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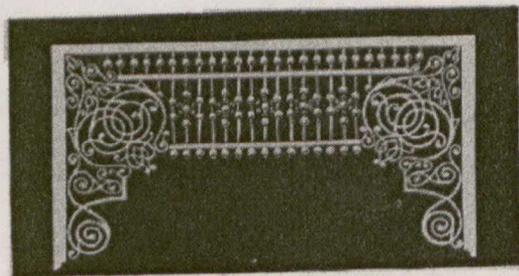
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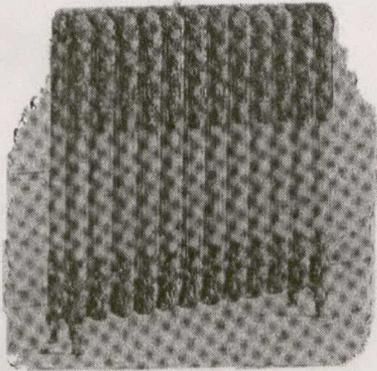
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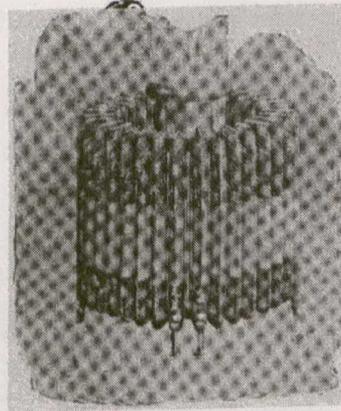
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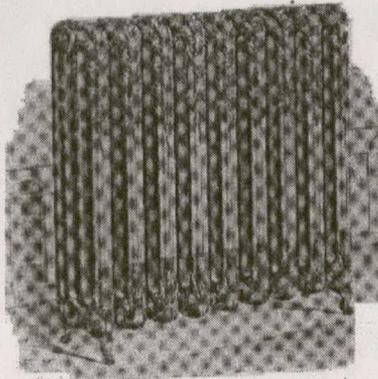


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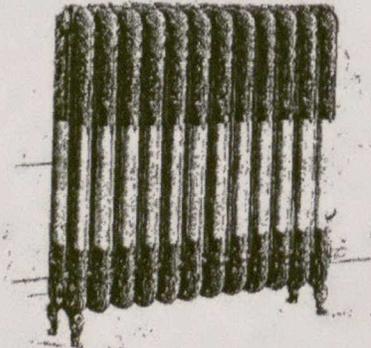
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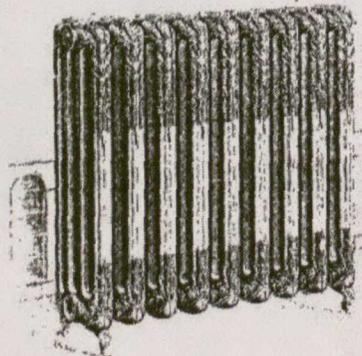
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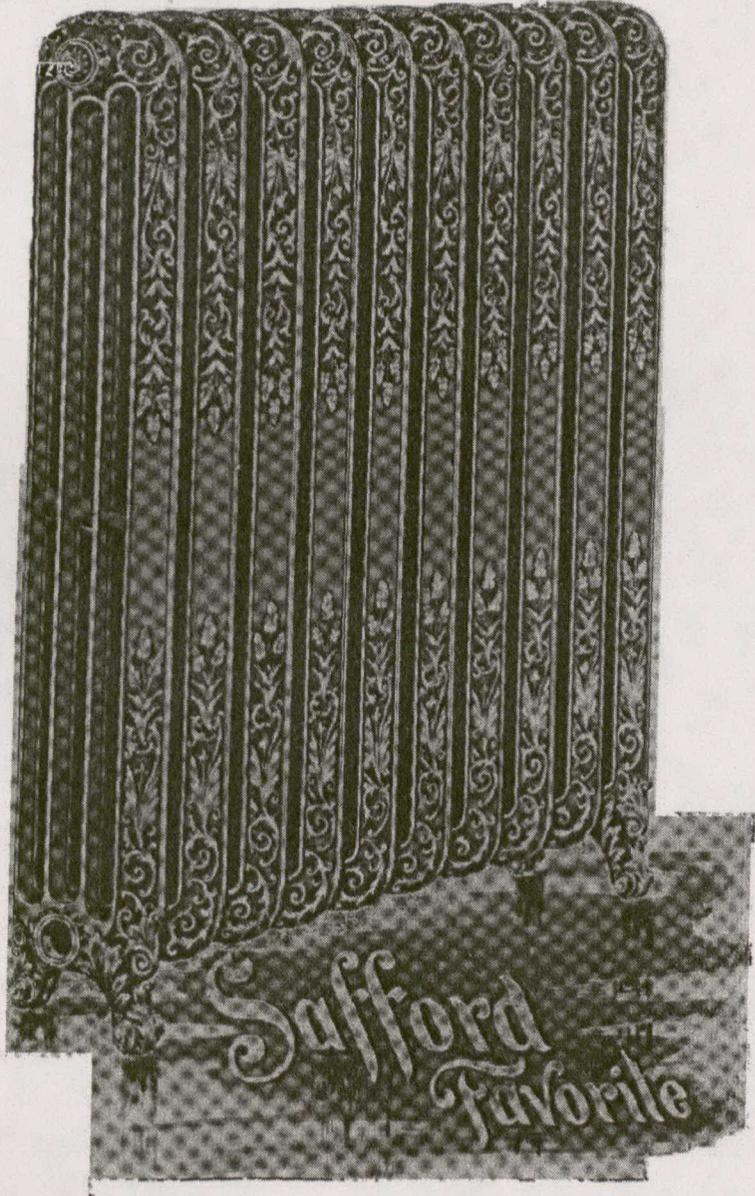
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VOL. XII.—No. 3.

MARCH, 1899

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*A Monthly Journal of Modern Constructive Methods,*

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This Spring Number of the CANADIAN ARCHITECT AND BUILDER is intended as

a substitute for the Special Number which until this year it was our custom to publish at New Years. It is destined to mark the opening of the building season, and we trust will meet with careful examination and the appreciation of our readers. We are indebted to Mr. Ernest Wilby for the excellent piece of design displayed on our front cover page, and to the other friends who have kindly contributed articles of special interest for this number.

The Season of '99.

THIS number is intended to mark the opening of the last building season of this century. In Toronto the season has already opened, a considerable amount of building being now in progress. Indeed, operations in that city were not entirely suspended last winter, except during the extremely cold weather. In the opinion of the majority of architects and builders, satisfactory foundations and walls cannot be properly constructed in winter in this climate, and throughout the country as a whole, little is attempted during January and February. In Toronto, however, the temperature is as a rule much higher than in most localities. Some architects and builders in recent years have endeavored to shorten if not close up entirely the gap which has separated the building season of one year from that of another. Judging by the number of enterprises already commenced and projected, the outlook for this year is most encouraging for architects, builders, workmen, manufacturers and dealers in building materials, and others whose welfare is dependent on building activity. The cost of building is likely to be enhanced at least to the extent of recent advances in price of materials. It is to be hoped that contractors' figures may likewise be increased to a point which will allow of a reasonable margin of profit. The season of 1898 was satisfactory so far as the volume of work done was concerned, but on all sides the com-

plaint was heard that contractors could make no money owing to the prevailing low prices. After a long period of inactivity, anxiety to obtain work was such that prices were cut much below the point where a fair profit could be realized. In some trades, as for example, plastering, the desire of some contractors seemed to be to secure an extraordinary share of the available contracts. To accomplish this bids were lowered below the profit line, and the whole trade suffered. It is most desirable that during the present season contractors should in their tenders allow for a fair margin of profit, to which they are entitled. Unless there is united action in this direction, the improved conditions which have now set in, so far as revival of building enterprise is concerned, will add little to the prosperity of contractors. In Toronto a few speculative builders are resuming operations. It is not probable, however, that building of this class will assume large proportions, as the loan companies, who were heavy sufferers by the building boom in the early years of this decade, will be certain to adopt a very conservative policy with regard to loans for this kind of enterprise. An encouraging sign of returning prosperity, so far as Toronto is concerned, is to be found in the recent sharp advance in real estate values, amounting in some localities to \$15 per foot, within a period of six to eight months. A rumor has been current to the effect that it is the intention of some of the unions of workmen connected with the building trades to demand an increase of wages. We trust that no obstacle of this nature will be thrown in the way of the returning tide of prosperity for which all have been waiting. Under the agreement made with the employers, the workmen have been paid the same rate of wages during the years of depression as prevailed in times of greater activity, and to this cause, in conjunction with the increased competition brought about by scarcity of work, is due the absence of profits experienced by contractors for several years past.

#### Compensation to Workmen.

A just fate overtook the Bill introduced by Mr. Crawford in the Ontario Legislature to provide for compensation to workmen who might be injured through accident while in the discharge of their duties. Some of its provisions were altogether unfair to the employers, and would have resulted disadvantageously both to employers and employees. For example, the Bill made it compulsory for the employer to notify the Government of any accidents that might occur to any of his workmen, regardless of whether he might have been informed of the occurrence or not, the penalty for default being \$100—half of which sum was to go to the informer. Thus, a workman who might sustain a slight injury, and make no mention of it to his employer, could arrange with an acquaintance to lay information with the Government against his employer, and to divide the spoils. Legislation of this nature should not be introduced for the purpose of catching the workingman's vote, but should be framed in the most careful manner, so as to equitably apply to all interests involved.

#### An Interesting Fact.

Architects and plastering contractors will be interested in a test which was recently made by a plasterer in Toronto of the qualities of metal lath. The test was the outcome of the offer by a firm of manufacturers to sup-

ply metal lath at a considerably lower price than that of a competing firm. The plasterer, who is one of the most experienced men in his line in the city, undertook to decide for himself which material would in the end prove the cheapest and, all things considered, the best. In the presence of the agent of the company offering the cheapest lath material, he had two pails filled with plastering material made up in exactly the same manner, and with this he proceeded to plaster a piece of each kind of lath measuring 48" x 15". The result showed that about 60 per cent. more plaster was required to cover the cheaper lath than was necessary to cover the more expensive kind, and that by using the more expensive kind of material, the contractor would effect a saving equal, if not greater than that which it was claimed the use of the cheaper lath would give him. There was an additional advantage due to the fact that it required much less labor to apply. The actual amount of plaster used for the pieces, 48" x 15", was 19 pounds as compared with 31 pounds.

#### The Licensing of Architects.

THE results of the operation of the law enacted by the Legislature of Illinois compelling architects to pass examinations and take out licenses, as set forth in the report of the Board of Examiners just to hand, are encouraging and satisfactory. During the period beginning September 21st, 1897, and ending the 11th of February, 1899, the Board passed upon 787 applications for licenses, 714 of which were granted and 73 rejected. There has been no opposition to or wilful violation of the law, and no prosecutions have therefore taken place. On the other hand, application for licenses has been made by almost every person claiming to be an architect within the State. This is certainly a wonderful showing in behalf of legislation of this character, and affords the strongest possible argument in favor of extending the law throughout the United States and in other countries. There is now a bill before the legislature of California which will require all architects of the State to take out a license at an initial cost of twenty-five dollars and an annual cost of five dollars thereafter. In Quebec the principle has received recognition, and architecture is now a close profession. We have no doubt that in Ontario likewise legislation of a similar kind will be enacted. The Society of Civil Engineers have now a bill before the Ontario legislature which is designed to close the ranks of that profession to all but duly qualified persons. If this bill should pass, there will remain no argument for refusing to place the profession of architecture on the same footing.

Many substitutes as a pigment have been offered from time to time for white lead, but there is nothing which will beautify and at the same time preserve that to which it is applied as will white lead. The characteristics of the good article are its affinity for linseed oil, its opacity and covering properties and its durability as a paint.

A British Columbia paper is authority for the statement that the Masters' and Servants' Bill was introduced in the Legislature by Mr. Macpherson, of Vancouver, to prevent Mr. Tompkins, a Brockville contractor who has carried out a number of contracts with the C.P.R., from importing Ontario workmen to perform work in British Columbia at wages 50 per cent. below what would have to be paid to local workmen.

## HOUSE DECORATION.

A SIGN of the times is the number of journals either devoted to, or giving space regularly to, household decoration. It is a sign that in this country and in the United States the habit of mind is moving on from absorption in the mere necessities of life to a desire for some of its amenities. This desire has arisen first with women, who in America are the nearest approach to a leisure class, and the journals which give attention to household adornment are, for the most part, ladies' journals, or depend chiefly upon women for their subscription list. The ideals aimed at are defined usually by the feminine attributes "cosy," "dainty," etc., and the kind of work that is described is such as can be done at home and may be generally described as imitation architecture. All this may be welcomed as an indication that there is creeping in some relief to the squalor of a life devoted entirely to business; but the squalor of a false pretentiousness in art is not so respectable and is more repellent. If, as seems to be the case, it is an early stage of a people whose intelligence is more fully developed than their culture, it must pass soon from this superficial imitation of architectural effects to an appreciation of their essence, and it is best worth while to consider in what the essence of domestic architectural decoration consists.

At the bottom of all architectural effect is plan. The decoration of a room for the attainment of character is best begun with the footing courses of the building. The character to be attained will come under two heads—dignity or "cosiness." The latter, which we may call the domestic manner, seems to be the special development of modern planning, and the recipe is briefly a compact complexity of arrangement; complexity, that is to say, not for its own sake nor for the sake of variety, but to match the complexity of modern domestic life by arranging the area of rooms with such artistic precision that there are no waste spaces. For this reason the floor plan is irregular and there is often much irregularity in the rooms themselves; for windows which are placed only with a view to catch the light or the sun are often bowed; fireplaces which are designed only for the greatest snugness are likely to be nooked; furniture which, like the sideboard, is of such dimensions as to be immovable is provided with a home of its own, recessed so as to be in the room without claiming unnecessary side space; while the hall, which is at once an entry, a waiting room, a place for storing outer garments out of the way, an approach which should invite to the principal rooms with encouragement of good things beyond, and which should indicate the stairs with equal promise but without encouragement, is a field for the ingenuity of the architect about which, if there is to be much comfort in little space, one can predicate little but that variety is assured. The wall treatment of such a plan is devoted in the first place to further emphasis of its complexity by furring down the ceiling in recesses from the main area so that they are subordinate in height as well as in area. It is obvious that when this is done the scheme is all there. Details aim rather at fitting into and emphasizing the arrangement than at attracting special attention to themselves; moreover, economy through force of taste is the idea at the bottom of this manner of work; elaboration is therefore not the note for detail so much as simplicity. Such details as are used have also preferably some function to perform. The picture moulding, the dado capped with a shelf, the built seat and cabinet recess are much in use. The picture moulding will run at the level of the lowered ceilings over recesses, forming an angle finish under these ceilings and the bottom member of a frieze for the loftier central area. The central area will thus be the only part that will have wall decoration proper, for the space between the dado and the picture moulding is properly, in a simple dwelling, devoted to pictures, and the only effort expended upon the wall is

to obtain such texture of material as will keep the surface from being dull, though, as a background for pictures, it should be plain. Sand finish plaster, burlap or decorators' canvas and other stuffs are in use; but here is a field for invention and discovery. There is no limit to the variety of material that would be suitable, with the proviso that it must be sanitary. This proviso, unfortunately, excludes such depth of texture as would collect dust. The frieze of the central area, being the crowning member of the principal part of the room, and being above the line of pictures or other movable decoration, may be the field for any degree of elaboration in any form of work. It is perhaps an evidence of the excellent quality of this domestic manner of housework that the conventionally accepted architectural forms, which are made according to regular patterns and by multiplying processes, do not look at home in such a room as this—not because they are too good, but because they have not enough life in themselves, but, when they are acceptable, are acceptable as factors in a scheme which is a scheme of proportion only. Here interest in all parts is best, and, though simple work will do, the best work is not out of place in the frieze of a living room. It is a field for wall painting—decorative figure or decorative landscape—for carving or for modelling in plaster. It is time that the practice of modelling in plaster directly on the wall was revived, and a running scroll founded on some flowering plant could be quickly and suitably rendered upon a frieze of this kind, for here if anywhere the slight irregularities of hand modelling would be in place.

For dignity the essential difference is lavishness of space—not large space so much, that lavishness which pays no heed to the exact space required for each function, but squares out to an all-comprising area which does not fit the necessities so much as include them, having in view an aim beyond mere necessity—the attainment of regular form for its own sake. The ornament, or decoration proper, is therefore in this key. Its furnishings or features have more to do than to fill a function; they have to maintain a character. A mantel piece is not merely a convenient shelf on which things which please the eye may rest to adorn the local centre of comfort or on which books and tobacco may be found to minister to it; in a dignified room a mantel piece is in itself a dignified composition, which may have, and often has, no other function than beauty. Walls are not merely walls, but a tripartite composition. Doors and windows have a function to perform, but this makes not the limit of their form, but only its motive. Each is a door or a window, but it is also a composition. Finally, everything—mantel, doors, windows, sideboard, or whatever else is necessary—though in itself a composition, is but part of a whole, which is the room; and, if the greatest dignity is sought, all rise together to the cornice, which unites them all in one. It follows then that, in this manner, the abstract architectural forms which jar with cosiness find their proper use, which is to minister to a unity, self-existent and admirable for itself, in which the comforts of a home can be spread rather than fitted and not be the less comfortable for the more stately housing. The ultimate home of details to suit this manner will generally be found to be Italy; but there is not much hope for the designer who borrows from Italy, either directly or through France, instead of making the principles which are at the bottom of Italian or French work his own. These principles would repay research, but the present space barely suffices to make this attempt to classify the two domestic manners.

It should be said in conclusion that cheap effects, which form so much the object of study in the decorative articles before alluded to, are proper to neither manner. The only form of economy possible in good work here (as in good work of any kind) is the economy of abstinence. Decoration which is founded on plan may be slight or copious, plain or rich, and good in all cases if the material is good, but only if the material is good; and neither the householder or his architect is wise who attempts too much for his money by aiming at the greatest quantity rather than the best material.

"Since the birth of time, throughout all ages and nations, has the craft of the smith been held in repute by the people."—Longfellow's *Evangeline*.

### BY THE WAY.

It is interesting to learn the precautions taken to conceal the identity of the competitors in the recent competition for plans for the proposed University of California at San Francisco. The designs, it will be remembered, were lodged in the Musée Royale des Beaux-Arts, in Antwerp. There they came into the hands of Belgian officials and employes. Photography has been employed to demonstrate to the competitors and others how the designs were kept concealed until the hour arrived when they were to be brought before the jury. The cases containing the drawings were covered with paper, securely tied and sealed with wax bearing an official stamp. The door of the room containing them was also effectually sealed. The next stage was to prepare the drawings for inspection. A photograph shows that no less than thirty men and boys were employed to make stretchers and to mount the plans. Every indication of a motto or other clue to authorship was carefully concealed. The plans were then covered with paper, tied and sealed. There was no likelihood of prepossessing in favour of any design, or of prejudice against it, when a design came before the jury. Each had to depend on the impression which was made when it was revealed. There was no confusion or liability to confound the design of two competitors.

x x x

THE Municipal Council of Paris has decided to give prizes to the architects and constructors of the six handsomest houses that may be erected during 1899. The owners will be exempted from half of the increased assessment for improvement to the properties. Fifty-two sets of plans have been handed in for a similar competition held last year. This is an excellent method of awakening public interest in architecture, and effecting an improvement in the character of building designs. The associations of architects of Ontario and Quebec should try to induce the cities of Montreal and Toronto to copy the example of Paris in this direction. Failing that, they should consider whether they themselves could afford to offer prizes which would induce architects to enter a competition of this character. The appointment of experts to judge the designs and award the prizes might be left in the hands of some competent and independent authority. I am of the opinion that a competition of this character, properly organized and conducted,

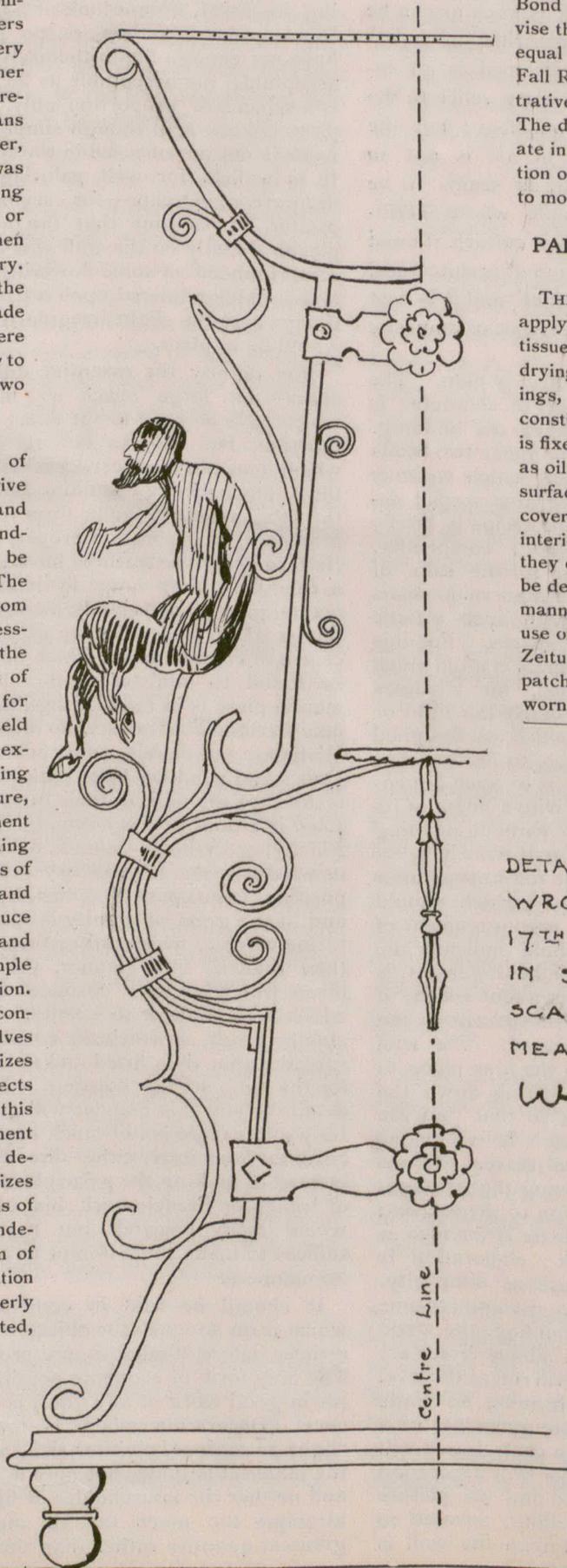
would direct public attention to architecture and awaken a widespread interest in the subject such as would not result from public lectures or any of the other methods which have been suggested from time to time at the architects' conventions.

x x x

In the construction and decoration of railway coaches and passenger steamers there has in the past been little demand for the services of Canadian architects. As a rule, in this class of work only the best materials are employed, and in many instances better results might have been attained if the disposition and treatment of them had been placed in the hands of skilled architects. This fact is being recognized by the Bertram Company, who have at present in hand the construction of the new steamer "City of Toronto." They have engaged the services of Messrs. Bond & Smith, architects, to design and supervise the decorations of the new vessel which is to equal in character the steamers of the famous Fall River line. A series of relief panels illustrative of Canadian history will adorn the walls. The decoration of the saloon will also be elaborate in character. In like manner it is the intention of the Richelieu and Ontario Navigation Co. to modernize all their steamers.

