

PAGES

MISSING

INDEX TO ADVERTISEMENTS

Architects.
 Ontario Directory..... III
 Quebec Directory..... III

Architectural Sculptors and Carvers.
 Holbrook & Mollington
 etc..... i

Architectural Iron Work.
 Canada Foundry Co. viii
 Dominion Bridge Co. j
 Hamilton Bridge Works
 C..... iv
 Watson, J. Hn..... III

Architects' Supplies
 Chas. Potter..... iv

Bridges.
 Canadian Bridge
 Company..... vii
 Hamilton Bridge Works
 Company..... IV

Builders' Supplies.
 Luxfer Prism Co.,
 Limited..... ix
 Montreal Directory..... xvi
 Ontario Lime Associa-
 tion..... xvi
 Robertson & Co. D..... IV
 Toronto Directory..... xvi

Building Stone Dealers.
 Amherst Red Stone
 Quarry Co..... xv
 Credit Forks Stone Co. xv
 Pro. In. Is..... xv
 Head & Son..... xv
 Kline, John..... xv
 P. L. K. J. C..... xv
 Roberts & Co. B..... xv
 Samuel & Son Thos..... xv

**Builders' Hard-
 ware.**
 Rice Lewis & Son..... IV

Bricks.
 American F.enameled
 Brick & Tile Co..... i
 Eamsville Brick &
 Terra Cotta Co..... xii
 Dean Valley Brick
 Works..... vii
 Toronto Pressed Brick &
 Terra Cotta Co..... xi
 Milton Brick Co..... viii

Slate
 Steinberg & Hndry
 Co..... iv

Contractors' Plant and Machinery
 Rice Lewis & Son..... IV

Cements.
 Owen Sound Portland
 Cement Co..... III
 The Rat' har Co..... v
 Wind or Plaster Co. ix

Cordage.
 Samson Cordage
 Works..... II

Ornament Stairs
 Cabot, Samuel..... xiv

Elevators
 Fenom, John..... i
 Leitch & Turnbull..... i
 Malloch & Co..... i
 Miller Bros & Toms. iv
 Turnbull & Russell ColV
 Williams & Co., A. R. II

Embedded Moulding
 Hoynton & Co..... v

Engravers.
 Can. Photo-Eng Bu-
 reau..... xiv

Folding Partitions.
 Springer, O. T..... II

Grilles and Railings
 Dennis Wire & Iron Co. iv
 Toronto Fence & Orna-
 mental Iron Works. iv
 Watson, John..... III

Granite
 Brunet, Jos..... vii

**Gas and Electric
 Plasterers**
 Black & Boyd Mig Co iv

Heating.
 Canada Radiator Co. xiii
 Clark Bros. & Co..... xi
 Dominion Radiator Mfg.
 Co..... I and II
 Gurney Foundry Co. iii
 Gurney, T. I den Co. xii
 Leonard, E. & Sons. xi
 Ormsby & Co., A. B., i
 Pease Furnace Co. xiv
 Reid & Co. Geo. W. II
 Robb Engineering
 Company..... x
 Smart Mfg Co. Jas. xvi

Interior Decoration
 Elliott & Son Co..... iv

**Landscape Archi-
 tect**
 Frederick G Todd... III

Lime.
 Ontario Lime Associa-
 tion..... xvi
 Robertson & Co..... xv

Legal.
 Quinn & Morrison.. II

Mantles, Grates, and Stoves
 Holbrook & Mollington i
 Rice Lewis & Son..... IV

Hall Chutes.
 The Cutler Mfg. Co. xij

Roofing Colors and Shingle Stains.
 Cabot, Samuel..... xiv
 Muirhead, Andrew..... i

Ornamental Iron Work.
 Dennis Wire Iron Co. iv
 Toronto Fence & Orna-
 mental Iron Works. iv
 Watson, John..... III

Painters.
 Montreal Directory..... vii
 Toronto Directory..... viii

Pyrisms.
 Luxfer Prism Co.,
 Limited..... v

Paints & Varnishes
 Canada Paint Co..... ix
 Imperial Varnish &
 Color Co..... vi
 Muirhead, Andrew..... i
 W. A. Fleming & Co. vi i

