings as is, for instance, the work of Le Corbusier and Lurcat. Next, I believe that local color produced by the use of materials found in the respective districts is of much importance. What about such in this "international style" in which all is made to look alike and the cheapest of all materials, stucco, is employed as *the* ideal material? In a nut shell, one formula will never do for all work, even if less unhappy than the one now being attempted. Any one who has traveled recently in Germany must have observed the utter monotony of this newer work, all following the same scheme. There was no doubt a good reason for Germany's economizing in every way possible immediately after the War because of its sad economic condition. To gain effect as much as possible through simplicity, avoiding the use of all ornament and saving cost in every way possible was perfectly logical. Indeed this newer work was a distinct improvement on much of the over-decorated so common in Germany before the War. But to extend the particular type, however well suited to Germany's conditions, to all other countries is deplorable. I am not depreciating the excellent work done by such men as Behrens, Bonatz, Kreiss, or even Mendelsohn and others. Theirs has marked tremendous advance. On the other hand, many of their followers have merely seized upon and exaggerated their idiosyncracies.

Probably no one has done more injury than Le Corbusier and his followers. Only those who have actually seen the finished results can appreciate the difference between their theories and their accomplishments. But for the writers who too often laud their abortive attempts to the skies, form wrong public opinion and cause an era of misunderstanding, their sad creations would probably receive but little notice. It is certainly remarkable what the press agent and the science of advertising may accomplish even in the field of architecture.

It is a far cry from some of the utterly stupid work being done, to the intelligent application of modernism in Holland. Work such as that of Oud, the Department Stores of Dudok, the Van Nelle tobacco factory by Brinkmann und Vandervlucht, are altogether admirable and clearly indicate what modern architecture at its best may be.

Rationalism can never fully compensate for lack of beauty which must obtain in a structure if it is to qualify as architecture. No one questions the sensible treatment of the modern machine, its directness and straight-forwardness, or that architecture may not take a healthful lesson therefrom, but a machine is not architecture, in which good taste, fertility of imagination, poetic fancy, and a certain mystery must obtain as in every other form of art. The plainly obvious is commonplace in art even though desirable in the appearance of the machine. Architecture calls for the unexpected, for the ever-varying, for subtlety, for composition, for enrichment however restrained, just as do music, poetry, and sculpture. Architecture can never be reduced to formula. The purely utilitarian, the engineering problem, may to its practical advantage resemble the modern machine, but to treat all types of building alike is fundamentally wrong.

To the young man, then, I would counsel that he inform himself thoroughly on the best of the past, possess himself of as comprehensive a vocabulary as possible and that he aim at the sound and sensible rather

than the startlingly new or different. Too often the strange and unbalanced is mistaken for originality. If the student be endowed with originality—which, by the way, can not be cultivated—it will no doubt proclaim itself in due time. In the meantime, he had best devote himself to doing just good sincere work. Naturally there must be constant striving for improvement and plenty of application. There must be progress, interest in new problems and readiness to meet them sanely, efficiently, æsthetically. Where the problem is new, a new solution must be found rather than force the old to fit. Where on the other hand the problem is an old one, it is well to profit by the solutions of the past, improving thereon to the best of one's ability. There must be enthusiasm but not brainstorms; simplicity and directness but not ugliness; there must be freedom but not license; there must be logic but there must also be soul in the work; and above all there must be beauty.

Much of today's vogue so highly praised by some is but a passing fad. The best work of the past continues to hold its own in spite of all changes. Let the young man observe and follow the principles underlying the works that have stood the test of time and avoid the pitfalls of the fashion of the day. This irrespective of acclaim or criticism. Let him be honest, sincere, conscientious and energetic and both the old and the new will unfold to him the good in them. Thus he will neither be carried away by the present nor unduly fettered by the past.

Subsequent articles in this series will be written by Alfred Fellheimer of New York, Louis La Beaume of St. Louis, John W. Root of Chicago, William F. Lamb of New York, Irving K. Pond of Chicago, Ralph Adams Cram of Boston, Dwight James Baum of New York, and C. Howard Walker of Boston.

A Brief Comment From California

A West Coast Architect Continues the Discussion of Design

By Myron Hunt

Criticism by the more radical element among architects and writers on architecture can perhaps fairly be said to be the result of an impatience with concessions of plan and of structural form, for the sake of looks. It is, I believe, quite fairly met by a like impatience, on the part of conservatives, with unnecessarily obvious and often illogical structure and plan.

It seems to me that the matter of style is of secondary importance, and that certain satisfying fundamentals of good looks have been met in every successful building in every great style or period. If plan, lighting, and structural common sense be largely sacrificed in an effort toward archæology, the resulting design will suffer. Large concessions to and overemphasis on structure, plan, and other necessities have likewise produced much work that surely will not stand the test of time and good taste.

It is hard to call to mind any successful architecture of any time that has been conceived in the strict terms of structure and function alone. Even in the most satisfactory modern design—the design of machines—there will be found elements that are not essential to the machine and its prime use. The outward mould of a fine motor car follows the lines of chassis, engine, transmission, hardly more closely than, say, the stone work of the Metropolitan Club its steel frame. The grinning skulls of humanity are, to be sure, not denied in the countenances of our friends, but by the kindly provision of nature they are not entirely evidenced.

FROM A PEN-AND-INK DRAWING BY JOHN RICHARD ROWE

OLD HOUSE IN CONNECTICUT

THE CAFÉ DES DEUX MAGOTS AND ST. GERMAIN DES PRÈS

A Group of Parisian Sketches by Hubert G. Ripley

In Which are Recorded Scenes Visited Last Spring by the Beaux-Arts Expeditionary Forces

What more soothing lenitive to the draftsman's soul than to be seated, sketchbook in hand, in a form-fitting wicker chair at a little round marble-topped table before one of the world's masterpieces? On the table, at one's elbow, is a silver bucket of ice, a shallow saucer marked 3f50, and a tall goblet with graceful stem filled with liquid gold: at adjoining tables, similarly set up, groups of "Voyageurs" cracking merry quips and pledging each the other in lawful libation. Over all the soft mellow haze of Paris in late spring. Time stands still while the Muses flutter their pearly wings.

The urge to draw helps to embalm such moments in our memories.

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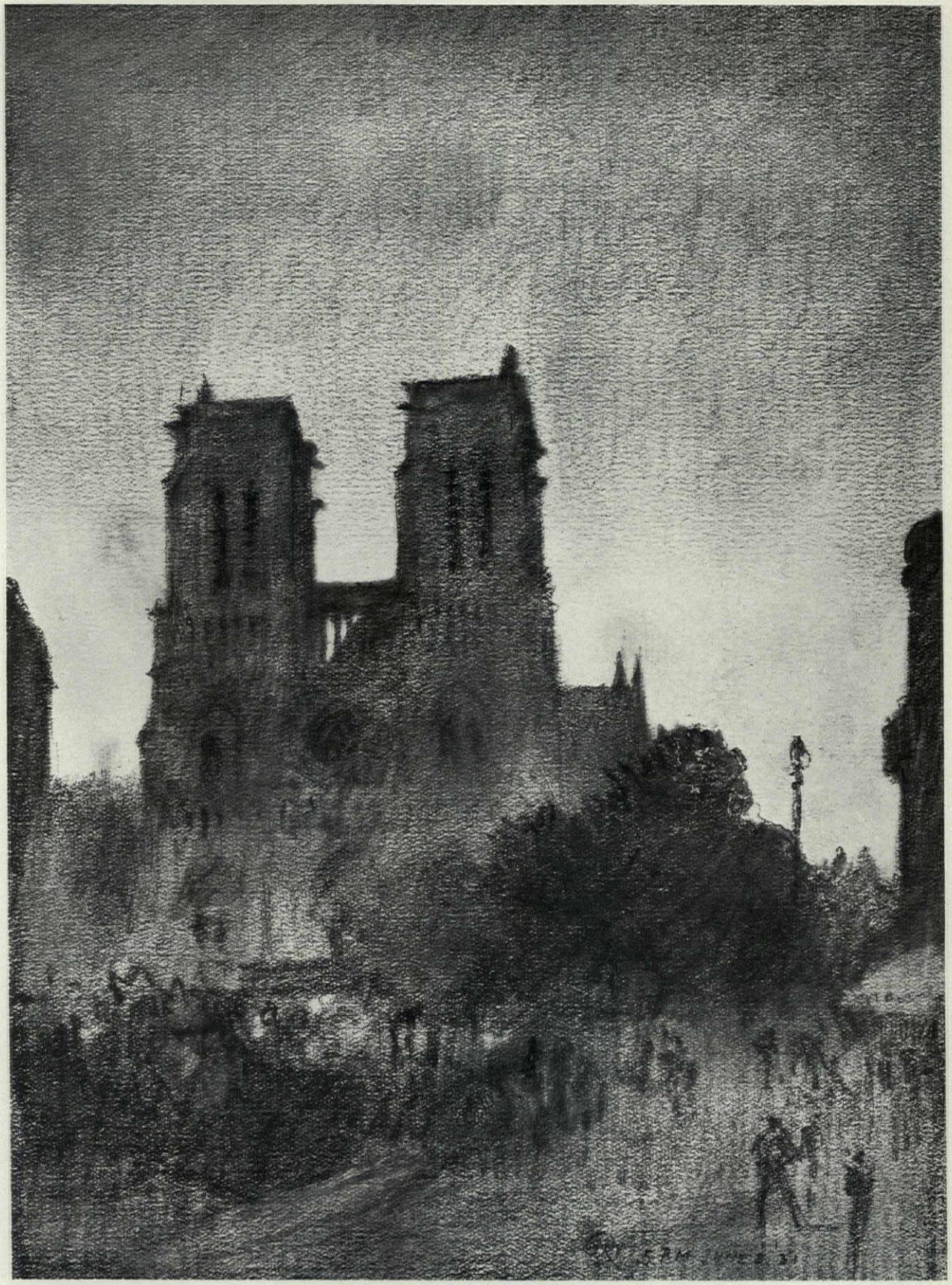
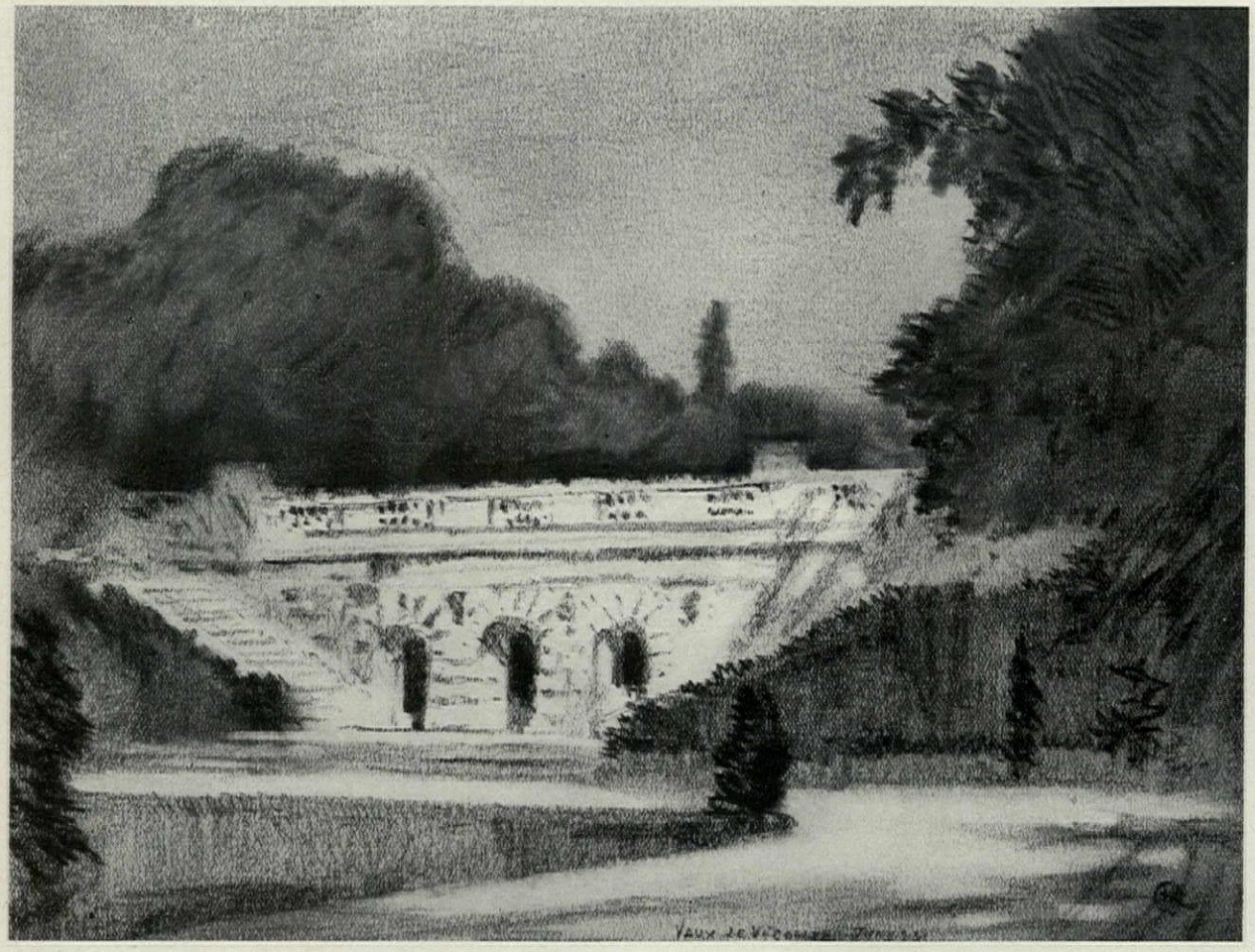
The accompanying sketches were made from slightly smaller ones drawn on the spot with a 4B pencil on velvet paper; the redrawing of them with crayon pencil was somewhat of an experiment. Aside from minor corrections and a bit of smudging they are the same. The reproductions are approximately the size of the originals, none of which, as may be readily imagined, took more than a half hour.

CORNER OF ANGKOR-WAT, REPRODUCED AT THE COLONIAL EXPOSITION, PARIS
FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY

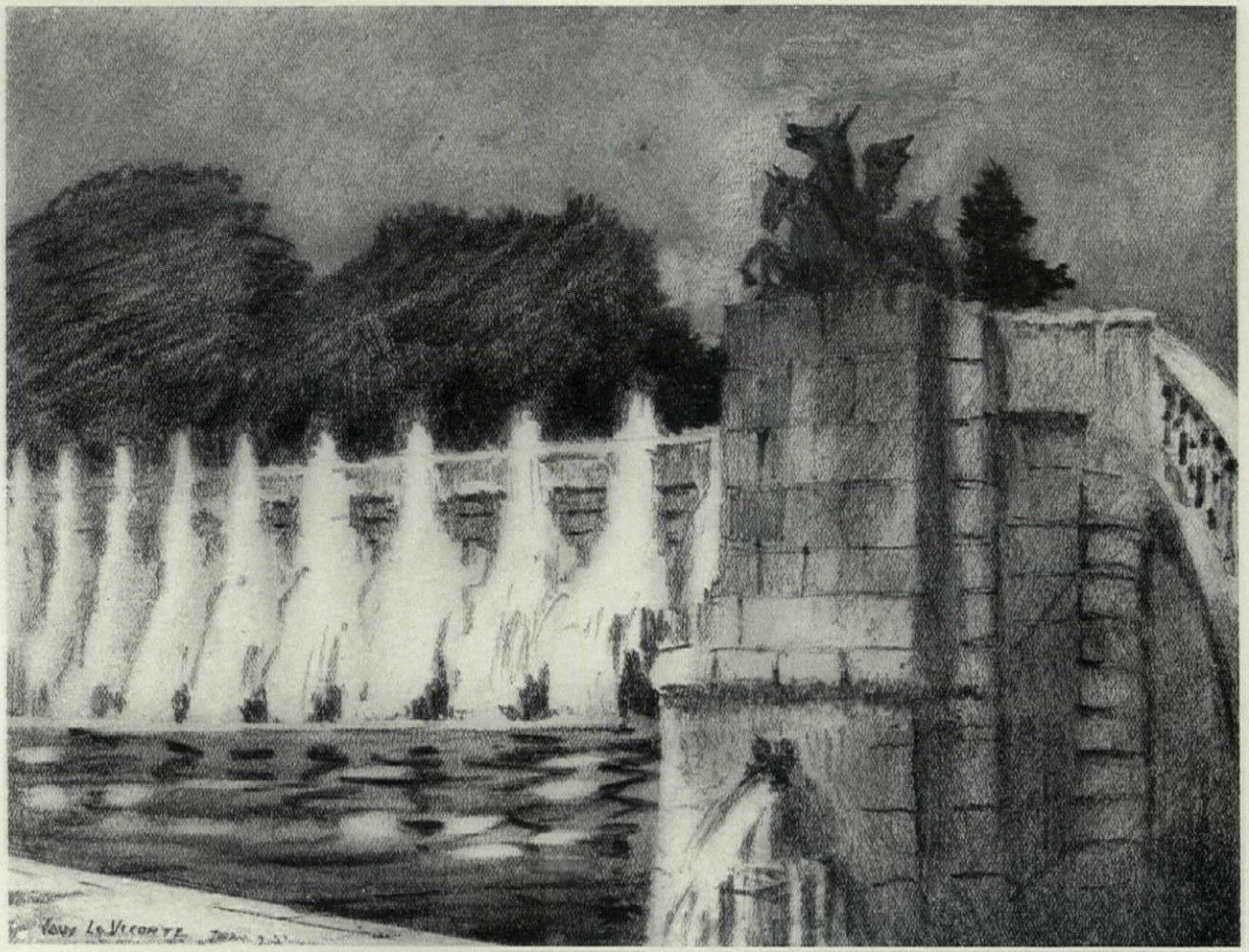


NOTRE DAME DE PARIS IN SILHOUETTE—FROM THE TERRACE OF THE ROTISSERIE PERIGORDINE
FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY



A VISTA AT VAUX-LE-VICOMTE

FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY



FOUNTAINS AT VAUX-LE-VICOMTE

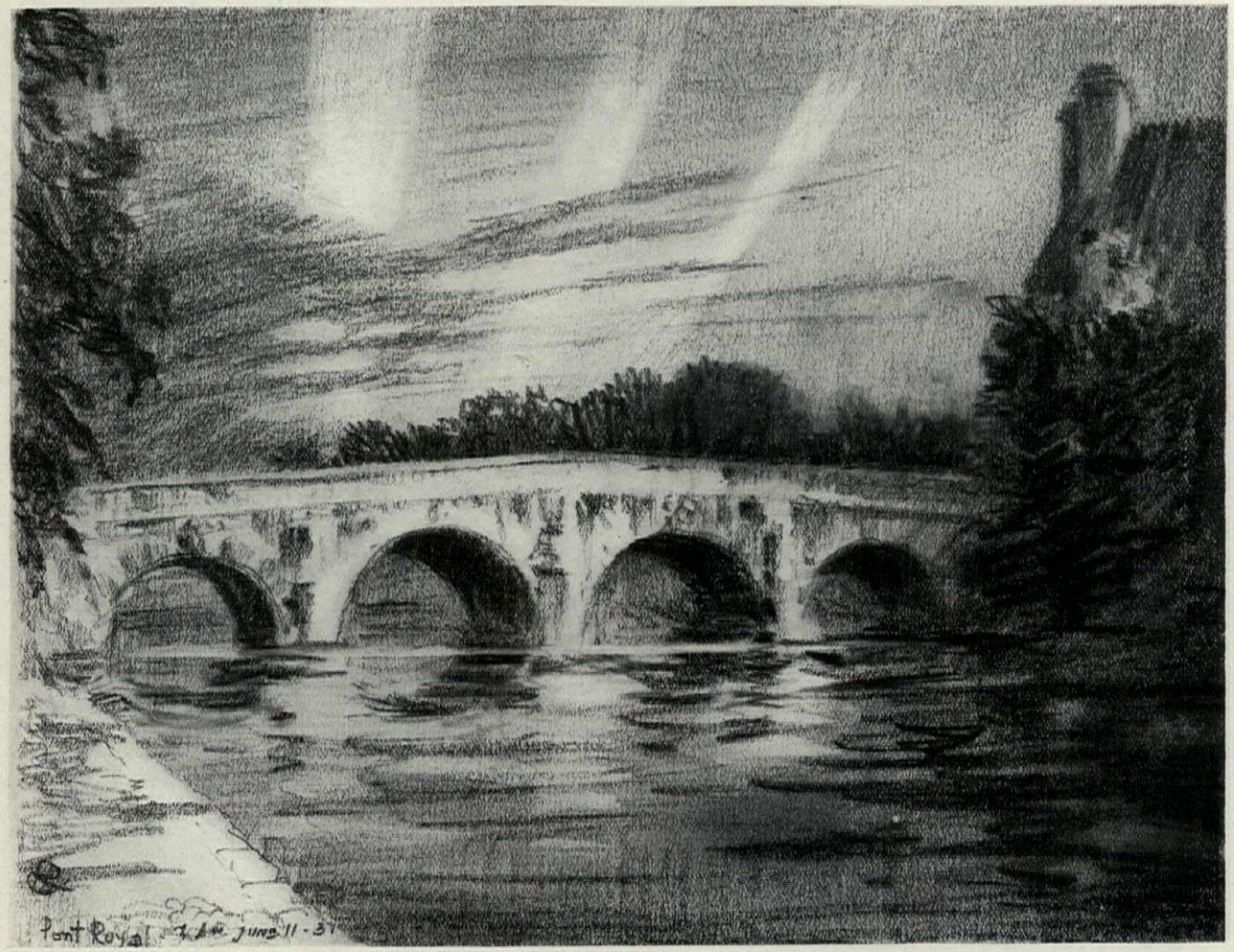
FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY

LE TOUR ST. JACQUES AT SUNRISE

FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY

ST. GERMAIN DES PRÈS, SEEN FROM THE TERRACE OF THE DEUX MAGOTS AT SUNSET

FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY



THE PONT ROYAL AT SEVEN IN THE MORNING

FROM A CARBON PENCIL SKETCH BY HUBERT G. RIPLEY

Saving Through Careful Superintendence

By H. Vandervoort Walsh* and Alexander T. Saxe†

It has been said that modern buildings are so complicated that if the contractor wants to use inferior materials and poorer workmanship than called for in the specifications, he can do it without the architect's superintendent finding it out. In large work, there is a great element of truth in this statement. It is, therefore, very important for the architect to begin his supervision at the very outset and inspect the quality and reputation of all subcontractors who are to come onto the job. But the shrewd ones know that it does not pay to get a bad reputation for putting in cheap materials and shoddy workmanship, and so the modern technique of getting around the vigilance of the architect's superintendent has developed along other lines.

To begin with, every specification calls for some guarantees from the contractor, a very obvious confession that the architect cannot inspect and pass upon the worth of everything that goes into the building. Here is the sheet-metal contractor who must guarantee his work for five years, here is the roofing contractor who gives a bond for his efforts, here is the heating contractor agreeing to repair or make right the system if it does not give 70 degrees heat on a zero day, etc. But what do these guarantees mean, if the contractor really wants to get out of the responsibility? The architect must begin his supervision of the building before the contract is signed and insist upon having the right to select the "subs" and weed out those who have no background, and who often take work at too low a figure just to get a start. Even if the General Contractor is responsible for the work of the "subs," it is essential that the architect examine the status of all of them, for if he demands their guarantee he cannot enforce it when the final payment is made. Many architects, of course, select the subcontractors for the special work involving craftsmanship and do not leave this up to the general contractor, but this is usually limited to work like stained glass, ornamental bronze, pipe-organ, etc. It is in the smaller items, though, like sheet-metal work that carelessness can creep in. A guarantee from the sheet-metal contractor to repair all defective work within one or five years after completion is essential, for no architect can expect by his superintendence to check up the possible defects of workmanship in this line. The "sub" who has put in a low bid and is working close to get money out of every move he makes can easily skimp on good materials and workmanship. In the old days when construction was simple, and today in small work, the architect assumed the attitude that he was a policeman on the lookout for defective workmanship, but today in large work this is practically impossible and is becoming more and more difficult in small operations. The required guarantee, therefore, places the responsibility up to the subcontractor, but unless the architect is able to analyze the cost and to pass upon the reliability of the contractor's previous work this means nothing. *His real superintending, therefore, must take place before any contracts are signed.*

Here is an example of what happens every day. On an office building recently erected four subcontractors bid on the sheet-metal work, as follows:

$12,600	from a firm in business					27	years.
11,850	"	"	"	"	"	34	"
9,990	"	"	"	"	"	10	"
7,400	from a firm which was only a year old.						

The general contractor was pleased with the low figure, and as the members of the young firm had wormed their way into his favor, he presented his bid and eventually got the job. The specifications, as usual, called for a guarantee of five years to be given by the sheet-metal contractor. The architect, instead of inspecting this situation and demanding from the general contractor a record of the bids of his "subs," let it go on the grounds of the required guarantee. During the first winter after completion it was found that the flashing in many places had not been carried high enough to take care of melting snow and many leaks developed. On the basis of the five-year guarantee the contractor was summoned to repair the job, but the firm had been dissolved with the usual ablution of debts and a new partnership of virgin purity had been formed. It cost the owner, therefore, $3,700 to make the repairs. *In the mind of the owner the architect was not absolved from blame in this situation.*

At the present time the *Unit Price system of contracting is growing more and more in favor and with it the responsibility of the architect's superintendent increases,* for he becomes or should become the *final judge of the true values of the unit* and whether the contractor is bidding on the actual number of units in the building or is padding them out. Contractors can get away with a nice little penny right under the eyes of the architect's superintendent by clever manipulation of bills. Methods of this kind are more apt to be used than skimping on the materials or work. The layman thinks that shrewd contractors make money by putting in inferior materials and workmanship in place of those called for in the specifications of the

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architect, but this is exaggerated. The real manipulations for making money are far cleverer than that.

One of the oldest games of this kind that keeps within the requirements of the contract is practiced by the "subs" doing excavations. In one case we recall that the contractor agreed to do the general excavation for a unit price of $1.70 per cubic yard, excavation for trenches at $2.40 per cubic yard, and excavations for piers and grillage pits for $2.95 per cubic yard. The total yardage agreed upon was 8430. The itemized bill submitted was like this:

	No. Cubic Yards	Cost
General Excavation @ $1.70	6,890	$11,713.00
Trench Work @ $2.40	985	2,364.00
Pier & Grillage Pits @ $2.95	555	1,637.25
Total	8,430	$15,714.25

This bill satisfied the Superintendent, because the total number of yards excavated was correctly stated, but actually the bill was padded, for the number of cubic yards of Trench work and Grillage pits was increased and the General excavation decreased. If the superintendent had checked against the actual work done, he would have found that the bill should have been like the following, and he would have learned that the Contractor was making almost $700 more than he was entitled to get.