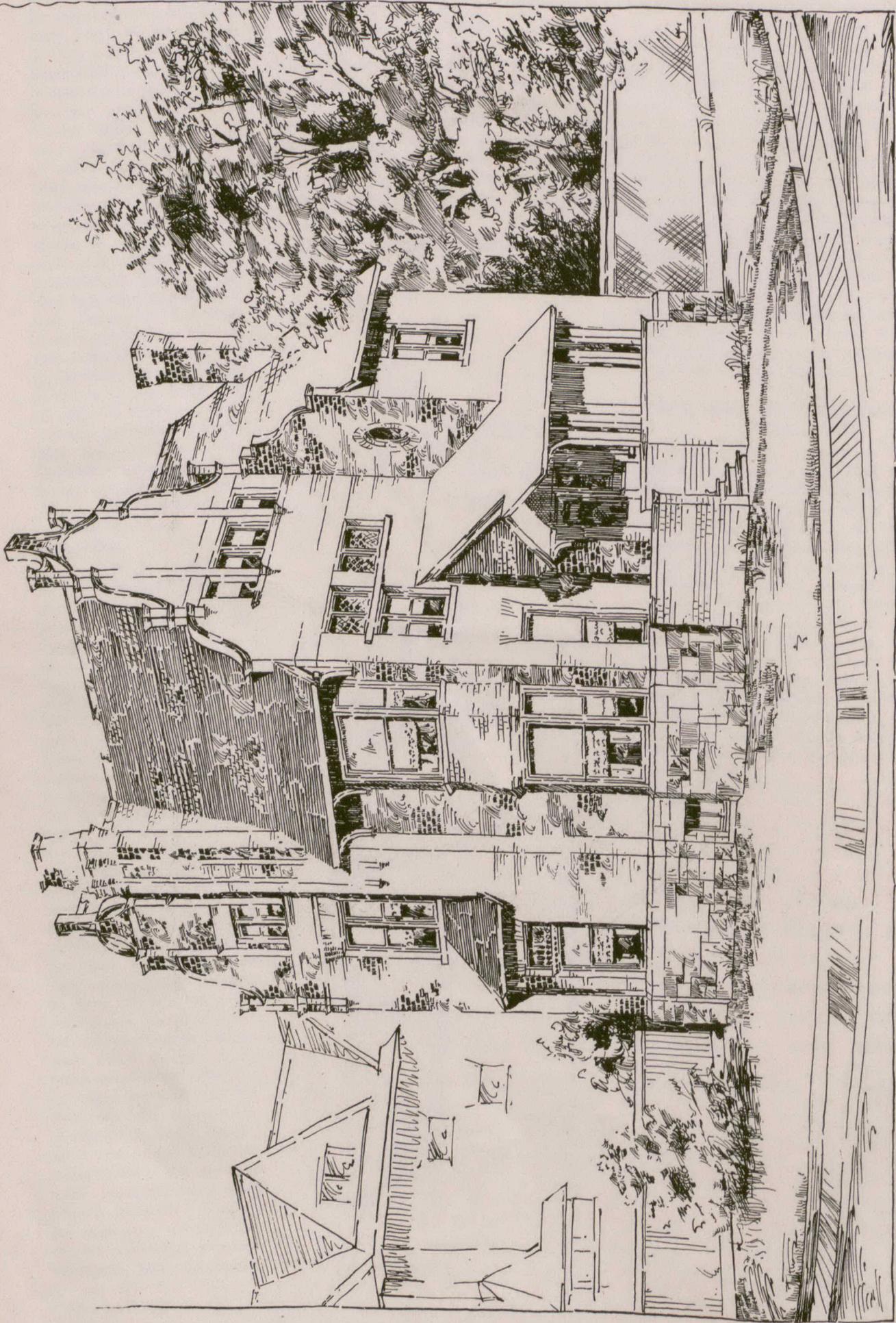
### PAINT SKIN COVERING FOR FLOORS, WALLS, ETC.

THIS covering is produced in Germany by applying oil paint or varnish paint on very thin tissue paper, reinforcing the first coat, after drying, by any desired number of further coatings, and decorating same so that the whole constitutes a strong, tough oil paint skin. This is fixed by means of an adhesive agent, such as oil or resin, putty or paste in sheets on the surfaces of the floor or wall. These paint skin coverings are an improvement on ordinary interior and decorative painting, inasmuch as they can be produced at a factory and can thus be decorated in a more tasteful and thorough manner than is possible in painting by the use of stencils and the like, says the "Farben Zeitung." Furthermore, the decorations can be patched and repainted by applying new sheets in worn out places.



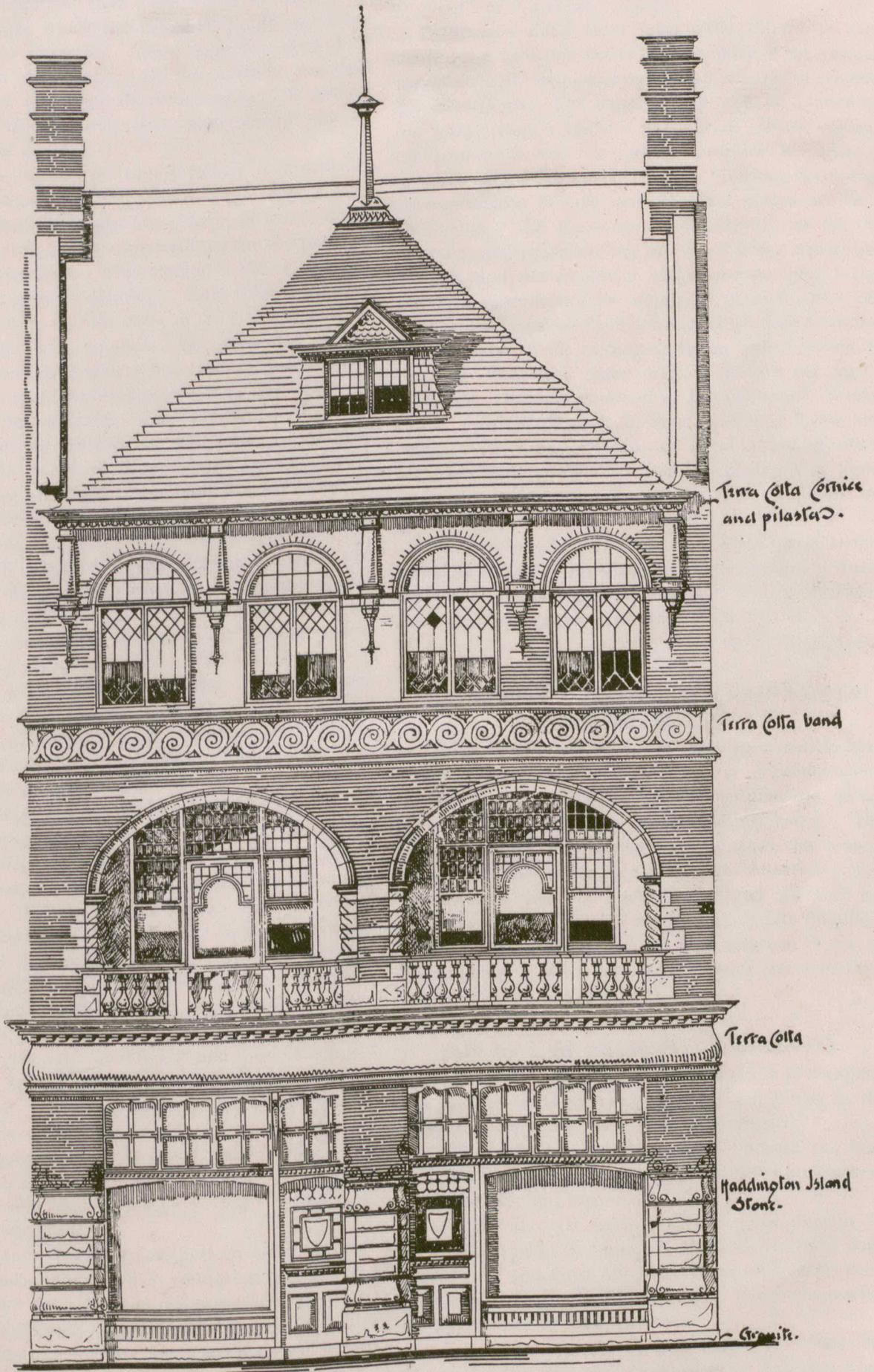
DETAIL OF TRIPOD STAND,  
WROUGHT IRON, ITALIAN  
17<sup>TH</sup> CENTURY,  
IN SOUTH KENSINGTON MUSEUM  
SCALE— $\frac{1}{4}$  FULL SIZE  
MEASURED AND DRAWN BY  
*William Rae.*

Plastique Bordin, a paint to protect wood or iron against the action of acids, is said to be obtained by the melting together of resin with powdered charcoal, spermaceti and animal charcoal with admixture of linseed oil varnish and vaseline, the proportions varying and being adapted to the respective demands upon the elasticity of the coating. The preparation of the paint should take place shortly before application.



*A. F. WICKSON ARCHT.*

RESIDENCE FOR MR. JAMES GERMYN, ROSEDALE, TORONTO.  
A. F. WICKSON, ARCHITECT.



30'0"

Study for Business premises  
with dwelling above  
Scale of feet.  $\frac{1}{4}$ " of one Inch to one foot.

Robt. M.ripp.  
J. R. J. B. A.  
Arch<sup>t</sup>

Victoria - B. C. 1898-

## PAPER HANGINGS.

PAPER hangings were originally made on sheets of paper pasted together, each sheet being of the size of paper then made, which was called Elephant, and measured about 22 x 32 inches. These were joined so as to make a length of 12 yards. On this primitive arrangement patterns were stencilled sometimes in several colors, and considerable dexterity was shown in the adjustment of the stencils.

When paper-making machinery (which is practically what is now in use) was introduced, single lengths of 12 yards were substituted, and huge blocks of wood, which were in reality wood-cuts, were used to print the patterns instead of the stencils. This method is still in use, and is called hand or block printing. Each color to be used has its own block, and the color of one block must be dry before another is applied. The workman stands before a framework in which the block is suspended, and by means of a foot lever passes the paper under the block, and at the same time brings pressure on the block to evenly print the pattern on the surface. Another section of the paper is then brought by guide pins exactly in place under the block, and the operation is repeated until the whole length is printed.

This process, on account of the weight of color applied, is still in favor for certain classes of paper, but the advent of the cylinder presses for calico printing also revolutionized the printing of paper hangings. By means of this machine all the colors are printed at one time, and what occupied hours under the old system only requires a few seconds under the new. In these machines each color has an engraved copper cylinder, which is so arranged on the large cylinder as to make with the others a complete pattern. Small vats with brushes supply an even amount of color to the cylinders and the printing proceeds with perfect exactness.

The lowest grades of paper hangings are called "brown blanks," the paper being of a light brown or grey color, and the pattern being printed on without a background. "White blanks" follow these, the only difference being in the quality of the paper. Formerly the ground of the next grade was printed with the pattern, this being called "blotch printing," but the practice now is to brush the ground color evenly over the surface before printing the pattern. These were formerly called "grounds" or "flats," and these names are still applied to the better qualities, though without special reason. Various surfaces are given to the ground by the application of French chalk, which is polished to produce what is called "satin finish"—by the dusting on a sized ground of finely powdered mica, to produce what are variously termed "glimmers," "silks," "micas," etc.

The addition of bronze to the pattern forms another class of paper-hangings, which addition is probably the most lucrative operation for the manufacturer. Two methods are followed—the first being the application of the bronze held in a solution composed mainly of potato starch, these being called "liquid bronzes" or "gilts." In the second process the size is first applied to the paper as a color would be, the bronze is dusted on this size when at the right period of "tack" or stickiness. These are called "varnished bronzes" or "gilts." All of these processes are also followed in the hand or block printed papers. To give additional texture to the surface, various embossers are applied, such as leather, gros grain silk, canvasses of various weaves and fancy

patterns. This is carried to a further point when the pattern of the paper is duplicated in the embossed roller and is thus raised from the surface. These are called "raised" or "pressed" papers.

Wallpapers differ from most other fabrics in that while great variation exists in the quality of the various materials used, the materials after all are only of secondary importance. The paper is only used as a medium for transferring a pattern to the wall. Thus, various other materials may with perfect propriety be imitated in wallpapers. Expensive leathers, silks and tapestries are reproduced in paper and excellent effects are thus obtainable. The European manufacturers lay all the museums and palaces of the old world under tribute for designs, and the American manufacturers busy themselves in reproducing as rapidly as possible these designs in less expensive and consequently inferior grades. But a number of the leading designers and architects of England contribute many original designs for paper-hangings. Among others may be mentioned Walter Crane, Lewis F. Day, J. D. Sedding, Shand Kydd, and others. Their designs are not in imitation of other materials, but purely in the line of ornamental or floral treatment, and are for that reason more favorably regarded by many.

It may be said, in conclusion, that while the materials as before remarked are secondary to the design, as much difference exists between desirable and undesirable qualities of wallpaper as in other fabrics.

W. H. ELLIOTT.

## PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

The committee which was recently appointed to look about for more suitable rooms to serve as headquarters for the Association, have recommended that the necessary accommodation be procured up town. The Council of the Association have adopted the recommendation, and on the first of May the Association will remove from the rooms which they have occupied for a number of years past in the New York Life Building, Montreal, to new quarters on St. Catharine Street, in the building in which are the rooms of the Canadian Society of Civil Engineers.

## AN ART MUSEUM FOR TORONTO.

The following memorandum is printed in a conspicuous position in the catalogue of the exhibition of the Ontario Society of Artists, now in progress:

"The need for an Art Museum in Toronto has long been felt by those who are interested in the progress of art in the city and Dominion.

"During the last twenty years various projects for buildings suitable as a home of the fine arts have been considered, and have not been found sufficiently comprehensive to raise the enthusiasm of those who realize the importance of the question.

"The members of the Ontario Society of Artists, believing the time has arrived in the city's progress when steps should be taken to carry out this important requirement, have during the past season had the whole subject under consideration, and in the near future they hope to be able to present some suggestions and plans for such a much-needed institution."

The death is announced of Mr. James Perry, one of the oldest and most respected contractors of Ottawa.

## BRITISH COLUMBIA LETTER.

No. I.



TERRA COTTA FINIAL, TOWER MUNICIPAL BUILDINGS, TORONTO; HEIGHT, 13 FEET.

ON first entering Victoria, the visitor is not very favorably impressed, for should he arrive on an ocean steamer he is landed at the outer wharf nearly two miles from the centre of the town and is hurried along in his cab past the chemical works, flour mills, lumber mills, etc., that line the banks of the harbour hereabouts; he catches a fleeting glimpse of the Provincial Government Buildings, which are on his right, as James Bay Bridge comes into sight on his left front, with its unsavoury adjunct the Reclamation. Very slowly and cautiously he is driven across the dilapidated old bridge which is in the last stages of decline, thence bumpity-bump over the worn out macadam of Government Street to his hotel. Should our traveller arrive coastwise from Puget Sound ports or from Vancouver he is discharged, that is the most suitable term, on a dirty wharf crowded with a rather tumble down lot of buildings, and picks his way up the steep outlet to fall into the hands of a yelling mob of hotel and cab touts. To reach Government Street he turns

abruptly into Bastion Street, passes the positively hideous court house, and so on to his destination. Visitor, whom we may presume to be of the genus architect and of an observant and enquiring disposition, takes an early opportunity of critically examining our street architecture, hopeful of finding much of a virile western character to interest him, but is doomed to disappointment, for the buildings prove to be almost wholly flat roofed, two storied structures of a feeble nondescript sort with a monotonous skyline of open parapets and crude cornices; painted brickwork prevails, and our friend quickly realizes that the business portion of Victoria contains little of architectural interest.

We refrain from giving his criticisms of the variegated sidewalks with their playful habit of suddenly letting the wayfarer down a foot or two when he steps on the loose end of a plank—the other end jumping up at him in an alarmingly threatening manner, neither do we judge it wise to repeat his vitriolic comments on the spikes which “stub” his toes and threaten to trip him up.

The first building which attracts attention as a very decided exception to prevailing mediocrity and excites feelings of interest and pleasure is the Bank of Montreal, an excellently well handled little piece of English Renaissance in its modern interpretation, handled with refreshing breadth of purpose and simplicity: the steep roof and the management of the parapet line is delightful, and the architect Mr. F. M. Rattenbury, is to be congratulated on eschewing all galvanized iron sham detail, all painted and striped brickwork and for putting a roof and not a deck on his building. The Banking Hall is pleasingly and carefully detailed, though reasonable objection may be taken to the streaky effect of the marble die of the counter and it seems out of place to surmount fine marble columns with plaster instead of bronze capitals, the impression received being akin to that afforded by the clay feet of the Golden Image, for the effect is somewhat paltry.

The Five Sisters Block though not exactly a new building is one of the more recent improvements, a plain red brick building with mansard roof, with refined detail throughout, marred by its execution in painted metal, a hopelessly lifeless material to design in. The Bank of British Columbia though not lacking a certain degree of dignity is rendered trivial by its overload of cement and metal ornament, some of which is flimsy; the style is a conventional style of Italian; the little single storied Bank of British North America is a quaintly plain piece of granite work with an

entire freedom from the tawdiness that distinguishes so many buildings; the Dricord Hotel from its size and importance as an hostelry next commands attention, which its architectural merits could not earn for it; the Board of Trade Building and the new home of the Colonist newspaper are attempts in that species of American architecture which is described by the ubiquitous reporter—as “That Splendid Block” or “That Handsome Structure,” both having much of the swaggering, braggadocio, painted sand galvanized iron, rock faced stone and tuck pointed brick genus of features which may be more but generally are less original and cannot be deemed architectural.

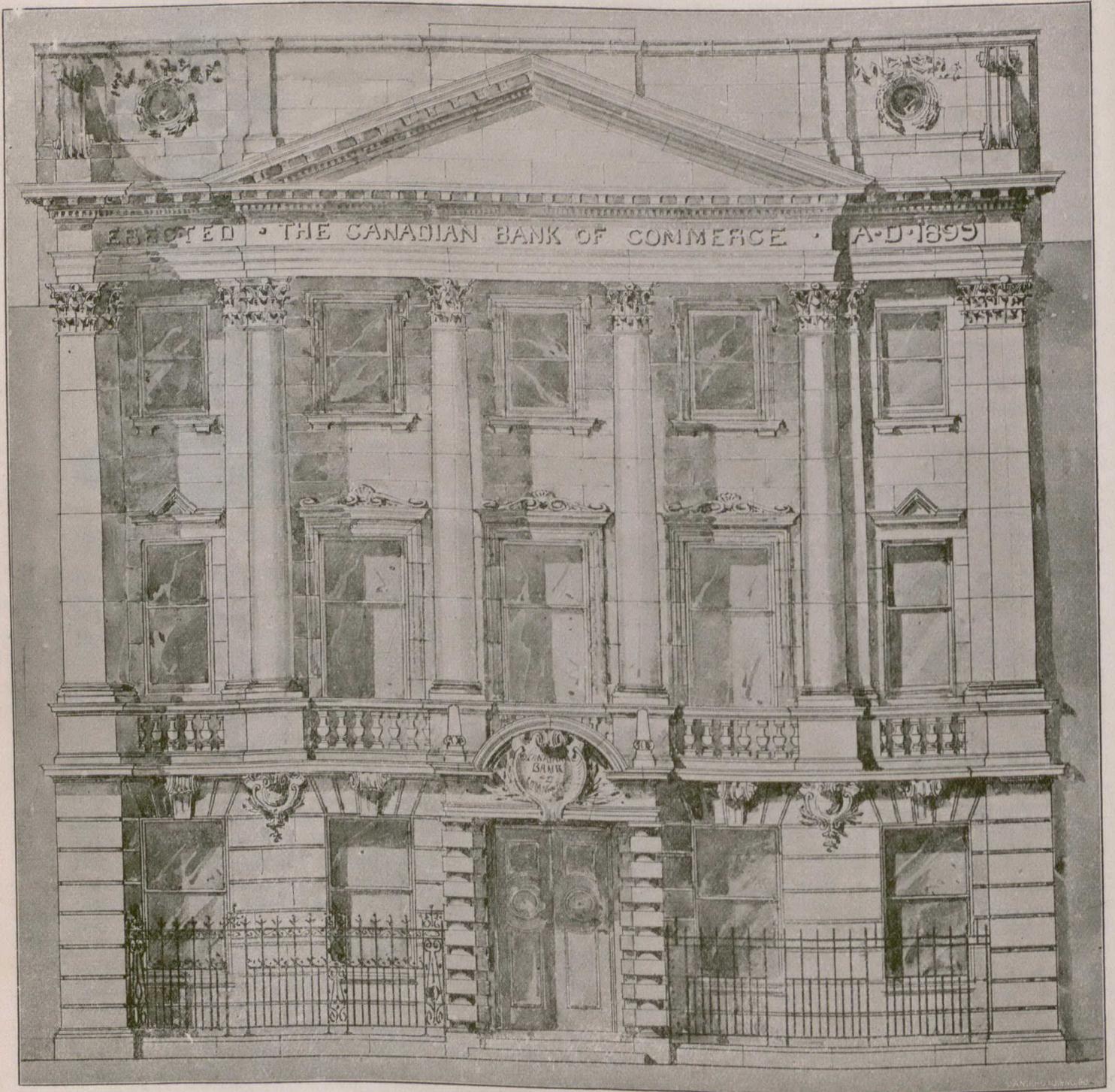
The new Post Office and Custom House occupies a fine site commanding the approach to Government street from the James Bay Bridge and is a big solid mass of stone work, three stories in height, with a great mansard roof. The whole is bold in appearance, designed in a characterless version of modern French Renaissance, but very coarse in detail and uninteresting; the Post Office has a pannelled ceiling, heavy in effect and certainly not beautiful; the screens are quite ugly and the upper portions filled with a vulgar sort of stock pattern description of stained glass contrasting strangely with the huge radiators built of stacks of uncompromisingly utilitarian iron pipes gorgeously arrayed in gold paint. The building as a whole is a fair type of Dominion Government Official Architecture and causes one to deeply regret that this sort of work is not offered to public competition with assessors of known ability and undoubted professional standing, in the manner now commonly adopted by public bodies in the Old Country to the great gain of the British public and of Architecture. This system of competition first revealed to England the wealth of architectural talent she possesses in such men as Aston Webb, Ingross Bell, T. E. Colcutt, E. W. Mountford, Hare, Belcher, Gibson & Russell, Carpenter & Lugdow, Bloomfield, Bryden, Waterhouse, and a host of others, who originally proved their calibre in competition work. But for the wise course adopted by inviting great and small to compete on the fairest of terms for all the important works which 25 years ago were customarily entrusted to the tender mercies of the Town Surveyor or some petty official fossilized by long service in departmental grooves, many of the ablest architects would have never secured the longed-for opportunity; moreover one has but to consult the architectural papers to fully realize the splendid educational work that is done by competitions fairly conducted.