Parquet Floors
 Elliott & Son Co..... iv

Plate Glass
 The Consolidated Plate
 Glass Co..... II
 Toronto Plate Glass
 Co..... iv

Plumbers
 Montreal Directory..... xvi
 Toronto Directory..... xvi

Roofers
 Campbell & Gilday xvi
 Dunthie & Sons, G..... xvi
 Douglas B. Co..... xvi
 Forbes Roofing Co..... xvi
 Nicholsons & C..... D. xvi
 Rennie & S'n, Robt xvi
 Ormsby & Co., A. B. j
 Rice ham, George..... xvi
 Stewart & Co., W. T. xvi
 Williams & Co., H..... xvi

Architectural Sculptors..

Modellers
Wood Carvers
 etc... .

Dealers in
 Maw & Co.'s
 and Minton &
 Co.'s Artistic and
 Plain Tiles for Cabinet
 Hearths, Floors, Etc.

No. 296 King St. West
TORONTO
 TELEPHONE MAIN 2490.

Holbrook & Mollington

Established 1850.
GREATEST DURABILITY
SMALLEST COST
SUPERIOR EFFECT

MUIRHEAD'S METAL WHITE

This article, as its name implies, is a White Metallic Paint, ground in Pure Linseed Oil.
 IT DOES NOT injure the Linseed Oil as all grades of White Lead do.
 IT WILL NOT chalk nor flake off.
 IT IS unalterable for painting the inside and outside of houses farm implements, boats, greenhouses, or any thing requiring paint.
 BY ACTUAL TEST it has worn six times as long as pure White Lead on a floor—it is equally good for door steps and decks of vessels.
 IT MAY be tinted to any shade.
 IT IS the most important article introduced for painting in recent years.

MANUFACTURED BY...
Andrew Muirhead
 Office, No. 8 Bay Street
 Warehouse, Mincing Lane
 Factory, St. Lawrence St. **TORONTO**

ENAMELED BRICK (Royal Victoria Hospital, Montreal)

ENAMELED Subway Tile (Patented)

ENAMELED INTERLOCKING TILE (Substitute for Brick)

American Enameled Brick & Tile Co.,
 1 Madison Avenue, NEW YORK.
HUGH CAMERON
 Canada Life Building, Montreal Canadian Agent

Send for Catalogue explaining Patents and their application; Color Sheets; Special Shapes; and extensive list of our past work (illustrated).

Please Mention the CANADIAN ARCHITECT AND BUILDER when corresponding with Advertisers.

WILLIAM MALLOCH & CO.

Electric
 Hydraulic
 Elevators
 Hand Power
 Steam
 Electric Dumb Waiters
LONDON, ONT.



"Safford Radiators"

YOU CAN'T DOUBT IT.



IT'S not "hear say" but straight, existing evidence. It's before your eyes at every turn. The "Safford Radiator"—the most successful heater of the age. It has been acknowledged such by your countrymen, by builders of every country. You can't doubt it's superiority.

POINTS.

And why is the "Safford" Radiator so popular? Because the "Safford" is a positively non-leakable radiator without bolts or packing. It is unique in construction, graceful in decoration and design. Non-leakable, that's the great point—a simple screwed-pipe connection, no red lead, no bolts nor packing. The heat circulates evenly and immediately because all this ensures a free passage.

Send for a free booklet about our Radiators.

You don't need to experiment, the world has done that for you.