	No. Cubic Yards	Cost
General Excavation @ $1.70	7,585	$12,894.50
Trench Work @ $2.40	610	1,464.00
Pier & Grillage Pits @ $2.95	235	693.25
Total	8,430	$15,051.75

Another example of manipulation of bills, which can never be checked back on once the bills have been passed, is in the general arrangement about the cost of removing boulders from excavations. The architect's specifications usually make a separate allowance for the excavation of rock at a certain price per cubic yard. It is common practice on a job where soil and rock are encountered to charge many small boulders and pieces of loose rock to the total quantity of rock removed. To get around this, the specifications should not only make an allowance for rock excavation, but state that all boulders under 1 cubic yard should not be figured in as rock. Careful checking by the superintendent is needed to enforce this clause. On one job that was typical, the superintendent was satisfied that 3,874 cubic yards of rock had been removed, because the number of trucking slips, which indicated the number of truck loads of rock removed, checked with the total. It had not been observed that about 200 cubic yards or about 5% of the total was made up of boulders less than 1 cubic yard. As the price agreed upon was $5.50 per cubic yard the bill was about $1,000 more than it should have been.

Of course one might argue that this was not the duty of the architect's superintendent to check up on details of this kind, but that the builder's superintendent should have been quick enough to catch the trick. *It is a question of how far the architect is responsible for the proper spending of the client's money.* His duty is to see that the requirements of standards of materials and workmanship conform to the specifications. If he includes in the specifications the agreed price of rock excavation and that nothing under 1 cubic yard should be counted as rock, then is he not responsible to see that this part of the specification is enforced?

As was previously stated, the Unit Price system of contracting is becoming more and more popular with all concerned in the building line. It has many advantages which the architect can appreciate, but it brings to his door *responsibilities which he must either close his eyes to or accept.* Take for example a masonry contract. The agreed upon unit price was for the exterior wall at $1.50 per square foot. No mention was made one way or the other of openings, by a clause requiring all openings over 4 square feet to be deducted from the gross area of the wall in estimating costs. As a result, a bill like the following was submitted:

For exterior wall of building

100x175 = 17,500 square feet
@ $1.50 square foot = $26,250.00

Now actually in this wall were 150 windows, each 3′x6′, which made a total of voids of 2,700 square feet. The net area of the wall, therefore, was 14,800 square feet and should cost only $22,200.00 instead of $26,250.00. In this case the contractor had deliberately put in a lower bid than the others to get the work, knowing that he could make up the difference by this method. In other words he figured he could get $4,050.00 out of the job by this trick. He was perfectly safe, for if he was caught, he would give the usual alibi that everybody figures it that way, and that the agreed price per square foot was low enough to cover the cost of deducted openings.

This is such common practice that one will find it in bills submitted for hollow tile and gypsum block partitions as well as for office railings and the like. The gross area is figured and the doors come extra. The gross length of the railing is figured and the gates put in as extras.

As an example we recall a case where a contract was made for 2,790 lineal feet of wood and glass partitioning. In this were 241 doors. The height of the partition was the customary 7 feet. In addition to the above, 526 feet of railing and 39 gates were included. The bill submitted by the contractor was as follows:

2,790 lineal feet of 7 feet high partition @ $8.50 per foot	$23,715.00
241 doors 3′x6′-6″ @ $17 each	4,097.00
526 lineal feet of railing 34″ high @ $6.50 lineal foot	3,419.00
39 gates 3′ wide @ $7.25 each	2,827.50
Total	$34,058.50

Such a bill might easily pass by the architect's superintendent. At first it is not evident that the owner is not only paying $17 for each door but also $25.50 for 3 feet of partition not deducted. In other words each door cost $42.50. The same thing applies to the gate which cost $7.25 each plus the cost of 3 feet of railing $19.50.

Another example of similar tactics which contractors justify, if caught, by saying that that is the custom of the trade and has always been done, can be found in work for marble or tile wainscoting. A charge is made per square foot and then an extra charge for base and cap per lineal foot. Observe this bill for a marble wainscot and see whether you can detect the overcharge of $21,339.50.

3,283 lineal feet wainscot 5 feet high @ $3.85 square foot	$63,197.75
3,283 lineal feet of 6″ base @ $3.40 lineal foot	11,162.20
3,283 lineal feet of 4″ moulded cap @ $3.10 lineal foot	10,177.30
Total	$84,537.25

A very common example is to be found in estimates submitted for foundation wall work in country houses. A certain contractor agreed to build a concrete cellar wall for $ .55 cubic foot. The perimeter of the wall measured 217 feet. The plans called for a 7 foot ceiling and a wall 18″ thick.

The bill submitted was as follows:

217x7 = 1,519 square feet x 1.5 = 2,279 cubic feet
@ $ .55 cubic foot = $1,253.45

The architect's superintendent noted that the ceiling height from cellar floor to underside of beams was 7 feet as called for by the drawings. He did not realize however that the foundation wall was only 6′-8″ high, because it stopped quite naturally at the level of the underneath side of the sill, the floor beams resting on top of the sill and not cut down at the ends so that their lower edges were flush with the bottom of the sill. If figured accurately then the bill should have been as follows:

217x6-2/3 = 1,447 square feet x 1.5 = 2,171 cubic feet
@ $ .55 cubic foot = $1,194.05

A similar padding of total quantities is common when the unit price is applied to brick masonry, concrete, stone, or tile work, for the contractor figures to outside dimensions all the way around the building and says this is the total length of the wall. This of course adds the thickness of the wall at every corner and in a large building this may add quite a bit to the cost as the following example will show:

	As figured	If proper allowance for corners had been made
East Wall—	150x300 = 45,000	150x300 = 45,000
West Wall—	150x300 = 45,000	150x300 = 45,000
North Wall—	100x300 = 30,000	98x300 = 29,400
South Wall—	100x300 = 30,000	98x300 = 29,400
Total	150,000 cubic feet of brick	148,800 cubic feet

About 1,200 cubic feet of brickwork @ $1.75 = $2,050 had been added to the price by not deducting for corners. For this one item it was not a bad haul for the contractor.

In electric work, the architect relies a good deal upon the certificate of inspection issued by the Underwriter's inspector. The specifications usually call for the work to be done according to the Electric Code of the National Board of Fire Underwriters. A scheming contractor can conform to all of these requirements and yet make an additional sum out of the job. An example of this is shown in the following bill submitted by an electric contractor:

For furnishing and installing 4,208 lineal feet of concealed pipe work @ $1.27 per lineal foot = $5,344.16.

This looks innocent enough, but the architect's superintendent should have known that in this case the code permitted the use of ovalflex cable which could have been installed at $ .76 lineal foot and would have resulted in a saving of $2,146.08.

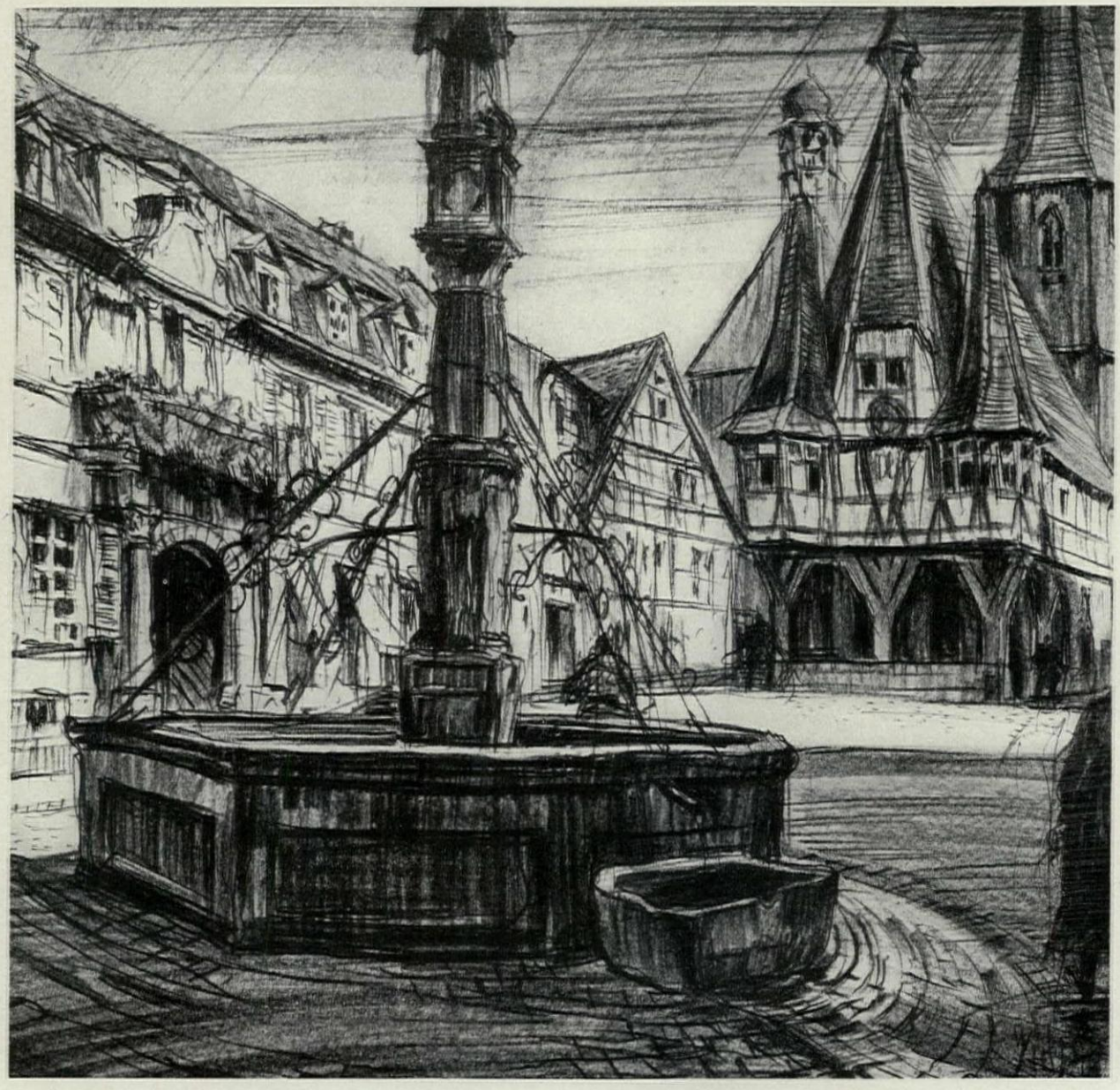
There is an "Old Spanish Custom" among electrical contractors in computing the total number of lineal feet of concealed cable work on ceilings, often necessary in tenant changes in steel buildings, to add 50% to the total number of feet of wiring to cover the cost of chopping of plaster and running cable underneath beams. This percentage is usually much in excess of the actual amount that should be allowed. Take a typical bay of 20 feet width. Only about 6 additional feet need be added to go around the beams. This is only 30% and not 50%. When one considers that there is as much chance of runs going parallel with the beams, the overcharge is even more exaggerated.

Similar liberal methods of estimating are made by painting contractors if the superintendent does not catch them. An allowance of 50% more to the total square feet of ceiling surface to be painted is put on the bills to cover the excess area of the sides of the beam and girder.

In almost all of the trades, example after example might be cited to show that the shrewd subcontractor today is out of fashion if he stoops to the clumsy method of putting in cheaper and inferior materials to make money. It is much safer and more effective to get around the vigilance of the architect's superintendent on his well known weak side—*his lack of knowledge*

of building costs and systems of billing. In nine cases out of ten, the architect's superintendent lets these matters get by him, because he is practically blind to what is going on. If the owner calls his attention to such affairs, he excuses himself on the grounds that the architect cannot take care of details of this nature but leaves them up to the general contractor for his time is spent in seeing that the plans and specifications are followed and the contract fulfilled. There are few laymen, however, who would see it this way, when their own money is involved.

Would it not be better for the architectural profession to give more time and thought to matters of cost while they have the time to do it? Is the matter of costs to remain a closed book in the hands of contractors, in spite of the fact that the public is supposed to regard the architect as the guardian of the owner's building fund?



FROM A CONTÉ CRAYON DRAWING BY CARL WESTDAHL HEILBORN

WHOSE WORK WILL BE FEATURED IN OUR NEXT MONTH'S ISSUE

The Geometry of Architectural Drafting

20—Circles at Right Angles

By Ernest Irving Freese

Editor's Note:—*This article, which is copyrighted, 1932, by the author, continues the series begun in August, 1929.*

When two circles meet, or cross, in such relative positions that their respective tangents drawn through a point of junction lie *perpendicular to one another*, the two circles, or circular arcs, are said to intersect *orthogonally*, that is, at right angles. Obviously, then, either of said tangents must pass through the center of the other circle. In other words, the direction of one curve, at the junction point, is then normal to the direction of the other; since the direction of any curve, at any particular point thereon, is defined as the direction of its tangent through said point. Wherefore, it is just as logical to speak of "circles at right angles" as it is to so designate the relative positions of any two straight lines. For brevity and distinction, however, such circles are herein termed *orthogonal*—one to another. Possibly a more correct term would be "orthogonally-intersecting"—but it's too clumsy.

It is a fundamental law of good design that, at the junction-point of any two curves, their relative directions shall be either coincident or squarely opposed; that is, the two curves shall meet either tangentially or orthogonally—either in harmony or in utter contrast. While this law has long been recognized, and while its fulfillment is well within the scope of elementary geometry, yet no works heretofore produced

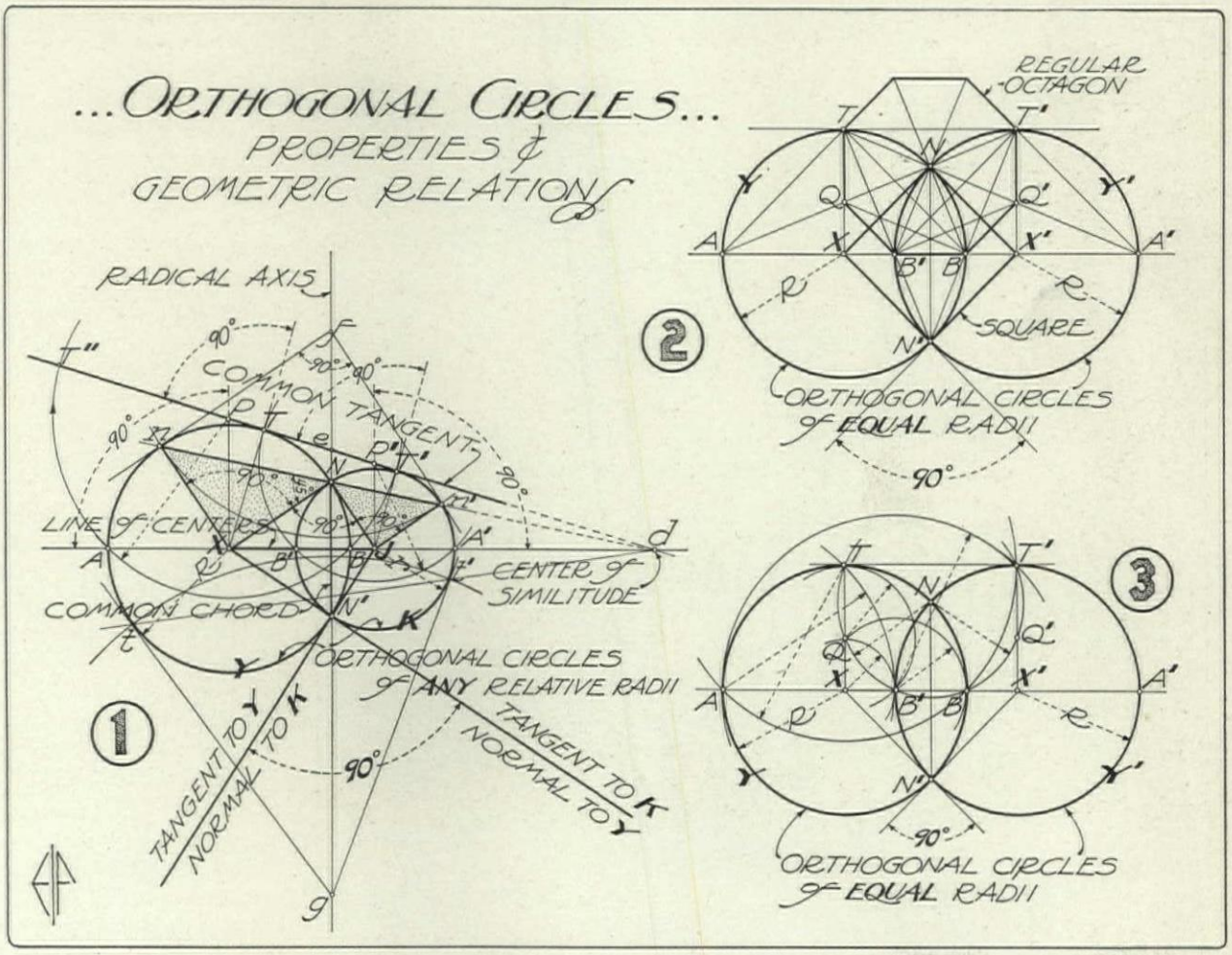


FIGURE 182

either on geometric design or on any phase of practical drafting have recorded any geometric constructions dealing with orthogonal circles from this standpoint. Wherefore, Part 20 of this work, herewith, opens up virtually a new field of applied geometric design directly concerned with the fundamental law above stated. And in Part 21, following, the same principles are applied to the solution of allied geometrical problems that arise in the more usual run of drafting-room routine. All of which will be found replete with actual applications.

Figure 182:

Pile all the geometries heretofore extant in one huge pile. You will search in vain through the multitudinous pages of that pile for the amount of pertinent information contained in this one Figure. Here, for those who are questing the "why," are recorded the inherent properties and geometric relationships of "circles at right angles." Reach for your compass:—

For the purpose of general demonstration, draw a circle, K, as at Diagram "1," of any radius you please. Through its center J draw a prolonged *line of centers*—a T-square line, say. From any point N, on K, draw a tangent crossing the line of centers at X. This tangent will be perpendicular to the normal NJ. With radius XN, draw the circle Y. The two circles then cut each other *orthogonally* at the points N and N'. Clearly, the normals JN and JN', of K, become tangents to Y, and vice versa, as shown and noted. The line NN' is a chord common to K and Y: it is perpendicular to, and is bisected by, their line of centers. This *common chord*, prolonged in both directions, is termed the *radical axis* of the two circles K and Y. From *any* point, say g, on the radical axis, draw tangents to Y and K. These four tangents, two of which are gt and gt', will be *equal in length*. So, the *common* tangent, between the points of tangency T and T', is *bisected* by the radical axis at the point e. Prolong this common tangent to meet the prolonged line of centers at point d. The latter point is termed the *center of similitude* of *all* circles that are centered on the line of centers and that are tangent to the common tangent. A line drawn through the ends of any paralleling radii of these circles will pass through this point d. Hence, since the line nNn' is directed to d, the radial Xn parallels the radial JN; and Jn' parallels XN. Wherefore, tangents drawn through n and n' will meet at *right angles* at point f on the radical axis. You will also find that the points t and t' are collinear with d, but that the angle subtended by the two equal tangents becomes 90 degrees only when N or N' is collinear with nn' or with tt'. Again, the similar chords Nn and Nn' subtend equal central angles of 90 degrees, as designated. Now, through the centers X and J, draw lines square with XJ, cutting the common tangent at the points P and P', respectively. Then the distance PT' equals the distance PA or the same distance PB; and the distance $P'T$ equals the distance $P'A'$ or the same distance $P'B'$. This property, discovered by the author, affords an exceedingly simple method of inscribing any number of orthogonal circles in any given angle, one center being known. In this case, the common tangent becomes one side of the given angle, and the line of centers becomes its bisector. Practical applications of this problem are shown in Part 21 at Figure 204, hence, will not here be dwelt upon.

Diagrams "2" and "3," of Figure 182, illustrate in an obvious manner, the *special* geometric relations of the "twins," that is, of any two orthogonal circles having *equal* radii. At Diagram "2," the regu-

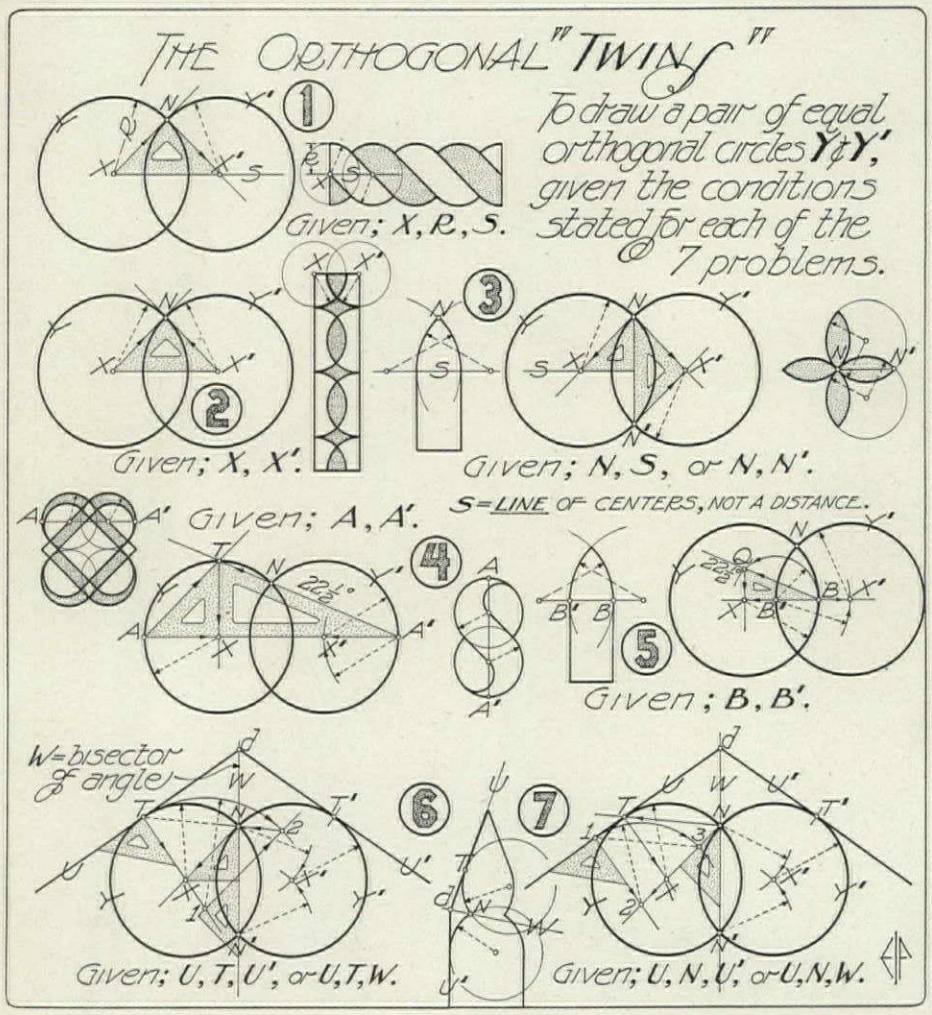


FIGURE 183

lar octagon and the square are shown to clearly define the slope of all lines connecting the various related points. These lines are all inherent obliques, produced by the 45-degree triangle and the 22½-degree triangle. On the other hand, Diagram "3" records these relations by circular arcs of the indicated centers and radii.

By means of the data contained in the three Diagrams of Figure 182, practically all geometrical problems, and all dimensioning problems, involving orthogonal circles are made ready to solve. The perfectly *general* relationships depicted at Diagram "1" are utilized in the solution of the general problems propounded and solved in Part 21, following. The *special* relations of the "twins," made plain at Diagrams "2" and "3," are particularly applicable to problems occuring in geometric *design*, as in this Part exemplified, and now in order.

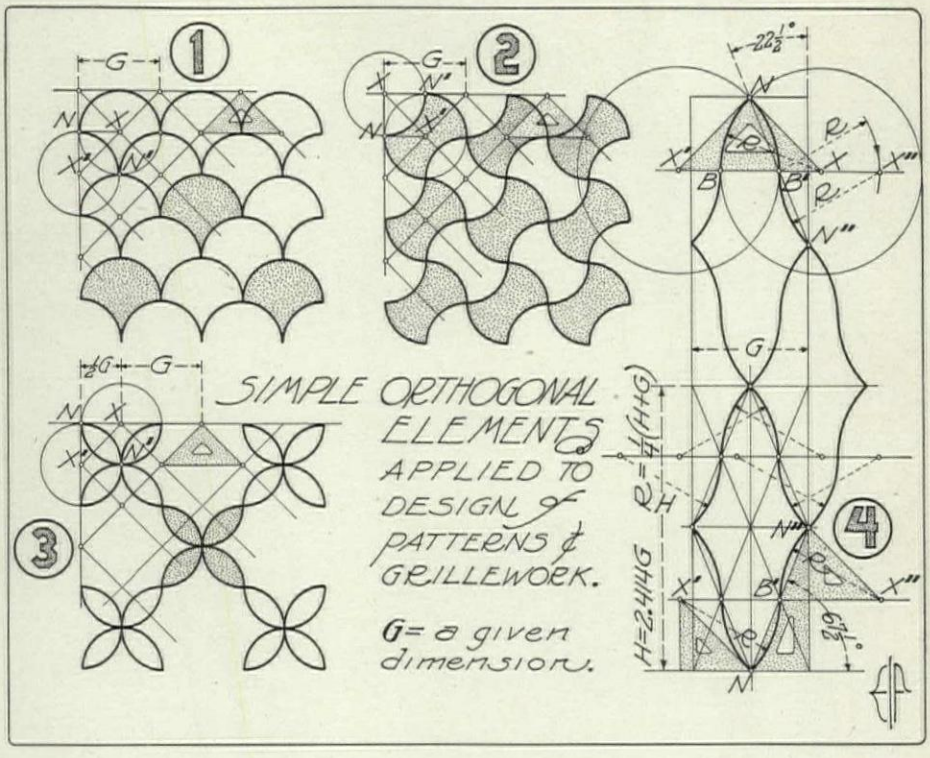


FIGURE 184

Figure 183:

The solutions of the first five problems of this Figure are certainly clearly portrayed. Diagrams "6" and "7," however, possibly require elucidation. It is required to inscribe two equal orthogonal circles, *Y* and *Y′*, within a given angle in such a manner that their common chord, *NN′*, will be coincident with the bisector, *W*, of the given angle. Two conditions operate to produce the two constructions. At Diagram "6," the given conditions are one side *U* of the angle, the tangent point *T* thereon, and either the other side *U′* of the angle, or the bisector *W*. In the one case, *W* is given: in the other it can readily be determined. The required centers are then found as follows: From *T* draw a line square with *U*. Place the point of your compass anywhere on this line, say at point *1*, and draw an arc from *T* as shown. Cross this arc at point *2* with a line projected from point *1* at an angle of 45 degrees to *W*. Cross *W* at *N* with *2T*. Cross *T1* at one required center *X* with a line from *N* at 45 degrees to *W*, which line will parallel *2-1*. With *XN* as radius, draw one of the required circles *Y*, crossing *W* at *N* and *N′*, and passing through *T*. From *N* and *N′* as centers, cross arcs of radius *XN* at the other required center *X′*. The twin circles, *Y* and *Y′*, each of radius *XN*, will then intersect *orthogonally* at the common chord points *N* and *N′*, and will be tangent to the sides of the given angle at the points *T* and *T′*, respectively, as required. Now suppose, as at Diagram "7," that the intersection-point *N* is given instead of the tangent point *T*. Well, do this: From any point, say *1*, on *U*, draw a line square with *U*. Cross this at point *2* with a line from *N* at 45 degrees to *W*. From point *2* as center, revolve point *1* to point *3* on *2N*. Locate *T* on *U* with a projector from *N* parallel with *3-1*. Locate *X*, one required center, with a projector from *T* at right angles to *U*. The other center *X′* is then easily found as before. All problems of this Figure suggest one or more applications. More are to follow.

