PENCIL POINTS

An Illustrated Monthly JOURNAL for the DRAFTING ROOM *Edited by* RUSSELL F. WHITEHEAD KENNETH REID & E. L. CLEAVER *Published by* THE PENCIL POINTS PRESS, INC.

Ralph Reinhold, *President*, P. H. Hubbard, *Vice-President*, William V. Montgomery, *Secretary*

This Month and Next

An amusing little story by Wells Bennett will lead off in the October issue. It pokes a bit of fun at some of the efforts that have been made to get publicity for the profession but does it so gently that no one can really be offended. Perhaps there is a moral to the story. Read it and see.

Claude Bragdon has contributed for next month an extremely interesting theory of architecture which has been evolved from his mature experience. The title is "The Frozen Fountain," from which the reader may gain a suggestion of what it is all about. Mr. Bragdon always stimulates thought by his architectural writings and this article is no exception to the rule. We will be surprised if the theory he will present does not arouse comment and therefore invite our readers next month to let us know what they think of it.

We have an article for October by Rayne Adams, prepared before his untimely death last April. It deals with drawing from life, particularly as taught at the Massachusetts Institute of Technology, and is illustrated by some of the work of students at that school. Mr. Adams brings out some unusual points explaining why life drawing is important training for an architectural draftsman.

Contents

For September, 1931

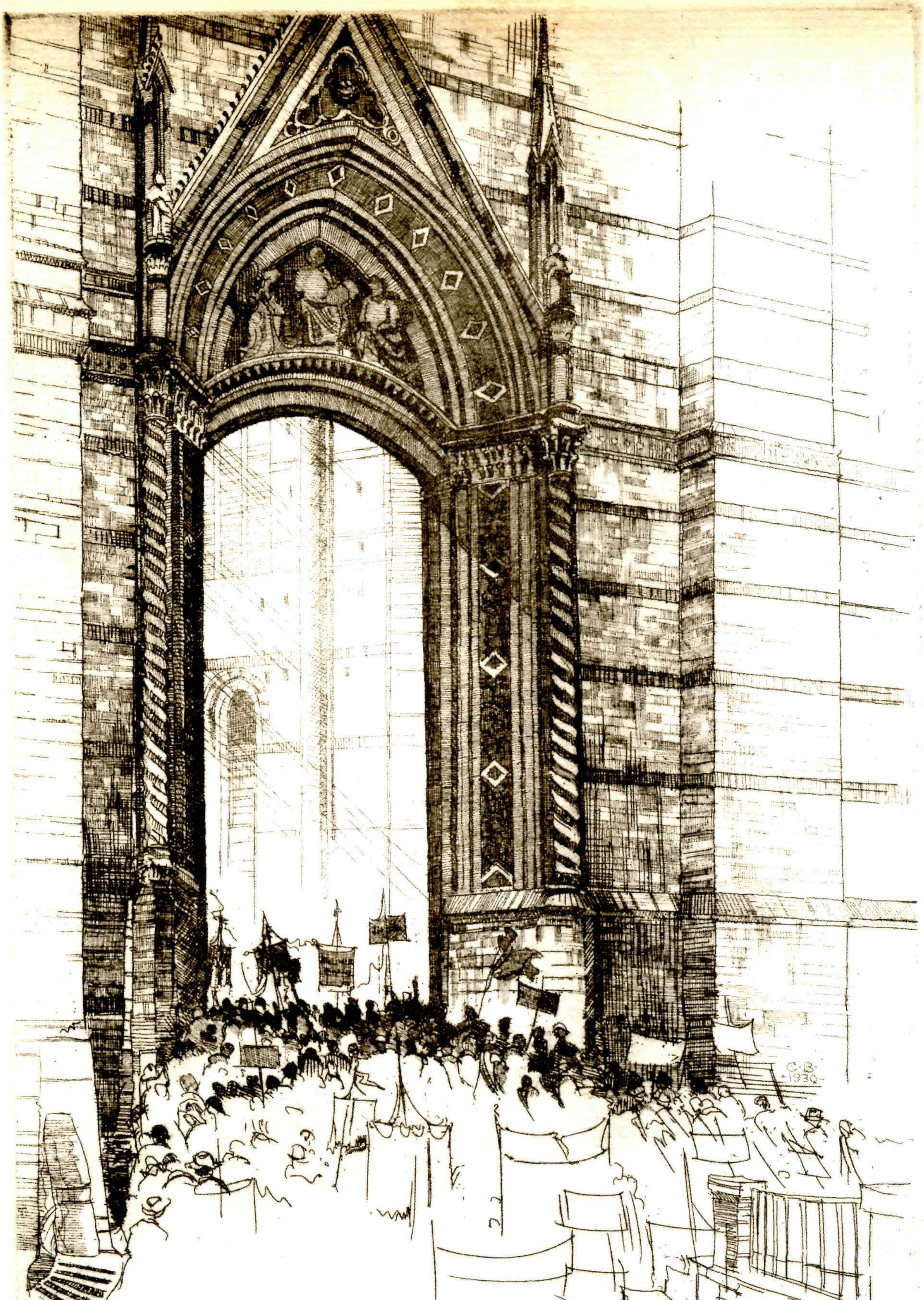
It has been some time since the last "Building on the Board" appeared in Pencil Points, but next month we resume the series with a small school building by Kilham, Hopkins, and Greeley of Boston. This will be shown by means of a selection of sketches and working drawings which will bring out the development of the design.

It will be noticed that we have, in this issue, returned to our usual practice of including four "plates." This feature had to be omitted from the June, July, and August issues on account of the space taken by our symposium on cooperation, which crowded material originally intended for June into the two following months. The plates will be continued in the future as in the past.

John Vassos, who will be remembered as the designer of a small modern apartment published in October, 1930, has recently done an effective modern restaurant on Broadway, New York. Inasmuch as the design of this establishment has had a great deal to do with its financial success we are sure that it will be interesting and are therefore planning for next month an illustrated article describing it.

Pencil Points—*Yearly subscription, payable in advance,* $3.00 *to the U. S. A., U. S. Possessions, Cuba, and Mexico. Foreign subscriptions in the Postal Union,* $1.00 *additional for postage; Canadian subscriptions,* 50 *cents additional. Remittances by International or American Express Money Order or by Draft on a bank in the U. S. Payable in United States Funds. Subscribers are requested to state profession or occupation. TO SUBSCRIBERS: Instructions for change of address should reach us before the twentieth of the month to assure delivery of the forthcoming issue. Please give both old and new addresses. TO CONTRIBUTORS: We are always glad to receive manuscripts, drawings, etc. We will use due care with material in our hands, but cannot be responsible for damages.* *EDITORIAL AND BUSINESS OFFICES,* 419 *FOURTH AVENUE, NEW YORK.*

Pencil Points is indexed regularly in *The Art Index*



EAST PORTAL, UNFINISHED CATHEDRAL, SIENA
FROM AN ETCHING BY CECIL C. BRIGGS

PENCIL POINTS
September, 1931

PENCIL POINTS

Volume XII September, 1931 Number 9

Silhouettes of American Draftsmen and Designers

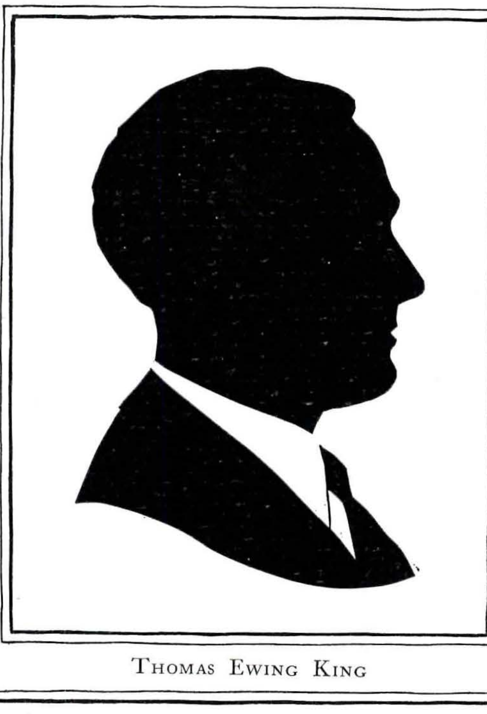
6—Thomas Ewing King

By Lawrence S. Bellman

A limited few have the ability to read into the make-up of their fellows and divine their tastes, and then, with a complete mastery of things architectural, present a development of the embryonic idea. The ability to place one's self in the thought train of another is accomplished only by those both conversant and self-effacing.

King was born in Toledo in 1882 and spent his youth in the city so berated by Dickens. His youth was spent in the days of the grand manner; the Syndicate had popularized the theatre; the little city was gay. Living at that time was complete and the characteristics of a gentleman were a perfect sense of the fitness of things.

The story of King is lined synonymously with that of George S. Mills. At the time of his high school career, Mr. Mills was the drawing instructor. To what extent his development is due to his close association with Mr. Mills one may readily surmise, and the devotion expressed by King has continued through the ensuing years. Mills' force, his enthusiasm, his large understanding of architecture, his generous encouragement and, above all, his far-reaching critical ability could command only King's respect and admiration just as they have commanded the respect of all who have had the privilege of his friendship.



Thomas Ewing King

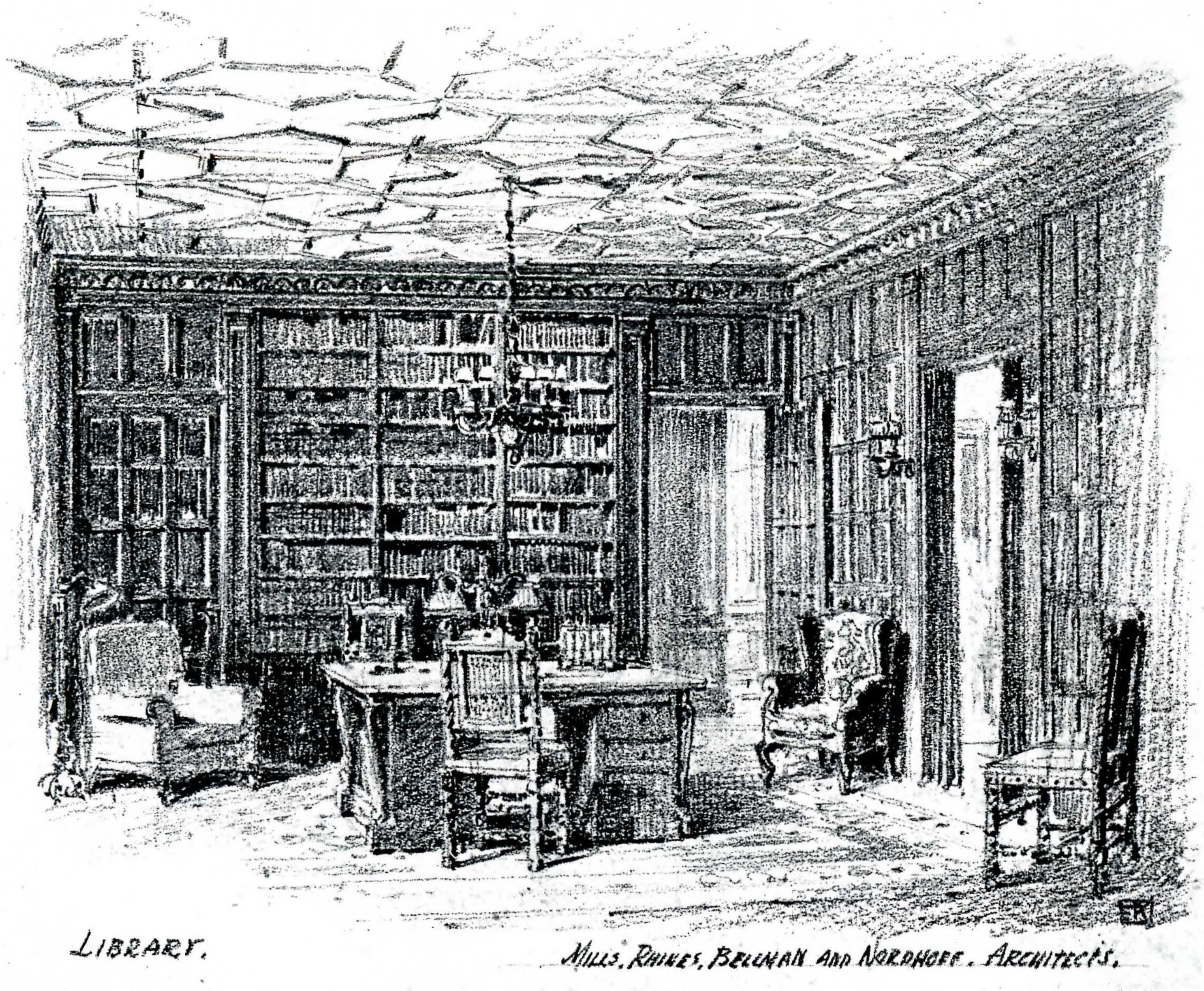
It was upon the advice of Mr. Mills that King spent a year in the Art Students' League after he was graduated from high school. While there, he studied in the antique class of Davis Volk, who suggested that he enter Kenyon Cox' life class. He was also in Daniel French's modeling class.

King then returned to Toledo to spend three years in Mills' office, which had in the meantime been established. During his sojourn there he worked along general architectural lines. This was a time of exuberance, and he was remembered for his happy disposition and love of life. At the close of this three-year period Mr. Mills suggested that he go to the University of Pennsylvania for the two-year course.

Upon leaving he entered Hunt & Hunt's office and was there for five years, during which he gained much general architectural experience, and was closely associated with such master draftsmen as Harvey Wiley Corbett, Livingstone Pell, and William Cromwell.

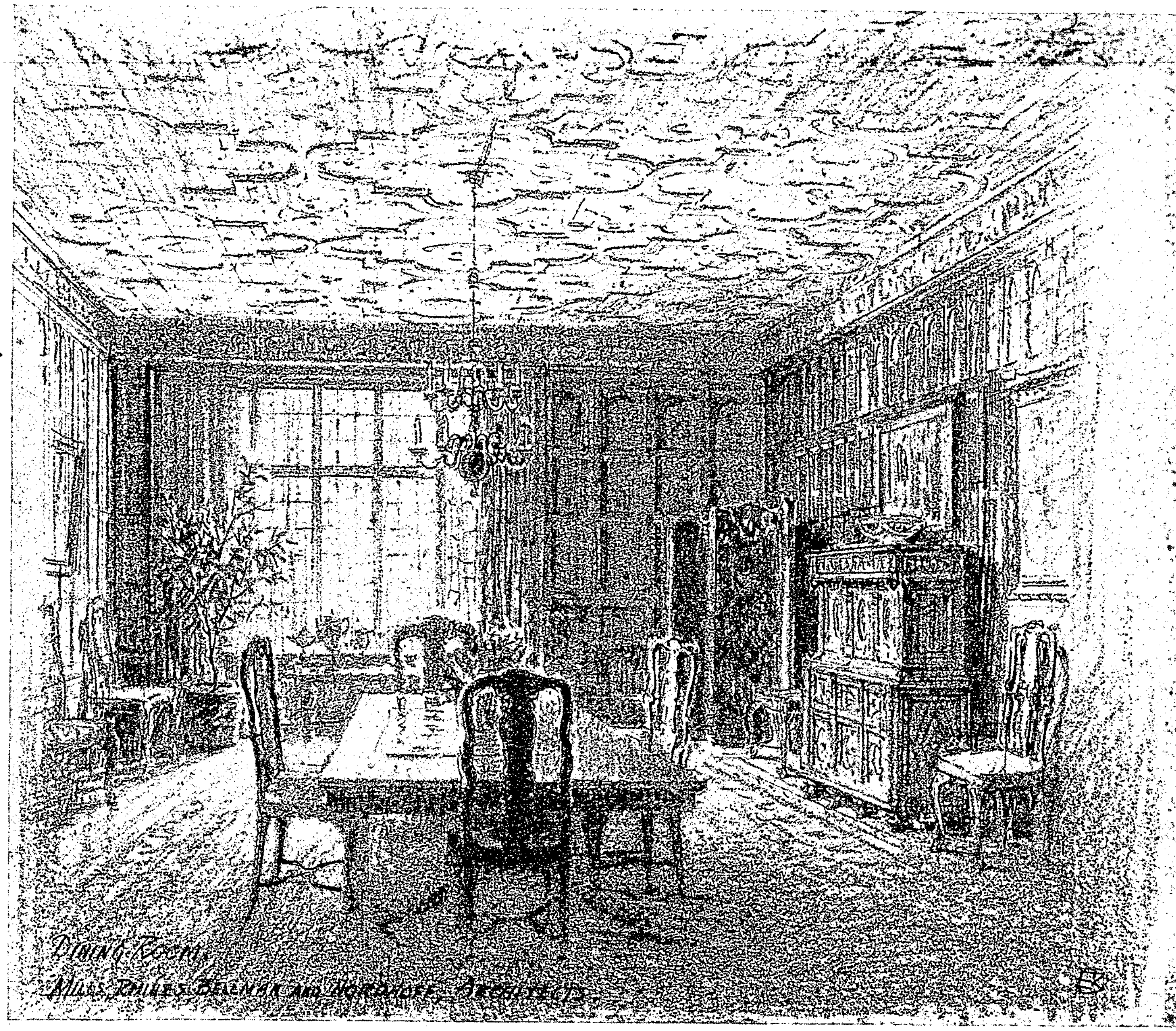
The atmosphere of the office was of the old school. Great *camaraderie* existed over the occasional brimming bowl of punch, and tea was a solemn rite. King's admiration for his fellows' work was great and he was inspired to draw well.

In the interim he was with H. Davis Ives, who introduced him into the office of McKim, Mead, and White, where he spent three years. While he was there he met Ralph Calder through Jerry Holmes and Tom Ellett, a friendship which has lasted through the years. At that time Jules Crow was the delineator and, upon his leaving, an office competition was held to find a successor. King's rendering was chosen and he intermittently executed *rendus* for the office during the



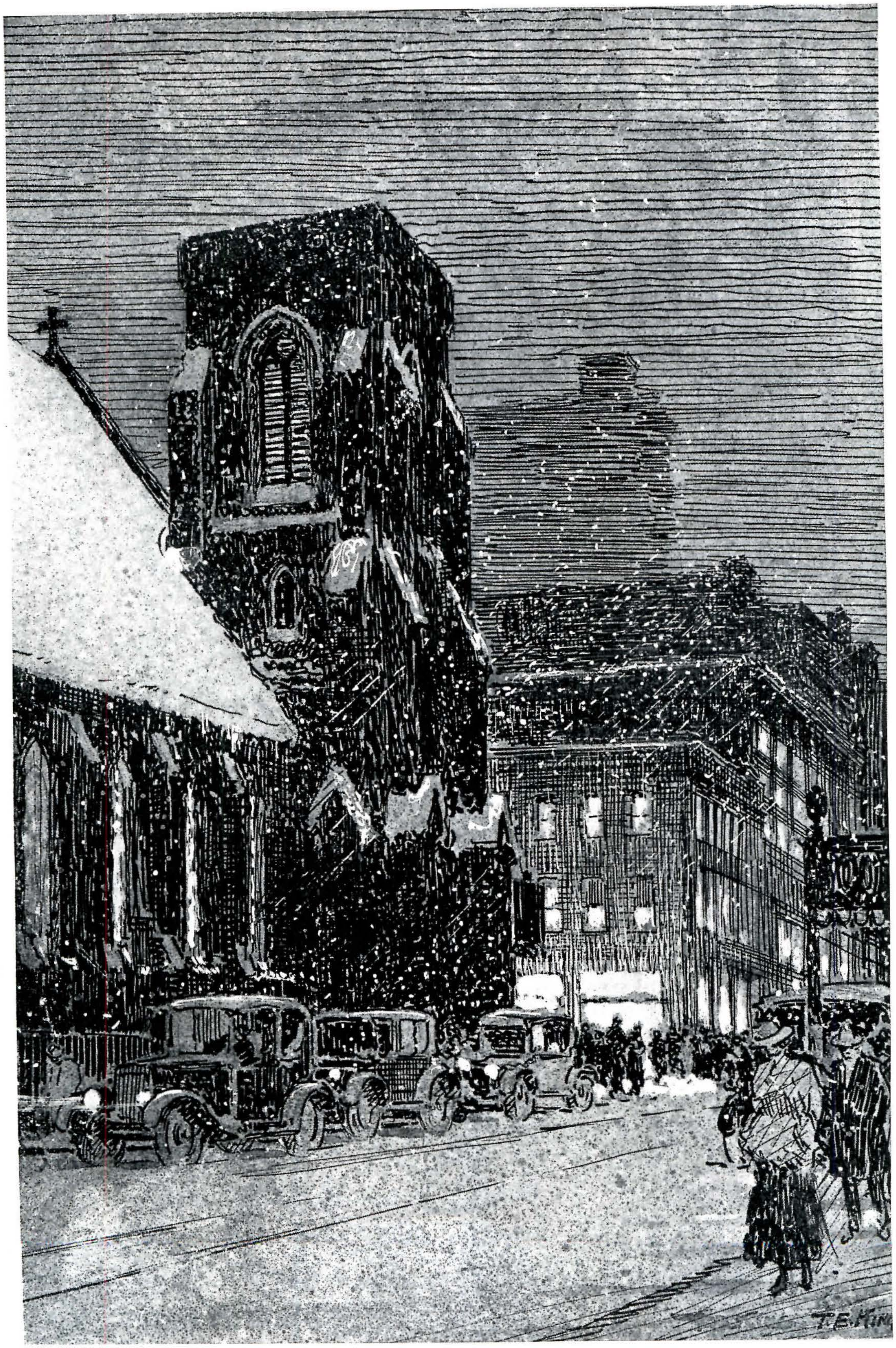
PENCIL STUDY BY THOMAS EWING KING

AN INTERIOR BY MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS



PENCIL STUDY BY THOMAS EWING KING

AN INTERIOR BY MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS



TRINITY CHURCH, TOLEDO, OHIO—PEN-AND-INK DRAWING BY THOMAS EWING KING
WITH A YELLOW WASH AND TOUCHES OF CHINESE WHITE

rest of his stay. Charlie Ewing suggested that he follow this angle and from then on he gradually went in for it.

During this time King made sketches around New York, for publication, for Rheinthal & Newman.

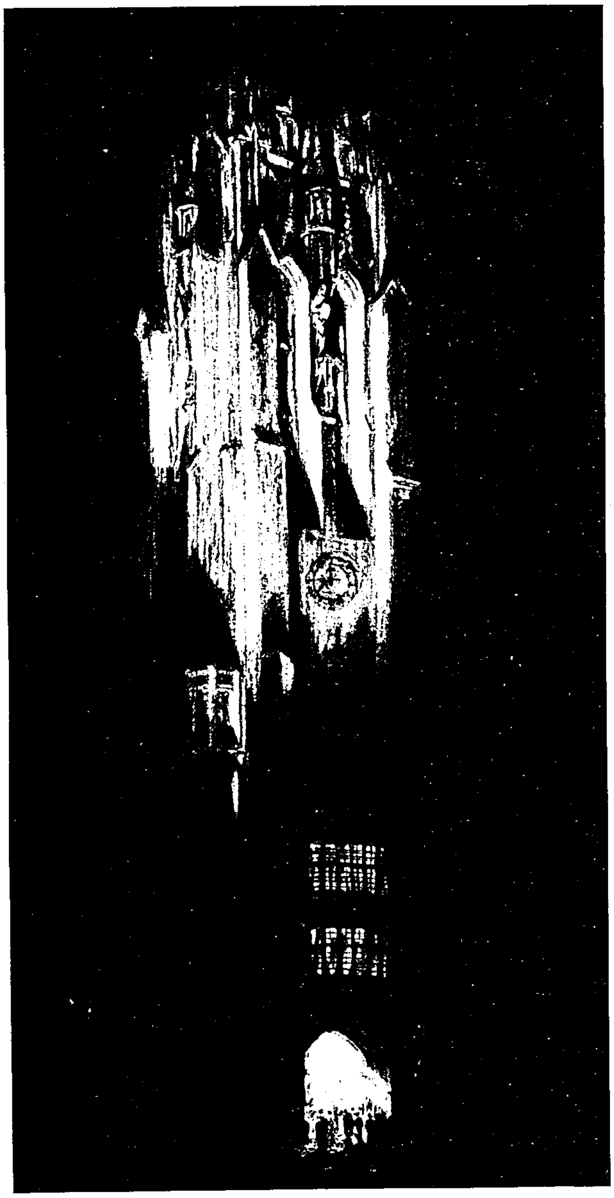
Following the "go West urge" King spent a year in California during a slump. He spent a few days in almost every office there but soon was back in New York in the offices of York and Sawyer, Charles Platt, and for a while Carrère and Hastings.

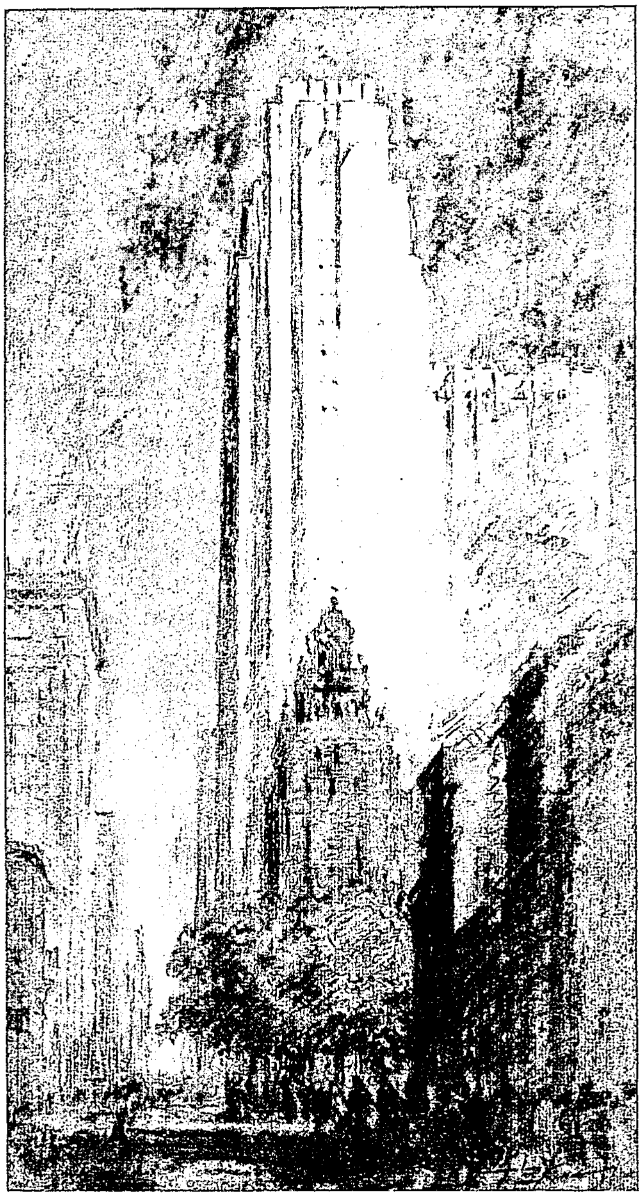
In 1915 King worked with Albert Herter at Easthampton, doing perspective drawings for the Council Chamber of the Capitol building at Madison, Wisconsin. He was greatly inspired by this artist and decided definitely to go in for delineation. He also understudied Herter, and some of the painting on the work is his. His broad experience in architecture gave him a grasp of the subject few ever have. A designer of ability and above all an artist, he decided wisely.

In 1915 he returned to Toledo to Mr. Mills again, the firm of Mills, Rhines, Bellman, and Nordhoff having been formed in the meantime. His influence, continuing to this day, has been fruitful in production of good architecture. It is not my intention to dwell on the output of this office but one may find King's fingerprints on the work.

In 1921 King went to the office of Smith, Hinchman, and Grylls where he spent three years. Examples of his work there are among his best efforts.

He then returned to Mills, Rhines, Bellman, and Nordhoff. King's understanding of architecture and

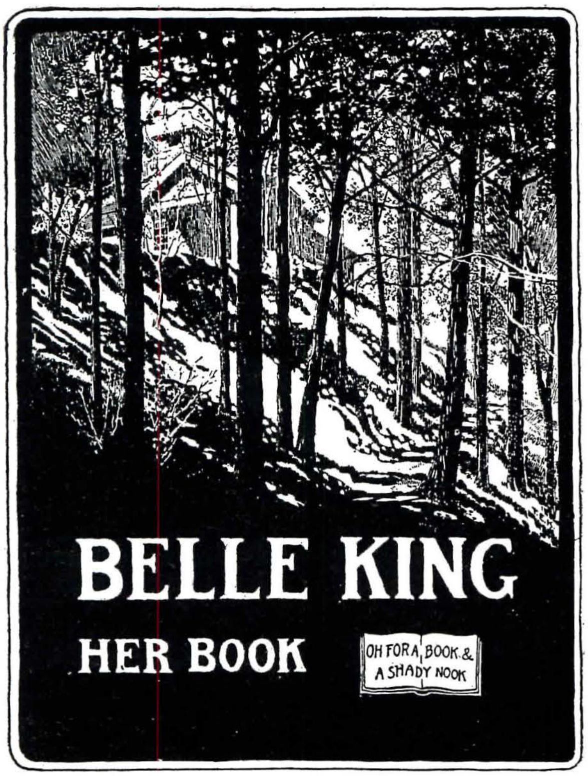


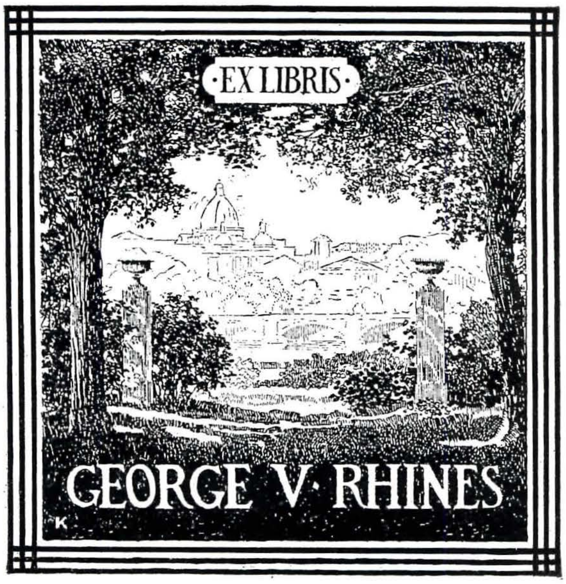


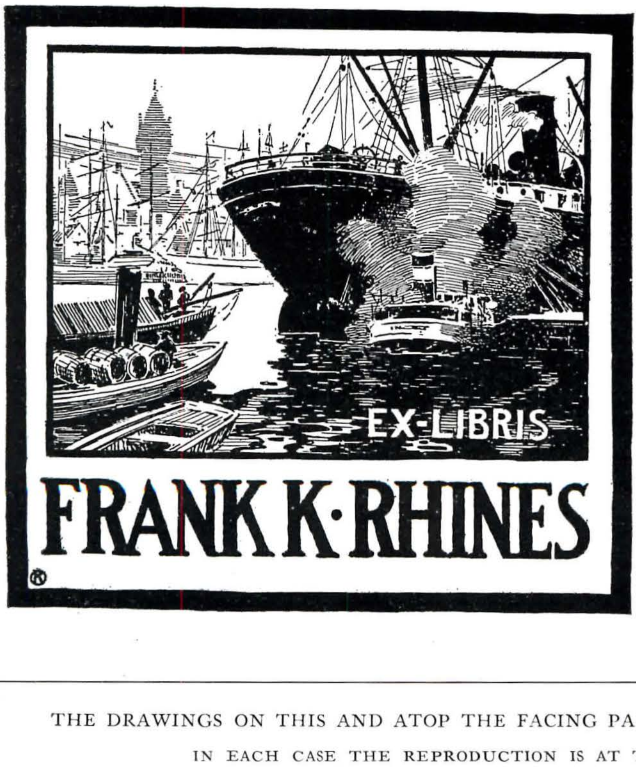
TWO CHARCOAL STUDIES BY THOMAS EWING KING