THE DOMINION RADIATOR CO.,

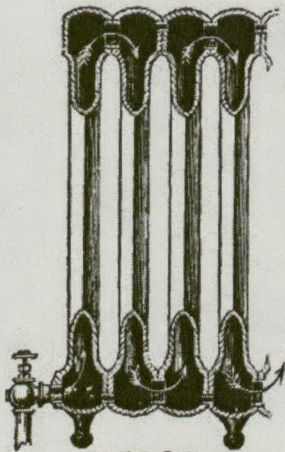
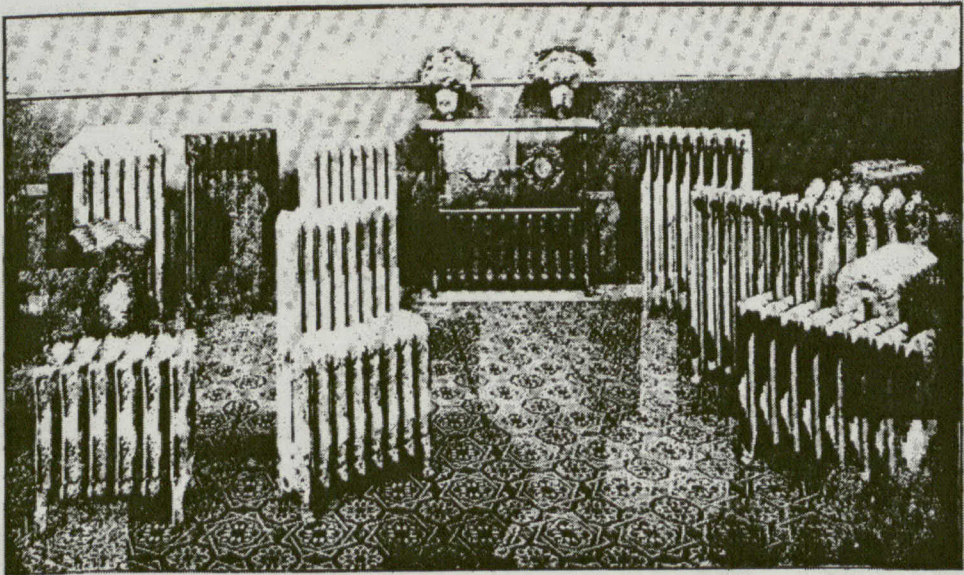
LIMITED.

HEAD OFFICE AND WORKS.

TORONTO, - - CANADA.

The "Ionic Capital" has in place of the square abacus of the Doric order a scroll rolled in on both sides by means of large volutes, the spaces between being decorated with leaves and egg and dart mouldings, sometimes a neck may be added below the scrolls. This Capital has two distinct faces and two sides. The shaft is nearly always fluted.

CANADA HOT WATER and STEAM RADIATORS



Section Cut
Showing improved circulation.

THIS COMPANY have now one of the most complete radiator plants on this continent, and are prepared to supply radiators in large or small quantities on the shortest notice.

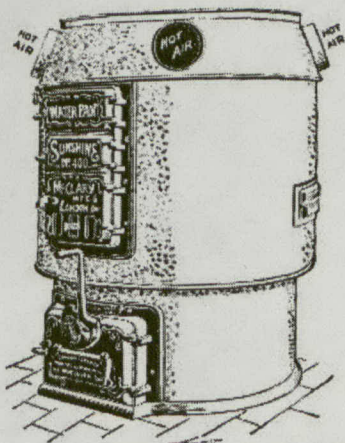
Their radiators are working satisfactorily in all parts of the Dominion. Send for catalogue and any further information desired.

THIS IS THE ONLY CAST IRON RADIATOR WITH PERFECT CIRCULATION.

CANADA RADIATOR COMPANY, LIMITED

Head Office, - - TORONTO.
Foundry and Works, PORT HOPE.

Sunshine Furnaces



This is the most successful warm-air furnace in Canada.

Made to suit every condition of heating.

Architects and Builders will be interested in the following points:—

Made in three sizes. Burns coal, coke or wood, and gives perfect satisfaction with either.

Has large feed door. Diameter of fire pot, 19x21 and 23 ins.

Low setting. —easy to set up.

Dust and direct draft damper.

Water-pan and triangular grates.

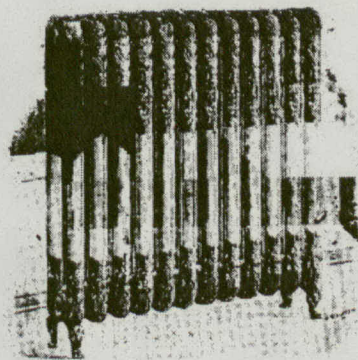
We also make the **FAMOUS FLORIDA** and **FAMOUS MAGNET** Furnaces, both of which are up-to-date in every detail.

Write for full information for any or all of these.