Figure 184:

The layout in each case is governed by a definitely predetermined unit-dimension *G*, arrived at by a consideration of the fitting subdivison of the total space to be covered by the design. Diagrams "1," "2," and "3" are applications of Problem "2," Figure 183. In each of these, *G* is both the unit width and the unit height of the repeating element. Diagram "4," Figure 184, is an application of Problem "3," Figure 183. The proportionate height *H*, for a given width *G*, of one repeating unit, is readily found graphically as indicated. Formulas for *H* and *R* are also recorded in case the actual dimensions of a panel of these units must be determined. If *H* is a fixed dimension, then merely transpose the given formula and you get *G* equal to *H* divided by 2.414. The simple and pleasing patterns of this Figure are but faintly indicative of the almost limitless possibilities residing in orthogonal elements of design. Note that, without exception, the junction of any one arc with any other is either a point of tangency or a point of orthogonal intersection—*or both*. The law of good design directs the compass. Artifice becomes art!

Figure 185:

Here, again, the constructive geometry recognizes the *working dimension G* as the governing factor of

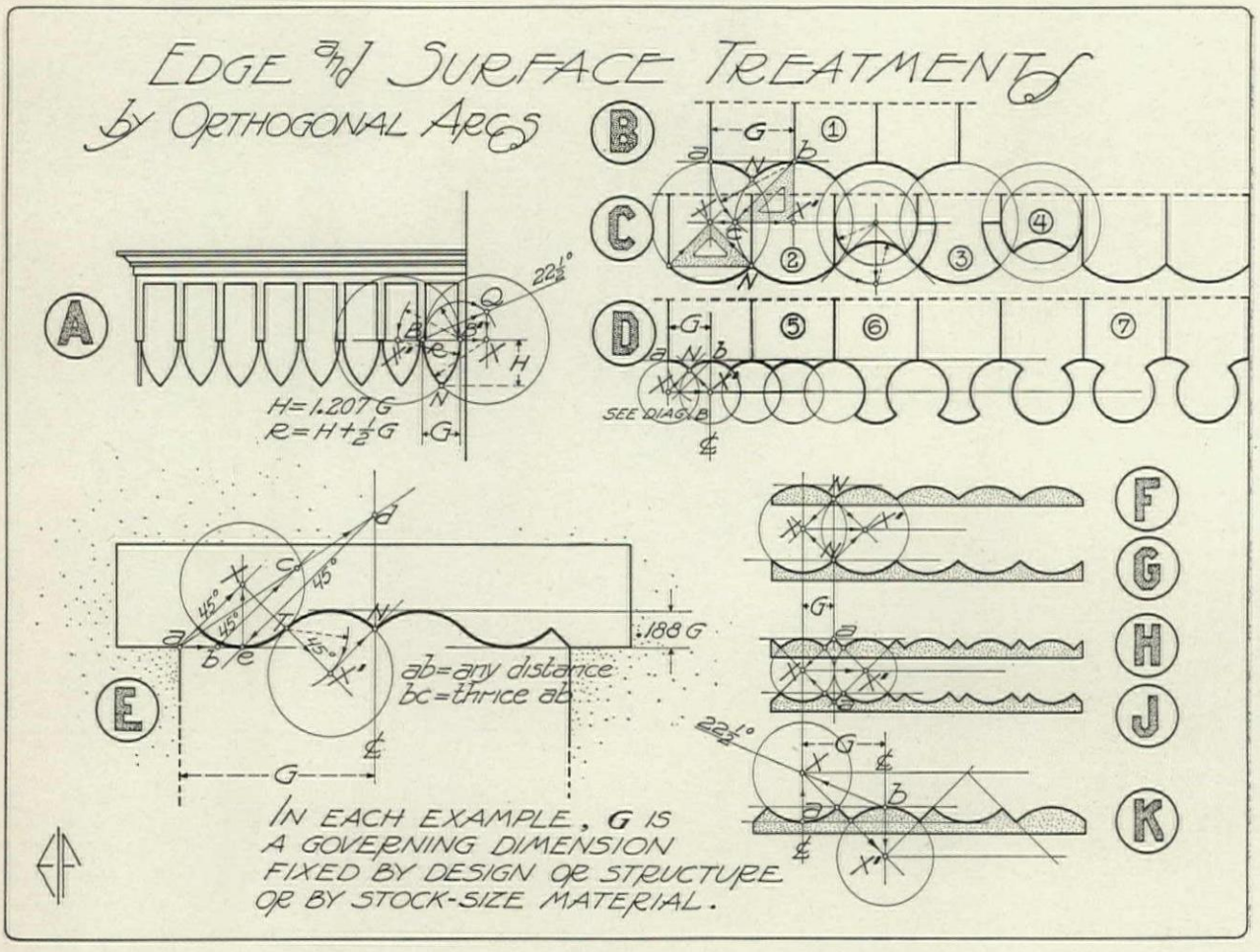


FIGURE 185

each layout. Also, the formulas for dimensioning are given in the cases where they are likely to prove of use. Diagram "A," of this Figure, is a direct application of Problem "5," Figure 183. At Diagram "B," Figure 185, the centers for the orthogonal fringe-cut are located as follows: Make *bc*, on a line at 45 degrees to *ba*, equal to *ba*, either by measurement or with the compass as shown. A line through *c*, paralleling *ab*, is then the required line of centers. At Diagram "C," *X* is located at once by the 45-degree line from the given point *N*, the vertical center line being given. Interesting variations are produced by the fringe-cuts numbered "3" and "4," the layout being made obvious. At Diagram "D" the edgings numbered "5," "6," and "7" are all produced from the same centers found as directed for Diagram "B"; the limiting points *a* and *b* being given: the arcs will then meet orthogonally at *N*, as the 45-degree lines indicate. The lintel-cut shown at Diagram "E" is laid out graphically like this: From any point, say *b*, on the straight bottom line of the uncut beam, draw *bc* at 45 degrees thereto, and make it equal to three times *ba*. Project *c* to *d*, in line with *a*. Project *d* to *e* via another 45-degree line. The rest is easy enough. And so is any of it—after you know how. If you want to know beforehand just how far that ogee is going to cut into the depth of the beam, merely multiply the distance *G* by .188 and you've found out. Or call it 3/16ths of *G*, which is near enough! Diagrams "F" to "K," inclusive, are a few suggestive cross sections of modern surface treatments productive of linear backgrounds of shade and shadow. The constructive layout is made clear for each case, and is controlled by the desired spacing *G* as shown.

Figure 186:

Here, the "twins" turn some more interesting tricks, just to prove their championship as geometric acrobats. Watch closely. They're showing you *how*.

Figure 187:

In the Moorish design, the heretofore ungainly and impractical "horse-shoe" becomes at least acceptable both from the standpoint of appearance and structure. As the drawing makes clearly evident, the intrados of the arch is formed by the orthogonal "twins." The utilization of the horse-shoe arch as a frame for an arched doorway surmounted by a circular transom is an innovation, born of geometry, not of the Moors. As here presented, it conforms to the elemental law of good design. And it's structurally sound. Surely, a "lucky" horse-shoe!

In the orthogonal Gothic arch, Figure 187, all lines meet at right angles on the center line of the keystone, while the joint lines radiate from the center of the intrados arcs, thus resulting in a 90-degree keystone as well as a pleasingly-proportionate thickening of the arch rings from spring to crown. The various centers

are located in conformity with the solution of either Problem "5" or Problem "3," of Figure 183, depending upon the given conditions of the case. Looks complicated, but it's really very simple. After the centers of the intrados and extrados are found, the centers for any intermediate lines of the ring can be found by direct linear proportion, since, as shown, the distance XX' is exactly the same as the depth NN' of the keystone, and T is to W as t is to w. The right-hand half of the arch indicates how the centers may be found if the crown points N and N' are given rather than the spring points.

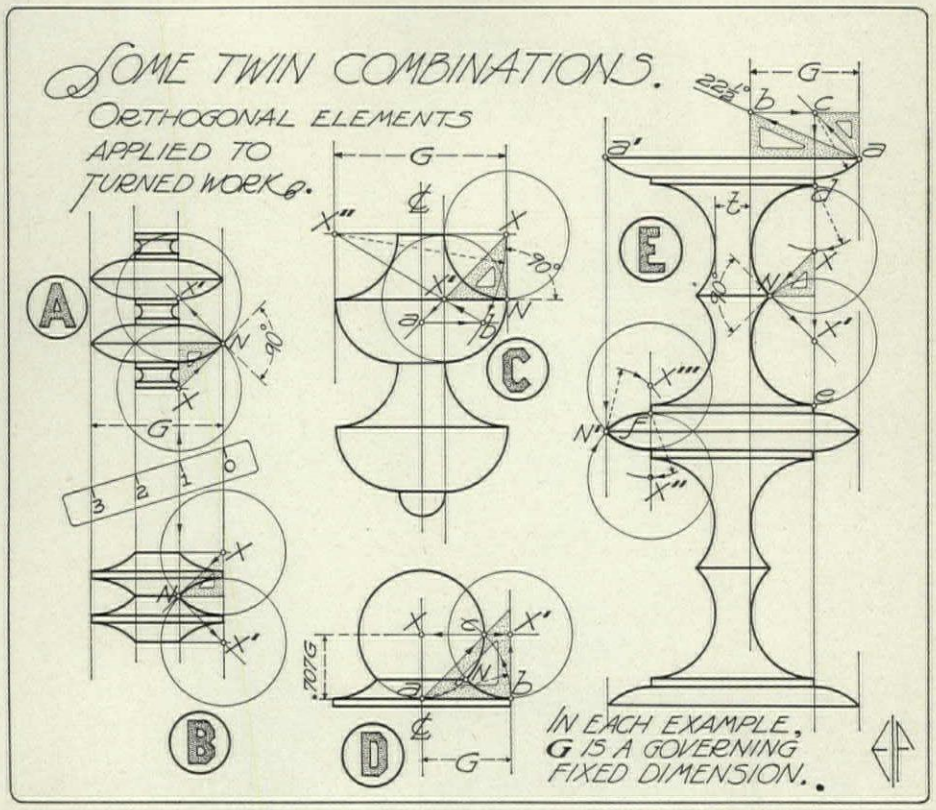


FIGURE 186

In the geometric design of the Spanish gateway and wall, Figure 187, the given desired distance G is the governing factor of the constructive layout. The location of centers X and X' is then merely a working out of Problem "4," Figure 183, the given points A and A' being on a tangent line instead of on the line of centers. The centers for the sphere and its orthogonally-intersecting base, atop the gate-post, are located as per Diagram "D" of Figure 186. This latter Diagram also informs you that the radius of the sphere and its base is half the width of the gate-post multiplied by the decimal .707, which decimal might just as well be taken as the fraction 7/10ths in this case—for a bump on the stucco would make more difference than that!

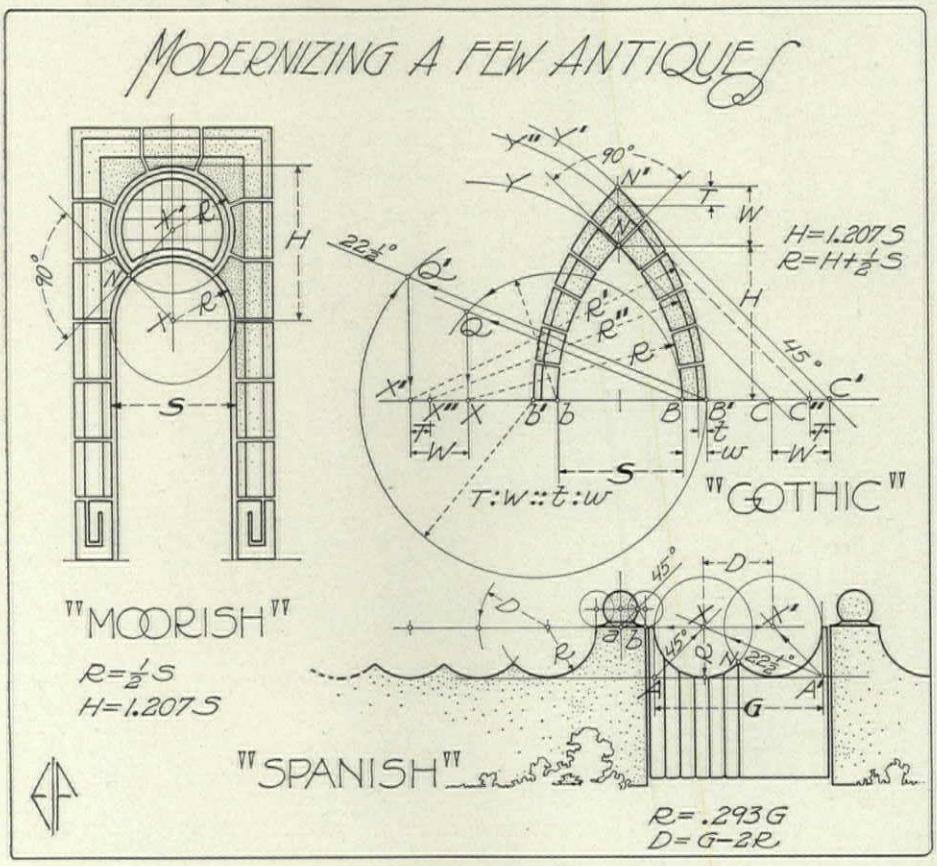


FIGURE 187

In all Diagrams of Figure 187, the simple formulas required in the determination of figured dimensions are also recorded for use when wanted. Note that, for a fixed clear span, the resultant clear heights of the Moorish and Gothic orthogonal arches are the same, namely, 1.207 times the span. If the height is the fixed dimension, then the span becomes *H divided* by

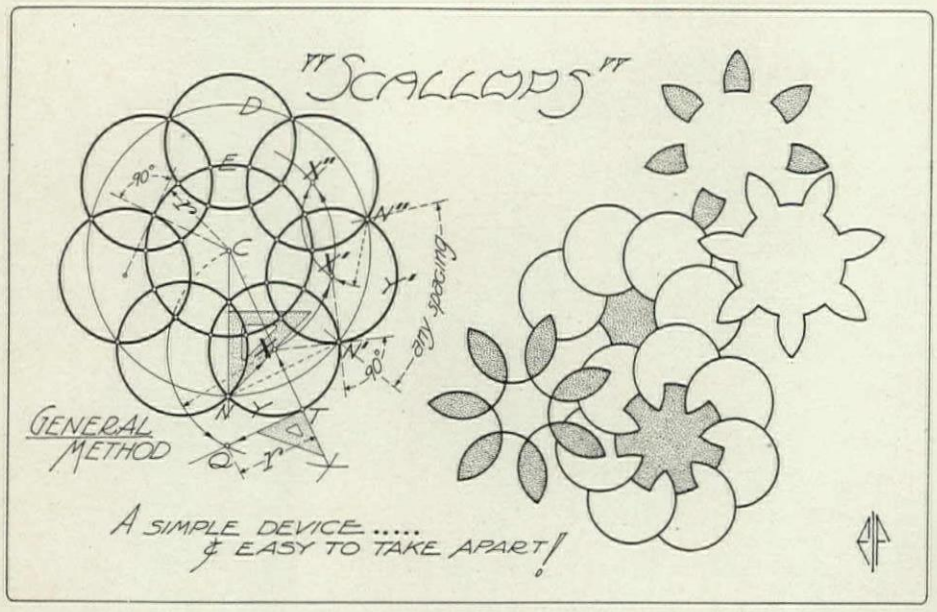


FIGURE 188

1.207. In this Figure, the reference letter *S* indicates a *dimension*, not a construction line.

Figure 188:

Let *D* be a given circle, and let the points *N*, *N'*, *N''*, etc., be any number of equally-spaced points therealong. Draw a line from *N* at 45 degrees to *NC*. Locate *X* thereon with the perpendicular bisector of the chord *NN'*. From center *C* draw a circle with *CX* as radius. From center *X*, with *XN* or *XN'* as radius, draw the circle *Y*. From *N''* as center, same radius, locate centers *X'* and *X''*. In the same manner locate the centers for the other scalloping circles. Every intersection of these circles will be *orthogonal*. Now, from any point *T*, on one of these circles, draw a tangent; then locate *Q* thereon with radius *XC* from center *X* as shown. A circle *E*, of radius *TQ*, which radius is *r*, swung from center *C*, will cut all the scalloping galloping circles orthogonally. You have now set out a device from which you can unravel all manner of "correctly" designed geometric motifs, only a few of which are prestidigitated in the Figure. Not a straight line in them—just *circles at right angles*.

Figure 189:

At Diagram "1," as before, let *D* be the limiting circular boundary, and let *N*, *N'*, *N''*, etc., be any equally-spaced points thereon. Draw the perpendicular bisector of the chord *NN'* as indicated. Cross this at point *a* with a line from *N* at 45 degrees to *NC*. From point *a* as center, revolve *N* to *T*. From *T*, draw a line square with *ac*, which, of course, will be parallel with *NN'*. Then locate *X* by a line projected from *N* at 45 degrees to *NC* or square with *Na*. From center *C*, radius *CX*, draw the circular locus of centers as shown. Then, from the respective spaced-off points *N*, *N'*, *N''*, etc., as centers, and using the radius

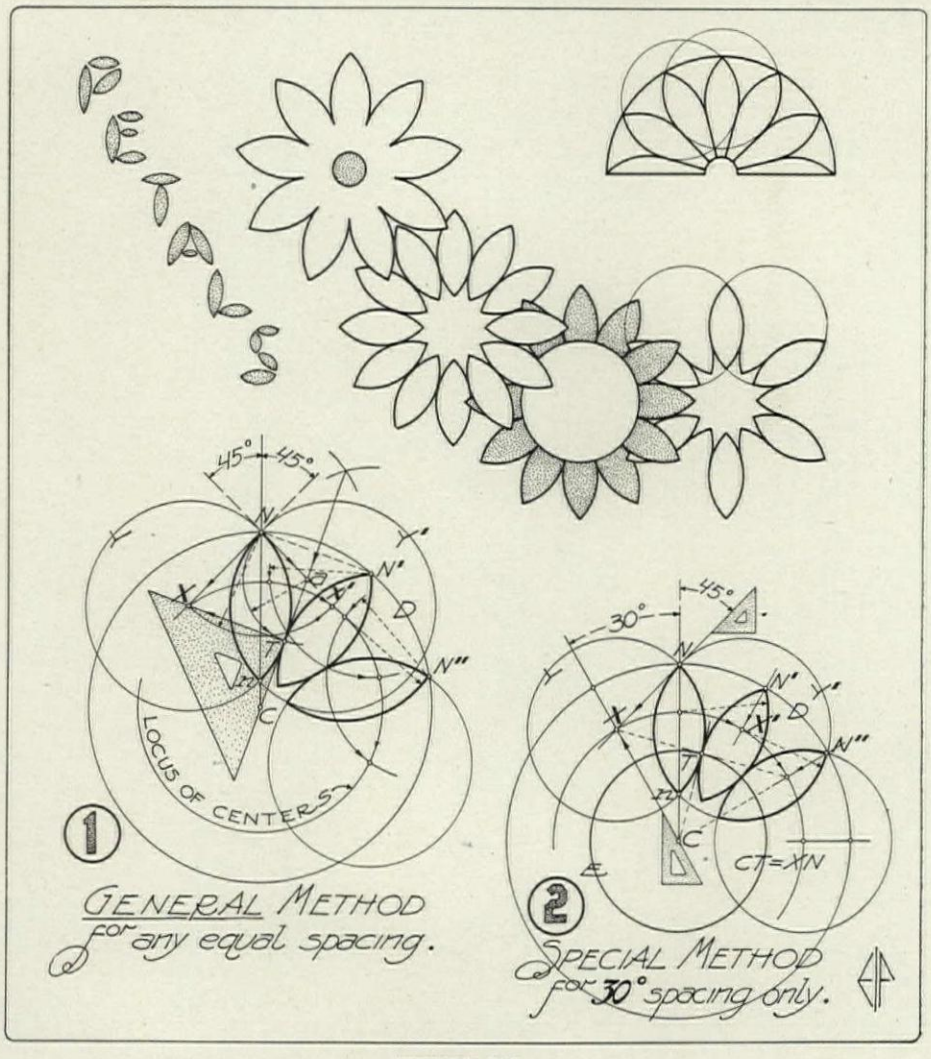


FIGURE 189

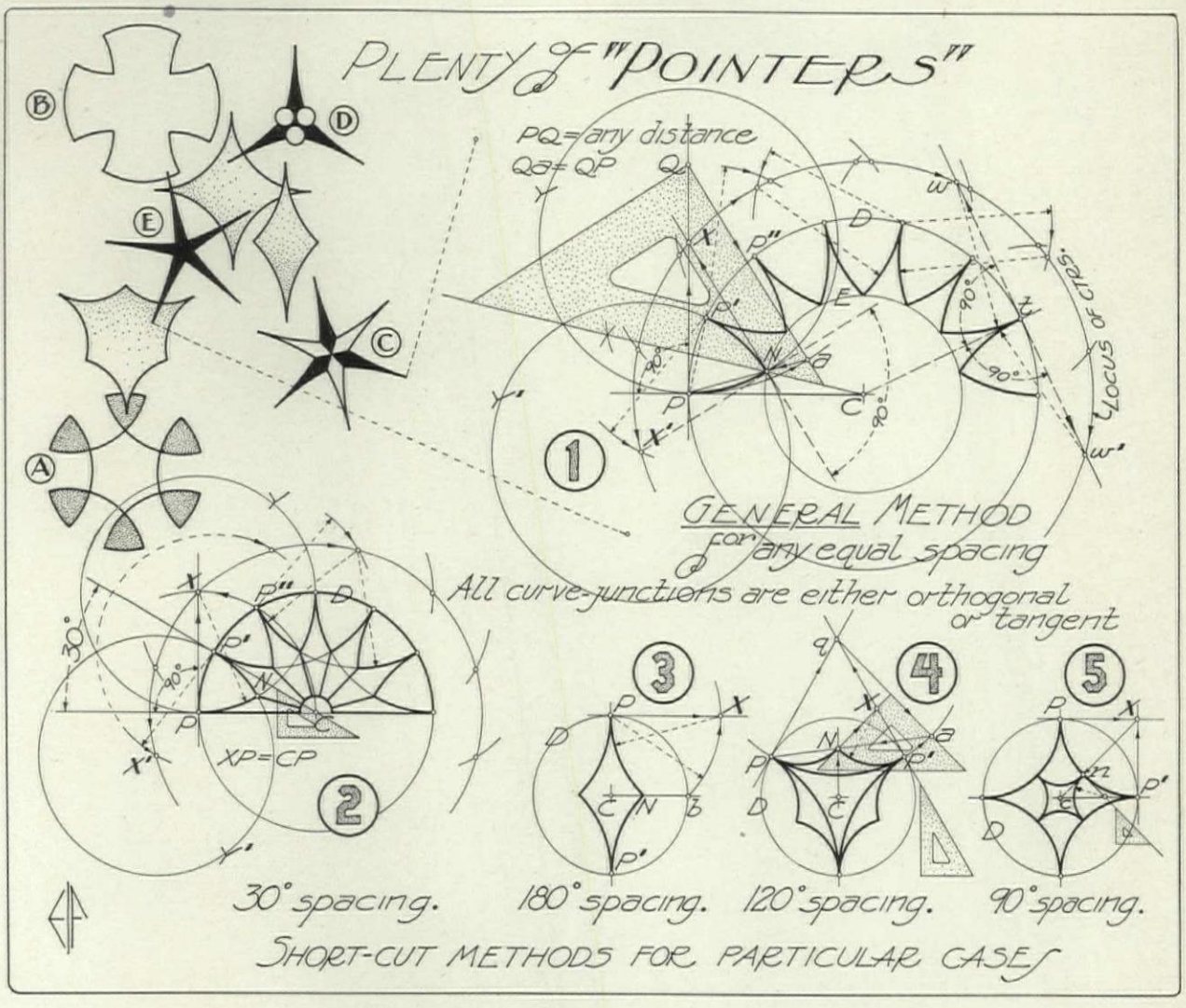


FIGURE 190

XN, fix the other centers *X'*, etc., from which the arcs of the "petals" are swung. These arcs will intersect *orthogonally*, and they will touch *tangentially*. Again, the law of good design has been geometrically fulfilled. Diagram "2" clearly shows you the very simple layout required for the special but common case of 30-degree spacing. Some of the interesting and usable motifs emanating from this invention of the author are shown in the Figure. Now you try some.

Figure 190:

At Diagram "1," *D* is any given circle or any portion of same. And the points *P*, *P'*, *P''*, etc., are any equidistant points thereon. Draw a tangent from point *P;* and draw any line *Qa* at 45 degrees to the perpendicular bisector of the chord *PP'*. With the compass at *Q*, make *Qa* equal *QP*. Now locate *N*, on aforesaid perpendicular bisector, and where *aP* crosses same. From *N*, project a line at 45 degrees to the same bisector—which 45-degree line will parallel *aQ*—thus locating *X* on *PQ* as indicated. So now, you have found *X*, the center from which the arc *PN* is swung. And a circle of radius *CX* will be the locus of all other centers which can now be located as has before been shown, and as the Diagram indicates. Or, if more practical, these centers, pair by pair, can be located as follows: From any one of the spaced-off points, say *t*, on the spacing-circle *D*, project a tangent both ways to cross the locus of centers at *w* and *w'*, which latter are the centers required for the "point" at *t*. And so on. Diagrams "2" to "5," inclusive, are short-cut methods applicable only to the particular spacings noted. The information is all there.

The above construction yields an astonishing number of dissimilar geometric motifs, some of which are shown in the Figure. The ones at "A" and "B" are brought forth from Diagram "2"—30-degree spacing. Those at "C" and "D" are based on 60-degree spacing by the general method of Diagram "1," the *alternate* divisions being used for the shape at "D." The "starfish" at "E" comes from 5-point division of the circle by the general method. But you'd better have plenty of *room*—note the length of radius for the points. This radius becomes rapidly lessened as the number of points is increased. For the 30-degree spacing, 12-points to the circle, the radius of the points is exactly equal to the radius of the bounding circle *D*—easy!

