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When you are planning a hotel, club or other similar building, consider the use of Lincrusta-Walton. A book of samples will be sent you on request.
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The Lumberjack

The lumberjack as we knew him was a devil-may-care sort of a fellow, the kind with "hair on his chest"—equally ready to fight or befriend you.

The profligate, the man of letters and the failure at other things, all pulled together in our great northwoods. Some were there to earn their daily bread, others to forget. But they were all held by one common bond—work in the pines.

Because these lumberjacks worked like real men we have been able to fill a nation-wide need for Shevlin Pine.
Detail of Tower, Wrigley Building, Chicago; Graham, Anderson, Probst & White, Architects; Lanquist & Illsley Co., Builders. Note the new twin building at right. These buildings are faced on all sides from sidewalk to searchlight with Northwestern White Enamel Terra Cotta.

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THE CATHEDRAL, AUTUN

THE AMERICAN ARCHITECT
FOR a smoothly working organization, one that functions efficiently in every way, let us consider The Architectural League of New York. No obstacles, no matter how serious, appear to daunt the men of this organization. It is but to recall history to refer to the fire that wiped out in two hours on the opening date an exhibition that it had taken a month of painstaking effort to arrange. It was but a matter of a few days' work, however, to assemble a new, if smaller, exhibition and thus maintain unbroken a series of presentations of architectural work, each one very much to be commended.

Criticism has been made of other art organizations that, aside from a spasmodic exhibition once or twice a year, they have been moribund the rest of the time. This may not be truthfully said of the League. Exhibitions are not its only constructive work. Its monthly meetings and dinners each have a well-defined purpose. Things are accomplished. Public opinion as to architecture properly directed and the big task that the League has set itself, the encouragement of industrial art and the promotion of a better craftsmanship, is always being consistently accomplished. It is well to stress this point, if for no other reason than to combat an idea that the sole purpose of the League is to hold these annual exhibitions.

Even success may, in a certain sense, become monotonous. Success marks this year's exhibition in the same brilliant manner that it has marked those of the last ten years. With succeeding years, the interpretation of architectural exhibitions becomes broader. No longer are they planned and executed as something of purely professional interest. Rightfully, it seems to us, exhibitions are now more largely a motive for popular education in architecture. This value is served by the fact that when the man on the street has visited an architectural exhibition he has received in part a liberal education as to what properly constitutes civic pride. He learns, to use a homely expression, to stand on his hind legs and look through his eyes; to elevate his vision from the sordid level of usual observation and to gaze with appreciation on the good architectural expression that is everywhere to be

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found. Undoubtedly, there is a very great artistic impulse in these annual showings of architecture.

It is unfortunate that there is not available in the largest city of the country a building adequate for exhibition purposes. We need an art center and there is no other civic need just now of greater importance. The Vanderbilt Galleries, where League exhibitions have been held for many years, have a certain atmosphere of aristocratic exclusiveness. They do not attract, and seem to forbid the presence of a large part of the city's population that needs, and badly, to learn the lessons that these exhibitions teach.

The exhibition that was held at the Metropolitan Museum of Art three years ago, when the Vanderbilt Galleries were destroyed by fire, attracted thousands that would never have gone over to the exclusive West side to view the same exhibition. The exhibition of municipal art, held during the recent “Silver Jubilee” of New York, was also thronged by people who had an opportunity to study, to the very best advantage, municipal architecture and the exhibits that showed the city's growth and development. If we are to prove to the masses that art is not a hobby of the rich, but vitally a necessity of
COUNTRY CLUB OF DETROIT

ALBERT KAHN, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
DETAIL OF DOORWAY
FIRST NATIONAL BANK BUILDING, DETROIT, MICH.
ALBERT KAHN, ARCHITECT
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
every-day life, we shall have to make our ex-
hibitions accessible to all the people and never
surround them with an atmosphere of exclusive-
ness. It is for these reasons that the early selec-
tion of an art center is of great importance.
There is a pressing duty on the part of architects
to labor toward this end.

In watchin<^ this exhibition throughout its
various stages toward completion, certain special
features have been ob-
served, some of which
are covered by the
following notes.

* * *

Just what zoning
has done for New
York is splendidly
shown at this League
exhibition. The future
possibilities point to a
skyline as fine in sil-
houette as is the fa-
mous view from the
lower bay. Neither
influence of sordid in-
terest nor political
power has served to
make inroads on a zon-
ing law that was prop-
erly framed at the
outset. The monotony
that so strongly
marked certain sec-
tions of rapid develop-
ment is now giving
place to a diversity
that is beautiful. The
exhibition presents in all its phases the effect of a
correctly maintained zoning law and is an object
lesson of great value to every municipality in
the country.

* * *

Eighteen million automobiles were made in
this country during 1923—enough, it is said, to
give half of our population a ride at one time.

Many have claimed
that these figures por-
tend a lessening of the
ture spirit of home
life, and that the prev-
alence of the motor
car prevents the build-
ing of houses, large
and small. This may
or may not be true,
but it is not to be no-	ticed in this exhibi-
tion. There never has
been a more satisfac-
tory showing of the
suburban house of all
types from the unpre-
tentious home of the
average commuter to
the "estate" of the
man whose war profits
seek some permanent
investment. For ten
years the development
of our domestic archi-
tecture has been one
of steady and satis-
factory growth. The
artistic use of mate-
DETAIL OF WING

HOUSE OF CHARLES SMITHERS, WHITE PLAINS, N. Y.

DONN BARBER, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
materials is, for lack of a better simile, like the use of the palette colors by an artist painter. We use materials in this country with the finest sense of their possibilities. Houses as they are designed and planned today, undoubtedly have a strong influence on the mental development of those who live in them, and they are therefore clearly an index of a better culture and a finer sense of civic spirit.

It has taken the hard-headed business man a long time to learn that good architecture is a fluid commercial asset. In Shakespeare's time, good wine needed no bush, and in Emerson's, the mouse-trap man did not need to advertise. But today, if in the swirl of strong competition the manufacturer would find a market for his product, he must let the world see that it comes out of a building or a group of buildings that is up-to-date in plan and architectural design. The battle to secure from a one-time obdurate client an appropriation to insure certain aesthetic additions to a purely utilitarian design, has been won. The walls of this exhibition proclaim that fact.

The golf course architect is abroad in the land and as a result, there have been important developments of large tracts. These erstwhile barren fields are now transformed into undulating spaces, with their putting greens and hazards all placed to best advantage. Dominating the whole is the club house, a social center where members meet to find recreation and good health. It's a fine sign of our progression to note these strong tendencies toward a life out-of-doors whenever possible and it is gratifying to see that the surroundings are planned on lines of good architecture and pictorial composition.

The Avery prize awarded annually to sculptors under thirty years of age was given to Brenda Putnam for her fountain designed for a formal garden. Chester Beach's "Glint of the Sea," a bronze fountain with a central decoration of figure and dolphins, received the gold medal in sculpture. The Kensington Company received the gold medal for craftsmanship, partly for the excellence of its present exhibition and also for past general performances.

The Michael Friedsam prize awarded for conspicuous service to the cause of the industrial arts, went to Henri Creange of Cheney Brothers. Mr. Creange was honored principally for the fine work he has done in textiles and pottery.

The awards in architecture, landscape gardening and painting were this year withheld.

The opening ceremonies of this exhibition were, as usual, full of pageantry. The feature on this occasion was a review of the League's dramatic activities, entitled "The Passing Years." These were represented by a medieval masque, "The
HOUSE OF WILLIAM J. HAMILTON, FLUSHING, L. I., N. Y.
ROGER H. BULLARD, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
DETAIL OF MAIN ENTRANCE

HOUSE OF WILLIAM J. HAMILTON, FLUSHING, L. I., N. Y.

ROGER H. BULLARD, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
Festival of Fools," as of 1917; "David in the Lion's Den," a Babylonian masque, 1920; "The Princess Who Never Smiled," a Russian fairy tale, 1922; concluding with the Bendia Masques, representing 1919. Space does not permit a more extended review of this interesting feature, except to add that it was staged in a most artistic manner, produced with much skill as to stage management and reflected the utmost credit on those who had to do with its preparation.

The catalog this year, as in previous years, is a well prepared record of the best recent achievement in architecture and the allied arts. As reference volumes, these catalogs have large value and would make dignified additions to an architect's working library. We learn that there are a few copies available.

The work of the Jury of Selection and the Hanging Committee has been well carried forward. No exhibition of paintings has a more human appeal than has this exhibition of the League. There are no uninteresting spots, no mediocrity. As a means for good education in good architecture, the value of such a collection is very large. But, it seems that it might be well to say to exhibitors that it will not be possible for the League to maintain its high standards unless there is a perfect spirit of co-operation. The officers and members of the League give a very great amount of valuable time. This effort is absolutely unselfish. It should be acknowledged and appreciated and the way to show that is for exhibitors to contribute an effort proportionately as great as those who conduct these exhibitions.
WHAT the ARCHITECT THINKS of ZONING*

BY HARVEY W. CORBETT, President, The Architectural League of New York

THE growth of American cities has constantly exceeded the prediction of the most optimistic. People like to go where the crowds are. It may be that they find in the city greater opportunity, greater financial returns, or come into closer contact with recreation and amusement. It may be greater markets or a more abundant labor supply that attracts the manufacturer. In any event, the increase in urban over country population has become a marked feature in the economic life of this country. This steady increase in population has brought the larger American cities into a constant state of flux. Building operations unknown a generation ago house enormous numbers of people within a single structure. These great city buildings, with their large population of workers, may be compared to springs or reservoirs that feed the stream. The crowds upon the streets at the hours of going to work in the morning, at noon time and at the closing of business in the evening are determined by the volume of population poured into them from the great city buildings.

In our American cities we are in a peculiar position of those who have built canals first and completed the reservoirs which are to fill those canals with water. Our reservoirs have in many cases grown too large for our canals and the result is that they overflow and are congested with traffic whenever the tide of humanity is led into them.

Apart from the social and moral benefits that attend wise building regulation, there are certain architectural values and economic advantages that follow zoning regulations. Some of these are now beginning to be apparent in New York, where the results are closely watched and while in the case of others sufficient time has not yet elapsed to demonstrate fully the workings of the laws, yet there is much partial evidence from which inferences may be drawn.

The life of the average modern city building is not more than a generation. I think this span of life will be found to prevail in Philadelphia as in New York. There are very few of our modern buildings that are not liable to be pulled down to make way for more modern structures within thirty years, which is a long time in the rapid pace set by the metropolitan cities. The new buildings, conforming to the setback law, will produce an even cornice line. This cornice line, of course, will be higher along wide thoroughfares than in side streets, but will produce for the man in the street an architectural uniformity that does not exist today.

It is uniformity of height that in Paris smooths out the strongest architectural contrasts between adjoining buildings and brings about a harmony and beauty that blend the entire city into a single unified concept. But American cities operating under the zoning regulations possess a greater advantage. The buildings above the setback line will present every possible combination of cupola, spire and tower. In the case of New York City and of other cities now building for the future, there will be produced a skyline that will be even more impressive from a distance, as seen from New York harbor, for example, than the New York of today.

The limitations of the heights of buildings will have an important effect upon property values. The bulk of buildings is determined by land value. The land value reflects directly the possible return. Since in proportion to the ground space occupied, a low building will not return an income commen-

*Paper read before the Housing Conference held in Philadelphia, in December, 1925.
surate with that of an adjoining higher building, the result will be, in avenues of high property value and possessed of adequate transit, to force all buildings up to the line allowed by law, producing the uniform cornice line. The direct result of the uniformity will be to increase taxable values enormously for the number of highly valuable types of buildings will be greatly increased.

It is possible, however, that the increase in individual taxation may not be proportionate with the advance of taxable values, for the uniformity in building heights which the law will produce will tend to distribute the burden of taxation. Instead of a comparatively few towering structures, there will be hundreds of great buildings of uniform height and a similar amount of floor space for a given area of ground space.

This in turn will tend to equalize and distribute the volume of vehicular and pedestrian traffic which flows upon the streets. It will give a greater population per square mile of city with less crowding than at present. The developments, as always heretofore, will follow lines of transportation.

The skyscraper of the future will not be so lofty as the skyscraper of today, but will be more in harmony with the buildings next to it. There will be something beyond the plain street front to intrigue and fascinate the imagination. We look around about us; we look from side to side; we look down the length of the street, and we often have to "look out!" But we don't look up. The new type of city with its innumerable spires, towers, and domes, set back from the cornice line, will provide a fascinating vision, all the novelty and originality in the world brought under a larger scheme.

Thus I firmly believe that the present is the time to plan for city zoning. I think when the public realizes what it means in beauty, in improved types of buildings, in freedom from congestion, in advanced property values, they will, eagerly accept the new idea in city building and the younger generation will look forward to the planned city of the future as a great advance over the city that has, like Topsy, "just grewed."

The origin of the American city slums lies in the inequalities of city planning. Skyscrapers next to mean business blocks, palaces next to hovels, will be unknown under more rational city building. When the meaner buildings disappear under population pressure and zoning laws, many of the problems of housing sanitation and recreation will disappear.

GATEWAY TO GARDEN OF W. S. BENSON, PASSAIC, N. J.

JOHN F. JACKSON, ARCHITECT

Built of hollow tile, succeeded in a faint shade of pink. Coping of red roofing tile. Gateway coping of Indiana limestone. Ornamentals of polychrome terra cotta

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
AUTUMN

OVERDOOR PANEL IN ORIENTAL GALLERY OF CHAUNCEY McCORMICK, CHICAGO, ILL.
ANTHONY DE FRANCISCI, SCULPTOR—PHILIP L. GOODWIN, ARCHITECT

PAINTED DECORATION OF EAST END OF MAIN HALL OF BUILDING FOR THE
STANDARD OIL CO., NEW YORK
DESIGNED AND EXECUTED BY MACK, JENNEY & TYLER
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
EDITORIAL COMMENT

THE CONTROVERSY surrounding the election of Fellows at the last convention of The American Institute of Architects clearly disclosed that a group of five men could prevent the election of any candidate that for personal reasons they might seek to oppose. The high type of men that the Institute has selected for advancement to honorable rank should not be subjected to the risk of such small political methods. It, therefore, seems an act of simple justice so to amend the present by-laws that the election of Fellows shall be as logically conducted as is the election for membership.

It has been suggested, and the proposal is one that it is believed would be a great improvement, that the Jury of Fellows, composed largely of past presidents of the Institute, should, after a thorough canvas of the nominations forwarded by the chapters, certify their findings to the Board of Directors. The Board, composed of fourteen members, and as now organized regionally covering the entire country, would then vote on the candidate certified by the Jury, and a majority vote would elect. By this method the highest class of Fellowship would be assured, and that, of course, is the first purpose of the Institute.

With the adoption of a revised by-law along the lines above suggested, among the first duties of the Jury might be the consideration of the candidacy of men who have failed of election during the past two years.

* * *

THE DECISION TO HOLD the 1925 convention of The American Institute of Architects in New York City will certainly result in an epoch marking meeting. The outstanding feature will undoubtedly be the architectural exhibition. The opportunity offered and the ample time available for preparation should produce a result that will awaken the liveliest interest on the part of the general public.

Naturally, the plans at the present moment are largely nebulous, but it seems to be the fixed intention to combine with The Architectural League of New York and to secure representative exhibits from the architectural societies in the leading capitals of Europe. With every Chapter of the Institute sending its best, with The Architectural League at its best, and Europe sending every good thing available, an exhibition will be assured greater in volume and more important in every detail than has ever before been held anywhere. Here is an end worth working toward.

It is humiliating to be forced to acknowledge that in New York, the largest city of the United States, there is at present no Fine Arts building adequate to house a large and important exhibition such as is contemplated. The committee in charge of the 1925 exhibition will undoubtedly find an adequate place, but it will have to search among structures designed for purely commercial purposes. Such a condition is not perhaps altogether unfortunate, particularly if it locates the exhibition where it will attract the largest number of people and not repel, by a certain exclusiveness, that part of the public it is most desirable to reach. The present situation accent in the most forceful way the lack of civic pride in New York and emphasizes the necessity for propaganda that will arouse a demand for a Fine Arts building. If this sentiment has not crystallized in time to provide a building, there is a fine opportunity for the Institute and the League to energetically and to inaugurate a competition that would present the matter in graphic form to that class of people who must "be shown" and who are not easily moved by a plain statement of fact. Here the Society of Beaux-Arts Architects, who will no doubt participate in this 1925 exhibition, will find a chance to present in its Paris Prize Competition a problem based on an actual site and well understood conditions.