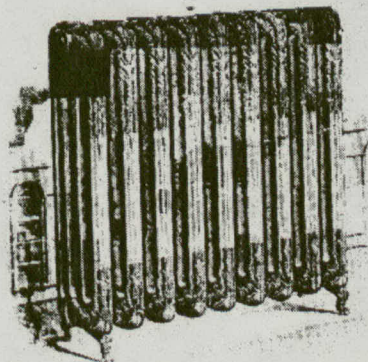
The McClary M'f'g. Company
London, Toronto, Montreal, Winnipeg, Vancouver and St. John, N.B.

Please mention the **CANADIAN ARCHITECT AND BUILDER**
when corresponding with advertisers.

Hamilton Radiators



★
For
Hot Water
and
Steam



Are the production of the best mechanical skill to be procured.

Unexcelled in **QUALITY, DURABILITY, and EFFICIENCY.**

Made with all iron to iron joints—no packing of any kind.

Used in hundreds of the best and most expensive buildings in Canada

Manufactured by ...

Correspond with us before deciding on your method of heating.

THE GURNEY, TILDEN COMPANY
Hamilton, - Canada. **LIMITED**

TORONTO OFFICE: 134 Bay Street.
EASTERN AGENTS: H. R. Ives, Montreal, Que., and The Star Iron Co., Montreal.
WESTERN AGENTS: The Gurney Stove & Range Co., Limited, Winnipeg, Man

CATALOGUE FOR THE ASKING

Comprehensive Efficiency

... In

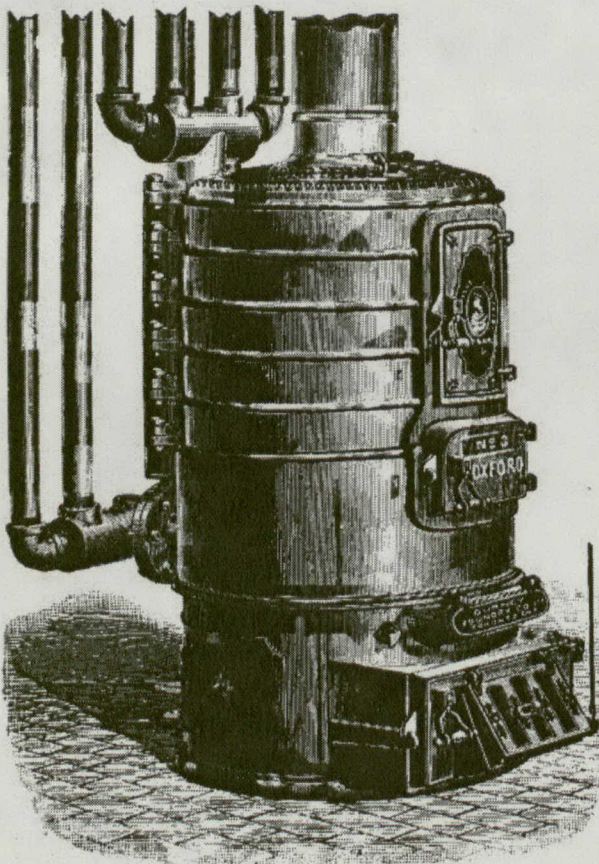
Gurney Heaters

The evolution of our Boilers for hot water and steam heating has been comprehensive—symmetrical—resulting in the complete efficiency of every detail.

We have approached the problem from every side. From that of economy, that of efficiency, that of durability, and that of simplicity. We have not tried to overcome one fault to the exemption of others. The result being that our Heaters are equal to all demands, lacking nowhere, everywhere successful.

The

“Bright Idea” “Oxford” “Doric”

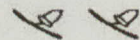


GURNEY OXFORD BOILER

Have different capacities to suit all varying needs.

A choice among them gives you absolute security from disappointment.

Consult our booklet for accurate and exhaustive detailed information.



**THE
GURNEY
FOUNDRY
Co., Limited**

Toronto, Winnipeg,
Vancouver.

**THE GURNEY-MASSEY CO.,
LIMITED**

Montreal

ELEVATORS

Any desired capacity.
MILLER BROS. & TOMS
MONTREAL
Any service. Any motor.