TOLEDO UNIVERSITY CHAPEL AT NIGHT AND OHIO BANK BUILDING, TOLEDO

Mills, Rhines, Bellman, and Nordhoff, Architects

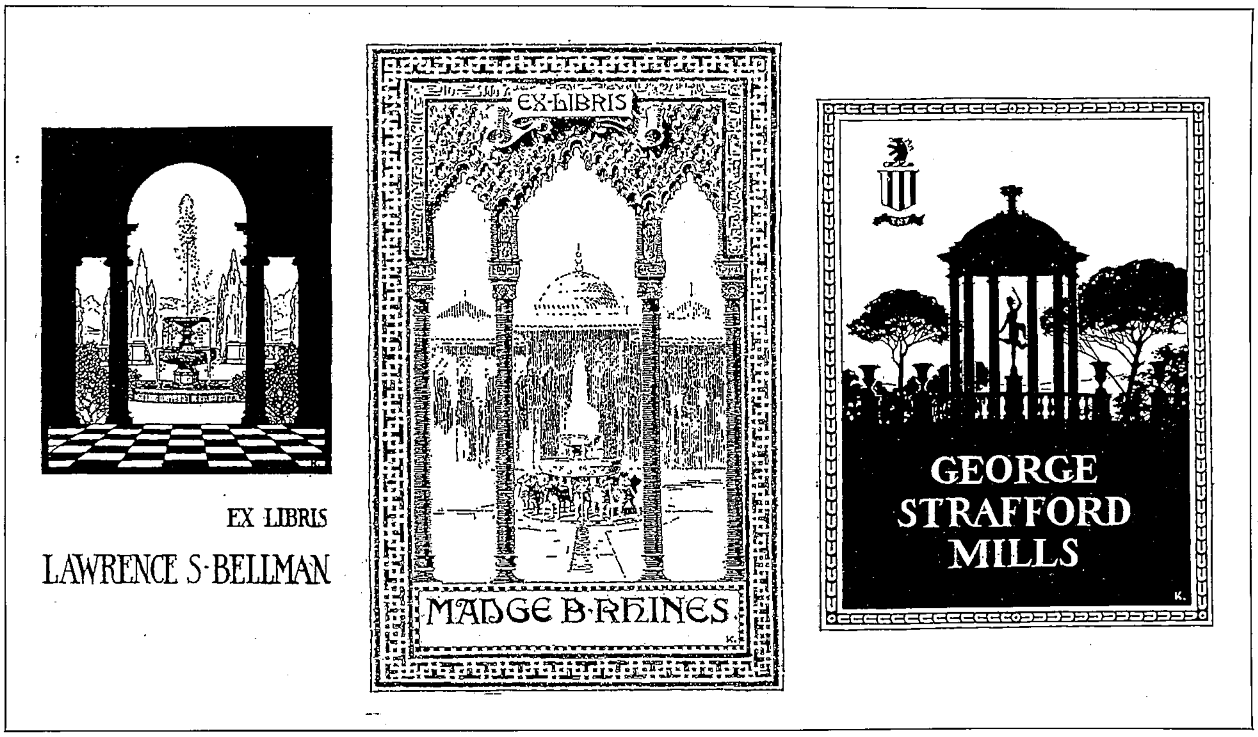


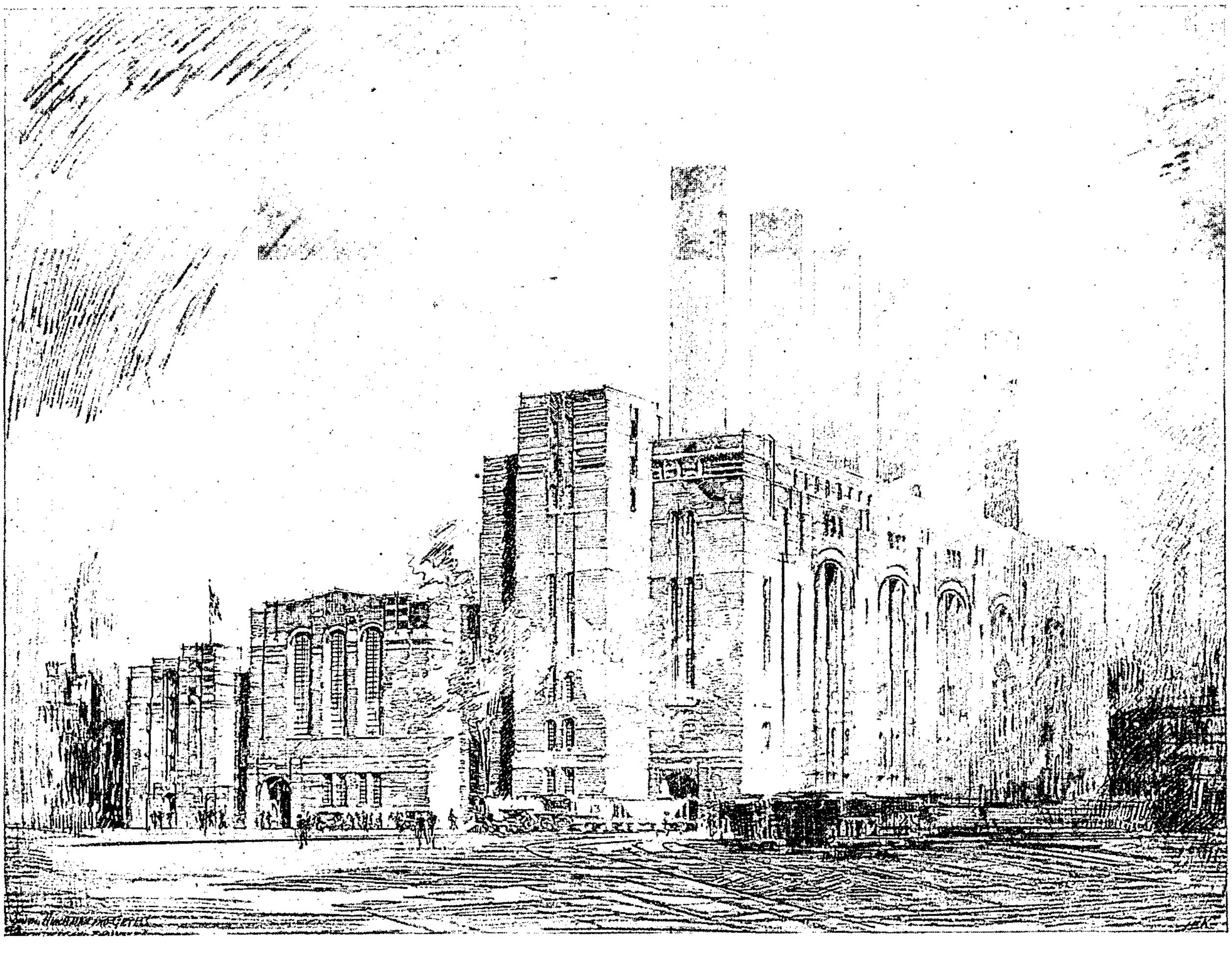




THE DRAWINGS ON THIS AND ATOP THE FACING PAGE ARE BOOKPLATES BY THOMAS EWING KING

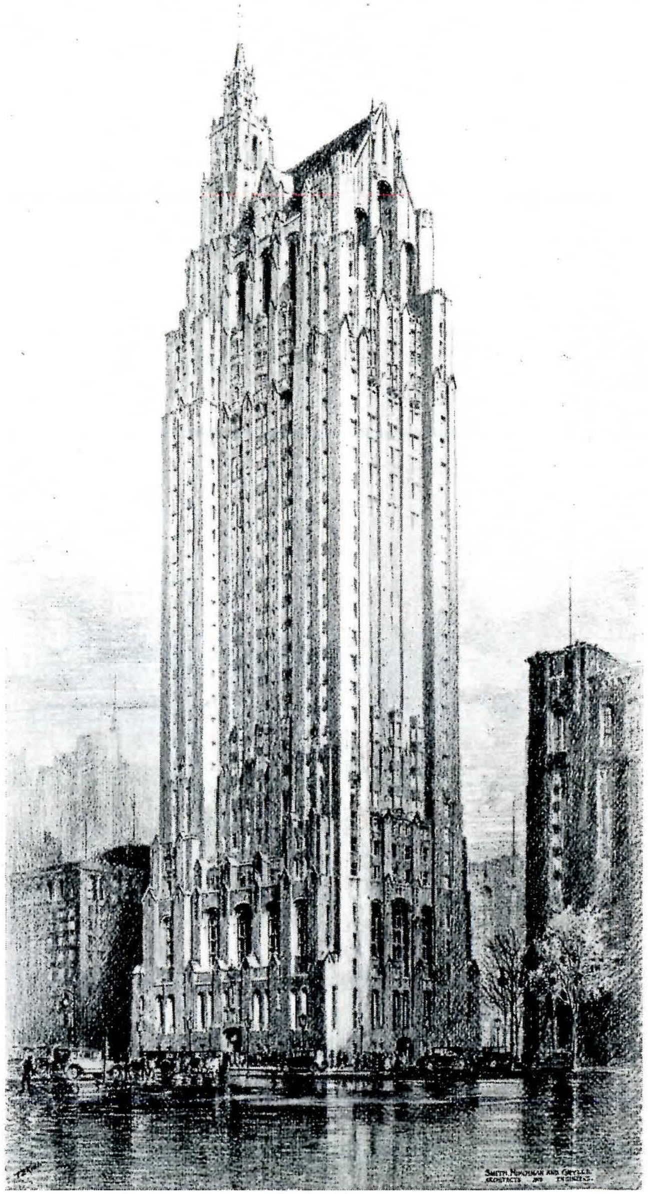
IN EACH CASE THE REPRODUCTION IS AT THE SIZE USED FOR THE BOOKPLATE





DETROIT MUNICIPAL POWER HOUSE—SMITH, HINCHMAN, AND GRYLLS, ARCHITECTS
FROM A PENCIL RENDERING BY THOMAS EWING KING

OHIO BANK BUILDING, TOLEDO
Mills, Rhines, Bellman, and Nordhoff, Architects



PROPOSED TOWN AND COUNTRY CLUB, DETROIT
Smith, Hinchman, and Grylls, Architects

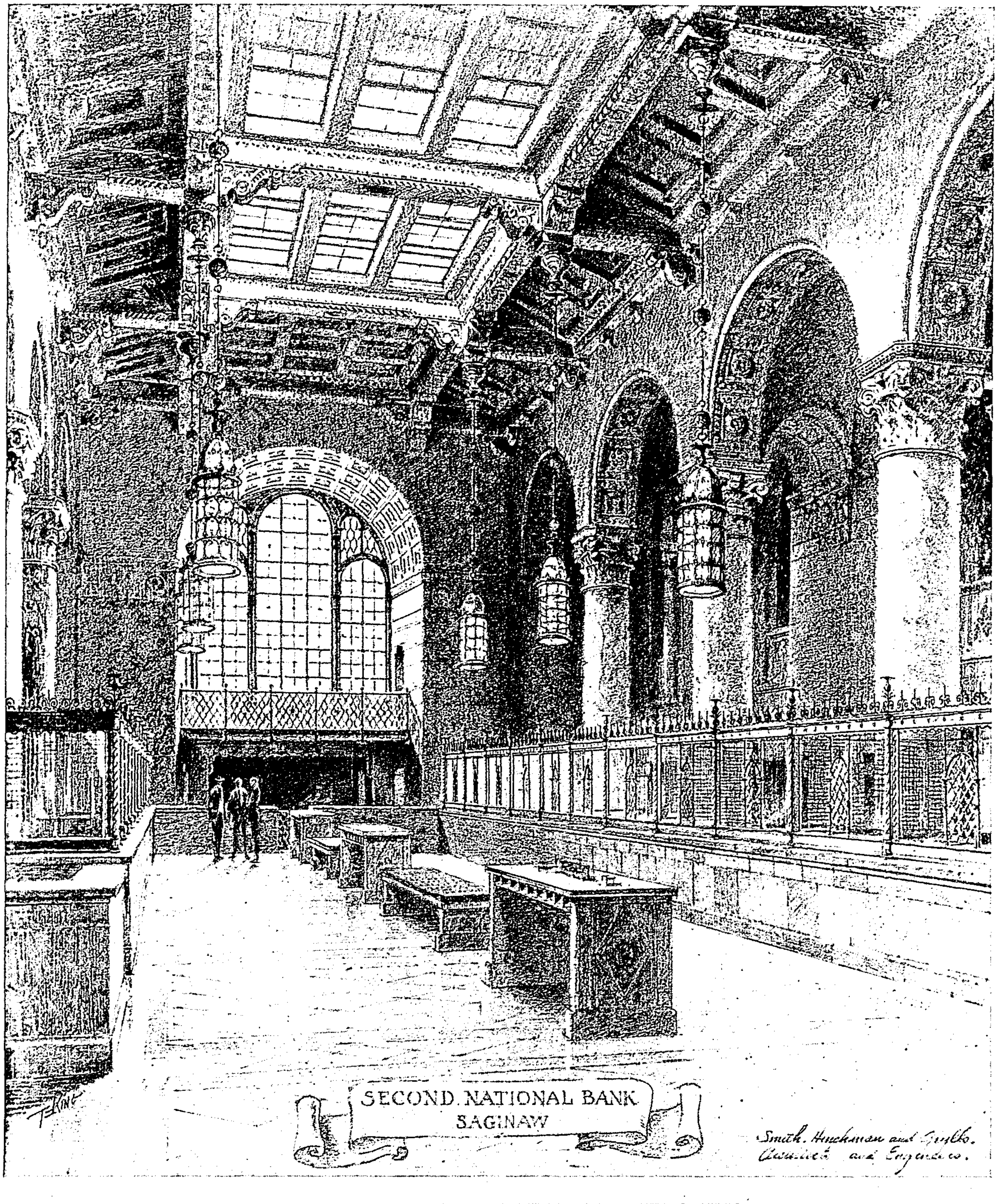
TWO PENCIL RENDERINGS BY THOMAS EWING KING

RESIDENCE FOR E. R. EFFLER, ESQ., OTTAWA HILLS, OHIO—MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS

FROM A PASTEL RENDERING BY THOMAS EWING KING

Pencil Points Series of Color Plates

This drawing by Thomas Ewing King, whose work is the subject of the accompanying article, was made on Vidalon drawing paper of a warm brown color. It was outlined directly on the final sheet with charcoal and then colored with pastel. The original measures 23½" x 15½".

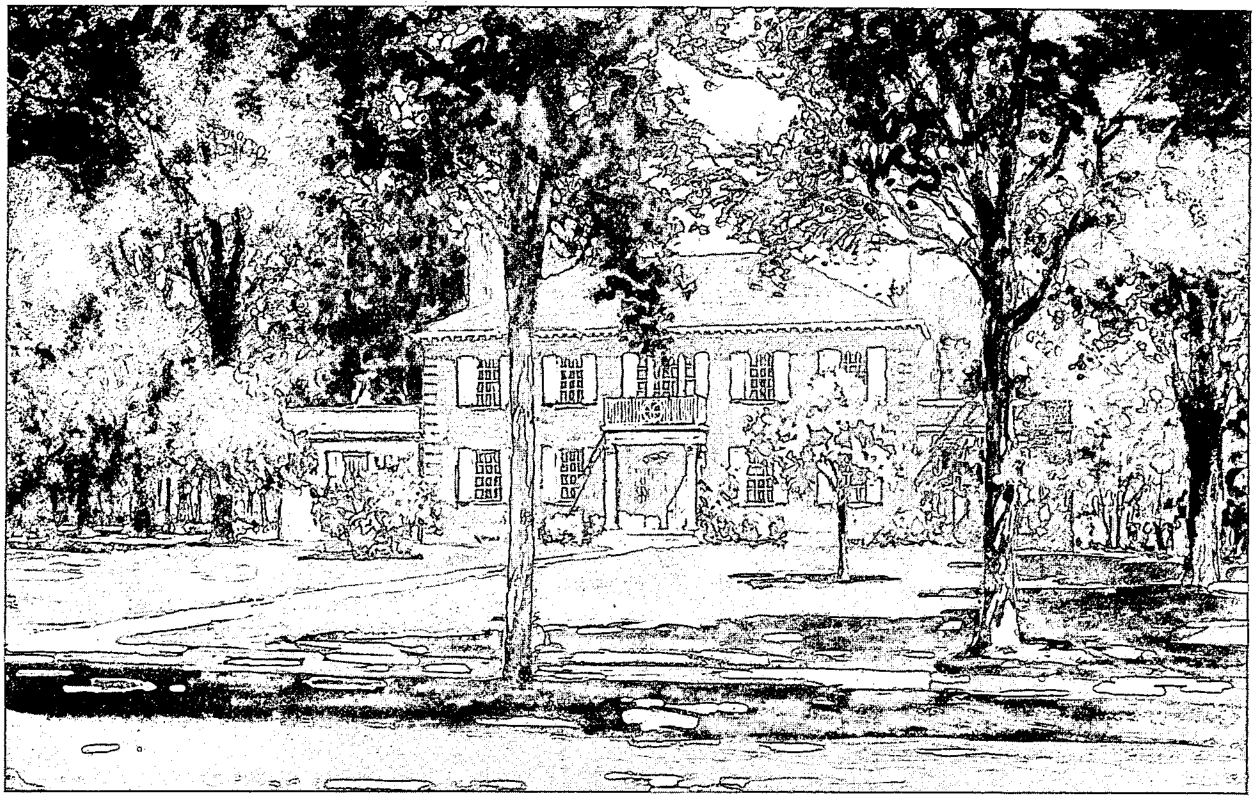


FROM A PENCIL RENDERING BY THOMAS EWING KING
INTERIOR, SECOND NATIONAL BANK, SAGINAW, MICHIGAN
Smith, Hinchman, and Grylls, Architects and Engineers

FROM A PASTEL DRAWING BY THOMAS EWING KING

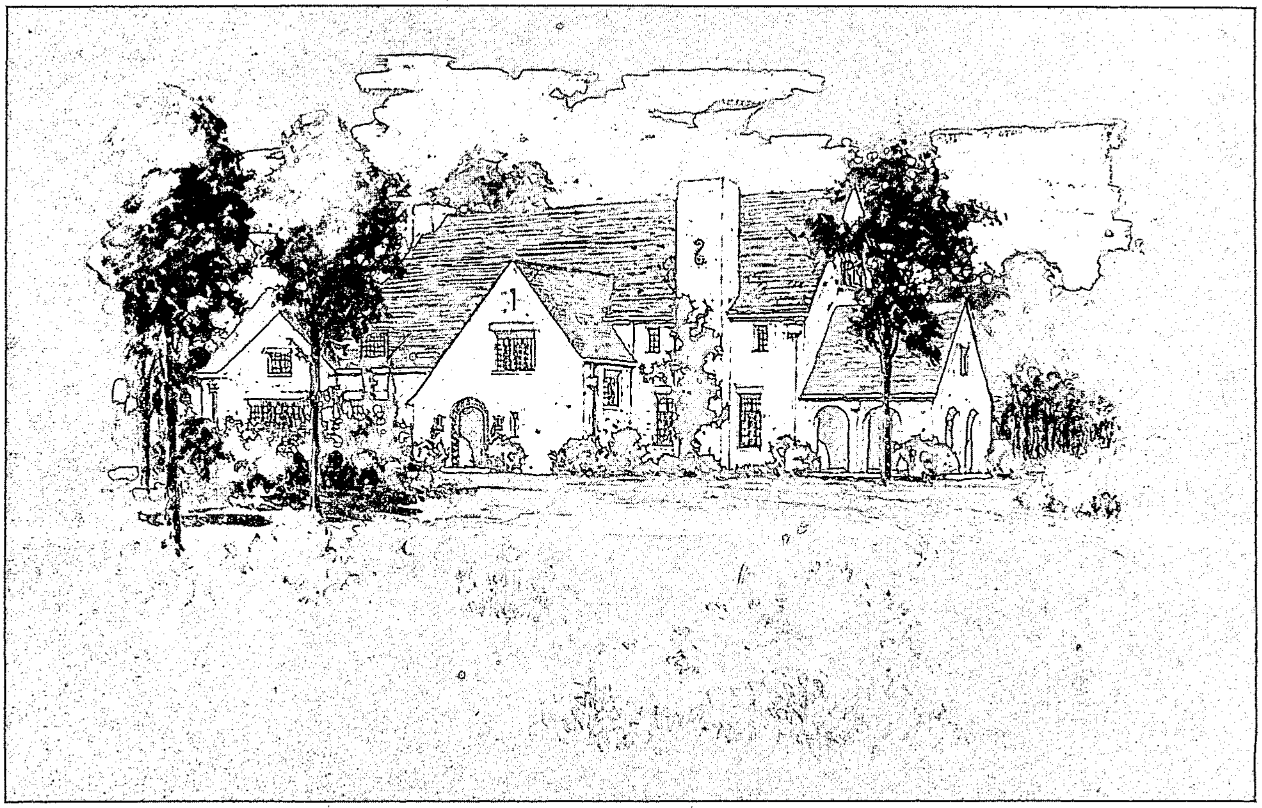
FLOWER GARDEN, ESTATE OF MR. GEORGE ROSS FORD, WOOD COUNTY, OHIO

Mills, Rhines, Bellman, and Nordhoff, Architects



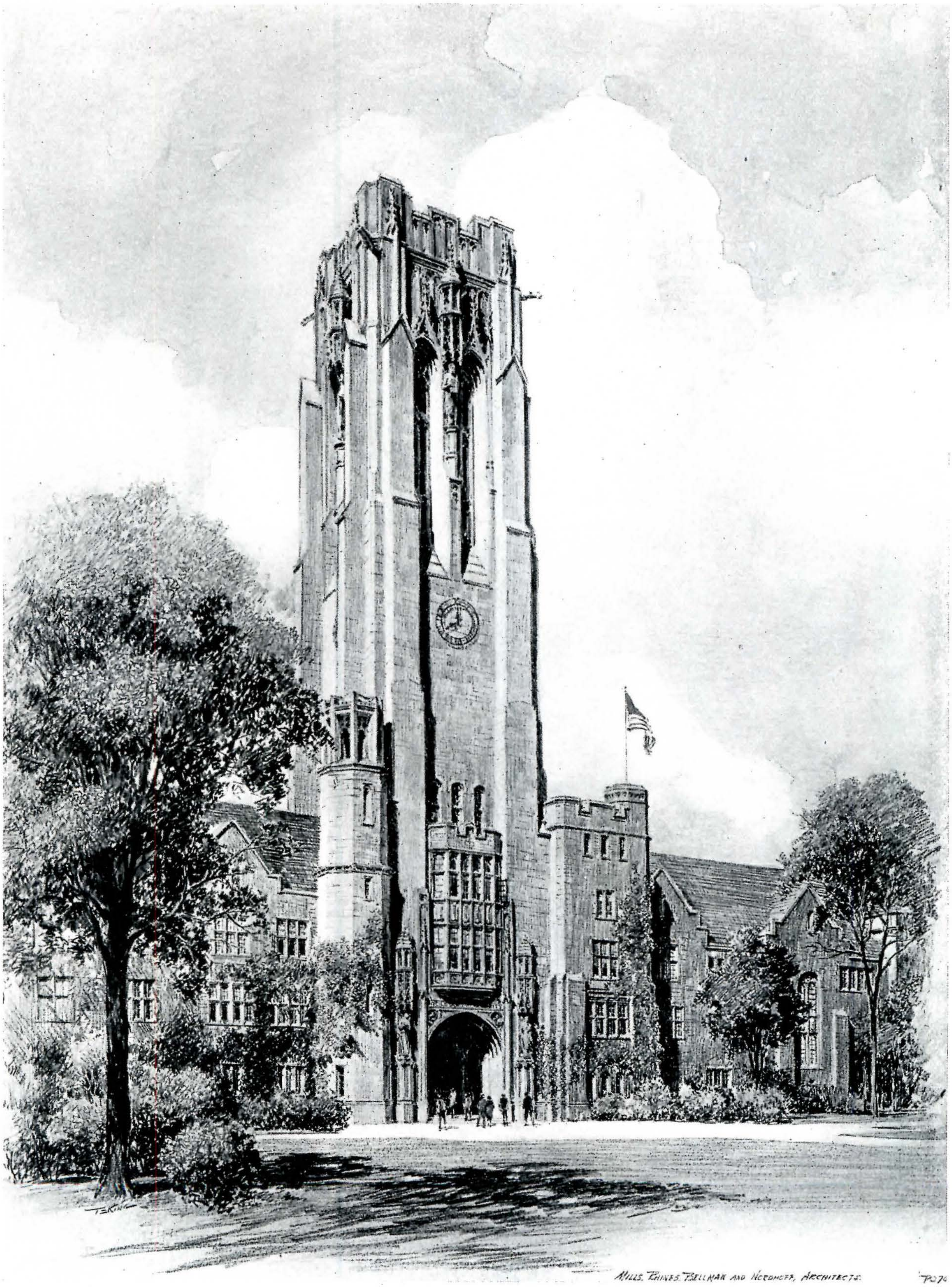
OPAQUE WATER COLOR DRAWING BY THOMAS EWING KING

RESIDENCE AT MONROE, MICHIGAN—MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS



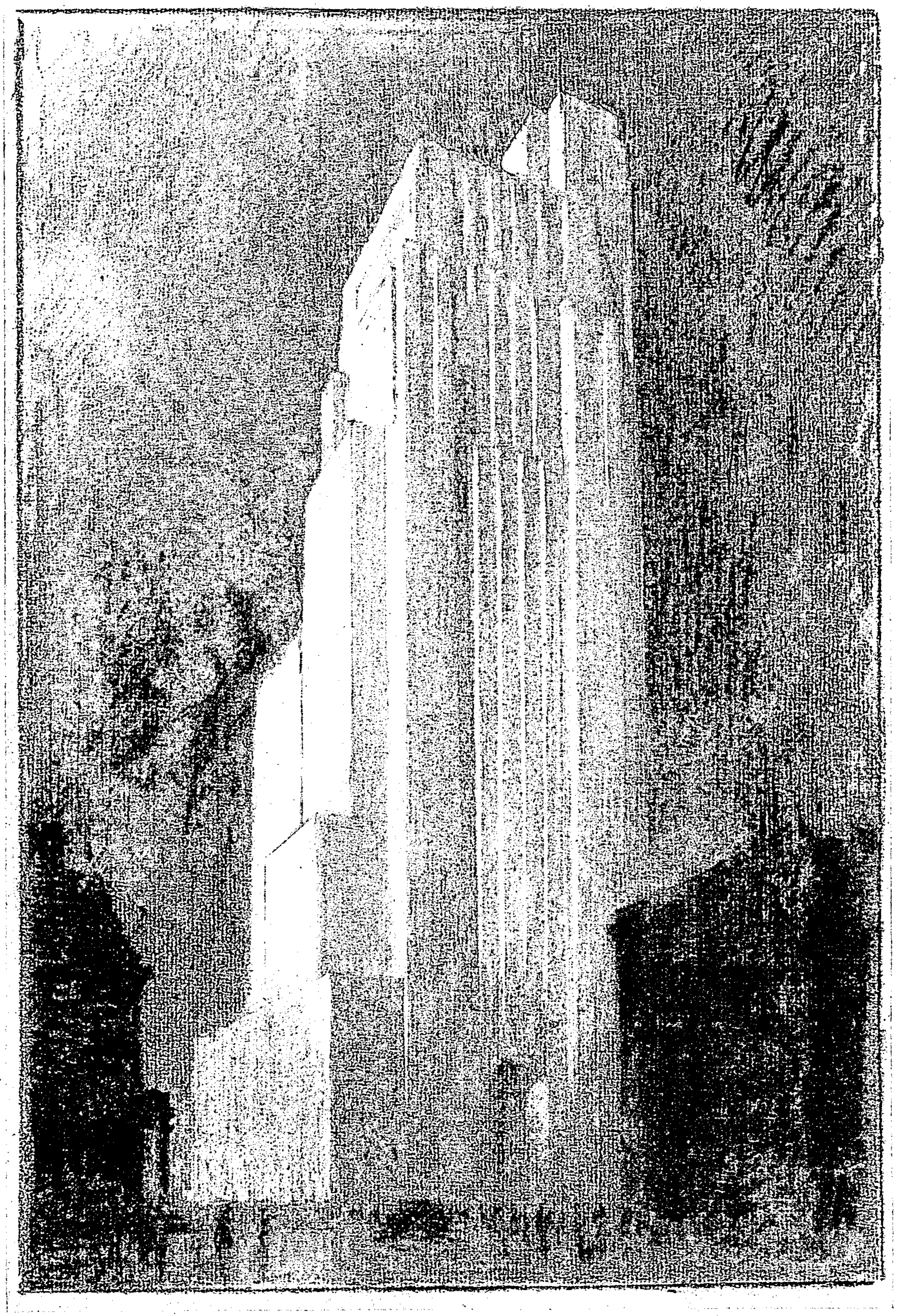
OPAQUE WATER COLOR DRAWING ON TINTED PAPER BY THOMAS EWING KING

RESIDENCE AT TOLEDO, OHIO—MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS



PENCIL AND WATER COLOR RENDERING BY THOMAS EWING KING

TOLEDO UNIVERSITY CHAPEL—MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS

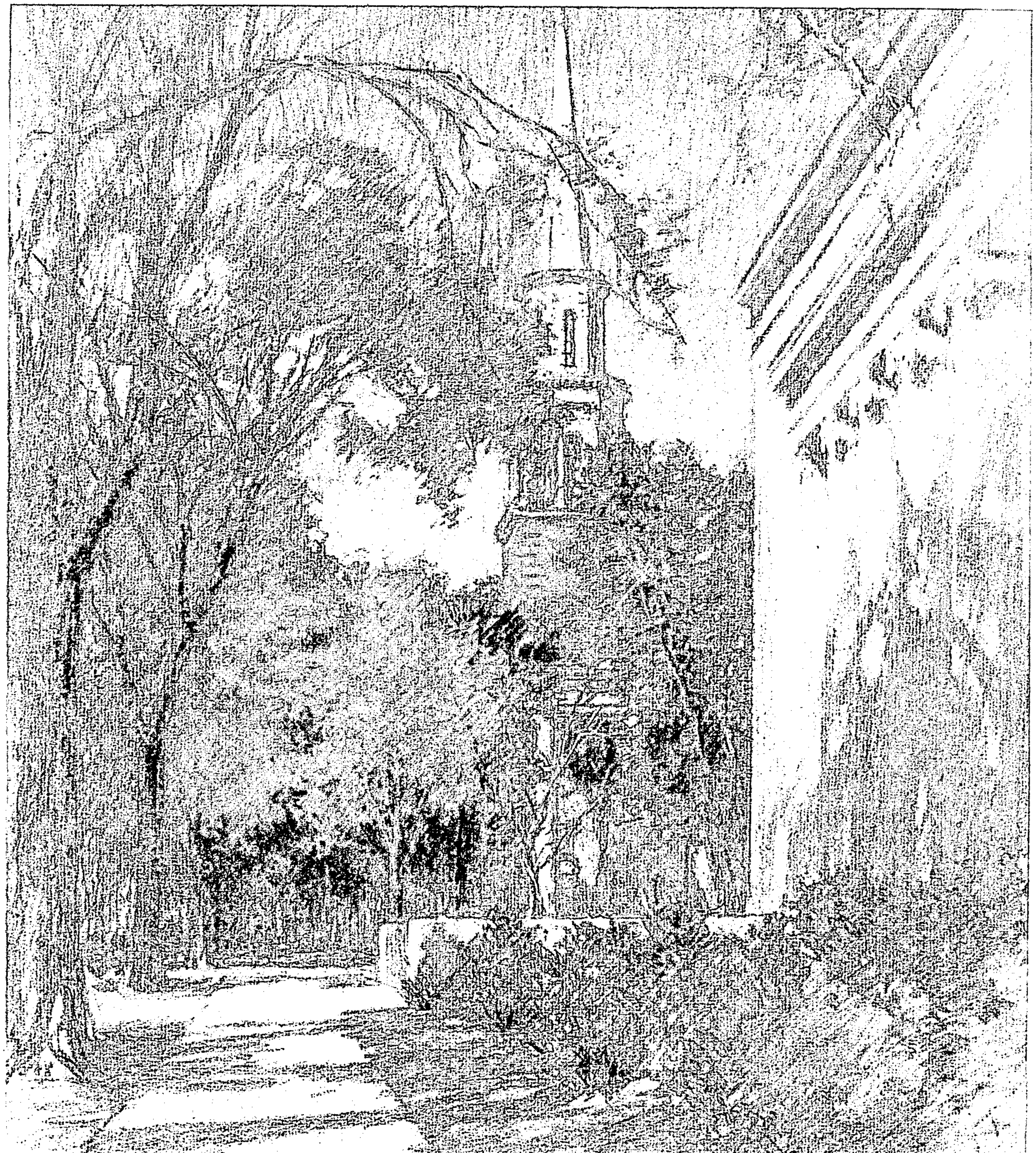


FROM A CHARCOAL STUDY BY THOMAS EWING KING

OHIO BANK BUILDING, TOLEDO—MILLS, RHINES, BELLMAN, AND NORDHOFF, ARCHITECTS forms is extensive—with his retentive memory he seldom refers to documents.

In his later work he has made much use of the lithographic pencil. In such sketches the detail of the building cannot be drawn but is suggested—such suggestion as comes only from one who knows what he is suggesting, and with amazing speed. He works in almost every medium and with great facility. It is easy for him to draw—one might say effortless.

Of all men I know in architecture I know of no one more beloved than Tom King. His quiet modest manner betokens confidence and his democratic disposition draws admirers from all walks. I have never heard anyone say an unkind thing of him.



FROM A CHARCOAL SKETCH BY THOMAS EWING KING

UNITARIAN CHURCH, TOLEDO, OHIO

Architect's Right to Damages on Discharge

By Clinton H. Blake

A rather interesting situation has been submitted by a subscriber to PENCIL POINTS. It raises various questions of interest to practicing architects generally. It also suggests something of a new angle of approach to one of the oldest problems of the architect, namely, the right of the owner to terminate his employment and the rights of the parties in the event of such termination.

In the case in question, the architect and owner entered into a contract which provided in substance as follows:—The architect should prepare preliminary sketches for the sum of $100 to be paid on the delivery of the sketches. The sketches should be sufficiently full to enable preliminary estimates to be secured. If the job was proceeded with, the architect was to prepare working drawings and specifications and supervise the work to completion for a fee of ten per cent. The architect prepared the sketches, which as a matter of fact were worked up into final working drawings shape, and prepared specifications, and delivered the drawings and specifications to the owner. The owner expressed satisfaction with them, but pleaded his inability at the time to make payment of the $100. The owner asked for bids, and the architect secured these for him. The owner then stated that the cost of the work would be too much and the work was indefinitely suspended. No further communications were had between the architect and owner for about one and one-half years. The architect then learned that the owner had employed another architect to prepare new drawings for the same work and had secured a permit from the local building department for the work to be done. No work had actually, however, then been undertaken.

Under the foregoing conditions, the architect proposed to sue the owner for the $100 due for the sketches and also to recover damages for the breach of a contract to employ the architect.

There is, of course, no question of the right of the architect to the $100. The sketches were prepared and submitted under a definite agreement to pay this amount for them, and the architect is entitled to receive it. The other and more interesting question raised by this rather unusual situation is far less easy of solution. The ordinary rule is that a contract of personal employment, such as the employment of a doctor, lawyer, or architect, is subject to termination at any time upon payment of the reasonable or agreed value of the services rendered up to the time the employment is terminated. On the other hand, if there is a special contract providing that the architect is to be employed in any event on a special job to the completion thereof, he would under these conditions be entitled to recover as damages the prospective profit which he would have made had his employment not been terminated. This is on the theory that the termination of his employment under such conditions would amount to a breach of the contract.

Under the circumstances of the case in question, it would seem that the contract might well be construed to be a definite agreement that the architect would be employed for the complete job if the work were proceeded with. The fact that only a nominal charge was made for the preliminary sketches strengthens this conclusion. Assuming that this is the case, however, the architect has another hurdle to negotiate. The payment of his percentage compensation was contingent, under the agreement made, on the work progressing. The architect claims that the taking out by the owner of the building permit under the second set of plans in itself is proof that the work was to progress. I doubt if this conclusion could be sustained. The taking out of the permit, on the contrary, seems to me to be merely evidence of an intention on the part of the owner to proceed with the work. If he does proceed with it, the architect should be able to recover the profit which he would have made, if he had been continued as architect as agreed. The better course for the architect, in view of these considerations, would seem to be to wait until the work has actually gone forward before bringing suit for the damages. He can, however, in the meantime, fortify his position by notifying the owner that he claims the right to act as architect, if the work is proceeded with, and that he will hold the owner liable for the damage caused him by the owner's breach of the contract.

Also, under the canons of ethics of the American Institute, an architect would, under such conditions, do well to notify the second architect who has been chosen that his prior claim has not been settled and is now legally at issue and should be adjusted before the second architect proceeds with the work.

The chief moral pointed by the present case is that, if an architect desires to vary the ordinary rule allowing the owner to terminate his employment at will, he should see to it that the agreement covering his definite employment for the complete job should be in such form that it is neither ambiguous nor uncertain. It is quite possible to frame an agreement in such a way that the architect is definitely employed and is entitled to damages if another architect is asked to supersede him. His damages in such a case ordinarily would be the profit which he would have made, had he been allowed to proceed under his agreement of employment. If, for example, this contract had provided that if, after the preliminary sketches were made, the owner decided to go ahead with working drawings, the architect who made the preliminary sketches should be employed to make the working drawings, any doubt of his right to recover would be removed.

The rule allowing the employment of a professional man to be terminated by the owner under ordinary circumstances is a sound one and in accordance both with common sense and professional ethics. On the other hand, it is often essential, as a matter of fairness, that the professional man be employed for the entire job and not merely for a preliminary stage of the job and that he be protected in this employment. Where this result is desired, the architect would do well to take advice so that he may be assured that the agreement entered into is binding and effective.

FROM A CHARCOAL SKETCH BY WILLIAM C. ULRICH

CITTA CASELLI—PIAZZA SAN LORENZO

FROM A WATER COLOR BY LIONEL H. PRIES

Pencil Points Series of Color Plates

This water color sketch by Lionel H. Pries was made on a fairly rough water color paper. The colors used were all transparent and included the following pigments: Alizarin Crimson, Cadmium Pale, Yellow Ochre, Raw Sienna, Burnt Sienna, Cerulean Blue, French Blue, and Emerald Green. The original sketch measures 13½" x 9½". The artist has used the white paper effectively and in places has taken advantage of the rough texture to obtain a sparkling effect through the use of a fairly dry brush.

On Linoleum Cuts

By Burton Ashford Bugbee

The art of block printing has a long and honorable history stretching back, for all purposes of record, to the eighth century, when the Japanese acquired the Chinese and Korean system of wood engraving; this system they developed through the centuries to the perfection of the nineteenth century color prints of Hiroshige, of Hokusai—those subtly simple tones of rice-paste and water color that are ever the wonder and despair of the graphic artist. In the fourteenth century the Germanic countries were independently beginning the tradition of wood block book illustration — crude, naive, religious representations which were the forerunners of the second great group of block printers—the school of Dürer and Holbein. These masters used the facsimile black line in an almost incredibly painstaking way, with engraving-like effects of delicacy and richness.

In eighteenth century England, Thomas Bewick revolted against this tradition and developed the white line system, whereby the design was engraved against a black background, as the medium logically implied. Timothy Cole and our American school of wood engravers who worked in the nineties before the advent of photo-reproduction, carried the white line method to its fullest extreme, and were able meticulously to reproduce the delicate tonal effects of the oil paintings from which they worked. Some of the finest wood blocks ever made lie buried in the files of the magazines printed during this golden age of illustration.