The great amount of work necessary to co-ordinate all the many details before this exhibition is assured will demand much time and the finest professional ability. The year ahead of it and the ability of those who will undertake this huge task, bespeak a splendid success.
BUSH HOUSE, LONDON

HELMLE & CORBETT, ARCHITECTS

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
THIRD CHURCH OF CHRIST SCIENTIST, PARK AVENUE, NEW YORK

DELANO & ALDRICH, ARCHITECTS

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
THIRD CHURCH OF CHRIST SCIENTIST, PARK AVENUE, NEW YORK
DELANO & ALDRICH, ARCHITECTS

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
THIRD CHURCH OF CHRIST SCIENTIST, PARK AVENUE, NEW YORK
DELANO & ALDRICH, ARCHITECTS
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
LIVING ROOM WINDOW, "GOODSTONE," MIDDLEBURG, VA.
GOODWIN, BULLARD & WOOLSEY, ARCHITECTS
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
GARDEN ELEVATION

HOUSE OF MISS ANNE MORGAN, SUTTON PLACE, NEW YORK

MOTT B. SCHMIDT, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
DETAIL OF DOORWAY, STREET ELEVATION

HOUSE OF MISS ANNE MORGAN, SUTTON PLACE, NEW YORK

MOTT B. SCHMIDT, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
DETAIL OF DOORWAY

HOUSE OF MRS. W. K. VANDERBILT, SUTTON PLACE, NEW YORK

MOTT B. SCHMIDT, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
INTERIOR ARCHITECTURE

Well designed and executed walnut table. The simple lines are relieved only by the acanthus leaves from which the twisted legs evolve and by a delicate inlay design which decorates the edge of the top.

EXHIBITION of INDUSTRIAL ART at the METROPOLITAN MUSEUM*

There are over nine hundred objects, specimens of work of American designers and manufacturers, shown in the annual exhibition of Industrial Art, which opened at the Metropolitan Museum of Art, New York City, on Monday, January 14. The purpose of the exhibition, as set forth by the Museum authorities, is to demonstrate the artistic progress of American manufactured goods during the year 1923, and it does this well. The quality of design and workmanship of the entire collection is to be commended. Furniture and rugs, textiles and wall papers, jewelry and silverware, and other goods, representing some forty industries, comprise a finely educational exhibition. It is interesting and worth while remembering when viewing the collection, that every product represents a stock pattern,—goods actually produced in quantity and carried in stock by the manufacturer,—and not mere special order work. As much credit must be given the Museum for fostering an exhibition of this kind as to the designers and manufacturers whose work made the exhibition possible and worth while.

The exhibition is strictly a manufacturer's exhibit and from his viewpoint is a huge success.

It is not, therefore, a criticism to call attention to a different method of hanging and arranging of the material, which would surely increase its interest and educational value to the layman and to the decorative trade as well. Of course, the size and proportions of the available space for an exhibition of this character in a museum are against real unity of scale. For instance, the effect of a chandelier hanging from a thirty-foot ceiling on a fifteen-foot chain, when it was designed to hang from a twelve-foot ceiling, with perhaps, fifteen inches of chain, cannot be good. Some sort of arrangement should be made to take care of this, or the chandelier should not be hung at all. It is also of the utmost importance in showing fabrics to point out their relative value in a scheme of decoration. The designs and colorings of the many fabrics and wall papers on view are of such a variety that the grouping of materials, according to their use in an actual scheme of decoration, could be easily and attractively done. While it need not be necessary to indicate the purpose for which each material is to be used, each group could have a fabric for the window drapes, the door hangings, and the different pieces of furniture coverings, as well as a wall paper and a rug. These materials could be of various designs,—some plain, some figured,—
of different textures,—some linens, some mohairs,—and all of colors entirely harmonious. The unity of scale in all designs used in a scheme could then be retained.

The furniture on exhibition is of the highest order, and represents the peak of good quality and design. The pieces are all of fine lines and proportions, and the high standards of workmanship may not be justly questioned. It is inter-

One of the beautiful mohair patterns which are conspicuous amongst the textiles exhibited. Whilst the design is purely modern in character, it shows the designer's familiarity with older styles

esting to note that, although this furniture collection represents the best specimens of design of the year 1923, every piece shows a decided period influence. This, too, is in no sense a criticism, for The American Architect maintains that the periods are the highest standards of good taste and proportion, and, in choosing them for inspiration, the modern designer has made no mistake. On the other hand, the designs cannot justly be said to show anything of very great originality. In the galleries the other day, an observer was heard to remark that a certain piece of furniture on view was a "beautiful reproduction." It is quite impossible that the authorities would allow of a reproduction under the rules of admission. Yet this shows the striking influence of the periods on the designs.

Wall paper design of decided Japanese feeling, a paper not so decided in character that it could not be used as a pleasing wall covering in almost any room. The colors are soft and their effect on a wall is like a delicate Oriental fabric

The textiles exhibited form one of the most interesting features of the collection. Modern methods of manufacture have advanced so far that looms can turn out practically anything the designer calls for,—a hearty indication that we are gradually but surely developing a better craftsman ship. Among the tapestries and brocades,

An artistic iron fire screen. The scroll design is good in line and proportion and the figures are well placed in relation to it. The chiseled-in lines give a modeled effect to the flat surface
there are some unusual designs and colorings. The wall papers are equally good. Judging from the designs shown, it is apparent that figured wall papers are coming into vogue again. The soft colorings and pleasing designs simulate an effect of

Armchair of William and Mary influence. The turnings and carving of the legs and stretcher are good in detail and the embroidered covering sets off the lines of the arms, seat and back to good advantage

fine fabrics. The rugs shown indicate the rapid advancement of the industry in this country both as to weave and pattern. Many so cleverly follow the Oriental methods as to deceive all except experts.

The Bulletin of the Metropolitan Museum of Art, discussing the influence which it is endeavoring to enact on the uplifting of industrial art, clearly states this matter. It says:

"This is not the occasion to offer a defense for mass production in the industrial arts. Whatever such factory methods may or may not do to design under present conditions, it is not our purpose to discuss or to prescribe for. It is an incontrovertible fact that quantity production is a democratic expedient for meeting the requirements of the mass, that it does now meet these requirements, and that, in the estimation of those who have most closely observed its method and results, it has consistently improved the design of its output. It is with the design of this output that the Museum is concerned. The appearance of an isolated example of craftsmanship must remain the concern of a limited number of fortunate persons who come in contact with it. The design of a repeat of curtain material can become something akin to a public nuisance. Many such designs issued at the same time may even constitute a conspiracy against public taste. Thus, although fully convinced that the craftsman should also have his opportunity to demonstrate his prowess in an exhibition of like proportions, the Museum feels that the producer of industrial art in quantity represents from an educational and inspirational point of view the more urgent problem."

From every angle, then, the exhibition is highly creditable to American manufacturers. In its arrangement, too, the object of the exhibition is attained. The suggestion made for different arranging is only to increase the value of the exhibition, where the unusual assembling of such a wonderful collection of allied industries under the same roof makes its further value possible.

Previous exhibitions of this nature sponsored by the Museum served the purpose of showing the use made of the Museum by the designers. That this is a well known fact is now conceded by all. The Museum has on its staff members who are especially delegated to assist industrial workers and designers. Manufacturers are more and more realizing the value of the art quality in their product. The design, the one place where this art quality stands out conspicuously, must be the best obtainable. The high standard, which the designs of the various industries represented have reached, is in no small way accredited to the Museum and its staff. Other museums scattered over the country should take cognizance of this fact. They have the material, but perhaps they have not encouraged designers to make the same use of it as has the Metropolitan. Let the exhibiting of industrial art become nationwide, thus effecting better designs and a better market!
AN interesting feature of this year's exhibition of The Architectural League of New York is the large space set aside for photographs and illustrations of architectural interiors. There is no doubt of the increased appeal of an interior design when based on architectural principles and the many interiors fashioned on these lines shown in the exhibition prove that this feeling is becoming better understood by both clients and architects. The general style of most of the interiors exhibited bear out an earlier statement made by this department that the modern American style of interior architecture in its best form is featured by simple formality and comfort. Periods are not now in vogue except for inspirational purposes, and informality is entirely discarded. But a well balanced architectural arrangement of wall treatment, decorations and furniture is always conspicuous.

While it is impossible to suggest any other way in which to show complete interiors except in the manner which is there used, by photographs,—a little more of the actual working out of the various details which are involved in real architectural language could not be out of place and would be most instructive. Rough studies, finished renderings and even full size details of this phase of architectural designing would impart an educational value to the exhibition which cannot be attained by photographs. The proof of the interest which this kind of drawings would arouse can be judged by that shown in the sketches and renderings of certain exterior work. For instance, the studies in black and white of different phases of the application of the zoning system are probably as much observed and discussed as anything in the exhibition.

That part of the exhibition devoted to mural art bears out further the truth of these statements. There is assembled a group of mural decorations by representative artists, some sketches in black and white, some scale drawings with color.

GROUP OF SPANISH FURNITURE DESIGNED AND MADE BY KENSINGTON MFG. CO.

The present revival of interest in the Spanish style of design is well met by these tables and chairs which bear marked characteristics of that interesting period.
suggestions, some full size panels in complete color, in other words, all the phases of execution, and together they make a valuable part of the exhibition. There are also some fine specimens of work of students of the American Academy in Rome, of which a Pompeian fresco in color is conspicuous. For the student of mural painting, especially, this interesting portion of the exhibition is highly instructive. Could not the other branches of the architect’s field be put forth this way?

In considering the

character of the material which manufacturers and craftsmen have sent to the League exhibition, it seems that the generosity of the League in giving up space and doing everything possible to provide an opportunity for their products has not been properly availed of. The attempt to show the progress of the manufactured goods is not very successful, and the few odd pieces of furniture and wrought iron work but touch the rim of what might have been accomplished. While all the material is good,—else it could not have
passed the Jury of Selection,—it certainly is not as comprehensive nor as important as in earlier years. Manufacturers should understand that these exhibitions afford an unusual opportunity and should show better appreciation of the efforts of the League to promote their interests.

The interest in rendering of architectural designs, which has already been suggested, is a subject to which too little attention is given. To be able to design and attractively render those designs does not befall the lot of even the best architects, but when it does it is readily discernible. A rough perspective sketch rendered by the designer will convey more than an accurate perspective drawing, done in full color, made by another. Education of architectural students to appreciate this fact is most necessary. No better place could be found to demonstrate the art of architectural rendering, to students and the general public as well, than here at the League exhibition. For ideas, suggestions and inspiration, photographs serve their purpose, by showing accurate results and records of work accomplished. But the sketch on paper must clinch the job, before any photographs can be made. And the client,—an amateur, a layman,—must decide from the sketch. It must tell an architectural story in architectural language which the layman can understand. He does not understand details, but he does understand effect. All eyes are trained to grasp effect, but only professional eyes can see detail. This is the type of pieces that are looked for at an exhibition of this kind. The few that are there are proving their value. The finished photograph alongside the rough sketch gives an opportunity for studying how the sketch is made, what to show and what to eliminate, and how to show it.
The LAW as to ARCHITECTURE

BY CLINTON H. BLAKE, Jr., of the New York Bar

SOMETIMES the architect will agree with a client, either by a definite written agreement or verbally, that the plans are to be satisfactory to the client and that, whatever changes are necessary to make them conform to the wishes of the client, will be made and are included in the architect's services. This is a particularly dangerous proceeding. Unfortunately, also, the chances are that it will be adopted by the architect in the case of work involving a considerable amount of money, as it is in just such a case that he is anxious to secure the job and to give to the client such assurance as may be necessary to enable him to do so.

Where a client is reasonable and fair-minded, and is not inclined to take any advantage of the architect, the latter will probably suffer no ill effects from having entered into an agreement of this kind. If, however, the client is either inclined to sharp practice or of the arbitrary and unreasonable type, the architect will have reason to regret having, in effect, placed himself in the client's hands by agreeing that he will perform whatever services are required to meet the latter's wishes. The architect would much better not secure the job than to proceed with it and be called upon to prepare set after set of studies and plans, without receiving adequate compensation for his work. Not only will his fee be jeopardized under a provision such as that referred to, but, if he refuses to make the changes and additional plans called for by the client, unless he is paid an additional fee, he will face the claim by the client that he has been guilty of a breach of the contract, and that he must respond in damages to the client as well as forfeit any fee for the work done.

It must be remembered always, that, where a contract is entered into, the architect and the client alike are bound by its terms. The architect cannot have his choice of proceeding under the contract or under quantum meruit for the reasonable value of the work done. The contract will control and be decisive. If the contract provides that the architect's services are to include the changing of the plans until the client is satisfied, it will be enforced in accordance with that provision and, unless and until the client is satisfied, the architect will be forced to continue to make changes and incur additional expense thereby, unless it can be shown that the client is acting in bad faith. Under certain conditions, the number of the different sets of plans might be limited by legal implication to a reasonable number, but in any event, all profit to the architect would be wiped out by being forced to make repeated changes. If the architect does undertake any work under an agreement of this character, he should realize the danger which he faces and at the least confine his agreement to preliminary studies and not extend it to matters of plans, details and specifications.

Even assuming that, after the client has demanded various new sets of sketches or plans, the architect refuses to make more, claiming that the client is acting capriciously, and is sustained by the court under the facts in the case in this contention, it will be difficult, if not impossible, for him to recover his compensation for the work which he has done, if the contract is so worded that the architect is thereby bound to furnish plans which are satisfactory to the client.

As a matter of fact, the safe procedure is just the converse of that which we have been discussing. The architect, where new sketches or plans are prepared, should be entitled to receive the reasonable value of his additional services and, if those services involve the change to a different scheme, rather than simply modifications of the scheme first submitted, and the preparation, in effect, of entirely new plans, he should be entitled to payment for the second set of plans on the same basis as the payment accorded him on the plans originally prepared. This applies equally to plans and preliminary studies, and should be covered by the contract, where this is practicable. If it is not covered by the contract in this way, the contract should at the least provide that the architect is to receive the reasonable value of extra services made necessary by changes in the studies and plans. Where this is done, the question of reasonable value will be one to be determined upon all the facts in the case. The important thing is that the architect should not allow the prospective profit of an important job to blind him to the danger of placing matters entirely in the hands of the client and in effect agreeing to make as many plans as the whims of the client may call for. No job, however important it may be, warrants the taking of any such risk. The more important the work is, the more expense the architect will be put to for changes and for the redrafting of sketches and plans, where the client insists on holding the architect to the letter of his agreement.
LEGAL DECISIONS

A CONTRACT for the installation of plumbing in a public school building provided that the city might, in case of default of the contractor, take over the work and use the materials and equipment at the site. The contractor, to secure the bonding company against loss, had assigned to it all of its equipment. The contractor went into bankruptcy. On an action to determine whether the trustee or receiver for the bankrupt was entitled to this material and equipment, or whether the city might hold them, it was held: That the provision in the contract relative to the taking over of the equipment by the city gave the city and the bonding company against loss, had assigned to it the equipment in question which neither one of them was entitled to the possession of the equipment, and that neither one of them was entitled to the equipment as against the creditors of the contractor for the reason that the contract and assignment had not been filed as chattel mortgages, as required by the New York Lien Law. That in addition, there was no valid pledge to the city or the bonding company of the equipment in question which either of them might enforce, because there had been no delivery of possession of the equipment, and until and unless the city took over the materials at the site they must be deemed to be in the possession of the contractor, and the contractor might recover them or its creditors levy execution upon them.