BENT GLASS

MANUFACTURERS

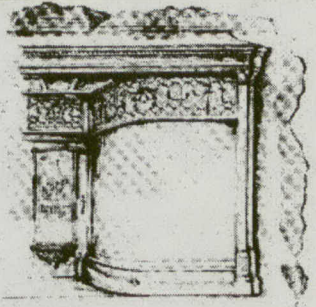
FOR { **Shop Fronts**
House Windows
Show Cases

FINE BENT GLASS FOR CABINETS AND ART FURNITURE.

Toronto Plate Glass Importing Co.
ALL KINDS OF WINDOW GLASS.

135 and 137 Victoria St. TORONTO

Refractory Glass TRANSOMS for Light of vision.



Use Rock Wall Plaster

Wood Carpet, Borders for Rugs
Wainscoting, etc.
Turned and Twisted Grille Work
Designs on application.

ELLIOTT & SON COMPANY, LIMITED
MANUFACTURERS
79 King St. West, TORONTO



TENDERS WANTED

A Weekly Journal of advance information and public works.
The recognized medium for advertisements for 'Tenders.'

CANADIAN CONTRACT RECORD
TORONTO.

CHARLES POTTER

(ESTABLISHED 1853)
OPTICIAN .: 81 Yonge Street, Toronto.
Architects', Surveyors', Builders' and Engineers' Requirements

Drawing, Mathematical, Surveying and Philosophical Instruments, Set Squares, Rules, Tape Lines, Spectacles, Eye-Glasses, Etc.

Repair Department on the premises, furnished with tools and all facilities to repair and supply parts required in brass or glass. Skilful and experienced workmen employed. The guarantee of an old established house: that all goods sold will be precisely as represented. Mail orders undertaken with care and faithfulness. Enquiries cheerfully and promptly answered.

ORNAMENTAL METAL RAILINGS



FOR
Banks, Offices,
Churches, Theatres, etc.
IRON STAIRS
FIRE ESCAPES
WIRE WORK
OF ALL KINDS.

Send for Catalogue.

Dennis Wire & Iron Co.
LONDON, ONT.

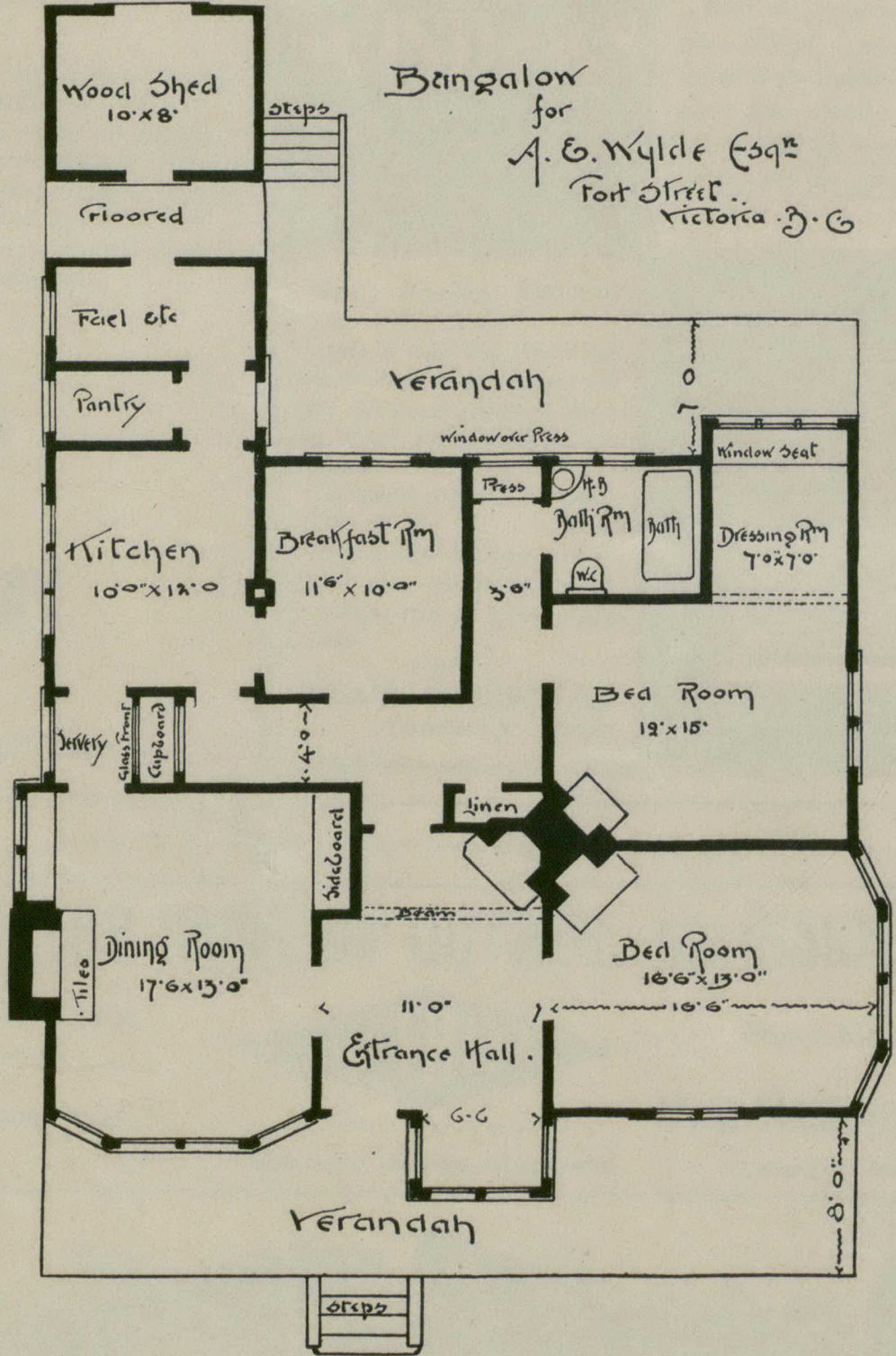
THE STEINBERGER, HENDRY CO.