But all this, as Rudyard Kipling says, is another story—still the digression may be excused as a natural one forced from us by sad experiences.

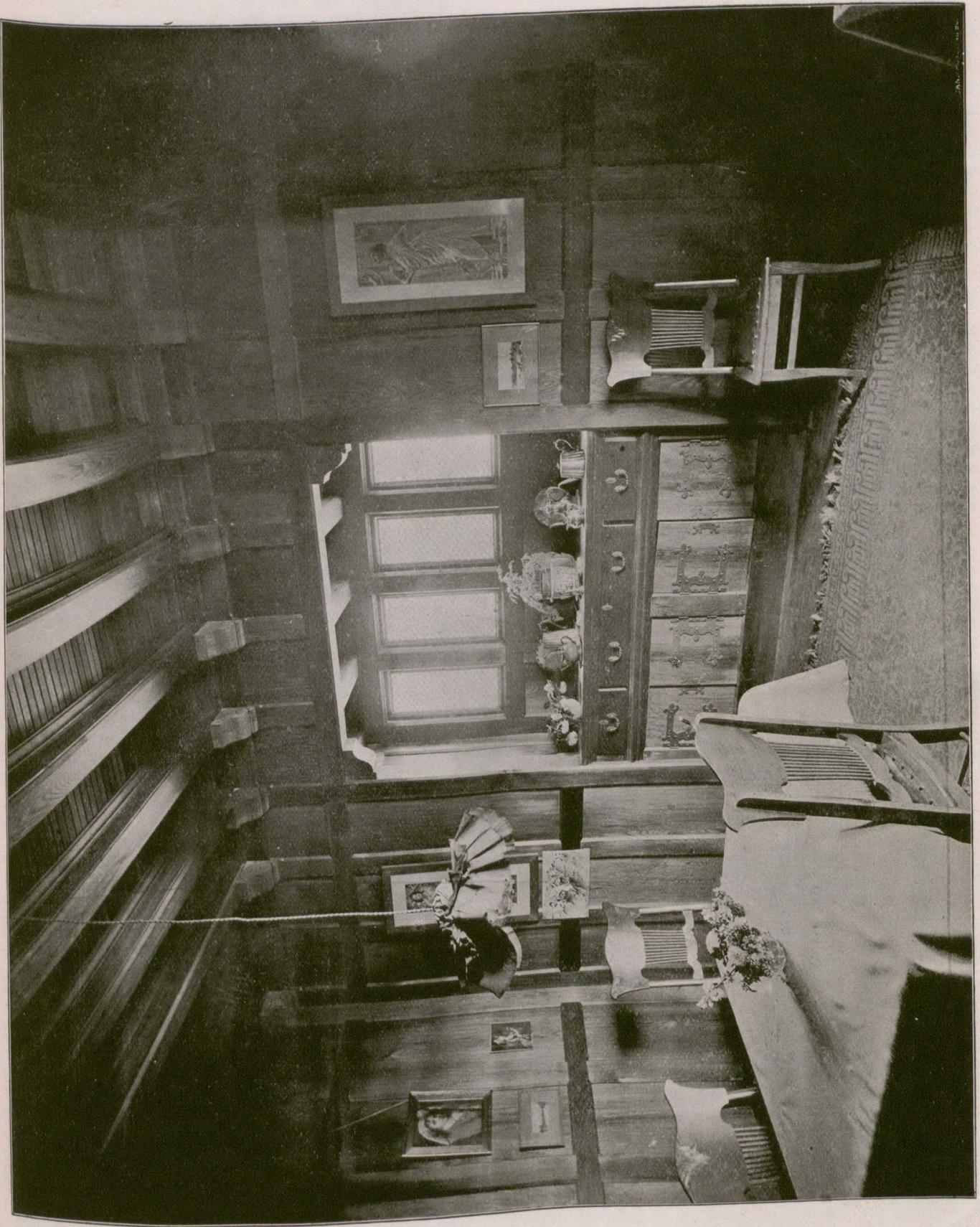
The most important work now in progress is a five-storied flat roofed red brick building on Government Street, designed by Mr. T. C. Sorby for Messrs. Weiler Bros.; it is a warehouse probably 60 x 120 or thereabouts, with three frontages unbroken by any projections except those afforded by string courses and cornices; the building is unpretentious in a good honest “A warehouse is a warehouse,” mode which is distinctly refreshing; the stone fronts are cleverly detailed and the few decorative features are refined throughout.

Though the street architecture of Victoria is not particularly ambitious or interesting, her churches, though more pretentious, are scarcely more successful efforts in design; the R. C. Church is of considerable dimensions and bears evidence that its author had a general acquaintance with a certain phase of modern Gothic, but that he was not intimate with ancient work, the conventional foliage, the moldings and details generally being the rocks upon which he suffered pretty complete shipwreck. An extraordinary edifice in an exaggerated form of the “rock faced” mania, with tin pinnacled buttresses and a roof the grouping of which baffles all efforts to elucidate, is the proud possession of the Methodists. The Anglican Cathedral is an uncompromising box with the all too customary hollow buttresses of “rustic” and a square tower with parapet, all of the same hopeless style; the interior though a modern travesty of a stone construction, has a certain ecclesiastical feeling which is heightened by a good stained East window and a pulpit rail and reredos in oak too evidently new and too good for the building.

That a small town which until very recent years was in a singularly isolated position should possess so much building of a somewhat perfunctory description is not very surprising, and with increased prosperity, great, possibly very great, improvements may be confidently augured. The indifferent materials with which the earlier builders had to work must be accepted as being largely responsible for many shortcomings; bricks no longer require to be painted that they may be weather-proof and fine building



BANK OF COMMERCE, WINNIPEG, MAN.  
DARLING & PEARSON, ARCHITECTS.



MR. MACLURE'S BUNGALOW, VICTORIA, B.C.  
S. MACLURE, ARCHITECT.

stone is now easily obtained at a fair price; steel and iron are not as formerly almost prohibitive in cost: in every direction may be found greater facilities and lower prices, which, together with a demand for sounder methods created by the knowledge of what is being done in other places near at hand will quickly bring about better results.

But it is in her residential and suburban architecture that Victoria shows to best advantage, and it is a pleasant change to leave the business portion of the town and wander along the roads with their oak trees and wild roses, the bracken and the broom growing luxuriantly up to the very macadam. There are to be found many charmingly designed houses with a home-like, cosy air about them, that is really delightful; the close cropped bright green lawns, the well grown hollies, birches, poplars and spreading oaks, the laurels, box hedges, roses, and the wandering, rambling dark green ivy, all combine to create a resemblance to English houses so often claimed for many Victoria homes; as there is perhaps nothing so altogether enchanting as a certain type of English Country House, this is no small praise; better still, it is not altogether undeserved.

Victoria's gardens and the fine panoramic view of the Straights del Fuca and the Olympian Range are her great glories, and indeed neither the gardens nor the view are easily excelled anywhere; the pleasant equable climate too, makes it possible to enjoy both of these advantages to the fullest extent. Moreover the country round about, which is a capital mixture of cultivated and virgin land, is well intersected with roads; perhaps it is but natural that the Victorians should a little neglect the "City" for the outskirts, the attractions of the latter being duly considered.

Though many of the better houses are designed on English lines with red roofs well gabled, and upper stories and gable ends pannelled in a more or less happy imitation of half timber, there are also some very refined examples of American picturesque;—two houses on Rockland Avenue being perhaps the best; they are executed in shingles, are subdued in color and the lines are simple and dignified, relief being afforded by admirable fenestration; the porte cochere in one instance is piquancy itself.

There is a tendency to utilize the rough-cast and half timber effect without restraint and without breadth, a tendency which at times degenerates into positive meaninglessness; there are not a few instances where weather boards have been pannelled to represent half timbering by means of dark painted 1 x 6 framing planted on them; such poor subterfuges cannot be too strongly condemned for they are not even successful as shams; it may be frankly conceded that it is doubtful taste to imitate the old half timber construction by framing panels on rough lining and filling in the spaces with roughcast, still the effect is there when cleverly applied and with feeling, and viewed through the dark green foliage of the oaks is most pleasing.

Many houses have good square halls with brick fire-places which harmonize well with the dark brown tones of the pannelled cedar wainscots and beamed ceilings. Cedar is very freely used in the interior fittings and the plaster walls and ceilings (where not pannelled) are usually kalsomined—indeed both cedar and kalsomine are so much in evidence one is tempted to conclude that there really can be too much of a good thing, especially when it excludes other modes of decoration. Surely in these days of Norris & Dresser wall papers, Voysey, Sedding and Crane friezes, dados and ceilings, place might be found for one or another of the many charming color schemes and all our patterns that can be procured at an expense which is slight compared with the cost of the simplest panneling.

Here, as elsewhere, novelty is too frequently and evidently striven after with the usual results,—strained effects, exaggerations and lack of repose; why should so many gables, which as plain honest gables would be pleasing enough, suffer from violent irruptions of cut and fancy shingles, turnings, fretwork, brackets, finials overladen with detail, setting sun panels, and what not? All these could be discarded to the advantage of the client's pocket, to the infinite gain of the design (which is injuriously affected not enhanced by all this rubbish) and also to the architect himself, by impelling him to more truthful modes of expression, to say nothing of the poor but honest critic who is frequently driven to desperation by the endless repetition of these errors in elementary good taste.

Domestic building in British Columbia is universally executed in timber and that medium will long continue to be principally employed; it has been declared that there can be no such thing as a timber architecture in the higher sense, which may be more or less true, but whoever propounded that theory certainly never intended that it should be inferred that design in timber should be

confined to imitating the features of a nobler order. Timber buildings should bear their origin and construction on their faces in the unmistakable manner that stone and brick structures bear theirs'. When we have had to design in a distinctive manner for the material the above statement may be successfully challenged: at present we are in Jackdaw with-borrowed-feather-stage, the tendency on the part of the Jackaw to moult, the moulting and the rather bedraggled fine plumes producing a truly lamentable result; doubtless the peacock's feathers are sometimes very cleverly applied, nevertheless Jack in his honest coat of sober hue, his pearly grey necktie, together with a sturdy form, strong bill and clear bright eye, is a picture, rustic if you please, but cheerful, self-contained and dignified enough, too.

We look to you, Mr. Editor, to support our plea for greater attention to breadth and simplicity of design, for long lines, wide gables, deep projections and consequently good grouping and fine contrasts of light and shade, plenty of good plain surface; help it to be understood that one carefully drawn moulding, one feelingly profiled turning is better ornament than the most ingenious agglomeration of ill designed detail, and some of the worst features of our timber architecture will become discredited.

### MODERN SYSTEMS OF INTERIOR WIRING.\*

By L. B. CHUBBUCK.

FORTUNATELY, in this climate the small amount of moisture in the atmosphere has practically no effect on inside wiring, though in foggy districts near the sea coast, and especially in England, a great deal of trouble is experienced from grounds caused by a film of moisture forming over the surface of the fittings. In regard to wires imbedded in plaster, the effect on the insulation is uncertain, depending on the composition of the plaster and the covering on the wire. In some cases the alkalies in the plaster soon break down all insulation on the wire, while there are many instances of specimens of wire testing well after being imbedded in plaster for many years.

To prevent any liability of leakage or chemical action on the wire, it is now supported throughout on porcelain knobs or cleats, and where passing through timber or plaster is surrounded by a porcelain tube. In Fig. 1 is shown a sketch of this method of

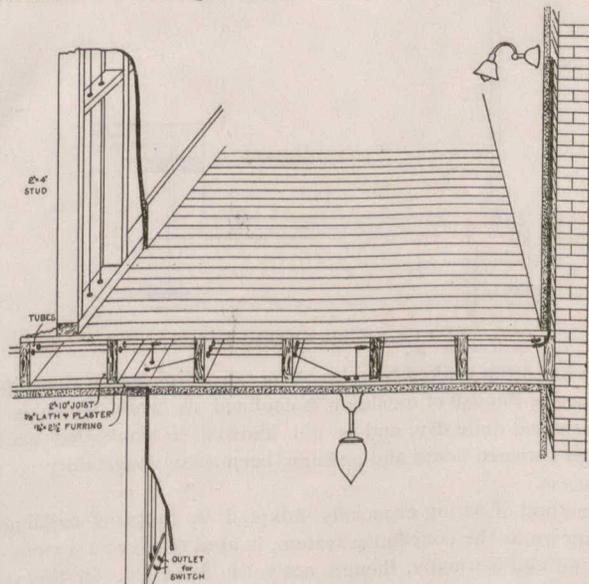


FIG. 1.—PORCELAIN TUBE WORK.

wiring as installed in the ordinary style of building. As may be seen from the figure, there is considerable open space in the partition walls, under floors, and in many cases on the outer brick walls, in which the wiring may be concealed. The joists, studs, etc., are bored to receive the porcelain tubes, and the wires run through these tubes, which are made in different sizes and lengths, depending on the size of the wire and the thickness of the timber they are to pass through. The wiring of the building is most readily done while the building is under construction and before the lathing and plastering is commenced. In finished buildings, where the wiring is to be concealed, the problem is more complicated, and to avoid breaking the plaster, a number of devices are used by different contractors. In passing down the partition walls the best work is done by using bits with shanks that can be lengthened to twelve feet or more, and boring through

\* Abstract of paper read before the Engineering Society of the School of Practical Science, Toronto, and published by permission.

all obstructions in the partition from top to bottom. In passing down the narrow space between the lathing and brick work on outer walls, what is technically termed a "mouse" is used, consisting of a short chain fastened to the end of a cord. This is dropped down the wall and fished out from below; the wires are then drawn up to the outlet in flexible conduit. In order to conceal the wiring under the floors, some of the flooring is taken up, preferably by carpenters, although in small jobs this work is generally done by the electrician himself. Where thick, gummy flooring is encountered, this is a most laborious operation with a hand saw, and a small circular saw is often used to much advantage. The writer has seen a combination of one of these saws geared to a small iron clad motor used for this work, which answered the purpose perfectly. Both saw and motor were mounted on a light wooden frame, by which the saw was moved ahead as the cutting proceeded. The connection to the motor was made by a long twin wire to the mains in the basement.

When it is considered too troublesome or expensive to conceal the wiring in a finished building by lifting floors, etc., the wires are often run in wooden mouldings to diminish the unsightliness of open wires across the ceilings or walls. This class of work is much used on steamboats and is especially adapted to wiring panelled rooms, as the moulding may be made to match the woodwork of the room. Considered from an electrical rather than the decorative standpoint, wiring imbedded in moulding is inferior to wiring supported on porcelain and freely surrounded by air. The dissipation of heat is more easily effected in the latter case than in the former, and in a damp place the moulding will cause leakage, as wet wood is a conductor rather than an insulator. A case was met with recently where a No. 8 wire under the action of electrolysis had been entirely wasted away to a green trace of copper salts, by being imbedded in moulding,

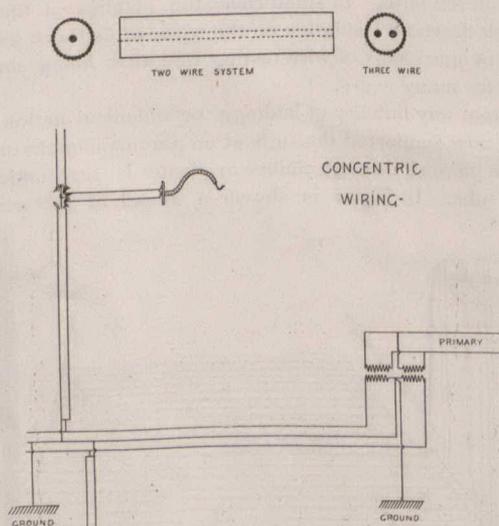


FIG. 2.—CONCENTRIC WORK.

which had been soaked by a break in an adjoining water pipe. In practice the use of moulding is confined to work which is in full view and quite dry, and is not allowed in concealed work, such as between floors and ceilings, because of uncertainty as to dampness.

A method of wiring especially adapted to fireproof buildings, and known as the concentric system, is used to a great extent in England and Germany, though not yet in America. In this system, as illustrated in Fig. 2, instead of using two separate wires, one conductor is enclosed inside of an outer armor, which is used as the other conductor. The inner conductor is a tinned copper wire, which is surrounded with vulcanized rubber, taped and bedded with jute. Over all is bound a layer of galvanized iron wires twisted spirally, forming a complete tube about the inner conductor, and having a conductivity equal to it. For three-wire work, there are two inner conductors, insulated from each other, and from the outer covering, which in this case is used as the middle wire of the system. In both the two and three wire work this outer armor is grounded where the mains enter the building, and at different points along the wiring, if the stretches are long. A case may occur where the terminals of two separate concentrics which are on long circuits come a short distance apart. If one of these cables is fully loaded while the other is idle, there may be a "drop" of 2% on the loaded cable to no "drop" at all on the other, which will cause a difference of potential of 1% between the outers at the ends of the two cables. This under certain conditions is sufficient to set up electrolysis, which in time would destroy the covering of one or both cables

unless they are both well grounded at these ends. For alternating current work, unless for short runs, both conductors must be run in the outer covering, as in the case of a single conductor in an outer iron armor, the drop along the line will be increased by impedance due to the alternating current.