THE general contractors of a building in Cleveland were required to complete the performance of the work within a specified time. They let a sub-contract for the installation of metal doors in the building, providing that the work should be completed by October 1. The general contractor was unavoidably delayed and the building was not far enough advanced in its construction for the doors to be installed at the time fixed for the completion of that work. The representatives of the plaintiff and the sub-contractor for installing the doors, consulted with the general contractor, the defendant, as to details of the sub-contract which plaintiff had undertaken, and these representatives secured in this way information and knowledge as to the progress of defendant's work. The sub-contractor attempted to rescind its contract, and the defendant, the general contractor, opposed its right so to do. The court held: That if time were of the essence of plaintiff's sub-contract to install the metal doors and the defendant did not have the building ready for the installation of the doors at the time fixed for the completion of the sub-contract, plaintiff would have had the right to cancel the contract at the expiration of that date. The court held, however, that in the case in question, time was not of the essence of the contract, inasmuch as it did not in terms so provide; that the fact that the general contractor was unavoidably delayed did not, as a matter of law, warrant the sub-contractor under these conditions in canceling its contract; that the knowledge acquired by the representatives of the plaintiff from the defendant as to the progress of defendant's work should be considered the knowledge of the plaintiff; that whether the delay of the general contractor is completing the building to such a point as would allow the sub-contractor to install the metal doors in accordance with his contract was so unreasonable as to warrant the sub-contractor in canceling its contract was a question for the determination of the jury; that whether plaintiff had waived, or by its conduct was estopped from urging, the failure of the defendant to permit the plaintiff to perform its sub-contract, was similarly a question for the jury.


A BUILDING contract provided that in the case of default on the part of the contractor the owner might retain and use all materials brought on the ground by the contractor. The contractor went into bankruptcy, and the question was raised whether the foregoing contract provisions would apply to materials not owned by the contractor in existence at the time the contract was made. The court held: That they would not and that the provisions of the contract were not enforceable against the trustee in bankruptcy as to materials not owned or existing at the time the contract was entered into; that mortgages or contracts pledging subsequently acquired property, while void at law, will be enforced in equity as agreements to give liens as between mortgagee and mortgagee and as against purchasers with notice, but will not be enforced against creditors.

In re Midtown Contracting Co., 283 Fed. 871.

A CONTRACT required the owner to furnish a statement of defects. It was claimed that such a provision required him in addition to furnish directions as to the steps to be taken to remedy the defects. The court held: That the requirements to furnish a statement of the defects did not carry with it any requirement to direct what steps should be taken to remedy the faults complained of and that the owner was under no such obligation.

Lumber Co. vs. Amigo, 183 Penn., 439.
BUILDING FOR AMERICAN PIANO CO., WEST 57TH STREET, NEW YORK
CROSS & CROSS, ARCHITECTS

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
MAIN ENTRANCE. Y. M. C. A. BUILDING, PASSAIC, N. J.

JOHN F. JACKSON, ARCHITECT

Building contains gymnasium 50'x80', swimming pool 20'x60', home rooms for men and boys, educational classes, banquet rooms, cafeteria and 100 bedrooms

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
TOWER AND PARLOR WING, THE FIRST BAPTIST CHURCH, JAMAICA, L. I., N. Y.

JOSEPH HUDNUT, ARCHITECT—W. E. MANHART, ASSOCIATE

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
DETAIL OF GARDEN FRONT

HOUSE OF FRANK A. HOLBY, BEECHMONT, NEW ROCHELLE, N. Y.

W. WHITEHILL, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
COTTAGE ENTRANCE, FARM BUILDINGS, SYOSSET, L. I., N. Y.

PHILIP L. GOODWIN, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
CLUB HOUSE, OAKLAND GOLF CLUB, BAYSIDE, L. I., N. Y.

ROGER H. BULLARD, ARCHITECT

The low roof lines are accentuated to carry out the character of a dwelling. The choice of material from stone to shingles is consistently handled.

(The seventh Annual Exhibition, The Architectural League of New York)
THE OAKLAND GOLF CLUB
Bayside, Long Island

ROGER H. BULLARD, ARCHITECT

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
ARCHITECTURAL ENGINEERING

AIR LEAKAGE THROUGH the OPENINGS in BUILDINGS*

BY F. C. HOUGHTEN† AND C. C. SCHRADER‡

HEAT is lost from buildings in two ways:

First, by transmission and second, by infiltration. Both sources of heat loss are

of vital concern to the heating and ventilating engineer, the architect and the owner. Both are
difficult of exact measurement and determination of constants which may be used in practice
with the desired engineering accuracy. As a

result, the calculation of heat loss from

buildings probably involves a greater ele­

ment of chance than any other engineering

problem.

Heat loss by trans­

mission was one of the

first problems to re­

ceive the attention of

the Research Labora­

tory. Total heat loss

by infiltration for a

room as a unit has also

received considerable

attention. (Journal

American Society of

Heating and Ventilating Engineers, January and

September, 1921.) In January, 1916, a paper on Window Leakage by Stephen F. Voorhees

and Henry C. Meyer, Jr., was presented at the

Annual Meeting of this Society (Transactions,


The great need for information regarding in­

filtration led to the present investigation of the

leakage of air through and around all types of

windows and doors by the Research Laboratory

of the American Society of Heating and Venti­
lating Engineers, in co-operation with The Amer­

ican Institute of Architects and the U. S. Bureau

of Mines. The architect is interested in the rela­
tive leakage of air through various types of win­
dows and doors, with and without weatherstripping, in order that he may design a building with the

lowest heat loss consistent with other con­

siderations. The heating engineer needs to know

the actual leakage through and around all types

and sizes of windows and doors, or better, through

a unit length of crack around such openings, in

order more accurately to calculate the heat loss

from any room or building and supply radiation

accordingly.

This report deals with the method employed in

the investigation of

and results obtained

for double hung win­

dows, 2 ft. 8 in. x 5 ft.

2 in. x 1 3/8 in., in a

13 in. brick wall, plas­
tered on the inside

with cement plaster.

Results are given for

the leakage through

such a window without

weatherstripping, with

two types of weather­

stripping, around the

frame, and through

the brick wall itself.

Leakage of air

through cracks around

windows and doors, cracks in walls, and through

the porous materials of which walls are made,
takes place in accordance with two physical laws.

First, there is an interchange of air through the

wall by diffusion; second, there may be a cur­
rent of air through the wall caused by a pres­
sure difference set up by the impinging wind.

The first goes on at all times, is independent of

wind velocity, and is probably negligible. The

second takes place only when there is a pressure

difference between the two sides of the wall. Such

a pressure difference exists whenever the wind

blows against the surface of the wall or whenever

the direction of the wind toward the wall is

changed. For any given velocity of wind strik­
ing the wall at right angles, there is always a

definite pressure produced at the surface which

tends to cause leakage of air through cracks. The

amount of air leakage for any crack for a given

pressure difference is the same regardless of

whether this pressure is produced by wind or some

other cause.

*Copyright, 1924, American Society of Heating and Ventilating

Engineers and reprinted by permission.

†Research Head, A.S.H.& V.E. Laboratory.

‡U. S. Bureau of Mines.
Uniform air velocities over a large area for a long period of time are hard to produce and difficult to duplicate. It is much easier to produce and duplicate pressure differences on the two sides of a window by means of a blower. It was, therefore, decided that for this investigation the apparatus should be so designed that a blower could be used to produce a pressure drop through the test window built in a section of wall.

**APPARATUS**

After carefully considering all phases of the problem, the apparatus shown in Fig. 2 was designed by and built under the direction of the Research Laboratory. In many respects it is similar to the apparatus used by Voorhees and Meyer in the work previously mentioned. The apparatus is built of 18 gauge galvanized iron, and consists of a pressure chamber A and an air collecting chamber B separated by a section of wall including the particular window or door to be tested. Air pressure is produced in the first chamber by means of a motor-driven blower, and the volume of air passing through the wall is measured by the orifice box C. The test wall, 10 ft. high x 6 ft. 6 in. wide, is built in the collecting chamber section flush with its outer edge and the pressure chamber section of the apparatus bolted on later. The desired pressure is produced in A by varying the inlet of the blower, and by means of a butterfly damper and relief slide in the connection between the blower and A. Chamber A is substantially air-tight, although the requirements of the investigation do not demand that it be absolutely so. A door, 4 ft. x 1 ft. 6 in., allows entrance into this chamber to make any changes in the opening under study. The present blower has a capacity of 1100 cu. ft. per min., at 5 in. water pressure. Chamber B must be air-tight so that all air passing through the test wall must pass through the orifice box used for measuring its volume. Every precaution including soldering and painting the joints, was taken to make this part of the apparatus tight. Tests which will be described later in the report show that this condition was practically obtained.

The orifice box is one used by the Bureau of Mines for measuring the flow of steam and air in connection with boiler tests. The box is cylindrical in shape, 24 in. in diameter, with the orifice plates in the end. Orifice plates with openings varying from \( \frac{3}{4} \) in. to 5 in. in diameter were made so that they were easily interchangeable. These were carefully turned out in the instrument shop of the Bureau of Mines in accordance with R. J. Durley's specifications. The law of the air flow through orifices has been well established by Durley *(A.S.M.E. Transactions, Vol. 27, p. 1913)* and others, and is given by the equation:

\[
Q = 1096.5 \left( \frac{A}{p} \right)^{1/4} C \sqrt{w}
\]

where:
- \( Q \) = quantity of air, cu. ft. per min.
- \( A \) = area of orifice in sq. ft.
- \( p \) = pressure head in inches of water causing flow through the orifice
- \( w \) = weight of air in pounds per cu. ft.
- \( C \) = coefficient of discharge.

The coefficient of discharge used is 0.6 because it approaches this value at the pressures obtained for all the orifices used.

The pressure drop through the orifice which in this case is the difference between the pressure in the orifice box and the atmosphere, was measured by a Wahlen gauge accurate to 0.0001 in. of water. This gauge was developed at the University of Illinois and is fully described by A. C. Willard in the University of Illinois Engineering Experiment Station Bulletin 112.

While the accuracy of the orifice method of measuring air flow is well accepted by those familiar with its use, it was thought desirable to compare it with some other method. The orifices in the box as used in the tests were compared with a dry gas meter used as a standard in the meter testing laboratory of the Equitable Gas Co., Pittsburgh. These tests showed that the results for the orifices using the equation given above were more consistent than those for the gas meter with which it was compared. As a further check of the relative readings of the various sized orifices they were compared with each other and with duplicate orifices by placing a second orifice in the window opening in the test wall in series with the box. This was done when the total leakage through the wall was reduced to a negligible but known value.

The pressure drop through the test wall was measured by an inclined U-tube gauge of a par-
particularly accurate type designed and built by the Bureau of Mines. It was compared with the Wahlen gauge and found to be accurate to 0.003 in. of water. The two legs of this gauge are connected by rubber tubing to chambers \( A \) and \( B \).

A test of any particular window was made by regulating the blower pressure so as to give the desired pressure drop through the window indicated by the differential gauge. The size of the orifice chosen for any test was such as to give a pressure in the orifice box of from 0.3 to 0.7 in. of water. When these conditions were maintained for a sufficient time to insure equilibrium, the two pressure gauges were read simultaneously. By repeating the tests for a large number of pressure differences through the window, data was obtained for plotting a curve giving leakage through the wall in cu. ft. per min. against pressure differences in inches of water or wind velocity. All velocities and volumes given are for air weighing 0.07488 lb. per cu. ft. corresponding to air having a barometric pressure of 29.92 in. of mercury, a dry bulb temperature of 68 deg. fahr. and 50 per cent relative humidity. Many tests in such a series were repeated after opening and closing the window and also after taking the sash out of the frame and replacing them.

**Data and Results**

The results given in this paper are for a double hung window, 2 ft. 8 in. x 5 ft. 2 in. x 1 3/6 in. in a 13 in. brick wall plastered on the inside with cement plaster. The brick wall was built, the plastering was done and the window hung by mechanics in the employ of large contracting firms in the city of Pittsburgh. The work was done according to specifications supplied by and under the direction of S. F. Heckert, representing the Structural Service Committee of The American Institute of Architects. All changes in the window, such as hanging new sash and applying weatherstripping, were made also by mechanics under his direction. Every precaution was taken to make the wall and window represent work done by the ordinary contractor under the supervision of an architect. The sash and frame were given three coats of paint. Fig. 3 is a vertical section through the unweatherstripped win-

![Diagram of window sections](image_url)
PRELIMINARY TESTS

Preliminary tests were made in order to study the working of the apparatus itself and in order to differentiate between the various channels of leakage through the window and wall. Leakage through the window may be divided into the following parts. First, that which passes through the cracks, around the sash perimeter which are subject to weatherstrip application; second, that which passes through the cracks between the from and the brick and can be eliminated by calking under the staff bead or brick mold. This may be called the frame leakage. Third, leakage through other cracks in the frame or sash which cannot be eliminated by either weatherstripping or calking and may be called the "elsewhere" leakage.

Before making the first series of tests, the joint between the brick and the chamber wall was calked so that all leakage would take place through the wall or window. In all other respects, the wall and window were in the condition in which they were left by the mechanics, the sash having been fitted as tightly as would allow free sliding, though probably more tightly than would be allowable in actual construction because of swelling in rainy or damp weather. The window was left un­locked. A large number of tests were made with various pressure drops through the wall, many of them being duplicated several times after opening and closing the window, in order to determine the variation due to the way in which the window was closed. No care was taken to close the window in any particular way other than to see that the lower sash was pushed down against the sill and the upper sash raised until the meeting rails were even. Curve 1, Fig. 6, shows the leakage for this condition for various pressures or wind velocities. The shape of the curve is characteristic of all curves obtained with the various conditions of the window and, as would be expected, shows the same characteristics as the curve for the flow of air through an orifice. For a pressure difference of 0.1 in. of water through the wall corresponding to a wind velocity against the wall of 14.4 miles per hr., 42 cu. ft. of air per min. passed through the window and wall. With a pressure drop through the wall of 1 in. of water, corresponding to a 45.5 mile wind velocity, 174 cu. ft. per min. passed through.

The second series of tests was made under the same conditions as the first series excepting that the window was locked. Curve 2 shows the leakage for various wind velocities for the locked window. Locking caused a reduction in leakage of 20 cu. ft. per min. with a 14.4 mile wind and 64 cu. ft. per min. with a 45.5 mile wind. The third series of tests was made with the cracks around the sash perimeter, which are subject to weatherstrip application, sealed with a rubberized adhesive tape. This tape was tested and found to be as effective as a plastic calking compound and was more easily and quickly applied and removed. The leakage for this series of tests is given in Curve 3, and the difference between this Curve and Curve 1 or 2 indicates the maximum possible reduction in leakage by a perfect weatherstrip.

Before making the next series of tests the staff bead, or brick mold, was removed and the crack between the frame and the brick wall calked. The brick mold was then replaced. Calking was also applied between the frame sill and the brick. The leakage for this condition is given in Curve 4 and the difference between Curve 4 and Curve 3 gives the leakage between the frame and the wall, commonly called the frame leakage.

In order to determine the elsewhere leakage, a sheet of galvanized iron was fastened by screws over the entire frame and the edges were sealed with calking compound. The leakage for this condition is given in Curve 5. The difference between Curve 4 and Curve 5 is the leakage stopped by the galvanized iron and is the elsewhere leakage.

Curve 5 shows a considerable leakage which does not go through the window opening but through the brick wall and the plaster. To prove that this leakage was really through the brick wall, the wall was painted one coat with asphaltum
paint and another series of tests made. The result of this series is shown in Curve 6. The difference between Curves 5 and 6 represents the leakage stopped by one coat of paint. The wall was then thoroughly inspected and any visible cracks in the mortar closed with calking compound and given second and third coats of paint after each of which additional series of tests were made resulting in Curves 7 and 8, respectively. These curves show the reduction in leakage through the wall by each coat of paint. Another coat of paint was applied later and the leakage through the wall was further reduced to one-half of that shown in Curve 8. The total leakage through the entire wall had been reduced by the various processes from 4.5 cu. ft. per min. to 0.2 cu. ft. per min. for a 14.4 mile wind, and from 28 cu. ft. per min. to 0.8 cu. ft. per min. for a 45.4 mile wind. No doubt further painting would have reduced the leakage still more, but that shown by Curve 8 was so small that it was considered negligible.