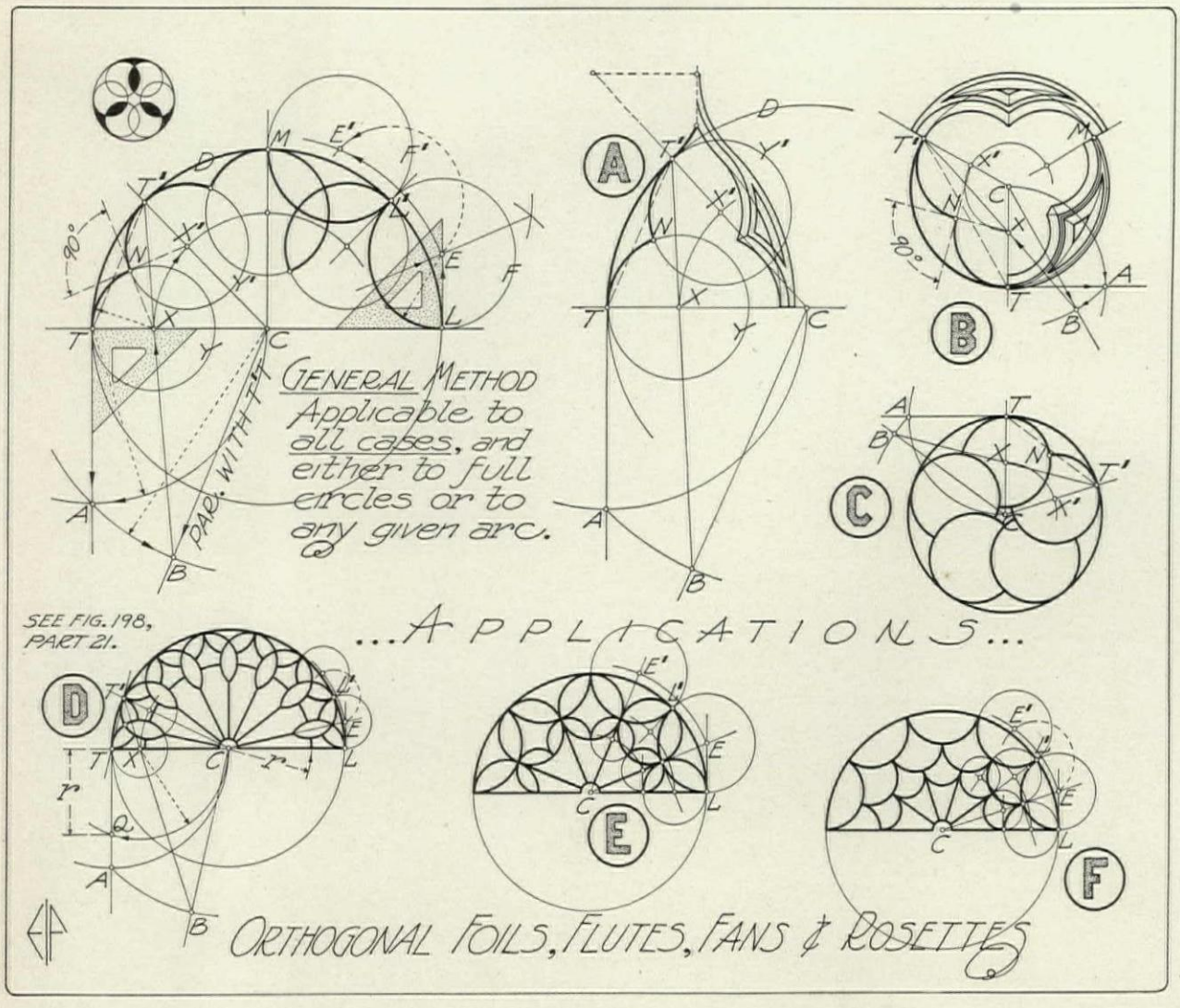


FIGURE 191

Figure 191:

Anything you say! Foils, flutes, fans, cusps, scallops, rosettes, and bouquets! Here's the simple layout: Let T and T' be any two points on a given circle or circular arc D. On a tangent from T, make TA equal TC, as shown. From center C swing the arc AB, and locate B with a line projected from C in a direction paralleling the imaginary chord $T'T$, or in a direction square with the perpendicular bisector of this chord. The line BT' will then cross TC at one required center X of the equal orthogonal circles Y, Y', etc. And a circle of radius CX will locate X', etc. Or, if you want to "flute" the circle D, or do the scalloping stunt in reverse gear, follow the directions given on the other half of the general construction Diagram. At every curve-junction produced by this layout, the various arcs are either mutually tangent or mutually orthogonal. Aesthetically? Yes; and geometrically, too.

The various applications at Diagrams "A" to "F," inclusive, of Figure 191, all emanate from the one general layout Diagram, and all carry the same reference letters. The method is absolutely general and invariable. At Diagram "D," however, another circle concentric with the bounding circle, and of radius designated as r, is placed orthogonal to the inscribed orthogonal circles. The way to determine r is shown in this Diagram, and has also been explained in connection with Figure 188, hereinbefore.

Figure 192:

The layouts of Diagrams "1" and "2" are direct applications of the general construction of the previous Figure, requiring no other directions.

At Diagram "3," it is required to cusp the arc TM in such a manner that the required foil centers X and X' shall fall on the spring line of the arch and on the center line of the arch, respectively. This is another problem of the "twins"; the required arcs being of equal radii. Make TA, square with the spring line, equal to TC. Make BQ, on the center line of the arch, equal to BT. Then the line AQ will cross the spring line at one required center X. The other required center X' is then speedily located by revolving X to X' about the center C as shown. The point of tangency, T', is then found, if wanted, by a prolongation of the line of centers CX'. This layout makes the foil TNT' come tangent to the given arc at the

points T and T', and results in an orthogonal cusp at point N.

At Diagram "4," both centers for the foliation lie on the center line of the arch, thus making the opposite foils segments of the same two circles, as shown. Here, the required circles are of *unequal* radii. Center J lies at the crossing of center line and spring line. Center X is then materialized like this: Make JQ equal the radius r of the given arc TM; and make JA equal JT. Then project a line from A, square with AQ, to cross the spring line at B. From center C revolve B to cross the center line of the arch at point X', the other required center.

At Diagram "5," Figure 192, the upper center J may be fixed anywhere on the center line of the arch; the radius of the upper arc of the foil then becoming JT'. In the Diagram, however, the radius of this upper arc is taken as one fourth of the span, that is, as TP, found in the graphical manner indicated. By revolving point P about the center C, the upper center J is thus fixed. In either case, regardless of how center J is determined, the other center X, on the spring line, is found as follows: On a line perpendicular to the spring line, make TQ equal the already fixed radius of the upper arc of the foil, that is, make it equal to JT' or, as in the Diagram, make it equal to TP in the manner there made plain. The required center X then lies on the spring line at the crossing therewith of the perpendicular bisector of the imaginary line QJ.

The layout at Diagram "6," Figure 192, is applicable only to lancet arches where the radius CT is not less than 1.31 times the corresponding span S. Otherwise the point T' will fall beyond the upper limit of the given arc TM. The lower center J is fixed at the intersection of the spring line and center line of the arch, as shown. Then, square with the spring line, TQ is made the same as TJ. Crossed arcs swung from centers J and C, and of radii JQ and CJ respectively, will then locate the other required center X; and the radius XT' will then, necessarily, be the same as the other radius JT. Thus, the orthogonal "twins" disclose another secret unlocked from their bag of geometric tricks.

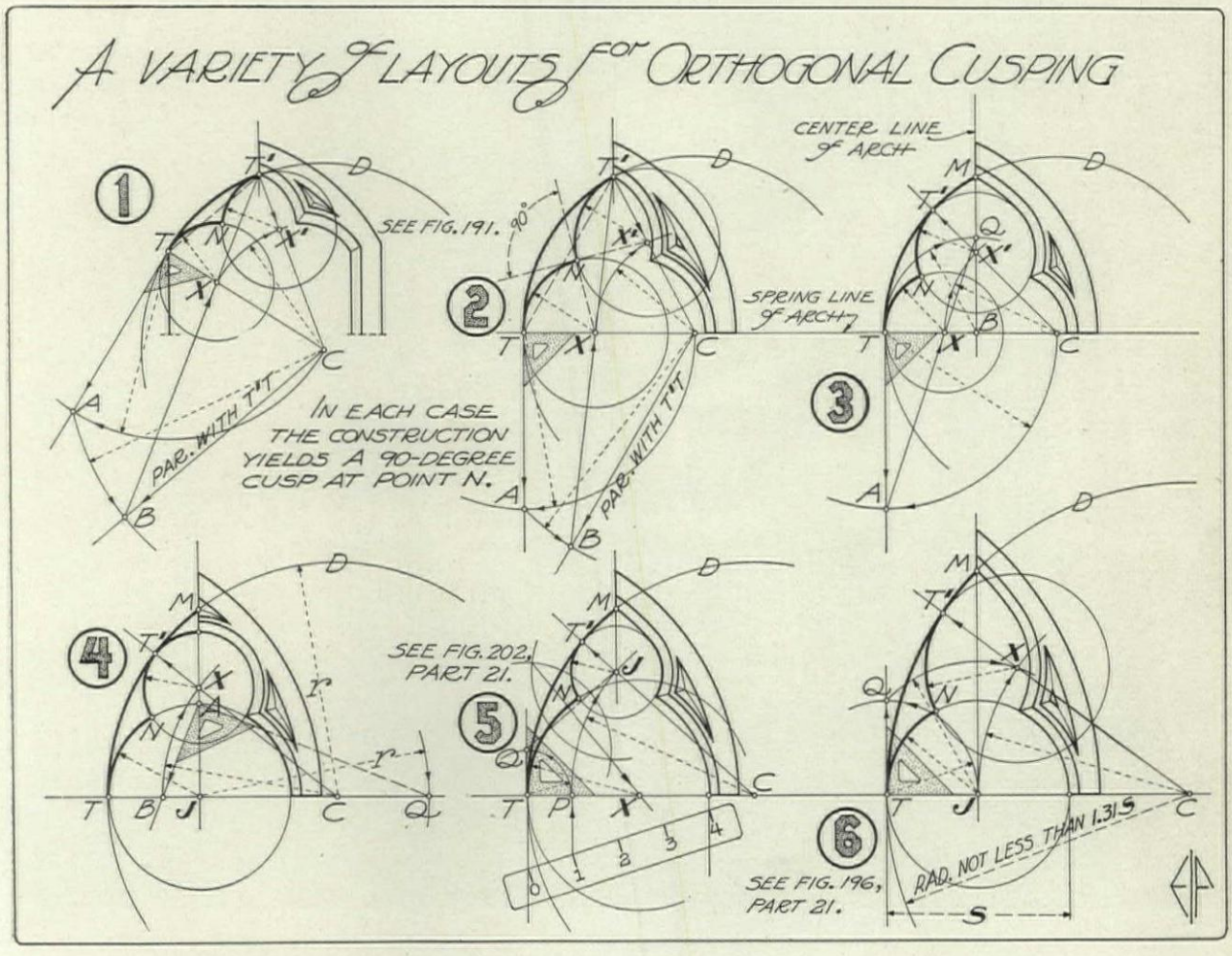
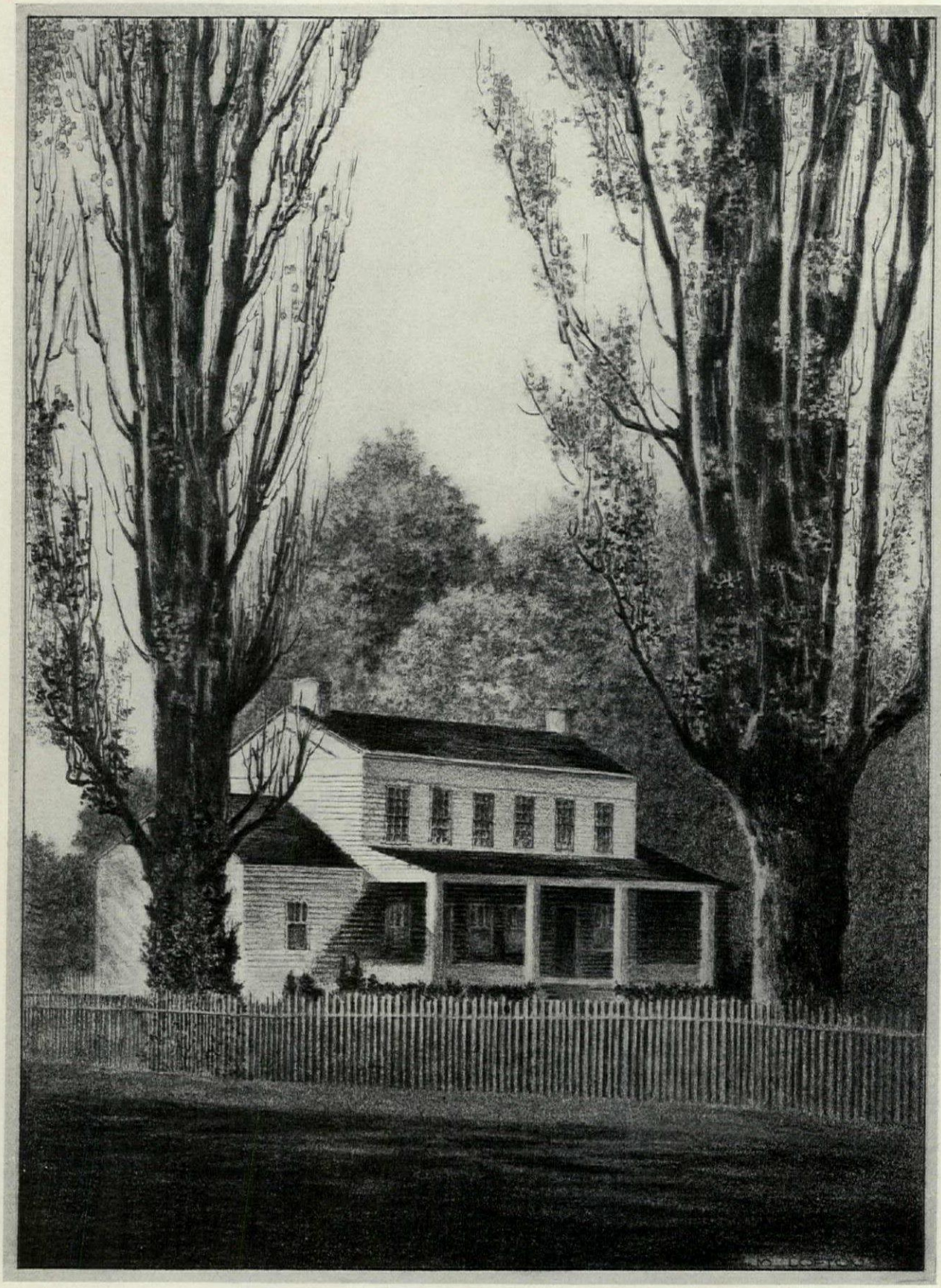


FIGURE 192



FROM A PENCIL DRAWING BY MELVYN LOFTON

"EARLY OREGON RANCH HOME"

The Architect Suggests a New Technique

Extracts From an Address on Housing

By Robert D. Kohn

Editor's Note:—*At an important Housing Conference, held in the Empire State Building in New York and attended by members of the Housing Section of the Welfare Council and the Housing Association of the city of New York, President Robert D. Kohn of the American Institute of Architects delivered an address of which the following text comprises extracts. Other speakers were Andrew J. Eken of Starrett Brothers and Eken, Alfred K. Stern of the Rosenwald Foundation, and Paul Blanshard of the New York City Affairs Committee. It appears to be the consensus of opinion that the best prospect of early revival of building lies in the field of large scale housing so that what is going on in this field should be of the greatest interest to every architect and draftsman.*

There are a good many so-called practical men who think that the architect is really an amateur in this matter of building houses. They think that if it were not for the hard-headed investor or speculator every one of our urban model housing or suburban cottage housing schemes would long since have been in bankruptcy. They think the architect is an amateur. While it is perfectly obvious that worthwhile results in housing will have to come about through the judicious cooperation of the various essential functions concerned, it is also true that in this field of housing almost every progressive step in design and execution has been the result of the efforts of such amateurs. These amateurs were not all architects—there have been builders and even investors who were able to see further than the immediate salable product. But though hope lies with the amateur (if "amateur" means someone who loves something), the important thing to note is that there is no hope in fads or the faddist.

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It is not to be denied that the whole field of housing has suffered deplorably from the faddists; architects, well intentioned philanthropists, or any of the many others. One false ideal set back city planning twenty or thirty years; the so-called "City Beautiful" ideal, which lost sight of the social needs of communities. Something like that ideal set back housing development for almost as long. The utter extravagances and silly prettiness of some of the earliest suburban developments long discouraged any serious effort to study the subject as a social problem. One of our well known and much vaunted housing developments of those early days was started ostensibly for workmen and ended up by being occupied by bankers, and then most of them carried second mortgages on their houses. Some of these fads we have put behind us; we are much closer to reality today. But we need to be warned that there are fads upon the horizon which are likely to endanger the future of good housing as these other fads have in the past. We must distinguish between wise experimentation based on careful study and the merely sketchy improvisations of inexperienced exhibitionists. The problem we have to face is too serious to let these people wreck worthy attempts at a solution.

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Valuable experiments are being made with new materials and with new methods of assembling structural parts. We must be on the watch for any process and every adaptation of simple materials which will serve to decrease time and labor, and consequently the cost of construction. But at the same time we must not waste time on the tiresome kindergarten gabble of the amateur construction reformer. He always starts by saying: "We are using the same construction methods as they did in Babylon thousands of years ago." And that is supposed to be a devastating criticism of modern construction. When someone finds a more convenient, cheaper and at the same time more efficient unit than brick it will be adopted in a flash the world over. Likewise these naive critics talk about all steel and glass and concrete houses. Perhaps in time we will find ways of using these materials to a greater extent than we do; if thereby we can produce more permanent dwellings without sacrificing low-cost and other even more desirable qualities. But at best the economies to be made by reforms in construction methods and materials, while important, are not of the essence of the problem. The first thing we need to improve housing is to think of it in terms of social progress. We need thinking which will control both design (in the largest sense) and finance. Piling up a series of concrete and glass filing cabinets one above the other is not a solution for urban housing, even if that is the so-called international style. We rage about the monotony of the repetitious rows of old

houses and tenements and then we propose to do something infinitely more monotonous with not even the privacy of the proverbial goldfish bowl.

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There are two things that seem to be of immediate importance. We must develop a new technique of design; but one that is not so much concerned with external details or methods. It will concern itself with what is socially desirable. So, too, we must develop a new technique, to finance housing construction, based on similar considerations. The elements of the new design problem are fairly well understood by those who have already been deeply involved for years in studying them. They concern themselves with the many different kinds of human beings to be accommodated; with their racial differences; the varieties of their conceptions of family life; of provisions for family growth and with the relations between the living quarters and the work and recreation and educational periods of the life of the members of the group. And this study also concerns itself, in the larger sense, with relations between groups of families in the community and in turn between communities. We are no longer to consider that the problem is solved when we build a good house or a good multiple dwelling. Neighborhoods and cities are what we must design. And the design can never be one based on the assumption that people are alike. It will be worked outwardly from the individual to the group. It will be based on the infinite differences between people, not alone on their similarities. It is the element of differences—the precious variations between people—that must be accommodated in such a way as to make possible their growth and development.

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And the other new technique which we must discover is in the direction of a new finance. The only methods we have known are those of the speculative builder, of the "own your own home" propaganda, and sometimes a combination of the two. We know that the efforts of the speculator have never met the need for housing of the right kind for any but a small proportion of the public. We know now that it never will. We know that the "own your own home" ballyhoo was false and misleading for most of those whose housing problem it claimed to meet. And we also know that many of the combinations of these two schemes; the fake cooperatives; have been little short of scandalous in their results. There are two new lines of research in finance which we must tackle. The first is to try to bring into the picture the capital—in materials, technique, and money—of the construction industry itself. Heretofore, housing projects that have been promoted have rarely been based on the technical knowledge and the means at the disposal of the building industry itself. The banks and other lending institutions were the deciding factors. The construction industry generally did what it was told to do. It was seldom the principal; it was the employee. The most encouraging sign of the present time, in this period of depression, is that all over the country people in every branch of the building industry are jointly studying what can be done through their own efforts and means to become the controlling factors in the financing and design of new large scale operations. It is too soon to point to results. But the tendency is a highly desirable one. It does not seem more unreasonable to expect that the building industry through the joint effort of all its manifold functions can work out a solution for the problem of decent housing, than to say that the medical profession will gradually work out the problems of public health.

And in the next place we must help to educate the public as to the Governmental responsibility to aid in proper housing for the so-called "unprofitable" tenants by the rental of publicly owned lands and even by long term financing. Governmental agencies would not do this housing efficiently, as owners. Governments in this country do everything inefficiently that they now do. But, with the supervision of carefully selected Housing Boards, control can be had of expense and method without losing the invaluable initiative of industry technique and experience. Mrs. Woods points out in her recent book that we pride ourselves we have avoided the European Governmental methods in subsidizing low-cost housing. But we have actually subventioned housing in New York City (in the 1921-1932 period) through exemption from taxation of new houses with a larger total amount of money than greater London did with its aid for the construction of workmen's houses since the war. And London got good houses for a class of workers for whom New York never built a single room during that same period.

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Every one of our cities is cursed with a blighted area—a great district of old rundown business and residence buildings. These would have no logical worth today had a reserve been set up for their depreciation during their useful existence. We know that it is silly to go out further and further into the suburbs to construct utilities for houses that in turn will find themselves in such a blighted area. The success of certain wisely planned housing schemes carried on even in this period of depression makes it evident that this is a field of construction that can even now be carried on with a fair return on the capital invested. Our task is to work out a new technique of design and finance giving consideration at every turn to the human factors involved. It can be done if we work it out in co-operation—but giving an entirely new meaning to the word cooperation.

A Draftsman Goes to Europe And Brings Back Some Facts

By Irving Coryell

I was born with the wanderlust and working in architect's offices where I came in contact with many fellows who had done considerable traveling did not help to diminish my desire to travel. Naturally, being in the architectural line, my thoughts went to Europe where one could see all the famous cathedrals and other buildings one hears so much about. So, for a long time I dreamed my dreams of the thousand and one things connected with a European tour and made an ideal listener for all those lucky ones who had been over and liked to talk about it.

They all seemed to know a great deal about the subject. They were all familiar with the places I hoped some day to see for myself. So, when my trip was no longer a dream but in the "fact" column, I naturally sought out Tom, Dick, and Harry for some information that I felt it would be well to have. Costs, European Rail Travel, Hotels, etc.—these were the things about which I inquired. I had no doubt but that I could get some reliable, definite advice.

When it came to the showdown I found Tom, Dick, and Harry the three vaguest and most contradictory fellows I had ever rubbed up against. True, they had all taken similar trips but when it came to facts and figures those who told the most interesting stories about their experiences were the hardest to pin down.

One would say London was "expensive," and another that London was not. "Well," I asked, "how expensive or how cheap is it?" After a long period of hesitation the answer would come, "PRETTY expensive," or "FAIRLY cheap." Obviously one cannot budget a tour on that kind of dope. The travel agencies were of no greater help as they were intent on selling me much more expensive accommodations than I could afford. Also I did not care to tie myself up to a definite itinerary, much preferring to spend a little more time in the places I liked and a little less time in the ones I found uninteresting. Booking accommodations in advance did not fit in with my ideas of freedom of movement.

After collecting all the vague and indefinite information that one can obtain about Europe on this side of the big pond I decided to take the bull by the horns and my courage in my hands and go to it. Everything worked out so well that I believe a brief outline of what I did and how I went about it will help any average fellow, who does not have too much money, to take a similar trip. So here are some of the facts and figures that I gathered.

Passport and Visas

The very first thing to do is to obtain your passport. In order to do this it is necessary to have a copy of your birth certificate and two photos of the regulation size—three by three inches. The birth certificate is usually secured from the Department of Health in the place where you were born. Any photographer who specializes in passport work will give you the proper size photos. Get a half dozen as the cost will be no higher and they may come in handy. Apply to any United States District Court for your passport and allow about two weeks for it to come through from Washington. The cost is $6 and it is good for two years.

When you receive your passport, go to the consular offices of the various countries you intend visiting and buy the necessary visas. The French, Spanish, and Austrian visas cost $2 each; the Czechoslovakian visa $1. In Germany a visa is necessary but costs nothing. A British visa costs $10, but if you only intend staying for two weeks or so a transit visa is good enough and only costs $1. You are allowed two weeks in Holland without a visa and could probably stay a month and nothing would be said. No visas are needed for Italy, Belgium, or Switzerland.

The above-mentioned countries are the ones I visited. If you intend going to other countries, call at their consular offices for information.

Ocean Transportation

The next thing to worry about is a boat. Go direct to the steamship company office if you want to book a tourist ticket. Tourist Class rates are about one-third of First-Class rates. Tourist Class is the best way to travel unless your funds are unlimited. It is not to be confused with third-class which is really steerage. You will find the accommodations, especially on the large ships, excellent and your traveling companions probably more congenial than in first-class.

If you like ship-life and wish to spend more time on the water, get yourself passage on a One Class Cabin Boat and enjoy ten days at sea instead of the usual five. The cost will be practically the same. In any case, be sure to book a round trip and save about $35. (The return portion of your ticket is good for two years.)

You can buy a round trip ticket from New York to Southampton and have the return made out from Cherbourg to New York or any other combination of ports to suit your itinerary. In other words, a round trip ticket can be arranged from any port in the United States to any port in Europe, and vice versa, that the line serves. Prices will be found identical on all the leading lines, so go on your favorite ship. A round trip Tourist ticket to any of the nearer European ports will cost about $185; including the $5 government tax.

The food, cabins, and entertainment aboard all the big ships are excellent, the service courteous, and the prices of articles bought aboard ship fair. Your American cigarettes will cost fifteen cents; a glass of beer seven and one-half cents; most wines fifteen cents a glass and table wines are reasonable too. Laundry, tailor, shoe repairing, and photographic supplies are all in line. In brief, incidentals will cost no more than if you were at home.

Tips in Tourist Class or on a Cabin Boat should run about as follows: Room Steward $2; Dining Room Steward $2; Deck Steward $1; Smoke Room and Bath Stewards 50c to $1, depending upon how much you use their services. These men receive no salaries and depend upon their tips for a living, so be fair. I have seen people

leave the boat without tipping and consider this a most contemptible trick as the amount involved is so small. *Never tip until you are ready to leave the boat.*

European Rail Transportation

Rail transportation is a mighty important item. All Continental trains carry three classes—and at different rates. First-class is, generally speaking, patronized by people of unlimited means and—Americans. If you want to miss a valuable cross-section of European life ride first-class by all means. Second-class is betwixt and between as the designation indicates. Many middle class Europeans ride this way—also the more conservative foreigners. The cost is considerably less than first.

But, if you are traveling on a limited budget, use third-class. Third-class is clean and perfectly usable all over the Continent with the possible exception of Spain. First-class in Spain is none too good, to my way of thinking. In England there are only two classes, first and third. Third-class here is equal to second on the Continent.

You can save enough by using third-class transportation to pay your way for many days. The average cost of third-class rail for ten European countries is one and one-half cents per mile. In planning your trip take a large map and connect the cities and towns you want to visit by straight lines. Scale off the total mileage, add 10% and multiply by two cents. Set this amount aside for railroad fares. You will find the 10% and the extra half-cent per mile will cover that sleeper jump you will have to make at some time and will also allow you an occasional ride in second-class.