Limited
37 RICHMOND STREET W., TORONTO, ONT.

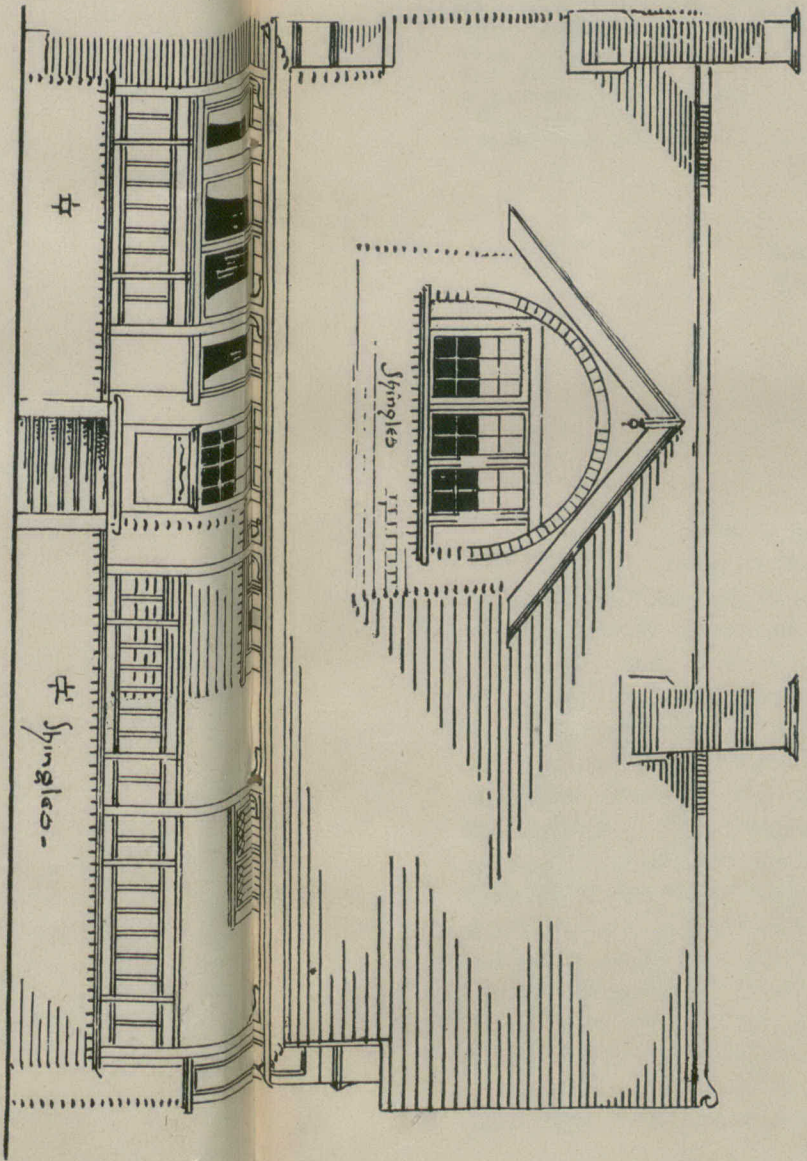
Slate and Hyloplate
Blackboards

URINAL and FLOOR SLATE