With the leakage through the window and wall reduced to a minimum, some special tests were made in order to determine the magnitude of any leakage which might occur from chamber B. The leakage through the wall and window as indicated by the orifice reading is too small by the amount of the leakage from chamber B. While every precaution was taken to eliminate this leakage, it was not possible to do so entirely. However, as shown by the following tests, it was negligible.

When the leakage through the wall as shown by the orifice reading was reduced to a minimum, a pressure drop of 1.5 in. of water through the wall, gave a pressure difference of 0.066 in. between the second chamber or orifice box and the atmosphere when a ½ in. orifice was used. That is, 1.41 cu. ft. per min. passing through the orifice and an unknown amount which we will call \( x \) was leaking from the second chamber. The leakage through the wall was then \( 1.41 + x \) cu. ft. per min. We wish to determine the value of \( x \) for all pressures. Since \( x \) cu. ft. per min. were passing through minute openings with an orifice pressure \( p \), \( x \) is given by the orifice formula as:

\[
x = 1096.5 \frac{C}{A} \sqrt{\frac{P}{W}}
\]

where the various symbols have the same significance but probably not the same values as given in equation (1). \( A \) and \( C \) are not known but are constant for the same conditions and \( w \) is also constant; \( A \) and \( w \) can therefore be included with the numerical constant 1096.5 as \( K \). Our equation then becomes,

\[
x = K \sqrt{\frac{P}{W}}
\]

The orifice was eliminated by using a plate without a hole and the leakage through the wall became equal to that from the second chamber. The pressure drops observed through the wall, and

![Fig. 8. RESULTS OF TESTS ON WINDOW WITH 1/16"
CRACK AROUND PERIMETER](image-url)
between the second chamber and atmosphere were 0.045 in. and 0.701 in. respectively; therefore,

\[ y = K, \quad 0.045 = x = K \cdot 0.701 \]  

Solving equations (5) and (6) simultaneously gives \( K = 0.308 \) and the leakage from the second chamber for all pressures becomes,

\[ Q = 0.308 \sqrt{p} \]  

This gives a leakage from the second chamber of 0.258 cu. ft. per min. for an orifice pressure of 0.7 in. of water, the maximum used in the tests. This leakage is entirely negligible in comparison with the results obtained.

**FIG. 9. RESULTS OF TESTS ON WINDOW WITH 1/8" CRACK AROUND PERIMETER**

When the galvanized plate was removed and also when the tape was removed from the sash perimeter cracks, tests were made in order to check the decrease in leakage resulting from their application. The caulking around the frame and the paint on the wall were not removed after having been applied, so that the curves in all figures after Fig. 6 do not include the frame and wall leakage, and show only the leakage through the window.

**TESTS ON WINDOWS WITH AND WITHOUT WEATHERSTRIPPING**

After completing the preliminary series of tests, a large number of tests were made with a number of sash with and without weatherstriping and with various width of crack around the sash perimeter. As was mentioned before the preliminary tests were made with a sash too light for practical purposes. Tests were made with cracks of \( \frac{1}{16}, \frac{1}{8}, \frac{1}{4} \) and \( \frac{3}{16} \) in. on both sides, top and bottom of the sash, without weatherstriping and with two types of weatherstriping. The size of the crack was increased to approximate

the condition of windows that become loose, as is found in old buildings.

In these tests the sash were often changed and at least two different sash were fitted and tested for each condition. Figs. 4 and 5 show vertical sections of the window with the two types of weatherstriping together with horizontal sections through one side of the sash and frame, and also detailed sections of the various weatherstriped cracks.

The curves in Fig. 7 show the variation in data obtained for different windows fitted in the same way, for the same sash removed and replaced several times; also the leakage for tight windows and the effect of sealing the pulley holes. The five curves for the unlocked window with \( \frac{1}{16} \) in. crack show the variation which can be obtained for the same window under different conditions and for a second window fitted as nearly the same as could be done by a carpenter. The greatest variation from the mean of the five series of tests is about four per cent. The variation in the leakage of the same window locked shows the effect that locking may have. The main effect of locking is on the leakage through the meeting rail crack. The lock on the sash giving the three solid line curves was put on by the carpenter in the usual manner. The lock on the sash giving the curve with the short dashes was put on by a member of the laboratory staff in such a manner as to draw the meeting rails together as tightly as possible. The locks on the weatherstriped windows were put on by the carpenter. Locking caused no reduction in leakage for these windows.

The tight window was fitted so as to allow opening without great difficulty. The very tight window required considerable effort in opening.
In the tests for elsewhere leakage the cracks around the upper sash were sealed on the inside because the weatherstripping was put on the inward side of the pulley holes and thus would not reduce the leakage through these holes. The cracks around the lower sash were sealed on the outside because the weatherstripping was applied near this side of the sash. A series of tests was made in order to determine the percentage of the elsewhere leakage which passed through the outer pulley holes into the weight box and out through the inner holes or through cracks in the frame. Curves in Fig. 7 show that more than half of the elsewhere leakage occurred through these holes.

Figs. 8 to 11 give the results for the various sized cracks without weatherstripping, with two types of weatherstripping, and with 100 per cent weatherstripping, that is, with the cracks subject to weatherstripping application sealed up thus allowing only the elsewhere leakage. In each case the curve given is the average of several tests.

The curve for the unlocked window with the ¼ in. crack as obtained from the test data shows less leakage than the same condition with smaller cracks. While this is contrary to what might be expected it can be explained and corrected as outlined in the following paragraphs.

In testing the windows without weatherstripping, the lower sash was pushed down against the sill and the upper sash raised until the meeting rails were even. Because of the construction of the meeting rails, raising the upper sash beyond this point would reduce the crack between them. With the ¼ in. crack and the meeting rails even, it was found that the upper sash would just come up to the edge of the outside stop on the head frame. This stop extended ½ in. from the frame. Also, if the sash were not planed off parallel to the head stop, there would be a visible crack. In order to get a test, the conditions of which would compare with the conditions of the preceding tests, the upper sash was raised until it was above the edge of the head stop. By doing this, the crack between the meeting rails was decreased and the resultant leakage was less than that for the smaller cracks. In order to correct for this decrease, a series of tests was made with the crack between the meeting rails sealed. The results of this series are shown in Fig. 11. Curve 2 shows the leakage with the crack between the meeting rails not sealed and Curve 3 the leakage with the same crack scaled. The windows with the ¼ in., ½ in., and ¾ in. cracks were then tested with this crack scaled to determine the leakage between the meeting rails with the members even. The leakage thus found, subtracted from that found without this crack scaled, represents the leakage through it. This proved to be much greater than that found in the tests on the window with ¼ in. crack with the meeting rails uneven. Also it was found to be practically the same for all three windows. An average was taken and the leakage for the window with ¾ in. crack corrected accordingly.

Curve 1, Fig. 11, shows the corrected values. The difference between Curves 1 and 2, Fig. 8, shows the leakage between the meeting rails for the window with ¼ in. crack. These tests also showed that the leakage for all the windows with the crack between the meeting rails sealed was practically the same.

An examination of the curves for a plain window with different size cracks shows only a small variation for the three smaller ones. Various factors must be taken into consideration to account for this. The thickness of the sash is 13/8 in. and it slides in a 15/8 in. groove. If the sash were held in the middle of this space between the stops there would be a crack 3/16 in. wide on either side. In this position the smallest crack closed to the edge of the sash through which air must pass is a maximum. The moment the wind strikes the window it tends to move it against the inside stops, thus increasing the crack on the outside but decreasing the crack on the inside. Since leakage depends largely upon the minimum width of crack around the sash perimeter, it is limited by the tightness with which the sash is forced against the stops. Increasing the width of crack around the edge of the window does not increase the minimum crack width and hence the leakage is not increased measurably.

When weatherstripping is used the window is held in the middle of the groove. The cracks between the members are so much smaller in comparison with the unweatherstripped window that a small variation in this crack will cause a measurable variation in the leakage. The curves
for the weatherstripped windows show a corresponding increase with size of crack.

Tables 1 and 2 contain data taken from the curves Figs. 6 to 11 or resulting therefrom. Table 1 gives the leakage in cubic feet per minute for the whole window and per linear foot to crack, for wind velocities of 14.4 and 24.9 mile per hour. It is of interest to note that for a plain window with crack varying from \( \frac{1}{16} \) in. to \( \frac{3}{4} \) in. the leakage is 46 cu. ft. per min., while for the two types of weatherstripping tested it varies from 9 to 18 and 7 to 10 cu. ft. per min. respectively. The heat loss is given for two temperature differences. The heat loss for any temperature difference varies directly as the leakage. The radiation required to supply this heat loss is given for the higher temperature difference only, since it must be supplied for the maximum condition. With a 14.4 mile wind based upon the above temperature difference the unweatherstripped windows with cracks varying from \( \frac{1}{16} \) in. required 14.6 sq. ft. of radiation, while the same windows with the two types of weatherstripping require only from 2.8 to 5.7 and 2.2 to 3.2 sq. ft. respectively. Basing the cost of radiation on $2.00 per sq. ft. installed, the two types of weatherstripping will show a resulting decrease in first cost of radiation of about $18.00 and $23.00 per window respectively. The further saving in coal per year based upon a seven month heating season with an average temperature difference of 35 deg. is also given.

Table 2 gives the elsewhere, wall, and frame leakage, and also the leakage through the window with and without weatherstripping for various wind velocities.

Perhaps the most surprising fact brought out by this table, if not by the whole investigation, is the leakage per square foot of wall. With a 15 mile wind each square foot of the 13 in. wall, plastered on the inside, allowed the passage of 0.111 cu. ft. of air per min., while the leakage through the window and frame for the same wind velocity was 47.5, 9.7, and 7.8 cu. ft. per min. for the plain window and two types of weatherstripping respectively. The area of the window and frame is 16.25 sq. ft. giving a leakage of 2.82, 0.597 and 0.48 cu. ft. per min. per sq. ft. of window without and with the two types of weatherstripping. Based upon these figures the leakage through the window and frame varies from 4 to 28 times that through the same area of wall. When we take into consideration the usual greater area of wall to window, it is evident that the leakage into a room is usually
greater through the wall than through the win-
dow if weatherstripped, and not many times less
if not weatherstripped. It is of interest to com-
pare the heat loss through windows and walls by
transmission and by leakage. The leakage for
the plain window and with two types of weather-
stripping all for % in. crack and a 15 mile wind
is 47.3, 3.7, and 7.8 cu. ft. per min. respectively,
representing a heat loss of 2580, 527, and 423
B.t.u. per hr. respectively for a 50 deg. tempera-
ture difference. A leakage of 0.111 cu. ft. per
min. per sq. ft. of wall represents a heat loss of
6.03 B.t.u. per hr. for a 50 deg. temperature dif-
ference. Taking the transmission through the
wall as 0.28 B.t.u. per hr. per sq. ft. per degree
temperature difference, this loss is 14 B.t.u.
per hr. for the same temperature difference. The
heat loss as thus indicated by infiltration is 43
per cent as great as the heat loss by transmission
as indicated by the constant use.

The values given in the table are from the tests
as made and are probably somewhat higher than
those actually found in practice. They represent
the leakage when the pressure drop through the
window is a certain value which represents a
definite wind velocity at right angles to the win-
dow. If the wind strikes the window at an
oblique angle the component of the velocity at
right angles to the window must be considered.
Pressure difference between the outside and the
inside surfaces of the window for an actual wind
will be slightly less for a given velocity because
of a building up of pressure within the room
before the air leaks out the opposite side of the
building. Attention is called to the fact that air
leaks in on the windward side of the building
and out on the leeward side and, since the wind
will blow from various directions at different
times, heating for any room having only one ex-
posure must be based on the maximum loss. The
heating plant, however, need not be figured on
the sum of all maximum leakages but in gen-
eral only half of the total. However, the tables
give accurate comparative figures which are prob-
ably not much too high for actual practice. In
order to apply these values, a further study of
the overall results as found in practice should be
made, and the figures modified, if necessary, to
fit practical conditions.
BRIDGE IN CEMETERY OF THE GATE OF HEAVEN, MOUNT PLEASANT, N. Y.
CHARLES WELLFORD LEAVITT & SON, LANDSCAPE ENGINEERS
The architectural style follows that of other features in this cemetery.

OFFICE BUILDING, OUTPOST FARM AND NURSERIES, RIDGEFIELD, CONN.
ROBERT J. REILEY, ARCHITECT
Local field stone with white pine trim; Virgin pearl black slate roof
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
BEAUX-ARTS INSTITUTE OF DESIGN

DIRECTOR OF THE INSTITUTE—WHITNEY WARREN
ARCHITECTURE—RAYMOND M. HOOD, DIRECTOR
SCULPTURE—EDWARD FIELD SANFORD, JR., DIRECTOR
INTERIOR DECORATION—FRANCIS LENGYON, DIRECTOR
MURAL PAINTING—ERNEST C. PEIXOTTO, DIRECTOR

OFFICIAL NOTIFICATION OF AWARDS
JUDGMENT OF JANUARY 8, 1924

CLASS “A”—II ESQUISSE-ESQUISSE
“AN AEROPLANE RECEPTION STATION”

It will soon be customary for people to cross the ocean by aeroplane, and among the foreigners visiting us, there will always be a number of distinguished persons, such as have heretofore been met at their arrival by special representatives of the Government. For these it is proposed to erect a special reception pavilion on a landing field near a great city.

The landing field is a flat plateau, from which the ground slopes gently toward a great river. On the edge of the field, overlooking the river is the site for the pavilion. Between the river and the pavilion, the ground will be laid out in a formal garden treatment. The formal treatment will include an esplanade and a space for the parking of motor cars, while at the bottom of the slope at the river’s edge will be a dock for steamers or yachts that may occasionally take the aeroplane passengers to their final destination. The pavilion to which the arriving guests will go directly should contain a main reception room, two or three private retiring rooms, and the other necessary services for the press, telephone, etc.

The treatment of the entire composition will be of a very dignified and rather formal design in view of its distinguished function, and emphasis should be placed on the fact that its appearance and disposition as seen from the sky is of almost primary importance.

The entire piece of ground to be disposed of in this composition, exclusive of the landing field, measures 750'-0" in a direction parallel to the river and 1000'-0" from the edge of the landing field to the river.

CLASS "B"—II ESQUISSE-ESQUISSE
“A COLLEGE MEMORIAL GATEWAY”

A college in a medium sized city has received a gift of funds to build a memorial gateway, facing the highway.

The Deed of Gift recites that “the design of the en­ trance shall include a clock tower.”

No further condition is hereby imposed, so the follow­ing program is issued by the University:

The entrance shall consist of a gateway not more than 15'-0" wide, closed with iron gates, or if preferred, two gates each about 10'-0" wide. The clock tower can thus be placed in the center or on one side.

The general line of the face of the tower and gateway must be at least 12'-0" back from the line of the college wall along the highway. It shall be connected with it by curved or broken pieces of wall or wings. This places the gateway in a situation in the college wall. The tower should not be more than 8'-0" in plan in any dimension. The entire motif, including the wing walls, shall not exceed 60'-0" in length along the highway.


NUMBER OF DRAWINGS SUBMITTED:—28.

AWARDS:


MEASURED DRAWINGS


NUMBER OF DRAWINGS SUBMITTED:—5.


CLASS “A” AND “B” ARCHAEOLGY—II PROJET

"THE INTERIOR OF AN EARLY CHRISTIAN CHURCH"

The early Christian churches had simple exteriors, but the interiors were carried to a high degree of elabora­tion by the use of marbles and mosaics. The clerestory walls of the nave were supported by marble columns, and the ceiling above was either of flat paneling or of open timber trusses, treated in color. The altar was usually placed in a huge niche forming the end of the nave, and it was here that the decorations were the most elaborate.

This problem calls for the treatment of the altar end of an early Christian Church. The nave is 38'-0" wide, and the aisles at either side about one-half that width. The attention of the student is called to the Churches of St. John Lateran, St. Paul beyond the Walls, and Ste. Marie Maggiore, in Rome; to Ste. Apollinaire in Ravenna; and to the Capello Palatino and Monreale in Palermo. He should particularly note the use of marble panels, the mosaic figure designs and the carved inlaid marble altars and pulpits.