My route was London, Brussels, Amsterdam, Berlin, Dresden, Prague, Vienna, Venice, Florence, Rome, Naples, Genoa, Nice, Marseilles, Barcelona, Carcassonne, Avignon, Valance, Grenoble, Geneva, Lausanne, Berne, Basle, Paris, Bayeux, and Cherbourg. The distance covered was five thousand miles. The total cost $103. This route included sleeper from Amsterdam to Berlin and several second-class jumps; also water transportation from Naples to Genoa with two nights aboard ship and all meals.

Hotels

I am of the opinion that you can allow a dollar a day for hotels while in Europe, and that at the end of your trip you will not be far off. In London you will probably have to pay $2 for a typical middle class hotel room, but a very large breakfast is always included. Likewise in Holland where the price will be about $1.50 with breakfast included.

Do not go to any but a native hotel. You will see plenty of places that are supposed to be for Americans and moderate in price, but your bill will always be larger than expected. The only way I know to find a real native hotel is to walk along until you see a place that looks as though an American had never crossed its threshold. This isn't nearly so hard to do as it may sound. If you are in a small town, and are going to leave from the same station where you arrived, live near the station. There are always plenty of hostelries within a block or two.

In a big city take a cab or carriage to the American Express or Thomas Cook's office. These two agencies are nearly always next door to each other and about in the center of the town. When you dismiss your cab start walking in any direction that strikes your fancy and you will find a place within two blocks. Then you will have the advantage of living in the heart of everything and you won't waste half your day going to and from an hotel in an out-of-the-way section. There is a method of checking your baggage at the station and starting out on foot to look for a place to stop but the disadvantages are obvious. In the first place you do not know where the center of town is and are liable to locate in an extremely inconvenient section. Many of the railroad stations are a considerable distance from the center of things. And further, much time and effort are consumed going back to the station for your luggage so that by the time you are finally installed you are more in need of a hospital than an hotel.

So take the cab, as I suggest. It will not cost over fifty cents in any city. In London the system will have to be varied slightly—go to Russell Square. There are a thousand of just the right sort of places in that vicinity.

Most places in France a room will cost about 80c.; in Belgium 65c.; in Germany, Switzerland, Spain, Italy, Austria, and Czechoslovakia, $1. Always ask in advance if service is included and if it is, or if 10% has been added, *tip no one.* After your bargain has been made stick to it and under no circumstances pay more. Baths are always extra, costing about 25c.

About Food

We mortals have to eat occasionally so we had better devote a few lines to meals. It seems rather silly for me to tell anyone how much or how little to spend on food. The best advice I can offer is, "Go native." Eat what and where the common people eat and it will cost you surprisingly little. If you are not able to eat well for $1.25 per day, or less, in Europe you are either a glutton or else your tastes are too expensive for this type of trip.

In Holland and England a very large breakfast is included with your room, although other meals in these two countries will be a little higher than elsewhere. A typical breakfast average for the other countries would be something less than 20c., as breakfast in these places is a very unimportant meal and little can be had excepting coffee and rolls.

Lunch and dinner, all over Europe, are very large meals and an American, used to a light lunch, cannot eat both of them. The best plan, in the countries that have coffee and rolls for breakfast, is to eat a second breakfast at noon. In England and Holland go very lightly or entirely without lunch. Then at night have a big dinner. Dinner ought not to cost more than 75c. in any country and a good part of the time will cost less. This plan is not only economical but is satisfying as well.

Again let me caution you about tipping. If service is included or if 10% has been added, tip no one. Otherwise tip 10%. It may seem like too little to you but it is all that is expected. It is not advisable to go into a restaurant that does not display a menu in the window and if this menu does not include a fixed price meal, go elsewhere. Stick to the table d'hôte dinners and you'll get a well-balanced meal that will cost less.

Money

Regarding money, it is advisable to carry travelers' checks. Letters of credit are all right for large sums but for any amount up to a thousand dollars I believe the checks safe and much more convenient. They are easily cashed; hotels, stores, railroads, and restaurants all honor them. Tens, twenties, and fifties are the denominations to stick to. A check larger than fifty is hard to get cashed and one for less than ten is usually useless. Have most of your money in twenties.

Every town in Europe is dotted with little money exchange shops. Don't go to these shops, either to cash your checks or exchange money, as you will lose on every trans-

action. It is an excellent plan to go to the American Express Office when you are ready to leave a country and get about ten dollars worth of the currency of the country you are about to enter. This saves the trouble of a border exchange and the loss that a border exchange invariably involves.

The final word of advice in this department is to acquire the habit of mentally translating all prices back to United States money and see if the price asked seems reasonable. Prices on ordinary articles do not vary greatly regardless of where you may be.

Baggage

The problem of how much and what kind of baggage to take is one that should be given serious consideration right from the start. If you are going to be continually on the move a trunk is out of the question. You will be charged for a trunk every time you turn around and at every border you will have to go up to the baggage car, find your trunk and open it for the customs' inspection. You will also learn that a person who has a trunk is subject to a much more rigid inspection than a person who travels light.

My advice is to carry one bag. Get a good sized Gladstone and put only necessities in it. A list of articles of clothing sufficient for the average fellow would be—

1 extra suit
2 pairs comfortable shoes
6 shirts
4 changes underwear
10 pairs socks
1 hat
1 topcoat
1 light sweater
pajamas
handkerchiefs
2 bow ties (they look better than a four-in-hand when a shirt is not fresh and don't wrinkle).

Keep the bag as light as possible. If you pick up odds and ends as you go along make up a package and send them home Parcel Post. If you have only one bag you can pick it up and carry it yourself and be able to get that train at four in the morning without the aid of a moving van.

If you will make a practice of holding your passport in your hand while going through the various customs, you will have a much easier time of it. Often the inspector, after merely glancing at it, will say, "Ah, an American," and will O.K. your bag without even looking into it. So I repeat, if you want to be happy travel light.

Languages

Many fellows who would like to go to Europe hold back because they speak only English and feel that this is not enough to get along with. English is more nearly a universal language than any other, and is quite enough in most cases. If you are fortunate in being able to speak French, German, or Italian so much the better, but it is not necessary. And if your knowledge of any language is meager or your pronunciation is not correct you will get along much better by sticking to your English. Use one word rather than a sentence. A sentence very often confuses and the one important word will be lost. Most English words have two or three synonyms, so don't stick to the U. S. expression alone. For instance "room" may not convey the thought to a Frenchman but "chamber" would. "Lodging" would probably get the same thought over to an Italian.

Speak slowly, enunciate clearly and do not use slang expressions. If you walk into an hotel, it is taken for granted that you want a room, so do not start a useless discussion. When you go into a restaurant it will be taken for granted that you want something to eat. The whole thing boils down to an argument about price. Carry a pencil and some paper in your pocket and argue price with them. The figures you learned in the first grade at school are usable until you get as far away from home as Persia. So don't worry. Use your English and see for yourself how easy, and interesting, it is to get along.

Sightseeing and Amusements

Organized sightseeing by bus, etc., is just as unsatisfactory in Europe as anywhere else. It is expensive and takes you no place that you can not go by yourself. The best plan, and the one allowing you the most freedom, is to buy a map of the town. Mark your hotel, also the places you want to see. Connect all these points with lines along the streets and follow your own route. You won't get lost this way and you will save a lot of time. Use the street cars and subways. You will get a great kick out of it and will see twice as much as any guide could show you.

Do all your sightseeing first; then waste as much, or as little, time in indiscriminate wandering as you care to. Amusements you will have to plan to suit yourself. I do not know your tastes, but here are a few things I would not miss.

A typical English Music Hall or Variety House. It is nearly the same as "The Palace" in New York but there is a difference. Mingle with the people at the bar between the acts, watch them and listen to their conversation. In Berlin the opera when one of Wagner's scores is being presented. In Vienna one of the lighter operas. These are worth while even if you do not care particularly about opera as a rule.

In Germany and Switzerland the beer gardens. A whole evening spent in one will teach you more about the German and Swiss people than you could learn in any other way. In Austria it is a coffee house; in Belgium or France a sidewalk café and in Spain a gambling house.

You will go to Monte Carlo, of course, but stay at Nice and each evening take the bus that travels the High Corniche Road to the famous gambling resort. It is one of the most beautiful rides in the world, a half hour each way. A round trip ticket costs 20c. See if you do not think it the biggest twenty cents worth you ever received. Go into the Casino and watch the play. But do not take a few turns yourself unless you are prepared to lose. A stroll about the gardens will convince you that the money necessary for the upkeep of this showplace must come from the patrons. When you tire of the Casino tarry for a while at the café across the road. Here you will find the best dance band in all Europe and plenty of life and companionship until the bus leaves for Nice at midnight.

Spend an afternoon at the trotting track at Nice and at the racetrack just outside Paris.

These are some of the things no one should miss even if their trip was primarily planned in the interest of architecture or sketching.

Miscellaneous

Your attitude is important and is something that is generally not mentioned in books or articles on travel. Go with an open mind and you will be better received by the people of Europe. If you appear interested in their

city or countryside they won't be able to show you enough of it. You will see things and be taken places that the "tourist" is sure to miss. Travel intelligently — be tolerant.

Don't complain if you find most of the places you visit twenty years behind the United States in matters like sanitation, vertical transportation, or railroads. If Europe were as modern as our own country we very probably would not spend the time or money that a trip across involves. Half the charm of the Old World lies in the quaintness of its methods, its people, and their customs.

Fight for your rights, if necessary; but do it courteously and do not go around with a chip on your shoulder. Be quiet. Americans have an undesirable reputation for being noisy and I am ashamed to admit they have earned it. Don't let anyone get you excited about anything as probably the only thing you can obtain by getting excited is high blood pressure.

Count your change. You will very often be cheated if you do not. It is no disgrace to take the time to do it and if you sweep your change into your pocket without even looking at it you will rightly be taken for a fool.

I would include in my luggage as absolute necessities— a copy of Cook's Continental Time Table, which is revised monthly; and a can of concentrated coffee, if you are a coffee drinker. Before leaving home arrange with your local telegraph office for a cable address. This costs nothing and will save you considerable money if you send home many cables. Names and addresses are counted and use up from 5 to 8 words out of your allowance on each message.

Carry about twenty one dollar bills. Very often a dollar bill will get you a special favor where more than its equivalent proves of no avail.

With the above information I believe that any draftsman planning a trip to Europe can very easily figure out the approximate cost. The prices I have quoted in this article are those charged the transient guest. If your stay in any town is of a week or more no doubt even lower rates, for both room and food, could be obtained.

FROM A PENCIL SKETCH BY FREDERICK W. GARBER

"GEORGIAN BAY"

Steel Windows for Penal Institutions

By Robert L. Clingerman*

PREFACE

On June 23, 1931, there was transmitted to President Hoover the Report on Penal Institutions, Probation and Parole by the National Commission on Law Observance and Enforcement, signed by Geo. W. Wickersham, Chairman.

The article appearing below was written some few months prior to the issuance of that report and was based on the writer's extended study of prisons from the angle of required window improvements.

Robert L. Clingerman

Much that appears in the above-mentioned report has a direct bearing on the subject matter and therefore, even though causing some repetition, some random but important quotations from that report are given as follows:—

Page 208—"People leave prison as well as enter prison." This statement, placed at the beginning of our foreword, expresses a fundamental fact about prison institutions which civilized society commonly overlooks . . . . in figures, the number leaving prison in the course of a year is approximately 96 per cent. of the number who, entering, hear the doors clang behind them.

Page 7—The vast majority of the prisoners in the Federal and State Prisons and reformatories are released within two years. Unless these prisoners are so readjusted before release that they are more likely to be law abiding citizens than before they were arrested and sentenced, then the prison has not served its purpose. If the prison experience not merely fails to improve the character of the inmate but actually contributes to his deterioration; if, as is charged, our prisons turn the less hardened into more hardened criminals, then the prison has not only failed in its duty to protect society but has in turn become a contributor to the increase of crime within the community.

Page 235—The history of prison construction is one of the most fascinating of the less well known branches of the building and engineering industries. Each cell is a fortress in itself, being presumably escape-proof when a man is locked in . . . . Such cells commonly stand in long rows, so that an observer in front sees a series of cages which might contain wild animals. Indeed there is a very close analogy between the construction of a prison and the construction of the more dangerous parts of a park or circus menagerie; except that it is doubtful if any lion ever went to sleep in as strongly built a cage as that of a forger or pickpocket.

Page 35— . . . . If, on the other hand, there is a great deal of unnecessary irritation, if the environment is irritating, then no amount of discipline or cruelty will save the institution from internal violence, riot, fire and murder. The pressure becomes so great that prisoners break out in unexpected fury, not because they plan to, but because some incident opens the valve, so to speak, of hitherto suppressed feelings and the prison is in a state of fury and hysteria before anyone knows exactly just what has happened.

Page 72— . . . . It is therefore suggested that buildings be so constructed as to make possible a grouping of prisoners in minimum, medium, and maximum security structures. . . . . The questions to be answered, then, are not merely questions of health, or intelligence, or vocational competence, or any other simple and single factor, but rather the complex question of the probability of successful adjustment to the community upon release. This is a far more important matter than is certain custody. Mere safety from escape is no adequate basis for final judgment of the prisoner and an insufficient basis for ultimate release.

Page 238—Certainly the conclusion cannot be escaped that the individual cell behind an impassable wall is by no means the essential thing that it has been heretofore regarded.

Page 273—Almost certainly the United States county jail is the most notorious correctional institution in the world. Foreign visitors invariably select it as the outstanding disgrace of our whole penal system. For decades penologists have condemned it, and the literature of criti-

*Member American Society of Mechanical Engineers
Engineer Member Society of American Military Engineers
Member American Prison Association
Consulting Engineer

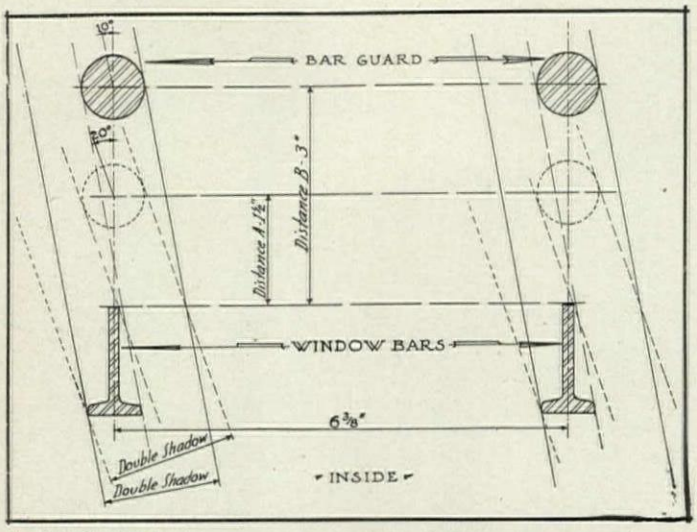


DIAGRAM A—The above only takes into consideration the horizontal movement of the point of light intensity since it is a horizontal section. It does, however, clearly show the inefficiency of the system. The further the guard and window bars are separated the less the efficiency. With the center of the bar guard three inches from the outside face of the window a double shadow is thrown for all hours when the point of light intensity is ten degrees or more from a right angle to the window. By closing the distance to one and one-half inches as shown dotted, this angularity increases to twenty degrees, thus giving fewer hours when a complete double shadow is thrown.

cism heaped upon it is probably more violent in tone and large in extent than that heaped upon any other institution. For this there is justification and reason.

Page 295—O. Basic Findings.

(1) People leave prisons as well as enter them. At any given moment the stream of persons coming out of prisons is substantially as great as the stream entering. (2) The primary object of incarceration is not to punish. It is to benefit society by reclamation of the offender where possible, and by indeterminate segregation of the offender so long as reclamation is impossible. (3) Prisons ought to be less large than they are today, the maximum population recommended being 800. Construction should be strictly for use, and each State ought to plan its institutional construction carefully. Simple and inexpensive construction can replace much of the expensive construction now current. Maximum security is not necessary for all of the persons sent to penal institutions.

* * * * *

For many years society has exercised the right to take away the freedom of an individual convicted or even suspected of wrong doing. Due to erroneous prison construction society frequently has, when taking away the freedom of the individual, also taken away that individual's God-given right to a normal supply of daylight, sunshine, and fresh air. This was not entirely intentional, but was primarily the result of ideas in construction, then thought to be sound, but now known to be unsound.

Too much criticism should not be directed toward those responsible for such conditions having existed in the past. Prison construction is just now getting the much belated thought and study which it deserves and it is fortunate that our wave of building penal institutions of all types should come at a time when there is so much knowledge on the subject available and the public interest at such a high pitch.

One can look at an old style cell with its dark, poorly ventilated and therefore unsanitary interior and readily understand that the only mental seed that can grow in such environment is resentment. Then one can picture almost the same interior flooded with light and sunshine and with proper ventilation and understand that the seed of reform might easily and quickly grow.

The treatment of the interior of the rooms in which we live has a decided effect on the minds and lives of all of us. Those detained in Penal Institutions are subject to the same reactions. Any of us starting as completely normal people if placed in a steel cage will soon become subnormal. How then can we expect those who may be at least to some degree subnormal to do other than to react unfavorably.

Without in any way bowing down to the extremists, modern thought demands consideration of these factors and the challenge is today right at the door of all those having any control whatever over the planning and construction of new prisons to make them modern in this respect. Construction design must keep pace with the strides of psychiatry and penology.

Classification of an inmate's room as a "steel cage" will depend to a very great extent on whether or not it has an individual window and if so then on the treatment of that window opening. Some recent plans show the window placed outside with the usual bar guard on the inside. While this will improve the appearance from the outside, its depressing effect on the inmate will be increased, the working on the bars in an attempt to escape will be facilitated and the temptation to do so therefore increased, so that such an arrangement can only be considered as a step backward.

Windows are more than a construction material—they

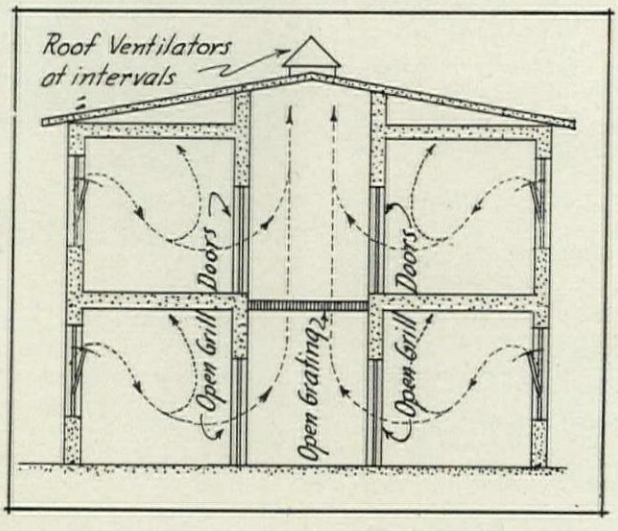


DIAGRAM B—The cooler air upon entering will first sink toward the floor and then find an outlet through doors made all or in part of open grills. The roof ventilators will maintain a suction through each cell. Due to the stack effect this suction will be stronger on the lower floor. For this system, it is recommended that doors be used with upper section only of open grill, such section to be equipped with a sliding wire glass panel to vary the degree of opening through the grill and better control the movement of air through the room.

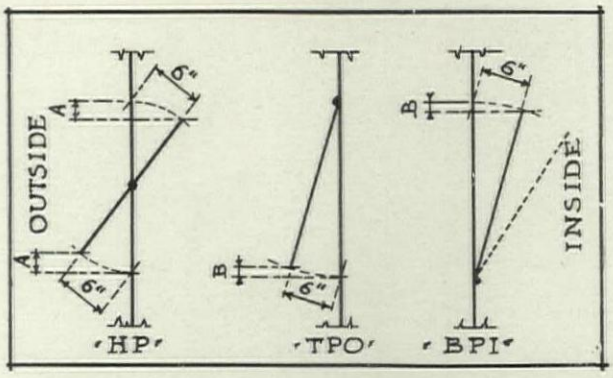


DIAGRAM C—Refers only to minimum security group where ventilator openings are not protected by muntins or other bars, thereby limiting the ventilator swing to six inches net. Note the two horizontally projected net openings A for the horizontally pivoted (HP) type as compared to the one opening B for either the top pivoted outswinging (TPO) or bottom pivoted inswinging (BPI) types. The swing of the ventilator in the BPI type tends to deflect air inside, thus making it more efficient than the TPO, but it cannot compare with the HP so long as the opening is limited to six inches. For the intermediate and maximum security windows, the protected ventilator openings remove such limitation in the degree of ventilator swing, thus greatly improving the efficiency of the BPI construction—see dotted indication above.

are a psychological factor affecting the entire scope of penology. Their importance must not be underestimated. Dark, dreary, sordid and foul interiors as places to house human beings have been primarily brought about in the name of security. Study and experience have developed new ideas on this subject.

Security

It must be admitted as fundamental that the *degree* of security offered by *any* window construction is in direct proportion to the *degree of supervision* over the inmates and the extent of careful management over the entire institution.

Common sense indicates and experience has shown that of all the ways there may be to escape from an institution, about the hardest that could be selected would be for a prisoner to hack his way through the window opening.

When it happens, it is because other avenues of escape have been closed through proper supervision, while *blind confidence* was being placed in the so-called escape proof qualities of a window device with resultant lack of supervision.

Webster says a window is "an opening to admit light." If sufficient steel is placed in the opening to make it "escape proof," even granting that such a thing is possible, the opening practically ceases to deserve the term of window.

When an escape of such character occurs, because of a certain amount of romance attached to the idea, the event always gets newspaper headlines. Good newspaper men know the value of such headlines as "Prisoners saw their way through steel bars." Escapes of other character, and there have been many, excite much less comment.

This may be illustrated by two specific instances, in one of which three men made their escape and the other four.

CASE A—*No supervision.* Men waiting trial. Window openings carried, in addition to a wood sliding window, two sets of bar guards, one on the inside and one on the outside. The inner one was of ordinary steel, while the outer one had been purchased and installed as being of "tool proof" steel. Both sets were sawed through and three men escaped. Newspaper headlines and much comment.

CASE B—*Lack of proper supervision.* Four men jumped into an automobile which had been driven into the property by an official. They just drove away. Comparatively little newspaper comment.

These two cases happened within a few weeks of each other and were located within thirty miles of each other, and clearly and forcibly prove the point made above—the degree of supervision determines the escape hazard. Men working out of doors, with nothing but air between them and the wide open spaces, do not escape when properly supervised.

This does not mean that any degree of carelessness can be permitted in the selection of proper windows, but only that the overemphasis and distorted ideas that have existed in the past be discarded and the matter now approached from a more modern angle. Window constructions must be selected to meet the requirements of the particular case at hand, which necessitates the three divisions of security listed below.

a—Minimum security.
b—Limited or intermediate security.
c—Maximum security.

Just where and under what conditions the three types should be used is a matter that must be determined for each individual institution by those controlling its design and classification. All windows should positively *provide detention*, if not to prevent actual escape, to prevent "visiting" and going on surreptitious "errands."

From a security standpoint, the sole objective is to *prevent* escape. From mediæval times up until quite recently there has been but one answer offered for windows, namely, to put a large quantity of steel in the opening, the larger the better. Such an answer is no longer satisfactory. Careful study shows that two equally important factors must be considered.

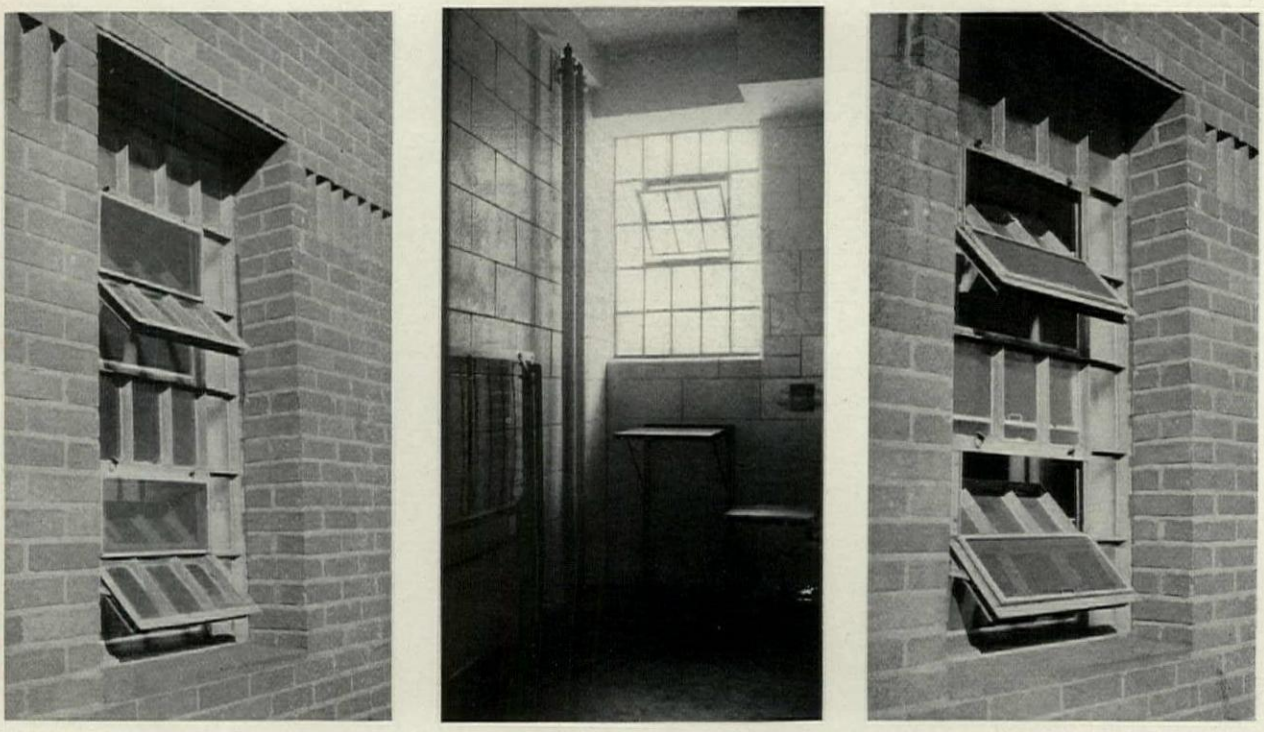
a—Time required to escape when equipped with certain tools.
b—Visual evidence of an attempt to escape. This phase of the matter has not in the past had sufficient consideration.

In addition to the time and difficulty for one man to break through an opening another factor is of importance—the guarding against concerted action of a few or the case of a riot where many may be involved.

With properly engineered and constructed intersections between the vertical and horizontal bars of a window, weight and depth of sections used become determining factors. It is a fundamental law of beams that for plain rectangular shapes the strength varies as the square of the depth, while the rigidity varies as the cube of the depth. Other than rectangular shapes are used in the making of windows, but this law still applies sufficiently to prove the importance of depth.

Weight of sections used is of importance, but is secondary to depth in that weight alone does not determine strength. Weight and shape are interlocking factors that must be considered together in the obtaining of strength values.