ESTIMATES GIVEN

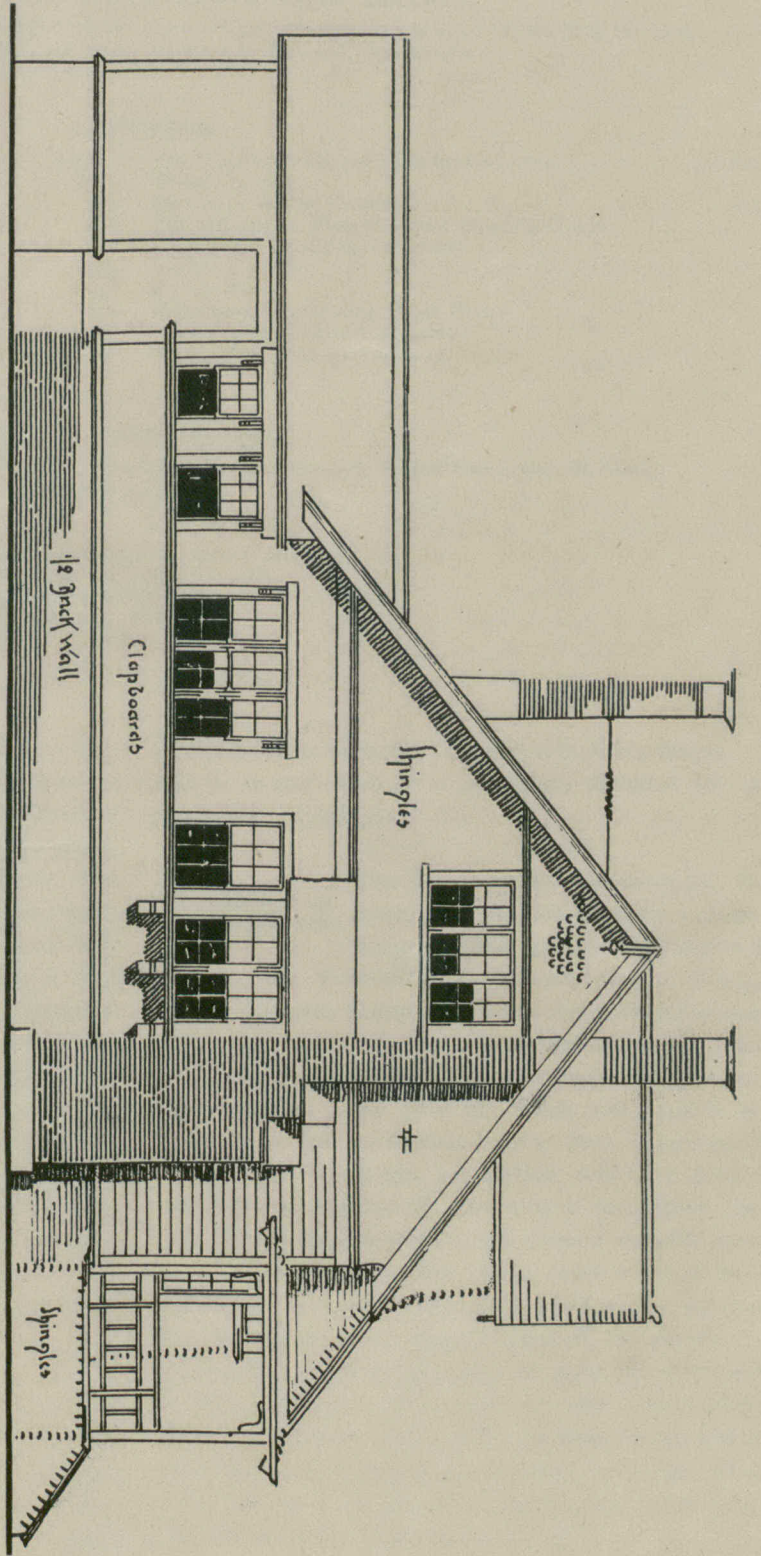
BUNGALOW, FORT STREET, VICTORIA, B.C.
R. M. FRIPP, F.R.I.B.A., ARCHITECT.