NUMBER OF DRAWINGS SUBMITTED:—38.

AWARDS:


MEASURED DRAWINGS


NUMBER OF DRAWINGS SUBMITTED:—5.


SECOND MENTION:—C. Ferris, Syracuse Univ., Syracuse.
Brick Masonry Specifications (Continued)

The suggestions in the last discussion of specifications having to do with the laying of common brick covered the general items that should be specified for general requirements. Every building will have miscellaneous masonry items in many cases peculiar to the character of the building, all of which must be constructed of common brick. For instance, the rough construction for fireplaces, brick fireproofing or covering for structural columns, brick lining or protection for membranous waterproofing, and in some cases, brick flooring. It is probable that in every case the general specifications would be sufficiently clear to cover each of such peculiar items, but if there is anything special that must be made more clear, the specification writer should include it under the general heading, "Laying of Common Brick" unless it appears more reasonable to make a separate caption for fireplaces or other special conditions. Perhaps the only point that will be general in all of these spaces is the selection of mortar, which, of course, involves the exercise of good judgment as to the character of mortar required for the particular instance.

After specifications have covered the laying of common brick, it would seem logical to specify next the laying up of face brick. Mention has already been made of the usefulness of sample panels showing face brick as it is proposed to lay them up. In general, this question will be determined either by the design or by the specifications covering the layup of the sample panels, unless the specification writer desires to restrict his specifications for the sample panels to their requirement only, thus leaving the layup and other desiderata to be determined by the drawings or by the specifications for the general face brick work. Under the caption of "Laying of Face Brick," the kind of mortar that is to be used for face brick in various positions must be specified. Care must be taken to see that if the specifier has elected to use a particular kind of mortar for the laying up of brick in parapet walls or in piers of which the face brick will become an integral part in so far as strength is concerned, he will also specify the same kind of mortar for the face brick. In some cases, especially where an extra wide joint is desired, the face brick may not be bonded with the backing brick because of the variation in joint levels. In such cases even though the face brick then is separated from the backing brick and is not thoroughly bonded to it except as a tie to hold it in a veneering position, it would be well to specify the same kind of mortar with the heavier sand or fine aggregates for the body in order to maintain the settlement in the joints as nearly equal as possible. If mortar is to be colored, it should be so stated here and where more than one color is to be used, the specification must be as explicit as in the choice of mortar for different purposes.

In all cases the kind of bonding desired must be specified, governed of course by the design drawings. If the drawings are quite complete, reference may be made to such indications without further detail, but if there is an incomplete indication on the drawings the specifications must supply the deficiency, as the costs in laying up face brick are so variable that the contractor bidding on the work and his foreman on the job must know all of the particulars unless, as stated above, this is covered under the specifications for sample panels. The choice of bonds sometimes involves the question as to kind of bond that will be used to tie the face brick to the backing. Where straight running bond is desired without headers, blind headers must be used unless the cheaper method of using brick ties is resorted to. Nothing can be said against the use of brick ties unless the full strength of the wall must depend on the masonry bond between the face brick and the backing brick,—a matter which does not obtain in the majority of face brick usages. If blind headers are desired they must be specified, especially if not distinctly shown on the drawings, as their use is expensive and ordinarily the contractor does not like to use this method unless it is a part of his contract. In all events the specifications must be explicit as to the means by which the face brick is to be bonded to the backing brick. Where face brick is to cover concrete such as spandrels, foundation walls projecting above the grade, or similar situations, it is customary to provide metal ties in the form work before the concrete is poured to tie the face brick to these surfaces.

The specifications for laying up of face brick do not involve very much other than the kind of mortar and the bonding and joints that are desired. The brick, of course, must be laid level and true to line with vertical joints plumb. If from aesthetic standpoint the alignment of the brick is not an especial point, or if brick out of line are desired, the specifications should be somewhat more explicit, but it is reasonable to presume that the wall will be carried up plumb and with the beds of the brick generally level unless a batter is shown on the drawings. In the more ornamental bonding of face brick the specification-
tions should require that fractional brick be cut accurately and that the start of a course be made at an opening or on the center line with the working out of the vertical joints according to the dimensions of the horizontal runs. Where piers or other breaks or returns are encountered, the internal angle should not show a joint running straight up from bottom to top, but the jointing of the brick should be made alternately one abutting the other so that the internal angle will be broken showing the joint first on one face and in the adjacent courses on the other or intersecting face. The thickness of joint selected must be adhered to and where the thickness of joint selected does not work out exactly with the heights of openings or their predetermined heights, the courses should be laid out on a pole so that the adjustment or variation in thicknesses of joints may be made as the work progresses, rather than to wait until the masonry is carried up to within a foot or two feet of the top, thus entailing the rapid curtailment of joint thicknesses.

As with the common brickwork the laying up of face brick involves mantel facings, floors, and numerous other spaces or materials more particularly requiring experienced workmanship in every respect. It may be necessary that the specifications stress any peculiarity that occurs to the specifier, but he should be careful to make sure that his desires may be accomplished without difficulty, taking into consideration the size of the brick, the possible tolerances that must be allowed for in sizes and the kind of mortar that is to be used.

The character of joint for face brick is more particular than for common brick. Joints may be weathered, rough cut or struck, V-grooved, raked, or recessed. The selection of joints in face brick generally is determined when the character of bond and color of brick as well as the color of mortar are selected. A weathered joint of course must be struck with the intonation extending inwardly and upwardly from the bottom of the joint, and not, as so frequently happens, inwardly and downwardly from the top of the joint, thus leaving a slight shelf for the accumulation of water. It is not believed that the specifications must be so explicit. It should be sufficient to specify a weathered joint and the specifications then must be interpreted properly by the superintendent who must see that the correct weathered joint is used. As a matter of fact, it is not possible to see how the other kind of joint could be called a "weathered" joint. For rough cut or struck joints, the specifications should be sufficiently explicit if merely the desired term is used, providing, of course, that local usage will give it the correct interpretation. The V-grooved joint is used a very great deal in cheap construction, but it is a horrible looking joint and should be prohibited by the careful architect unless enamelled brick are used laid in narrow joints and also if the architect is certain a metal tool and not the edge of a wood ground will be used for forming the V. For recessed or raked joints, both of which are quite expensive to produce, the kind of mortar to be used and the thickness of joints must be carefully studied so that after the joint is formed, the mortar will be sufficiently stiff and will set fast enough not to delay the work, and still at the same time hold the brick in perfect alignment horizontally. A common fault found in construction work in this connection is the slippage of the brick outwardly because of the mortar not being stiff enough to hold it in position after the joints have been raked or after the wood strips used in recessed joints have been removed. As a matter of precaution the specifications should require that joints should not be raked or that joint strips removed until six or eight courses have been laid, thus keeping at least that number of courses unfinished while work is progressing upward.

The question of making parapet walls watertight, which will be discussed later, involves careful specifications for the laying up of the face brickwork, especially where a wide joint or a recessed or raked joint is to be used. There may be instances where it is desirable to use elastic cement for pointing the outer face of the joints. Also, if brick sills are to be used and these generally occur in face brickwork, common practice is to lay them in cement mortar, but experience has proved that in many cases, cement mortar in itself cannot be depended upon to maintain intimate contact with the brick. Therefore, it is recommended that elastic cement of a color matching the mortar used for the face brick surrounding the sills, be used to point the outer inch of the vertical exposed and the outward exposed joints and sills. The same question may enter in the construction of wide belt or string courses, or the first course in a residence where it is placed close to the ground. It is presumed, of course, that masonry work laid on foundation walls should be laid on cement mortar, or shall have an intervening course of slate, stone, or other impervious material to prevent the passage of moisture by capillary attraction from the foundation to the brick masonry. The specification writer should analyze the exterior exposures of the face brick very carefully, not alone from the standpoint of initial strength and stability, but also from the standpoint of future weathering. This is particularly urgent in localities having a normal high moisture content in the air, and where rains are usually of the driving kind. One additional point in this respect is the construction of the face brick over windows where they are supported by steel lintels. One case comes to mind where a gauged
cement mortar was used (and probably the gauging was quite generous) and after the building had been occupied for about two years, it was discovered that water was leaking in through the tops of wood window frames, through the brick joints in the course resting on the angle lintel. It was discovered that the water was passing down the face of the brick over the horizontal leg of the angle and back to the end of the angle, which was 4" in from the reveal of the window, from which point it was easy to get back on the head of the window and come down in the weight box of the double hung sash. This situation was corrected by resetting the brick in rich cement mortar but if elastic cement was used at that time as it is used now, it is probable that the outer inch of the joints would have been canniked with this material at much less expense.

While it may seem rather trivial for the specification to require that all green masonry walls be braced during construction, this is a very important point that should be specified under a special caption for its proper emphasis. Instances are known where walls have been blown down by sudden squalls and in each case the difficulty arose not so much because the wall was blown down, but because of damage that was done to the structure in place, all of which could have been prevented by the placing of wood bracing as the wall was built. Although the specifications require that the brick masonry work be erected, it is well to require precautions of this character, especially where the length of the wall is greater than twice its height between masonry bracing walls.

One precaution in the laying of brickwork that might be given some thought, especially in localities where extremely hot days occur, is the need for keeping the masonry wall damp during extremely hot weather, especially where the humidity is low. At such times the contractor will, of course, drench the brick before being laid in the wall, but it is not unusual to find the heat so intense that the moisture is taken from the mortar before it has had time to attain its proper set. Under such conditions fine cracks occur in the joints and while they may not involve damage to the joint, the question may come up—especially from the owner's viewpoint—and he may be led to believe that the mortar is not sufficiently well made or cured to give him a substantial, well bonded wall. In a similar situation it was only after several days of unceasing argument that the owner was persuaded that the fine hair cracks had no effect on the mortar and it would be unnecessary to have a great deal of masonry work torn down and rebuilt. So, the careful specification writer should include some precaution respecting the handling of constructed walls in extremely hot weather.

**Miscellaneous Data**

**Resistance to Weathering:**—Slate consists essentially of insoluble and stable minerals that will withstand weathering for hundreds of years. However, small percentages of less resistant minerals may be present. Calcium magnesium or iron carbonates are slowly soluble in water containing carbon dioxide, and their presence may hasten deterioration. As a rule, a determination of the carbonate present would indicate fairly well the probable resistance of slate to weathering when exposed on a roof. Some slate in Pennsylvania contains ribbons which consist of narrow original beds usually containing carbon, and darker in color than the main body. There is a tendency for some ribbons to contain an excessive amount of the less resistant minerals and they should not appear on exposed surfaces.

**Color Stability:**—Slate colors may be fast or changing. The fast colors are due in the main to the presence of iron oxide and other stable oxides. As indicated in the preceding paragraph a change in the color may be due to the oxidation of disseminated carbonates. The terms "fading" and "unfading" are unfortunate, as fading always conveys the impression of inferiority. In some instances the change in color is quite undesirable, in others very pleasing tones of color result. The terms "fast" and "changing" are more appropriate.

Spots and blotches are of common occurrence in the slates of Vermont and New York. Careful chemical and microscopic studies as recorded by Dale indicate that variations in color are due to differences in the proportion of carbonates, pyrite and hematite present. It is probable that decaying organisms embedded in the original shale have reduced the FeO·Ox to FeO and the latter has been removed in solution. Usually in the centers of the spots there is an excess of carbonate which may have originated from the shells of the organisms. In general the spots are permanent features that are practically as stable and unchanging as the colors in the main body of the slate.

The oxidation of iron carbonate or of the mixed carbonates of iron, lime or magnesia may cause rusty stains. If the carbonates are evenly distributed they may on weathering change the general color of the entire surface. Stains are also caused by the oxidation of iron pyrite. However, the presence of pyrite is not a sure indication that the slate will stain upon exposure, for some forms of pyrite will remain unaltered for many years. The whole question of the oxidation of pyrite in building stones has been fully discussed by the author in another publication.

**Strength:**—As slate consists largely of overlapping scales firmly cemented under intense pressure, it is remarkably strong. If slates are not split excessively thin they possess sufficient strength for any roofing demands.

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GARDEN APARTMENTS, JACKSON HEIGHTS, N. Y.

C. H. WELLS, ARCHITECT

FIRST CHURCH OF CHRIST SCIENTIST, MERIDEN, CONN.

Orr & Del Grella, Architects—Lorenzo Hamilton, Associated

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
GARAGE AND STABLE OF RICHARD B. DUANE, Bryn Mawr, PA.

LUCIAN E. SMITH, ARCHITECT

Stone covered with a buff colored wash. Natural wood lintels. Grey-blue doors and trim

(Thirty-ninth Annual Exhibition, The Architectural League of New York)
SOUTH ELEVATION
HOUSE OF CHARLES SMITHERS, WHITE PLAINS, N. Y.
DONN BARBER, ARCHITECT
(For another view of this house see Page 144)

REMODELED HOUSE AT NEW CANAAN, CONN.
CALVIN KISSLING, ARCHITECT
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
IN this "Tudor Type" house with its outswung casements, the window niche formed an admirable place for the radiator.

It was the owner's wife who suggested enclosing it with this serving shelf and Ferrocraft Grille combination.

It is one of the 500 standard Ferrocraft designs which you have to select from. Below are two more.

All Ferrocraft Grilles are made from hand-tooled patterns.

Each casting is painstakingly finished by hand.

Only skilled metal crafters are employed for this work.

PERSONALS

Edwin H. Lundie, architect, announces the removal of his office from 532 to 649 Endicott Building, St. Paul, Minn.

Ernest H. Fougner, architect, announces the removal of his offices from 764 Broad Street to 197 Market Street, Newark, N. J.

Charles F. B. Roeth, architect, announces a change of address from 2520 Hillcourt Avenue to 2524 Cedar Street, Berkeley, Cal.

Arthur B. Heaton, architect, E. Burton Corning, associate, announce the removal of their offices from 1410 H Street, N. W., to 1211A Connecticut Avenue, Washington, D. C.

Announcement is made that Keene & Simpson, architects, have moved their offices from 403 Reliance Building to 1005 Land Bank Building, Kansas City, Mo.

I. A. Baum, of the Boyer-Baum Company, architects, St. Louis, Mo., has resigned from that firm, and will now practice architecture in the city of Memphis, Mo.

Carl E. Macomber, architect, has moved his office from 310 Forrester Building to the Board of Commerce Building, 234 North Washington Avenue, Saginaw, Mich.

Clifford Shopbell & Company, architects, announce a reorganization under the new firm name of Shopbell, Fowler & Thole, Inc., 707 Furniture Building, Evansville, Ind.

Strawn Gay, in charge of the La Salle, Ill., office of John Hamifen, architect, has moved to larger quarters on the second floor of the Tribune Building, La Salle. Manufacturers' catalogs and samples are desired.

J. P. Ruset, A.I.A., architect, has established an office at 331 Fleming Building, Des Moines, Iowa, for the practice of architecture. Manufacturers' catalogs and samples would be appreciated.

It is announced that the Hub Engineering & Construction Company has opened an office at 2855 Third Avenue, New York City, for the practice of architecture and general construction, where they will be glad to receive manufacturers' catalogs and samples.

E. T. Heitschmidt, architect, has moved his office from 768 East Taylor Street, Portland, Ore., to 641 Pacific Mutual Building, Los Angeles, Cal.

It is announced that the architectural firm of Della Penna & Erickson has been dissolved. V. Della Penna has opened his office at 344 East 149th Street, New York City, where he would be pleased to receive manufacturers' catalogs and samples.

Cramer, Bartlett & Wise, architectural engineers, announce that they have moved their offices from 430 Chapman Building to 1918 West Seventeenth Street, Los Angeles, Cal., where they would appreciate receiving manufacturers' catalogs and samples.

Announcement is made of the dissolution of the partnership of Atwood & Trysell, architects, Detroit, Mich. Ernest H. Trysell has taken over the business for himself and is now located in new and larger quarters at 512 Donovan Building, 2457 Woodward Avenue, Detroit. The new office will be conducted under his name.

Ernest A. Van Vleck, Oran W. Rice and Ernest Brooks announce that Frank Gaertner, Herbert M. Hathaway, Otto A. Johnson and Edgar L. Kirby have been admitted to partnership with them and that the business is to be continued under the present firm name of Starrett & Van Vleck, architects, 8 West Fortieth Street, New York City.