In ordinary commercial work windows are subjected only to wind loads and are, therefore, constructed to have greatest resistance from the outside, whereas, in detention work, while ample strength against wind loads must still be provided, maximum resistance should be against pres-



WINDOWS IN THE HOUSE OF DETENTION FOR WOMEN, NEW YORK

SLOAN AND ROBERTSON, ARCHITECTS

At the left is shown a minimum security window glazed from the outside. The ventilators are horizontally pivoted and screened. Screens are left on the window the year around and are permanently hinged to the window at their lower edge, being locked shut at their upper edge by a special device to which only the matron has a key. The maximum open position of the ventilator allows a net opening above and below the pivot of 6". Ventilator pivots are entirely concealed in the window weathering. Muntin bars are 1½" deep. Each hand operated ventilator is equipped with concealed friction adjusters. At the right is shown a similar window except that the screens have been unlocked, permitting them to drop down so that the outside face of the window can be washed from the inside. In the center is shown a typical cell using a minimum security type window. Note that the window is set so that it is clearly visible from the cell door through which the view was taken.

sure from the inside to guard against possible concerted action from the inmates.

Fortunately, all of the factors listed, demanding strength, weight and depth of section, help to provide a construction that will also have long life and require minimum upkeep expense.

In many institutions there will be a certain minimum number of cells where security must rate first. Cells housing the criminally insane and the more dangerous types of criminals and even those not generally rated as dangerous, but who will nevertheless make desperate efforts at escape, all justify this rating.

In such cases the buildings should be so designed as to prevent the prisoners ever having unsupervised access to outer windows. (By "outer windows" is meant those which would serve as the only remaining barrier between the inmate and freedom. Where there is a prison wall or the layout is such that an escape through the window would not permit escape from the premises, the problem will somewhat differ.) This calls for inside cell construction, which has one well recognized disadvantage. This is dealt with under the subject of Light.

Finally, the subject of security must be dealt with from the common sense angle. All prisoners will not attempt to escape—many could not be driven away. A fair percentage are much like bad boys who will get into or create mischief whenever and wherever possible, but at the same time without the nerve to try for an escape.

To set up an exact yardstick for the measuring of the security value of a window construction is most difficult. One construction may take say x hours to go through with certain tools yet be so built as to give little or no visual evidence of an attempted escape. Another construction may take only $1/3\ x$ hours, yet by being so built as to give visual evidence of the attempt be the safer of the two. Hours alone mean nothing, for there is most always plenty of time. The chance of getting caught at it means everything.

Screens

Their usage is vital to prevent disease carriers from entering as well as for the personal comfort of the inmates. They may serve an additional important function not hitherto recognized, i.e., *increasing security* and left on the windows the year around for this purpose. They will help in giving *visual evidence* either of an attempted escape or the passing of articles or notes into or out of the prisoners' quarters. Each prisoner should be made directly responsible for the screens in his quarters remaining unperforated and penalties attached to any damage of same.

A part of the failure to recognize the value of screens from this standpoint is that in the older forms of construction sliding windows were used and screens were often entirely omitted, one of the reasons being that while not over 50% of the window could open, it was necessary to screen 100% of the masonry opening. Modern construction eliminates this disadvantage by making it possible

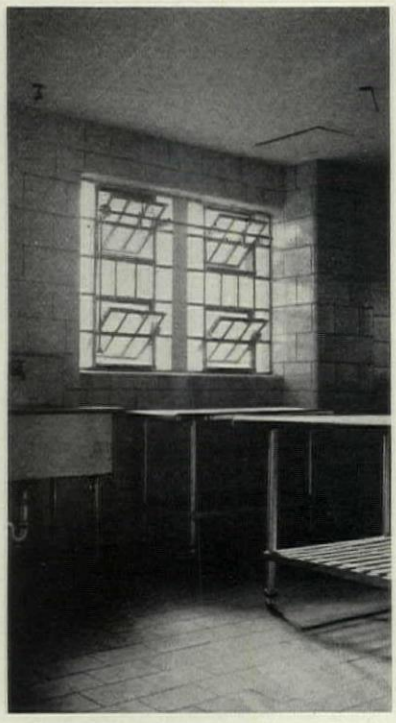
to screen only the portion of the window which opens for ventilation, thereby using unit screens of comparatively small area. These small solid frame unit screens are ideally adaptable for prison work since they can be made of one piece of rugged construction, easily rewirable, and may for special cases carry a diamond-mesh, steel-wire grill welded to their face in addition to the usual 32-gauge, 16 mesh to the inch, insect screen.

LIGHT

The indictment against the old forms of construction is probably strongest on this point. Small masonry openings were blocked off to start with by window and bar guard material in an effort to obtain a degree of security which was, in the majority of instances, far in excess of the requirements.

It is astonishing that, even today, the idea seems prevalent that if the bar of a guard is in direct alignment with the bar of a window, there will be no decrease in light through the use of two members instead of one. The source of light intensity always comes from above the horizontal and shifts across the face of the window constantly, so that there never is a time when it is in direct alignment with all bars, even though the two kinds of bars align with each other (Diagram A). Maximum efficiency demands that only one device be placed in an opening and that it serve the combined purpose of window and guard. Two devices, one to serve as a window and one as a guard, is a needlessly expensive system, in addition to which if such system must equal the single device in the admission of light, the masonry opening must be increased, thereby increasing both window and guard areas and again increasing expense.

The kinds of glass best suited to meet the needs of penal institutions presents a special study in itself and cannot here be covered. Each institution when being designed should have the special study of those qualified by experience to pass on daylighting problems. Daylight and direct sunlight have a direct bearing upon problems of sanitation. Places where food is prepared should have special consideration in respect to sunlight.



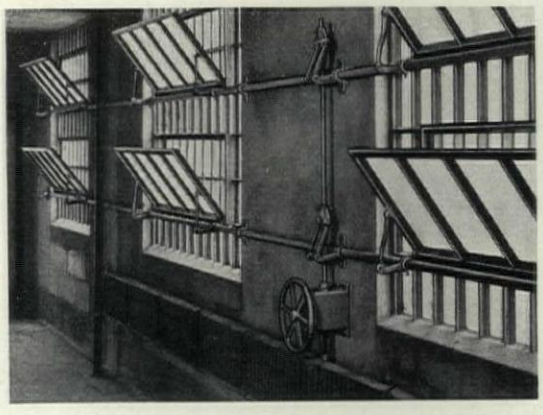
This illustration shows a layout of the minimum security type window as used in the kitchen. The lower vents are hand operated while the upper vents have a small torsion operating device built integral with the window.

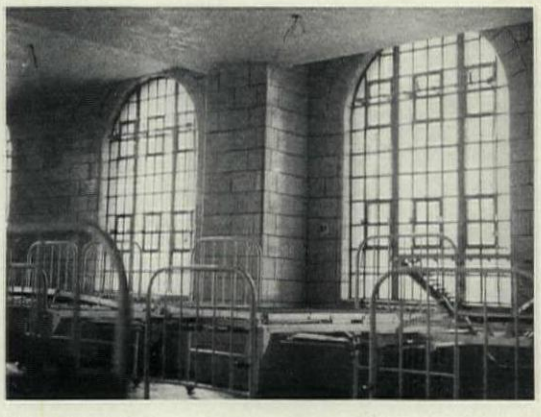
Location of buildings themselves, of living quarters in the buildings and of the windows in the living quarters determine the direct sunlight available and this ties right in with the problems of the psychiatrist, particularly where mental cases are involved. An effort should be made when laying out an institution to locate in sunlit quarters those most needful of having such quarters.

It has been mentioned that, for maximum security, prisoners should not have unsupervised access to outer windows. This brings into consideration the interior cell type of building. Here the problem of adequate light in the cell is more difficult, but not at all insurmountable. While it is true that the strength of the light is in inverse proportion to the square of its distance from the point of its entrance, the window area in the outer walls may be considerably increased.

Windows that are quite high and of considerable width have in the past been used, but these areas have been considerably blocked off by window and guard material. The use of a combined window and guard will increase the light giving efficiency of the opening, but not to a sufficient degree to entirely solve the problem. The openings should be increased in width.

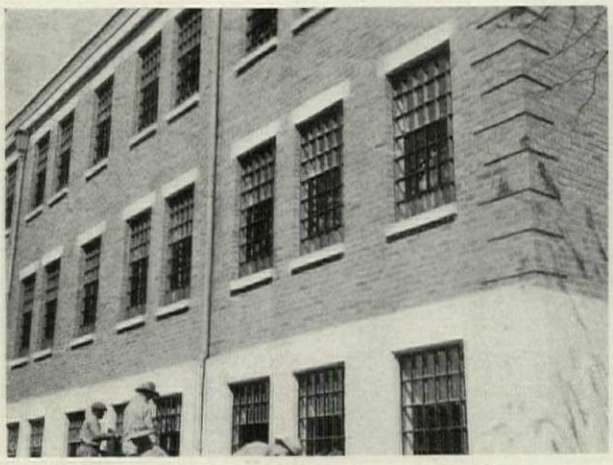
The real solution lies in adopting an architectural development now being carried into all types of buildings—entire walls made of windows. For quite some years, in industrial work, it has not been uncommon to carry the windows past the outside face of the columns and continuously around the building. This idea is now being carried into the more finished and monumental types of buildings and many examples either have or are being completed.

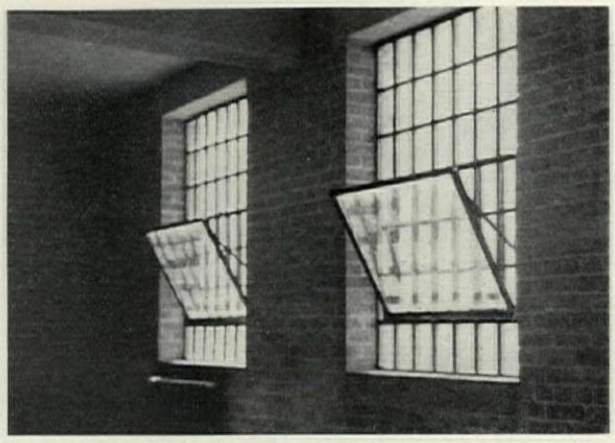




TWO PROBLEMS IN GROUP CONTROL

At the left is shown an application of torsion operating device to maximum security windows in a corridor where appearance was not a major consideration. At the right are windows of the minimum security type in a hospital section where neat, inconspicuous operating device is required to operate in unison all ventilators in each bay.





STATE INDUSTRIAL FARM, MAIDENS, VIRGINIA—CARNEAL, JOHNSTON & WRIGHT, ARCHITECTS

The pleasing architectural effect obtainable by dispensing with old style bars and using maximum security steel windows is illustrated on the left. Windows shown are in individual cells. Note interior view below and the abundance of light. On the right are windows in laundry portion.

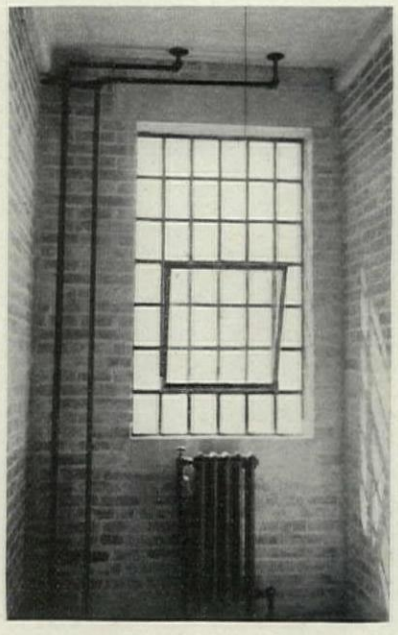
Ventilation

A very usual mistake is to find that in quite small rooms where an inmate sleeps and with the bed within a few feet of the window, the percentage of window ventilation will exceed by a considerable margin that provided in places where manual labor is performed and human beings are grouped together in constant motion.

Recent plans issued have in some cases shown a tendency toward providing much greater ventilating areas for cell windows than is required. It is forgotten that for a six foot by nine foot room a window of say three feet wide by five feet high with its entire area designed to open is out of proportion. In usual residence practice a fifty per cent. opening for such size room would be considered ample. To provide excess ventilation is poor economy both in first cost and in winter heating bills.

Hard and fast rules as to the proper percentage of window ventilation cannot here be stated. A cell to be occupied only at night will require different handling than one continuously occupied—where roof ventilators are used in a building and there are open grill doors in the cells, then cells in the lower floors may require fewer and smaller ventilating areas than those on the upper floors, due to the stack effect obtained. (See Diagram B.) Buildings in northern climates require different treatment than those in southern climates—different buildings about an institution will require different treatment depending on their usage.

Designers and planners have access to the experience and knowledge of those who have for many years dealt with such problems and advantage should be taken of the opportunity to obtain a special study of all window ventilating problems peculiar to each institution.



This illustration shows the general appearance from the inside for windows of either maximum or intermediate security type as described in the article, when using the layout shown. In other words, the difference lies in the weight and depth of bars, so that for a given ventilator layout the general appearance will be the same for both maximum and intermediate types.

One point is worthy of special mention, i.e., for sleeping quarters a bottom-hinged, inswinging ventilator located at the sill of the window is desirable. Provided the plane of the bed is below the ventilator, it will always insure an adequate supply of air at night even during considerable rain. It is particularly valuable in the warmer climates.

Maintenance

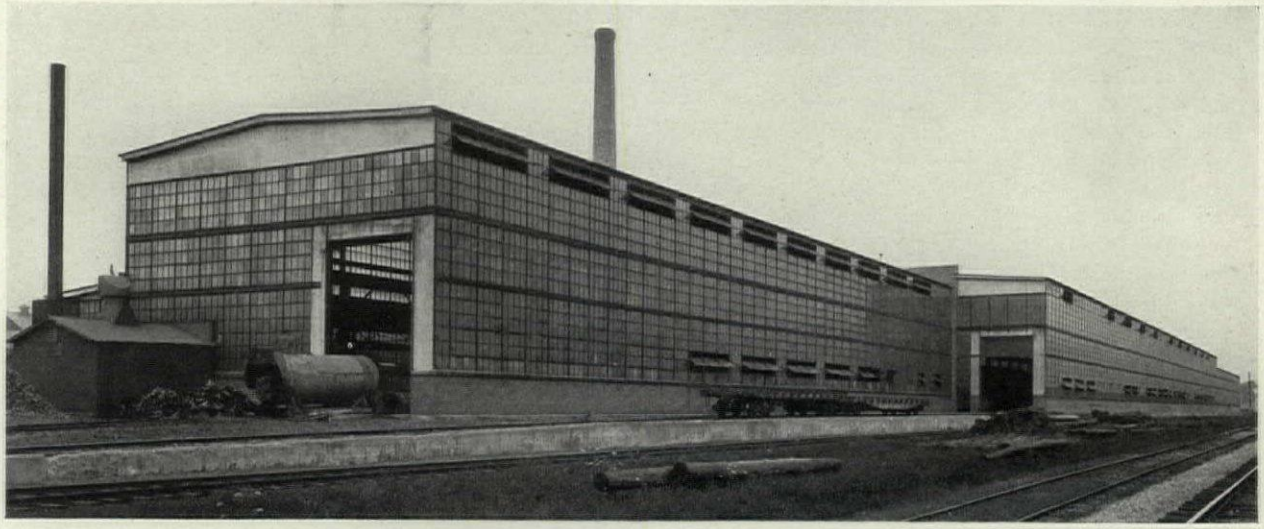
This is a point on which theory and practice clash. Theory says that in a penal institution there is an ample supply of free labor with little or nothing to do and that the maintaining of buildings and equipment cannot be a problem. Practice indicates that even so, maintenance does not get proper attention. Human nature being as it is, good judgment demands preparing in advance for this practical condition, insofar as is consistent from the standpoint of expense.

Strength, rigidity and required hardness of materials demand the use of steel for windows. When this material has in the past caused difficulty from corrosion, it has in most cases been due entirely to positive negligence, primarily at the time of installation and secondarily through an almost complete absence of maintenance.

Many industrial window installations that have been in for twenty years and had just reasonable care are today in almost perfect condition. To insure this condition it is vital that windows be properly painted when first installed. This requires—

1—A good priming coat at the factory.
2—A good field coat before glazing.
3—A second field coat after glazing.

A paint that has considerable merit for all three coats is a pigment of suboxide of lead, containing lead in its



A SHOP AT SPRINGFIELD, OHIO

For some years, in industrial work, it has not been uncommon to carry the windows past the outside face of the columns and continuously around the building. This is the real solution in prison lighting for the interior cell type of building where the prisoners have no unsupervised access to these outer windows.

natural state, which upon exposure to air creates an amalgam formed of lead compounds. Aluminum paint is also being successfully used. Window manufacturers are interested in the subject and their advice will be found unbiased and based upon actual experience and observation.

On the subject of washing windows again theory and practice collide. Oftentimes first cost is considerably increased to provide for easy washing only to find that in practice washing consists of the use of a hose from the outside.

Buildings housing women or juveniles, where the building is under management of women, should provide for washing, for it may reasonably be assumed that such provisions will be used. This will affect windows of the minimum security type.

In buildings with inside cells where the windows may be continuous around the sides of the building, a window washing cage suspended from a track placed around the eaves would be helpful, but may be a needless additional expense where labor not only costs nothing, but may be needed to keep the inmates busy. In other words, failure to keep the windows washed is primarily occasioned by bad management and that same bad management would take no advantage of special and expensive provisions made to facilitate the work.

Location of Windows in Walls

Where adjoining cells are on the outside, it is good economy to have one mullioned window serve two cells, with the partition between the cells joining to a wide window mullion. This will make adjoining rooms opposite hand, but the plumbing also usually creates this condition.

Where there are large rooms or dormitories a repetition of small windows is not good economy as compared to fewer and larger mullioned windows.

In individual cells, the location of the door in relation to the window is such that by looking through the door one's vision is at right angles to the inside face of the window, so that an inmate located in the masonry opening would at once be visible. (See illustration.) In dormitories this might not be true. These two conditions affect the location of the window in the opening with respect to the inner face of the wall. In the first condition, the window placed near the outer face of the wall would be advantageous in creating a usable ledge at the sill for articles. In the second condition, such a location might provide a reveal in which a prisoner could conceal himself.

This latter condition is also true where large windows occur in outer walls and the cells are inside. In such instances the windows should also be placed with their sills six feet or more above the floor line, so as to be out of easy reach. This will not materially affect the light, since the cells will be away from the walls and the light will come from above.

Conclusions

When listing basic requirements that should be carried by windows for Penal Institutions, it should be kept in mind that commercial reasons somewhat limit the list in that it should not include features entirely peculiar to any one product; also exact details of any one product must be omitted. An individual product may carry additional and valuable features which should be considered by architects, prison officials, and other interested parties.

Minimum Security Type

(A special adaptation of industrial windows to serve detention purposes.)

1. Glass size approximately 6″ x 9″ for adults and 5″ x 7″ for juveniles. (Net sight openings will be somewhat less.)
2. Glazed from the outside and prepared for the use of glazing springs in addition to the usual putty glazing.
3. Weight and depth of sections should have careful consideration not only from the standpoint of strength but also to obtain permanency.
4. Intersections between vertical and horizontal bars should be made in such a manner as not to weaken the structure.
5. Ventilators may be any one of three types.
   a. Pivoted at their sides in the center with tops swinging inward and bottoms swinging outward.
   b. Pivoted at the bottom to swing inward at the top.
   c. Pivoted at the top to swing out at the bottom.

   All of these types of ventilators must be limited to give a net clear opening not to exceed 6″ for adults, or 5″

for juveniles. It is therefore obvious that the center pivoted type mentioned under "a" is nearly twice as efficient as the other two types because of providing such opening both above and below the pivot point and is the recommended type. Ventilators of the "projected" type are sometimes used in industrial work. A "projected-in" ventilator is hung or "floated" on side arms and its bottom slides upward in a track as the top swings inward. A "projected-out" type reverses the operation, but with the bottom swinging outward. Consideration of these types should involve careful comparison with bottom pivoted inswinging ventilators where two corners of the ventilators become securely anchored to the fixed frame, thus providing a more rugged construction.

Ventilators pivoted at the top to swing out at the bottom are inefficient and are not recommended. When opened the net projected vertical opening equals that of the bottom pivoted inswinging type for the same degree of angularity, but the latter type serves to deflect air into the building. (See Diagram C.) The top pivoted outswinging type is also difficult and expensive to screen.

6. The window should be constructed so as to be inexpensively screened in a substantial manner with a minimum of small parts and in such a way as to give long life in service. Screens should be furnished with and as a part of the window in order to guarantee proper fit and construction.
7. The entire structure should be of sufficient strength and so constructed that an inmate cannot go through the window at any point without the use of tools.

Intermediate Security

(A type developed specifically for detention purposes.)

Items 1, 2, 3, and 4 given for the Minimum Security Type apply.

5. In the Minimum Security Type the removal of a ventilator would permit an escape through the ventilator opening. For the Intermediate Type this should not be possible. This requires that the ventilator opening be so protected as to make the removal of a ventilator of no importance, which is accomplished by permitting both vertical and horizontal muntin bars to be continuous past the ventilating area and the ventilator itself is applied to the inside face. Therefore, the use of center or horizontally pivoted ventilators described in "a" above is prevented, but at the same time, it removes the necessity to limit the ventilator net opening. Ventilators with their tops swinging inward of either the bottom pivoted or projected type are then recommended. Bottom pivoted types should have substantial friction limit arms to provide various degrees of openings. It is sometimes thought that unless the bottom pivoted ventilator comes down to a horizontal position full effectiveness of the ventilating area is not obtained. Study will show, however, that this is not true. For example, with a ventilator opening two lights high, and the ventilator open to forty-five degrees, it will be found that the opening area at the top plus the sum of the triangular openings at the sides is considerably greater than the net area of the vertical opening which is uncovered by the ventilator. Therefore, since no more air can enter than is permitted by the net uncovered area, the "projected-in" type functions no better from a ventilating standpoint than the bottom pivoted type and the choice becomes one of ruggedness of construction—see reference to same under "5" for the Minimum Security Type.

Ventilators sliding vertically on the inside face of the window could be used but have certain definite disadvantages. To avoid blocking out considerable light with box frames they should be spring balanced which is objectionable in detention work—to be tight they must be weatherstripped—they limit the ventilating area to fifty per cent. of the window—mechanical operation is difficult and expensive—when open they uncover the bars in the ventilator right at the point which is most convenient for the inmate to work in an attempted escape. Their greatest disadvantage, however, is that prison inmates can hardly be classified as "fresh air fiends" and the problem in a prison consists primarily of getting the inmates to keep their windows open rather than closed. The sliding type would permit a direct draft on the inmate, causing him to keep the ventilator closed too great a portion of the time. (Witness the plate glass deflectors used at the sills of sliding windows in office buildings and which are not practical for use in penal institutions.)

6. As given above for Minimum Security Type.
7. As given above for Minimum Security Type except that the change in ventilator construction listed in "5" adds greatly to the security of the structure as a whole and it will be noted that the ventilator could be torn completely off the window without reducing its security value. In the forming of a window the intersections between vertical and horizontal members may be done in such a way as to give great strength and rigidity and the question of whether or not these intersections should in addition be welded becomes one of individual handling and decision. While welding may add to strength, it is not recommended as a sole method of assembly because of a tendency toward brittleness where welds are comparatively small.* Therefore, it must always be considered as in addition to the usual methods of interlocking and because of the additional expense should have careful consideration.

Maximum Security

(Developed specifically for detention purposes using special sections.)

All of the requirements listed for the Intermediate Type will apply. When comparing the Intermediate Type with the Maximum Security Type one might think of the latter as a sort of "Super" window, in that the bars used must greatly exceed in both weight and strength those used in the Intermediate Type.

These bars should equal in weight and area the round bars that have been in use in the making of the old style bar guard. Because of their deformation when rolling to make them adaptable for use in windows they will, however, have much greater strength against bending than the round bars. In addition every bar in the window becomes supported and reinforced by a cross member, a maximum of every nine inches of the height and six inches of the width of the window.

Intersections should always be welded in addition to being mechanically interlocked. Welding alone is not recommended.* This recommendation differs somewhat from that applying to the Intermediate Security construc-

**Present methods of welding intersections depend entirely on manual operation requiring careful technique. Thousands of these intersections may require welding on one production job, all dependent on the human element. Under such conditions, it is reasonable to expect recurring failures when welding as a sole means of assembly is adopted. Hence, the writer's recommendation that welding be in addition to mechanical methods wherever strength and certainty are of major importance.*

tion. This is because welded intersections unquestionably add to security both from an actual and psychological standpoint, in addition to which a larger mass of metal at the intersections of these heavier shapes will cause less radiation, therefore slower cooling, and have greater value. Architects when specifying welding usually specify grinding. While welds of intersections should be neatly done, it is highly preferable on detention work that they remain unground, except in such instances where they might interfere with contact members. After installation, realization of whether or not the welds are ground results only from a rather careful and critical inspection, therefore, the extra cost of grinding each and every weld flush with adjacent surfaces is not worth the small difference in appearance, particularly in prison work. In addition, the unground weld will have more strength.

In order to saw anywhere on the glazed portion of the window, it is necessary to remove lights of glass, which at once gives visual evidence of an attempted escape. It is evident that removal of lights should be made as difficult as possible. The combination of putty which has set, with glazing springs, has a holding value far exceeding what the layman might expect, but in addition the bars should be rolled to provide a retention groove for the putty. When so done glass cannot be removed from the inside without breakage.

Both the Intermediate and Maximum Security Types have certain features in common. Ventilating areas may be located most anywhere in the window and may comprise any percentage of the total window area by using one or more ventilator units. There are frequently places where more than fifty per cent. of the window area will be required to open, which is obtainable with this type, whereas the old sliding type always limited the ventilating area to fifty per cent.

There are sometimes buildings or portions of buildings where ventilators are out of reach or long runs of windows require mechanical operation. With the types of windows above described the use of mechanical operators present no such problems as would exist with sliding windows.

To effect an escape, the bars forming the window must either be cut or twisted out with a wrench. To do either anywhere on the glazed portion requires the breaking of glass prior to the attempted escape, thus immediately giving visual evidence of the effort.

When bottom pivoted inswinging ventilators are used, an attempt to escape through the ventilator opening area by removing the protecting muntins requires either the breaking of the ventilator light or working over the top edge of the ventilator, which is exceedingly difficult. In addition, the ventilating area should always be screened for reasons other than that of security, in which event the breaking of the screen would promptly give visual evidence of the attempt.

On the Maximum Security Type using "super-bars" and with all intersections positively and mechanically interlocked, then completely welded, the twisting out of a bar in such a way as to permit an escape is next to impossible.