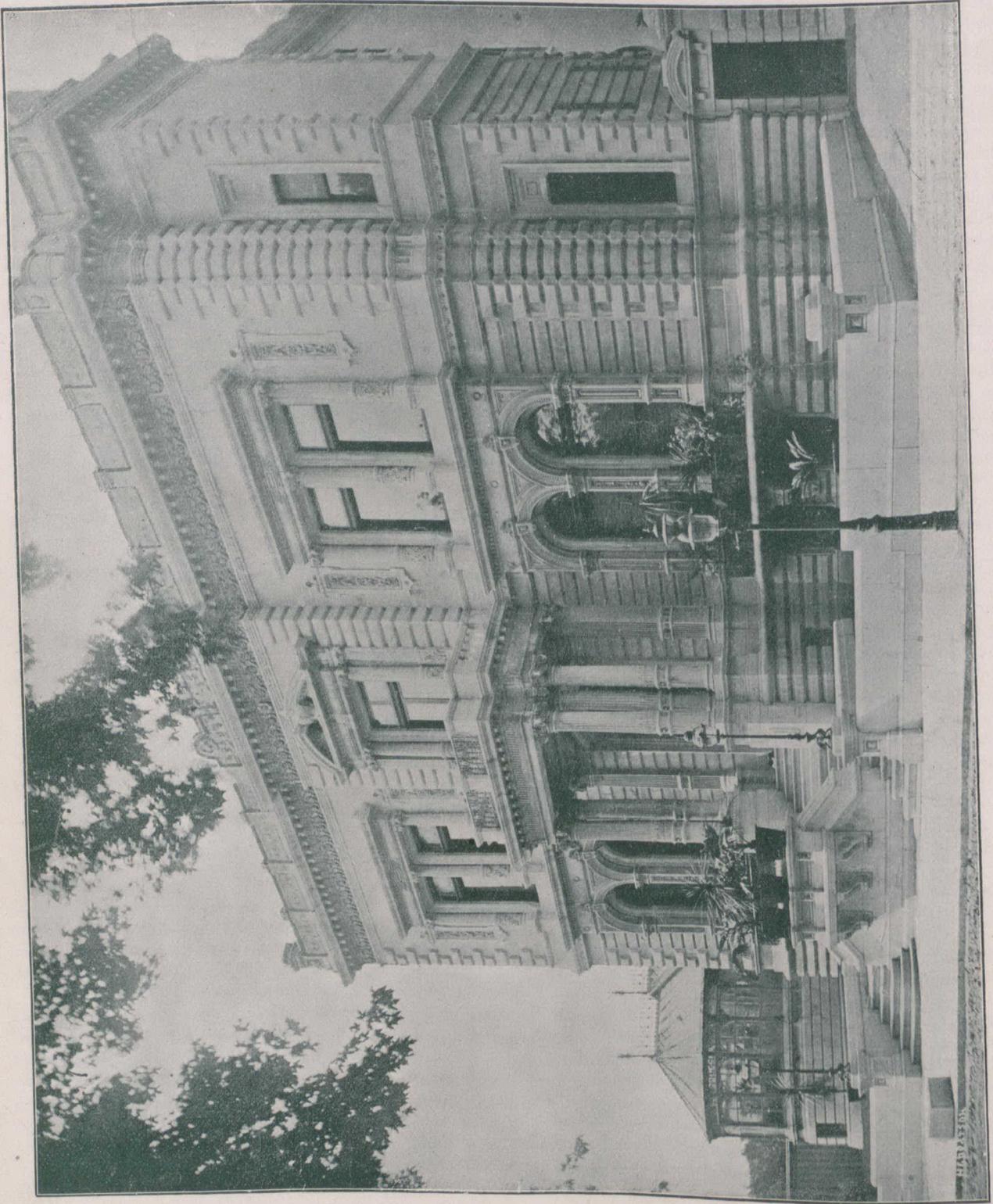
The advantages of the concentric system are, that there is practically only one wire to run, and this may be buried in plaster or run over iron work with impunity. The cable itself also is quite small, being for a No. 12 wire only  $\frac{5}{16}$  in. in diameter, and as no insulators are required it is very easily concealed. Since it is armored, it is unaffected by nails, etc., and in case of any rough usage, such as the rupture of the cable by a chisel, a dead short-circuit is formed, which blows the fuse immediately, without any arc being formed external to the cable. The adherents of this system claim, like Mark Twain, that it is best to put all your eggs in one basket and then "watch that basket." They argue that it is better to put all the insulation on one conductor, and to see that this insulation is well protected, than to have two conductors, each liable to a breakdown. The disadvantages of this system are, first, the obvious difficulty in making the joints, and, second, having the outer grounded, which is a disputed question. This system is used chiefly in isolated plants or in buildings using alternating current and supplied from separate transformers, as there would probably be considerable electrolysis of gas and water mains where there was a network of bare outer conductors all over a city.

The concentric system is not used in America, and in the modern type of fireproof buildings, having brick partitions and floors of brick arches across the steel floor beams, the frail system of wiring on porcelain knobs is unsuitable. There is usually no free space along the floors or in the walls for running the wires, and even if there were such a space, the chances are great that falling mortar or brick would either break the wires or ground them on the steel frame work. To provide protection and accessibility to the wiring in such buildings, the conduit systems have been evolved. As far back as 1885 there are instances of wiring on some steamers being run in small brass pipes. The inside of the pipes was smooth, and as the runs were not long, the flexible cord used was easily threaded through the pipe from one opening to the next. Speaking tubes were tried about this time to act as a channel for the wires, but it was found that the conductors could not be inserted or withdrawn freely, and speaking tubes for this purpose were discarded. Since that time there has been very largely used a tube of papier mache, impregnated with a bituminous compound, to render it impervious to moisture and also to increase its insulation. It was found, however, that when this "plain conduit" was concealed in plaster, it was ultimately destroyed by chemical action. Another form of conduit, called circular loom or flexible conduit, is now used extensively. The inner portion consists of a tube formed by a strip of treated paper wound in a spiral; over this is a braided covering coated on the outside with flakes of mica. Though the inner tube is rather inflammable, the outer tube will withstand quite a flame for some time.

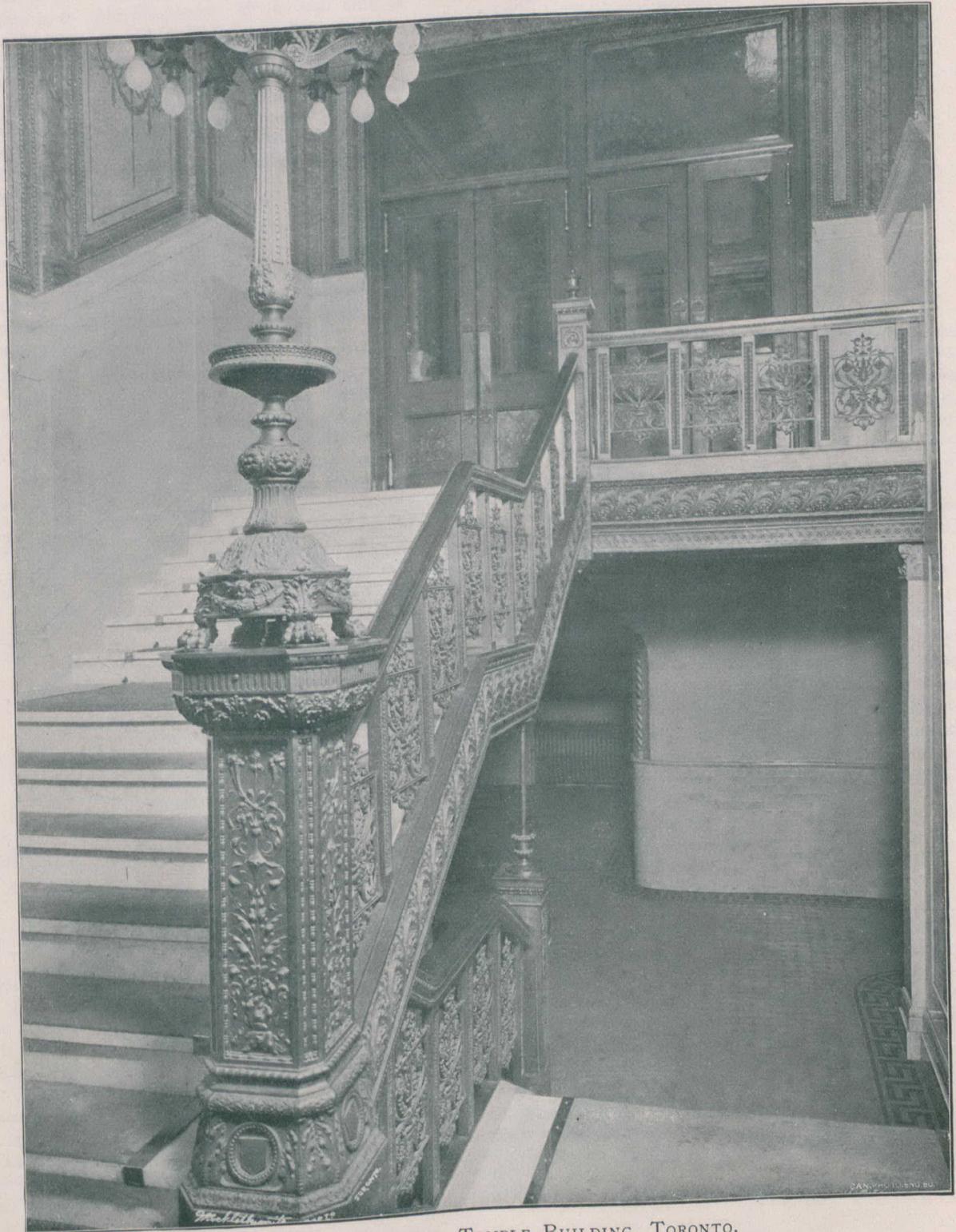
The next step was to cover the plain papier mache tube with a thin brass sheath having a longitudinal seam. This brass armored conduit was thought at one time to be near perfection, but even it was found to have its faults. It withstands chemical action to some extent, but is not completely waterproof, and, like all the preceding forms of conduit, it is very susceptible to mechanical injury. Much of the trouble with brass armored conduit has been due to the poor manner in which it was installed, as moisture entering at the outlets or at poor joints is absorbed by the inner lining, which in time will ground the wires on the outer covering.

Several tests were made in the school laboratories on both the circular loom and brass armored conduit, to determine their insulation under the presence of moisture. These tests were made by the condenser method in connection with an electrostatic voltmeter. It was found that in the case of the circular loom, though of fairly high insulation when dry, the insulation resistance fell off very rapidly under the presence of much moisture. The brass armored conduit tested well when dry, and also with moisture for a short time. When exposed, however, to damp for some time, especially if the armor was defective, the insulation fell off, the effect of grounding being more noticeable in the case of the brass armored conduit than with the circular loom, on account of the metal covering.

For absolute mechanical and moisture protection, the iron armored conduit is now used. It has been made with insulating linings of paper, wood, rubber, cement, enamel and asphaltic compound. The metal tube should be the minimum of metal for strength and rigidity, and the lining, besides being capable of



RESIDENCE OF LORD MOUNTSTEPHEN, SHERBROOKE STREET, MONTREAL.  
W. T. THOMAS, ARCHITECT.



ENTRANCE STAIRCASE, TEMPLE BUILDING, TORONTO.  
GEO. W. GOINLOCK, ARCHITECT.



afterwards inserting the wires they are run to the furthest outlet, and, working back, a loop is left at each of the other outlets, to

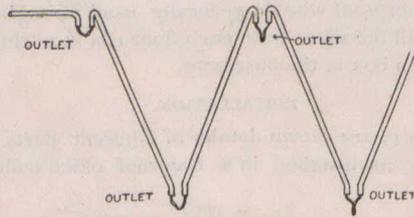


FIG. 6.—LOOP SYSTEM.

which the wires from the fixture are connected. Thus in this "loop system" (Fig. 6) the branch wires are not cut at any place between the panel board and the furthest outlet, so that if larger wires are afterwards required, the different fixtures may be disconnected, the old wires pulled out from end to end, and the larger wires inserted.

Some details of the conduit work on branch circuits are shown in Figs. 7 and 8. It will be noticed that the conduit is run on the

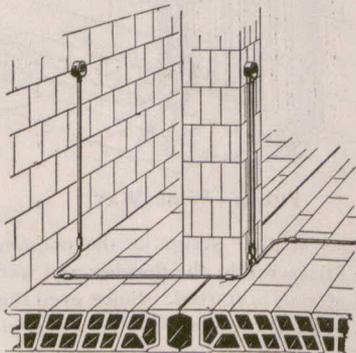


FIG. 7.—DETAILS OF BRANCH CIRCUITS.

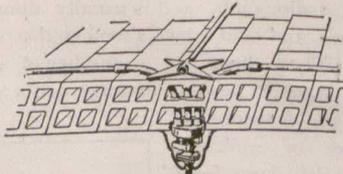


FIG. 8.—DETAILS OF BRANCH CIRCUITS.

brick flooring and not across the ceilings. This is because the plaster on the ceilings is not thick enough to cover the iron armored conduit, and since the brick flooring is afterwards covered by two to four inches of cinders, over which asphalt or the floor boards are laid, the tubes are completely concealed. In both these figures outlet boxes are used, into which the ends of the conduit at the outlet are sealed. These outlet boxes are made of iron, with a lining of the same material as that used in the conduit. Two common forms are shown in Figs. 9 and 10, the first of

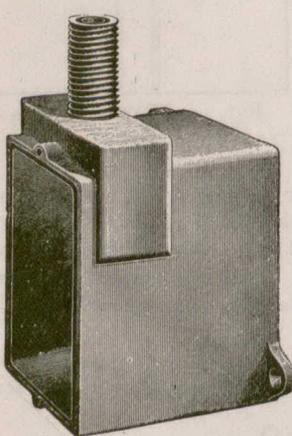


FIG. 9.—OUTLET BOX.

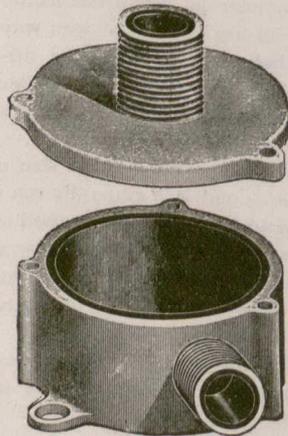


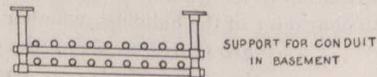
FIG. 10.—OUTLET BOX.

which is an outlet box shaped to act as a receptacle for a flush switch. Fig. 10 gives a form used at a bracket outlet, showing the nipple on the cover by which the bracket is supported. In many buildings, however, outlet boxes are not used, especially for bracket and ceiling lights, the conduit being trimmed off nearly flush with the plaster and the fixture connected up in the usual manner. When one or more branches are to be tapped off the mains for an electrolier, etc., a "junction box" is used. These are very similar to outlet boxes and often contain a branch cut out, making them practically a distribution box on a small scale

The wiring in the basement is usually run open, i.e., not concealed in the plaster, and is often run in flexible conduit or on porcelain knobs, though for fireproof work the iron armored conduit is continued to the switchboard. A very useful support, made from gas pipe, for carrying the conduit in the basement is shown in the upper portion of Fig. 11. This figure also shows a form of switchboard suited to the feeder system in Fig. 3, each pair of feeders being controlled by a double pole switch.

It is not permitted when installing the conduit to run cords in the stretches as they are put up, to facilitate pulling the conductors through afterwards, as this might make poor construction possible; that is, it would be an easy matter to pull even large wire through a conduit having rough, poorly made joints, which would abrade the insulation on the wire. When the wire is run through the conduit properly, it is practically a guarantee that the conduit has been well installed or the conductors could not be inserted. For this same reason, it is important to have all necessary curves as gradual as possible or difficulty will be had in running the wire afterwards. In making a correct joint in iron armored conduit, a wheel pipe cutter is used to cut merely through the outer iron armor, a hack-saw being used to saw through the lining. A reamer is then used to trim up the end of the conduit before it is threaded. A jack-knife is often used instead of the reamer, but a poor job is generally the result. Care should also be taken that the white lead used in sealing the joint does not get between the ends of the conduit. This can be prevented by giving the coupling a turn or two on the conduit, and then applying the lead to the thread on the outside of the conduit.

The actual wiring of the building by running the conductors through the conduit is not done till all the plastering, flooring,



SUPPORT FOR CONDUIT IN BASEMENT

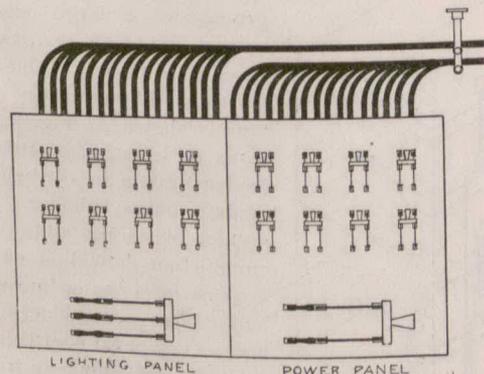
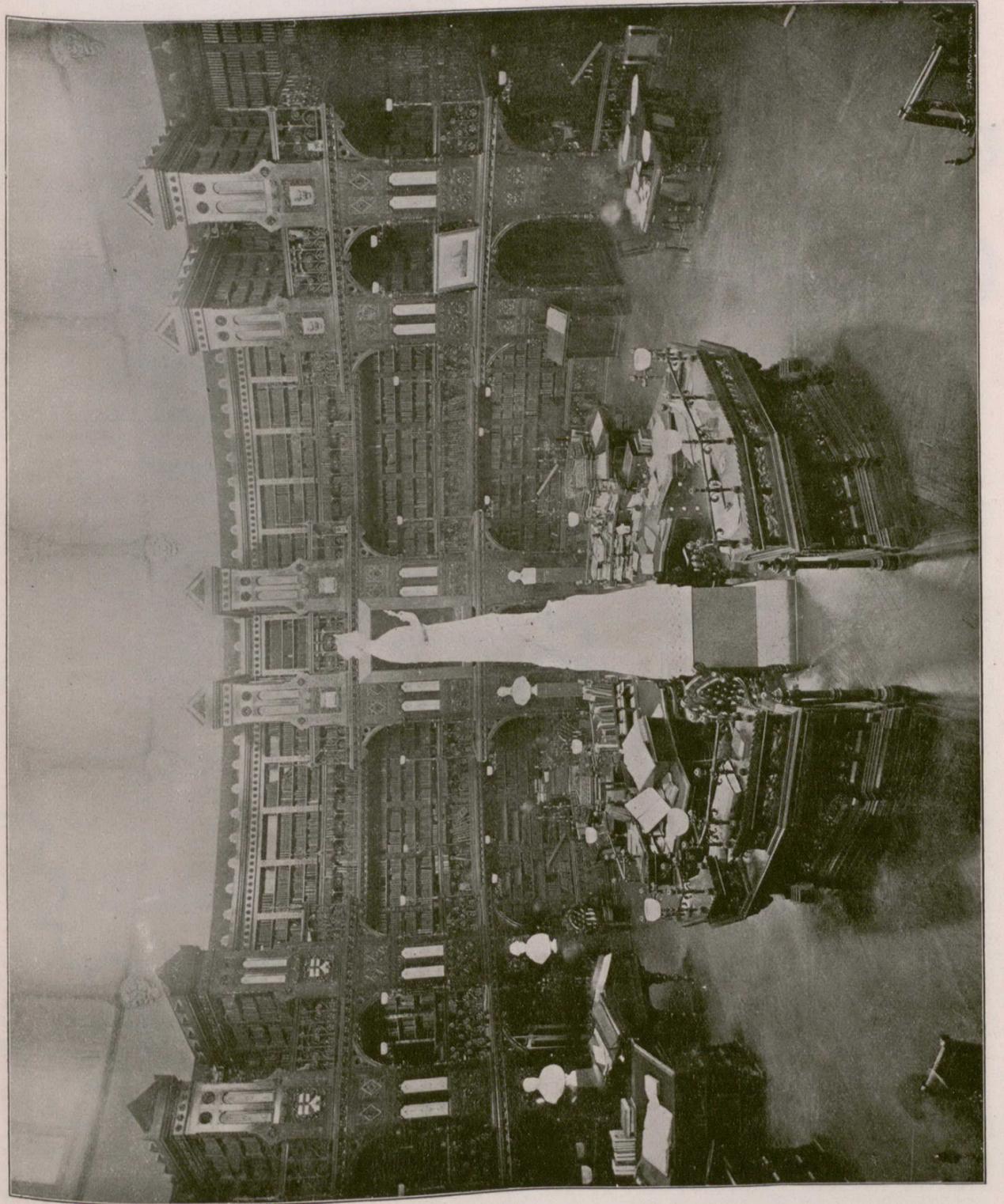
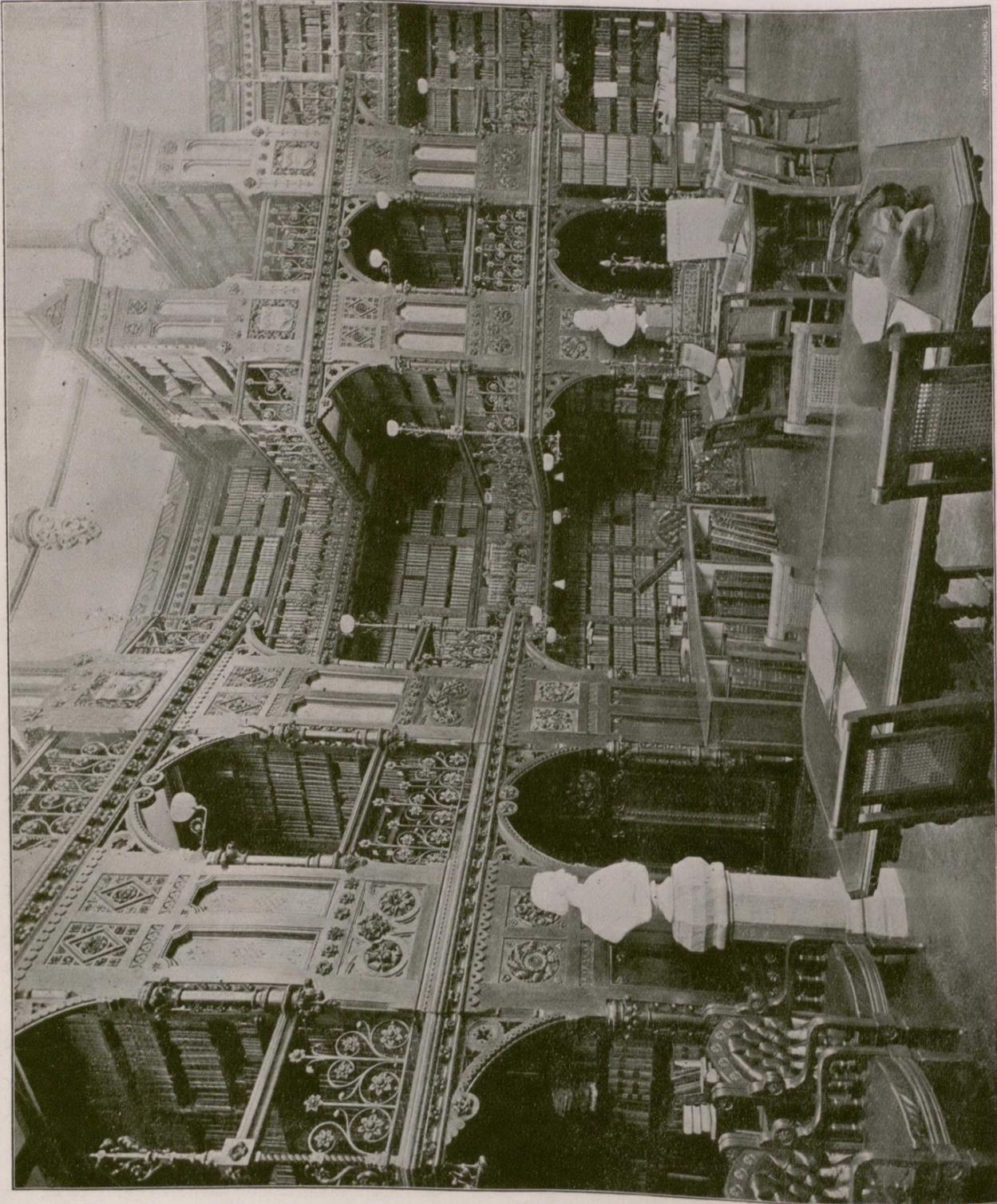


FIG. 11.—SWITCHBOARD.

etc., is over and the building is nearly finished—in fact, the wires are often run and the fixture work done at the same time.