It is announced that Philip A. Beatty, M. Am. Soc. C. E., has opened an office for the practice of architecture and engineering at 7 East Church Street, Frederick, Md. Mr. Beatty has also associated himself with a firm of Baltimore architects to facilitate the handling of the design of churches, apartment houses, office buildings, and other structures. Manufacturers are requested to send catalogs and samples.

Word is received of the sudden death in Milan, Italy, of Harry R. Temple, architect, Champaign, Ill. Mr. Temple and his wife were on a trip through Europe, having sailed from New York last September. He was a graduate of the University of Illinois in the class of 1900 and began his professional career with the firm of Spencer & Temple, Champaign, Ill. Of recent years the firm was known as Temple & Berger.
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The reason why the Straus Plan of financing building construction is fundamentally right is because no project can be considered unless it shows a potential profit to the borrower. If returns are ample, the safety of the bond buyer is assured, the security of S. W. Straus & Co. is enhanced, and the investor secures his deserved profit. We are always glad to discuss construction loans in amounts of $250,000 upward, as well as loans on modern completed buildings. Call or write for information regarding the Straus Plan.

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THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW has gratuitously set apart this section for use by The American Specification Institute. The Editors and Publishers assume no responsibility for any statements made, or opinions expressed.

The purpose, simply stated, is to afford an organization which, it is believed, will become a most important element in architectural practice and building operations, a medium through which it may, without expense to itself, reach a class of readers that are most intimately identified with the field of the activities of The American Specification Institute.

Publishers, THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW.

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36. Tie Rods:
37. Steel Jacket:
38. Charging Chute:
They Stood in Line
at the Union League Club

The showers of this prominent Chicago club were formerly equipped with ordinary mixers. The management decided to test the Powers Mixer on one of the showers. Members say that the men quickly found out that it did all we claim for it and actually stood in line to use it, rather than use the showers equipped with ordinary mixers.

Some Recent Installations


Make this 30 Day Test Free

A 30-Day free trial of The Powers Shower Mixer will conclusively prove every claim we make. It comes in four styles. For exposed and concealed piping. Made of solid brass with nickel plated dial and handle. It is ruggedly built and has no delicate parts to get out of order.

Has this ever happened to you?

Have you ever been cheated out of a pleasant, enjoyable shower by an unfriendly "shot" of cold or scalding hot water? This menace to your complete enjoyment of a safe and comfortable bath is eliminated by the Powers Shower Mixer.

Thirty years of specialization in temperature control behind this Mixer. The Powers Shower Mixer is different from all other mixers. Turn the handle of the ordinary mixer to "Warm," and if cold water is drawn from nearby showers, faucets, flush valves, etc., the reduced pressure on the cold water line allows a "shot" of hot water to reach the bather. Ordinary mixers give no protection against changing water pressures.

How the Powers Mixer Works. A simple all-metal pressure balancing valve instantly equalizes the pressure of hot and cold water before they enter the mixing chamber, so that regardless of pressure changes, a Powers Mixer always holds the temperature of the water right where you want it.

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48. Grates—Stationary:
49. Smoke Flue:
50. Smoke Flue Supports:
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MAP FOR A DIRECTORS’ ROOM
ARTHUR COVEY, PAINTER
(Thirty-ninth Annual Exhibition, The Architectural League of New York)
Standard Elevator Door Hardware for the Standard Oil Building

R-W IDEAL Elevator Door Hardware Is the Recognized Standard

The Standard Oil Company's new office building in New York City stands as a monument to the wisdom of standardization. Standardized business methods, combined with the use of standardized equipment have been largely responsible for this company's success. Hence it's not surprising that R-W IDEAL Elevator Door Hardware—the standard of America—was selected for use in its building.

Positive safety, assured silence of operation and the ability to withstand gruelling service have made R-W IDEAL Elevator Door Hardware the choice of the country's foremost architects. The complete line includes automatic door controllers and checks, and hangers for single-speed, two-speed and three-speed doors; for doors in pairs, operating from both sides, and for combination swing out doors.

Write today for our time-saving detail folder, from which actual blueprints of elevator door installations can quickly and easily be made, as well as for Catalog D-21.
BOOK NOTES

BERMUDA HOUSES

It has taken a long time to discover the Bermudas architecturally. As a pawn under British possession, the history of Bermuda dates from its discovery about 1511, and from that time during the earliest settlement on our Southern Atlantic seaboard, these islands were a stopping place for ships bound to the Capes of the Virginias. Today the Bermudas are well known as a place of delightful resort where one may find a salubrious climate and a scenery that is attractive, to break the monotony of a Northern Winter.

But architecturally there has been little said or little said that was worth while until the publication of a splendid book by Professor Humphreys of Harvard. This book will be a very valuable addition to an architect's working library. While the small houses illustrated are, of course, built to meet conditions of a tropical climate, it is interesting to note how easily adaptable they are to most any location in the United States. Every house illustrated is of particular interest. The large suggestive value of the many designs may not be overstated. The marvel of it is that all this wealth of good material should have so long awaited an appreciative discoverer.

Well drawn plans accompany each house shown. In addition there are photographs of gateways, buttressed retaining walls, doorways and other interesting feature. There are 181 plates in the book. The text is limited to a brief but interesting historical sketch of the Bermudas and an equally brief reference to methods of construction and color effects.


THE PREVENTION OF VIBRATION AND NOISE

THIS book is a valuable addition to a literature which is all too small. It is the result of the author's necessity for overcoming some problems in preventing vibrations. In order to do this, certain investigations were made applicable to the matters in hand and later extended to other phases of the subject. To these results are added the findings of other investigators, gathered from some twenty-one books which in some manner treat of the subject of vibration and two hundred and thirty-two articles in technical journals, reports and pamphlets. It is this assembling of widely scattered data which makes this book so complete.

Two general subjects are included, vibrations and sounds. Human susceptibility to vibration and the methods and instruments used in measuring vibrations are described. This is followed by a chapter devoted to vibrations in buildings, bridges, towers and trains. The isolating of piers and the various damping devices in use are fully described in Chapter IV. The transmission and isolation of sounds and noises of various kinds in buildings of different types, the acoustics of rooms, the instruments and methods employed in using them for the measurement of sound intensities are discussed in detail in Chapter V. The concluding chapter is devoted to the balancing of machines for the purpose of eliminating vibration and its attendant annoyances.

The book is fully illustrated with photographs, drawings and diagrams. The tables are carefully arranged and very complete. The typography and make-up are excellent. Although published in England, the citations to American publications form a very considerable portion of those made and the book is of value to architects and engineers, of whatever country, who have problems of vibration and noise to be solved.


ISLAMIC ARCHITECTURE

THIS is a small book. The text describes the growth and spread of Islam and the Moslems over a considerable portion of the world. The attendant Islamic architecture, influenced by the religious beliefs and rituals and the widely different countries and peoples who embraced the faith, is analyzed in a clear and interesting manner. A comprehensive bibliography is given and the phases of Islamic architecture, found in the different countries, are illustrated by forty-eight full page plates.

Typical Wayne Installation for Large Public Buildings

How Wayne Water Softeners Cut Expenses in Buildings

Hard water deposits or scale in boilers, piping, plumbing fixtures, hot water heaters and pumps, causes continuous losses and periodic cleaning expenses that can be completely eliminated by the installation of a Wayne Water Softener.

In the boiler room a Wayne Water Softener will save one car of coal in eight, due to increased heating efficiency when boilers are free from scale.

It eliminates the use of boiler compounds and does away with the need for cleaning, because scale never forms at all where Wayne softened water is used.

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Wayne Water Softeners are a decided operating economy that no careful architect or building engineer can afford to overlook. They are simple in design, compact and easily installed. They operate at the pressure of the water supply. The regenerating process requires only 20 minutes, including all operations. Costly storage tanks are not necessary.

Made in a full range of sizes to fit all requirements—types for buildings ranging from $600 up—and they cost less to buy and operate for given capacities than any other make on the market.

Architects and engineers are invited to write for copy of booklet “Water Softening and Filtration”—a complete treatise on modern water softening methods, and giving full details regarding Wayne Rapid Rate Water Softeners. The book is worthy a place in your business library.

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At its January meeting, the New York Chapter of the American Institute of Architects had as its guests eight of the leading consulting engineers of New York City who discussed the following subjects: Acoustics, the Earthquake in Japan, Elevators, Illumination, Landscape Work, Mechanical Equipment, Structural Work and Ventilation. The speakers were all men of national reputation and clearly indicated the intimate relationship between the work of the architect and the architectural engineer. The meeting was a delightful occasion of fraternizing between two elements of the building industry which are in a large measure interdependent upon each other.

The meetings of the New York Chapter are arranged along broad, interesting lines and are well worth the attendance of its members. The present administration is making an enviable record in its conduct of the Chapter and its activities.

AN ARTS TOUR OF EUROPE

Professor Albert C. Phelps, of the College of Architecture, Cornell University, will again, as in 1923, act as leader of a group of architectural students during a trip in Europe next Summer.

According to the preliminary announcement, the architectural course under Professor Phelps will be one of four overlapping courses which together will compose a general arts tour, the other three sections being designed primarily for students of painting, of landscape architecture, and of history, respectively. The architecture section, while not excluding objects of outstanding interest outside of the architectural field, will emphasize the study of important buildings and decorative composition, the examination of drawings and models by the world's greatest designers, and will give opportunity to photograph and sketch architectural details.

The arts tour is one of a series of international students' tours which three years ago were established as a non-commercial undertaking under the auspices of the Institute of International Education, for the purpose of providing objective educational travel of a high order at minimum cost, with scholarly guidance and instruction, and under dignified auspices. The arts tour of 1924 will be similar in plan to that which was carried out by the Institute of International Education as a part of its program for 1923.

The income from the gift shall be used, according to the terms of the donors, "for instruction in those arts which are directly related to making home life more perfect and to making the home more beautiful and attractive; to provide for competent instruction in specific subjects relating to home decorations, and to furnishing and clothing designs with equal consideration for the artistic and economic phases involved."

This new gift leaves only $275,000 to be raised in order to obtain the $600,000 recently offered to Northwestern conditionally by the General Education Board.

UNIVERSITY OF DETROIT TO HAVE NEW HOME

From press reports we learn that the University of Detroit is to have new structures built on a sixty acre campus.

The design for the initial group of twelve buildings submitted by Malcolmson & Higgins, architects, in competition with eight other architects, has been chosen by the committee of architects and officials of the university for adoption. Second and third places were awarded to B. C. Wetzel & Company, architects, and Stratton & Snyder, architects, respectively.

It is estimated that the buildings included in the design will cost approximately $3,000,000. They comprise the faculty building with living quarters and a chapel for faculty members, a commercial and finance building, the administration building, a recitation hall, a parish church, chemistry building, library, general science building, chapel for student religious exercises, an engineering building, gymnasium and power house, and an athletic stadium.

The architectural design adopted is the Mission style with a suggestion of the more pretentious Spanish Renaissance.

ENDOW CHAIR OF HOME ARTS

Endowment of a professorship in the home arts through the gift of $100,000 by the heirs of a woman who believed the home to be the most important institution of the social structure, was recently announced by Northwestern University, Evanston, Ill.

The income from the gift shall be used, according to the terms of the donors, "for instruction in those arts which are directly related to making home life more perfect and to making the home more beautiful and attractive; to provide for competent instruction in specific subjects relating to home decorations, and to furnishing and clothing designs with equal consideration for the artistic and economic phases involved."

This new gift leaves only $275,000 to be raised in order to obtain the $600,000 recently offered to Northwestern conditionally by the General Education Board.

CANADIAN SCHOLARSHIP FOR ARCHITECTURE

The Royal Canadian Academy of Arts, it is learned, offers a travelling scholarship for architecture valued at $8,150. The scholarship is restricted to Canadian citizens of at least six years' residence in Canada and under 30 years of age. The object of the scholarship is to encourage the study and understanding of architecture as a fine art.
Two architects and three engineers agreed on this heating plant

BIRMINGHAM'S beautiful Masonic Temple is warmed by a battery of four T-79-9 IDEAL Smokeless Tube Boilers.

Low pressure boilers for this handsome building were decided upon only after the most thorough consultation among the architects, Mr. H. B. Wheelock, and Warren, Knight and Davis of Birmingham, Mr. Ray S. Wilde, Consulting Engineer of Detroit, and the two engineers on the Building Committee.

The performance record of this battery of IDEAL 79 Boiler has thoroughly vindicated the judgment of these architects and engineers. For Mr. F. B. Keiser, President of the Masonic Temple Association of Birmingham, writes: "We are pleased to advise that the boilers are satisfactory from a standpoint of fuel consumption, efficiency and splendid results derived from the individual units. One boiler carries the load in mild weather. We shall be glad to have you refer anyone to us for information."

If your files do not already carry complete information about the IDEAL 79 Boiler, write to either address below for a catalogue.

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REFERENCE LIST OF BUSINESS LITERATURE

A service arranged for the use of the Architect, Specification Writer, and Architectural Engineer.

This list of the more important business literature of Manufacturers of building material and equipment is published each issue. Any of these publications may be had without charge, unless otherwise noted, by applying to The American Architect and The Architectural Review, 243 West 39th Street, New York, or obtained directly from the manufacturers. Either the titles or the numbers may be used in ordering.

AIR CONDITIONING—See also Heating and Ventilation

The Bayley Manufacturing Company, 732-766 Greenbush St., Milwaukee, Wis.

491. Bulletin No. 3. This bulletin is descriptive of the Bayley Turbo-Atomizer, the Bayley Turbo Air-Washer, and Air Conditioning, for cleaning, cooling, tempering, humidifying and dehumidifying air. It contains an interesting treatise on air conditioning methods together, with useful tables and a set of specifications. 22 pp. Ill. 7½ x 10½ in.

ARCHITECTURAL IRON WORK—See also Ornamental Metal Work

ARCHITECT'S OFFICE EQUIPMENT

Precision Addition Machine Co., Gotham Bank Elkridge, New York City.

270. The Quicken Fractional Adding Machine. A machine for doing mathematical computations in tens of hours, in scale for each telescopic model and special material handling section. Fully illustrated with photographs and descriptive matter of same. 20 pp. 2 colors. 8½ x 11 in.

ASH HOISTS—See also Lumber—Roofing


273 Catalog No. 90. A treatise on the manufacture and uses of Johns-Manville Building Materials made of asbestos and made for all places exposed to fire or corrosion. 100 pp. Ill. in colors. Board covers. 8½ x 11 in.

ASHES—See also Lumber—Roofing

The Pillow Company Co., Lockland, Cincinnati, Ohio.

380. Ashes versus Fire. Booklet in colors. Contains information for builders, architects and others using ash Phoenix Ashes Roofing; pictures of buildings on which they have been used. 15 pp. Ill. 8½ x 11 in.

ASH HOISTS—See also Heats

Gillis & Geoghegan, 545 West Broadway, New York, N. Y.

329. General Catalogue. Contains specifications in two forms, (1) using manufacturer's name, and (2) without using manufacturer's name. Each is ½ in. scale for each telescopic model and illustrates ancient and modern architectural works of note in brick. Size 7½ x 9¼ in. 66 pp.

127. A Manual of Fire Brick Construction. The history of brick building, the various types of face brick, showing details of construction for walls, chimneys and fireplaces. Details of use of tile, firebrick, and composition, and different types of bonds are given. A plan of grills and elevations of small houses, descriptions, useful tables and suggestions are illustrated and described. Size 8½ x 11 in. 116 pp. Price $1.00.


ARMS—See also Brick

American Face Brick Association, 1756 People's Life Bldg., Chicago, Ill.

103. The Story of Brick. Contains the history of, and basic reasons of building brick, architecture, sanitary and economic reasons, comparative costs, and fire safety with photographs and drawings and illustrates ancient and modern architectural works of note in brick. Size 7¼ x 9¼ in. 66 pp.

BUILDING CONSTRUCTION

Cement-Gun Company, Allentown, Pa.