CHRISTMAS CARD BY THE AUTHOR

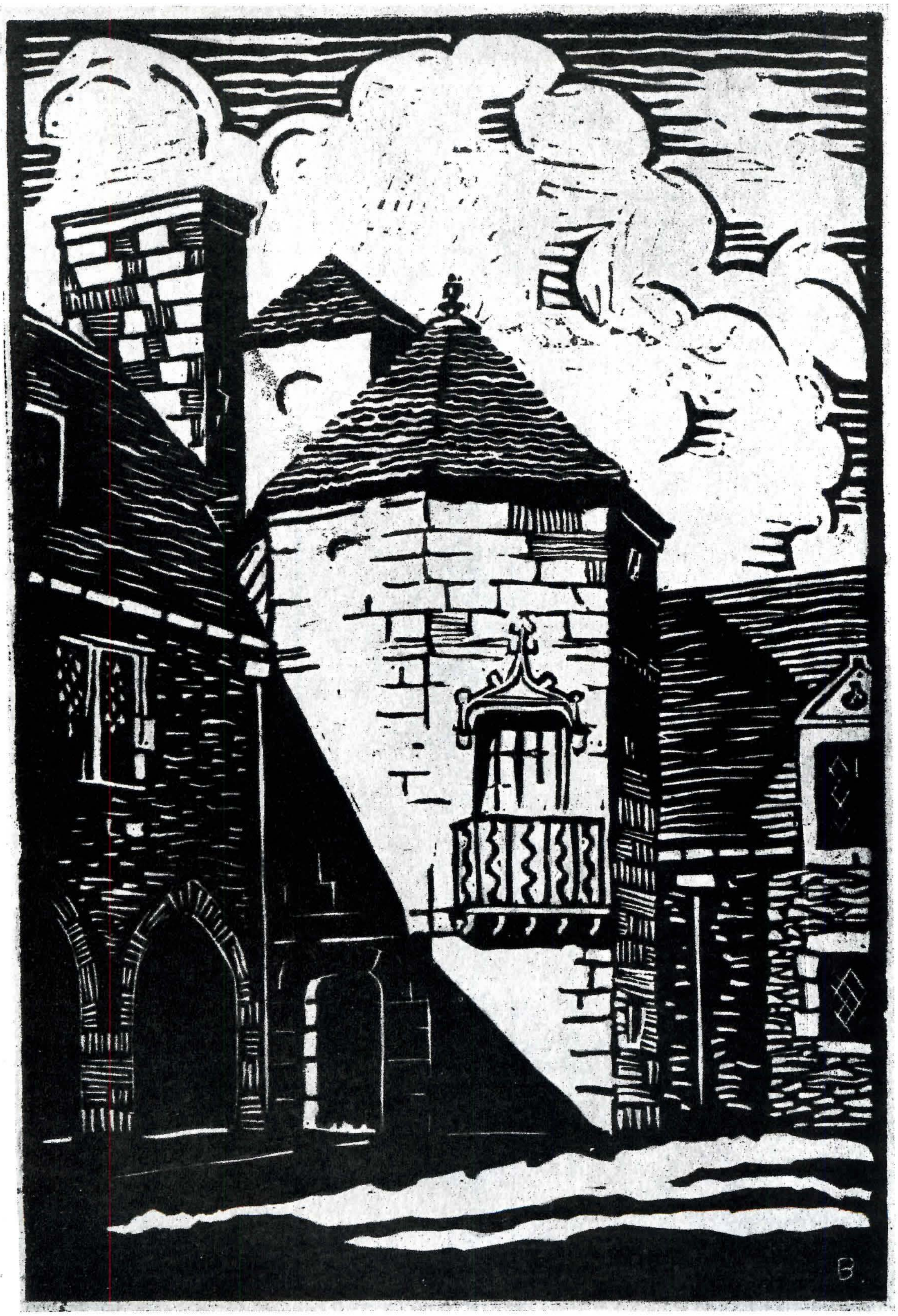
In recent years the wood cut has come into pronounced favor, especially as an ally of typography. The remarkable achievements of Rockwell Kent and J. J. Lankes are outstanding in America, while in Europe some of the leaders are Frans Masereel, Pierre Gusman, Walther Klimm, and Sidney Jones.

The linoleum cut is the offspring of this long line of woody ancestors, and to some eyes it is the black sheep, the shady member of the family. In the first place it suffers from the indignity of its name: a lowly floor covering seems poor material for serious graphic efforts. Then, the comparative ease with which it may be worked has endeared it to the arts-and-crafters, in whose hands it often ranks only a cut above pyrography and raffia work.

But the proof of the pudding is the eating: and the meritorious results of serious workers in America, and particularly in Germany, amply justify the use of linoleum as a graphic medium. It differs from the wood cut only slightly in the quality of the material, and the charm and range of the block print are common to both. For the amateur with an urge toward the graphic arts, linoleum offers many inducements: it has none of the technically complex processes of etching or lithography; it is cut with comparatively small physical effort; and (the crowning advantage) it may be printed successfully without use of the press.

Linoleum block making, like all Gaul, may be divided into three parts—the design, the cutting, and the printing. And the greatest of these is the design. Linoleum as a medium speaks of large, bold masses, potentialities of black and white in luminous contrast, but it need not degenerate into a clumsy, graceless blob on ink-smeared paper; the material, at the expense of time and care, will respond beautifully to delicate cutting where needed, and produce subtle effects of texture.

Granted that a promising subject has been found—from a photograph, perhaps, from a previously made sketch, or even, God being good, from the thin air of the imagination, one's best friends are the No. 0 brush, the bottle of show card white, and the bottle of India ink. It really does not pay to begin cutting till the idea is carefully studied, for, unfortunately, the mere process of printing has no magic to make a badly composed picture look well. The first subjects chosen should, of course, be simple—still life, or perhaps a simple bit of architecture. The design may be sketched quickly and roughly at thumbnail size with the brush, enlarged, worked over with opaque white and ink, till it seems satisfactory; then



FROM A LINOLEUM BLOCK PRINT BY BURTON ASHFORD BUGBEE (SEE STUDIES OPPOSITE)

RESIDENCE OF J. SEWARD JOHNSON, ESQ., NEW BRUNSWICK, NEW JERSEY

Thomas Harlan Ellett, Architect

A PRELIMINARY STUDY

Rapidly done at small scale to adjust masses.

it should be carefully studied at the exact size of the proposed block. A good stunt is to work considerably in white on a black background—then the strokes of the white brush will give a close approximation of the final effect of the cuts of the gouge. Scratchboard and black paper will also be found useful in studying the design.

With the design well in hand let us give a thought to the materials and the tools for cutting. Common unpatterned battleship linoleum in plain colors of gray, brown, or green is most satisfactory—the ¼″ thickness preferably. It may be purchased from an art supply dealer or, in the grand manner, from a floor covering house. Make sure it has a smooth, soft surface, for it hardens with age and becomes difficult to work. It is easily cut to size with a knife by scoring the smooth surface, breaking, and then severing the burlap backing.

The necessary tools for cutting are simple—two veiners (one a small U-shape, the other V-shaped), a larger gouge (perhaps ¼″ across the points), and lastly, that *rara avis*—a sharp penknife. The veiners and gouges are best bought from a dealer: either wood cutting gouges or regular linoleum cutting tools may be used. For the handy man, it may be suggested that the rib of a discarded umbrella, mounted in a handle and sharpened, makes a very satisfactory veiner for delicate work. It is necessary that the tools be kept properly ground and as sharp as possible at all times; a few strokes over the oilstone whenever they are used will prevent ragged lines and profanity.

With the design and the linoleum block ready, the next step is to get them together—to transfer the design to the block. It must be remembered that the picture is reversed when printed and allowance must be made, or the heroine will be wearing the wedding ring on the wrong (or right) hand, and traffic will be Britannically keeping to the left. Some subjects will not be harmed by reversal but actual views, of course, and such things as lettering, must be tediously cut backwards.

The simplest way of transferring the design is not to transfer it at all, but to make the final study directly on the surface of the linoleum. The surface should be wiped with ammonia (or a raw potato) to remove grease, then coated with a thin film of opaque white water color. The design is then drawn with brush and ink, worked over, and corrected with opaque white as on paper; when it seems satisfactory, the block is ready to print. It is important that the film of white be very thin or it will flake off under the application of the ink. White oil paint would be more durable, but is slow to dry and hard to remove when comes the time to print. Perhaps some day the linoleum makers will see fit to make us white linoleum.

Another excellent transfer method, theoretically, is to make the final study on thin tracing paper, which may then be pasted directly on the block and cut. But alas, in my experience there seems to be no paste made which is strong enough to prevent the paper from tearing and curling as the gouge goes through; even the

THE FINAL STUDY

Made carefully at full size with attention given to textures and quality of line. From this study the design was transferred to the block.

TWO LINOLEUM BLOCK PRINTS BY BURTON BUGBEE—THE DUOMO, LUCCA, AND FIFTY-SEVENTH STREET, NEW YORK

The one at the left measured 5½" x 7", that at the right 4¾" x 7¼" in the original.

faithful Vegetable Glue seems too weak. But the idea is superb, theoretically.

The most dependable method seems to be the use of carbon paper. A careful tracing is made of the design (the picture may be reversed at this stage by merely turning over the paper) and it is then traced over carbon paper onto the whitened surface of the block. This transfer offers many chances for accumulating error in the repeated tracings, and it will really pay to do it carefully, also to spend a little time and patience making a finished ink drawing on the block before beginning to cut.

Cutting is a simple matter with the design fully worked out—it becomes the mere process of removing certain predetermined areas which appear in white on the block. The small veiners are used in cutting the delicate lines, and the gouge in routing large areas of background. The only lesson experience seems to teach is: "Be patient!" The tools must be kept sharp, of course, which is good reason for working away from the left hand which is presumably holding down the block; a sharp gouge is capable of some nasty punctures and gashes. By the same token, restraint in cutting is advisable to prevent the gouge slipping and mowing a swath through carefully studied Gothic tracery or what not; this, I presume, is what Shakespeare meant when he referred to "the most unkindest cut of all." It is good medicine to work away from the design toward the middle of white areas, and to outline patches of black carefully at the start with a veiner. Where a large area is to be routed, it pays to cut a channel down the middle and dig ditches toward it, rather than remove the surface in sweeping and perilous strokes. As linoleum is a fairly soft material, do not cut down too straight and deep, or the line may crumble under the pressure of printing. The sides of the cuts should be splayed, to give a firm base for the lines, especially where they are rather thin.

Some people will tell you that linoleum blocks cannot properly be printed by hand; but they are not to be believed. For the most complex and most perfect block prints we have, the Japanese color prints, never came from a press. For a press we need substitute only a modicum of care and patience.

The ink used is regular printer's ink, black or colored, or the block printing colors of the art dealer—printer's ink is entirely satisfactory. The only special tool necessary is the brayer, a gelatine composition roller mounted on a handle, used for applying ink to the block. Here again the art supply dealer or the printer's shop must be visited. A few dabs of ink are put on a slab of glass, marble or some other smooth impervious material, and spread with a palette knife; then the brayer is rolled over the ink till it forms an even coating over the slab and roller. If the ink appears too thick (it should have the consistency of cold butter) it may be thinned with a few drops of pure linseed oil. When the brayer is well charged—experience will soon teach just how much ink to use—it is rolled back and forth in different directions over the block until an even and perfect film of ink is deposited. The block is then ready to print.

The most satisfactory paper by all odds seems to be the thin Japanese variety, although any absorbent and not too rough paper will work. In New York City the Japan Paper Company on East 31st Street is a splendid source of supply, and should be visited by every architect anyway on general principles. Blotting paper takes the ink delightfully, even tracing paper will do, but any smooth coated paper is unsatisfactory, because the ink squeezes out under pressure and leaves ragged edges.

The inked block is laid face up and the paper, cut to size, is laid over it smoothly; if the paper is thin the ink is usually sticky enough to hold it in place firmly without further worry. The Japanese used as a baren, or rubbing gadget, a pad covered with stretched bamboo leaves, which they rubbed over the paper till the color adhered. What with the present shortage of bamboo leaves, however, the bowl of the common dessert spoon will be found to function very well: it is rubbed back and forth over the paper till the design is completely imprinted, just as one rubs off a study onto the final stretch. With thin paper the process shows through, and areas which need more ink can be spotted nicely. It is always possible to lift one corner of the paper—the ink will usually hold the rest fast—and roll the brayer over thinly inked spots on the block.

Then comes the big moment in the life of the printer—the pulling of the first proof. High on the list of solid satisfactions stands the warm glow that ensues when the design turns out as one had hoped; when it appears that that evil slip of the gouge actually produced a credible figure in the foreground; when the print comes off with all the blacks a solid, even tone. But there usually are many details that need retouching, so the block must be wiped clean and the necessary revisions cut before the final printing.

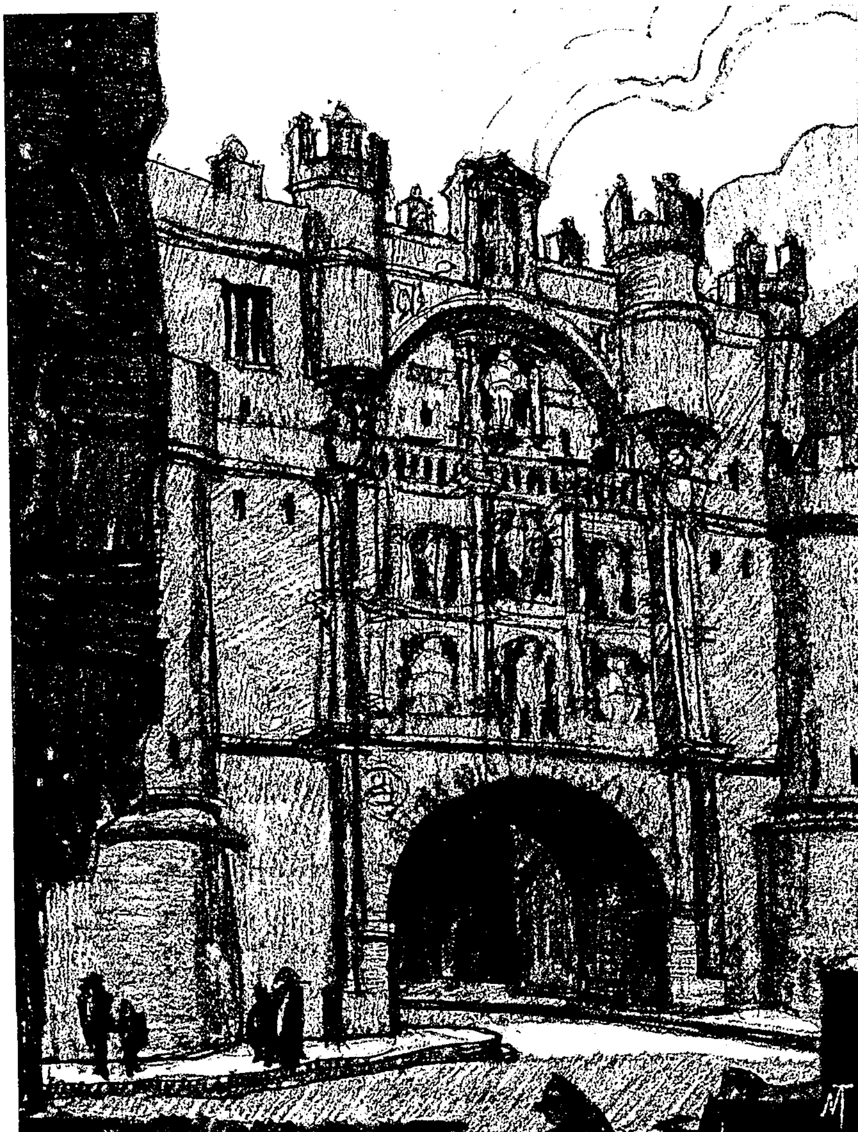
The dessert spoon is only one of many systems of printing without a press. The rolling pin, or the photographer's hard rubber roller, and a little elbow grease will do the trick; it is well to dampen the paper slightly first. Or for small blocks one may put a pad on the floor and print the block by standing on it on one foot; the laundry wringer may easily be turned into the homemade equivalent of an etching press; a solid blow on a well-inked block with a mallet will do wonders. As far as I know, the possibilities of printing under the wheels of an automobile are untouched: it would be possible to print four blocks at a time, as the car moves back and forth across the garage floor.

Printer's ink is a messy affair, and a good supply of cleaning rags and gasoline should be kept handy to wipe off the blocks, slab and brayer. Usually the block should be wiped after every six or eight proofs, as the ink gradually accumulates where it isn't wanted and lines get thick and smeary. The brayer is a delicate thing (reputed to be made of the improbable sounding mixture of glue and molasses) and must not be left lying on its roller, or it will get out of shape.

Ink left on it will cause it to become hard and useless.

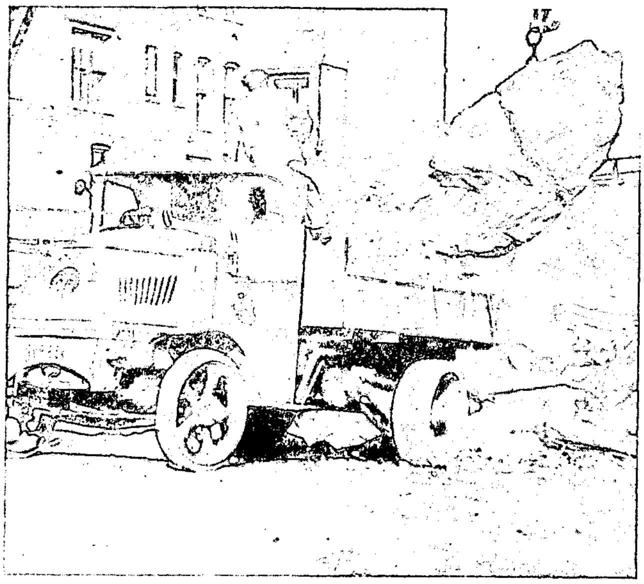
The linoleum cut is an ideal medium for the Christmas card; the thin Japanese paper may be used, mounted on a card, but usually a stiffer stock is preferred. Even a fairly stiff card may be printed by the dessert spoon method, although it does take a good bit of hard rubbing and the card must be held firmly on the block to prevent sliding and smearing. With a non-absorbent surface the amount of ink on the block must be carefully regulated; too much ink causes smudged lines, and too little produces fuzzy prints. The block must be cleaned frequently with gasoline when using a stiff stock.

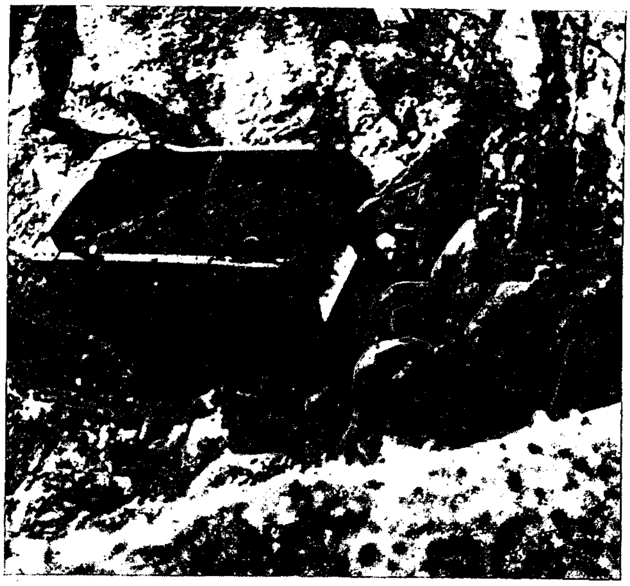
For the ambitious experimenter, there is the whole realm of color printing to be explored. Effective results are easily attained with only one block by use of colored ink on colored paper, but of course, such a simple process can never match the range of the multicolor print, of which Ernest Watson has given us such splendid examples. This use of several blocks (one for each color) is a lengthy task and requires the use of a press unless one can acquire the patience and cunning of the Japanese masters. It is amazing to think that some of the finest of these were printed from as many as forty blocks, with only the aid of cut register marks on the corners.



ARCO SANTA MARIA—BURGOS

CONTE CRAYON DRAWING BY MARC W. THOMPSON





Removing the "X" from Excavations

Cost Factors That Count

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

There is no other part of the construction job that presents more cause for doubts than the excavations. Although simple in appearance, the actual problem can be complicated by many unknown elements. The large jobs of excavation are usually less of a gamble than the smaller ones, because more attention is given to getting all the necessary information about what is to be excavated and what is the most economical method of doing it.

Usually test borings are made to find out the nature of the soil in all parts of the site and careful topographical surveys are secured from which to estimate actual quantities of materials. Also in a large job, the labor conditions of the community are studied and the transportation facilities observed, the conditions of the roads for hauling noted, and the opportunities of disposing of the excavated material. Even the protection of the sidewalks around the property and the bracing of adjoining buildings is considered and not left to chance.

On the other hand, the small job is not handled with such care. The contractor usually visits the site, looks it over, makes a few inquiries about neighboring conditions, and then, by the roughest methods, guesses at the cost, signs a contract to do the work and hopes for the best. If rock is encountered, then it becomes a game between the contractor and the owner to decide who is to pay for its excavation. If wet and running soil is found, then things go pretty soft for awhile, but hard financially. If no topographical survey has been made, the contractor may or may not have estimated the right quantities of material to be taken out. When it does come out he trusts that the trucks can cruise down the streets and sell to some one seeking fill. All of this, of course, is absurd and can be avoided if a little care is taken in getting together the necessary information, before any contracts are signed or any promises made.

Things That Should Be Known

1. *Conditions of Labor*

   Find out the current price of local labor to decide whether outside labor should be brought in.

2. *Labor Transportation*

   Note conditions of transportation to and from job, for this will affect efficiency, time, and to some degree the rate.

3. *Conditions of the Roads*

   Note the conditions of the roads from site to dumping place, whether good, fair or bad, because this factor influences hauling time.

4. *Proximity of Dumping Grounds*

   Normal conditions of disposing of excavated material should be noted and length of haul determined.

**Ass't Prof. of Architecture, School of Architecture, Columbia University.*

†In charge of University Classes in Estimating and Superintendence of Building Construction, School of Architecture, Columbia University.

5. *Nature of the Soil to be Excavated*

   For any important job test borings should be made to determine nature of material to be taken out. Information on small jobs about soil may be obtained from local experience near by. Unit prices for excavating rock should be agreed upon and included in the contract for general excavation. Also it should be clear who owns the excavated material, the owner or the contractor.

6. *Methods of Excavation*

   The best methods and the most economical ones can only be determined by a careful analysis of the previous five items.

7. *Protection of Excavations*

   Any one of the following may need protection during excavation:—

   Sides, sidewalks, walls of adjoining building, new footings for adjoining building. It may be necessary to have a night watchman to protect whole site.

Methods of Excavation in Use Today

All mechanical methods used in excavation work are but enlarged hand methods, and they do not begin to pay until the job is big enough to allow the machine to do enough work to save money to pay for its transportation to the site and its maintenance and still show a profit over hand-work. Where this line between hand methods and machine methods is to be drawn involves an interesting study that depends upon a complete analysis of the conditions of every job. The slack conditions of today make power-shovel excavating extremely economical, because there are ten power shovels to one job and keen competition exists between bidders, with the result that upkeep costs and interest on the investment in the machinery is not even considered.

Hand methods. As it stands now, the hand methods of excavation can be described as *pick and shovel to a depth of 6 feet* and *pick and shovel methods* extended *below 6 feet.* The cost of excavating below this 6-foot level increases because of the fact that material cannot be thrown out of a deeper pit than this with a shovel in the hands of an average workman.

Hand methods of excavating rock are only used when boulders are encountered and it is possible to split them up into small parts with "plugs and feathers," a term used to describe a wedge driven into a hole between two smaller wedges that superficially resemble bent feathers.

Mechanical methods. Mechanical methods of excavation can be classified into two groups; those involving the use of a *horse or motor-tractor drawn scoop* which can be used on soft soils but must be preceded by a plough when hard soils are encountered, and those in which the various *types of mechanical shovels* operated by steam, electricity, or gasoline are used. Drilling and blasting rock and hoisting machines for loading trucks comprise the remaining mechanical methods.

Three Kinds of Excavations That Affect the Cost

Excavations should be thought of in three different ways, because the type of work to be done determines the method to be used in getting out the ground and consequently the cost. Take any building plan and one will immediately see how the excavation to be done is divided up into

1. the general work for the basement
2. the trenches for walls and footings
3. the pier pits under isolated supports.

No one needs any experience in estimating to realize that the first is the easiest job to tackle, for the steam shovel with its great capacity for speed can be run in to scoop out the ground for the big hole under the main portion of the building. This part of the excavation is, therefore, the cheapest to get out. Extremely different are the small and confined pier pits which must be dug by hand methods and which are, therefore, bound to be more expensive for the same unit of measure. In between lies the work on trenches, for, although in most cases these must be dug by hand, yet occasionally the very efficient trench digger can be brought in to gouge out the ground in a way that is even more amazing to watch than the steam shovel. Accordingly, therefore, in thinking of the relative costs of excavations, one should classify the work into the three mentioned parts and think of them in terms of relative expense on account of the methods that must be used.

Soil Conditions That Affect the Cost

It can be said, regardless of the size of the excavation, that the kind of soil to be excavated and its condition of being either dry or wet will determine the cost rate per cubic yard. The unit cost of excavating by hand a 200-cubic-yard job of ordinary dry dirt runs about the same as the cost of excavating a cubic yard of the same material with a steam shovel on a 20,000-yard job, because of the added expense of the steam shovel, equipment, cartage, etc. In other words, it is possible to figure the cost of excavating cubic yards of various types of soil for any one locality and these unit costs will be the same whether the building is small or large. Likewise the cost per yard will *increase from 10% to 15% if wet,* because labor slows down and there are extra costs involved in removing the water. To show how the kind of soil affects the cost, the following table of common prices for one particular section is quoted—

Sand	$ .45	per cu. yd.
Light loam	.60	" " "
Ordinary dirt	.70	" " "
Heavy soil	.85	" " "
Gravel	.95	" " "
Clay	1.15	" " "
Hardpan	1.70	" " "
Shale	1.90	" " "

How Haulage Affects Cost

Another factor which determines the cost of excavation is the kind of haulage to be used. For example on a small 200-yard job the haulage might be nothing

Table I

EXCAVATION

HAULAGE OF EXCAVATED MATERIAL

By Means of Motor Trucks

LOADING TRUCK BY HAND						LOADING TRUCK WITH STEAM SHOVEL					
Minutes Loading	Travel'g Time-Ml.	Minutes Unload.	Waiting Time	Total Pr. Trip	KIND OF SOIL	Condition Road	Minutes Loading	Travel'g Time-Ml.	Minutes Unload.	Waiting Time	Total Pr. Trip
30	5	5	10	55	Sand or Light Loam	Good	10	5	5	10	35
30	6	5	10	57	Sand or Light Loam	Fair	10	6	5	10	37
30	8	5	10	61	Sand or Light Loam	Bad	10	8	5	10	41
35	5	5	10	60	Ord. Dirt or H'y Sl	Good	12	5	5	10	37
35	6	5	10	62	Ord. Dirt or H'y Sl	Fair	12	6	5	10	39
35	8	5	10	66	Ord. Dirt or H'y Sl	Bad	12	8	5	10	43
40	6	5	10	67	Clay or Gravel	Good	13	6	5	10	40
40	7	5	10	69	Clay or Gravel	Fair	13	7	5	10	42
40	9	5	10	73	Clay or Gravel	Bad	13	9	5	10	46
50	6	5	10	77	Hardpan or Shale	Good	17	6	5	10	44
50	8	5	10	81	Hardpan or Shale	Fair	17	8	5	10	48
50	10	5	10	85	Hardpan or Shale	Bad	17	10	5	10	52
50	7	5	10	79	Loose Rock	Good	20	7	5	10	49
50	9	5	10	83	Loose Rock	Fair	20	9	5	10	53
50	11	5	10	87	Loose Rock	Bad	20	11	5	10	57

Note—*The above table is based on the use of an average-size motor truck capable of carting 7 yards of material at a load.*

more than a wheelbarrow, making the cost of hauling only $ .35 per cubic yard. Or on the small job, where the material had to be taken away, a 2-yard horse-drawn truck might be used, which would increase the cost of hauling to $ .60 per cubic yard. On a large job where the excavated material is taken out by the motor-driven 7-yard truck, taken on a long haul and dumped, the cost might be for such haulage as much as $1.10 per cubic yard, to say nothing of dumping charges.

Road Conditions Affect Haulage Costs

Not only does the method of hauling have its effect on the cost, but the condition of the road affects the cost of hauling, and so this factor must also be taken into consideration. To estimate all of these conditions in a simple manner, a table is printed here that deals with the various costs of haulage using the motor truck (Table I). Similar tables could be shown for the horse-drawn truck and the wheelbarrow if space permitted.

Now observe this table, and note how it gives the time factor for trucks loaded with a steam shovel or by hand, and how, knowing the distance of the haul, the *total time required for a round trip* can be read for various kinds of soil over good, fair, or bad roads.

Let us take an example where a power shovel will be used to fill the motor truck and the roads are good, and the soil to be taken out is clay and gravel and the distance that it is to be hauled is a mile. By reading down the table to "clay" with road conditions "good" and following the horizontal division over to the right to the last column, it will be noticed that the "round trip time" of the truck will be forty minutes. If the haulage were two miles, instead of one, it will be noticed that under the column "Traveling Time" that six minutes must be added for each added mile of hauling.

Now, trucks are usually rented out for an eight-hour day with driver, including gas, at about $30.

In one eight-hour day there are 8 x 60 or 480 minutes. From the table we read that the round trip took 40 minutes, so, dividing this into 480 minutes for the day we find that the truck will make 12 trips in a day.

But these trucks carry 7 yards so that 7 x 12 trips would mean that 84 yards would be hauled a day over the one mile distance. From this, the hauling cost per cubic yard can be determined by dividing $30 (the cost of the truck per day) by 84 and this will give a little over $ .35 per cubic yard. To this figure must be added the cost of dumping and the overhead and profit.

Computing the Unit Cost of Excavating by Steam Shovel

To show another type of table, which is only an example of what might be reproduced, if space allowed, for other methods of excavation, there are printed two tables on steam shovel excavation from which can be computed the cost per cubic yard of excavating any kind of material (Tables II and III).

Let us suppose that the job to be excavated has been computed to have 7,840 cubic yards of *dry*, ordinary dirt and that we are going to use a ¾-yard shovel.

Table II

EXCAVATION

3. STEAM SHOVEL METHOD

Table of Costs

ITEM OF COST	UNIT	TAKING SHOVEL TO JOB ½-Yd. Shovel	¾-Yd. Shovel	1-Yd. Shovel	DAILY OPERATION ON JOB ½-Yd. Shovel	¾-Yd. Shovel	1-Yd. Shovel	TAKING SHOVEL FROM JOB ½-Yd. Shovel	¾-Yd. Shovel	1-Yd. Shovel
Labor—Foreman	Hours	9	9	9	8	8	8	9	9	9
Labor—Engineer	Hours	9	9	9	8½	8½	8½	9	9	9
Labor—Fireman	Hours	9	9	9	9	8	9	9	9	9
Labor—Laborers	Hours	27	27	36	24	32	40	27	27	36
Fuel—Coal	Pounds				1000	1500	1850			
Water	Gallons				1000	1400	1740			
Waste and Upkeep	Dollars	2.00	2.50	2.75	2.00	2.50	2.75	2.00	2.50	2.75
Repairs (App.)	Dollars	2.60	3.20	3.70	2.60	3.20	3.70	2.60	3.20	3.70
Depreciation	Dollars	7.50	8.30	9.15	7.50	8.30	9.15	7.50	8.30	9.15
Int. on Inv.	Dollars	4.25	4.80	5.40	4.25	4.80	5.40	4.25	4.80	5.40
Miscellaneous	Dollars	3.00	3.50	4.00	3.00	3.50	4.00	3.00	3.50	4.00
Trucking Shovel	Dollars	20.00	22.00					20.00	22.00	24.00

Read from the table of the daily output of various-size shovels, down the center column "Kind of Soil" to "Ord. dirt—dry." Then, reading to the left under the ¾-yard shovel, it will be observed that such a shovel takes out 300 cubic yards in an eight-hour day. We now have the necessary information to compute the number of days that we will have to use the shovel. We divide the 300 into the 7,840 cu. yds. of dirt to be excavated and we get the answer of 26 days.

The next job is to figure the cost of bringing the shovel to the job, keeping it working 26 days and taking it away. The table of costs for the Steam Shovel can now be used to do this. Observe, under the ¾-yard shovel, the various units for estimating this cost, "Taking the shovel to the job," "Daily operation," "Taking it away."

By using this table the following calculations were made based on assumed labor prices

Table III

EXCAVATION

3. STEAM SHOVEL METHOD

Daily Output of Various Size Shovels

CUBIC YARDS PER 8-HR. DAY ½-Yd. Shovel	¾-Yd. Shovel	1-Yd. Shovel	1¼-Yd. Shovel	KIND OF SOIL	HOURS PER CUBIC YARD ½-Yd. Shovel	¾-Yd. Shovel	1-Yd. Shovel	1¼-Yd. Shovel
315	350	385	415	Sand—Dry	.0254	.0228	.0207	.0193
255	285	315	340	Sand—Wet	.0314	.0281	.0254	.0235
290	320	350	380	Light Loam—Dry	.0276	.0250	.0228	.0211
235	260	285	310	Light Loam—Wet	.0340	.0308	.0281	.0258
270	300	330	360	Ord. Dirt—Dry	.0296	.0267	.0242	.0222
220	245	270	290	Ord. Dirt—Wet	.0364	.0326	.0296	.0277
240	265	290	315	Heavy Soil—Dry	.0333	.0302	.0277	.0254
195	215	235	255	Heavy Soil—Wet	.0410	.0372	.0340	.0314
215	240	265	290	Clay—Dry	.0372	.0333	.0302	.0277
165	185	205	220	Clay—Wet	.0485	.0432	.0390	.0364
200	220	240	260	Gravel—Dry	.0400	.0364	.0333	.0308
150	170	190	205	Gravel—Wet	.0532	.0471	.0421	.0390
180	200	220	240	Hardpan—Dry	.0444	.0400	.0364	.0333
140	155	175	190	Hardpan—Wet	.0571	.0516	.0457	.0421
150	170	190	210	Loose Rock—Dry	.0532	.0471	.0421	.0381
135	150	170	185	Loose Rock—Wet	.0591	.0532	.0471	.0432

Note—*The Term as used in above Table refers only to Material "In Place."*

Estimating Cost of Bringing Shovel to Job*

Foreman at $2 per hr.	9 x $2.00	$ 18.00
Engineer at $1.50 per hr.	9 x $1.50	13.50
Fireman at $1.50 per hr.	9 x $1.50	13.50
Laborers at $1.00	27 x $1.00	27.00
Waste and Upkeep		2.50
Repairs		3.20
Depreciation		8.30
Interest on Investment		4.80
Miscellaneous		3.50
Trucking shovel if trailer is used		22.00
Total Cost		$113.30

**Taking it from job is charged up to next job.*

Estimating Daily Operation Costs

Foreman at $2 per hr.	8 x $2.00	$ 16.00
Engineer at $1.50	8½ x $1.50	12.75
Fireman at $1.50	9 x $1.50	13.50
Laborers at $1.00	32 x $1.00	32.00
Fuel—coal at $12 per ton and 1500 lbs.		9.00
Water		.50
Waste and Upkeep		2.50
Repairs		3.20
Depreciation		8.30
Interest on Investment		4.80
Miscellaneous		3.50
Total Cost Per Day		$106.05
But shovel will be operated 26 days, so 26 x $106.05 will give total cost of $2,757.30		$2,757.30
To which should be added cost of bringing shovel as determined above—$113.30		113.30
Giving *total cost* of operation		$2,870.60

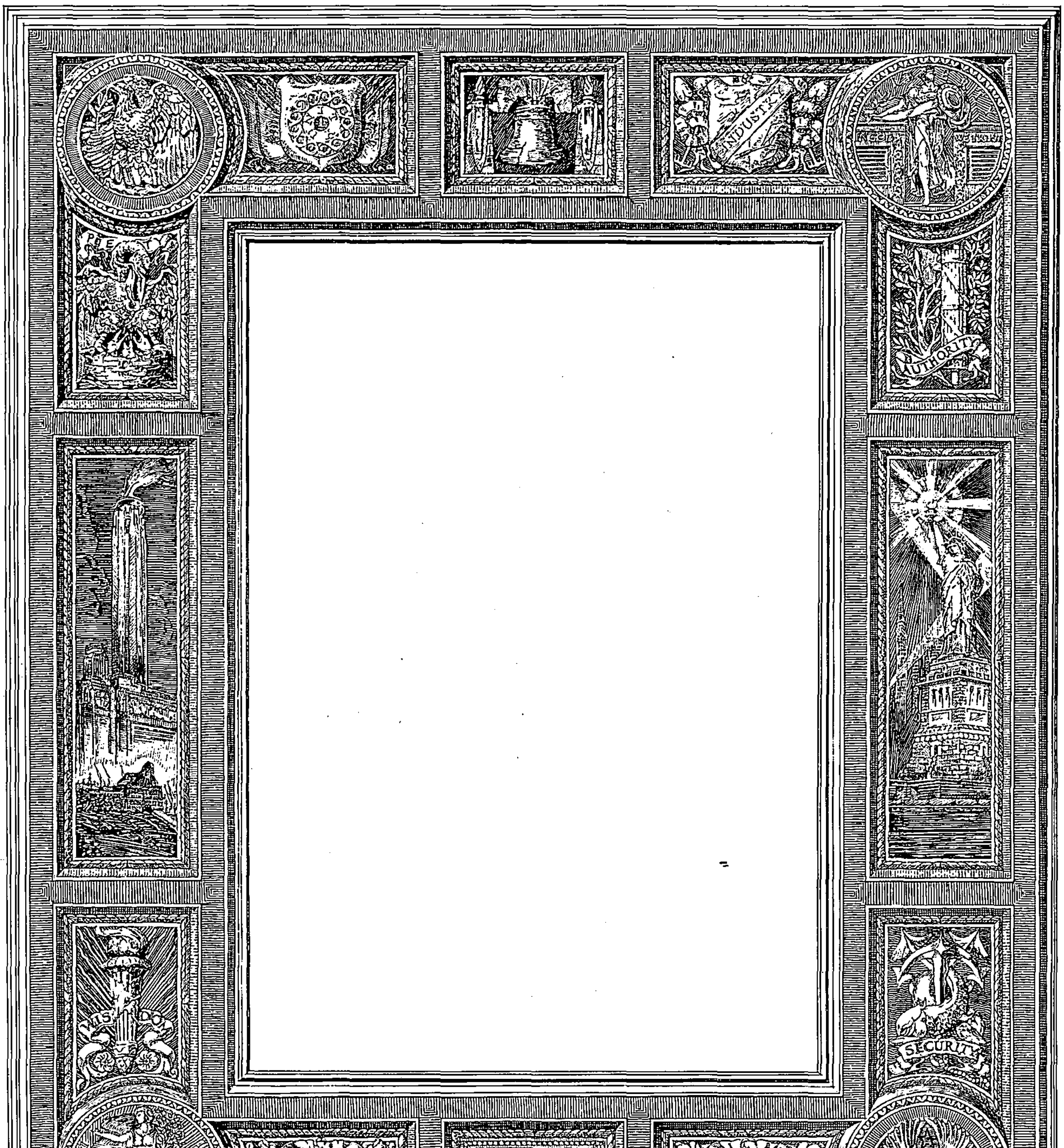
Now dividing the 7,840 cubic yards of dirt to be excavated into the total cost of $2,870.60 we get the information that it costs $ .36½ per cubic yard to excavate dry dirt with a steam shovel.