There is not much difficulty in running the risers or feeders, as the conduit is large, and the wire, where larger than No. 6, is generally a stranded conductor. On the horizontal branch circuits, however, with many turns and using twin wire, the problem is not so simple. The inside surface of the conduit is first rendered smooth by blowing some powdered soapstone out of a horn through a section of the conduit. A steel tape about  $\frac{3}{16}$ " wide and as thick as a clock spring is then passed through the conduit, after which the wires may be run. The tape is always run downwards if possible from a higher to a lower outlet. An ordinary stretch for a run is from fifty to eighty feet with three or four turns, though it is sometimes possible to thread the steel tape nearly two hundred feet on a horizontal run.

In conclusion, it may be stated, that on account of the high standard of insulation now used on wire, any system of wiring is practically perfect where the insulation is protected from mechanical and chemical injury. The system to be employed in any special case depends on the circumstances. In some cases one system may be perfect, while in others it is expensive and unnecessary. In the best practice iron armored conduit is used in fireproof buildings or where the wiring is embedded in plaster or brick work. For the ordinary class of buildings with wooden joists, etc., where there is no liability of mechanical abuse, porcelain work is perhaps as good a system as can be used. In any case, where the wiring is properly done, the incandescent electric light—in contrast to the explosive and poisonous character of ordinary lighting gas—is probably the safest method of illumination yet devised by man.



PARLIAMEN  
 CHAMBER, OTTAWA.  
 MESSRS. FULLER & JONES, ARCHITECTS.

ILLUSTRATIONS.

- MR. MACLURE'S BUNGALOW, VICTORIA, B.C.—S. MACLURE, ARCHITECT.
- BANK OF COMMERCE, WINNIPEG, MAN.—DARLING & PEARSON, ARCHITECTS.
- ENTRANCE STAIRCASE, TEMPLE BUILDING, TORONTO—GEO. W. GOINLOCK, ARCHITECT.
- RESIDENCE FOR MR. JAMES JERMYN, ROSEDALE, TORONTO—A. FRANK WICKSON, ARCHITECT.
- STUDY FOR BUSINESS PREMISES, WITH DWELLING ABOVE—ROBT. M. FRIPP, F.R.I.B.A., ARCHITECT.
- RESIDENCE OF LORD MOUNT STEPHEN, SHERBROOKE STREET, MONTREAL—W. T. THOMAS, ARCHITECT.
- TINTERN ABBEY, WEST DOOR—MEASURED DRAWINGS BY STEPHEN A. HEWARD.

Tintern Abbey is in Monmouthshire, and is of easy access from Bristol or Clifton across the Channel.

To the student in search of Gothic examples, Tintern gives excellent opportunities of study—the condition of the ruins inside the abbey, being such, ruinous enough yet not too much so, as to allow of examining many details that are on the ground and of also seeing them in position in other places—one of the advantages of a ruin.

but externally both it and the aisle are 16 sided. At each external angle of the building is a flying buttress to resist the thrust of the vaulting originally designed to be of stone, but which idea was subsequently abandoned and a plastered ceiling simulating the interlacing ribs of the original design substituted.

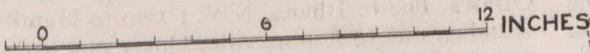
The inside diameter of the dome is 87 ft. 6 inches, and its height 140 ft.; the outside diameter of the building, 127 ft. exclusive of buttresses, but 146 ft. inclusive of buttresses.

The walling is of local limestone faced with local sandstone and the dressings of sandstone from Ohio, excepting the voussoirs of the flying buttresses, which are of heavy bedded local limestone. The roof and lantern have iron principals, wooden rafters and wooden roof boards covered with copper. The inside walls and dome are plastered.

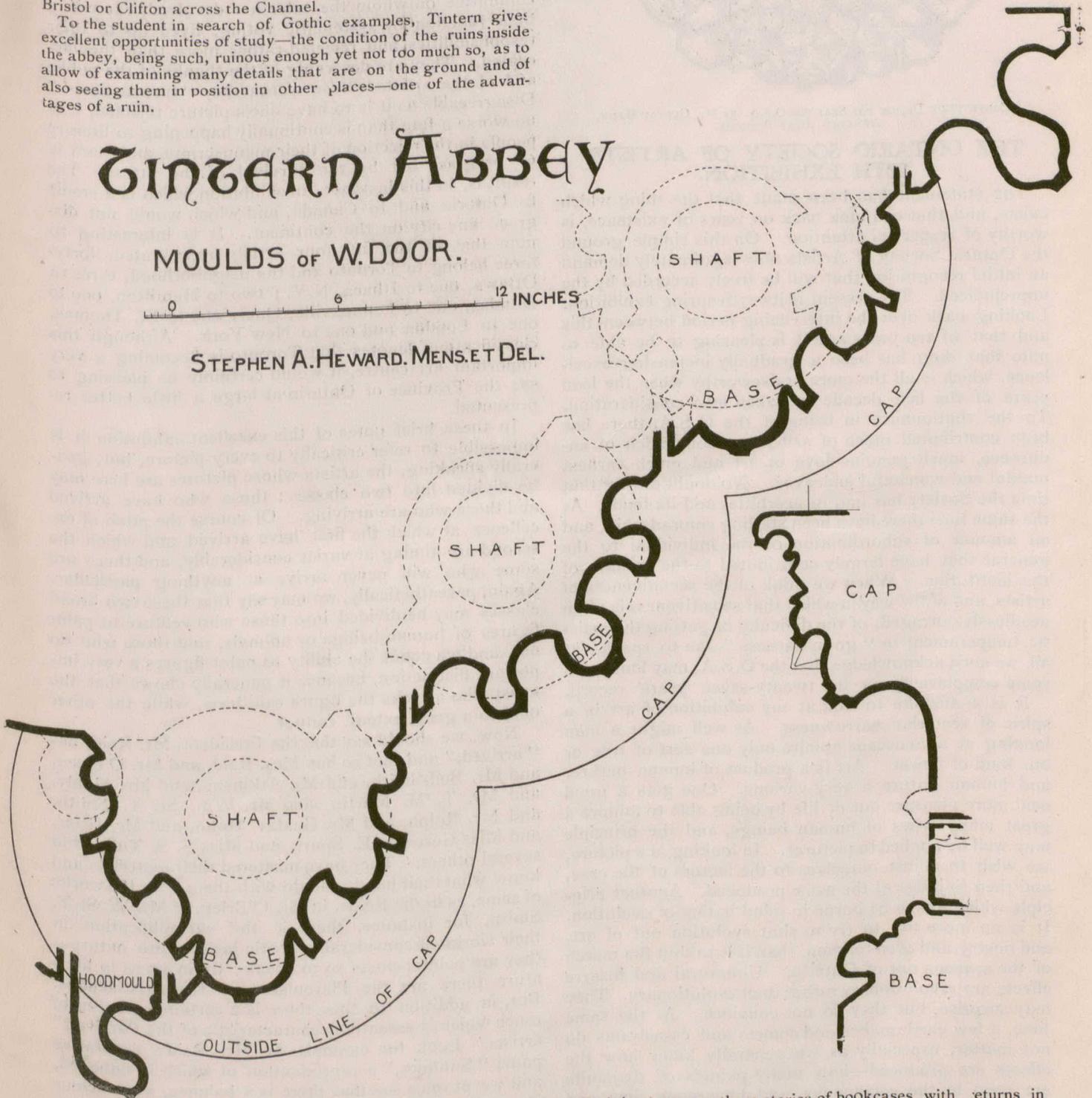
In the circular interior wall of the dome is a door corresponding to each side of the outer wall, one of which doors leads into the Parliament House, one to an external entrance, and the others to the rooms into which the lean-to is divided. Against the circular

# TINTERN ABBEY

MOULDS of W. DOOR.



STEPHEN A. HEWARD. MENS. ET DEL.



The West Door, the subject illustrated in this number is a fine specimen of 13th century work.

PARLIAMENT LIBRARY BUILDING, OTTAWA—MESSRS. FULLER & JONES, STENT & LAVER, AND THOMAS FULLER, ARCHITECTS.

Although usually spoken of as a separate building, it forms part of the Parliament building. It was included in the original design for which Mr. Fuller received the first premium in 1859, and the building as completed conforms closely to the original design. Construction was commenced in 1860, but when the buildings were occupied in 1866 the library walls were covered in above the lean-to. In 1868 the construction was resumed, but it was not until 1877 that the building was completed and fitted up for occupation.

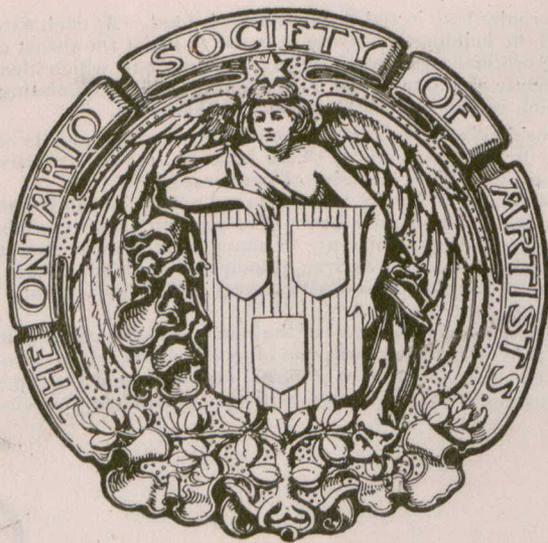
The building consists of a dome surmounted by a lantern and surrounded by a lean-to aisle. Internally the dome is circular,

wall of the dome are three stories of bookcases with returns inwards towards the centre at each door, leaving a radial passage on floor and each gallery. All the bookcases and galleries are of white pine, the gallery floors ground glass, and the railings wrought iron. The woodwork is elaborately carved in floral designs. The flooring of the dome is in Canadian woods.

In the centre of the floor space is a pedestal supporting a marble statue of Her Majesty the Queen.

The dome receives its day light through large clerestory windows and from the lantern; by night incandescent electric light is used.

The heating is indirect from stacks of steampipes in a cruciform passage which divides the basement plan into quadrants. This passage is directly over subterranean air ducts leading from the face of the cliff and the fresh air therefrom when warmed by the steam coils passes up through the floor in large tubes terminating several feet above the floor line in brass registers.



COMPETITIVE DESIGN FOR SEAL FOR O.S.A., BY MR. GUSTAV HAHN,  
AWARDED FIRST POSITION.

### THE ONTARIO SOCIETY OF ARTISTS' 27TH EXHIBITION.

THE statement has been made that the thing which exists, and that can look back on years of existence, is worthy of respectful attention. On this simple ground the Ontario Society of Artists may legitimately demand an initial recognition that will be freely accorded by the unprejudiced. The present is its 27th spring exhibition. Looking back over the intervening period between this and that of ten years ago it is pleasing to be able to note that there has been a gradually increasing excellence, which is all the more praiseworthy when the lean years of the last decade are taken into consideration. To the continuance in being of the O.S.A. there has been contributed much of self-repression, much of endurance, much genuine love of art and much earnest manful and womanful endeavor. No doubt during that time the Society has had its acerbities and its feuds. At the same time there have been sterling comradeship, and an amount of subordination of the individual to the general that have largely contributed to the welfare of the institution. When we think of the sensitiveness of artists, and of the way in which that sensitiveness is often needlessly outraged; of the difficulty of getting the artistic temperament to "go in harness"—so to speak—at all, we must acknowledge that the O.S.A. may look with some complacency on its twenty-seven years' record.

It is a mistake to look at any exhibition of art in a spirit of sectarian narrowness. As well might a man looking at a landscape admire only one sort of tree or one kind of flower. Art is a product of human nature, and human nature is very various. One gets a good deal more pleasure out of life by being able to admire a great many types of human beings, and the principle may well be applied to pictures. In looking at a picture, we wish to adjust ourselves to the factors of the case, and then to judge of the work produced. Another principle which has to be borne in mind is that of evolution. It is no more use to try to shut evolution out of art, and poetry, and even religion, than it is to shut the march of the seasons out of Ontario. Unnatural and bizarre effects are revolutionary rather than evolutionary. They may surprise, but they do not convince. At the same time, a few earthquakes and comets and cataclysms do not matter, especially as we generally know how the effects are produced—how many pounds of dynamite are used in the earthquake, and how much lime and oxyhydrogen gas it takes to "work" the comet across the stage. The path of progress in art is the good old path of evolution, let those climb by means of balloons and strange Daedalic flying machines who will.

But it is time to say something about the pictures.

Place aux Dames: The women painters who are represented here are:

M. E. Dignam.	A. Hime.	S. S. Tully.
E. Douglass.	M. H. Holmsted.	C. Vandenberg.
E. Elliott.	L. Muntz.	H. M. Vickers.
C. E. Galbraith.	M. H. Reid.	E. Windeat.
C. S. Hagarty.	G. E. Spurr.	M. E. Wrinch.
W. D. Hawley.		

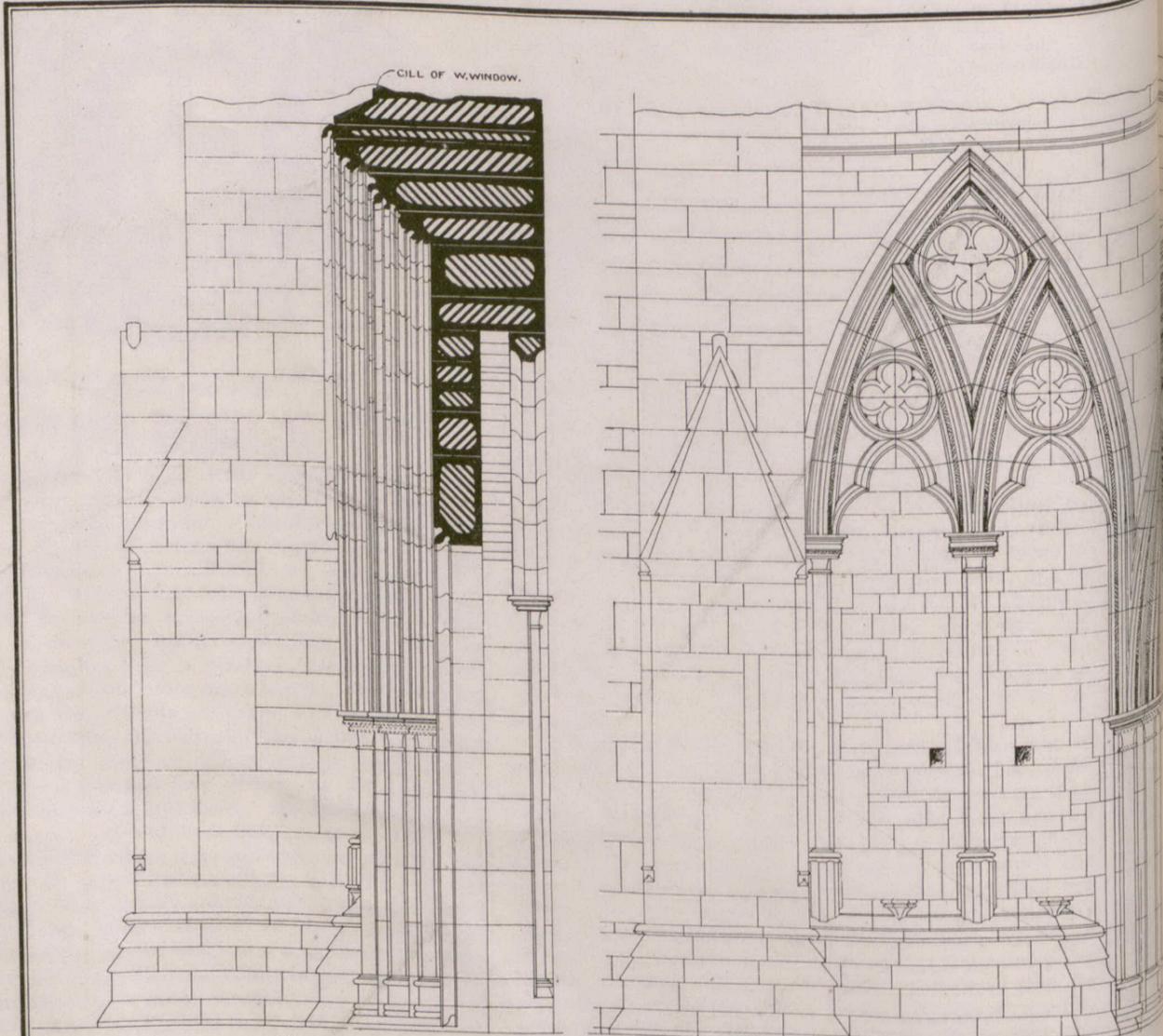
The men are:

C. Ahrens.	R. F. Gagen.	L. R. O'Brien.
W. E. Atkinson.	J. S. Gordon.	S. Pendleton.
F. S. Baker.	E. W. Grier.	J. A. Radford.
J. W. Beatty.	G. Hahn.	G. A. Reid.
F. M. Bell-Smith.	S. A. Heward.	W. Robins.
W. D. Blatchly.	F. McG. Knowles.	J. T. Rolph.
F. H. Bridgen.	J. E. Laughlin.	W. A. Sherwood.
J. A. Browne.	H. Martin.	W. St. Thomas Smith
P. F. Brownell.	T. M. Martin.	H. Spiers.
F. S. Challenger.	C. M. Manly.	O. Staples.
J. C. Forbes.	M. Matthews.	E. S. Thompson.
J. W. L. Forster.	E. M. Morris.	J. Willson.
E. Fosberry.	C. E. Moss.	

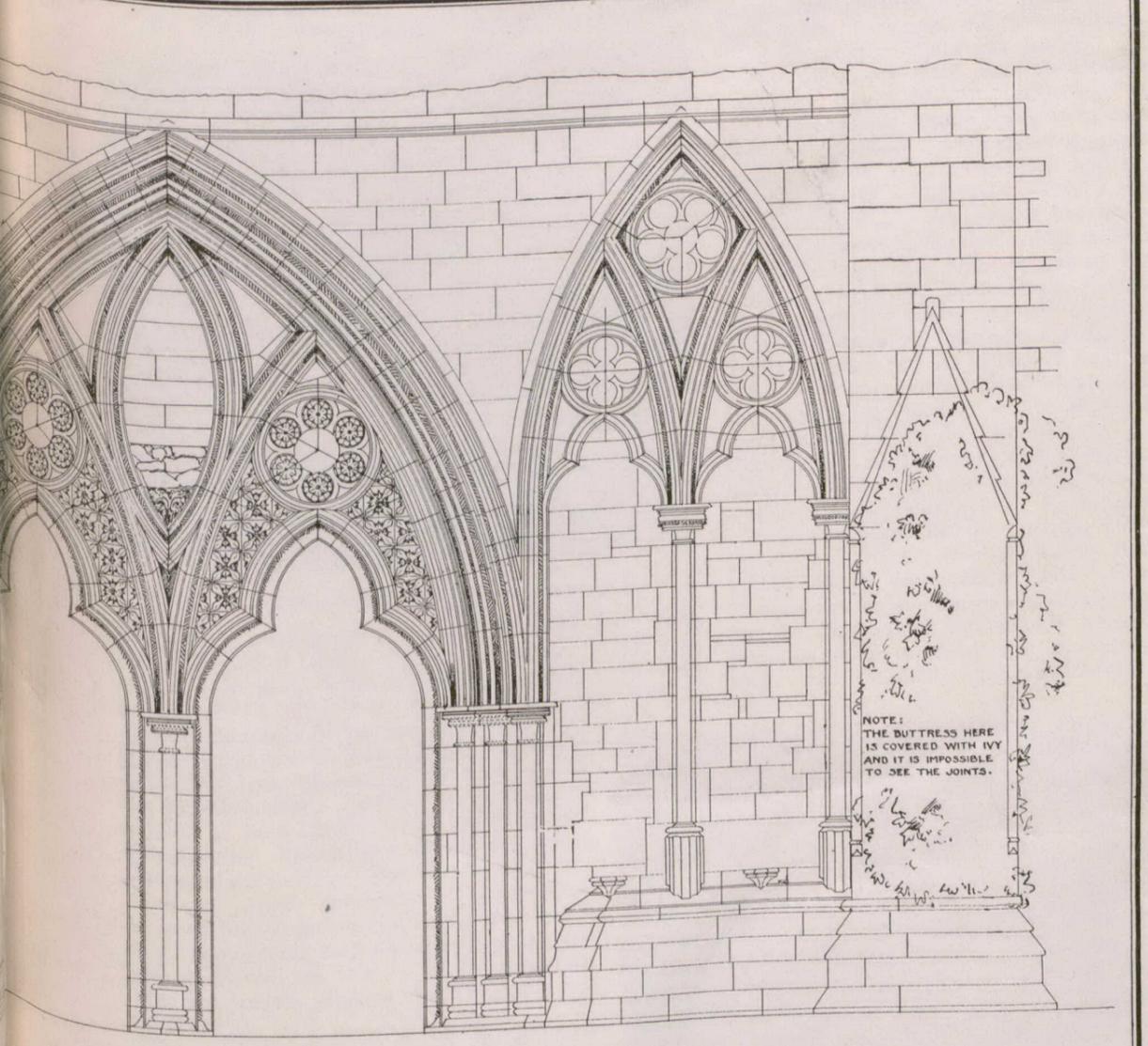
Here then we have the selected work of no fewer than fifty-four artists, and it is understood that this year the committee on whom the selection devolved, exercising their function by systematic voting, lived up to their responsibilities and rejected rather more than they accepted. They are deserving of the thanks of the public and of the artists whose works they "turned down." Disagreeable as it is to have one's picture rejected, it is no worse a fate than is continually happening to literary people in the rejection of their manuscripts, and there is no progress but by the survival of the fittest. The result is, in this instance, an exhibition which is a credit to Ontario and to Canada, and which would not disgrace any city on the continent. It is interesting to note that of the fifty-four artists represented, forty-three belong to Toronto and the neighborhood, three to Ottawa, one to Ithaca, N.Y.; two to Hamilton, one to Dundas, one to Lennoxville, Que.; one to St. Thomas, one to London and one to New York. Although this classification denotes that Toronto is becoming a very important art centre, it would certainly be pleasing to see the Province of Ontario at large a little better represented.