582. Report on Gunite Walls. A report of fire tests made by Underwriters' Laboratories on Gunite walls, resulting in giving them a three-hour fire resistance classification. 90 pp. Ill. 6 x 9 in.

Concrete Engineering Co., Omaha, Neb.

317. Handbook of Fireproof Construction. An illustrated treatise on the design and construction of reinforced concrete floors with, and without suspended ceilings. The Meyer Steel-form is emphasized and tables are given of safe loads for ribbed concrete floors. 40 pp. Ill. 8½ x 11 in.

Currit Companies Service Bureau, Clinton, Iowa.

602. Better Brick Houses. Vol. XIII. This volume contains floor plans and perspectives of 27 two family houses. The designs were made by Trowbridge and Ackerman, Architects, New York, and illustrations rendered by Schell Lewis. Printed in sepia on heavy cream paper. Sent free to architects, east of the Rockies, requesting it on business stationery, otherwise price $1.00. Ill. 9⅞ x 12⅞ in.

The General Fireproofing Co., Youngstown, Ohio.


293. Catalogue. Prepared and Built. A book of brick making, types of face brick, showing details of construction, reasons, comparative costs, and fire safety with photographs, being inspiring aids to all designers. Free on application. 7½ x 10⅞ in.

Truscon Steel Company, Youngstown, Ohio.

317. Truscon Floor Type Construction. Form D-35. Contains complete plans and illustrations of Truscon floor installations and specifications. Ill. 8½ x 11 in.


319. Truscon Building Products. Form D-25. Contains a brief description of each of the Truscon Products with advantages of steel shelving with bolted adjustment, also steel bins and racks, utility cabinets, bench legs, bench drawers, tool cabinets and stock room, frames, desks, waste bins, etc., 39 pp. Ill. 8½ x 11 in.


505. Concrete Floors—Proposed Standard Specifications of the American Concrete Institute. Specification with explanatory notes covering materials, proportions, mixing and curing. Plans and reinforced slabs are covered as well as one and two course floors and wearing courses. 15 pp. 8½ x 11 in.

Truscon Building Company, Youngstown, Ohio.

200. Truscon Floor Type Construction. Form D-35. Contains complete plans and illustrations of Truscon floor installations and specifications. Ill. 8½ x 11 in.

TRUSCON STANDARD SCHOOL BUILDINGS. Form D-36. Contains 8 illustrations of schools, with typical elevations, showing advantages of Truscon Products for this construction. 16 pp. Ill. 8½ x 11 in.

BUILDING DIRECTORIES

The Tablet & Ticket Co., 1015 West Adams St., Chicago, III.

517. Office Building Directory. Bulletin Illustrating and describing directories made by this company providing for any required number of names. Frames of wood or metal with glass cover or doors. Name strips with one quarter inch white letters furnished. Size 7⅞ x 10 in. 4 pp.

BUILDING HARDWARE—See Hardware

BULLETIN BOARDS


The Tablet & Ticket Co., 1005-1201 West Adams Street, Chicago, Ill.

516. T. & T. Changeable Bulletin Display Boards. Describes bulletin boards with changeable type which has a self-spacing device so the lettering always looks neat and regular. 24 pp. Ill. 6 x 9 in.

CABINETS

Hess Warming & Ventilating Co., 1204-7 Tacoma Building, Chicago, Ill.

386. The Hess Specimen Cabinet Lockers and Mirrors. Description with details of an enamelled steel medicine cabinet for bathrooms, 20 pp. Ill. 5 x 8½ in.

CASEMENTS—See Doors and Windows

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The Josam Manufacturing Co., 20 and Canal Sts., Michi­
ga City, Indiana.
630. Josam Floor, Shower and Roof Drains. Catalog F. A loose leaf catalog illustrating complete line of adjustable drain
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Kuestner & Heck Co., 1506 No. Branch St., Chicago, Ill.
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and accessories. 50 pp. Ill. 8 x 10 1/2 in.
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Crouse-Hinds Company, Syracuse, N. Y.
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297. Electrical Specialties. Catalog No. 17, 1917. This cata­
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Kuestner & Heck Co., 1500 No. Branch St., Chicago, Ill.
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log describing gearless traction elevators and worm-geared
traction elevators. 51 pp. Ill. 8 1/2 x 11 in.
Kimball Brothers Company, Council Bluffs, Iowa.
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sidewalk, and garage elevators and dumbwaiters and elec­
tric passenger, freight and push button elevators. 32 pp. Ill.
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557. Otis Gearless Traction Elevator. Leaflet describes
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652. Elevators and Inclined Elevators. A comprehensive cata­
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cludes freight elevators for stores, factories, warehouses and
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Bonded Floors Co., Inc., 1421 Chestnut St., Philadel­
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Pacific Coast Representatives: UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

REFERENCE LIST OF BUSINESS LITERATURE—Continued

STONE

Indiana Limestone Quarrymen's Assn., P. O. Box 563, Bedford, Ind. 245. Folders, Series D. Structural detail and data sheets showing modern building construction. 4 pp. each. 8½ x 11 in.

Indiana Limestone Quarries Association for Cut Stone Work. This is Vol. III, Series "A-3." Service publications on Indiana Limestone, containing information on quarries, and Supplementary Data, relating to best methods of specifying and using this stone for all building purposes. It can be obtained only from a Field Representative of the Association or through direct request from architects written on his letterhead. 56 pp. III. 8½ x 11 in.

Indiana Limestone Homes, Series B, Vol. 5. A portfolio containing sixteen designs for small and moderate-sized dwellings of different styles of architecture and sizes of lots. Plans, floor plans, perspectives, and description. Free to architects and draftsmen requesting same on employer's business stationery. 34 pp. III. 8½ x 11 in.

National Building Granite Quarries Assn., Inc., 31 State Street, Boston, Mass.

STONE FRONTS


Hester System Store Front Construction and Design. Yolos of Detail Sheets. Full size detail sheets a, b, c, and d, of hollow metal store fronts, giving full size sections of head transom, sill and jambs with moldings, spandrels, and bar coverings. 18 pp. 2 3/4 x 8½ in.


Details. A booklet. Full size details of "Dresco" awning transom bar covers, all covers, side, head and jambs covers, ventilated hollow metal sash and other members. Sizes 10 x 15 in. 3 sheets.

The New England Company, Niles, Mich. 258. A Collection of Successful Store Front Designs. Illustrations of recently erected modern stone store fronts with all framing connections,profiles of members, and show window surface secured by these designs. Many classes of occupancy shown. 64 pp. III. 8½ x 11 in.

Catalog L, 1929-1930 Edition. Details of solid copper store fronts and divisions. A complete catalog of copper shop drawings for all framing connections, profiles of members, and show window surface safety secured by these designs. Many classes of occupancy shown. 176 pp. III. 8½ x 11 in.

STOVES

New Process Stove Co., Division of American Stove Co., 310 South Dearborn St., Chicago, Ill. 259. Catalog No. 107. A complete catalog of gas ranges from a single cover hot plate to the most elaborate hotel range. Also lists gas heaters for rooms. 110 pp. III. 7 x 11 in.

Reliable Stove Company, Division of American Stove Co., Cleveland, Ohio. 260. Reliable Angiehlner Gas Ranges. A pamphlet illustrating hot plates, kitchen stoves and a complete line of gas cooking stoves and ranges equipped with the Lornon Oven Heat Regulator. 8 pp. III. 8 x 11 in.

STUCCO—See also Cement


STONECASE

The Bishops Manufacturing Company, Cincinnati, Ohio. 263. Bishopric for All Time and Clime. A book in colors describing and illustrating the use of tiles in floors, walls, ceilings, fireplaces, garages, for exterior embellishment, etc. Full of suggestions. Sent to architects on request. 7½ x 10 in.

TILE—ORNAMENTAL

The Associated Tile Manufacturers, Beaver Falls, Pa. 264. Home Specifications. A new book in colors describing and illustrating the use of tiles in floors, walls, ceilings, fireplaces, garages, for exterior embellishment, etc. Full of suggestions. Sent to architects on request. 7½ x 10 in.

Basic Information on Tiles. Book giving practical information on ingredients, processes, gradings, sizes, shapes, colors, finishes and nomenclature. Sent to architects on request. 7½ x 10 in.

Basic Specifications for Tilework and Related Documents. No. X-299. This specification is prepared in a very systematic manner for the use of architects and builders. It is printed on one side of the sheet, with facing page blank to receive ornamental designs and illustrations of examples of fagades, of movement pictures, houses, office buildings, shops, ventilators and corridors in which Northwestern Terra Cotta was used. Size 8½ x 11 in. 78 pp.

STOVE PIPE

The Great Outdoors Brought Inside. In this book is a

VAIL LIGHTS

American Three Way Luster Prism Co., 12th Street and E. 34th Court, Chicago, Ill. 341. Daylighting Text, one complete catalog on glass prisms for use in transoms, sidewalk and floor lights, skylights, etc., for lighting places inaccessible to direct daylight. Contains also measurements, specifications and other data required by designers. 42 pp. III. 8½ x 11 in.

VENTILATION

The Burt Manufacturing Co., Akron, Ohio. 252. General Catalogue covering entire line of Ventilators, Exhaust Heads and Filters. Separate leaflets on each type of ventilator, vent and damper. 253. The Great Outdoors Brought Inside. A description of the new revolutionary combination skylight and ventilator; the Burt fan ventilator for removing odors, fumes, etc., when atmospheric conditions interfere with the gravity process; and a table giving prices, dimensions, weights and gauges of inches of the Burt Ventilator. Contains also measurements, specifications and other data required by designers. 42 pp. III. 8½ x 11 in.

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Inter-Communicating Telephone Systems, Bulletin No. 528. A pamphlet giving just the information required and the installation of intercommunicating systems from 2 to 32 stations capacities. 15 pp. III. 7½ x 10 in.
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Norfolk House, Norfolk St., Strand
International Automatic Telephone Co., Ltd., London, W. C. 2, England
In Australia—Address—Automatic Telephones, Ltd., Mendel Chambers,
Castleleigh St., Sydney, Australia.

REFERENCE LIST OF BUSINESS LITERATURE—Continued

WAINSCOTTING
The Wright Company, Chamber of Commerce Building, Chicago, Ill.

WALL COVERING—See also Linoleum-Walton
Standard Textile Products Co., 220 Broadway, New York, N. Y.
111. Sanitas, Modern Wall Covering. Folio. Plans of color renderings of various interiors, with suggestions for the library, living room, dining room, bathroom, kitchen and church wall covering, using Sanitas. Size 11 x 8 in. 15 plates.

WATER HEATERS
567. Road Gas Water Heaters. Bulletins in filing folder describing instantaneous automatic water heaters for small homes and special units, multi-coil automatic storage systems, automatic storage systems and tank water heaters. Details for connections, hot water service and specifications. 15 pp. Ill. 3 x 8 in.
580. Road Automatic Storage System. Catalog of automatic hot water storage systems for domestic, industrial and commercial uses. Details, capacities, dimensions and other data. 24 pp. Ill. 6 x 9 in.
590. Road Multi-Copper-Cell Automatic Storage System. Catalog describing automatic hot water storage systems of large capacity for large residences, apartment buildings, hotels, hospitals, gymnasiums and factories. Details, capacities and dimensions for complete line. 32 pp. Ill. 6 x 9 in.

WATERPROOFING—See also Dampproofing
Samuel Cohot, Inc., 141 2nd St., Boston, Mass.
The General Fireproofing Co., Youngstown, Ohio.
Hydrex Asphalt Products Corp., 120 Liberty St., New York.
62. Dampproofing Walls, Above and Below Grade. Illustrated booklet. Uses and specifications of Hydrex Paint, Hydrex Grout Compound and Hydrex Waterproof Primer for walls above and below grade, stainproofing cut stone, soundproofing doors, etc. described. Size 9 x 11 in. 5 pp.

WATER PURIFICATION
600. Ultra Violet Ray Sterilization. Bulletins treating of water sterilization for homes, hotels, office buildings, hospitals, schools, industrial plants, breweries, ice plants, swimming pools, water softeners.

WATER SOFTENERS
The Permutil Company, 440 Fourth Ave., New York.
105. Permutil (Water Rectification Systems.) Illustrated booklet. Describes all methods of softening water, including the original Zolite process. For homes, hotels, apartment houses, swimming pools, laundries and industrial plants. Size 8 x 11 in. 32 pp.
382. Bulletin No. 200. This bulletin treats of the value of soft water in the home and describes the Wayne Domestic Water Softening System. 6 pp. Ill. 8 1/2 x 10 1/4 in.
Wayne Tank and Pump Co., Port Wayne, Ind.
697. Water Softening and Filtration. A valuable treatise on the subject of softening and quick-setting types of water softeners and their application to commercial, industrial and domestic uses. The construction of and uses for Wayne Pressure Filters are also adequately described. 32 pp. Ill. 8 x 10 1/2 in.

WATER SUPPLY—See Pumps

WEATHER STRIPS
The Diamond Metal Weather Strip Co., Columbus, Ohio.
610. The Diamond Way. A catalog of full size details showing the application of Diamond metal weather strips to double hung and casement windows and doors with complete specifications. 24 pp. Ill. 8 1/2 x 11 in.
Monarch Metal Products Co., 5020 Penrose Street, St. Louis, Mo.
512. Monarch Metal Weather Strip. The publication embodies all the suggestions for advertising literature made by the Committee on Structural Service of the American Institute of Architects. It contains a treatise on leakage around windows together with description of Monarch Metal Weather Strip. Contains many detail working drawings. 45 pp. Ill. 7 1/4 x 9 1/4 in.

WINDOWS—See Doors and Windows

WIRE AND CABLE—See Electric Wire and Cable

WOODWORK—See also Doors and Windows—Lumber
Currit Companies Service Bureau, Clinton, Iowa.
Hartmann-Sanders Company, 6 East 39th St., New York, N. Y.

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- Shutters, C-1165
- and C-1166
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PLATE GLASS gives this house a touch of distinction. It is one of the outstanding features that lifts the house above the commonplace and saves it from the ignominy of plainness.

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continually groping and searching for one material—

I RAN into Ten Broeck today."
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Write for Bulletin 21

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# Architects' Guide

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**IMPORTANT:** Each of the products specified below bears our name and trade mark

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**AT A GLANCE**

The correct paint, varnish, stain and enamel for various types of surfaces are seen at a glance on this Sherwin-Williams "Architects' Guide."

For details of specifications see: The Sherwin-Williams book of painting and varnishing specifications or Sweet's architectural catalogue.

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Full details and specifications appear on pages 2340-41, Sweets (1923). Additional information, such as references of installations near you, gladly sent.

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BRIXMENT

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Ceotex is a rugged, strong, weatherproof, durable building lumber made from the long, tough fibers of cane. It is better than wood sheathing—equals cork for insulation.

Ceotex is used for sheathing instead of wood; for plaster base, roof insulation, sound deadener and exterior finish.

Stock sizes: Thickness \( \frac{3}{8} \) in.; width 4 ft.; lengths, 8 ft., 8½ ft., 9 ft., 9½ ft., 10 ft., and 12 ft. Weight about 60 lbs. per 100 sq. ft.

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All over the country—yes in foreign lands, too—architects are specifying Celotex for more and more uses in ever increasing volume.

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The use of 20,000 feet in this one residence illustrates the possibilities of Celotex but still does not realize them to the fullest.


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**THERE IS A USE FOR CELOTEX IN EVERY BUILDING**

*Specifications of most products advertised in THE AMERICAN ARCHITECT appear in the Specification Manual*
The City Hall in Philadelphia is noted from its historical experience and its unique architecture. The architecture will always be pleasing, yet certain conditions have necessitated changes. The interior has therefore been remodeled to meet modern conditions. One of the changes was in the elevator shafts, which were formerly of the open type. These shafts have now been enclosed with Dahlstrom Standard Construction Enclosures.

From the early days when the founder of this organization originated hollow metal construction, shaftways have always been an important factor. Ever increasing building requirements have changed building construction. Dahlstrom has kept pace with these changes and led in producing this class of work until it is now recognized as Dahlstrom Standard Construction.