This does not include profit and office overhead which should be added.

Thus is shown the procedure used in determining a unit cost of excavation from local conditions of labor. Space does not permit more examples.

General Rules for Estimating Number of Cubic Yards to be Excavated

1. Always allow 2 feet extra around entire perimeter of basement walls to be excavated to take care of angle of repose of excavation and to allow sufficient space for setting of forms, waterproofing, etc.
2. Always figure 8 inches below cellar floor level, because all architectural sections and elevations are figured to the cellar floor level.
3. Compute the volume of footings to be excavated separately, since this must be done by hand.
4. When figuring the quantity to be hauled away, observe the rule that 5 cubic yards in the ground expands to 7 cubic yards as excavated material in the trucks.
5. Allow extra for wet conditions (10% to 15% more).
6. Do not figure from the first floor level in estimating volume to be figured, but only from the grade line. This may seem obvious, but experience shows it to be a common error.
7. Convert cubic quantity of soil to be excavated into cubic yards by dividing total cubic feet by 27.



FROM A PEN-AND-INK DRAWING BY JOHN YENSUAN—DECORATIVE BORDER
Size of original, 11½" x 14½"

Circulation in the House Plan

By Arthur Bates Lincoln

Doors, Rooms, Hallways, and Stairs are the Agencies of Circulation about the House. Every Route which will be frequently traversed should be made direct, not cramped, well lighted . . . .

Back in our school days, after we had studied the Orders, and were imbibing the technical knowledge which we expected to make us much sought after by the architect who had preceded us into the active field, we heard much of the importance of circulation in plan. We learned that the problem of planning a monumental structure or group of buildings was best solved where this matter of circulation, of permitting the people for whom the building was designed to move about as their needs required, was given fullest consideration. It became preeminent in our study of planning.

Then we found ourselves out in the world of material things. Some of us were bending over a drawing board, busily engaged in the uninspiring task of rubbing out, that constantly recurring role for which the newcomer is invariably cast, while learning that there is a difference between school and office practice. Buildings were built to rent, we were told, and it was impressed upon us that the marketable space was the important thing.

Eventually we have found ourselves in a position to open up a practice of our own, and what have we whereon to practice? Monumental buildings, requiring careful attention to the problems of circulation? Not likely; our jobs are houses, small homes lived in by people of limited means, even as you and I.

What about this matter of circulation? Should it all be forgotten? By no means. Although we may talk of a building as a seven- or a ten-room house, depending upon the number of major rooms included, when actually planning it we must go more into detail. It is necessary to provide for the people who will live in the house, and for any friends who may wish to visit them, an opportunity to move about from room to room.

In planning the house of the present it is easy to slip into the habit of depending upon the example of the past. We take a plan which the client brings to our attention, it may be a good plan, it may be a poor one, but it serves as a start for the study of the problem. Thereon the client and the other members of his family have been able to indicate, with a fair amount of clarity, what they hope to gain in their new home.

Large rooms are their unfailing demand, and they consider that a house without a hall is quite economically planned. The most frequent fallacy of these clients is the belief that all of the important rooms should be placed across the front, looking out toward the street. This not only results in a loss of light and air along the sides, if the plot of ground is narrow, but it prohibits the inclusion of space devoted to passage through the front part of the house to reach the rooms at the rear.

To make any building successful, whether it be the small house of the working man, or the mansion of the wealthy, the plan must be laid out with a proper arrangement of supplementary spaces to provide for movement about the building without conflict. All routes must be considered, with the lines most frequently traversed made as direct as possible. Conflicting routes, particularly between family and service requirements, should be eliminated wherever possible. Obstacles to comfortable progress, such as the awkward swing of some door, which may, in an unguarded moment, be so placed that it will swing against the customary direction of passage, should be avoided, as they may provoke never-ending discomfort.

Typical Route of the Family Head

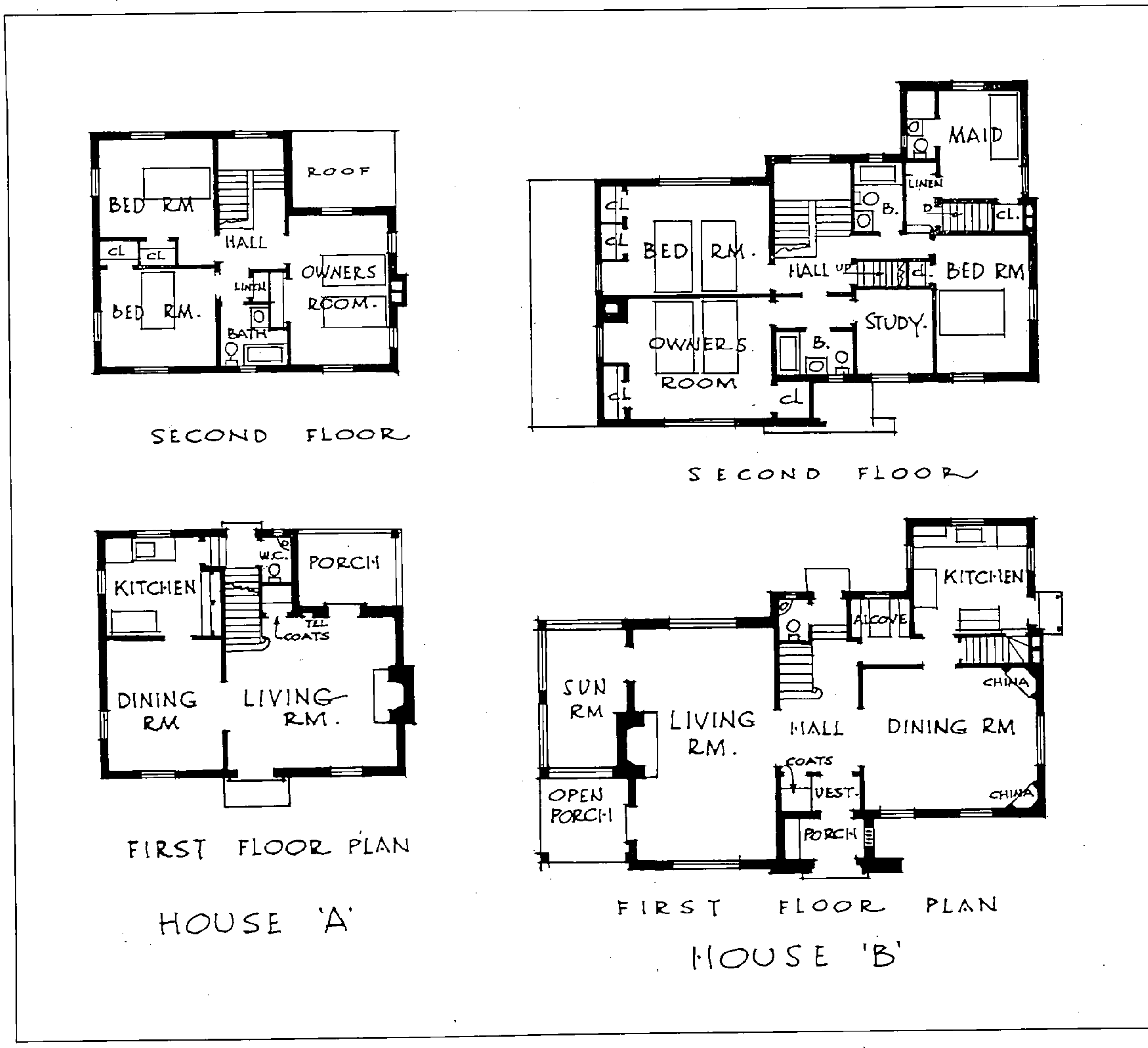
Let us digress for a moment, and ask ourselves, what is a typical line of circulation. Everyone is familiar with the service route between the kitchen and the dining room. Let us consider the typical route taken by another member of the family.

The master of the house will come home from his day at the office, step inside the door, doff his hat and shed his coat, and pause to hang them up. The closet for this purpose should not be too far from the entrance door, nor should it be cramped in size; otherwise it may be too full with the coats of other members of the family.

Habit will determine the next step, but in the majority of instances the man will proceed to his room upstairs, where he may freshen up for dinner. The stairway should lead directly to this destination. The bathroom should not be too far away from the room, nor too public, nor in use at the time. Of course an architect cannot stand at the door to warn prospective users of the bathroom that the head of the house will require the room directly, but a second bathroom may be included in the plans. This will allow the household to establish the necessary regulations which will leave the room clear.

Descending eventually to the lower floor, the man of the house will turn into the living room for the few remaining moments before the dinner bell summons all members of the family to the dining room.

It is enlightening to mark out upon any house plan even so simple a circulation route as the one just outlined. Many and unexpected handicaps to free movement about the plan will be found in even the expensive house. The route may be indirect, doors may be hung awkwardly, and very often provision for daylight at some important point will be meagre or entirely lacking.



HOUSE A illustrates the very small plan. All hallways, except those essential to meet the demands of privacy, are eliminated. People who may wish to move about the lower floor must pass from room to room, and they will ascend the stair to the second floor from the living room. Privacy is hardly possible, but that will not prove a serious drawback for the small family. The larger room area will be preferred to spaces set aside for circulation only.

HOUSE B presents a more elaborate plan. Halls and passageways are introduced to lead to every room. Service routes are considered, with particular thought to isolate activities of the maid to one section of the house, except when answering the front door bell. Passages forestall any possibility that such a trip might break in upon the privacy of occupants of either the living room or the dining room.

Halls and door openings are made wide where several people might be expected to move about at the same time, narrower where only one or two will be usual. Daylighting of stairs is assured, as is also ample headroom.

Circulation Needs

What determines the circulation needs in a house plan? The route just described is but one of many, often conflicting in nature where there are several members in the household. Precedence should be given to the probable movements of the family. The next consideration should be for those other regular members of the household, the servants if any, whose activities will frequently be directed toward the promotion of family convenience. Finally, because their demands will be infrequent, needs of guests should receive attention.

Three agencies are incorporated on plans to promote ease of circulation. The first of these is the door opening, placed in the partition between rooms, to permit passage from one room to another. Secondly the hallway is introduced to lead from one room to another which may be at a distance. Thirdly the stairway is provided to lead from one floor level to another.

The route to an objective should be direct, and ample width should be allowed for the number of people who may be expected to move at one time. Where there might be occasional cross circulation more liberal area should be provided than where traffic will be in one direction only under ordinary conditions.

There is a certain simplicity to the very small house which makes it appeal as an ideal to many. A brief analysis of the plan, however, will show some drawbacks. The simplest house plan will place most of the rooms adjoining, with door openings through the enclosing walls which separate rooms. Under such circumstances the doors direct the line of circulation. The serious drawback to such an arrangement is the absolute necessity for passing through one room in order to reach another.

The travel through a room which has to be used as a passageway will be guided by the door openings and subsequent location of furniture into as definite a route as though restrained between walls. This constant traffic will very quickly show in wear on the floor and floor coverings, marking a definite lane through the room. The area of the room must be increased more than would otherwise be desirable, in order to reduce conflict.

Privacy also is largely lacking, because everything which is done must be accomplished in the presence of every member of the family who may be using the room at the same time. The housewife lacking a vestibule at the front door, also, will often complain over her difficulties in trying to keep a room clean when people are continually stepping directly in upon her from the out-of-doors.

Practically all of the living rooms on the first floor, including the dining room and kitchen, are so planned that they may be traveled through. Doors will usually be arranged on adjacent or opposite walls, to facilitate such traffic.

While the living rooms may be in general use as a medium for circulation, not so the bedrooms. These must be reserved to the exclusive use of those who will occupy them. Bedrooms come under a different category; with only one door leading into them, they will mark the end of a route. On many occasions of illness or other contingency, the room may be occupied throughout the day, when others, even members of the family, would be barred. It is even undesirable to enter such a room directly from another living room.

Bathrooms are equally as much a room of destination, although sometimes they serve for purposes of intercommunication, when placed between two bedrooms with doors in opposite walls. This frequently becomes a nuisance to the later occupants of the house, for when one door is fastened on the bathroom side, the person barred may have to trespass through another's bedroom to unlock it.

Passages or hallways have a definite purpose in certain parts of even the smallest house plan. As a connecting link between living spaces and rooms devoted to sleeping or bathing, they afford the essential opportunity for privacy, while directing the line of travel.

Hallways Preferable to Rooms for Passage.

Where the house may be large enough, the introduction of hallways for the major routes of circulation is desirable. In such a plan no route should pass through a room to proceed from one part of the floor to another. Entrance to the house should be protected as well. The door should open into a hallway at least, and where better facilities are possible, a vestibule should be introduced between the outer air and the rooms of the house.

The desire to obtain the largest amount of room area in the minimum area of plan is a laudable one, but it is not wise to go too far. A house is planned to be lived in, and while it is pleasant to present to your client a room larger than any he may have expected, he will not appreciate such magnanimity at the expense of convenient movement from room to room about the house. A passageway between rooms may seem like space wasted, but when the person who will occupy the room prefers absolute privacy, he will resent a plan arrangement which allows others to pass through while he is busy.

Privacy is one of the states of being often as desirable to the human being as it is to the wild forest creature. Spaces set aside for circulation afford this seclusion, as well as definitely marking the route to be taken in proceeding from one portion of the house to another.

Circulation areas need not be limited to their material function. In many instances where they are direct lanes of communication through the plan, they form settings for vistas which the experienced planner is quick to develop. In such cases they move out of the class of the strictly essential into the artistic, and their size is usually increased beyond that dictated by the requirements of use, to satisfy the demands for beauty and architectural enrichment.

Hallways must not only be of ample width but, to be continually useful, they must be light at all times. Natural daylighting for such passages is highly desirable, and should be provided by windows in an exterior wall whenever possible.

Vertical Circulation

Circulation about a house is not confined to one level; it will be vertical as well as horizontal. The average house will have two or three floor levels, and the facilities for communication between them will constitute an important part of the plan.

The stairway is the universal method introduced for ascent to an upper floor. In even the expensive house or mansion, stairs are planned first. After them may come the elevator, the dumbwaiter, and even the movable stair.

It is as important to provide for safe and comfortable progress from one floor to another as it is to arrange for the convenience of movement on the level. Stairways should be placed where they may be readily discovered upon entrance into the house, and they should be made accessible to any one who may have occasion to make use of them.

In size they should be ample, not only for the usual but also for the exceptional demand which may be made upon them. While three feet is often considered a suitable width for the stair in a small home, it will do no harm to add a few inches to this figure unless space is very cramped. Width in excess of the minimum will be necessary if the stairway is enclosed between walls, where elbow room will be restricted.

Remember that furniture sometimes has to be carried up or down stairs.

Stairways present an accident hazard which is too real to be lightly disregarded. Other things in addition to the correct proportion of riser to tread contribute to the design of the satisfactory flight. Winders are an abomination which should only be introduced where the space is very cramped. Incidental steps are even more of a hazard, especially along passageways.

Many an otherwise excellent plan has proven to be a disappointment, after construction of the building, because the upper hall was dark and gloomy, even when the sun shone brightly. Danger of accident upon the stairway may be reduced if all steps and stairs are arranged to be daylighted. A window is almost as important in the stairhall as it is in any room.

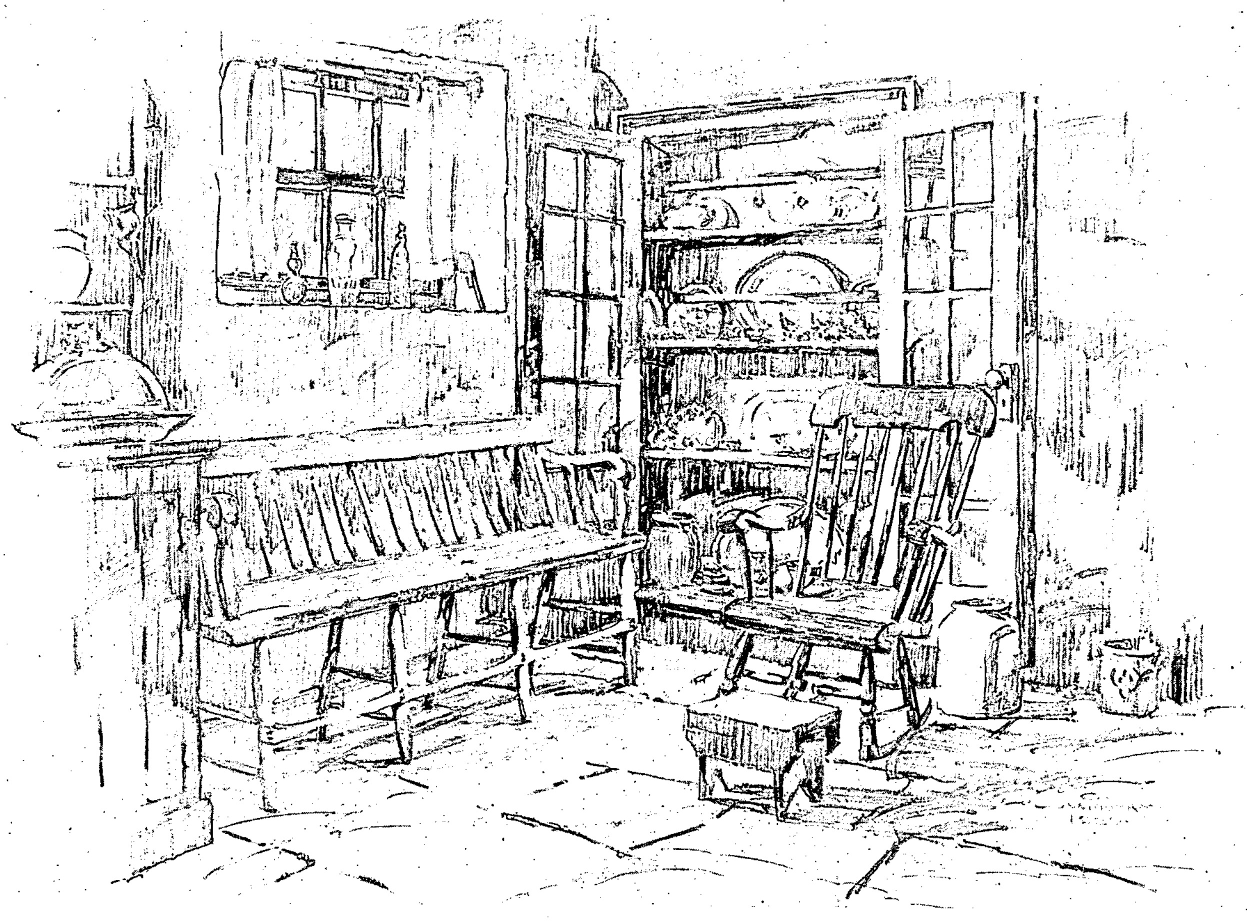
When you take up the planning of a large house, provision will be made for more than one stair. The main stair will then be ornamental like the reception hall wherein it will be found, and the demands of design will dictate a larger stair than would be required by the needs for service.

Secondary or service stairs may be narrower, but should not be less than 2′-6″ to allow for movement of trunks, which is one of the chief purposes of the service stair.

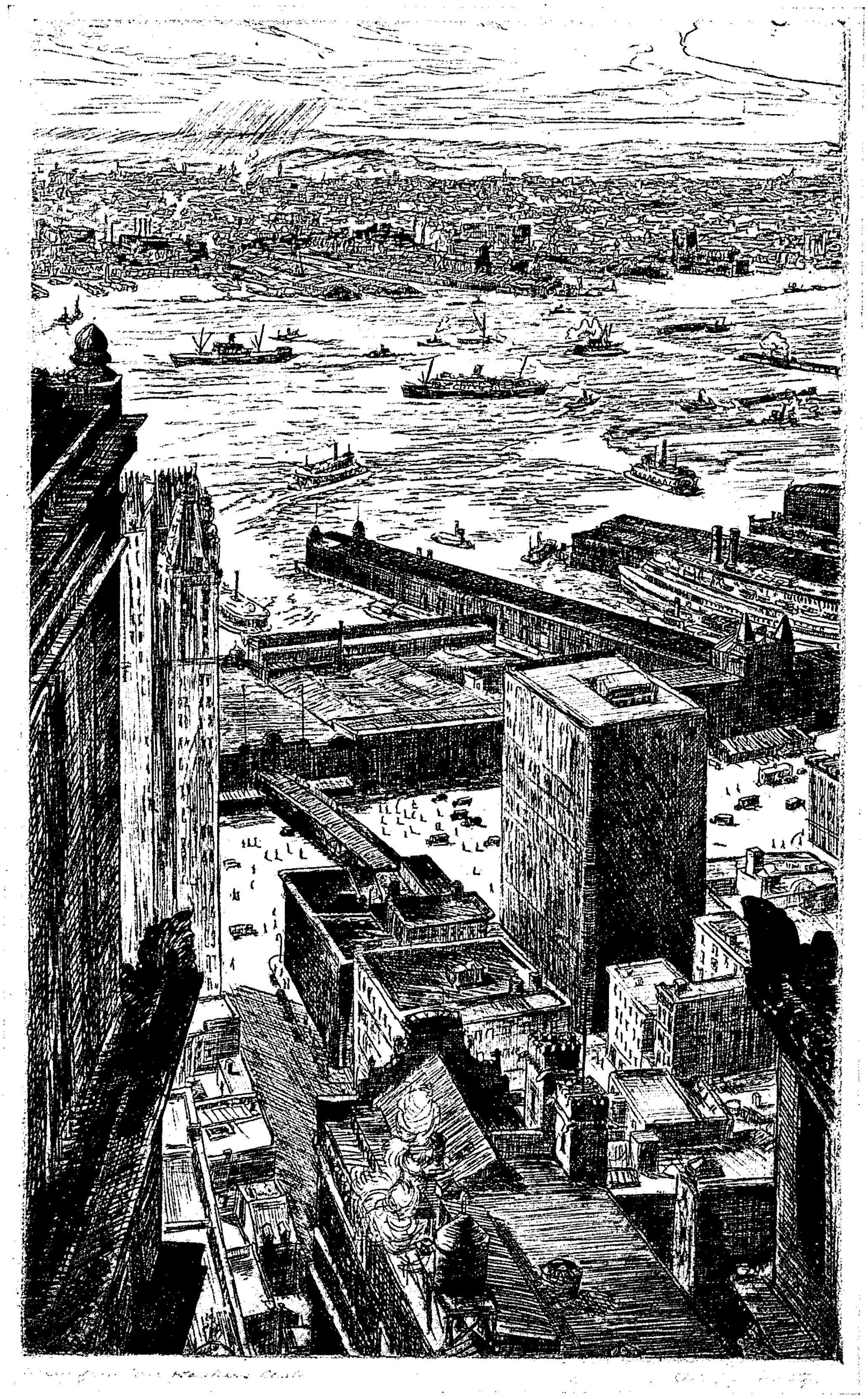
Another sound reason for the inclusion in the plan of a second stair, is seclusion. It affords the maid a means for going up and down stairs without imposing upon the social affairs of her mistress, or the privacy of the family. It should lead from the service portion of the house to the service quarters above, preferably closed off by a door at the upper end.

In the smaller house, where space cannot be allotted to a complete secondary stair, it is not unusual to provide a double flight of steps to a common landing halfway up to the second floor. This makes it possible for the housewife to reach the upper floor from the kitchen without being seen from the living room.

Adequate headroom is the last important requirement in the design of a stairway. If this is cramped it will most quickly show up by a bumped head as one tries to descend.



"AN OLD SAVANNAH KITCHEN"—PENCIL SKETCH BY CORNELIA CUNNINGHAM



Courtesy of Kennedy & Co.

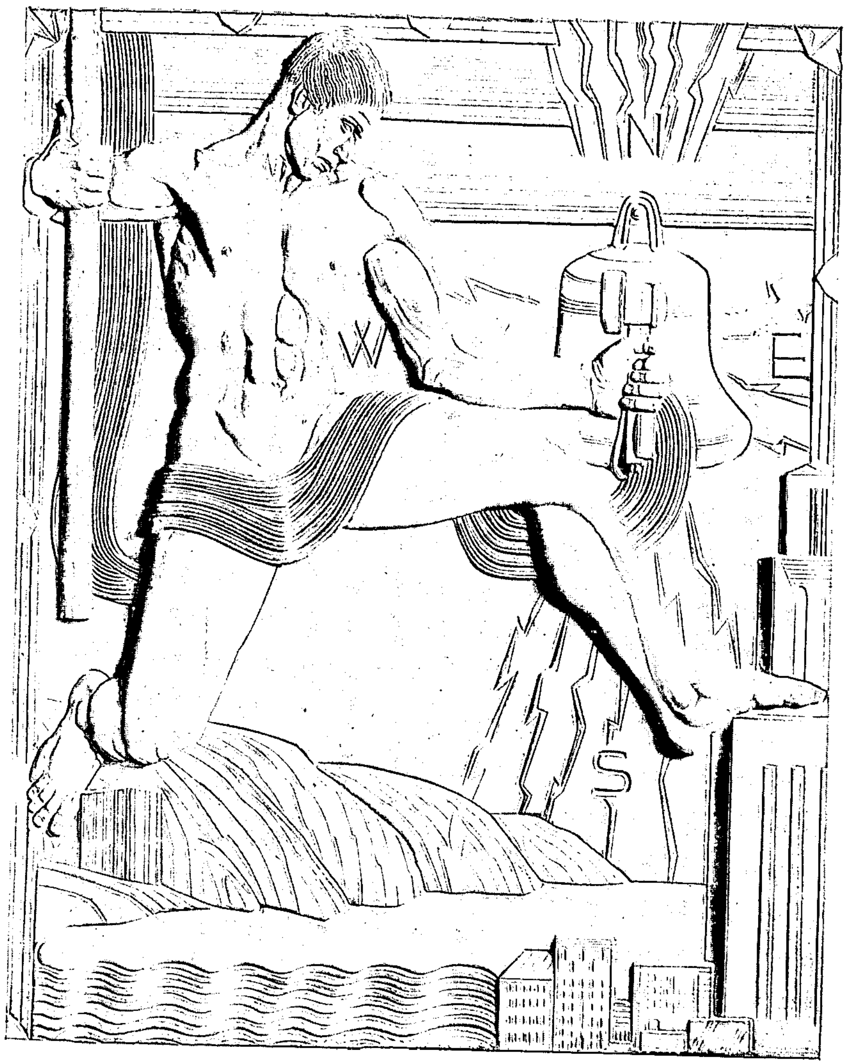
FROM A DRYPOINT BY WILLIAM C. McNULTY

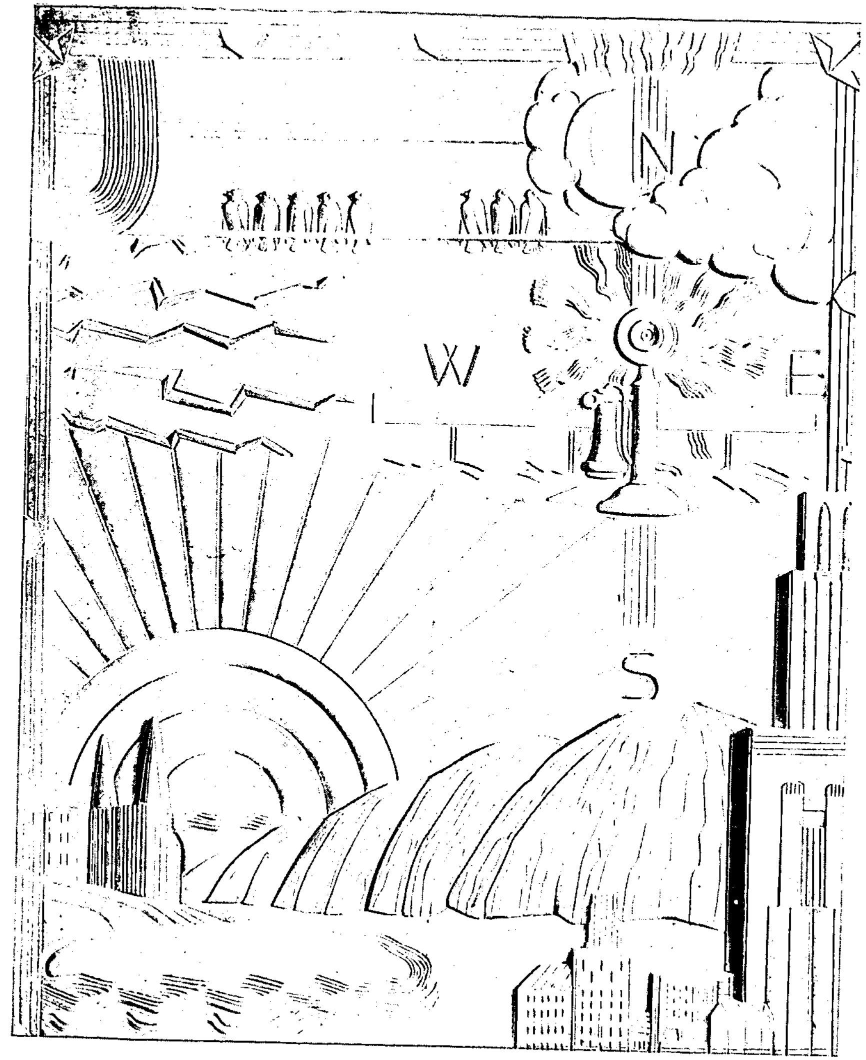
NEW JERSEY FROM THE BANKERS' CLUB, NEW YORK

PENCIL POINTS FOR SEPTEMBER, 1931

VOLUME XII NUMBER 9

This drypoint, which measures 8" x 13¼" in the original, is one of Mr. McNulty's more recent plates of New York.





"LEAPING OVER THE MILES," PANELS DESIGNED AND EXECUTED BY LEO FRIEDLANDER, SCULPTOR
FOR THE NEW YORK TELEPHONE COMPANY BUILDING AT BUFFALO, NEW YORK—VOORHEES, GMELIN, AND WALKER, ARCHITECTS

PENCIL POINTS FOR SEPTEMBER, 1931

VOLUME XII NUMBER 9

The panels shown on the other side of this sheet are symbolical of the installation of the telephone wirings throughout the country. The panel on the left shows "Speed," the telephone pole in one hand and the wiring in the other, "leaping over the miles." That at the right is a continuation of the sculptor's general theme of space. The finished panels measure approximately eight feet by five feet.

Courtesy "The Old Print Shop, Inc."

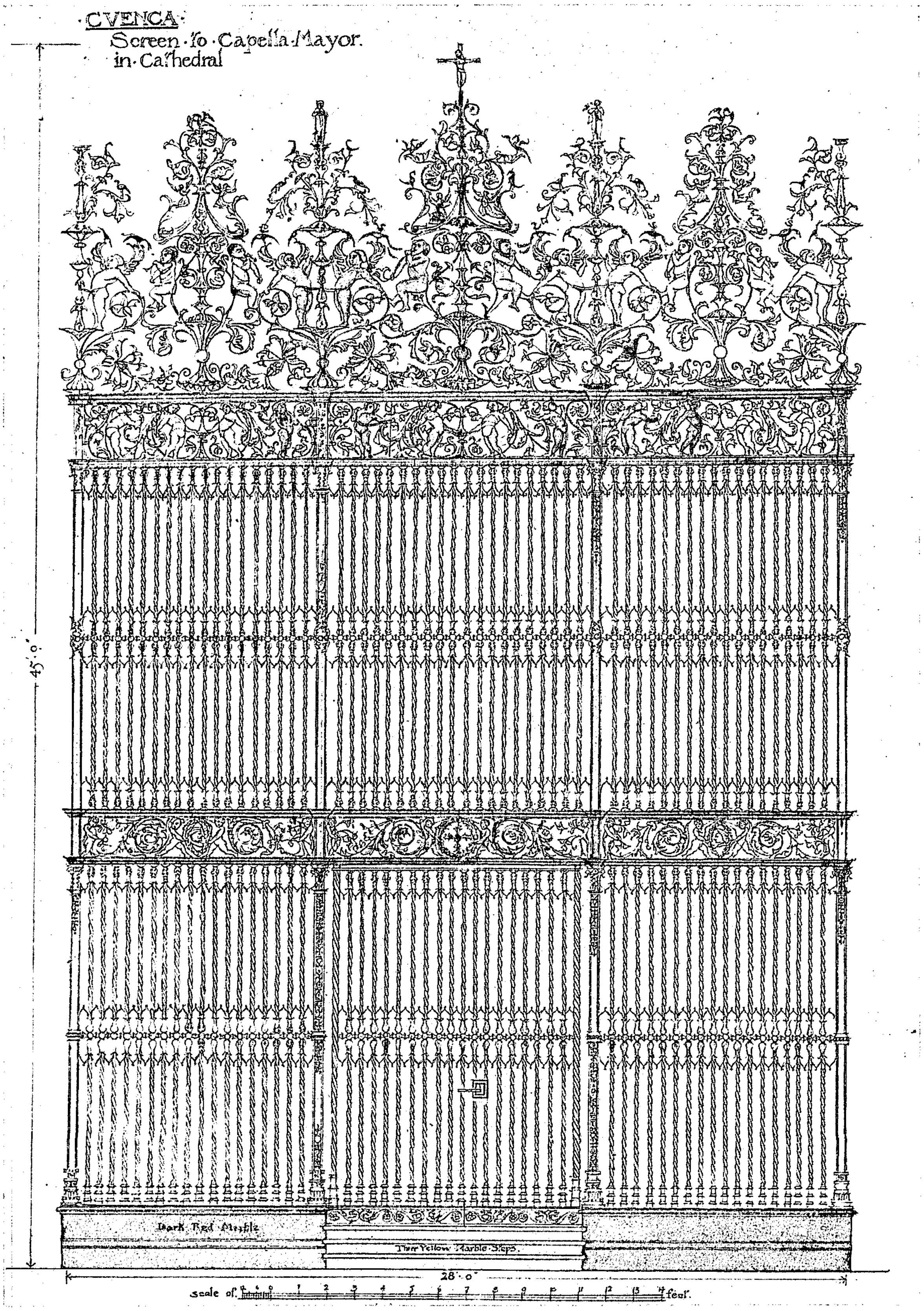
Timothy Cole

FROM A WOOD ENGRAVING BY TIMOTHY COLE
REPRODUCED AT THE EXACT SIZE OF THE ORIGINAL

PENCIL POINTS FOR SEPTEMBER, 1931

VOLUME XII NUMBER 9

This plate shows another of Timothy Cole's delightful wood engravings. While his landscape presented in our August issue was perhaps more typical of his work, the fineness of the detail on this plate is well worth careful study by all lovers of the work of this great American master of wood engraving.