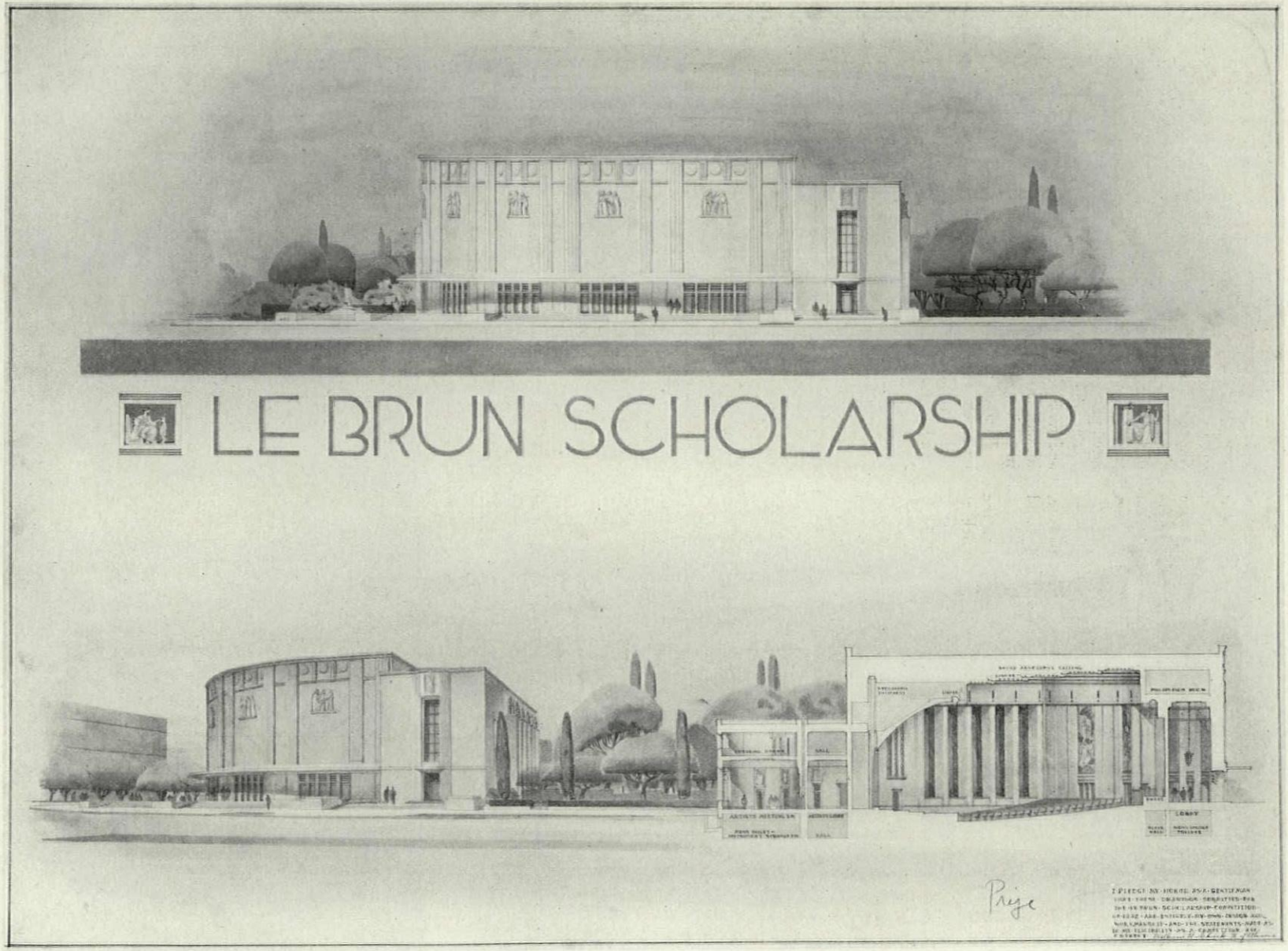
Escapes have at times been possible of completion only because of the very efficient manner in which the old style bar guard has served as a ladder, permitting the inmate to ascend to or descend from the roof by using the outside face of high window openings. The inmates will find the use of these glazed grilles, which are incorporated into windows as herein described, quite unsatisfactory as ladders, for proper placing of ventilators in high openings would make such usage exceedingly dangerous, requiring slow and most careful progress on the part of even an expert steeple-jack.

It is evident from all of the above that the resultant structures will represent a real step forward in security value in addition to providing a bar guard, an efficient daylighting and ventilating unit and a screen, all combined into one single structure, making for economy in first cost, in installation cost and maintenance cost.

(NOTE—Architects will be interested in the thought that any structure specifically developed and used for the purpose of keeping people on the inside will serve equally well for keeping them on the outside. Lower floors of warehouses, tool rooms, and cashiers' quarters in factories, art galleries, street floors of big city residences, banks, etc., all present to the architect almost the same problems as those solved by the development of the above described structures.)

COLUMBIA BROADCASTING SYSTEM RADIO MEDAL

GAETANO CECERE, SCULPTOR



ELEVATION, PERSPECTIVE, AND SECTION OF PRIZE WINNING DESIGN FOR "A CONCERT HALL," BY WILLIAM H. SCHECK

COMPETITION FOR THE LE BRUN TRAVELING SCHOLARSHIP FOR 1932

LE BRUN TRAVELING SCHOLARSHIP AWARDED

The Le Brun Traveling Scholarship, given by the New York Chapter of the American Institute of Architects, has been awarded to William H. Scheick of the University of Illinois, Urbana, Illinois, for his design for a *Monumental Concert Hall in a City Park*. Other awards were to Maxfield E. Gluckman, Albany, N. Y., Rowland Ulmer, New York, and to Harry Widman, of the University of Southern California. The designs were passed upon by a jury of architects consisting of Richard H. Dana, Eric Gugler, Oliver Reagan, and Chester Aldrich, Chairman.

The Problem

A bequest made to a municipality of moderate size provides for the erection of a Concert Hall which shall serve as a memorial to the donor. The site is at the edge of a city park, on park property, on a corner formed by the intersection of a main avenue and a subordinate street. The space available measures 300′ on the avenue by 400′ on the street, and the approaches to the building by foot and motor, together with ample parking spaces for motors during the performances, are to be studied with relation to the building. The area covered by the building shall not measure more than 200′ in any direction.

The building itself is to contain: the Concert Hall proper, seating in all one thousand people, with one or two galleries, and six boxes if desired. A stage which can hold 75 persons, in chorus or orchestra, or both. A pipe organ, to be treated as a decorative feature, if so desired. A Rehearsal Room to hold 75 persons, six artists' dressing-rooms and one larger general meeting room, of about 500 square feet, for artists. All dressing rooms are to have adjoining toilets. A small Library for musical literature, containing not more than one thousand square feet. A monumental Foyer for promenade during the intermissions, to contain a suitable memorial to the donor. The necessary ticket offices, lobbies, etc., and two private offices near the main entrance.

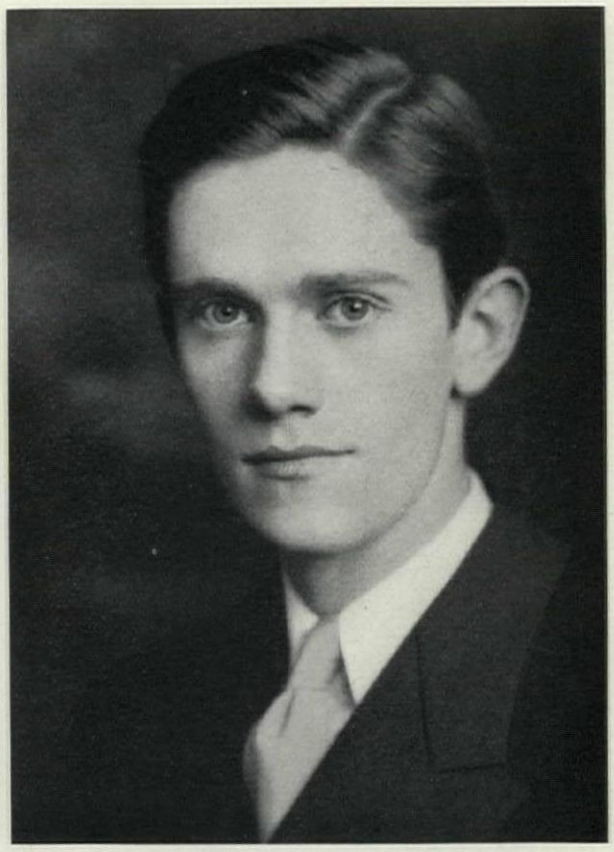
The building should have a dignified character in keeping with its use as a memorial, while it should at the same time be cheerful and inviting in appearance.

The prize winning drawings and the mention designs are shown on the pages following.

According to the jury the drawings submitted were of an exceptionally high level, showing in most cases serious study of the problem, and ample skill and resource in presentation. The winning design was characterized as having a sound architectural quality throughout. Mr. Gluckman's plan "shows great skill and ingenuity in arrangement. Many of the possibilities of the problem are clearly analyzed and brilliantly met, but the relation between the auditorium and the memorial foyer is not adequately worked out, as it is dependent on expensive devices of revolving stage and partition."

The winner, who has worked in a Chicago architectural office, will study architecture in Europe, not being obligated, however, to enter any school or atelier or to attend lectures, the scholarship being intended to supplement school and office training. Sketches and notes made by him abroad will be placed on exhibition on his return.

Contestants, in order to qualify, must be nominated by a member of the A.I.A., must be citizens resident in the United States, between the ages of twenty-three and thirty, with three years of actual architectural practice. Former beneficiaries of other traveling scholarships are not eligible.



WILLIAM H. SCHEICK

William H. Scheick, the winner of the LeBrun Traveling Scholarship, was born in Uniontown, Pennsylvania, September 18, 1905. His interest in architecture began in the office of J. C. Fulton and Son, of Uniontown, where he worked during vacations from school. In 1923 Mr. Scheick enrolled in Carnegie Tech and graduated in 1928; during these years he did some work in Pittsburgh offices. At Carnegie Tech he won the A.I.A. Medal for his five years' work. After graduation from Carnegie, Mr. Scheick spent another year in the Fulton office, after which he departed for the West to teach design at Oklahoma Agricultural and Mechanical College. The next year he went to the University of Illinois to serve as critic of Class B design.

Under the direction of Professor Arthur F. Deam of that school he won several medals in Beaux-Arts design; in 1931 he won the Warren Prize. Mr. Scheick feels that he cannot too highly appreciate the inspiration and criticism of Professor Deam during the last two years. He also wishes to express gratitude for the help and guidance of Professor Grapin and Professor Hitchens of Carnegie Tech, who greatly influenced his architectural training.

Mr. Scheick plans to leave for Europe with his wife about the first of June for a trip of six months or more.

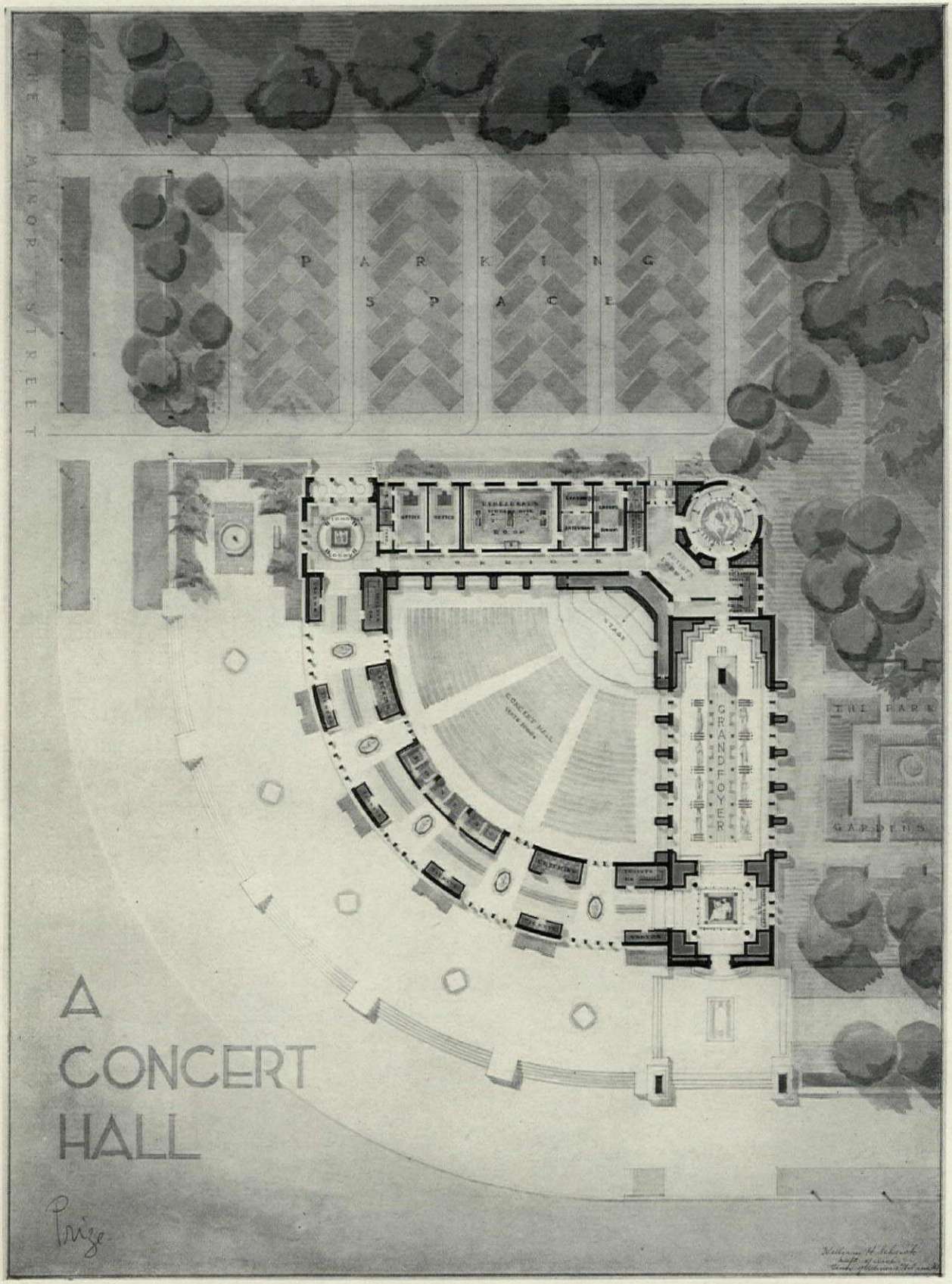
He is a member of Carnegie Tech Chapters of Alpha Rho Chi and Tau Sigma Delta.

MODERN ARCHITECTURE EXHIBIT ITINERARY

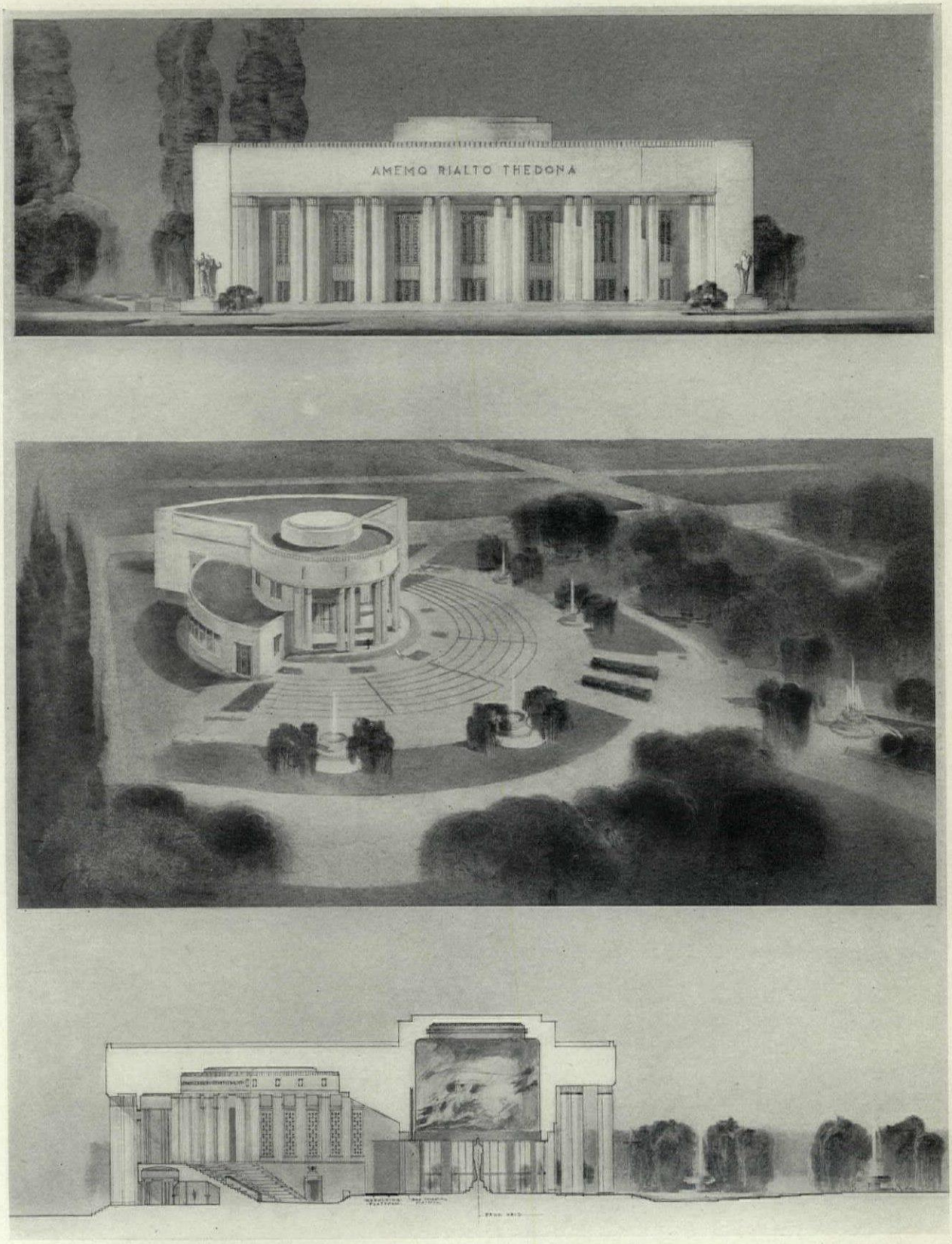
The exhibition of modern architecture which was held at the Museum of Modern Art in New York is now traveling and will be shown in the various cities on the dates given below.

Hartford, Wadsworth Athenum, May 2, 1932 to May 23, 1932; Chicago, Sears, Roebuck & Company, June 9, 1932 to July 8, 1932; Los Angeles, Bullock's Wilshire,

(Continued on page 382)

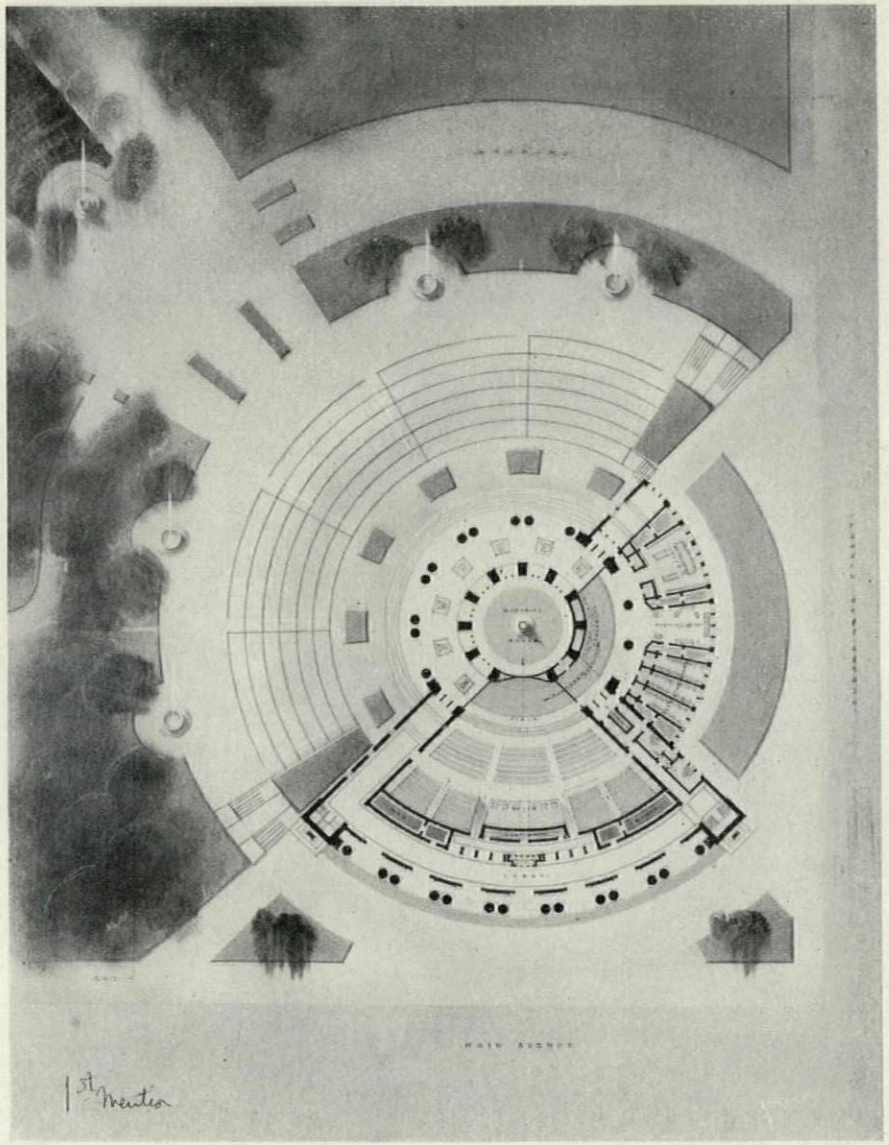


PLAN OF PRIZE WINNING DESIGN FOR "A CONCERT HALL," BY WILLIAM H. SCHEICK
COMPETITION FOR THE LE BRUN TRAVELING SCHOLARSHIP FOR 1932