In these brief notes of this excellent exhibition it is impossible to refer critically to every picture, but, generally speaking, the artists whose pictures are here may be divided into two classes: those who have arrived and those who are arriving. Of course the pitch of excellence at which the first have arrived and which the second are aiming at varies considerably, and there are some who will never arrive at anything particular. Again, parenthetically, we may say that these two broad classes may be divided into those who venture to paint figures of human beings or animals, and those who do not, and we count the ability to paint figures a very important distinction, because it generally shows that the artist who attacks the figure can draw, while the other one, to a great extent, cannot.

Now, we should say that the President, Mr. Reid, has "arrived," and that so has Mrs. Reid, and Mr. O'Brien, and Mr. Bell-Smith, and Mr. Atkinson, and Mr. Manly, and Mr. T. M. Martin, and Mr. Wm. St. T. Smith, and Mr. Rolph, and Mr. Gustav Hahn, and Mr. Grier, and Miss Gertrude E. Spurr, and Miss S. S. Tully, and several others. They have mastered their materials and know what their hands can do with them. In the works of some, as in the Reids, in Mr. O'Brien, in Mr. W. St. T. Smith, for instance, there is the exemplification in their works of considerable poetic insight into nature—they are painter-poets so to speak; for in art as in literature there are the Platonists and the Aristoteliens. But, in addition to this, there is a certain sureness of touch which is essentially characteristic of the "arrived" artists. Look for example at Mr. Reid's decorative panel "Summer," a reproduction of which is annexed, and we at once see that there is a balance, a conscious strength, a dignity about it which mark a very high pitch of artistic achievement. There is no striving for effect, because there is no necessity for it. Similarly in Mr. F. M. Bell-Smith's "Stoney Indian Camp, near Canmore, N. W.T.," though the work lacks the imagination and invention that we find in Reid's panel, it depicts nature with a considerable amount of masterly handling, and with a keen perception of what paint and brushes can be made to do, and these come only by long experience and severe study. All the Northwest pictures in the show, by the way, are the work of "arrives." T. Morver Martin's "The Asulkan Glacier, B.C." is no work of the flux period of the artist;



SECTION



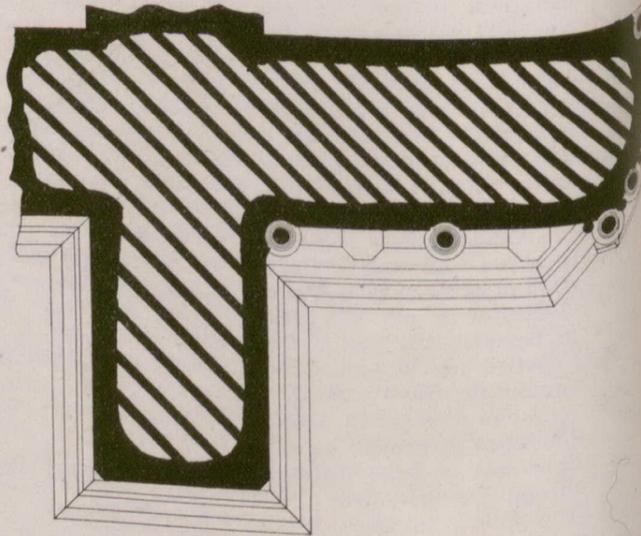
ELEVATION

NOTE: THE BUTTRESS HERE IS COVERED WITH IVY AND IT IS IMPOSSIBLE TO SEE THE JOINTS.

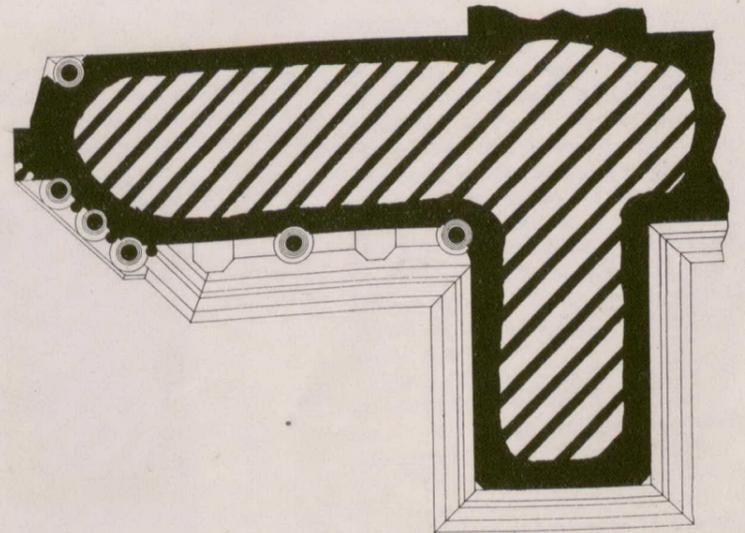
TINTERN ABBEY  
WEST DOOR

SCALE OF FEET

NOTES: THE DIAPER WORK IS ONLY HALF FINISHED AND BEARS TRACES OF COLOUR - (RED). THERE ARE TRACES OF PLASTER AND FRESCO WORK IN THE NICHE AT SIDES, WHICH ACCOUNTS FOR THE ROUGHNESS AND UNEVEN JOINTING OF THE STONWORK THERE. THE SHAFTS IN ALL CASES HAVE DISAPPEARED AND BASES ARE MUCH DAMAGED, ALSO PEDESTALS IN NICHE AT SIDES. AMONG THE RUINS OF THE ABBEY ARE THE REMAINS OF A STATUE WHICH APPEARS TO HAVE BEEN THAT OF A MADONNA AND CHILD - IT IS ABOUT THE SIZE OF THE CENTRE NICHE AND MAY AT ONE TIME HAVE BEEN THERE. THE NICHE IS HALF FILLED UP WITH LOOSE STONES AND ONLY HALF OF THE CARVED PEDESTAL EXISTS.



PLAN



STEPHEN A. HEWARD MENS. ET DEL.

it is certainly one of the best of that mountain region that he has produced, nor is Matthews' fine water-color "The Canyon at Evening," nor Bell-Smith's finest picture in the Exhibition, "The Heart of the Selkirks." Again, as fine examples of the "arrived" period, take any of Mr. C. M. Manly's. His "World of Heather,"



"RACHEL'S TOMB, BETHLEHEM."—F. S. CHALLENGER, A.R.C.A.

his "The Creeping Mists Came in," and his "The Silver Thread of Jerson," show a mature capacity in that style of work which is always delightful. Or look at Rolph's "A Hillside at Weston," and you have a perfect example of Rolph, one of the Rolphiest Rolphs we have ever seen. And in "Evening in the Barbican, Plymouth," we have one of the Smithiest of W. Smith's. It is just this quality of individuality, this adult characterism, this signed-all-over quality, that marks what we have ventured to call the "arrival" period. Of course those who have come to this stage—some earlier and some later—may please us from year to year with new combinations—the world is great and there are endless subjects and ways of treating them.

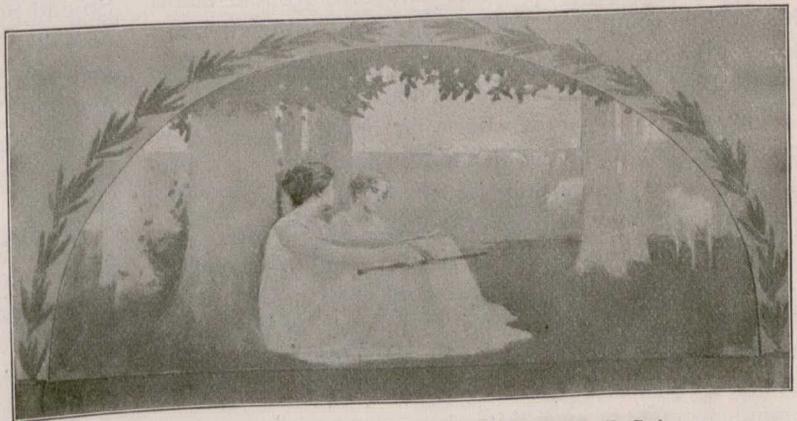
It seems strange not to put Mr. McGillivray Knowles into this category, but for the reason that he is such an adventurous voyager, turning his prow now here and now there, we must put him in the other. His boast is well-founded. Dropping the metaphor, Mr. Knowles can draw, he is a great colourist, and he sees things. His striking picture of Psyche, which occupies



"PSYCHE."—F. MCG. KNOWLES.

the place of honor in the exhibition this year, is one of the sort of pictures that lift an exhibition out of mediocrity, and as a beautiful work of art it has had few

rivals on these walls. The little nude "A Woodland Nymph" also does him much credit, while the "Bit on the Thames" shows the versatility and vitality of this accomplished artist. Miss Laura Muntz is another adventurous voyager in whose prowess one cannot but rejoice. Her pictures live. Those who remember her work a few years ago will acknowledge with pleasure a considerable increase of power. A little more restraint will come later, now she riots in strength and vitality. Her "Mussell Gathering," and her "Lullaby," are in our humble opinion the cleverest TOURS DE FORCE in the show. Miss Clara Hagarty has force that struggles with conventionalism and discipleship; her two fine portraits, however show a considerable advance on former work, and a human characterization that gives them distinction; they undoubtedly hold the first place in point of interest among the portraits exhibited. Mr. F. Gagen has made notable progress during the past few years, and his oil-painting "A Calm Summer Afternoon" with its red rocks, its water, its floating clouds and its feeling of heat, is a decided advance on former work. His "Just above High Tide," is also pleasing, and his other four watercolours are meritorious, as are also Mr. W. D. Blatchly's "The Path by the Mill Race" and "Morning Light," on both of which we heartily congratulate him, as they show conspicuous progress. F. S. Challener, has the root of the matter in him, and his pictures are always interesting. His "Rachel's Tomb, Bethlehem" is full of the Eastern atmosphere. His "Conscience Makes Cowards of us all" appears to be a picture with a story, but the story is not immediately apparent. The nude feminine ghost is clever and the accessories satisfactory. Mr. Challener has imagination. Mr. J. Arch-



DECORATIVE PANEL, "SUMMER."—G. A. REID, R.C.A.

Browne's "Clearing," a landscape showing the wind in autumnal trees is an effective effort and shows considerable strength of handling. Mr. Edmund M. Morris has two pictures one of which, "Landscape," is decidedly attractive as a powerful sketch, showing good colour and considerable dash, the other, "At the Docks," mixed as to colour, and with no regard for composition. We like Mr. Owen Staples' "Hollyhocks" better than we do his "Changing Pasture, the cow broadside on and taking up so much of the picture, though admirably drawn, is in our opinion hardly up to the artist's pictorial mark.

The water-colours demand a special notice and we are sorry that we have room but for the barest mention. Mr. F. H. Bridgen is decidedly improving and has several very clever sketches. Mr. J. S. Gordon's "A Tiff," is ambitious and clever. Miss Wilhelmina D. Hawley's "Cold Bath" and "Cleaning Brass" are exceedingly brilliant both in drawing and color.

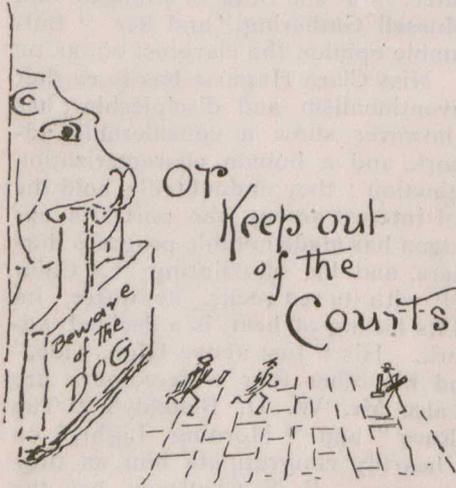
There are so many pictures in the exhibition that call for notice that we regret very much that the space allotted to us prevents us from doing more than thus noticing a few salient points.

BERNARD MCEVOY.

Mr. William Bryce Mundie, a former resident of Hamilton, Ont., has recently been appointed architect to the Chicago Board of Education.

## STUDENTS' DEPARTMENT.

"When we mean to build  
We first survey the plot, then draw the model;  
And, when we see the figure of the house,  
Then must we rate the cost of the erection;  
Which, if we find outweighs ability,  
What do we then, but draw anew the model  
In fewer offices, or, at least desist  
To build at all."—Shakspeare.



YOUNG men studying for the profession of architecture will do well to remember that the law has had a good deal to do with architects and their clients in the past and that there are some very important lessons to be drawn from the

fact. It is important that an architect should be posted on some particulars at any rate, in order that he may be saved from the consequences of actions that, though they are in themselves insignificant, may give rise to much trouble.

Some men are fortunate in their clients and no one at the outset expects that he will have trouble before his work is completed, but a sudden occasion will sometimes give rise to a serious disagreement and the settlement of accounts may result in alarming lawsuits.

The subject is one worthy a far more lengthy treatment than the limits of this article will allow, but I propose to give a few pointers to young architects and students that may help them to avoid the courts.

First of all, then, if an architect is employed to carry out a building that it will be more than a year before his work in connection with it is finished, he must have a contract in writing with his clients. This is according to the Statute of Frauds. The effect is, that, if at the commencement of an architect's employment it was foreseen that the work he is engaged for would take more than a year to complete and he has no written contract, if a dispute arises between him and his employer the employer can escape from paying for his services and the court cannot but uphold him in his contention. If the employer is a corporation or any body possessing a seal, there must not only be a written contract, but the seal must be attached. The seal is the sign that the whole corporation enters into the contract and not the individual who signs on behalf of the corporation. The fact that a mayor or president signs with the full intention of binding his corporation and that they fully concur in the signing does not count at law if the seal is not attached to the contract.

In the prosecution of an architect's work it sometimes occurs that some other person than the proprietor, his wife, for instance, will give the architect an order for some change of plan or some additional work, and the architect, believing that in pleasing the wife he is satisfying his client, has the work done as requested. When, however, it comes to a settlement of accounts, the architect learns to his mortification that the wife was not the duly authorized agent of the proprietor, and, as she had no authority to give an order, so the architect has no right to carry it out. It matters little that the client

benefited by the change and personally enjoyed the improvement. The architect has rendered himself liable for the whole expense. Again, in dealing with the authorized agent of a client, it may be his lawyer or his business manager, it is necessary to have it clearly laid down what is the extent of the agency, what power the agent has to order work or changes. So the architect, as the agent for his client for the particular purpose of his profession, must be careful not to exceed the powers of his agency. That is to say, it should be understood between architect and client what limitations, if any, are to be placed upon the architect in respect to ordering articles as, for example, gas or electric fittings, grates and so on, for it may be the employer concludes he is to have the choosing of such things, and it may be hard for the architect to prove that he had authority to give orders in the face of a determined stand of the client that he never gave such authority. It has, however, been laid down that where the orders given by the architect are "necessary for the carrying out of the work" he has that authority implied by his employment; the point turns on what is "NECESSARY for the carrying out of the work." It will at any rate be worth while to consult the client first.

The architect should never order anything for his client's building in his own name, lest, as has happened, the seller should find it easier to collect from the architect than his client. It is always well to make use of some such sentence as "I am authorized by my client So and So to order, etc., etc.," so that there may be no mistake. Where the employer becomes bankrupt, the architect has had to foot the bill because he omitted to mention that he was ordering for his client, even though it may have been naturally supposed from the circumstances that the architect could not be ordering for his own use.

If a client is disposed to quarrel, he can find occasion easily enough. He discovers that the architect has made some change, perhaps substituting stone for brick, or otherwise made some slight improvement that he thought would be advisable without adding to the cost, which, however, constitutes a variation from the drawings and specifications. If the architect can show no authority for the change he is liable. It has been held "that the power given to the architect by the builder's contract, to order additions and omissions, did not give authority to order VARIATIONS."

The architect being the agent of his client for a special purpose, the client has the right to require of him, not only skillful performance of his agency, but also good faith towards himself. James, L. J., has laid down "that any surreptitious dealing between one principal to a contract and the agent to the other principal is a fraud in equity and entitles the first-named principal to have the contract rescinded and to refuse to proceed with it in any shape." It has also been held "that when a secret gratuity is given to an agent with the intention of influencing his mind in favor of the giver of the gratuity the transaction is fraudulent and the contract void at the option of the other party to the contract." If, on the other hand, the architect, to suit the convenience of the employer, withholds a certificate from a contractor when it is justly due, he may be held liable, individually or jointly with the employer, but the contractor must prove that there has been collusion between the employer and the architect to defraud him.

A contract that binds the employer to pay on the certificate of the architect does not enforce payment if the

certificate is granted fraudulently. That is, if the builder has in collusion with the architect presented a certificate that is not honestly due, the owner may refuse payment, but he must establish the charge of fraud against the architect to succeed, and Lord Herschell has said "Fraud is proved when it is shown that a false representation has been made: (1) Knowingly or (2) Without belief in its truth or (3) Recklessly—careless, whether it be false or true." A false statement is not necessarily fraudulent—a false statement may be made in error, in an honest belief that it is truth, and where that is the case it is not fraudulent. An architect may be misled by the statement of the builder and grant a certificate in consequence; it has been held that such action on the part of the architect was not fraudulent.

With regard to plans and specifications an architect cannot be held liable for inaccuracies; he may make mistakes due even to gross negligence, but, unless he wilfully misrepresents and thereby purposely deceives the contractor, he is not liable. The contractor to be relieved from carrying out that for which he has contracted must prove fraud on the architect's part. Serious discrepancies, through negligence, have been found to exist between the drawings and the specifications, certain things shown on the drawings but omitted from the specifications—the contractor, however, is prevented from claiming extra payment by the clause which states that the drawings and specifications together form the contract. In a specification of a house all reference to flooring was omitted. The contractor provided the material because it was shown on the drawings, but refused to lay it without additional charge. Judge Pollock said, in delivering judgment, "that the flooring of a house cannot be considered an extra any more than the doors or windows." "The contract," said Channel, B., "is that the HOUSE should be completed, not that the works hereinbefore mentioned should be completed."

Just a note on "Penalties" and "Liquidated Damages." If the word "penalty" is used for the amount to be forfeited by the contractor if he fails to complete the work within a certain time, it necessitates the employer proving the damage or loss he has sustained; but, if the expression be "liquidated damages," the contractor in default must pay the amount mentioned without further investigation.

I have refrained from citations in the foregoing notes, but, in conclusion, let me say, that every point brought out is the result of an actual lawsuit in each case, and the decisions stand as precedents for all time.

R. W. GAMBIER-BOUSFIELD.

### THE CHICAGO SKETCH CLUB.

If we may judge by the programme of the meetings, the Chicago Architectural Sketch Club is conducted on unique lines. The notice for the meeting on Feb. 27th read as follows:

CONTINUOUS VAUDEVILLE AND DRAMA.

Curtain rises at 8 p.m. sharp. "Chaser" at 12 p.m.

First performance of the roaring Comedy.

"THE NEW DRAUGHTSMAN."

Specially written for the occasion by

MR. \_\_\_\_\_

and presented with marvelous stage settings and gorgeous scenery under the personal direction of the author.

A number of bright and catchy vaudeville "turns" will be put on before and after the drama.

Eatables.

Drinkables.

### ONTARIO ASSOCIATION OF ARCHITECTS.

THE regular monthly meeting of the Toronto Chapter of the O.A.A. was held on Monday evening, March 13th, in the form of a dinner at McConkey's. Mr. Helliwell, the chairman, was unable to be present through illness, and as Mr. Baker, the vice-Chairman, had the management of the affair on his hands, Mr. Edmund Burke was asked to take the chair, which he did to the satisfaction of all.

After the business of the meeting was disposed of, Mr. J. A. Duff, of the School of Practical Science, was called upon, and responded with an address upon the subject of the value of official tests of building materials, and, as usual, he handled his subject in a masterly manner. He confined his remarks to timbers, and read paragraphs on the subject from the American Government Reports, extending over the last ten years. About the beginning of that period engineers had been impressed with the evident fact that the methods of calculating stresses in timbers employed at that time, the system of employing factors of safety, etc., partook largely of the nature of guess work, owing to the manner of establishing coefficients for the different woods. The specimens upon which tests were made were simply taken from timbers of the different kinds in lumber yards and without considering the age of the tree, locality of growth, nature of soil, time of year cut, etc., etc., and without knowing anything of the stick, except its kind and whether green or dry.