RENAISSANCE ARCHITECTURE AND ORNAMENT IN SPAIN

A PLATE FROM THE WORK BY ANDREW N. PRENTICE

PENCIL POINTS FOR SEPTEMBER, 1931
VOLUME XII NUMBER 9

"The subject of this plate is at the entrance to the Capilla Mayor, and from its construction and detail appears to be of an earlier period than those given on the following plates. The square pillars forming the main supports are of wood, cased with metal plates, with beaten ornaments stuck on, and are connected with two beautiful friezes of an openwork design, the intermediate spaces being filled in with solid iron bars. The cresting is composed of hammered iron plates placed back to back. The whole of this screen is gilded with the exception of the cherubs and birds, which are painted flesh color. The screen rests on a Carrara marble parapet."

A. N. PRENTICE.

Misadventures of a Draftsman

2—The Tale of the Elusive Whistle

By George H. Allen

"Oh—so yo're the new man they said they'd send down hunh?" The foreman ran his eye up and down my lanky frame, and spat an enormous quid of tobacco juice, which made a streaked smear across a pile of lumber.

I was trying to get a job, during the summer months of my last year in school, with a builder who was putting up a medium-sized residence in my home town. Others in my class were doing, or endeavoring to do, the same thing, for the "practical experience." I approached the foreman of the job with a brand new pair of overalls which were a little too full for me. Their newness dubbed me as a "greeny," and I caught several of the men looking me over appraisingly. My embarrassment was increased by the manner in which the foreman surveyed me—knowing I was an "Arkytek."

"Y'had any experience around a buildin' b'fore?"

I replied that I hadn't.

"Hmmm—wal, let's see," he said, rubbing his chin, which had a thick growth of stubble on it and looked motheaten from the tobacco stains, which were very prominent. He looked around, as if undecided what to say, then his eye lit on the lumber, just delivered off a truck.

"Here y'are, boy" (he seemed to brighten up in anticipation), "take these timbers here and stack 'em up on the first floor. You'll have to cross them there trestles there, and watch out for the wheelbarrers." With a glowering glance, he walked off without more ado.

Disheartened, I surveyed the pile of lumber. The pile got bigger the more I looked at it, so I pulled at the top piece and got hold of it with both hands. Its sharp edges cut into me (I never thought of bringing gloves) but, scrambling along the runway, which was built so they could push wheelbarrows up it, I managed to juggle the heavy piece in the door and around some studding—and dropped it with a bang.

A carpenter, whom I had not noticed standing there, jumped a foot into the air and let forth a torrent of imprecations in, I supposed, Scandinavian. I left hastily.

By dinner time I had pains shooting all through my back and my hands were raw. We had half an hour for lunch and I sat apart from the bunch, with my pail beside me. Stiff and tired, I wanted to be alone, and to make matters worse, I didn't seem to have any appetite.

The afternoon wore on, interminably. I watched the shadow cast by the roof as it crept across the yard—and the day advanced slowly.

Once, I bumped into one of the laborers who was pushing a wheelbarrow down the incline; he threw me off balance and the board swung around, hitting a ladder, and knocking off a man who was nailing up some shingles.

"Hey, you thick-headed mud turtle, what the devil are you tryin' to do, wreck this place?" The foreman was waving his arms wildly from one of the windows, and the one who fell was sputtering and jumping around holding his arm. I stood there, looking like a barnyard owl, I guess, with my jaw dropped. Fortunately, I just don't remember the termination of that event.

In time, however, I gradually got used to the work and put on some brawn and beef. I also was promoted to nailing up rough studding, with a chipped hammer and pocketful of tenpenny nails. I liked the smell of new lumber, the buzz of the saw, and the sound of someone pounding a nail home with quick and accurate strokes.

My job, also, was to get water for the gang in a wooden bucket, from a farmhouse about half a mile away. I had to walk through the woods, and took advantage of this pleasant respite, by taking deep breaths of the clean country air while dawdling along—and feeling the soft, cool earth give under my feet.

Coming back with it brimming full and sparkling in the sun, I enjoyed stopping at a little mound not far from the house, whence I could get a good view of it. Standing there, I used to think of how it got its first inception on the lowly drafting board, then grew and grew, until finally it was given the last coat of paint. The hours over the board, the tiresome conferences with the client, the sporadic riots with the contractors, all vanished, as I saw the concrete result of all the labor, basking there in the sunlight—even as if it were proud to have been conceived—"in paper and pencil."

* * * * *

As I look back, my years in College were full years, but something of a fantasy.

We spoke of "charcoal *rendus*," delved deep into Letarouilly, reveled in Vietures' "choucroute garnie," spread rolls of drawings over the wood-topped tables in "Sawdust Annie's," lugged enormous drawing boards across the Campus, and, in general, thought we were rather *distingué*. When we had a *charette*, we worked feverishly into the night, with cold towels on our heads and a copious quantity of hot coffee, over a tedious drawing which we always hoped would win a "*medaille*."

We were too busy to realize, I suppose, that in the years to come all this colorful side of architecture would recede into a misty background—and in its stead it would be —"shop drawings, 4″ copper leader pipes, and cross-sections of sump pits."

School ended in the June following my summer of "building experience" with all the glamor and excitement usually attendant upon such events. One of my Profs, who had always taken an interest in me, called me into his office one day just before graduation and asked what I intended to do when I got out. I told him I would try to get into some sort of an office, just to get experience. So he was kind enough to give me the name of one of his friends, connected with a big oil refining company downtown, and told me to go and see him.

I couldn't imagine a refining company needing the services of an architect, but I went down a few days later.

They had a large building, named after the firm, in the lower section of the town. After I had entered the large lobby and was whisked up to the twelfth floor, I approached the secretary at the desk.

"Is Mr. Williams in?" I asked. "I have a card from Mr. Turner for him."

"Just a minute, and I'll see," she said, pleasantly enough. Shortly she came out again and told me to go right in. His office was a glass-partitioned affair at the end of a large room, which I could see was full of drawing tables.

"Mr. Reynolds?" he inquired, seated at his desk.

I replied in the affirmative and he told me to sit down. I stated my reason for coming and he seemed interested.

"Yes, yes, we do need an architectural man here. Ah—did you bring any samples of your work with you?"

I produced a portfolio that I had thought to bring, and produced several, I hoped, fair specimens. He glanced over them and sent me into another room to fill out an application, saying he would send for me.

By the time I had finished the questionnaire—that had in it almost everything imaginable—I had visions of being told "they would let me know later." I had wanted to work there as it seemed to be a very good firm, but was afraid I didn't have enough experience.

About half an hour later, I was called back and found a group of men around the drawings. I was introduced around and then Mr. Williams said:

"Well, Mr. Reynolds, I believe we can give you a try. Suppose you report for work Monday morning."

My first job! I thanked him and left the place walking on air. I suppose we all have had the same experience, and that, in our naïveté, we thereupon imagine ourselves conceiving gigantic impossibilities and constructing varihued castles, whose foundations are merely cerulean clouds —which fantasy, while idealistic, seems at the time to be real to us, though actually only existing in our minds.

The work, as it turned out, exceeded my expectations. The company, which was expanding very rapidly and was at that time absorbing other firms, had decided to employ someone to design and lay out its service stations, which were really houses on a small scale. This had been done before by an architectural firm, but it was found that there were too many minute details which couldn't be successfully taken care of by isolating the work in such a manner.

The conditions on each job were entirely different. In one instance, we had to tear down the buildings on a corner (they invariably bought corner property) which left an ugly old brick building, about three stories high, facing us on the adjoining lot. So we decided to cover the blank wall with a coat of stucco, and finished the station off in stucco and tile. That brightened up a corner, at least, of that dingy neighborhood.

At another time, we were putting up quite a few stations in Florida. The construction was different in many respects. We put in foundations sixteen inches deep because there was no frost, used painted wallboard for interior finish, and never included a chimney—no heat was needed!

One day, the boss brought in data on the construction of a "de luxe" station out in Ardmore, an exclusive suburb of the town. It was to be put up on a desirable corner property, in the residential section, but quite near the business district. There was a lot of litigation; some of the residents nearby objected to a "noisy filling station." The company, however, winning its point, was anxious to keep the good will of the majority and also to show them that a station could be beautiful as well as practical. Therefore, it was appropriating $20,000 for the project.

I went ahead and drew up quite an affair, choosing a Colonial exterior that I thought would help it to fit into its surroundings. There were small dark-green boxes (planted with real flowers), brick piers supporting a twelve-foot-high white paling fence, to help isolate it from the house nearby, shutters with small notched-out ornaments, and a small overhanging entrance with columns, that I had labored with to get their "scale" to fit the building.

After the station was finished, we all sat back in our chairs, and smoked fat cigars, considering we had "done ourselves proud."

Then it began. The complaints, I mean. First a couple of old maids nearby objected to the bells ringing on our pumps, for every gallon of gas sold. Well, we sent a man down and he succeeded in muffling them.

About a week later it was our spotlights. Jacobson had conceived the idea of two "spots" placed on each pier and focused on the building, which I do admit looked well at night. The glare was the objectionable thing, and we finally overcame that by installing colored lights of low intensity so that the situation, temporarily, was in hand.

The 'phone rang again—this time it was the smell of gas. The boss, who was getting grouchy and irritable over the trouble we were having, threw his hands up when he heard this one. Well, we couldn't perfume the gas, and there had to be a certain amount of odor, so we decided on planting geraniums about the place. That killed the smell somewhat, but to me, personally, the gasoline was a whole lot better. This was all right in the summer, and in the winter we figured they would be indoors.

Things sort of quieted down after that, and nobody jumped any more when the 'phone rang. The boss even fell back into his old habit of wiping his spectacles while he gazed out of the window in a dreamy reverie.

As lunch time was approaching one day, however, he sailed up to my table, red in the face and puffing furiously on a black cigar and said:

"Reynolds, for God's sake see what is the matter up at that complaint factory, *this* time."

"Why, what's the matter?" I inquired.

"Matter—matter? Those people next door claim we're harboring crickets on the place, and they're going to sue us unless we—!"

I had stopped him and was going to say more but thought it best to shoot down there quickly as I could.

Arriving at the place, I found that no one knew what caused a peculiar, weird whistling sound, except that they had heard it plainly, now and then, over near the house.

Walking over by the fence, I stopped and listened, but no sound. I walked up and down and stopping some more and kept it up for about fifteen minutes, but didn't hear a thing. Hearing someone call me, I turned around and saw the lady on the porch beckoning to me.

"If you are trying to locate the whistling sound that I complained to the office about, suppose you come into my living room with me. We usually hear it when we're eating dinner." I went in with her and we sat on some chairs near the open windows and waited.

The gentle breeze was wafting the curtains about lazily and in the distance we could hear a lone horn warning a tardy pedestrian. Then I heard it—a long, weird, high-pitched whistle that penetrated into the room clearly. It was uncanny, and I looked at her, with goose-flesh rising along my spine.

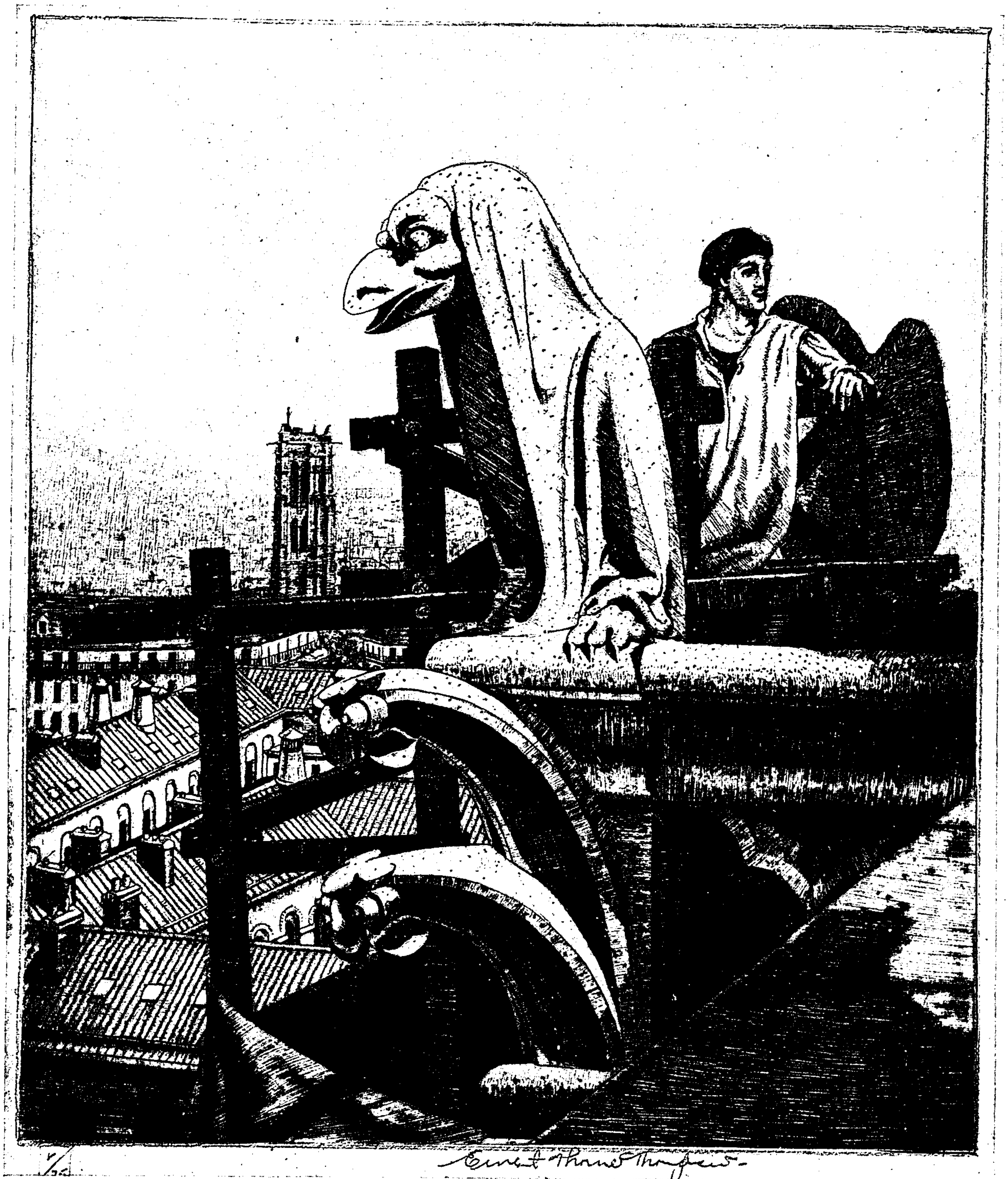
I went outside again and stood directly under the windows. Pretty soon I noticed one peculiar thing—it only happened when they were pumping gas for a customer.

Suddenly a thought struck me and I looked up. Voila! There it was.

The large gas tanks underground, of course, have to have vent pipes to let the air in as you take the gas out.

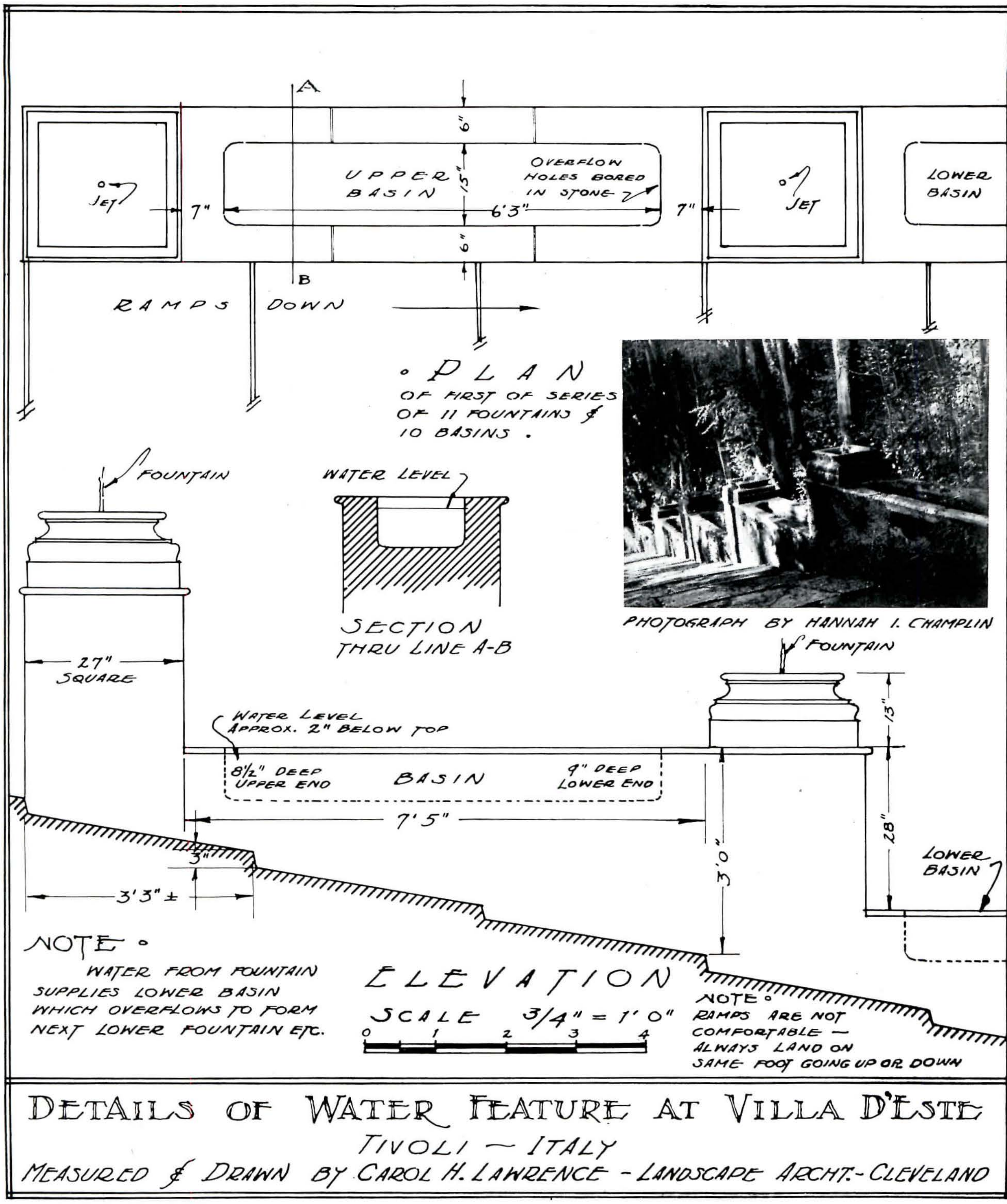
The law requires these pipes to be at least fifteen feet in the air and they have an inverted nipple on the ends, the opening of which is covered with bronze gauze. One of these nipples had a small piece of tinfoil caught in the opening—and that was the cause of the whistle. I pulled the sibilating bit of paper out and it immediately stopped.

Getting the chief on the 'phone, I told him everything was shipshape, and, catching a sandwich and a cup of coffee on the run, I hopped an uptown car, wondering if I could make the second show at the Knickerbocker . . . . . .



Courtesy Klumann-Thorman Galleries, Ltd.

"CHIMÈRE DE NOTRE DAME"—FROM A DRYPOINT BY ERNEST THORNE THOMPSON



MEASURED DRAWING BY CAROL H. LAWRENCE

Transition

By Hedley B. Sevaldsen

There comes a time in the life of every house or estate when it will be turned over to some one else or sold outright to strangers. In our day this occurs frequently.

The experience of the past has shown that a house with its service-portion, kitchen, pantry, etc., to the front, street, or main highway, has been most difficult to sell. This is not a theory; it is a fact. For every one who likes it ninety-nine do not like it, and it is, therefore, a liability rather than an asset. In every instance where a house of this type has been on the market for sale it has proved that just that feature of it made it a drawback.

The best school for a young architect would, to my mind, be to design, plan and build a few houses with his own money and then offer them for sale. That would soon strip him of all freakish notions, and he would, at the same time, find that tradition is not dead, but a vital factor in the life of man, and most astonishing would be the revelation that architecture is not an art that is getting out of its swaddling-clothes today.

Art and science, beauty and utility, when rightly understood, are never in conflict. But beauty is an elusive mistress, and comes to those only who love greatly.

If we strive honestly and sincerely for something which we know is not alone good for the one for whom we strive, but sound and wholesome in every other respect, we know, alas, also from experience, that the hardships one has suffered means nothing to another. Each one of us must, in turn, go through his own experiences and learns only from these. From no one else's.

This brings to my mind the thought that perhaps it is wiser to generalize one's experiences than putting them forth as actual advice, founded on experience, dearly paid for.

"We are not made of wood or stone, and the things which connect themselves with our hearts and habits cannot, like bark or lichen, be rent away without our missing them."—*Sir Walter Scott.*

Of the various modes of artistic or creative expression, architecture and music, more than any other form of art, begin to exert their influence in the life of man from his birth—from his cradle-song and toy-age—until the end. He grows up with both. Melody, which is an idealization of emotional speech, is sung, by mother or nurse, and thus the first form of creative art is impressed on his mind, and is, in a measure, commencing the moulding of his character. In his environment, architecture begins its work for better or for worse. His first steps and movements about bring him in contact with architecture in one form or another. And what he meets with is, again, a great factor in the moulding of his character. But both these forms of art, because they are so closely connected with life and the emotions of man, are apt to be, and have, unfortunately, been grossly misused and abused. This misuse has, especially of late years, particularly affected music, but is now in fair way also to be true of architecture. Like all diseases of a subtle character it is difficult to diagnose at first; but, like cancer, it grows stealthily until it takes such hold that it is extremely difficult to root out. Many explanations and excuses are put forward to ameliorate the stand taken and to bridge the point of view this misuse has occasioned, and the most common is this—that tradition is an outworn garment.

But everything that has growth has roots. The roots of tradition are in the ground of centuries gone by. It is from the past, known and *lived*, we draw knowledge and inspiration; not from a future as yet unknown and *unlived*. Any true artistic creation of outstanding merit has always, consciously or unconsciously, come into being from what has gone before: never from what has not as yet been, a future, unknown and unlived. Tradition means life lived; from life lived evolution works its wonders. Such is the law of nature. From the tales and legends of savages came epic poetry, out of which again, later, lyric poetry evolved. From emotional speech, as in the early Greek poems, came recitation; from this, again, song and music. Song and music are simply an idealization of strong, emotional, natural speech. Therefore, jazz, not being a natural expression of emotional speech, is neither song nor music, but a cancer-like growth that in time will be entirely removed.

Down through the ages all genuine architectural creations have, with unmistakable serenity, expressed the character of their purpose as the character of a human being is expressed in the face of man. This is an age of transition. The period of transition is dangerous because of the prevailing tendency to try everything at once. To blend where blending is useless; to force unrelated parts to fit in where they do not belong. Uncertainty. Groping.

New discoveries in the scientific world, new inventions in the mechanical, are not equivalent to a new order of things. Fundamentally, everything remains the same. When the excitement is over we are exactly where we were before: better off in some respects, perhaps; worse off in others—but still growing slowly.

To abuse the façade of a building with a void out of all proportions to the balance of the façade and the other voids that make up this façade, by inserting into it a garage with its large empty opening or uninteresting doors, when closed, is tantamount to the mutilation of a man's face. The abuse of architecture as an art is as glaringly painful to the eye as the abuse of music, jazz, is painful to the ear. Both are alike in this,—that they originated from irresponsible men, superficial in learning, and education. The line of demarkation between genius and insanity is said to be very narrow; may not the line of demarkation between boldness and irresponsibility in artistic endeavor be equally narrow?

If we strive for truth and sincerity in architectural expression, all sham and pretense must be eliminated. "Architecture speaks a language that all who see it may know its purpose." If the purpose of a dwelling is the housing of an automobile, then, by all means, let us make it so. But is it?

A good many people meddling with music found that to compose genuine music was an undertaking that taxed them beyond their natural ability, and so gave themselves to the manufacture of jazz. The melodic and harmonic structure being already present in somebody else's work, the rest was easy. A good many people meddling with architecture are following the same lead. Easy, convenient. The house is there, fix it someway, put the car into it. Or the house isn't there; but the car is. Put the house over it. Easy, convenient, but creative ability is sorely lacking.

Creative art gives birth to the things that make life worth while and beautiful. It gives birth to melody, birth to ideas and thought; birth to the picture on canvas as to the building on solid ground. To give birth is a painful, but also a joyful experience. In the natural order of things it fell to the male to give birth to ideas, a wise providence having given to the female the birth of man. But both are alike in this that they are accompanied by both pain and joy. All these multitudes of created things, whether a new human being or a new idea, are not fundamentally different. Lincoln as man and mind was beautiful, but so also was George Washington. And yet how different! The sunset of yesterday is alike the sunset of today; yet it is also different! No revolutionary change made it so. The jazz-maker only, whether musically or architecturally, will do that. An architect that has not felt this pain and joy of giving birth to an idea is not a creative mind—an artist—and is by the same token not an architect. If he were, to his mind an eight by eight or eight by sixteen-foot opening on the most important side of a dwelling would be an inconceivable thing.

No one with a spark of creative ability will ever attempt to lay down rules, laws and regulations for what another shall or shall not do; but this he asks: "Don't let it offend!" Garage doors on the front of a residence facing a street or public highway are offensive, there is no question about that! There is no dispute of their not being convenient; a good many things could be made to yield to more convenience—but perhaps, not to the same degree of improvement in morals or to greater advancement of beauty.

The nature in which we live, as well as the nature of man himself, has in it certain laws, fundamentally the laws of growth and evolution, that can not be broken. The attempt to break these laws will result in the most abominable manifestations in any form of art—and morals. Here is not a question of conservative or radical; here is not a question of likes or dislikes; here is not a question of taste or lack of taste. Here is a question of simple, natural, fundamental law, in all its simplicity and beauty.

When the automobile emerged from its experimental stages into its commercial birth, it was purchased and owned almost exclusively by people who previously had owned horse and carriage. The natural thing for such people to do was to convert their stables into garages. But the desire to own a car grew by leaps and bounds, and soon house owners in small cities and in the suburbs became owners of such vehicles. Not having owned horse and stable they had no convertible building, or room for one, or access to one had they the room—a twenty-five-foot plot with a house on it not leaving sufficient space for a driveway. They therefore parked their cars upon the front lawn, or on an empty lot, and covered it with a sheet of canvas. But the question of finding permanent room for their cars became day by day more and more important, and the riddle was finally solved by digging under their front porches a hole in the ground sufficiently large to hold a car, and thus it came about that the front of every house on a twenty-five or fifty-foot plot was ornamented by this ugly, square opening facing the street or public highway, revealing a dirty, smudgy room, resembling or making one immediately think of a black eye in a man's face. But this arrangement, being caused by the same need that causes large families to crowd into small rooms in tenements and in defiance of health, beauty or the consideration of the æsthetic sense in others, has swept the country like the other pestilence, jazz-music, and is now enthroned in the high seat and termed "modern," although it is, in reality, just another conflagration of a deadly and ugly disease.

But there is another aspect to this besides its ugliness. A woman, well known in society and charitable work, here in Westchester County, where this is written, was several months ago found dead in her bedroom, sitting before her dresser. The garage was underneath—modern, fireproof and all that. She had left the car in the garage with the motor going. The monoxide gas had penetrated the heavy stucco ceiling and killed her outright.

If those of us upon whose æsthetic sense this onslaught—the garage in the house and to the front—is most deeply felt, can not annihilate it in any other way, we will retaliate by going at it differently—and will win out in the end.

In Flammarion's "Mysterious Psychic Forces" is to be found a drawing by Victorien Sardou, supposed to be a dwelling in a landscape on the planet Jupiter, as seen and drawn while in a mediumistic trance. A good deal of what is termed "Modern Architecture" would, perhaps, fit nicely into such a frame or environment as that recorded to be nature on the planet Jupiter; but not at all on a planet like ours. We should not forget, or should always keep in mind, that the background, as it affects us on this planet, will always remain the same: the forest, the glade, the lake, the rocks and mountains, the plants and flowers in all their variety, constitute the only setting in which we can ever have our homes. We cannot, no matter how grossly conceited we ever will grow, change nature. We may be able to build a mountain; but we can never make—an oyster!

Will any one stand up and maintain that the very best that human mind can conceive of has already reached its highest point of perfection and beauty as sprung up from nature and reason, and which has been developed by lines laid down by tradition?

Needless Cost in Building

By F. W. Fitzpatrick

Editor's Note:—*This is one of the last articles written by Mr. Fitzpatrick who was fatally injured by an automobile on June 11 as he was crossing a street in Evanston, Illinois. His passing is mourned by his many friends, in and out of the profession. Few men of his age were so active or took so much interest in all phases of architecture and engineering. In sending us the manuscript he wrote, "Every architect takes* Pencil Points *but to the draftsman it is more than a subscription, a journal—it's a sort of Evangel, a textbook and guide. And as finally it is the draftsman who actually wrestles with the detail of planning, the adjustment of building to cost, it is to him I address this manuscript especially. It's a subject I've long wanted to touch upon. It used to bob up and hit me fifty years ago and it's just a little worse today because of the great increase in cost of construction and materials and the lessened production of labor. Many excellent superintendents claim that nearly 14% is added to the average building by quite unnecessary materials and that in some cases those extravagances may reach 30% excess—and nothing gained!"*

Now, Heaven forefend that I should decry proper construction, safe building, and advocate flimsiness and all its baneful concomitants. But the fact remains that our good work is a bit overdone and in our average work we most unnecessarily stick in far more weight of material and quite needless frills than are required but that add like the mischief to the cost of construction.

Of course the principle that controls in the building codes is that structures must be stronger than actually needed so as to compensate for poor supervision, errors, carelessness, and all that. And that end is sometimes accomplished by that means. But if not properly framed, intelligently assembled, and adequately supervised you may put 300% more material than is needed in your structure and yet it will not be safe.

More emphasis must or should be laid upon skill in building than upon the mere piling up of material.

And of all times this must be one of them when we should be encouraged to build well but economically.

Why build a brick wall 100 feet long 24 inches thick all the way when it could as well be but 8 inches thick with adequate pilasters or thickening at proper intervals, and not using half the brick?

In steel work is the greatest extravagance generally. Yet its supervision is much easier than that of most other materials, so that one can be surer of it than of anything else.

And when it is excessive there is scant intelligence used in the distribution of that excess. The floor beams may be far heavier than is required and not at all proportionate with the columns, so what's the use of that excess in those floor beams?

Too often it seems as if materials were just thrown in by rule of thumb. If there seems to be three or four times as much as is really needed, then indeed must that building be strong enough!

The mere fact that a frame is all tied together adds tremendously to its strength over what each piece might test independently.

My plea is for fewer factors of safety in the gross and more care taken with detail of assembly.

One incident indelibly impressed itself upon my memory. Years ago (in the eighties) I built a big hardware warehouse, a heavy thing, floors for four hundred pounds and over, etc., and provided ample basement space for storage of extra heavy goods, a ponderous old thing, and at the elevators each story was plainly marked what load per foot it was planned for.

Well, some ten years later I was in there one day buying some goods and, lo and behold, there was a whole bay of floor, on the second story, cut out so that they could store steel rods vertically, rods ten to twenty feet long, and, by jinks, they had stored them almost solidly in that panel—a space 16 x 16, pretty nearly solid steel two stories high, something nearly 6000 lbs. a square foot! At times they did leave an aisle a couple of feet wide through the middle, but when a shipment first came in it was as solidly packed as they could pack! Believe it or not, me bloomin' 'eart stood still, yet measurements showed there was deflection of but an inch or so. True the cross beams were only 4 feet on centre, ten-inch tile arches, but theoretically the maximum safe unit load for that floor was but 530 lbs.

Oh, of course I made them shore up that bay from the basement at once and ultimately put in extra columnettes, but, as it was, they had so loaded that section for eight years!

Ten years ago an important warehouse was projected in one of our large cities. As usual, bids ran away over estimates. It got so the owners flatly refused to go on unless the architect could cut down cost without reducing space. The architect had high-class engineers and experts, but they couldn't materially budge the cost, albeit they worked frantically and long at it and made many alternative plans, all at great cost to the architect. An outsider was called in, an independent expert, who kept the plans virtually as they were but changed the system of construction without impairing either appearance or strength, and got down to where the owner felt he could go ahead. $60,000 was cut off of steel and floor tile alone, and corresponding cuts were made throughout the other branches. It passed the building department, and the architect's own engineers couldn't find that he had affected the strength of the structure. It was different, but no weaker. Let's say just a bit more logical and carefully thought out from the angle of the man who pays for it all.

Not so long ago a great semipublic building was projected. It was to be but three stories high. And the foundation was put in. Caissons of wondrous accuracy. They were to carry just so many pounds. Yes, figured down to the ounce. Oodles of high-class engineers and all that.

Then suddenly the owners conceived the brilliant idea of getting a revenue out of it and decided upon going up with twenty-odd stories of offices. But what to do with the caissons? A dozen plans bursting with wisdom were suggested, how to carry all those extra stories.

The same great corps of engineers went at it tooth and nail. Then, ah! light shone upon them. Bless your heart, those same carefully figured caissons were found to be ample for the tall building too!

But where was all the carefully figured flubdub?

I haven't gotten over laughing yet.

As a matter of fact, a caisson down to hardpan, friction and compact dirt all about it, will carry pretty nearly anything, and nothing but an actual test to destruction would ever tell us very much about it, and then we'd be surprised.

The months I spent in the study of earthquakes and fire effects upon construction (a work done for the United States and other governments and industries some years ago) gave me a new slant on the subject, reinforced me in my belief that we overdid its emphasis on mere mass of material, and undervalued the importance of skill in assembling that material, an error of judgment that costs the clients millions of dollars every year.

That was a great experience. A spire toppled over so that it stuck out at right angles atop the tower. And it didn't fall down. A whole floor cantilevered on one side wall, held by a few nails and cross-bridging, in just a gentle slope—couldn't have been built that way by all the engineers on earth.

A statue atop of a column, the bronze figure more than three-quarters off the base, yet rigidly fast to the base, held by one bolt. And, oh, the cruel waste in steel framing not adequately protected from fire! And the irony of one wood-framed factory building standing alone and but slightly damaged in a wilderness of utter ruin and devastation. So little damaged that the men were back at work two days later, all because a couple of Irishmen had stood their ground and with buckets of water and wet blankets kept the fiery demon at bay all night!!

Oh, all that rack and ruin, heroism and stupidity, was a revelation, an epic, a study well worth while.

Moreover we labor under another delusion, the idea that we are building for all time, certainly for hundreds of years, where, as a matter of fact, our growth, the shifting of centres, the expansion of ideas, the change in our needs, all these things render our very best buildings obsolete in about thirty years. And, obsolete or not, they are replaced by larger ones then. I've had the pleasure, or sad experience, of helping to tear down two generations of a structure I have designed for the one site, and I'm but just edging up to the three score and ten period—albeit you wouldn't guess it if we had the gloves on.