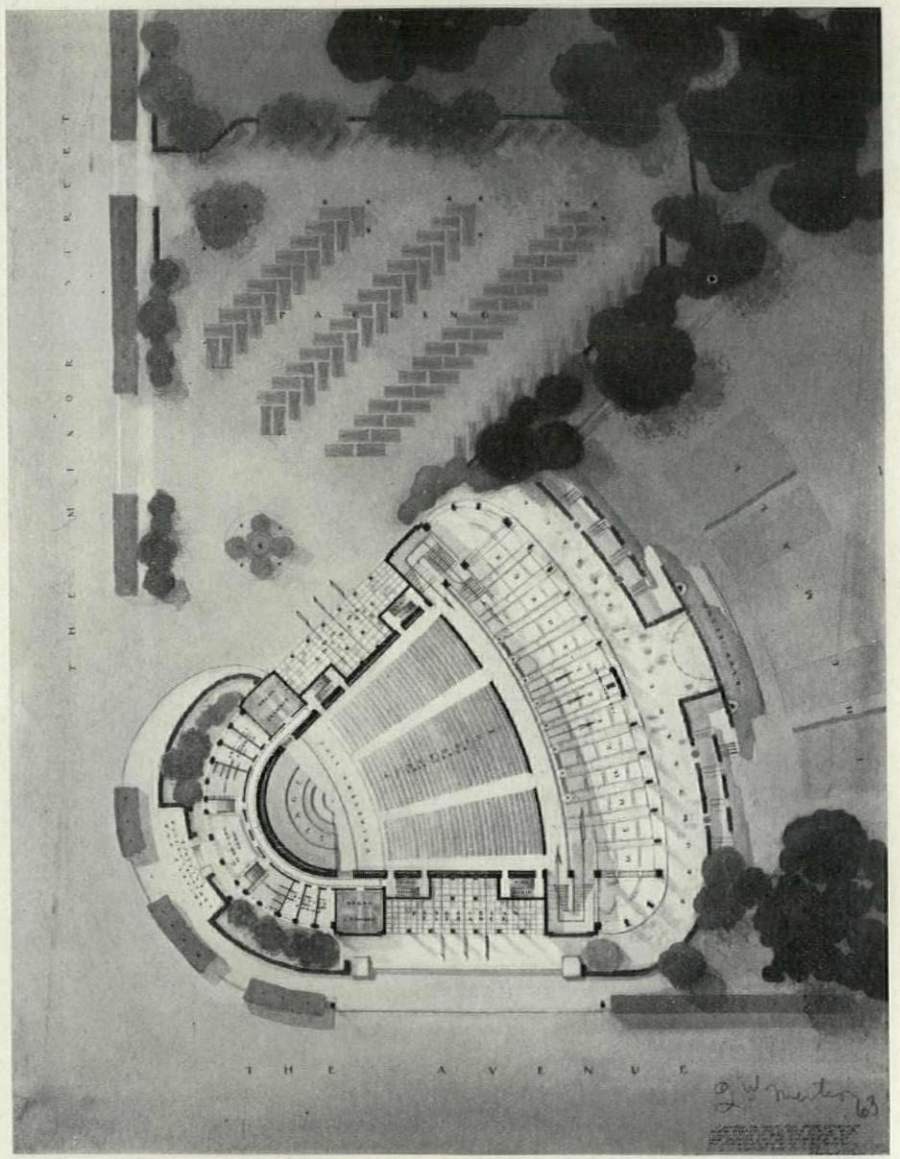


ELEVATION, PERSPECTIVE, AND SECTION OF FIRST MENTION DESIGN FOR "A CONCERT HALL,"
BY MAXFIELD E. GLUCKMAN

COMPETITION FOR THE LE BRUN TRAVELING SCHOLARSHIP FOR 1932

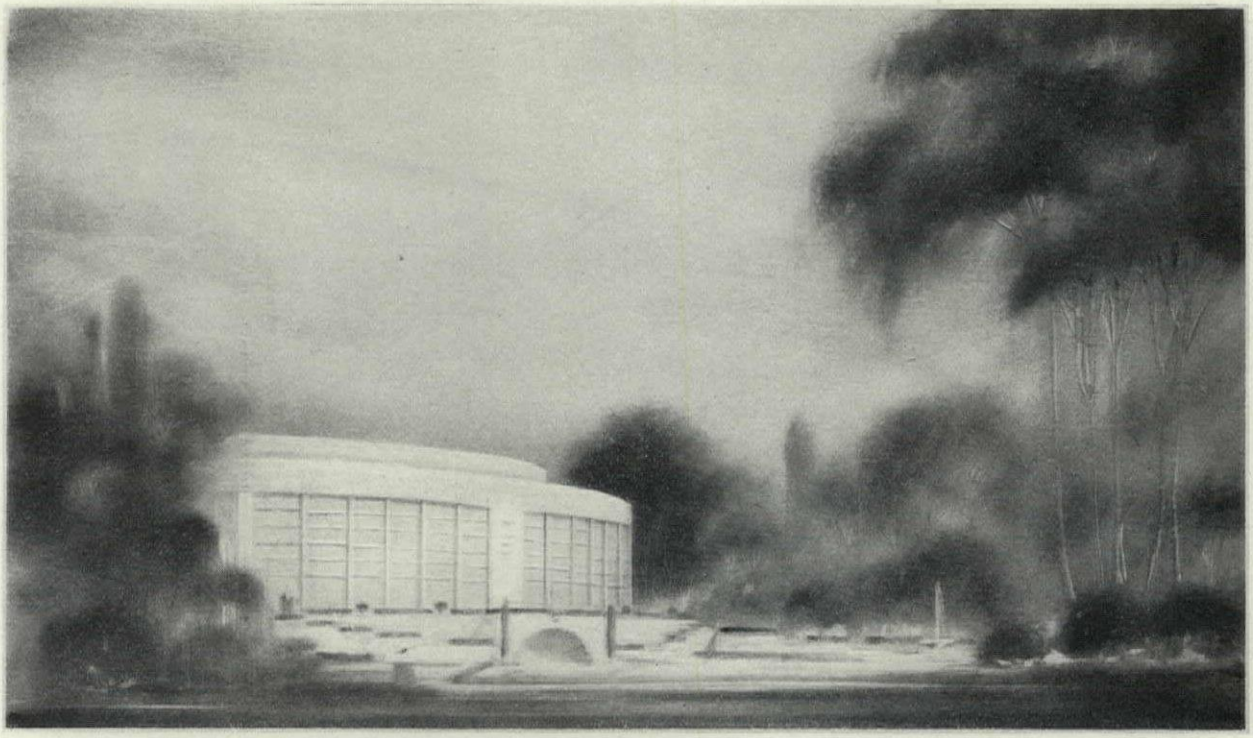


PLAN OF FIRST MENTION DESIGN, BY MAXFIELD E. GLUCKMAN

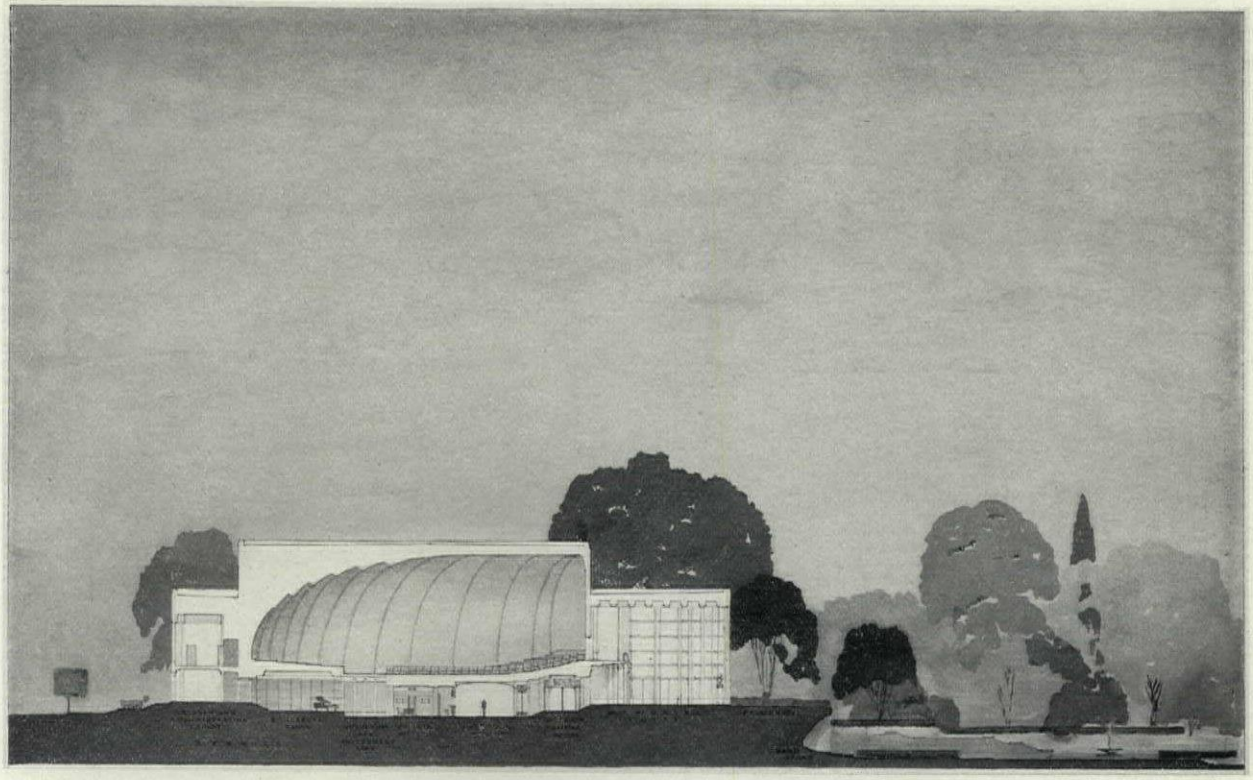


PLAN OF SECOND MENTION DESIGN, BY ROWLAND ULMER

PLANS FOR "A CONCERT HALL," SUBMITTED IN THE LE BRUN TRAVELING SCHOLARSHIP COMPETITION FOR 1932



PERSPECTIVE

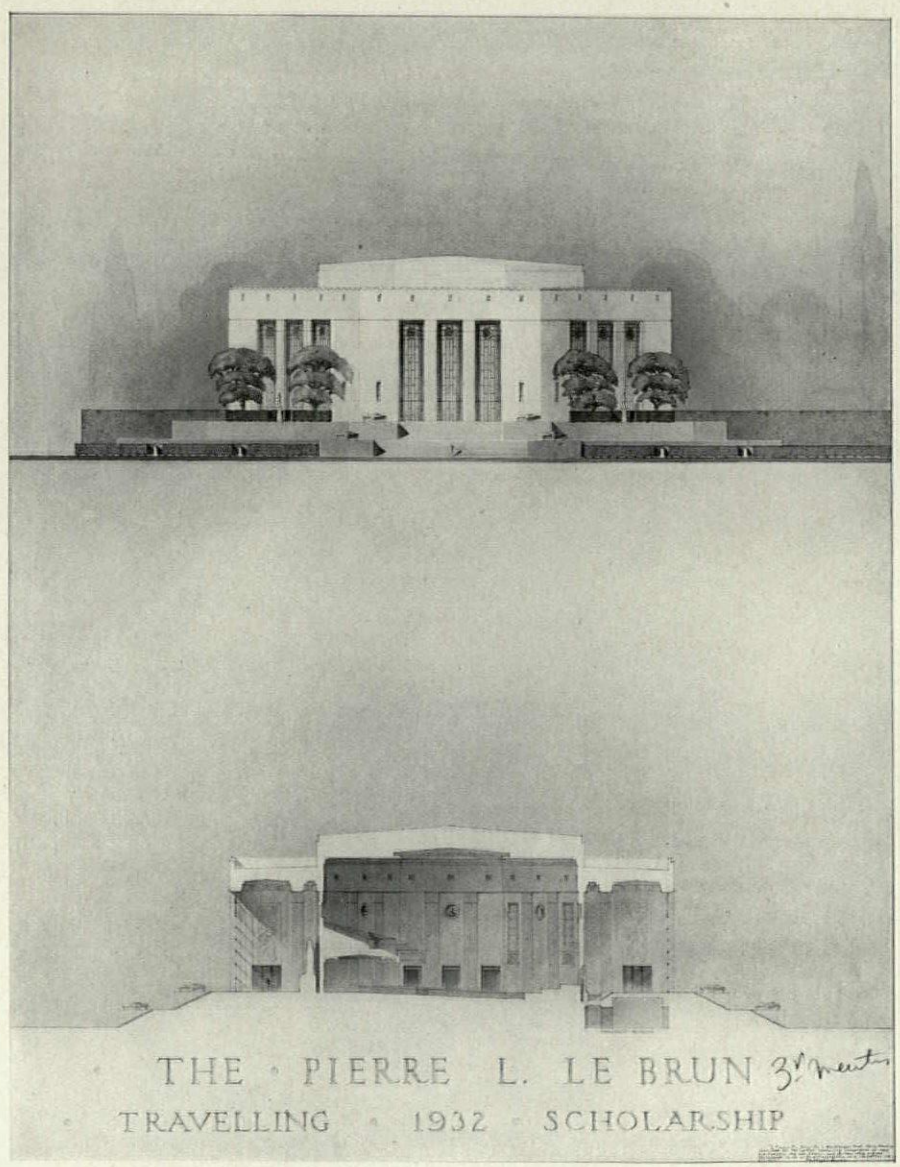


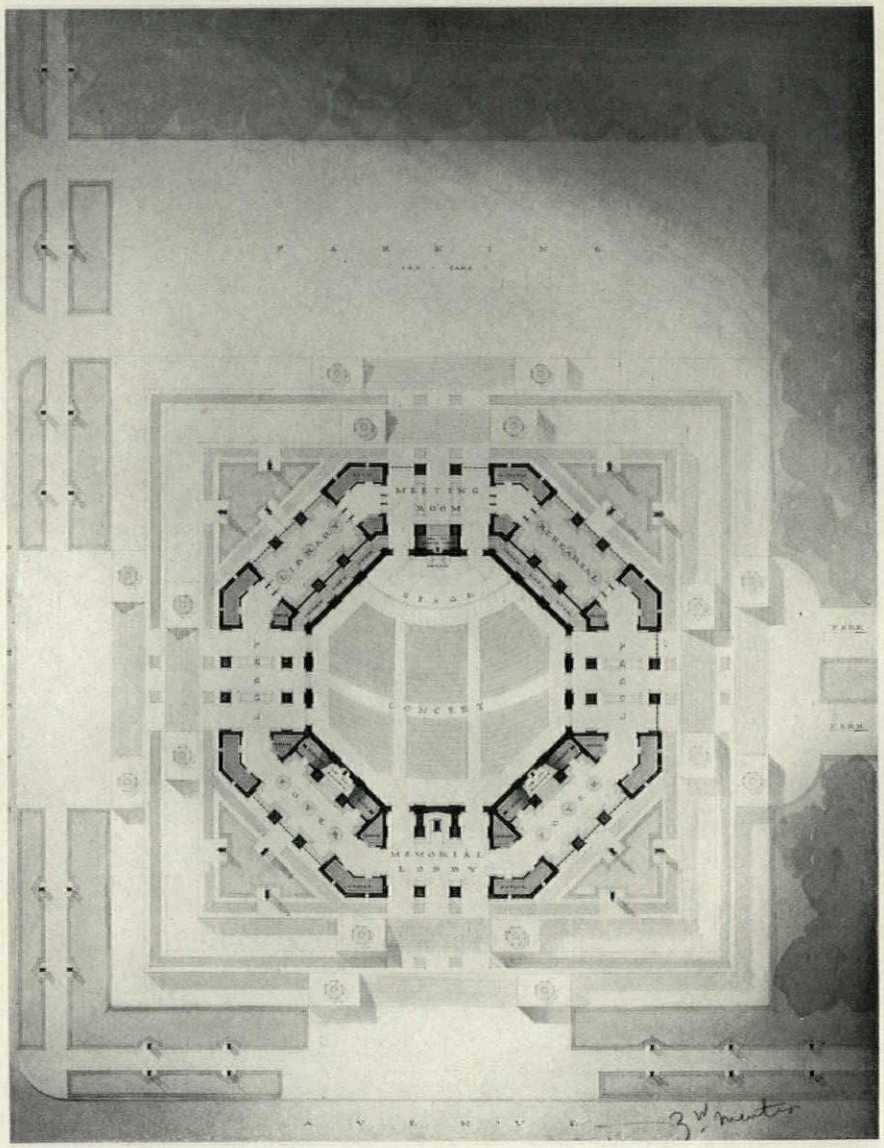
SECTION

SECOND MENTION DESIGN FOR "A CONCERT HALL," BY ROWLAND ULMER

COMPETITION FOR THE LE BRUN TRAVELING SCHOLARSHIP FOR 1932

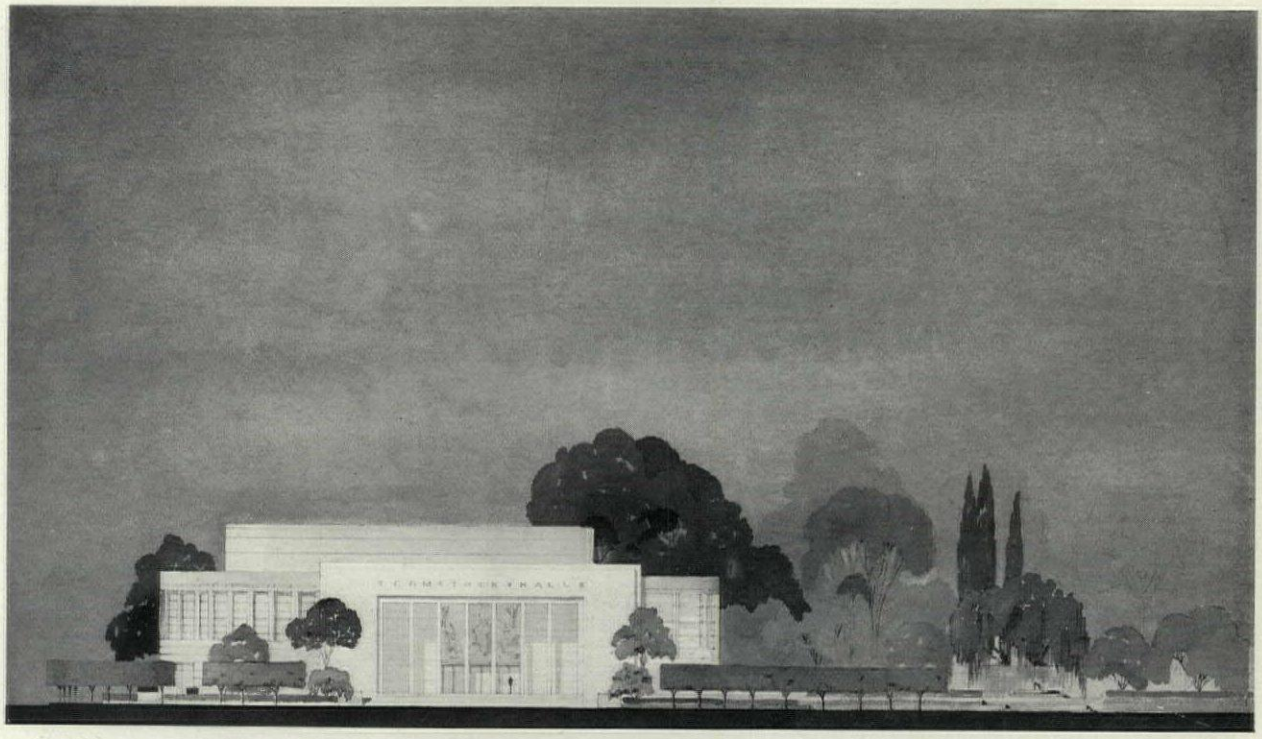
(See elevation on page 365)



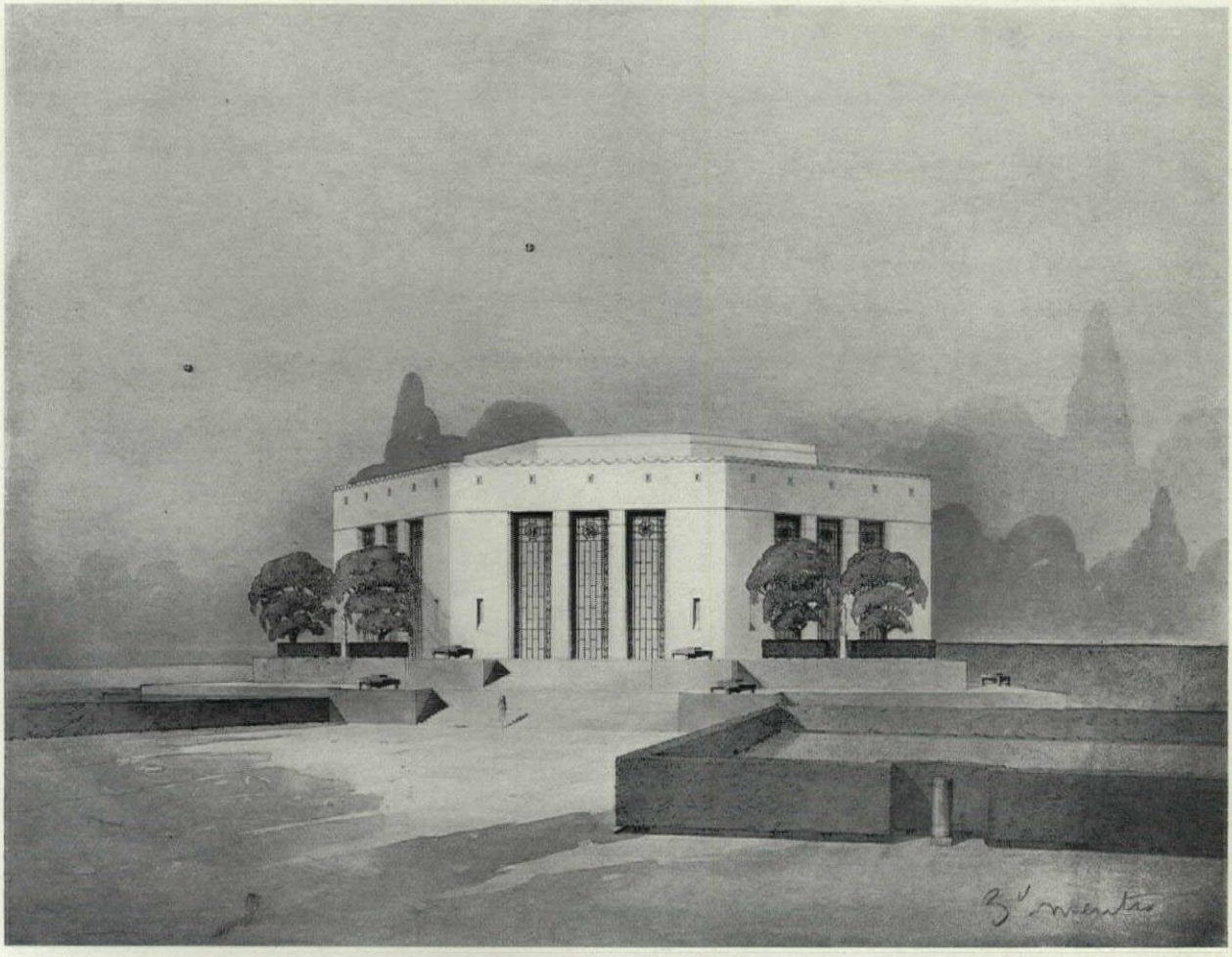


ELEVATION, SECTION, AND PLAN OF THIRD MENTION DESIGN FOR "A CONCERT HALL," BY HARRY WIDMAN

COMPETITION FOR THE LE BRUN TRAVELING SCHOLARSHIP FOR 1932

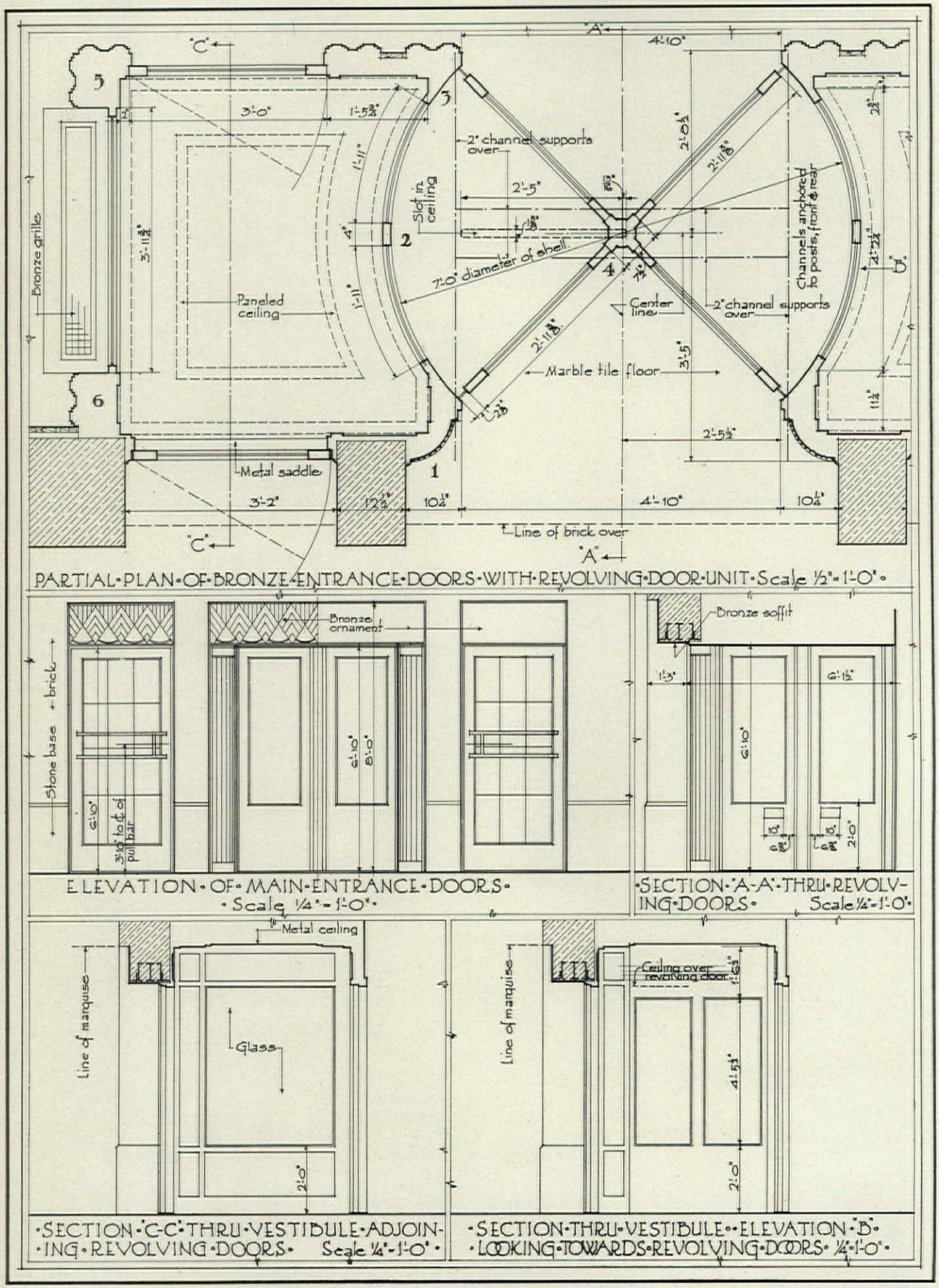


ELEVATION OF SECOND MENTION DESIGN, BY ROWLAND ULMER



PERSPECTIVE OF THIRD MENTION DESIGN, BY HARRY WIDMAN

"A CONCERT HALL"—COMPETITION FOR THE LE BRUN TRAVELING SCHOLARSHIP FOR 1932



DETAILS OF CONSTRUCTION FOR BRONZE ENTRANCE DOORS WITH REVOLVING DOOR UNIT—DRAWN BY PHILIP G. KNOBLOCH

ELDORADO

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Next month . . . . . *Maple tree illustrated*

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THE MART

David Weinberg, 169 East 54th Street, Brooklyn, N. Y., has for sale the following copies of PENCIL POINTS: November and December, 1927; January to December, 1928; January to December, 1929; January, 1930.

Charles E. Schade, Jr., 9401 Forbell Avenue, Brooklyn, N. Y., has for sale the following copies of *Architecture:* March and May, 1931; April to December, inclusive, 1923; January to December, inclusive, 1924. Text of copies in perfect condition.

John B. Reschke, 394 Eldert Lane, Brooklyn, N. Y., has for sale a complete set of PENCIL POINTS from Vol. 1, No. 1, to present date. Price $25 delivered in New York City.

Frank Kunc, 117 East 24th Street, New York, would like to obtain the following copies of PENCIL POINTS: August, 1929, to February, 1930, inclusive, and July, August, and November, 1931.

Drafting or desk space to sublet in architect's suite at 551 Fifth Avenue, Suite 1022, New York. North light, telephone, and privilege of reception room.

R. F. Bullen, 17 Birch Road, Watertown, Mass., has for sale copies of PENCIL POINTS from June, 1920, to June, 1922.

R. E. Bounds, 1717 S. Shepherd Drive, Houston, Texas, would like to obtain the September, 1925, and the June, 1926, copies of PENCIL POINTS in exchange for the May, July, and September, 1931, issues. Copies are in perfect condition. Would also like to purchase all copies of PENCIL POINTS from 1920 through the year 1924.

Richard Hedenkamp, Box 76, Rott Road, Kirkwood, Mo., would like to obtain the first copy of the first volume of PENCIL POINTS. Will trade any issues from the 1929, 1930, or 1931 volumes.

George B. Rogers, 1007 Van Antwerp Bldg., Mobile, Ala., has a complete file of the following volumes of PENCIL POINTS: Volumes 1, 2, 3, 4, and 5. Make offer.

Brentano's, Pittsfield Building, 63 East Washington Street, Chicago, Ill., has for sale the following copies of PENCIL POINTS: July, August, and September, 1931; January and February, 1932. Few copies of each.

Robert Ronowski, 410 N. Edgewood Avenue, La Grange, Ill., has for sale Guptill's *Drawing With Pen and Ink.* Price: $7.50. Also has the following copies of *Architectural Record:* May, 1928, to May, 1931, except for year 1930. Make offer.

John E. Miller, 2727 Colchester Road, Cleveland Heights, Ohio, would like to obtain the May, 1926, and the July, 1927, issues of PENCIL POINTS.

A. H. Howland, 731 Custom House, New York, has for sale the following copies of *American Architect:* 1923 through 1927, inclusive; *Architectural Forum:* 1923 through 1928, complete; also January to June, 1929; *Architectural Record:* complete year of 1928; *Architectural Review:* April, 1918, Special City Planning number. Advertising pages removed. No sets broken to sell individual copies.

H. S. Bill, 1008 Broadway, Columbia, Mo., has the following copies of the Bates and Guild *Brochure Series:* Vol. 1, No. 5; Vol. 3, No. 1; Vol. 4, No. 7; Vol. 5, Nos. 3, 6, 7, and 11; Vol. 6, Nos. 10 and 11; Vol. 8, No. 8. He will sell or exchange these for the following: Vol. 1, Nos. 6, 8, 9, and 12; Vol. 2, Nos. 2 and 11; Vol. 4, Nos. 9 and 12; Vol. 5, Nos. 2 and 8.

Bowman Graton, 182 Brattle Street, Cambridge, Mass., would like to purchase the following copies of *The Architectural Record:* March, 1928; July, 1929; and August, 1930. Would also like to obtain the following copies of the *White Pine Series:* Vol. 2, Nos. 1, 3, 4, and 6; Vol. 3, Nos. 1, 3, and 4; Vol. 10, No. 6.

PERSONALS

DENISON B. HULL AND STANLEY W. HAHN, ASSOCIATED ARCHITECTS, 77 West Washington Street, Chicago, Ill., have dissolved partnership. Mr. Hull will continue practicing architecture at the same address. Mr. Hahn's address is 6 North Michigan Ave., Chicago.

KNAPPE & MORRIS, ARCHITECTS, have moved their offices from 171 Madison Avenue to 192 Lexington Avenue, New York.

GEORGE D. RIDDLE, ARCHITECT, has moved his office from 201 Pacific Southwest Bldg. to 2826 Cedar Avenue, Long Beach, Calif.

C. L. HOLDEN, architectural designer and draftsman, 2000 Scotten Avenue, Detroit, Mich., would like to receive manufacturers' catalogs and samples.

MOUNTJOY & FREWEN, ARCHITECTS, 1000 Patterson Bldg., Denver, Colo., have dissolved partnership. Mr. Mountjoy will continue the practice at the same address. Mr. Frewen has opened his own office at 316 Patterson Building.

(Continued on page 48, Advertising Section)

EMPLOYMENT SERVICE ITEMS WILL BE FOUND ON PAGE 44, ADVERTISING SECTION