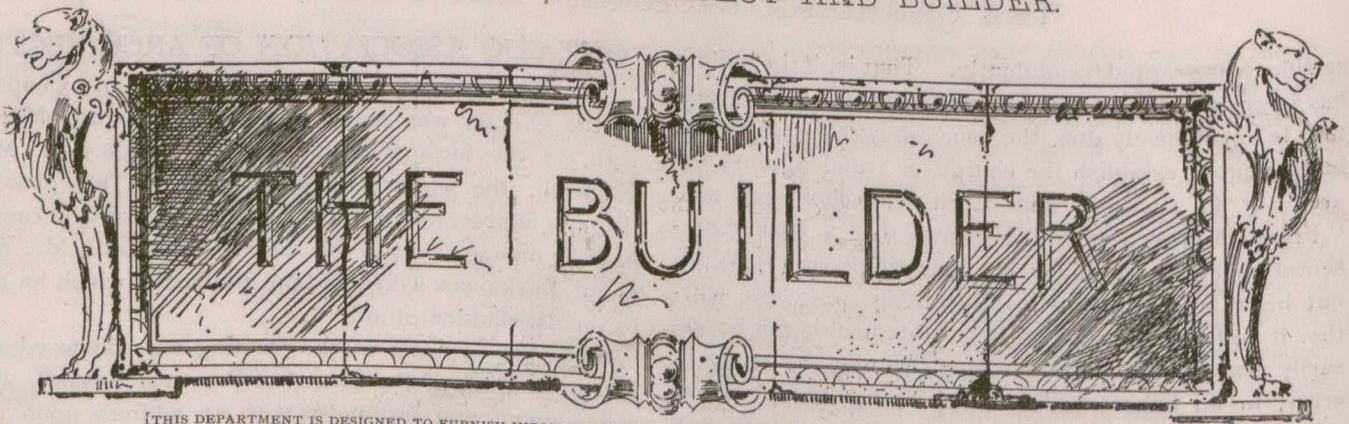
It was thereupon decided to commence a series of systematic tests of timbers, and the U.S. Government having made an appropriation, competent botanists were despatched to different localities and trees marked, full data being kept of all surrounding conditions. It was at first supposed that the method of testing small sticks, say 1" square and 12" inches long, was not a safe one, and machinery for testing large timbers was secured, but experiments proved that the testing of small pieces produced practically the same results. It was also thought that the manner of drying, whether naturally or artificially, affected the strength, but it was found that this made no difference, and that the extracting of the turpentine from yellow pine did not affect its strength.

The importance of observing the growth rings on the cross section of the logs was referred to, conclusions being drawn from the amount of spring and summer growth, which could easily be detected by the sappy nature of the former and the density of the latter; finally, reading from the latest reports, the speaker showed how accurately calculations can be made with the information now in hand, pointing out that the formulæ for compression strains could be used with slight variations for the calculation of all others. He had made tests at the School, after calculating the strength of the stick, which proved how close calculation can be made, with sufficient data, to the actual strength.

After some discussion by the members, a vote of thanks was extended to Mr. Duff.

Mr. C. H. C. Wright, of the School, followed Mr. Duff and more briefly touched on the testing of stone, brick and cement, stating that the tests of brick piers, already made by the School, had been of great use in establishing standards of this material. He spoke of further tests now in progress, of which reports would be forthcoming later. He expressed the thanks of the staff of the School to the Ontario Association of Architects, who had taken the steps which he hoped would bring about the thorough official testing of Canadian building materials, so that standards might be established which would benefit all classes of the community.

An adjournment was made at 10.15 p.m., after one of the most successful meetings of the year.



[THIS DEPARTMENT IS DESIGNED TO FURNISH INFORMATION SUITED TO THE REQUIREMENTS OF THE BUILDING TRADES. READERS ARE INVITED TO ASSIST IN MAKING IT AS HELPFUL AS POSSIBLE BY CONTRIBUTING OF THEIR EXPERIENCE, AND BY ASKING FOR PARTICULAR INFORMATION WHICH THEY MAY AT ANY TIME REQUIRE.]

*"In the old Tuscan town stands Giotto's Tower,  
The lily of Florence blossoming in stone,—  
A vision, a delight, and a desire.  
The builder's perfect and centennial flower,  
That in the night of ages bloomed alone,  
But wanting still the glory of the spire."*

—Longfellow.

### BUILDERS' EXCHANGE, WHY?

BY FRED. T. HODGSON.

WHY? Because it offers to builders and contractors so many advantages and opportunities, that must be apparent to everyone who has given the subject any thought, that it seems odd that every town of any importance has not got one within its corporate limits.

"What are their advantages?" it may be asked. Well, I will endeavor to point out a few, though I confess myself unable to present anything like a fair showing of the advantages and benefits that must assuredly result from a gathering of men engaged in one pursuit, and when an exchange of ideas and views on matters and things pertaining to that pursuit takes place.

Men making up the members of a builders' exchange must necessarily be men engaged in the construction, erection and decoration of buildings; bricklayers, carpenters, masons, plasterers, etc., and these again are in daily contact with other trades and occupations connected with building. The carpenter, for instance, branches off his trade and sublets portions of it to framers, roofers, stair-builders, factory men, painters, glaziers and others.

The bricklayer and mason may, and does often sublet portions of his work, such as excavating, cut stone work, brickwork, tiling, and often the plastering. Often, also, the mason supplies and places iron or steel girders, beams or bressumers, which brings him in touch with another class of tradesmen, thus extending the ramifications of the building trades. Then comes the plumber, who contracts for the water plant and sometimes for gas or electric light installation, for heating, bath service, and other lesser matters. The painter, who may be a sub-contractor, besides the ordinary work belonging to his calling, may also be decorator, paperer, and finisher, while the plasterer may engage master-stucco workers to his aid, all of whom may be employers of labor and directors of work, and are therefore, in my opinion, eligible for membership in a builders' exchange.

The men at the heads of the trades I have named are to some extent dependent on one another. Contractors on any one building must, in the nature of things, meet each other often in order to give and to receive directions regarding the work in hand. The bricklayer will have his walls ready for the joists on a certain day, and the carpenter must be made known of that fact,

and the bricklayer must have assurance that the joists will be laid in place on that day. The carpenter arranges accordingly, and the ironmonger is informed, and his columns, stirrups and other work is made ready for that day; and everything is arranged to go ahead in harmony and without costly interruptions.

Now how can these men be brought together, and their views and directions exchanged, by any better method than by aid of an Exchange? Here, during the noon hour of every working day, builders and those engaged in building transactions will make it a point to congregate, or, maybe, meetings may be the consequence of prior arrangements. At any rate, should one member fail to see another at any given time, he simply pens a brief request for an appointment, naming the hour, and leaves it with the secretary or janitor, or drops it in a letter box provided for the purpose. Previous to accepting, or even figuring on a contract, it is important that the main contractor should meet and confer with all his sub-contractors, in order that he may have his final estimate and tender on the figures obtained, and to insure a fair standard of accuracy, an Exchange should be well supplied with catalogues and price lists of every article entering into the construction of a building, and these catalogues and price lists should be so classified and listed, that a member of any particular trade may be able to place his hand on the particular object he wants without delay. Further, if there is any doubt as to the reading of the plans, or a thorough understanding of the specifications, the contractor and sub-contractors may put their heads together and untangle the difficulty, and thereby make time and prevent trouble in the future.

Besides the saving of time, there is much that is educational in the congregating of members for the purpose of discussing building matters. It is impossible for a body of intelligent men to mingle with others equally intelligent, day after day, without profiting and forming acquaintances that may be lasting and valuable. Exchange of thought, of opinions on new machines, new methods and processes for labor saving, and discussions on economical management, the value of new materials and appliances, are matters that may fairly be considered within the province of a Builders' Exchange, and which must result in benefit to its members. The social feature, too, is an advantage not to be despised, for it enables the members to meet each other on the same plane without that reserve that must obtain when rival contractors never have an opportunity of becoming personally acquainted with each other. It is human nature to imagine a business rival as a sort of a "terrible fellow," and one that will take all sorts of mean advantages to obtain a contract that we have an

idea justly belongs to us. To meet him in a social way and under the auspices of an association where our interests are mutual, we find that after all he is not so bad a fellow as we thought him. By rubbing against each other in the Exchange, many of the sharp edges of business rivalry get worn off, and many misunderstandings and misapprehensions are explained and rectified and jealousies allayed, and the dignity of the trades upheld. Another valuable feature is the additional character and weight an association of this kind would give to the building trades in general, and its influence on the actions of political and municipal bodies, when matters relating to buildings were involved would be immense, and in the interest of the public at large. No public body would dare to ignore an earnest request or petition emanating from a well organized and well equipped Builders' Association, that had for its object the betterment of the public service in the erection and maintenance of public buildings, sewerage, paving of streets, laying out and grading of parks and public walks, building of docks, assessments, and a host of other matters, where the forcibly expressed wishes of a united body of builders would prove timely and effective. In the prevention of frauds and rascality in the awarding of public contracts, a Builders' Exchange would become a potent factor, and thus prove of much service in perpetuating good municipal government, and at the same time giving to the public full value for its expenditures. A petition or a protest, emanating from an organization, such as indicated, for or against any project, carries with it the united expression of an intelligent body, and not the opinion of a single member, and must, therefore, demand an attention that could be denied the individual. If, after proper discussion, any law is found burdensome or unjust to the building interests and the public, or perhaps too lax in its application, or not sufficiently restrictive to compel a reasonable degree of safety in such work as the members are doing, how much more effective would be a protest or a petition from a substantial organization than one from a single person? There are many other matters in which a Builders' Exchange may be made a potent factor for public good.

An Exchange may also be made use of as an educational and entertaining centre for its members and others. There might be weekly or fortnightly lectures during the winter season, at which building and architectural matters might be discussed, and at which there might be a general exchange of opinions concerning the matter of the lecture at its close. In Toronto, Montreal, Hamilton, London, and many of our towns and cities may be found men fully qualified to lecture on architecture, on construction of buildings, on sanitary science, ventilation and other matters in connection with buildings, on laws regulating the construction of buildings, on the methods and systems of building in foreign countries, and many kindred subjects. Such lectures would be instructive and edifying to all persons engaged in the building trades, and might be so arranged, by charging a small fee for admission, as to add a little money to the treasury.

In connection with the Exchange, there should be a collection of books, not necessarily a library, but a collection of good "up-to-date" works which show and explain the most modern and approved methods of construction, and which offer to the reader all the recent devices in time and labor saving apparatus. It

would be easy to name a number of these, but perhaps not wise to do so at this time. In addition to these books, there should be on the table of the Exchange copies of all the current architectural and building publications of this country, the United States and Great Britain, in connection with all government reports that have any bearing on the building trades. Directories of manufacturers of all things required in buildings should be in evidence and easy of access. Models of difficult work, samples of bricks, stone, slates, glass, hardware and the thousand and one things required by builders, should be present, with prices attached, so that any member may find out with the least effort all he requires to know about the material in point.

In the foregoing, I have endeavored to point out a few—only a few—of the advantages that flow from a Builders' Exchange, but I am free to confess that those unmentioned are much greater than those I have presented, the truth of which, I think, any one will grasp, if he but think for a moment.

The question of inaugurating and maintaining an Exchange has not been touched, for obvious reasons; neither have any rules for its guidance been offered, as any suggestions for this purpose would not be in keeping with the tenor of this paper, but it is possible they may be subjects for future discussion.

### ARCHITECTURAL TERMS.

Sometime ago the Brickbuilder, contained the following explanation of the various phrases used by architects and not generally used by mechanics, which may prove beneficial to many. The front, or facade, made after the ancient models, or any portion of it may represent three parts occupying different heights; the pedestal is the lower part, usually supporting a column, and its place supplied by a stylobate is either a platform, with steps, or a continuous pedestal supporting a row of columns. The lower part of a finish pedestal is called a plinth, the middle part of the die, the upper part of the cornice of the pedestal or surbase. The column is the middle part, situated upon the pedestal or stylobate. It is generally detached from the wall, but is sometimes buried in it for half its diameter, and is then said to be engaged. Pilasters are square or flat columns attached to walls; the lower part of the column, when detached is called the base; the middle or longest part is the shaft, and the upper or ornamental part is the capital; the swell of the column is called the entasis. The height of the columns is measured in diameters of the column itself, taken always at the base. The entablature is the horizontal continuous portion which rests upon the top of a row of columns; the lower part of the entablature is called the architrave, the middle is the frieze, while the upper or projecting part is the cornice. The pediment is the triangular face produced by the extremity of the roof; the middle or flat portion enclosed by the cornice of the pediment is called the tympanum. Pedestal statues erected on the summit and extremities of the pediments are called acrosteria. An attic is an upper part of a building terminated at the top by a horizontal line, instead of a pediment.

The different moldings in architecture are described from their sections or from the profile which they represent when cut across. Of these the torus is convex, but its outline is only a quarter of a circle; the scotia is a deep concave moulding the cavetto is also a concave and occupying but a quarter of a circle; the cymatium is an undulating moulding, of which the upper part is concave and the lower convex; the ogee or talon is an inverted cymatium; the fillet is a small square or flat moulding. In architectural measure, a diameter means the width of a column at its base; a module is half a diameter, and a minute is a sixtieth part of a diameter.

Interior  
Finish.

It is not necessary to go out of Canada to procure handsome woods for interior finishings. For dark woods we have walnut, cherry and black birch, and for medium woods we have several of the oaks—white, red and black—which, when quarter sawn, equal, when properly finished, any oaks in the world for fineness and variety of grain and color. Then we have the despised butternut, the three or four kinds of ash, the elms, whitewood, basswood and white pine. Cherry, grown on low loamy land, is the peer of mahogany and is passed off for that wood as often as it passes for cherry. It has a fine silky grain and, if properly sawn, is veined as richly as mahogany, and will take a finish equally as well. Unlike mahogany, however, it is apt to warp and twist out of shape if not held in position. It is an excellent wood as a veneer on good pine cores. It may be easily darkened by staining the filler with some spirit stain before applying. Black birch is almost as fine a wood as cherry, and takes a finish nearly as well. As a rule it is easier worked than cherry, does not cost as much, will last as long, and makes a very handsome finish. Birch may be stained almost as dark as rosewood by using a spirit stain before filling and then staining the filling. It can be polished until it is as glossy as a polished mirror. White oak, quarter-sawn and well-seasoned, makes on the whole the most durable, and the most effective finish for rooms that are often used, or for halls or public rooms; and it has the quality of improving with age, something that cannot truthfully be said of many other woods. It is always better left in its natural color, which at first may be a little harsh, but it soon tones down to a soft, pleasing tone that is soothing to the artistic eye. Any of our oaks may be employed for trimmings, panel work, stairs, turned work, veneers, floorings or fitments of any kind. They are strong, durable and safe and not very difficult to work. Ash makes excellent chamber finish; it is bright, cheery, fantastic in grain, strong, and is not apt to get distorted or out of shape. It also makes excellent fittings for kitchens, pantries and similar work. Black ash has a grain similar to chestnut and takes stain readily. Furniture made of this wood and stained to imitate antique oak is often passed off as the latter to unsuspecting purchasers. It is a good wood to stand wear, and is especially suited to farm dwellings. Another Canadian wood that is seldom used in interior finishing is our beech. This wood, when properly filled and polished, has a very pleasing appearance, as it possesses a satiny glow and warmth that is quite charming. As a material for floors, beech ranks in the same class as maple. It is nearly as hard, is some darker and wears just as well. In the lighter woods nothing excels our white maple. This equals the much-extolled satin-wood, both as regards the fine grain and susceptibility of finish; and our birds-eye or mottled maple equals any light wood in the world in beauty, and it can be polished as smoothly as ebony. Butternut, basswood, elm and white cedar make good material for ordinary work. Butternut, when properly fitted and finished, makes a good showing and serves well in library or parlor, though not as well suited for such work as oak. White pine is the king of soft woods; it is at home anywhere, and, if finished in its natural state, shellacked or varnished properly, shows up a soft golden glow that is unsurpassed by any other wood. Some of the woods of British Columbia are well-adapted for interior finishings, while the coarser kinds make excellent framing timber,

scantlings, joists, rafters, etc., etc. There is plenty of timber to satisfy all Canadian requirements, within our own boundaries, and it is foolish and wasteful to import foreign woods for interior finishings.

Good  
Mortar.

THE late Col. Waring made a number of experiments and tests in making and using mortars for brickwork and for plastering, and the result of his experiments was that he found that ordinary coal ashes—sifted of course—when mixed with lime made a mortar superior in point of lightness and strength to mortar composed of lime and sand. In cities, where ashes are plentiful and sand scarce, the substitution of the former for the latter would reduce the cost by about one-third, and a superior article would result. Mortar composed of ashes and lime is especially adapted for the brickwork in bakers' ovens and for setting boilers, and for the brickwork in factory chimneys or any place where intense heat is likely to attack the work. Mortar composed of nine parts of fine anthracite ash intimately mixed with one part of fresh lime and properly moistened with water will, when one month old, give an average strength of 65 pounds to the square inch, as compared with 15 pounds per square inch in the case of mortar composed of lime and sand. The crushing strength is seven times greater than ordinary mortar, being in some cases as high as 1,000 pounds when extra care was taken in preparing the mass. It offers a much greater resistance to fire, and does not break and crumble away when suddenly cooled by water, as does mortar made in the old way. The best results are obtained when the ashes are finely sifted and the lime and ashes are well mixed and worked together.

Floor  
Deafening.

To effectively deafen a floor is rather a difficult undertaking, for in a long experience not a single method among dozens has proved as satisfactory as desired, and the most expensive methods have generally been the least effective. At Fig. 1 a very expensive method is shown;

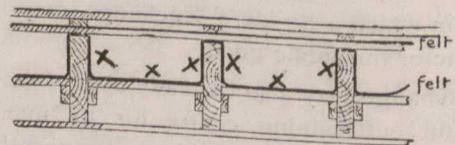


FIG. 1.

there is a matched floor between the joists, over which a coat of mortar about an inch thick is spread and continued up the sides of the joists for a couple of inches or so. On this is laid coal ashes to a depth of three or four inches. A rough floor is laid on top of the joists and well nailed. Then on the top of this rough floor is laid a course of thick felt, on which the finishing floor is laid. Another method, shown at Fig. 2, is less cum-



FIG. 2.

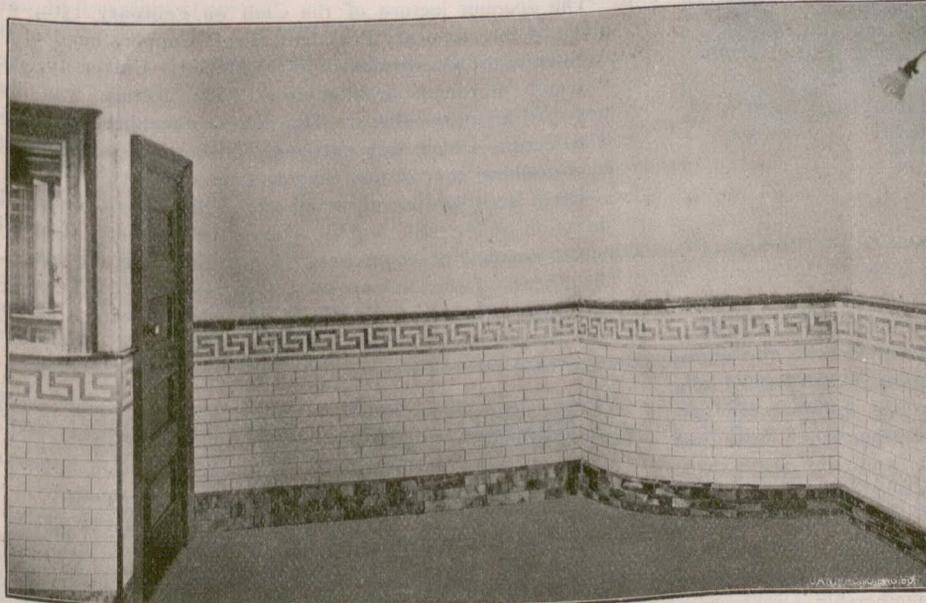
bersome and more likely to be effective. This is floored between the joists the same as the former example, then a layer of felt is laid over the joists, and passing over the top and all around the joists, so that no wood from the upper floors shall touch the joists at any point. On the joists is then laid a rough floor—thicknessed, of

course—and over this is placed one thickness of flooring felt. Then, on a line with the joists, battens  $\frac{7}{8}$  of an inch thick are laid as shown, and on them the finished floor is laid. This is a very good way, but there is really no actual necessity to run the felt down the sides of the joists and along the bottom boarding, as shown at X X X. This is a waste of labor and material; a strip of felt laid over the top edge of the joist answers just as well as covering the whole surface. It may then be asked, "What's the use of the boarding between the joists?" Well, for deafening purposes, it is of no value; if for keeping out cold, then it is all right as far as it goes. A cheaper, and perhaps a more effective method than either of the two shown is to first lay a strip of soft felt on the top of each joist, then lay the first floor, cover this with felt and put down the finishing floor on this; then tack strips of soft felt on to the under edges of the joists, and lath over the strips. This cuts off all communication between the floors and the ceiling, so far as woodwork is concerned, but the nails that are used for nailing on the felt often convey the sound from the floors to the joists, and so on to the ceiling below. No effective cutting off of sound, however, can take place so long as the joists rest their ends on girts or bond timbers in the walls, for sound travels along the floor to the wall, and is then transmitted to the joists, and by them passed to the walls and then on to the other floors. Felt, lead, or other "deadening" material should be placed under the ends of all joists, and between them and the plates of all partitions, if effective deafening is required.

**MANUFACTURES AND MATERIALS**

**GLASS AS A WALL COVERING.**

In recent years glass in a variety of forms has been applied to many purposes in building, and seems destined to find employment to a still greater extent in the future. A year or so ago it was reported that in France glass bricks were being manufactured and were likely to come into use. It has been decided to build on the grounds of the Paris Exposition a glass house or luminous palace, parts of which are now being constructed. It is thus described: "The principal facade, in the form of an immense portico, its roof surmounted with spires and with a winged statue representing Light, will be supported by heavy columns. The ground floor, reached by a double flight of stairs, will be used as a great exposition room. To the right and left will be large glass



GLASS WALL COVERING IN BATH-ROOM.

basins, overhung by grottoes of glass. In the interior of the hall will be five large openings, in which will be represented the five divisions of the globe."

Much attention has been bestowed on methods of utilizing glass as a covering for walls. Where success has been attained so far as the manufacture of the slabs or tiles was concerned, the cost of the production has been too great

to allow of the general use of the material. Perhaps the most successful experiment in this direction was made by Mr. Butler of Gas City, Indiana, who produced a plate of glass about half an inch thick in a mould, a tongue being formed on the back of the tile which could be inserted in the joints of ordinary brick work while building. In practice it was found that the excessive weight of the wall caused the tiles to break, and frequent replacement became necessary. Mr. Butler next perfected solid glass tiles about one half inch thick, pressed in moulds containing designs which were thus reproduced on the surface of the glass. These tiles were plated on the walls when built. Some of them are still to be seen in position on the walls of the Penn



GLASS WALL COVERING IN DEPOSIT VAULTS, TEMPLE BUILDING, TORONTO.