A long time ago I got myself in very bad by timidly suggesting that we do better in design, appropriateness of style or handling, more logic, less flubdub; even as timidly averring that it seemed to me fully one-half our work was rather poor. Then came the A.I.A. itself with a broadside that nearly blew us all to Tophet: its committee report that of the $4,000,000,000 spent on buildings in the U. S. in a year fully $3,000,000,000 was as good as wasted on utterly ugly, inappropriate eyesores! Further that the building departments reported that not over 10% or 15% of the plans submitted for permits were drawn by competent architects!

Well, now I'm going to get into another pickle by venturing that, let us say, we have not been quite so solicitous about our clients' pocketbooks as we might and should be. We have been too free with his money. We have put too much money into needless material rather than figuring closly and economically both as to structure and appearance. So much so that again I'll venture to assert we have utterly needlessly made our buildings cost perhaps 15% more than was necessary.

Then, after being properly shocked at my effrontery in thus criticising the dear profession, in a year or so a Committee of the A.I.A. will dig into the subject and formulate their findings in an authoritative report averring the profession costs the owners 30% at least over what buildings should cost!

My peeve at the average architect is that he piles too much into his buildings, it's easier that way than is close figuring. The same way with his specifications: he'll make one written originally for a church do for a warehouse, changing a word here and there. He's strong, however, on proper detailing. Oh, yes, a stock door is positively no good, nor can any molding serve that has been used anywhere else. The one he devises is not one whit better than a stock one, but, no, there must be a special knife cut for that mold. He'll stick ornament, expensive carving, where it's not seen nor needed. He'll clamor for an African marble where a local or native one will just as well serve the purpose. Generally speaking, he's a dinged expensive luxury around a building, and adds tremendously to its cost without contributing so very, very much to its beauty. At least the A.I.A. tells us three-quarters of his work is utterly below par.

Now, as a constructive criticism, let me just humbly exhort the dear Brethren to place themselves in their clients' shoes and try and cut down the unnecessary costs they have been accustomed to pile on. Why not try and produce the best results at the least cost, forget some of the foolish frills, and give their clients the very best there is in them? And try and have in them a lot more than there has been.

The profession is clamoring for more respect, more consideration from the public. It is formulating properly ethical advertising to that end. It thinks it has been abused, belittled, lost in the shuffle. It really isn't its fault if all that is not a fact. But let me add one little word: the very best advertising in the world is for it, the profession, to so work and act that it will deserve public esteem and respect, and it will get both in large chunks.

One best test: when a man builds a second house or apartment or store and goes back to the same architect with that second job. That's the supremest test.

Show me a dozen men with that experience and I'll show a dozen who have earned public esteem without artificial boost and mass advertising, etc., etc., a dozen who deserve that respect!

Do you get me?

The Paris Prize Competition for 1931

As announced last month, the twenty-fourth Paris Prize of the Society of Beaux-Arts Architects was awarded to Carl F. Guenther, whose winning design is presented herewith, together with those placed second and third by Herschel Elarth and Pierre Bézy, respectively.

The subject of the program was:

A PANTHEON

Through the centuries it has been a tradition among nations to honor their illustrious dead by interment in a shrine devoted to the purpose. Nothing of this nature has even been attempted in America and it is now proposed to erect on the banks of the Potomac River within the District of Columbia a National Pantheon, a gift of the Nation.

In the past the primary object of a Pantheon has been to commemorate national heroes, as were the Gods at Valhalla. But in this modern day, such a building is to be reserved as a final resting place for those Americans upon whose greatness our civilization is based, and whose fame has endured the test of time.

Those so immortalized have left, and will leave, a lasting trace on our national life; it is, therefore, proposed that the edifice include a series of galleries wherein may be preserved the visible expression of their fame. Thus the public may, after paying due homage to the memory of these illustrious men, review the history of the achievements which have entitled their memory to the highest honor the country has to bestow.

A self-perpetuating body is to be organized whose membership will be culled from the major national societies of our fields of culture, and it will be incumbent on them to select those who are to be honored by interment in this edifice. In order to gain a true perspective of history's evaluation of their greatness, no one may be herein interred until at least fifty years after his demise.

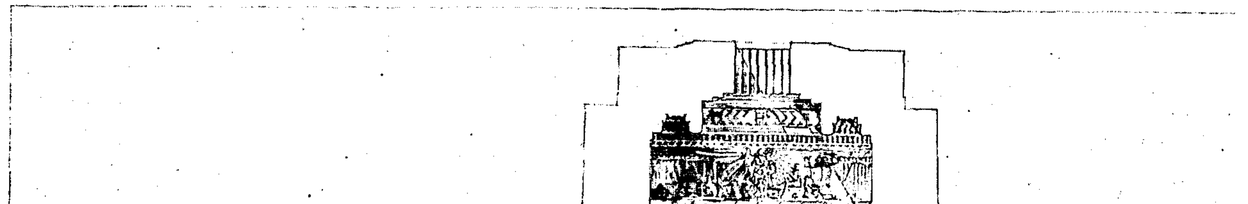
On the occasion of interment the body will be brought to the Pantheon on a vessel of war accompanied by naval escort and borne with solemn ceremony to the crypt of fame where the official rites will be performed. A broad flight of steps facing the Pantheon shall, with intermediate terraces, serve as a communication with the monumental landing stage at the water's edge.

The greatest latitude is permitted the competitor in giving architectural expression to the grandeur, the dignity, and the solemnity which must prevail in order to conform to the principles of that simple democracy on which the foundations of our country rest.

A site sloping gently towards the Potomac River within a broad reservation has been selected by Congress for this project. The dimensions of this site shall not exceed 1250 feet by 2000 feet and the complete development of the program shall be contained within this area.

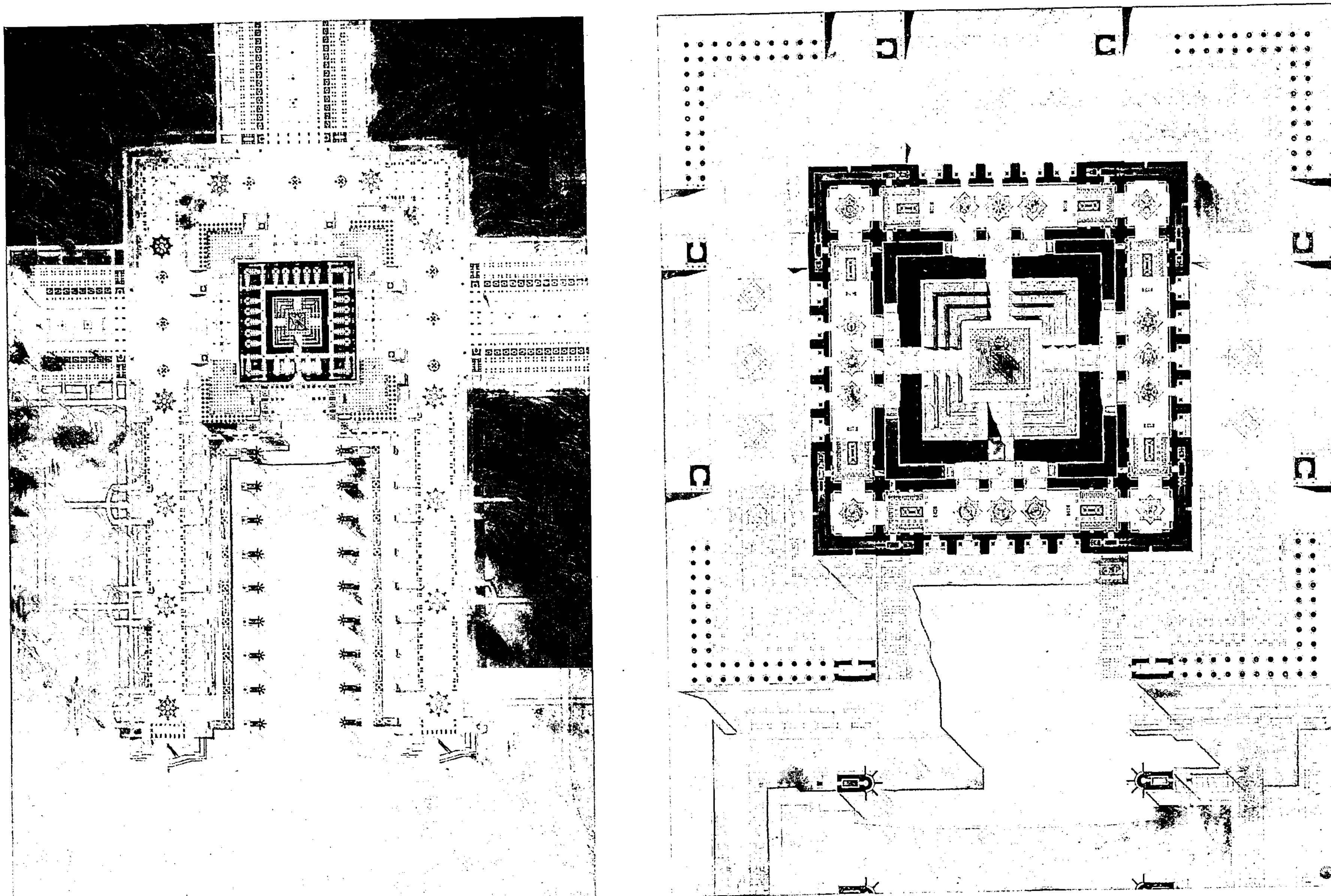
The Pantheon, exclusive of its steps and approaches, shall not exceed 400 feet in its greatest plan dimension and shall include the following:—a hall for the interment ceremonials; a suitable space for final interment; and a series of connecting galleries for the preservation of objects immediately associated with the dead, divided broadly into galleries of: military science, political science, commercial science, the fine arts, and so on.

It is not desired that the solemn character of the Pantheon proper be marred in any way by the inclusion of any public or attendant facilities. The development of these services as well as that of control and approaches, including terraces, colonnades, tribunes, etc., is left to the competitor.



SECTION OF WINNING DESIGN FOR "A PANTHEON," BY CARL F. GUENTHER

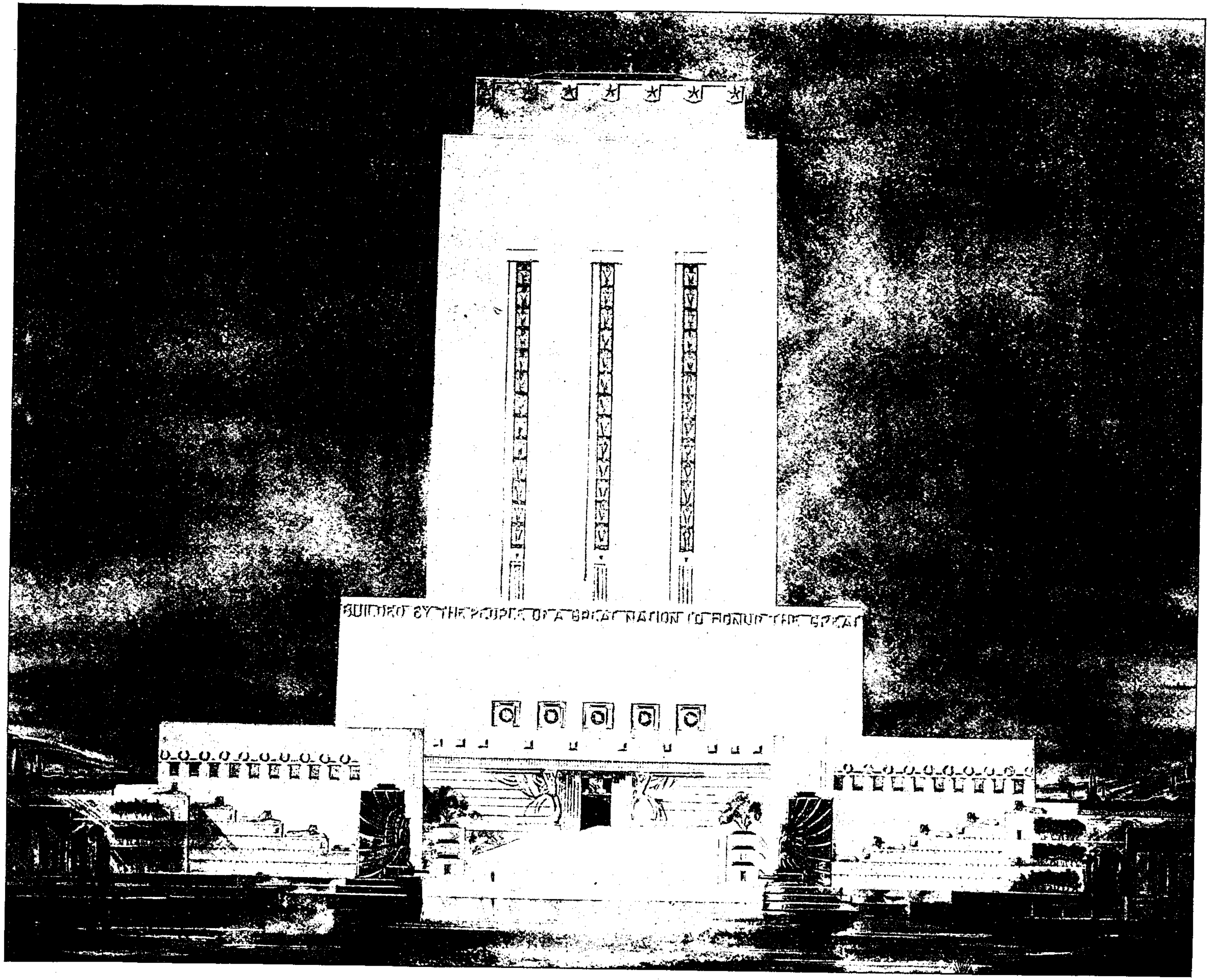
COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS



PLAN AND DETAIL OF WINNING DESIGN FOR "A PANTHEON," BY CARL F. GUENTHER

COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS

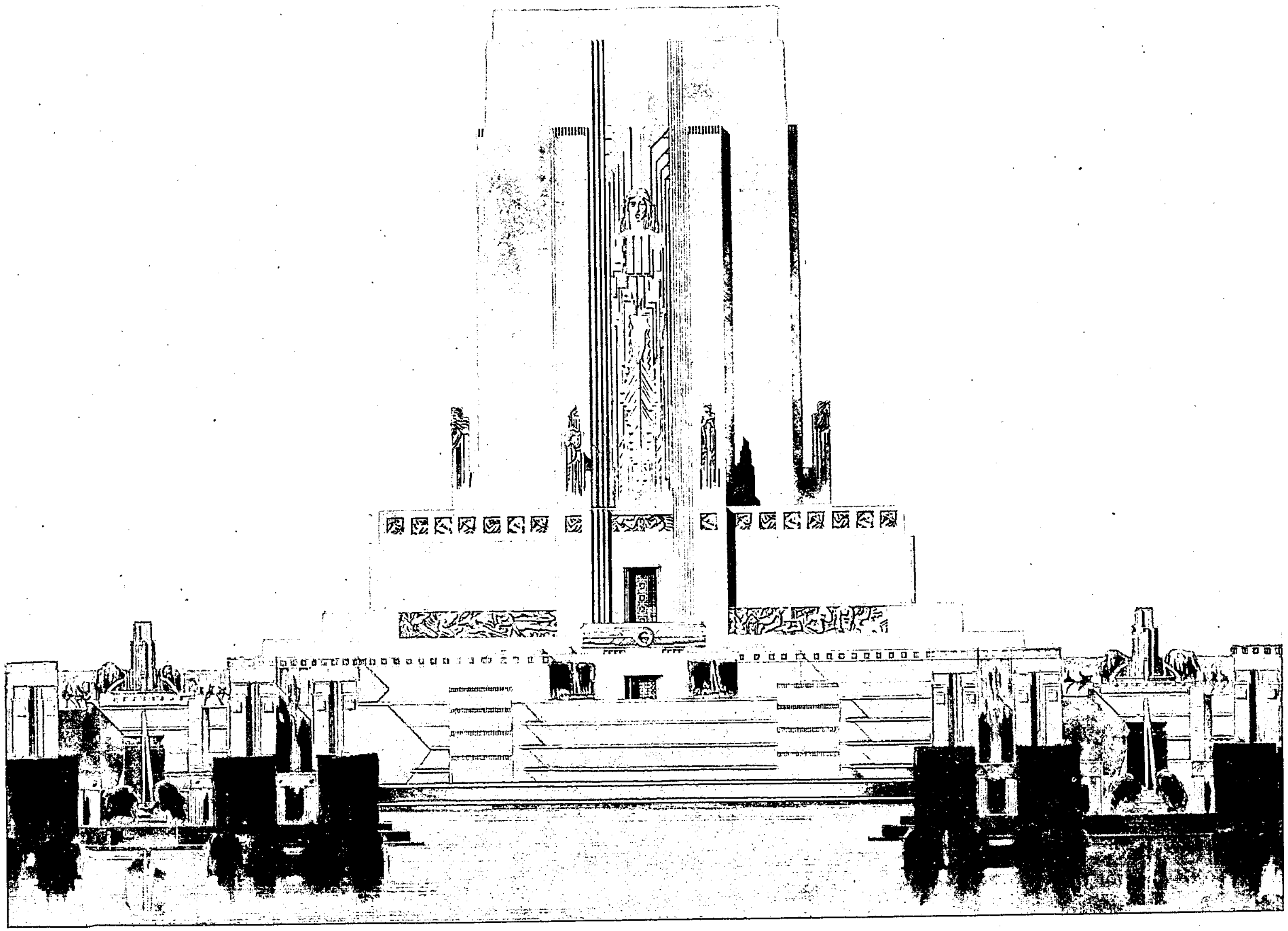
(See text on page 693)



ELEVATION OF WINNING DESIGN FOR "A PANTHEON," BY CARL F. GUENTHER

COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS

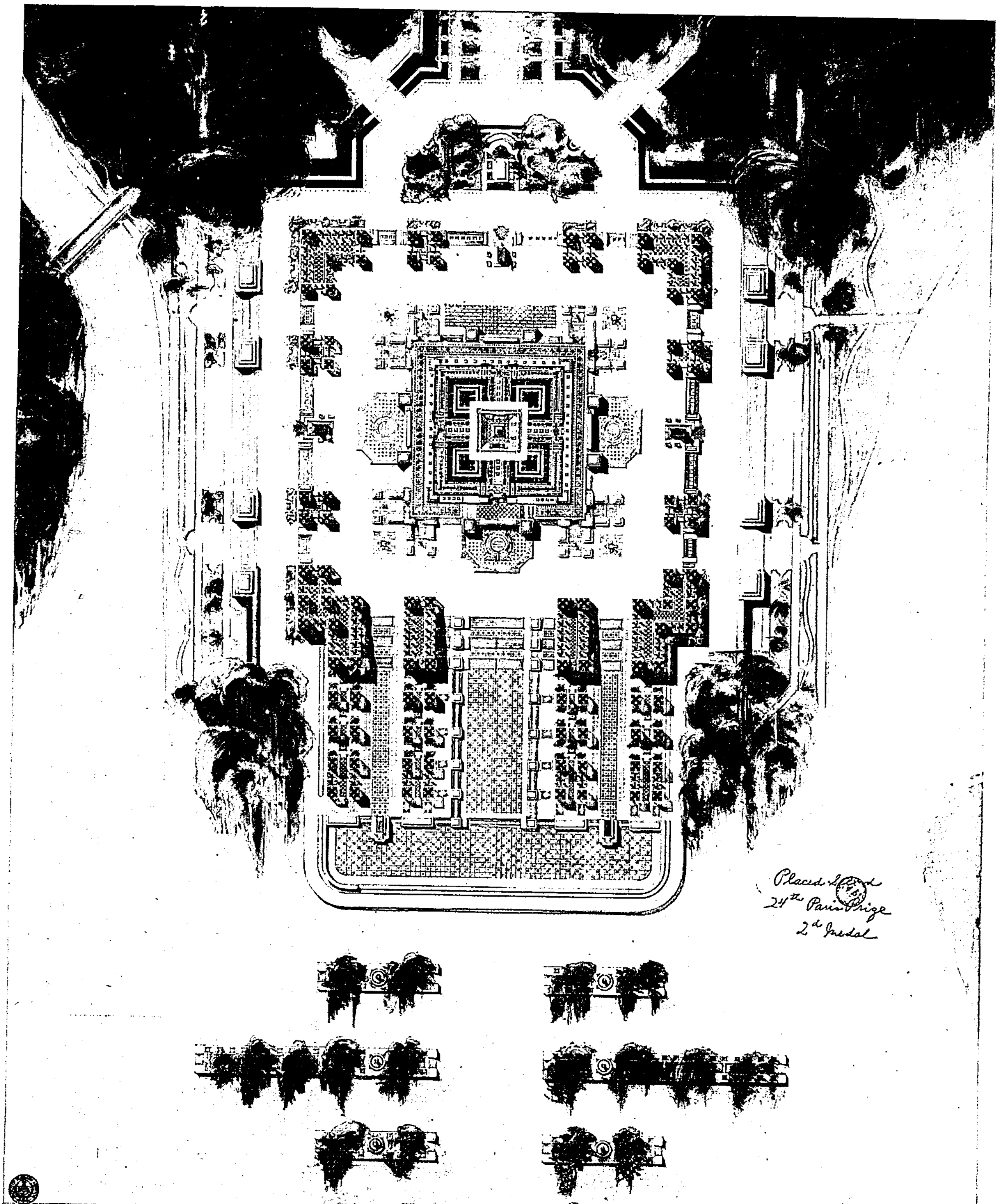
(See text on page 693)



ELEVATION OF DESIGN FOR "A PANTHEON," PLACED SECOND, BY HERSCHEL ELARTH

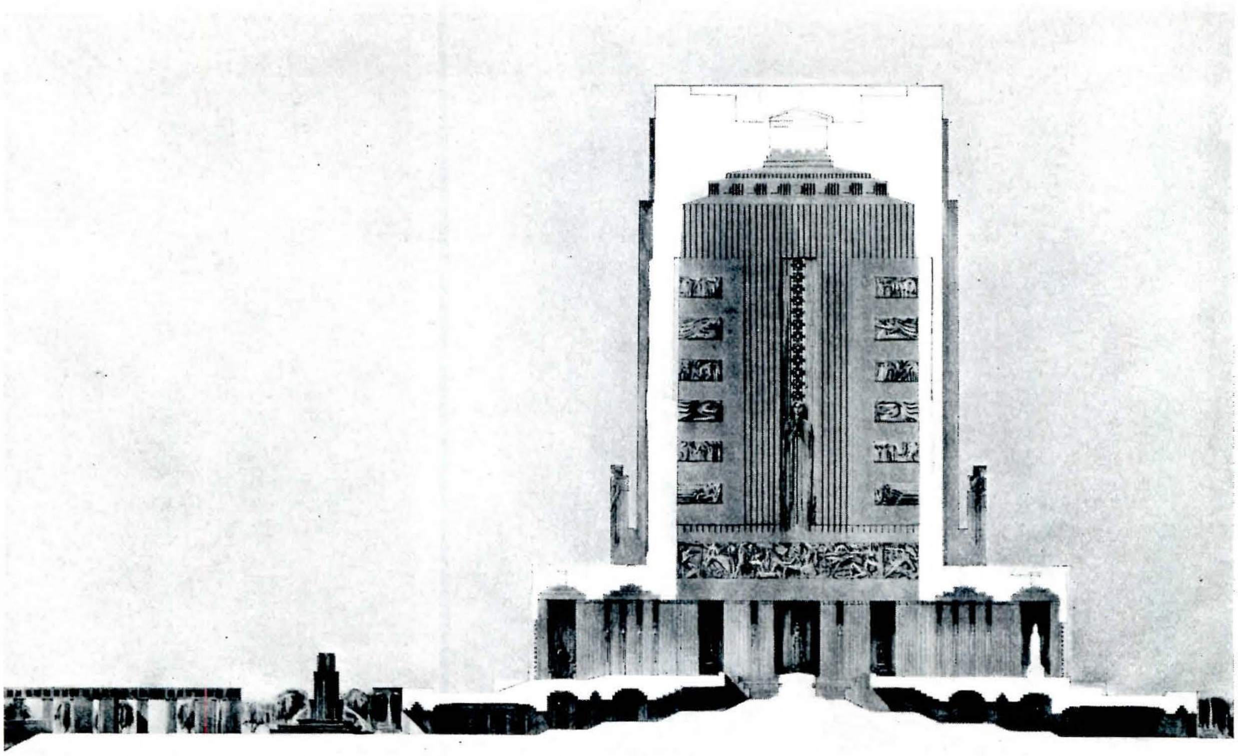
COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS

(See text on page 693.)



PLAN OF DESIGN FOR "A PANTHEON," PLACED SECOND, BY HERSCHEL ELARTH
COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS

(See text on page 693)

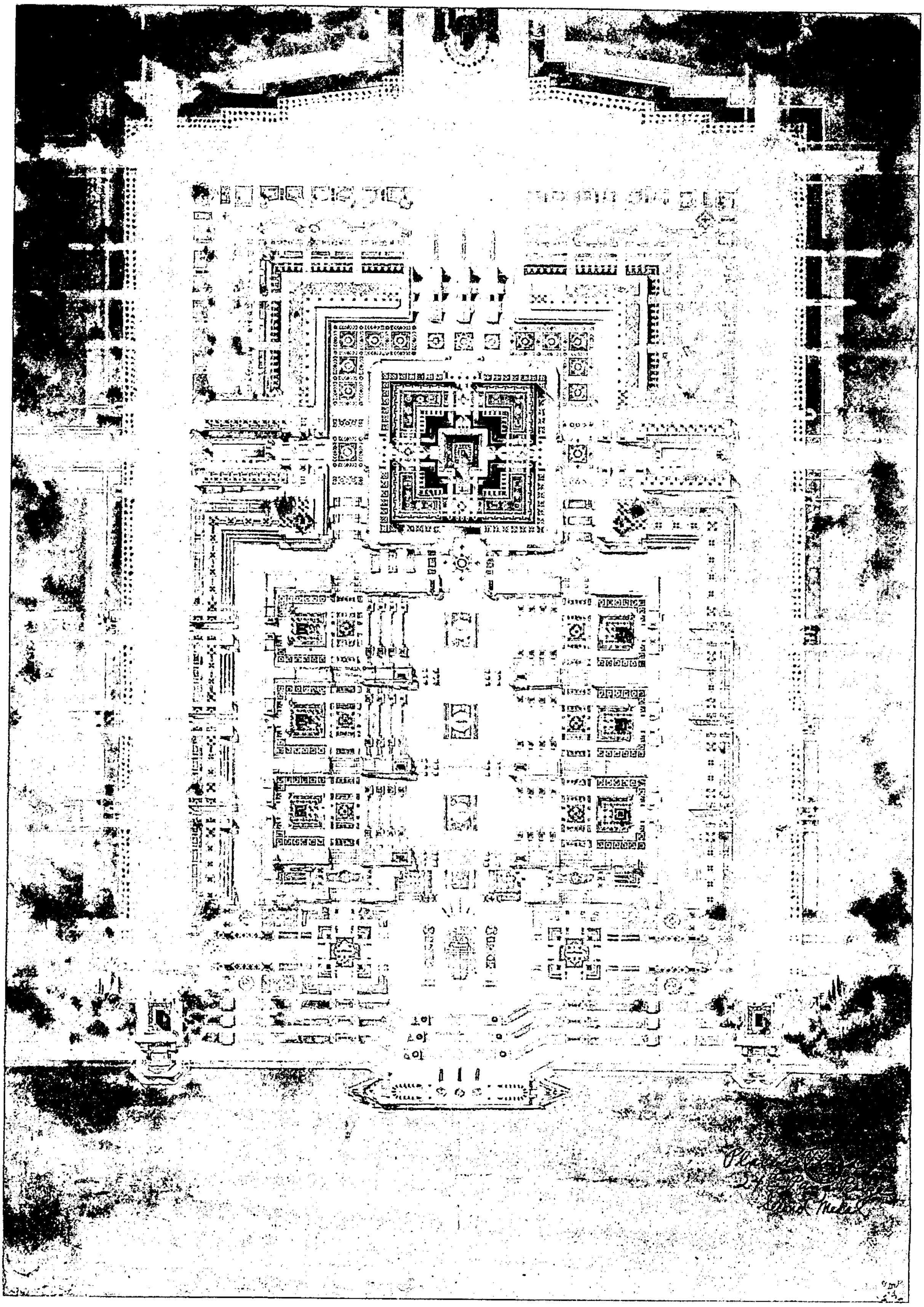


SECTION OF DESIGN FOR "A PANTHEON," BY HERSCHEL ELARTH

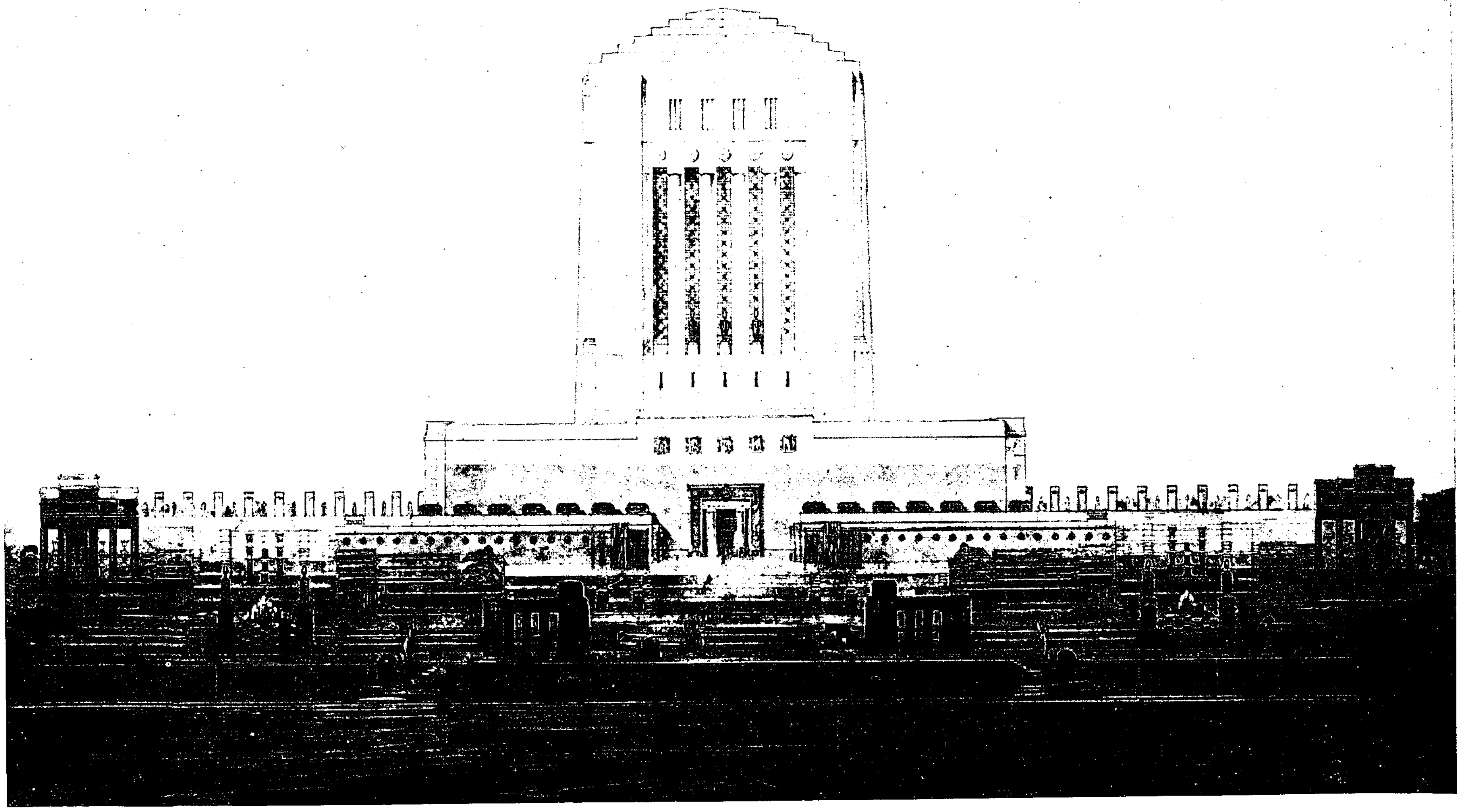
SECTION OF DESIGN FOR "A PANTHEON," BY PIERRE BÉZY

COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS

(See text on page 693)

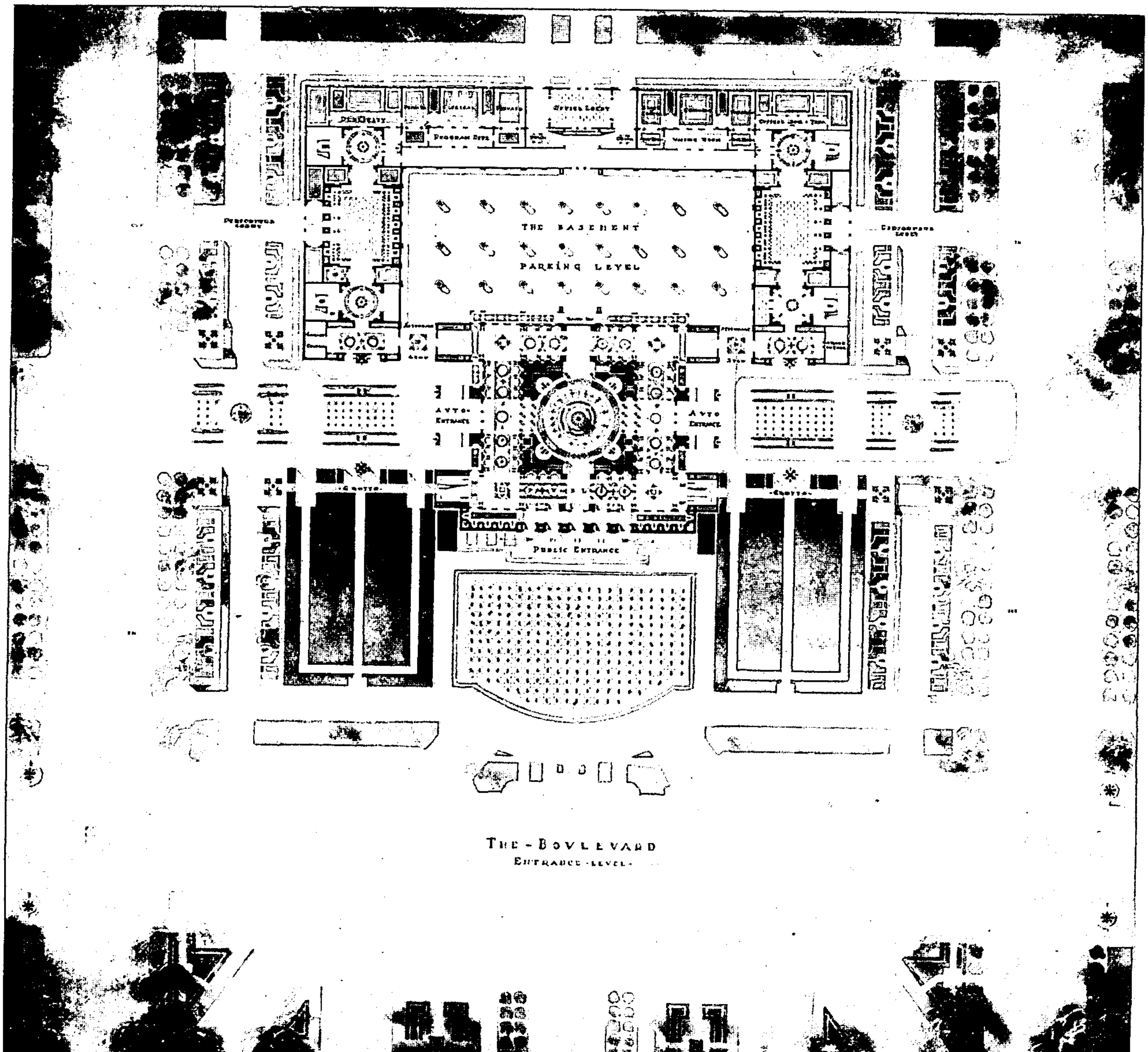


PLAN OF DESIGN FOR "A PANTHEON," PLACED THIRD, BY PIERRE BÉZY
COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS
(See text on page 693)



ELEVATION OF DESIGN FOR "A PANTHEON," PLACED THIRD, BY PIERRE BÉZY

COMPETITION FOR THE 24TH PARIS PRIZE OF THE SOCIETY OF BEAUX-ARTS ARCHITECTS



PLAN OF WINNING DESIGN FOR "A RADIO BROADCASTING STUDIO," BY FRANCIS J. HEUSEL

Competition for the Francis J. Plym Fellowship

The Francis J. Plym Fellowship in Architecture has been awarded to Francis J. Heusel. This competition is open to all graduates of the Department of Architecture of the University of Illinois who are American citizens of good moral character and who are under thirty years of age on the first day of June, 1931. The value of the Fellowship is twelve hundred dollars, to be used in defraying expenses for one year in Europe for the study of architecture. This year the subject of the program was *A Radio Broadcasting Studio.*

PROGRAM

A Radio Broadcasting Studio

General:

The phenomenal development of the radio has brought a new social force into being comparable to the newspaper, the telephone, and the telegraph. Great corporations have been formed to care for the work of preparing programs and broadcasting them. One of these proposes to erect a studio building in a large midwestern city. The building shall provide for the technical equipment and the studios, the reception of the performers, the reception of the public, and the business offices, with the usual service rooms.