Dahlstrom Metallic Door Company
Buffalo Street, Jamestown, New York

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Three carloads of black and galvanized Armco-Ingot Iron were used in the bins and pipes of this modern flour mill. For many years to come, this rust-resisting iron will avoid any costly replacement, the item that eats into profits. Armco-Ingot Iron is used for roofing, siding, heating and ventilating pipes and ducts, gutters, leaders, down spouts, cornices, tanks, tubes, fence wire, lath and many other purposes where corrosion must be retarded.

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The above is an illustration of an architectural drawing by Gerald A. Holmes of McKim, Mead & White, Architects, New York, of Screen and Console for a Welte Philharmonic Pipe Organ erected in the residence of Charles Deering, Esq., Sitges, Spain.

This drawing, done in 17th Century Baroque style, illustrates only one of many treatments employed in giving harmonious settings to Welte Residential Pipe Organs, all of which are available to architects.

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January 3, 1924

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2. All Onliwon papers are made in our own mills from clean new spruce pulp and clear, tested water. Towels are highly absorbent, contain no "sizing" to make them harsh and stiff. A single towel is sufficient to dry the face or hands. Onliwon toilet paper is strong and fine in texture, yet readily soluble in water and entirely eliminates clogged drains.

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RICHARDSON ROOFING
The Belknap Hardware and Manufacturing Company, Inc., Louisville, Kentucky, is assured of permanent weather protection by a Viskalt Membrane Roof.

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Laminex—a tested Door
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After 35 years of continuous research and improvement in the manufacture of Douglas fir doors, we have perfected a process which we call Laminex—conceded by technical experts, architects and contractors to be the last word in "built-up" door construction.

By this process we overcome the faults in door construction which you have always taken for granted. These are due to the tracheids or cells of wood as it grows in the tree. When cut into lumber, these tracheids remain constant in length but expand and contract in width with changes of moisture content.

In Laminex doors we build up the parts that go into the construction of the door, using a special Laminex waterproof cement and squeezing the whole together by tremendous hydraulic pressure into one solid piece.

The result is two-fold: First the natural cavities of the wood are closed up; Second: the grain of the adjoining sections is so “crossed” that it equalizes all expansion and contraction and holds the whole in check, for wood cannot shrink in length and the Laminex cement is stronger than the wood.

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In the Forest Products Laboratories, School of Forestry, University of Washington, Laminex doors taken at random from stock, underwent grilling tests. After soaking in water for twenty-four hours, “the complete absence of warping and the very slight expansion due to moisture was especially noticeable.” Laminex doors subjected to a temperature of 185° Fahr. for twenty-four hours, showed no shrinkage. Laminex doors tested in a 200,000-pound Olsen testing machine stood unruptured under 912 pounds average pressure.

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INDIANA LIMESTONE
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Here is a floor that has not only the impressive beauty of marble, but also the wear resistance. And yet it is as quiet and comfortable to walk upon as a carpet.

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Above is shown Crittall Casement installation in the Directors' Room of the Long Bell Lumber Co.

At left— a detail of the same room—
Hoit, Price & Barnes, Architects.

Leadership for generations in hand made steel casements and French doors has resulted in unquestioning acceptance of Crittall products, as the standard of quality, in England and Europe as well as America.

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Our fullest cooperation with regard to the most favorable location of convenience outlets in any class of building is gladly extended to architects.

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Remember it's the TeSlots, that make outlets "Convenient"
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In the modern school building, the architect’s ideals of beautiful simplicity are materialized.

His advanced ideas of light, sanitation and ventilation find expression in a simple way, not just because they fit in most admirably with his architectural plans, but because he has found the most effective way is the way founded on natural laws.

Univent Ventilation—fresh heated air from the window, uniformly distributed in each room, without draft, is the result of our close co-operation with architects. It is our wish to extend this co-operation to all architects. Write for our book, “Univent Ventilation,” and see if it does not express your ideas and ideals.
February 13, 1924

THE AMERICAN ARCHITECT—THE ARCHITECTURAL REVIEW

Carey
BUILT-UP ROOFING

—on the $6,500,000 Cleveland Public Hall

CLEVELAND'S new Public Hall was built to house the largest national political conventions of today. It is 385 feet long and 215 feet wide, with a seating capacity of 13,000.

Plans have been so drawn that the original building can be enlarged should future generations find even its ample proportions too limited.

The materials chosen for this building in which permanence was the chief consideration, were necessarily of the most enduring quality. It is significant that Carey Roofing was selected by the architects.

Many of America's greatest public and commercial buildings are covered with Carey Roofings. Architects everywhere specify them.

The lasting quality of Carey Roofing is assured by the superior Careymade felt and Carey-refined asphalt — the result of skill gained in fifty years' manufacturing experience.

Carey contract roofers are located throughout the United States. There is one near-by to serve you. Write for book of architects' specifications.

THE PHILIP CAREY COMPANY
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Carey roofed Cleveland Public Hall, J. H. MacDowell, Cleveland, Architect.
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  Finance Bldg., Kansas City
- Clarke and Clarke - Omaha, Neb.
  Technical High School, Omaha
- Jos. D'Esposito - Chicago
  Power House, Union Station, Chicago
- Doyle & Merriam - Seattle, Wash.
  Yakima Valley Bank, Yakima, Wash.
- H. C. Hikhs - Nashville, Tenn.
  McQuiddy Co. Bldg., Nashville
- R. L. Gamble - Topeka, Kas.
  Library, U. of Kans., Lawrence, Kas.
- Schmidt, Garden & Martin - Chicago
  Michael Reese Hospital, Chicago.
- Geo. F. McLean - Wilkes-Barre, Pa.
  Peoples Savings & Trust Co., Nanticoke, Pa.
- Pretzinger & Musselman - Dayton, O.
  Frank Smith Paper Co., Middletown, O.
- Grosvenor Atterbury - New York City
  Metropolitan Museum of Art, New York
- Jas. M. White, Univ. of Ill., Urbana, Ill.
  Farm Mechanics Bldg., U. of I.
- Link & Haire - Helena, Mont.
  Montana Life Bldg., Helena
  Lake Hotel, Gardiner, Mont.
- Geo. P. Hardy - New York, N. Y.
  Cloquet Pulp Mill, Cloquet, Minn.
- David S. Castle - Abilene & Dallas, Tex.
  West Texas Sanitarium, Abilene
- McMurry College, Abilene
- Garrett Cotton, Palestine, Tex.
- Lydick Roofing Co., Abilene
- Taylor & Hanna - Sharon, Pa.
  High School, Sharon

These are but a few names, picked at random; more next month.

Cross Section Steel Lead Bar

Showing Steel "T" Core and Lead Sheath

Steel Lead Skylight Construction is a permanent installation. No paint; no packing; no upkeep; no repairs. Every exposed part is pure, hard lead or lead coated. Resists attacks of weather, smoke, gases and fumes.

Architects who have investigated Steel Lead are specifying it in every skylight job they have.

If your office is not supplied with detail tracings and specifications, write for them.

AMERICAN

3 WAY-LUXFER PRISM CO.

Makers of Prismatic Store Front Transoms, Sidewalk Lights, and Skylights

1305 S. 55th St. 358-368 Webster Ave.
CICERO, ILLINOIS  LONG ISLAND CITY, N. Y.

The clipping shown here is from a recent issue of a Trade Paper and is a vivid reminder of what can be expected of many ordinary furnaces.

Look at this

Common Furnace Complaints

"The following are some of the most usual subjects of complaint:
- First, furnace fails to give enough heat.
- Secondly, furnace fails to heat certain rooms.
- Third, furnace leaks smoke and gas up into the rooms.
- Fourth, furnace heats basement too hot.

COMPARE such results as those mentioned above with the operation of the FarQuar Heating and Ventilating System in which are found the following exclusive features, each of which was designed to prevent the very evils mentioned in the above clipping.

A large fire-box and ample air capacities insure plenty of heat.
The FarQuar Vent and Return System insures a uniform distribution of heat to every room.
The FarQuar patented electrically welded, seamless steel fire-box absolutely prevents the escape of gases and fire poisons.
The shape of the FarQuar fire-box makes possible the easy movement of air, which, plus the complete insulation of the jacket, successfully keeps the heat inside the circulating system and prevents any heating of the basement.
The FarQuar automatic control maintains an even temperature with once-a-day firing and positively prevents any danger from over-heat and consequent waste of fuel.

When you specify the FarQuar System you can know your client will be entirely free from "Common Furnace Complaints." You will find the reasons fully explained in a special booklet for Architects sent free on request.

The Farquhar Furnace Company
102 FarQuar Bldg. - Wilmington, Ohio
In most cities you see them—old buildings of curiously mixed architecture, exteriors replete with cast iron columns, a characteristic feature of the buildings erected in the 'Seventies and early 'Eighties.

At least one concrete lesson these buildings have taught the builders of today: the superior lasting quality of the old wrought iron pipe used in their plumbing and heating systems.

The German Fire Insurance Building, of Buffalo, N.Y., erected 1875, is a typical example. Perhaps no part of its mechanical equipment has retained its full usefulness so long and with so little attention as the network of pipes—all Byers. A few lengths of basement pipes make up the total of repairs recorded in nearly half a century.

Byers, alone among pipe manufacturers, have continued to make the same quality of pipe since Civil War days, never deviating from the high standard of excellence set up long before modern cheapening processes were introduced. And with each passing year the superior lasting quality of Byers pipe stands out in bolder relief.

Send for illustrated service records of Byers Pipe in notable old buildings—free on request

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PITTSBURGH, PA.
Established 1864

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Distributors in all Jobbing Centers

Look for the Name and Year rolled in every length

To build or not to build

THAT is the question today with thousands of weary renters. People who are keenly desirous to own their own homes—who would build now, if they could convince themselves that this is a good time to build.

For those who are prepared to build right—to put good architecture, good materials and good workmanship into their homes—this is a good time to build—no doubt about that. You could not give sounder advice. Ask any banker.

But if your client is willing to compromise with quality—to be content with "compromise" materials and "compromise" workmanship—then this is not a good time for your client to build. And what is more—as you so well know—it never will be.

Where strict economy is vital, insist on these five fundamentals:

- Good Foundation
- Good Plumbing
- Good Heating
- Good Hardware

The best house ever built is of little use, if the locks stick—the knobs work loose—the windows rattle. Temperamental hardware is as disagreeable to have around as temperamental people. Good buildings deserve good hardware—all through the house—not just on the front door.

Advise your prospective clients to build now if they can build right!

P. & F. CORBIN
The American Hardware Corporation, Successor
NEW YORK CHICAGO PHILADELPHIA
Air Infiltration

Facts from unbiased authorities

Table on opposite page shows efficiency of Interlocking Strip over other forms of air infiltration control.

Something more than the mere statement of the manufacturer that his material will deliver certain results is today demanded by the architect. Proof from unbiased authorities is required—and properly so. It is the architect’s only safe measure for protecting his reputation and assuring his client the service to which he is entitled.

We welcome the opportunity to submit in the table on the opposite page such evidence of the proved efficiency of Monarch Metal Weather Strips. The interlocking equipment used in these tests was

Monarch Strip No. 400

The tests extended over a period of ten months and more than 300 separate tests were made.

An application of these figures to your own problems will reveal some interesting facts on the subject of air infiltration and the saving effected by the use of Monarch Interlocking Equipment No. 400.

For example: At a wind velocity of 15 miles per hour with infiltration as shown in table, to raise temperature 0 to 70, the resultant comparisons follow:

<table>
<thead>
<tr>
<th>Window</th>
<th>Air Infiltration</th>
<th>B. T. U.</th>
<th>Square feet</th>
<th>Pounds of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cubic ft. per hour</td>
<td>per hour</td>
<td>Radiation</td>
<td>Coal per Season</td>
</tr>
<tr>
<td>Plain—Unstripped</td>
<td>2760</td>
<td>3500</td>
<td>14.60</td>
<td>2714</td>
</tr>
<tr>
<td>Rib Stripped</td>
<td>768</td>
<td>989</td>
<td>4.12</td>
<td>766</td>
</tr>
<tr>
<td>Monarch Stripped</td>
<td>523</td>
<td>668</td>
<td>2.77</td>
<td>517</td>
</tr>
</tbody>
</table>

Compared with plain unstripped window the reductions are as follows:

<table>
<thead>
<tr>
<th>In Air Leakage</th>
<th>B. T. U.</th>
<th>Radiation</th>
<th>Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rib Stripped</td>
<td>72.2%</td>
<td>71.8%</td>
<td>82.6%</td>
</tr>
<tr>
<td>Monarch Stripped</td>
<td>81.0%</td>
<td>81.0%</td>
<td>87.0%</td>
</tr>
</tbody>
</table>

Attention is called to the infiltration between the rib strip and the interlocking. Progressive ratio between the two strips is striking. For instance: With wind velocity 14.9 miles, the infiltration through Monarch Strip with a \( \frac{1}{4}'' \) crack is 10 cubic feet per minute as compared with 18 cubic feet through \( \frac{1}{4}'' \) crack with rib strip; while at 24.9 miles an hour, the leakage through \( \frac{1}{4}'' \) crack with Monarch is 20.5 cubic feet per minute as compared with 36 cubic feet per minute through crack with rib strip.

This ratio holds good in all the factors shown in Table 1. The size of crack does not decrease the efficiency of Monarch Strip, because swelling and shrinking has no effect, while the reverse is true of the rib strip, both in the size of the crack and the degree of wind velocity.

The Monarch Company has created an Engineering Department for the purpose of serving architects and engineers in the interests of better heating plants at a lower cost of installation and operation.

**Monarch Metal Products Company**  
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HARRY B. MULLIKEN and
E. J. MOELLER
Architects
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New York, N. Y.

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way, New York City. This building will
be recalled as one of the largest and
finest apartment houses in this section
of New York

Breinig Brothers, Inc.
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VARNISHES-ENAMELS-PAINTS
Life Insurance

The new home office building of The John Hancock Mutual Life Insurance Company recently completed in the Back Bay section of Boston, near Copley Square, is one of the notable pieces of structural designing in this country from the standpoints of effective engineering, architectural beauty, good workmanship and service.

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San Francisco Los Angeles Seattle

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5. Promptness in delivery and speed in erection
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Buildings, Steel Joists, Highway Prod-
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<td>Rome Brass &amp; Copper Co.</td>
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<td>Russell &amp; Bynum Mfg. Co.</td>
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<td>Ruth Mfg. Co.</td>
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<td>R. F. Va., Inc.</td>
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<td>Sansom Cordage Works</td>
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<td>Sargent &amp; Co.</td>
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<td>Seward-Williams Mfg. Co.</td>
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<td>Shevlin, Carpenter &amp; Clark Co.</td>
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<td>Siemens Bros.</td>
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<td>Somma Shops</td>
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<td>Speakman Co.</td>
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<td>Standard Textile Products Co.</td>
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<td>Standard Varnish Works</td>
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<td>Stanley Works</td>
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<td>Stepney Products Co.</td>
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<td>Sterling Engineering Co.</td>
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<td>Stewart Iron Works</td>
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<td>Strauss, N. W. &amp; Co.</td>
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<td>Strauss-Carlson Telephone Mfg. Co.</td>
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<td>Tharp Fireproof Door Co.</td>
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<td>Triadic Color Scale Co.</td>
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<td>Truton Steel Co.</td>
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<td>Tuttle &amp; Bailey Mfg. Co.</td>
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<td>Utica Boiler Co.</td>
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<td>Van Zel Ventilator Corp.</td>
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<td>Yost Valve Co.</td>
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<td>Voss Mfg. Co.</td>
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<td>Voss Veneering Hardware Co.</td>
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<td>Wall Paper Mfrs. Assn. of the U. S.</td>
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<td>Wayward Truck &amp; Pump Co.</td>
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<td>Webster Mfg. Co.</td>
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<td>Wheeler, Osmond Co., The</td>
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<td>Wharton, W.</td>
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<td>Wilson, Th., Co., Corp.</td>
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<td>Winslow Boiler &amp; Engine Co.</td>
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<td>Wolf Mfg. Co.</td>
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<td>Wyler Building Supplies &amp; Quarters Assn.</td>
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<td>Yale School of Fine Arts</td>
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<td>Youngstown Sheet &amp; Tube Co.</td>
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