Block, Penn Avenue, Pittsburgh, Pa. The material in this form likewise proved to be too expensive.

Mr. Edwin Hill of the Toronto Plate Glass Importing Co., has recently perfected a process of plating walls with glass, which seems to fulfil all requirements. The tiles which are about one-tenth of an inch in thickness, are made either in pure white, or in any tint or color desired, and of every conceivable shape or size. They are solidly backed in cement on a foundation of plaster. The cement being of a plastic nature, becomes tenacious and

extremely hard, thus preventing either the tiles or plaster from becoming loose. The character of the work is such that it is unaffected either by excessive dryness or moisture. The cost of this material is said to be about one-half that of glazed tiles. Its adaptability as a sanitary wall covering for hospitals, etc., is at once apparent. The accompanying illustrations show the material in situ as a dado in a bathroom, and on the walls of the safety deposit vaults in the Temple Building, Toronto.

The Canadian Granite Company of Ottawa have commenced the manufacture of silica sand from sandstone deposits belonging to the company in March township. The material is ground to the fineness of salt, and is used in the fluxing of iron.

A syndicate of English and American capitalists have purchased from the Messrs. White, of Windsor, Ont., the stone quarry at Amherstburg, Ont. It is the intention of the new owners to operate the quarry at its full capacity. Stone from this quarry was used for the canal locks of the Sault Ste. Marie Canals, and for the United States Fort at Detroit, as well as in the construction of a number of public buildings.



PUBLIC STATUES IN THE CITY OF MONTREAL.

### THE RENAISSANCE CLUB.

An organization with the above title has recently been formed by a number of young architects of Montreal for the promotion and study of architecture and the sister arts. Those who are interested in such matters have until the present, had no place where they could meet and discuss subjects of mutual interest. The Club membership is not restricted to architects, but includes many of the leading artists, and a number

of art students and persons interested in art and literary work. The membership is however limited to sixty-five, and is already upwards of fifty. The headquarters of the Club is at No. 4 Phillip's Square where rooms have been furnished and decorated, and are open to members at all hours,

The opening lecture of the Club on February 15th, was given by the Honorary President, Prof. Capper, head of the Architectural Department of McGill University, on "Scotch Baronial Architecture." The lecture was illustrated with lantern slides. The audience numbered over 60. The lecture which was extremely interesting, was followed by a smoking concert and supper.

There is already in full swing a modelling class, under the direction of Mr. Hill, and as soon as the weather will permit, sketch classes will be begun in water color and pen and ink.

The officers of the Club are as follows:—Honorary President, Prof. Capper; President, Mr. W. S. Maxwell; Directors, Messrs. W. J. Spence, Chas. Saxe, R. Dawson, David Macfarlane, George Hyde.

Messrs. Victor Roy and Theo. Doust, two well known architects of Montreal, are reported to have entered into partnership.

Mr. W. J. Budd of Burnham, New York, has been appointed manager of the Georgian Bay Portland Cement Company, recently organized at Owen Sound. Mr. Budd was formerly a resident in the vicinity of Owen Sound.

Mr. A. F. Dunlop publishes a denial of the rumour to the effect that it was his intention to remove from Montreal to British Columbia. The rumor apparently arose from the fact that it is Mr. Dunlop's intention at an early date to visit Vancouver.

Richard J. Hovenden, who was for many years a well known painter and dealer in painters' and artists' supplies in Toronto, is reported to have become heir to a large estate in Queen's County, Ireland. Mr. Hovenden, who now lives in Windsor, Ont., will shortly visit Ireland with reference to this matter,

**AMALGAMATION OF RADIATOR MANUFACTURERS IN THE UNITED STATES.**

A NEW corporation, called the American Radiator Co., was chartered under the laws of New Jersey, February 11, with an authorized capital of \$5,000,000 common and \$5,000,000 preferred stock. The new organization has bought the plants and business of the American Radiator Co., Chicago; Standard Radiator Mfg. Co., Buffalo; Titusville Iron Works, Titusville, Pa., and the St. Louis Radiator Mfg. Co., St. Louis. The company also controls the output of the Kalamazoo Radiator Co., Kalamazoo, Mich., and of the M. Steele Co., Springfield, O.—altogether an output amounting to 75 or 80 per cent., probably, of the entire product of the country.

**THE COST OF HEATING AND VENTILATING.**

AN excellent illustration of the fact that it costs much more to heat the fresh air that must be supplied for good ventilation than merely to maintain the temperature of a room or building is afforded by the heating and ventilating plant of the new buildings of Columbia University. These buildings are supplied with enough direct steam radiators to overcome the loss of heat through walls, windows, etc., and the entering fresh air for ventilation is blown over stalks of heating pipes, so that it enters the rooms at a temperature of about 70 degs.

The buildings have a total cubic contents of about 9,700,000 cubic feet, the heating surface in the direct steam radiators is about 56,000 square feet, and the ventilating system is designed to furnish about 50,000,000 cubic feet of air per hour. When the outside air is at zero, the steam consumption of the plant is estimated as follows, in horse power:—Condensed in direct heating radiator, 560 horse power; condensed in heating stacks in connection with blowers, 2,205 horse power; power required for electric motors operating blowing and exhaust fans, 635 horse power.

In other words, the heating and distribution of the fresh air for ventilation takes about six times as much coal as is required to simply maintain the inside temperature of the buildings. In a lecture describing this plant, delivered before the Engineering Society of Columbia University, Mr. G. A. Suter, under whose direction the plant was constructed, gives the following useful figures from the experience with this plant:—One horse power of steam supplies 100 square feet direct radiating surface. One horse power-hour of steam supply heats 20,000 cubic feet of air from zero to 70 degs. Fahr. One horse power on the shaft of an electric motor driving a blower will move 75,000 cubic feet of air per hour into and out of the rooms. The very large amount of power required for moving the air will be, we presume, a surprise to many engineers; but it is to be remembered that as all the exhaust steam is utilized for heating and the power applied to the air, for the most part, also appears as heat, the fan system of heating and ventilating is really not so expensive in operation as might at first sight appear.

Recent advices from British Columbia are to the effect that the C. P. R. Cement Works have not been purchased by the British Columbia Portland Cement Company as was reported to be the case, but have been leased for a period of five years. The new Company will largely increase the capacity of the works, and endeavor to establish an export trade with Japan, China and Australia.

**CANADIAN PORTLAND CEMENT.**

There is a movement on the part of Canadian manufacturers of Portland Cement to extend very much the present manufacturing facilities to enable them to supply to a much greater extent than heretofore the requirements of this market. At a recent meeting of the shareholder of the Owen Sound Portland Cement Company, which by the way is the oldest Canadian concern in this line of manufacture, it was decided to increase the capital stock of the Company from \$100,000 to \$200,000. A new company, to be known as the Georgian Bay Portland Cement Company has also been organized at Owen Sound recently. This company propose to erect works on the Polson property. Kilns will be erected capable of turning out 125 barrels of cement per day, with other machinery having three times this capacity. The directors of this new Company are, M. Kennedy, A. G. McKay, H. B. Harrison, S. Lloyd and J. W. Maitland. Mr. Kennedy is president, Mr. Harrison vice-president and Mr. Maitland, secretary-treasurer. The Beaver Cement Company, the management of which is in the hands of a Montreal and British Syndicate, have recently acquired the cement deposit works at Marlbank, Ont., and propose to largely increase the output of the works. The works of the Rathbun Company at Napanee Mills have undergone constant enlargement and improvement, and are turning out not only Portland cement of the usual character, but also silica sand cement, a material into which sand enters more largely than in the case of Portland cement as ordinarily manufactured, and which is claimed to be superior for certain class of work.

A fine half-tone plate, about 11 x 15" in size of the new Terminal Station at Boston, from a negative by Soderholtz, is being sent out to architects by Mr. Samuel Cabot of Boston. Interesting statistics in regard to the building (which is the largest railway station in the world) are given, and attention is called to the fact that 62,000 sq. ft. of Cabot's Insulating Quilts were used to insulate the heating and ventilating ducts, under specifications of Prof. Bomer, Woodbridge, the expert, who has used the Quilt many times before in his work, notably Rutland Hospital, at Rutland, Mass., the High School at Newton, Mass., the Insane Hospital at Medfield, Mass., etc. The Quilt is made with or without the Asbestos covering and it is a wonderfully efficient and cheap insulator and deadener; and it is claimed for the Asbestos Quilt that it is the only article which combines the qualities of heat insulation, sound deadening and fireproofing.

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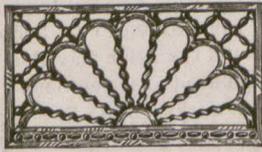
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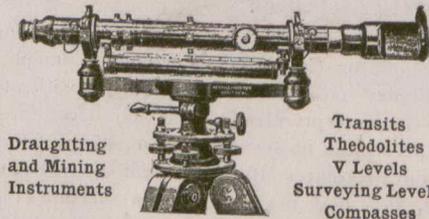
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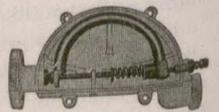
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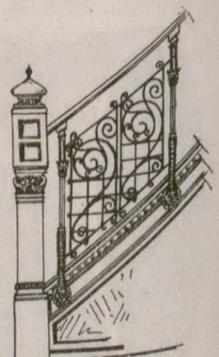
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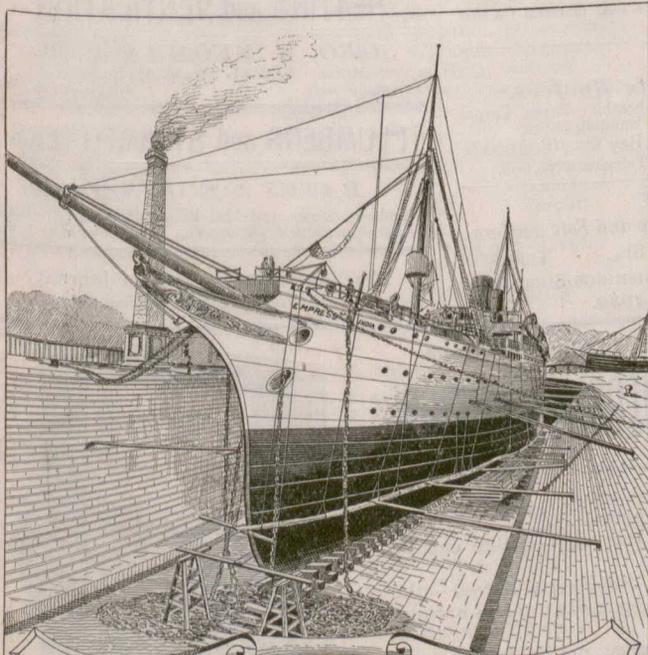
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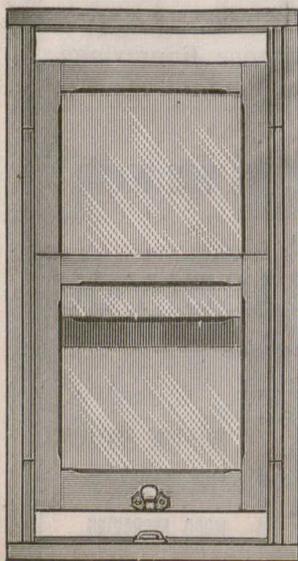
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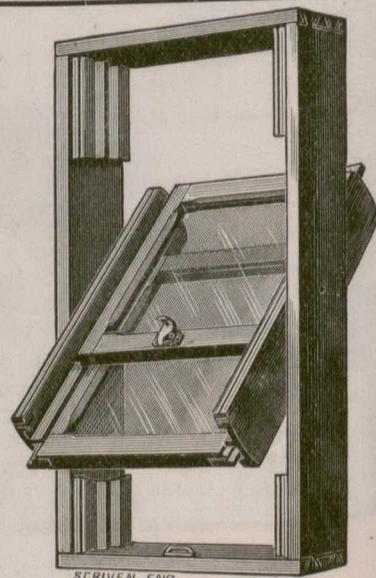
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- Are safer against burglary.
- Can be made by any sash manufacturer with his existing  
machinery, and fitted by any ordinary mechanic.
- Are far cheaper than weighted sashes.
- Are little dearer than the ordinary weightless sash.

For Duval's Sashes, or permission to manufacture them, apply to the patentees,  
where working models may also be seen, or further information obtained.  
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## THE MISSISSIPPI RIVER RUNS UP HILL

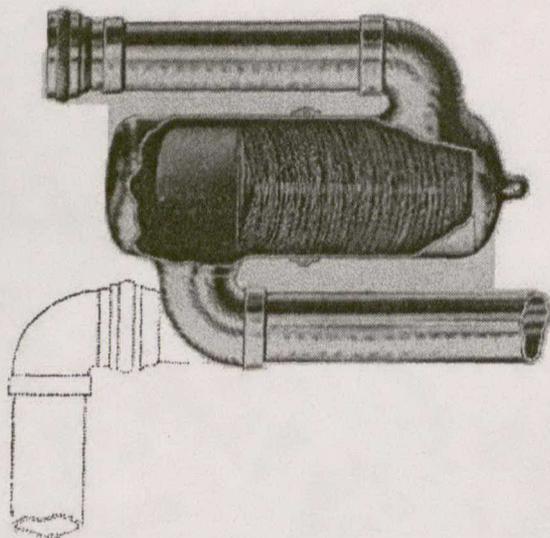
THE diameter of the earth at the equator is  $13\frac{1}{2}$  miles greater than it is at the poles; consequently, the mouth of the Mississippi, which flows in the direction of the equator, is about two miles higher than its source. This is a scientific fact worth knowing. Water will not run up hill unless it is forced to do so.

Centrifugal Force converts this tremendous inclined plane into a drainage canal to scour and purify the most fertile and populous valley on earth. The triumph of genius is the application of natural law to human needs.

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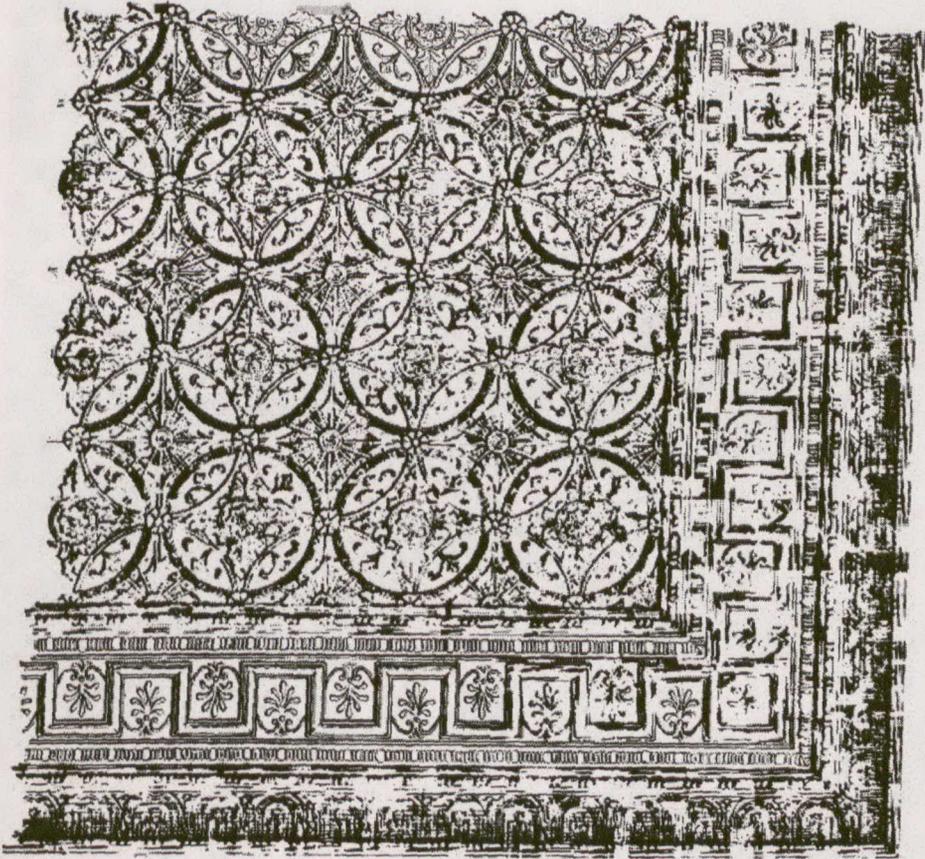
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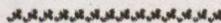


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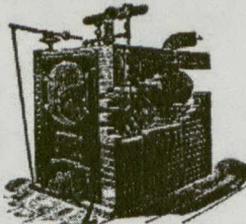


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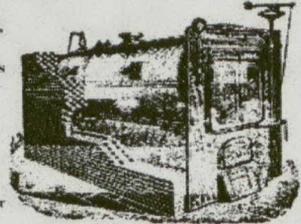


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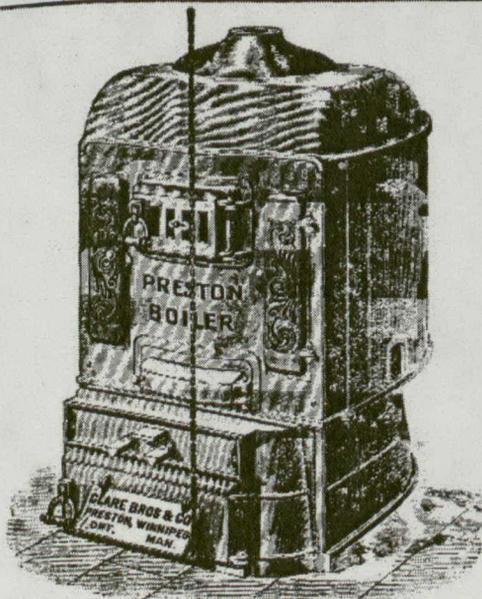
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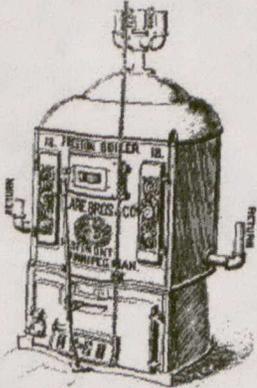
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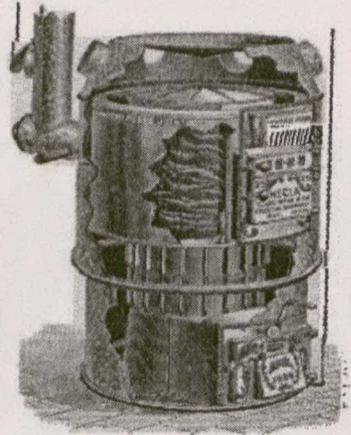
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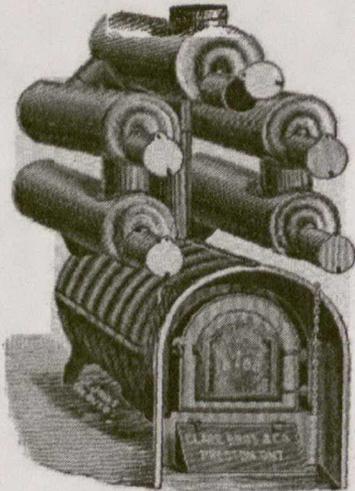
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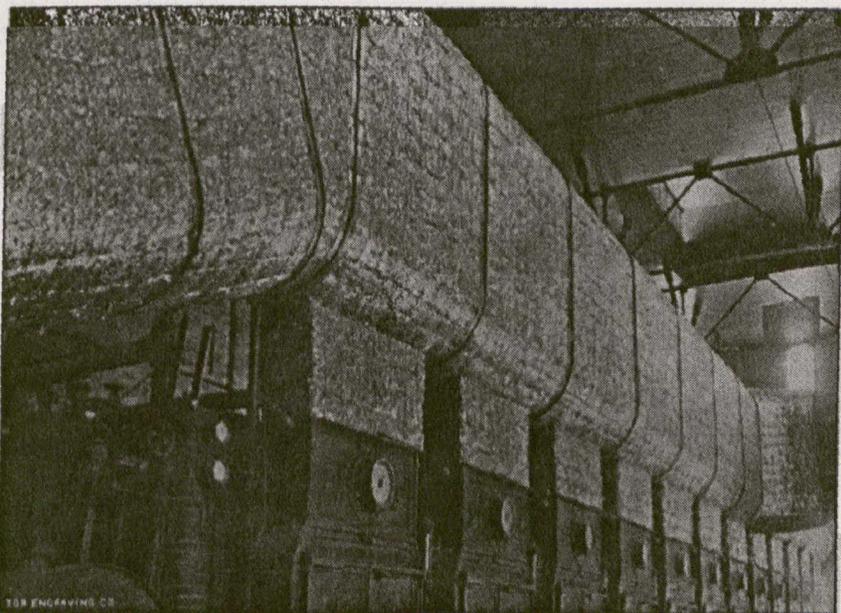
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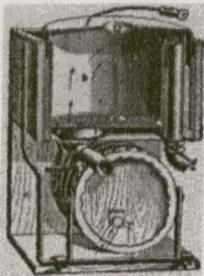
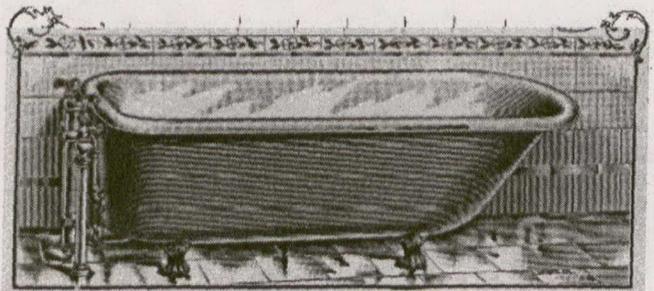


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