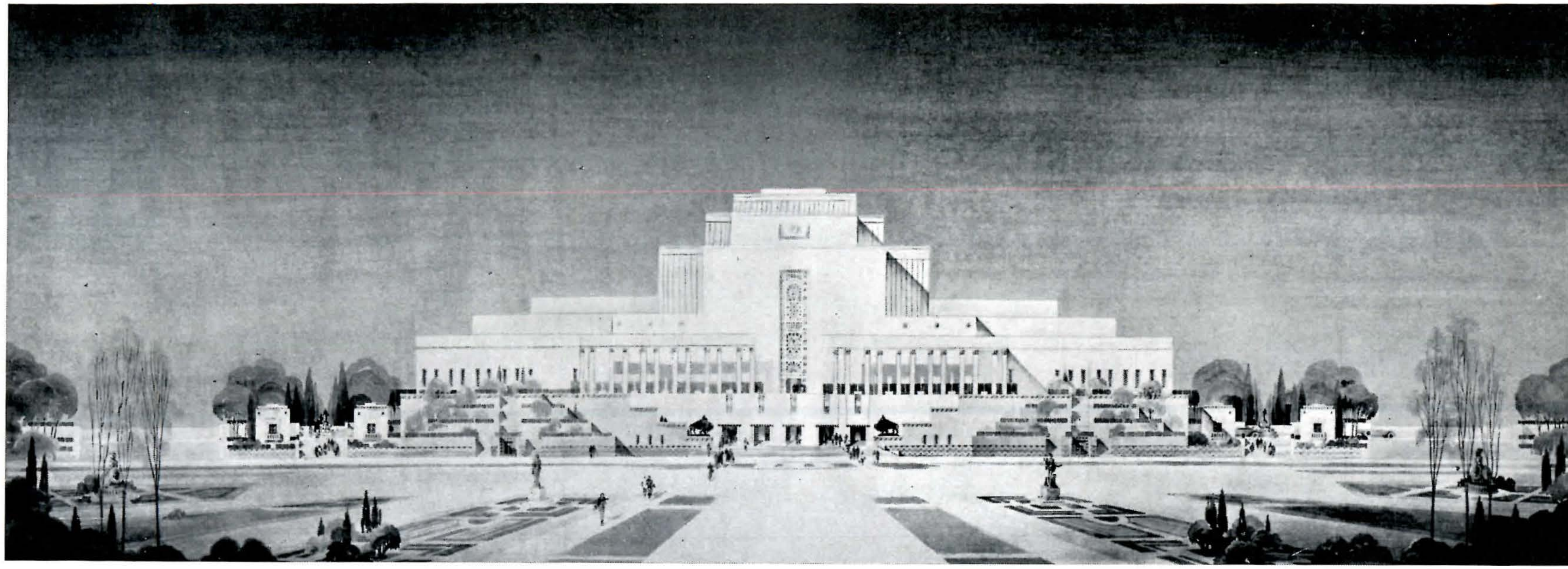
The station operates on one wave length; while programs are being broadcast from one studio the others are used for rehearsal. There need be no radio towers as the programs are transmitted by telephone to the actual station located in the country away from the atmospheric disturbances of the city.

Site:

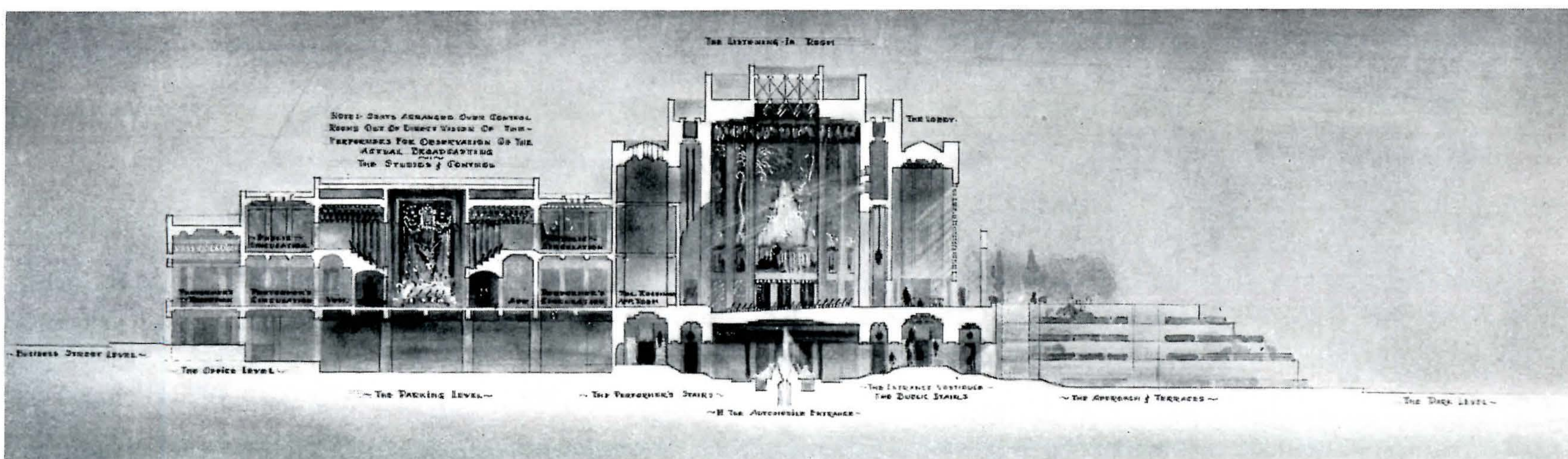
A lot four hundred feet square inside the sidewalks has been secured. It overlooks a boulevard and park on one side and is bounded by minor streets on the other three sides. The rear street is 15 feet above the park and the lot has a gradual slope towards the boulevard.

Requirements for the Building:

(a) *Technical.* There shall be three studios, one 2400 square feet in area and the other two each 1000 square feet in area. These shall each have a small control room about 200 square feet in area with a window permitting the operator to see the performers in the broadcasting studio. The operator regulates the volume and quality of the sound going out over the air. Communication be-



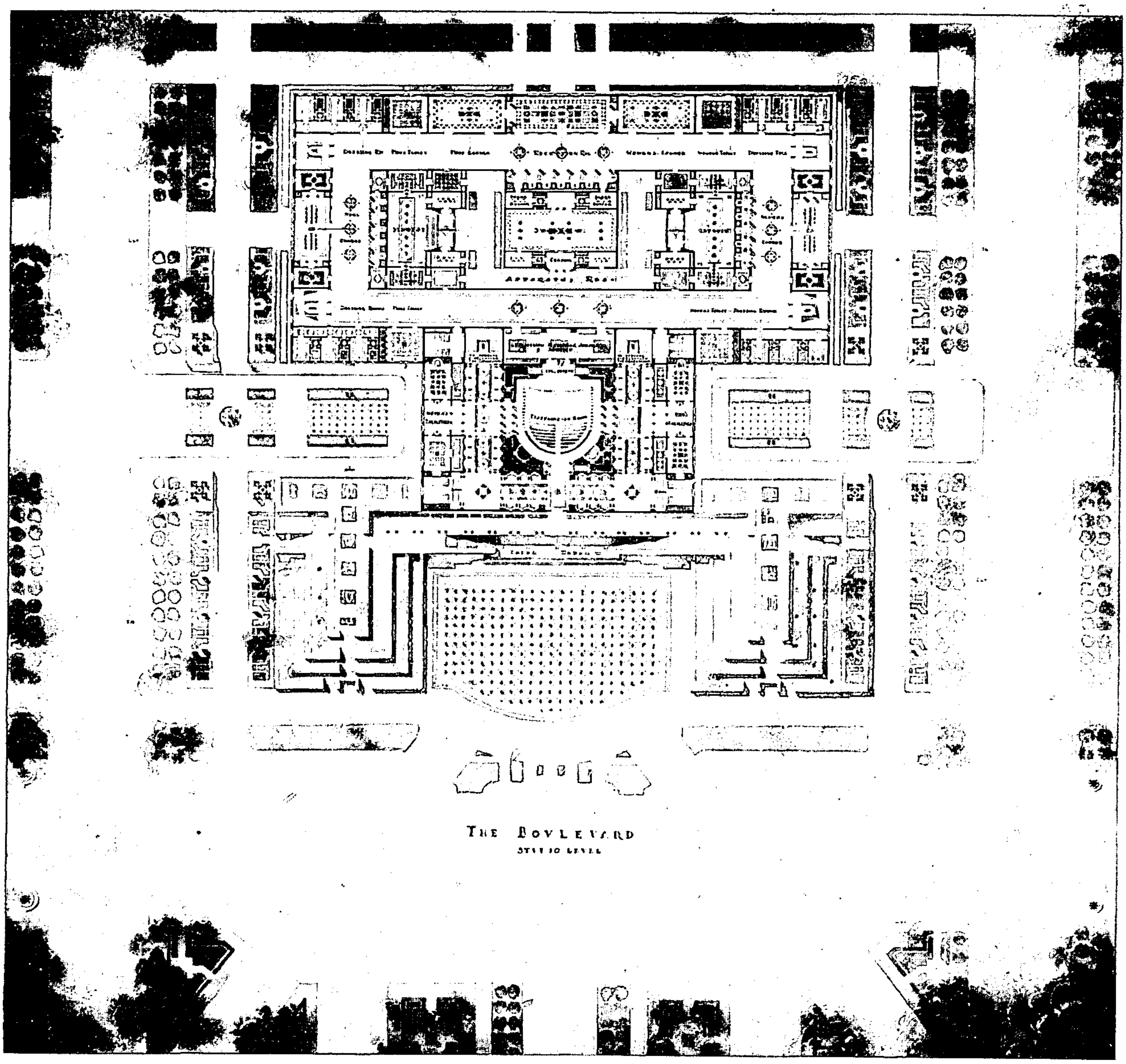
ELEVATION



SECTION

WINNING DESIGN FOR "A RADIO BROADCASTING STUDIO," BY FRANCIS J. HEUSEL

COMPETITION FOR THE FRANCIS J. PLYM TRAVELING FELLOWSHIP



PLAN OF STUDIO LEVEL, WINNING DESIGN FOR "A RADIO BROADCASTING STUDIO," BY FRANCIS J. HEUSEL

tween the studio and control room should be through a small vestibule to act as a sound buffer. A similar arrangement is necessary between the studio and the public space for the performers' entrance.

The control rooms are to be grouped around the apparatus room, which shall be not less than 1500 square feet in area and in which is placed the electrical apparatus controlling the entire work of the studios. From this apparatus room as outlined above there will be a glass window to each control room and a door communicating through a soundproof vestibule.

The studios are used for all kinds of programs so the control of acoustics is accomplished by using the proper materials and construction, and by having curtains of sound-absorbing material which may be spread out or drawn together as required. Isolation is therefore not an important item but none of the studios shall have windows or skylights opening to the outside.

(b) *Reception of Performers.* The performers shall have a separate entrance to the building with checking facilities, a lobby or public space communicating with the studios, reception and lounge rooms, and, since programs will be broadcast together with television, there should also be dressing rooms. The reception room for the performers shall be ample and dignified, as they frequently are people of importance in the literary, musical, and political world.

There shall be a large reception room of not less than 1200 square feet, a men's lounge, a women's lounge, twelve individual dressing rooms, two large dressing rooms for choruses, one for men and one for women, the necessary toilets, etc.

(c) *Reception of the Public.* There shall be a large listening-in room to seat 300 people and equipped with a television screen. It shall be preceded by a lobby and shall offer separate checking and toilet facilities as well as have a separate entrance. From a special circulation which shall not communicate with the performers' lobby there may be arranged glass windows through which the public can look into the studios and see the actual broadcasting. The public should not, however, disturb the performers by being too visible to them.

(d) *The Business Offices.* The business offices shall be easily accessible but not in a conspicuous place. They shall provide an office suite for the president and a room for the Board of Control; a series of offices both public and private for the program division, another for the offices for the accountants and treasurer, and, if desired, as a special part of the program division, there may be separate quarters for the publicity staff.

The requirements shall in general be housed on one level; this will not exclude half levels or a basement. The ground not used for the building shall provide for a suitable setting. Parking may also be provided on the lot.

Mr. Heusel's winning drawings are shown herewith.

FRANCIS J. HEUSEL

Francis J. Heusel, the winner of the Eighteenth Francis J. Plym Fellowship in Architecture of the University of Illinois, was born in Detroit, Michigan, in 1907.

He began his architectural training when he entered the College of Architecture of the University of Southern California where he studied for two years. Mr. Heusel then transferred to the University of Illinois where he remained for three years, instructing part time in architectural design during the last year at the University of Illinois, where he graduated in the Department of Architecture, Class of 1930. He won the Lake Forest Fellowship from Illinois and spent three months at the Lake Forest Foundation, studying under such men as Chester B. Price, Ferruccio Vitale, Dean Meeks of Yale, and H. T. Lindeberg of New York.

Mr. Heusel wishes to acknowledge with thanks the training he received under Professor L. C. Dillenback, formerly of the University of Illinois and now at Columbia, and also to thank Professors Provine and Newcomb at the University of Illinois for their help and advice during his student days. Mr. Heusel is also deeply appreciative of the assistance given him by Chester Price, of New York, and Alfred Granger, of Chicago, while he was studying at the Lake Forest Foundation.

EVENING CLASSES IN DRAWING

Ernest W. Watson and Arthur L. Guptill have announced for the season of 1931-32 evening classes in pen drawing, pencil sketching, water-color painting, architectural rendering, art appreciation, block printing and picture making. Afternoon classes will be held in interior decoration and figure sketching. The courses, which start October 1st, will be conducted under the auspices of The Brooklyn Institute of Arts and Sciences, 30 Lafayette Avenue, Brooklyn, N. Y., where further information may be obtained.

TAU SIGMA DELTA HONORARY FRATERNITY IN ARCHITECTURE AND ALLIED ARTS

The establishment of chapters of Tau Sigma Delta at the University of Texas and at the University of Southern California has made the Honorary Fraternity in Architecture and Allied Arts the strongest collegiate architectural organization in the world in the point of University Chapters. During the summer months E. H. Trysell, the National Secretary of Tau Sigma Delta, has visited a number of schools of architecture where new chapters will be formed as soon as convenient. A number of Tau Sigma Delta alumni are to be registered at schools now not having Tau Sigma Delta chapters and they will assist in formulating the plans for new chapters this coming school term.

Tau Sigma Delta mourns the loss, by death, of Professor Albert J. Rousseau of the Alpha Chapter at University of Michigan, and of Professor John Galen Howard, of the Eta Chapter at the University of California.

THE ARCHITECTS' AND ENGINEERS' SQUARE CLUB

The Architects' and Engineers' Square Club will start the fall season with a get-together meeting on September 24th, at the rooms of the Builders Exchange, 2 Park Avenue, New York. All members are urged to attend as soon after 5:00 P. M. as possible to take part in a motion picture production.

The evening will be devoted principally to short entertainment and vacation yarns.

Release of the film and first showing will be one part of the big time entertainment being planned for the 100% meeting on October 23rd.

TWO-YEAR COURSE IN ARCHITECTURAL CONSTRUCTION

Wentworth Institute, Boston, Massachusetts, offers an intensive course in Architectural Construction covering two full school years. This has been a very popular and successful course attracting students from different parts of the country.

The training given stresses the constructive side of architecture, rather than the æsthetic. The course, however, embraces enough of pure architecture to give the student a sympathetic attitude toward good design and appreciation for the beautiful in architecture. About two-thirds of the first year is given to the orders, rendering, and elementary design, and during the second year a comprehensive course in architectural history is given.

Mathematics, materials, mechanics, structures, lectures on building details, methods, and estimating comprise the theoretical work during the two years. In the laboratories practical work in different building materials is carried out simulating actual construction as far as possible. The drawing of the second year takes up scale and full size details, and working drawings of projected schemes developed as they would be in an architect's or engineer's office. Knobloch's *Good Practice in Construction* is used as a textbook. Surveying, leveling, and building layout is taught with instruments in the field.

The graduates enter the building industry, chiefly as assistants in building organizations, draftsmen, engineers, and salesmen of building materials.

As showing the students' desire of obtaining contact with the profession of architecture, it is significant that last year's classes subscribed 100% for PENCIL POINTS.

Another Letter

Discussing Means of Securing Better Cooperation Between Architect and Material Man

Editor's Note:—*This letter continues the discussion, commenced in* Pencil Points *for June, of ways of securing more intelligent cooperation between the architects and producers of building materials. All architects and material producers are invited to contribute expressions of opinion on this important subject.*

W. N. MACKEY,

Director of Marketing,

The Newman Manufacturing Company, Says:

"No manufacturer has a right to expect more of the architect than he gives in return. If his salesman finds the architect lukewarm or bored, the chances are that he (the salesman) has nothing of value to pass on to the architect.

"We producers of decorative metals should keep in mind the fact that one out of every hundred of our representatives is a technically trained man. The others have a smattering of knowledge. And these last depend upon friendships, whereas the architect needs *informative data* more than he needs friends.

"What happens in the ornamental metal work industry when an architect wishes to specify and detail this class of work? He has no file data. He can obtain from the producers of the various metals such information of a biased nature as they choose to give him, but from the general run of manufacturers' representatives he cannot dig out many facts which will prove helpful to him in his emergency.

"As with ornamental metal, so with many another building material I might mention. Every industry, through its trade organization, should provide architectural offices with complete, comprehensive manuals. Too many of us are broadcasting verbal and printed blah-blah. Yet down in our hearts we know full well that what the architect needs and is rightfully requesting is more and more data, including suggested specifications and everything requisite and necessary when a job is ready for detailing.

"My opinion, based on experiences covering 11 years, is that the architect is customarily more cordial and courteous to the salesman than the circumstances warrant. For, in our line, the steadily-growing demand for ornamental metal work has put gray hairs in the scalp of many a good architect. For he has found himself without a thorough knowledge of what the demand literally forces him to detail and specify. Therefore, it is reasonable to suppose that the day of the glad hand, the good cigar, and the smutty story has passed into the limbo of forgotten things, and the successful salesman of today is a highly trained specialist.

"If the architect seems 'ritzy' and upstage, it is mostly the fault of the manufacturer, or his representative who probably qualifies as such only because of his high-pressure methods.

"Certainly the architect wants the friendship of the representative, and of the company he represents, but he rarely needs their intensive cooperation, except in an emergency, when they should be equipped to 'come through' in grand style."

NEW OFFICERS FOR GRAND RAPIDS CLUB

Glenn Lyon is the new President of the Grand Rapids Architectural Club. Other officers named are: Vice-President, John Brill; Treasurer, John Baker; Secretary, Emil E. Zillmer, and Directors, Chris Steketee for three years and Rod Allen for one year.

DRAFTING ROOM OF THE DEPARTMENT OF ARCHITECTURE, WENTWORTH INSTITUTE, BOSTON

PORTION OF GALLERY, EXHIBITION OF SOUTHERN PENNSYLVANIA CHAPTER, A.I.A.
SHOWING WORK OF HARRISBURG, YORK, STATE COLLEGE, LANCASTER, AND WILLIAMSPORT ARCHITECTS.
Palms and many flowers made the galleries quite pleasant.

A successful architectural exhibition was held by the Southern Pennsylvania Chapter, American Institute of Architects, in Lancaster, Pennsylvania, a town of 60,000 inhabitants, during the week from June 12th to June 18th. Approximately 1,000 persons attended the exhibition which, in view of the facts that the section has been quite backward in its architectural development and that the exhibition was held during the hot weather, was particularly gratifying attendance. Officials of the Chapter are encouraged to believe that an annual exhibition can be held and will be of value in developing public understanding and appreciation in this area.

The Southern Pennsylvania Chapter includes architects of Altoona, Harrisburg, Lancaster, State College, Williamsport, and York. The exhibition was shown also in State College, Williamsport, and Harrisburg.

The exhibition included a wide variety of work such as banks, school buildings, residences, ranging from those of

THE THREE BOOTHS SHOWN HOLD THE WORK OF THREE LANCASTER ARCHITECTS AND A LANDSCAPE ARCHITECT
Notice one of the "library" tables on which were placed current architectural magazines and various good books on architecture. On another table was placed the same type of material relating to landscape architecture. Comfortable chairs were frequently filled with people copying addresses, etc.

moderate or low cost to those costing hundreds of thousands of dollars, and industrial plants. It also included gardens, an outdoor theatre, and items intended to show the design and comparative statistics of subdivisions. Most of the work was shown by photographs, but there were also some very fine pencil and water color perspectives, plan renderings in color, etc. Not only were contemporary buildings shown, but there was a collection of prints and photographs from the collection of Carl W. Dreppard covering early city and country views, showing some of the earliest architecture of the section. Antiques from several local collections were borrowed to help set off the very worth while exhibit.

The success of this exhibition should be encouraging to other architectural clubs and societies in different sections of the country, particularly in small and moderate-sized communities, for it has demonstrated that people can be interested in architecture and that they will attend such a show to acquaint themselves with the sort of work done by architects, landscape architects, and other allied professions. Any architectural organization desiring information as to how the exhibition was arranged can get full details by writing to James W. Minick, 23 North Third Street, Harrisburg, Pa., or to Harry B. Hostetter, Landscape Architect, New Holland Pike, Lancaster, Pa.

TALKS ON LEAKLESS MASONRY

A large group of prominent architects, engineers, and contractors were present on July 2, 1931, at a meeting called by the National Lime Association in the Boston Chamber of Commerce rooms to listen to a talk by Norman G. Hough, President of the Association, on the subject of leakless masonry. The importance of the subject and its timeliness was responsible for the great interest shown. Mr. Hough brought out a number of pertinent facts that influence the construction of leakless masonry walls. The principal points he covered concerned the effects on mortar of the factors of plasticity, adhesion, volume changes after hardening, elasticity, resistance to frost, freedom from efflorescence, rate of hardening, absorption, strength, and cost.

The National Lime Association is at present arranging for meetings in all the principal cities of the country at which Mr. Hough will present his talk. Invitations will be sent out to the architects in each locality when definite dates have been arranged for the meetings.

NEW COURSE AT N. Y. U.

The Department of Architecture of New York University has received many requests for a special course in the planning and promoting of apartment houses. In response to these requests, a course of 15 one-hour lectures will be offered weekly at five o'clock beginning in October, 1931. The lectures will be given by eminent authorities on the subject, among them being Clarence S. Stein, Ernest Flagg, Rosario Candela, and Edwin A. Kingsley.

While the course is primarily intended for practicing architects, a few students will be admitted if the capacity of the lecture room permits and two points of University credit will be given to those who are matriculated. The fee for the course will be $20.00. Students taking this course will have, in addition to the lectures, a weekly quiz or seminar.

LINN A. FORREST

ION LEWIS TRAVELING FELLOWSHIP AWARDED

The Ion Lewis Traveling Fellowship of the University of Oregon was founded last year by Ion Lewis, F.A.I.A., retired architect of Portland, Oregon. He and his partner, the late William H. Whidden, were responsible for much of the best work in Portland during the forty years of their practice as the firm of Whidden and Lewis.

Mr. Whidden came to Portland to take charge of the construction of the Portland Hotel for McKim, Mead, and White. Mr. Lewis had his early training with Peabody and Stearns.

The Fellowship will be awarded annually by the University of Oregon with the Dean of the School and two members of the Oregon Chapter A.I.A. as trustees.

The board this year consists of Harrison Whitney, Chairman; Ellis F. Lawrence, Dean; and Morris H. Whitehouse. Jamieson Parker is a reserve member of the board and acted in Dean Lawrence's place this year.

Residents of Oregon between the ages of 20 and 30 years are eligible. The applicants must be either graduates of a recognized architectural school or they must have had six years' experience in an architect's office.

The award this year was made to Linn A. Forrest of the staff of Whitehouse, Stanton & Church, Architects, of Portland, Oregon.

Mr. Forrest was born August 8, 1905, in Bucyrus, Ohio. He spent four years at the University of Oregon and part of one year (1928) at M.I.T. He has worked with representative Portland firms since his college days. He plans to sail from Boston on August 29th and to visit the northern countries first; then, after spending the winter in Italy, he will tour France and England.

He wishes to express his appreciation of the influence and encouragement of Roi L. Morin, Hollis Johnston, and Glenn Stanton.

FREESE'S CORNER

Editor's Note:—*As announced in June, Ernest Irving Freese will answer one inquiry a month on problems involving geometry or mathematics that have practical value to the draftsman or in one way or another to drafting room work.*

Address your problem to Freese's Corner, PENCIL POINTS, 419 *Fourth Avenue, New York.*

HOW TO DEVELOP A CYLINDRICAL ARCH IN A CIRCULAR WALL

To develop either face of this arch, its "elevation" must be unrolled on the plane of your drafting-board. Hence, it is first necessary to rectify, or stretch out into straight lines, the corresponding plan-curves.

The arch being symmetrical, the half elevation at "A" and the half plan at "B," Figure 2, contain all necessary given conditions. At "B," none of the arcs subtend an angle exceeding 45 degrees. The method of rectification given in the "Geometry" at Diagram "4" of Figure 122, and at Diagram "1" of Figure 127, Part 14 (PENCIL POINTS, Jan. 1931) is directly applicable. Like this: At "B," draw the prolonged tangent through *C;* then, at *any handy scale,* make the radial distance *A1* equal 2′-7″ or 31 units; and make *1-3* equal twice this, that is, 5′-2″ or 62 units; and make *1-2* equal 6″ or 6 units. Then, with *2-3* as radius which, of course, is 56 units, and from point *2* as center, fix point *4* on a vertical from point *1*. The projector *4A* then cuts the rectifying tangent at *D*, thus making *CD* equal the stretchout of the plan-curve *CBA*. In the same manner, and with the compass remaining set to the same radius *2-3*, transfer all required defining points from the arc *CBA* to the straight tangent *CD*. Repeat the process to produce the stretchout *C′D′* of the inner arc *C′B′A′*, and the analogous points therealong, as shown. Wherefore, the development of both the outer and inner faces of the arch can now be readily projected as has here been done at "C" and "D." In these developments, the joint lines are *not* straight, though nearly so. Auxiliary points can be projected, as is here suggested, to define the curvature of these lines, if such accuracy is essential.

Now (as explained in the August "corner" at Figure 1), the soffit of this arch forms a portion of the surface of an imaginary penetrating cylinder, hence, is accurately developable: it can be unrolled on your drafting board, as I have unrolled it at "E" of Figure 2 herewith. The half elevation of this soffit, at "A," is a quadrant arc; hence, the method of rectification shown at Diagram "3" of Figure 122 in the "Geometry" is directly applicable. Like this: At "E," of Figure 2 herewith, lay off *C′E* equal to one half the given radius of this soffit; then, at *any handy scale,* make *E5* equal 9′-5″ or 113 units; and make the coordinate distance *5-6* equal 1′-4″ or 16 units. The projector *6E* then cuts a perpendicular from *C′* at point *F*. Now lay off *FG* equal to 1½ times the given radius of the soffit, which, naturally, makes *FG* exactly thrice *C′E*. Wherefore, *C′G* is the rectangular stretchout of the soffit of the half arch. Divide it into the same number of equal or proportionate parts as the quadrant arc of the elevation at "A" is divided. The full development of the soffit's surface is then quickly materialized: it is here shown at "E."

Finally, or at any other time in the process of complete development, let the point *Q*, at "B," be on any line that

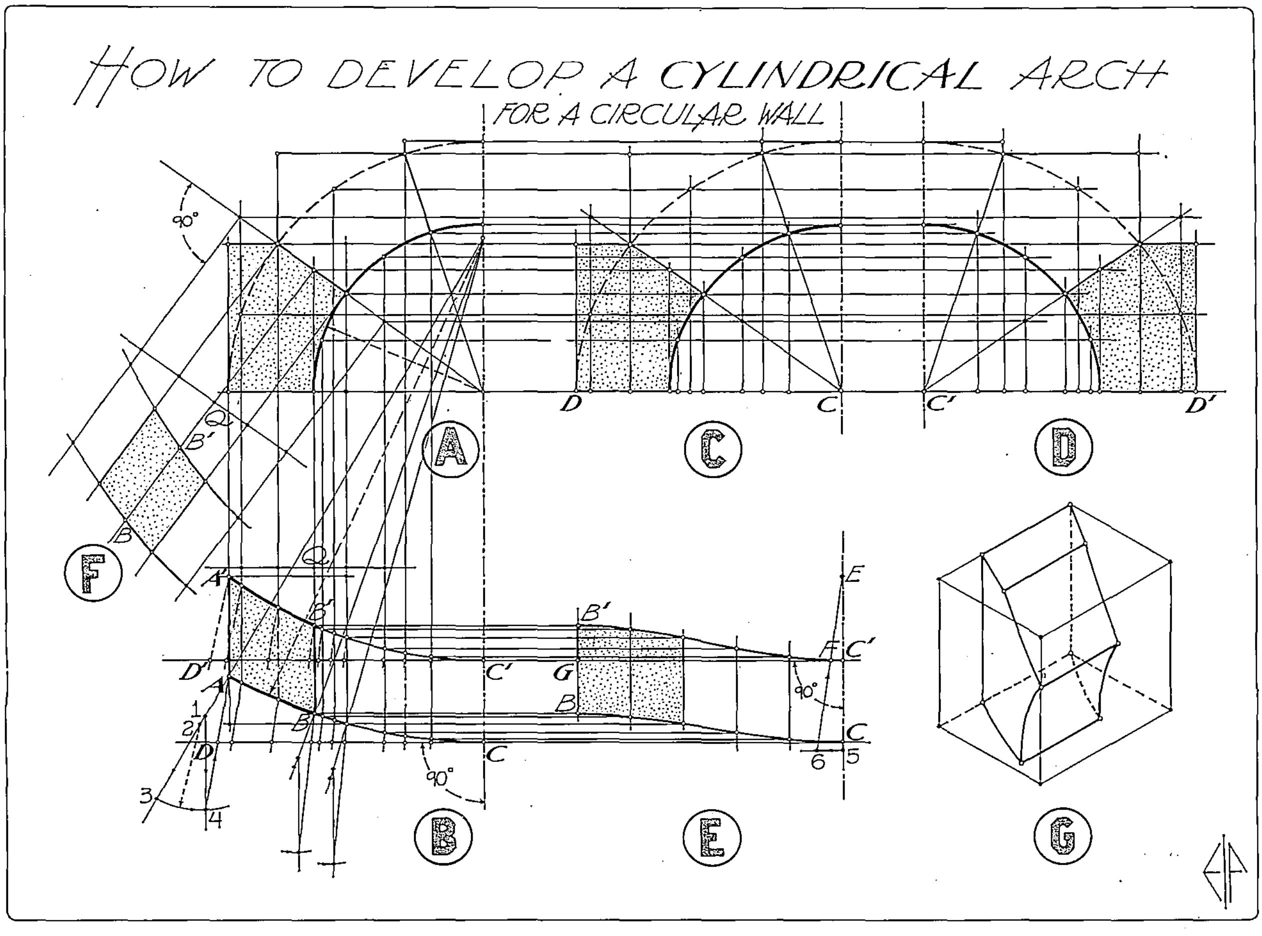


FIGURE 2

is square with the plan projectors as here drawn. And let the same analogous point Q, at "F," be on any line that is square with the projectors of the auxiliary joint-plane as shown. Transfer $QB'B$, from the horizontal plane at "B" to $QB'B$ of the inclined plane at "F." Likewise transfer the other points required to define the bounding elliptical curves of this particular joint-surface. So there you are: Diagram "F" reveals the true shape and size—the pattern—of the faces of the two stones abutting at the particular joint here raided. But they don't "raid" such joints in Canada—they develop them!

At Diagram "G," a clarifying isometric projection of the springer is shown; easily drawn from the orthographic limits established at "A" and "B."

The above general method of laying out patterns for *cylindrical* arches, together with the equally general method for *radiant* arches to appear here next month, answers inquiries from G.S.M., of Montreal, Canada, and from J.A., of Shaker Heights, Ohio. With the necessary allowances for particular conditions, both methods are applicable to arches of any shape; to those whose "elevation" is semicircular, segmental, or multiple-centered.

THOMAS EWING KING

Whose work is the subject of an article in this issue.

THE THIRD DEGREE

(From Part 3 of the Geometry.)

1: Do you know that the addition of a 22½-degree triangle to your kit of tools will increase the usability of the other two triangles by more than 100%?

2: Can you, with a protractor graduated to half degrees only, lay off, say, an angle of 68¼ degrees without interpolation?

3: How would you accurately bisect the above angle, or any angle, without recourse to either protractor or compass?

4: By what simple expedient would you draw the brick or stone joint lines of a sloping bay-window sill in oblique elevation?

5: The radius of one arc of a desired reverse curve is given, and the other arc is to finish tangent to a given line at a fixed point thereon. The geometric method of finding the center of the latter arc is *faster than guesswork.* Can you do it?

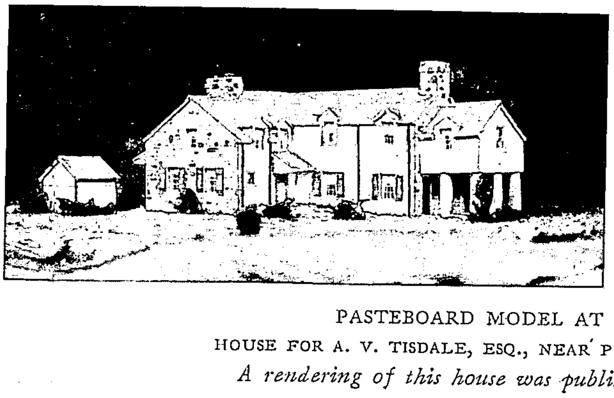
ARCHITECTURAL PROGRAM OF THE NEW SCHOOL FOR SOCIAL RESEARCH

The New School for Social Research, 66 West 12th Street, New York, announces an architectural program which amply demonstrates the value of the broader viewpoint in the profession.

Frank Lloyd Wright, en route to South America to serve as North American representative on the committee of judges in the architectural competition for the Columbus Memorial at Rio de Janiero, will stop in New York to hold three lecture discussions at the New School, September 16, 17, and 18.

For the year 1931-32, the architectural workshop will study the problem of reconstruction on the lower east side in the light of city planning principles, e.g., desirable size of block and height of buildings, open spaces, transit, number and type of schools, types of apartment houses, costs, rentals in relation to income classes.

In the course on present-day problems of architecture and construction, the various problems arising from changes in materials, in engineering technique, in legal requirements, will be discussed in a series of informal talks by men practically engaged in their solution.



PASTEBOARD MODEL AT ⅛" SCALE, BY W. W. PRICE

HOUSE FOR A. V. TISDALE, ESQ., NEAR POTTSTOWN, PA., W. W. PRICE, ARCHITECT

A rendering of this house was published in the August issue on page 608.

HERE AND THERE AND THIS AND THAT

CONDUCTED BY E.L.C.

This department conducts four competitions each month. A prize of $10.00 is awarded in each class as follows: Class 1, sketches or drawings in any medium; Class 2, poetry; Class 3, cartoons; Class 4, miscellaneous items not coming under the above headings. Everyone is eligible to enter material in any of these four divisions. Good Wrinkle Section: a prize of $10.00 is awarded for any suggestion as to how work in the drafting room may be facilitated. No matter how simple the scheme, if you have found it of help in making your work easier, send it in. Competitions close the fifteenth of each month so that contributions for a forthcoming issue must be received by the twelfth of the month preceding the publication date in order to be eligible for that month's competitions. Material received after the closing date is entered in the following month's competition.

The publishers reserve the right to publish any of the material, other than the prize winners, at any time, unless specifically requested not to do so by the contributor.

We had a beautiful vacation in England, became accustomed to driving on the left side of the road n'everything. We were quite proud of our ability in this direction until we met a most attractive officer of the law our first day at home, when we were showing some interested friends that "there is really nothing to it." We now have a ticket, a nice blue one, asking us to court the end of September. We wish it were Hampton Court!

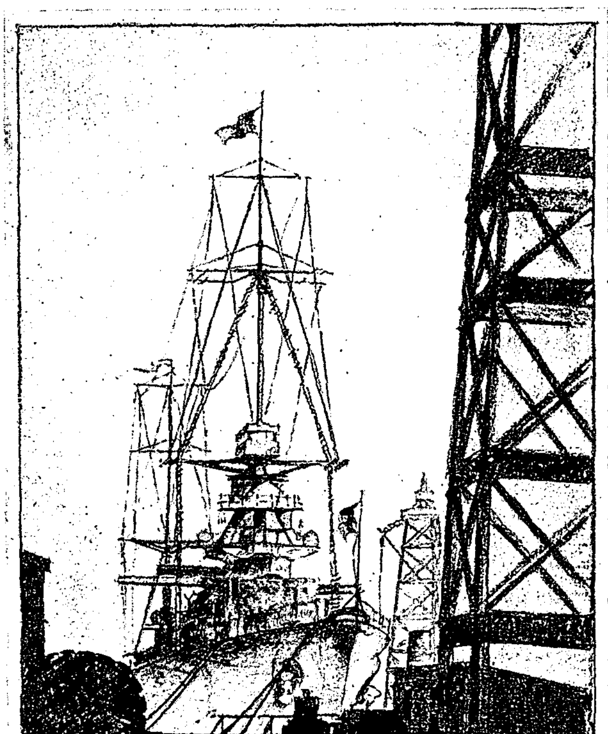
Salvador Gloop did nobly with Here and There last month and we wish to take this occasion to acknowledge with deep gratitude his efforts on our behalf. We bought Mr. Gloop what we considered an adequate gift in London as compensation for his service, and were so pleased upon presenting it to him to find that he already owned a similar object which he had purchased in New York for slightly less than half the price we had haggled our way into paying for it. There's nothing like the warm glow that comes o'er one with the knowledge that money has been wisely spent! Mr. Gloop, of course, behaved in his usual ever-gracious manner putting us completely at our ease when he said: "too bad you bothered with it—this tin I bought's much bigger, too."

Here we are behaving as though we had all the space in the world. To get down to business: the prizes this month have been awarded:

Class I—Walter Smith, Lynchburg, Va.
Class II—H. A. Sullwold, Pacific Palisades, California.
Class III—J. I. Rempel, Toronto, Canada.
Class IV—John Plattner, New Orleans, La.
Good Wrinkle—Philip S. Metcalf, Cambridge, Mass.

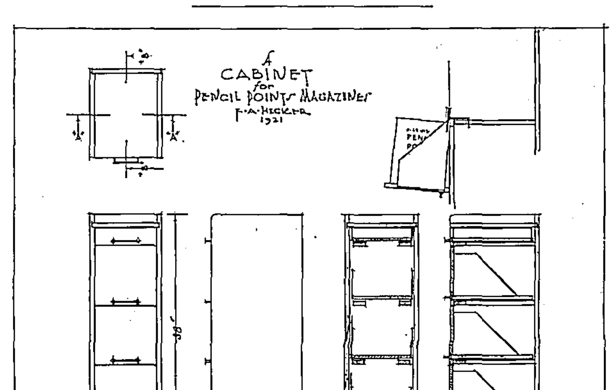
What an avalanche of good wrinkles this month! We're delighted with them. Our cartoonists have momentarily deserted, but we're looking for a strong return next month.

Do any of you know anything about a *palanquin*—the subject of a competition for readers of this department announced by Mr. Gloop last month? Neither do we! Anyway, have your drawings in by September 10th at 5 P. M. Daylight Saving Time. Mr. Gloop has promised to make a special trip from his estate at Dobbs Ferry (turn right at Suzette's Tea Room) to be present at the selection of the design to be awarded the "ten smackers."



Lithograph Pencil Drawing by Walter Smith
"U.S.S. Richmond"
(*Prize—Class One—July Competition*)

In the contract made in 1802 which appeared on page 631 of the August issue, the name Robert Guien Tun should have been Robert Guien Junr. (the old form for Jr.).



Frank A. Hecker, of West New York, has built himself a cabinet for filing his copies of Pencil Points, and sent in the above detail of it. He tells us:

"Now that the editions are beginning to pile up on my desk I find a need for some place to put them, therefore, I designed this cabinet which will hold six years' publications. Think of that! Six years of them!

"And what's more, I'll never have to root through all of them any more for a particular reference. No, sir, I have a file in which all the tables of contents are listed.

"That is the top drawer.

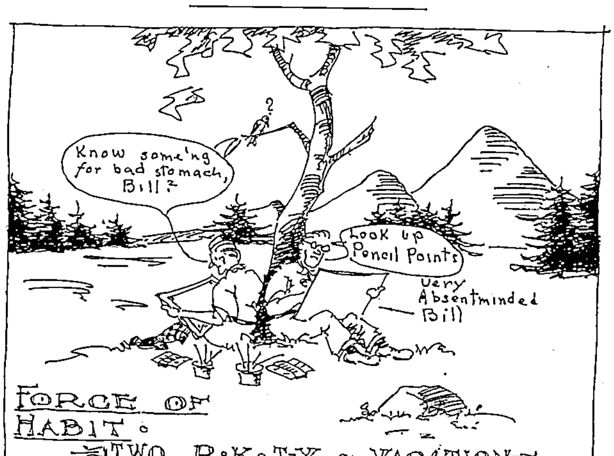
"All I have to do now is look through the index and by seeing the caption and titles, I know just what illustrations accompany them. Then, since I know just what I want to see, I dig up the edition, which is put away in its proper place, and I continue working without having a dozen or so magazines strewn about my desk."

• TABLE OF BRICK COURSES • 5 C. = 13" •										
		1	2	3	4	5	6	7	8	9
		2 5/8"	5 3/16"	7 13/16"	10 3/8"	13"	15 5/8	18 3/16"	20 13/16"	23 3/8"
10	2'-2"	2'-4 5/8"	2'-7 3/16"	2'-9 13/16"	3'-0 3/8"	3'-3"	3'-5 5/8"	3'-8 3/16"	3'-10 13/16"	4'-1 3/8"
20	4'-4"	4'-6 5/8"	4'-9 3/16"	4'-11 13/16"	5'-2 3/8"	5'-5"	5'-7 5/8"	5'-10 3/16"	6'-0 13/16"	6'-3 3/8"
30	6'-6"	6'-8 5/8"	6'-11 3/16"	7'-1 13/16"	7'-4 3/8"	7'-7"	7'-9 5/8"	8'-0 3/16"	8'-2 13/16"	8'-5 3/8"
40	8'-8"	8'-10 5/8"	9'-1 3/16"	9'-3 13/16"	9-6 3/8	9'-9"	9'-11 5/8"	8'-2 3/16"	8'-4 13/16"	8'-7 3/8"
50	10'-10"	11'-0 5/8"	11'-3 3/16"	11'-5 13/16"	11'-8 3/8"	11'-11"	12'-1 5/8"	12'-4 3/16"	12'-6 13/16"	12'-9 3/8"
60	13'-0"	13'-2 5/8"	13'-5 3/16"	13'-7 13/16"	13'-9	14'-1"	14'-3 5/8"	14'-6 3/16"	14'-8 13/16"	14'-11 3/8"
70	15'-2"	15'-4 5/8"	15'-7 3/16"	15'-9 13/16"	16'-0 3/8"	16'-3"	16'-5 5/8"	16'-8 3/16"	16'-10 13/16"	17'-1 3/8"
80	17'-4"	17'-6 5/8"	17'-9 3/16"	17'-11 13/16"	18'-2 3/8"	18'-5"	18'-7 5/8"	18'-10 3/16"	19'-0 13/16"	19'-3 3/8"
90	19'-6"	19'-8 5/8"	19'-11 3/16"	20'-1 13/16"	20-4 3/8"	20'-7"	20'-9 5/8"	21'-0 3/16"	21'-2 13/16"	21'-5 3/8"
100 = 21'-8" — 200 = 43'-4" — 300 = 65'-0" — 400 = 86'-8" — 500 = 108'-4"										

PHILIP S. METCALF sends in the above table of Brick Courses, and the following explanation of how he uses it, for which he is awarded the prize in Class IV.

"The following table I have found to be very convenient to use in figuring and dimensioning the height of brick courses. This table will also be found useful in checking elevations of brickwork when steel beams are encountered in the wall; in designing cast stone trim; and for checking stone shop drawing.

"The table given here is worked out on the basis of 5 courses equaling 13". This is the usual height of brick courses on the majority of all commercial and industrial brick buildings. Using a standard brick which is 2¼" x 3¾" x 8" this spacing gives a joint approximately ⅜" wide. It is understood, of course, that a 'course' of brickwork means one brick and one joint."



SUBMITTED BY J. I. REMPEL, TORONTO, CANADA
(*PRIZE—Class Three—July Competition*)

PRACTICALLY NOISELESS

By H. A. Sullwold

(PRIZE—*Class Two—July Competition*)

I bought an electric ice box
And built it in the wall
The salesman, when he sold it
Said it made no noise at all

"Of course for two three weeks or so
Until it's broken in
There'll be some noise and humming
Then a lessening of the din."

I waited two three weeks, then four
For the dog gone noise to stop
And then gave up disgusted
And telephoned the shop.

The motor kept on droning
And the belt went "lippty lip"
The compressor started singing
"Don't give up the ship."

The service man came along next day
And said, "I know your need—
New gas in the compressor
And a valve to control the speed!"

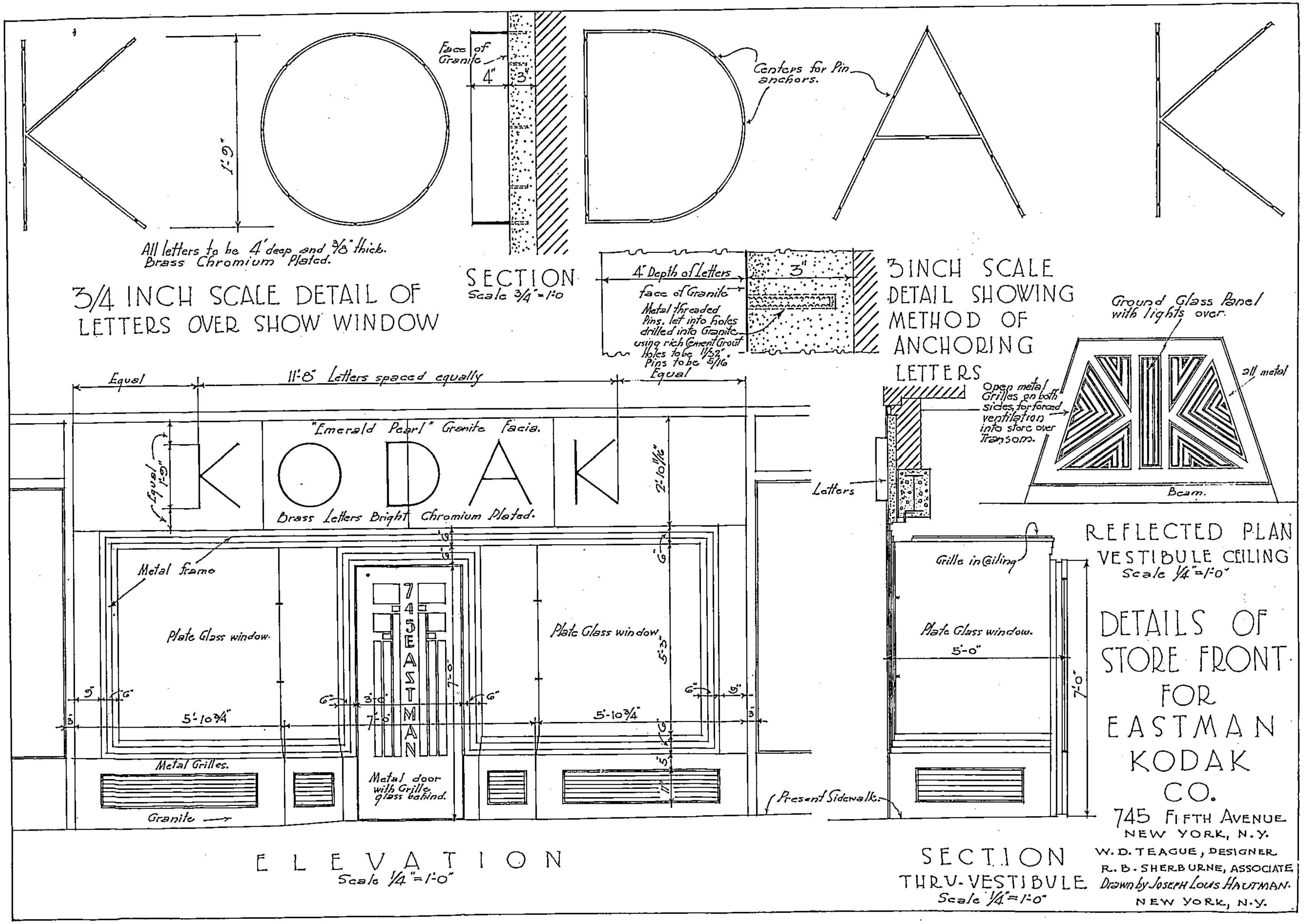
I said, "How much mazuma
To fix the gol darned thing?"
"Twelve dollars and four bits," he said
"And cash you bet, by jing."

Well I let him "fix" it
Was there lessening of the din?
No! and all for lack of an axe
To break the darn thing in.

L'Envoi

Take warning then ye Architects
Be as cunning as the fox
Let the other guy do the "breaking in"
When you're buying a "silent" box.

LINOLEUM PRINT BY JOHN PLATTNER
The Pet Bull, "Peggy"



DETAILS OF EASTMAN KODAK SHOP, FIFTH AVENUE, NEW YORK—DRAWN BY JOSEPH L. HAUTMAN

WALTER D. TEAGUE, DESIGNER—R. B. SHERBURNE, ASSOCIATE

THE SPECIFICATION DESK

Whys and Wherefores of the Specification

Glass and Glazing—1

By David B. Emerson

Glass as compared to stone, brick, plaster and other materials is a mere infant in the building industry. The very earliest known records of the use of glass as a building material were found in excavations in the ruins at Rome, and also in the excavations at Pompeii, which show that small sheets of glass were used for window purposes, but not extensively. The exact date of this early use of glass can not be determined, but it undoubtedly does not antedate the beginning of the Christian era.

Glass was not recognized to any appreciable extent until about the Fourth and Fifth Centuries, and even then centuries passed before any extensive use was made of it, and then it was only used for the glazing of church windows. Glazed windows in churches did not become very general until late in the Thirteenth Century or early in the Fourteenth Century. The glass of that period and of the preceding century was cast in small colored units and leaded together. The glass work of the artist artisans of the Middle Ages has hardly been equalled and certainly never excelled since that time.

The use of glass in residential buildings was very limited until about the Fifteenth Century, and then only the kings and the great nobles had glazed windows in their homes. In the Sixteenth Century, when the houses of the nobles became homes instead of fortifications, the size and number of the windows changed materially. Hardwick Hall, in Derbyshire, built in 1587, is a very good example of this increased fenestration, and provoked the couplet

"Hardwick Hall,
More glass than wall."

All of the glass used in this early work was in very small units, and was leaded. In fact leaded glass was used in England up until as late as 1697, when the house in Chichester now used as the County Hall was built by Sir Christopher Wren. Blown sheet glass began to be used in the latter part of the Seventeenth Century, but it was only possible to produce small units. This is quite noticeable in the Old Louvre, the Palace at Versailles, Hampton Court, and all of the great houses of the period. As small as the sheets of glass were, the cost was almost prohibitive.

Celia Fiennes, one of the diarists of the time of William IV and Anne, writing of the additions to Chatsworth made by the Fourth Earl of Devonshire tells us: "All ye windows ye squares of glass are so large and good they cost 10s. a pannel." When one considers the buying power of the shilling of that day, it would have been equal to at least twenty or thirty shillings a panel today, if not more. Also, the size of the panes of glass as shown in the photographs of Chatsworth is not over sixteen by twenty inches at the most, and may be less.

It is claimed by most authorities that glass was first made in the United States at Jamestown in 1608 or 1609. Whether it was window glass or glass beads to be used for trade with the Indians is impossible to determine. Incidentally this was the first manufacturing enterprise in the United States, and very probably the first one on the Western Hemisphere. This venture was like others in other colonies, very short lived. The first glass works of any importance were established at Allowaystown, New Jersey, in 1738, but, like its predecessors, this venture was unsuccessful.

Numerous glass works were established in this country in the Eighteenth and early Nineteenth Centuries, but it was not until the latter part of the Nineteenth Century that glass making assumed any proportions in this country. In fact I can remember when imported glass, both sheet and plate, was still used here to some extent. Today the United States leads the world in the production of glass both in quantity and quality.

Glass, generally speaking, is a mixture of sand, ground limestone, soda ash, and salt cake with a certain amount of "cullet" or broken glass added (a small amount of arsenic is also used by most manufacturers), fused under intense heat, given a purifying treatment and then put through the process of manufacture.

Window glass, "sheet glass," or "common glass," as it is variously called, is the most generally used and best known form of glass. The production of this particular kind of glass has undergone a complete revolution in the past fifteen years. Up to that it had been produced entirely by the blowing process; that is, the molten glass was blown into cylinders (first by man power and later by machine), split and then flattened by a heat treatment. In 1916, after considerable experimentation, "flat drawn" glass was produced. Now, practically all window glass is made by flat drawn processes, either the horizontal or the vertical, both of which produce excellent glass. The flat drawn glass is a great improvement over the blown cylinder glass in that it is absolutely flat, whereas the cylinder glass always had an almost imperceptible "bow," due to the fact that it could not be entirely flattened. This bow caused a slight distortion of objects seen through the glass, which does not occur with the new flat drawn glass. Flat drawn glass is also more uniform in thickness than the blown cylinder glass; it is much brighter and clearer; has a high lustre on both sides; and is entirely free from surface burns, a very common defect in cylinder glass.

Window glass is graded into three qualities, "AA," "A," and "B," depending upon the number of standard defects in each sheet. "AA" glass is a special classification, and is obtained by selecting a few sheets which grade better than the standard "A" glass. Only a very limited quantity of "AA" glass is available on the market, therefore it should never be specified except for small buildings requiring a very small amount of glass. I remember that some years ago one of New York City's prominent architects specified "AA" glass for a large high school in one of the neighboring cities. The contractor who took the job could not possibly obtain that amount of "AA" glass, and the architect refused to accept "A" grade. As a result they were deadlocked at the time I heard the story. I never heard the final outcome, but the moral of it is very plain. An architect should never specify that which can not be obtained under reasonable conditions, and a contractor should never contract to furnish that which he is not sure he can obtain.

The various thicknesses of window glass are known as "single strength," "double strength," and "heavy sheet." According to the United States Government specification, single strength glass, designated as S.S., varies from .08 to .10 of an inch in thickness, and should average from ten and one-half to twelve lights to the inch. It comes in sheets as large as 40″ x 50″. Double strength glass, designated as D.S., varies from .111 to .125 of an inch in thickness, and should average from eight to nine lights to the inch. This glass comes in sheets as large as 60″ x 80″. Heavy sheet glass is classified as twenty-six ounce, twenty-nine ounce, thirty ounce, and thirty-nine ounce glass. Twenty-six ounce glass varies from .125 to .135 of an inch in thickness, and should average from seven and a half to eight lights to the inch. Twenty-nine ounce glass varies from .135 to .148 of an inch in thickness, and should average from six and a half to seven lights to the inch. Thirty-four ounce glass varies from .15 to .175 of an inch in thickness and should average six to six and a half lights to the inch. Thirty-nine ounce glass varies from .176 to .205 of an inch in thickness, and should average from five to five and a half lights to the inch. Heavy sheet glass comes in sheets as large as 78″ x 120″. Some manufacturers make slightly heavier glass than the government specifications require; however the government specifications are the recognized minimum for thickness and weight. On account of the liability of breakage it is not wise to use window glass of the maximum sizes. From personal experience I would advise against using lights over 24″ x 30″ for single strength, 36″ x 44″ for double strength, 48″ x 60″ for twenty-nine ounce glass, and not much larger than that for thirty-four and thirty-nine ounce glass, as I think it best when the lesser dimension of a sheet of glass is over sixty inches to use plate glass.

Plate glass is the acknowledged aristocrat of all forms of clear glass. It was invented in France in 1687 by a glass maker named Perreau. The first factory for the manufacture of plate glass was established in Picardy near the River Oise in 1693. As far as I have been able to learn of this early plate glass, it was used for nothing but mirrors, due probably to the very high cost of manufacture. For many years the French had practically a monopoly in the manufacture of plate glass, and they still produce quite a large percentage of the world's supply.

The earliest attempt at the manufacture of plate glass in this country was at Cheshire, Massachusetts, in 1850. This venture was a failure as were numerous other attempts in various parts of the country. It was not until the early eighties that a successful plate glass works was established in the United States. Since that time the progress of the manufacture of plate glass has been remarkable, and today the United States leads the world in the production of plate glass.

There are several different processes for the manufacture of plate glass which differ in detail, but are practically alike in general principles. As with all glass, the "batch" is melted under an intense heat. The molten glass is poured from the melting pot onto the casting table, which is of steel and is about thirty-two feet long by twenty feet wide. It is then rolled with a huge steel roller which runs on steel gauge strips set at the desired height above the table to determine the thickness of the glass. Two new methods are used by some manufacturers. In one the molten mass is poured onto the casting table through rollers which form the unfinished sheet of plate glass. The other method is what is known as the flat drawing process. By this method the batch is continuously fed into a tank furnace and flat drawn by means of rollers. This produces a continuous ribbon of glass, and consequently admits of tremendous production. Directly after rolling, the sheet is run through an annealing oven or "lehr" and gradually cooled. This process takes about five hours, as too rapid cooling would cause the glass to crack. A new annealing process is used by some manufacturers. By this process a sheet one-quarter inch thick can be annealed in from eight to ten minutes and the entire time in the lehr varies from thirty to fifty minutes. After leaving the lehr, the glass is thoroughly inspected, and any defective portions of the sheets are cut out. The cut up portions of the sheets which are left are what is known as "rough stock." This "rough stock" is the rough plate glass of commerce, which is used for glazing skylights, for floorlights and wherever light without transparency is wanted. After the glass has been inspected and the defective portions have been cut out, the glass which remains is then ground, and polished, first on one side and then on the other. The grinding is done first with sand and water under enormous pressure, to remove all irregularities. Finer sand is used toward the end of the process and finally the very finest emery is used. The greatest of care has to be exercised in the final grinding to prevent scratching which would practically ruin the sheet. To give the glass its final polish, it is buffed with felt disks using red oxide of iron known as "rouge," which is the finest abrasive known. Plate glass is graded into five qualities, "first silvering" quality, "second silvering" quality, "mirror glazing" quality, "glazing" quality and "O. B." quality. Second silvering quality should always be used where the highest standard of glazing is required. It is seldom sold in sizes over twenty square feet in area, due probably to the practical impossibility of obtaining sheets sufficiently free from defects to be passed for that quality. Plate glass is available in sheets up to two hundred and fifty square feet, and larger sheets can be made to order, but due to the many difficulties in shipping, handling and setting, it is unwise to attempt to use it. The maximum sizes for one-quarter inch glass, as listed in the United States Government standard specification published by the Plate Glass Manufacturers of America, are 120″ x 280″, 144″ x 260″, and 160″ x 240″. When designing buildings where large sheets of plate glass are to be used in show windows, it is well to consider the possible wind pressure the glass may have to withstand. According to the United States Weather Bureau what is classed by meteorologists as a "great storm" produces a wind pressure of about twenty-one pounds per square foot, and a hurricane produces a wind pressure of about thirty-two pounds per square foot. A sheet of one-quarter inch plate glass 108″ x 108″ will safely withstand a pressure of twenty-one pounds per square foot, which can readily be seen does not leave much of a margin of safety. Now, do not for one minute think that I am an alarmist, nor be unduly alarmed over the possible breakage of plate glass show windows over 9′0″ x 9′0″. It is very unlikely to happen unless the building is located in the full sweep of the wind, but as a matter of caution I would advise not using much larger than 9′0″ x 17′0″ sheets quarter-inch of plate glass. If larger sheets are used, use glass thicker than one-quarter inch.

The standard thicknesses of plate glass are 1/8″, 3/16″, 1/4″, 3/8″, 1/2″, 5/8″, 3/4″, 1″, 1 1/4″, and 1 1/2″. The standard stock thickness which is used for glazing purposes is one-quarter inch. Polished plate glass over one-half inch thick is rarely if ever used in architectural work, in fact I can not remember ever having used it or seeing it used in my experience except for aquariums, diving tanks, deal plates, and table tops in banks. With plate glass as with window glass, due to certain apparently insurmountable difficulties in manufacture, certain tolerances in thickness have to be allowed. In 1/8″, 3/16″, and 1/4″ glass the general variation in thickness should not be more than one thirty-second of an inch, for individual lights under ten square feet in area.

In addition to the transparent or clear glass, there are numerous types of obscured glass manufactured. Processed glass is either plate or window glass which has been treated by one of three processes, grinding, one-process chipping, or two-process chipping. Ground glass is produced by driving fine sand against the surface of the glass by means of compressed air. This gives the glass a soft milky finish with which we are all very familiar. Ground glass is also produced by etching one surface of the glass with a dilute solution of hydrofluoric acid. Chipping is a process which makes use of the natural stresses and strains of the glass to produce the pattern. The method used is to coat the surface of the ground glass with glue, and then to subject it to a gradual heating. The contraction of the glue as it dries causes it to shrink and to shrivel off the surface of the glass in flakes, and each flake tears with it a thin sliver of glass. This is the one-process chipping, and is repeated to obtain the two-process chipping. The second process removes the sand blast lines entirely. The beauty of the chipping process is that there is no definite pattern, and no two pieces can possibly be absolutely alike.

Figured sheet glass, of which there is a large variety of patterns on the market, is produced by the casting process, and the rolling of the molten mass with steel rollers on which the desired pattern is cut. In some cases the process is reversed and the pattern is cut on the surface of the casting table.

Wire glass is quite a recent invention. It was first used sometime in the late eighties, but its use did not become very general until the late nineties or the first years of the present century. It was approved as a fire retardent by the various Boards of Fire Underwriters of the principal cities of the United States about 1898 or 1899. The first very extensive use of wire glass was in the rebuilding after the great fire in Baltimore in 1904. Like most Americans who "lock the stable door after the horse has been stolen," the City Government added a number of very salutary sections to the building code. Among these additions was one which has become very general throughout the country, which calls for the windows in the rear walls of buildings, and the side walls which adjoin other buildings, to have metal frames and sash, and to be glazed with wire glass. As a result of this thousands of square feet of wire glass were used in the work of rebuilding the burned district.

There are at least three, and possibly more, methods of manufacturing wire glass. In the Shuman process, after the glass is poured on the casting table, and rolled out, the wire mesh is spread out on the plastic sheet of glass and pressed into it by a method which smooths the surface at the same time. In the Appert or Schmertz process, a sheet of glass is poured and rolled to one-half the desired thickness. The wire mesh is then laid on this sheet and a second sheet the same thickness as the first is poured and rolled on it, thus producing a solid sheet with the wire mesh in the middle. In the continuous or solid process, which is now being used by some of the larger manufacturers of wire glass, the wire mesh is stretched and held firmly on the casting table, and adjusted so that it is held at a desired height above the surface of the table. The molten glass is poured over it and rolled, thus producing a solid sheet with the wire mesh firmly embedded inside. Wire glass is rolled in practically all of the patterns that are used for plain glass, and is polished where clear vision is required. In using wire glass it is well always to keep in mind that the maximum size allowed by the National Board of Fire Underwriters is not over forty-eight inches in either dimension, and not to exceed seven hundred and twenty square inches in area.

One of the most recent developments in glass is the ultra-violet tranmission glass. This type glass was developed in England in 1894, and is now manufactured under various trade names by several glass manufacturers in this country. About the only secret there ever was in the making of this glass, so far as I have been able to learn, is the use of a very high percentage of quartz in the "batch." This seemingly slight difference in the manufacture produces a glass which transmits the vitalizing ultra-violet rays of the sun, which do not pass through any other type of glass. This glass is particularly well suited for living rooms and nurseries in residences, for hospitals, for schoolrooms and for practically any place where human beings or animals spend their indoor life.

Quite a little has been said at different times regarding the loss of efficiency in ultra-violet transmission glass. I first had it brought to my notice by an architect and shortly after by a nurse in one of the New York hospitals. As I had recently specified quite a large amount of the glass on a large hospital, I was naturally a little worried. After a careful investigation I found that this glass goes through a period of solarization or seasoning after it is first exposed to the sunlight. This period, according to the reports of the United States Bureau of Standards, lasts about three weeks, after which time the ultra-violet transmission becomes fixed and permanent. After this period of solarization, when the glass has become stabilized, it will permanently transmit over one-half the ultra-violet rays of the natural sunlight. Certainly this must have a decidedly beneficial effect on the health of the occupants of the rooms where it is used. This glass can be had in "clear sheet" up to 40″ x 60″; in polished plate up to twenty-five square feet in area; in wire glass where it is required by the building codes and in colored glass where it is desired to prevent glare and to do away with shades where continuous sunlight is desired for therapeutic purposes. The United States Government has made extensive experiments with this glass, and a booklet has been issued by the Bureau of Standards. The information is rather technical, but if any of the readers desire more extended information I would recommend this publication to them. Although the ultra-violet transmission glass is naturally somewhat more expensive than the regular glass, the cost is far from excessive. It is quite possible to glaze all the windows in the master rooms in the first and second stories of a residence costing from eight to ten thousand dollars, for about sixty dollars or less, according to the number and size of the windows. As this amount is something less than one-tenth of one per cent of the cost of the building it is practically negligible.

In addition to the regular ultra-violet transmission glass there is a quartz glass on the market which costs no more than ordinary window glass. Although this glass is not as efficient as the regular ultra-violet glass, it does transmit quite a percentage of the ultra-violet rays of the sun.

What is probably the latest development in glass making, or at least the latest one of which I have heard, is X-ray proof glass. This glass which contains a certain percentage of lead, probably in the form of litharge (oxide of lead), is made in France, and it will not allow the passage of the X-ray. It is made in four thicknesses, four to six millimetres which is equal to one thirty-second of an inch sheet lead protection, six to eight millimetres which is equal to one sixteenth of an inch sheet lead protection, and ten to twelve and one-half millimetres which is equal to one-quarter inch of sheet lead protection. This amounts to a coefficient of protection of twenty-eight per cent of the average thickness of lead. This glass is a boon to X-ray laboratories for the glazing of operators' windows and for the glazing of sash in exterior walls, and makes the use of lead shutters formerly used unnecessary.

Bulletproof glass is still another of the more recent developments in glass making. This is a laminated glass made up of a sheet of plate glass about thirteen-sixteenths of an inch thick, with two sheets of plate glass about three thirty-seconds of an inch thick, one on either side, with a sheet of celluloid between each sheet of glass, all welded together under a high temperature and a tremendous pressure. It is a clear glass of brilliant lustre and excellent visibility, and is proof against the fire of as heavy a weapon as a .45 calibre automatic. A four-layer glass about one and three-eighths of an inch thick is also made. It will resist an even heavier impact than the three-layer glass. One of the various purposes for which this glass has been successfully used is for bank screens. A bank clerk safe behind bulletproof glass can smile at the holdup men on the other side of the screen, and feel assured that his life and the bank's money are reasonably safe. Another place where bulletproof glass is being used is in jails and other penal institutions for the glazing of windows liable to outside attack, and for the lights in partitions in the visitors' space, so that a prisoner cannot be put out of the way by someone coming in the guise of a friend. The largest available size in bulletproof glass is 34″ x 62″, and the largest size made by one company is only 30″ x 60″. For practical purposes larger sizes should not be considered, and small units are naturally far better than larger ones for resisting impact.

Shatterproof glass is a lesser edition of bulletproof glass. It is made up of two or more layers of glass with a layer of celluloid between, averaging from .12 inch to .275 inch in thickness and is made both in sheet and plate glass. Although this glass will not resist bullets or heavy missiles, it will not fly into fragments on impact. Originally intended to be used in automobiles, shatterproof glass has gradually found its way into architecture and is being used in psychopathic wards in hospitals, police stations, jails, art museums, and other places where a nonshattering glass is essential to safety. One use for which I would strongly recommend it, is for the glazing of entrance doors, both swinging and revolving, in buildings where crowds are liable to assemble. I have carried a scar across the back of my right thumb for over twenty years due to the shattering of plate glass from the broken glass in a restaurant door.

The making of colored glass antedates the use of glass for glazing purposes, and has continued without interruption up to the present time. It is fairly safe to say that the glass makers of the Thirteenth and Fourteenth Centuries produced glass which cannot be equalled today. Many of the secrets of their art apparently died with them. Exactly what was the method of coloring glass used by the mediæval glass makers is more or less of an open question. At the present time the various colors are produced in the furnace by the use of metallic oxides. Oxide of iron mixed in the batch is very extensively used. Reds are produced with oxide of iron, suboxide of copper, a little gold and silicate of sodium. The addition of cobalt, zaffre, and copper produces the various blues. Greens are produced with oxides of iron, peroxides of copper and chromium oxide. The addition of oxide of manganese, oxide of uranium, some antimony and silver produce a glowing violet. These are only a very few of the numerous mixtures which are used, and in colors produced by fire there are liable to be accidental results which are sometimes very beautiful. Among the better known and most generally used of the colored glasses are "antique," "cathedral," "opalescent" and "opal." Antique glass, which is very extensively used in stained and painted glass work, is a faithful copy of the ancient glass. It is blown in a cylinder, cut longitudinally, opened out on a flat stone while still plastic and settles down by its own weight. This settling causes the glass to take some impression from the granular surface of the stone, thus producing tiny pits which are found only on one side of the sheet. The opposite side which lies uppermost is quite smooth, except perhaps for a few minute excrescences caused by air bubbles which have risen to the surface. Flashed glass is produced in the same manner, except that the primary lump of molten glass before being blown is dipped into another pot containing either ruby or blue glass. On its being withdrawn a thin coating of color is left on the lump of glass, and as the latter is blown the color is expanded until it becomes a thin film over the entire surface of the cylinder. Antique glass comes in sheets twenty-four inches long, by approximately sixteen inches wide. Each of the longer edges are rounded and slightly irregular, and the ends are cut. Cathedral glass is a cast and rolled glass. It is made either with a smooth surface or in ornamental "hammered" effects, produced by rolling the pattern into it while it is in a plastic state. It comes in sheets approximately one-eighth of an inch thick and about thirty inches long by nine inches wide. Opalescent glass is a cast glass, and it is made either with a smooth surface finish or with a "granite" surface. The sheets are about forty to fifty inches long by about twenty-six inches wide. Colored plate glass, one of the more recent developments in colored glass, is available at the present time in no less than twelve different colors and shades. This glass works in admirably with the modernistic architecture.

(To be concluded in the October Issue)

KNOBLOCH'S "WHYS AND WHEREFORES OF THE SPECIFICATION"

Owing to lack of space we are not able to include Philip G. Knobloch's article on the *Whys and Wherefores of the Specification* in this issue. The next installment, on *Carpentry*, will be presented in October.