Elevation to Fort Street



Elevation to the East



The Canadian Architect and Builder

VOL. XIV.—No. 166.

OCTOBER, 1901.

ILLUSTRATIONS ON SHEET.

Bungalow, Fort Street, Victoria, B. C.—R. M. Fripp, F.R.I.B.A., Architect.

ILLUSTRATIONS IN TEXT.

Cottage, One Storey and Basement, Two Elevations and Plans.—R. M. Fripp, F.R.I.B.A., Architect.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Carvings on Public Library Building, Westmount, Que.—Robt. Findlay, Architect ; G. W. Hill, Sculptor.
Photogravure Plate.—Dominion Bank, Winnipeg.—Darling & Pearson, Architects.
Photogravure Plate.—Kirby Hall, South Side of Court Yard.

CONTENTS.

Editorial	193-94	The Quantity of Stone used for Concrete	201-202
Notes from Pan-American Exposition	194-95-96	Wood Carving	202
Canadian Society of Civil Engineers	196	Marble in British Columbia	203-204
Lectures on Architecture	196	The Market for Plumbing and Heating Goods	204
Office Building Wiring	196	Lead Pipes Breaking Crossways	205
Manitoba Correspondence	197	Practical Hints	205
Fire Prevention	198	By the Way	206
A Sulphur and Sand Cement	198	Paperhanger's Folding Paste Board	206
Intercommunication	199-200	A Canadian Architect in Korea	207
Laying House Drains	200-201	King Alfred was an Architect	207

SPECIAL CONTRIBUTORS

- PROF. S. H. CAPPER, R.C.A., Department of Architecture, McGill University, Montreal.
MR. W. A. LANGTON, Architect, Toronto.
" EDMUND BURKE, " "
" S. H. TOWNSEND, " "
" FREDERICK G. TODD, Landscape Architect, Montreal.
" R. A. L. GRAY, Electrical Engineer, Toronto.
" W. H. ELLIOTT, of Messrs. Elliott & Son Co., Toronto.
" J. C. B. HORWOOD, Architect, Toronto.
" A. F. DUNLOP, R.C.A., Architect, Montreal.

The Royal Visit.

Canada tendered a right Royal welcome to the Duke and Duchess of Cornwall and York, who have just left our shores after a month spent in visiting all parts of the Dominion. It is to the credit of our future King and Queen that they should have undertaken a nine months journey, traversing two-thirds of the earth's surface, with the object of acquainting themselves with the people and conditions existing in the various parts of the great British empire. The information which they have acquired will enable them to more capably discharge the functions of their high station. The people with whom they have come in contact feel that the bond of sympathy and loyalty which binds them to the Empire has been further strengthened. Great commercial advantage is also likely to accrue to Canada from the descriptions of the country and its resources and opportunities written by representatives of the leading British and American papers who accompanied the Royal party.

Building Conditions.

THAT a large volume of building is in progress throughout Canada is evidenced by the scarcity of tenders for work of ordinary character as well as labor skilled and unskilled. It is not unusual of late for an architect to solicit tenders from a dozen contractors and receive but one or two. Skilled workmen in all trades are in demand, and there are also too few laborers. The requirements in some trades are said to have been met by bringing in workmen from Buffalo, where, according to the observation of Canadian visitors, there is not to be seen a single residence in course of construction. While a high degree of prosperity prevails in Canada, there is

no perceptible tendency towards a building boom. The activity is the result of a legitimate demand for more and better buildings.

Development of the Canadian North-west.

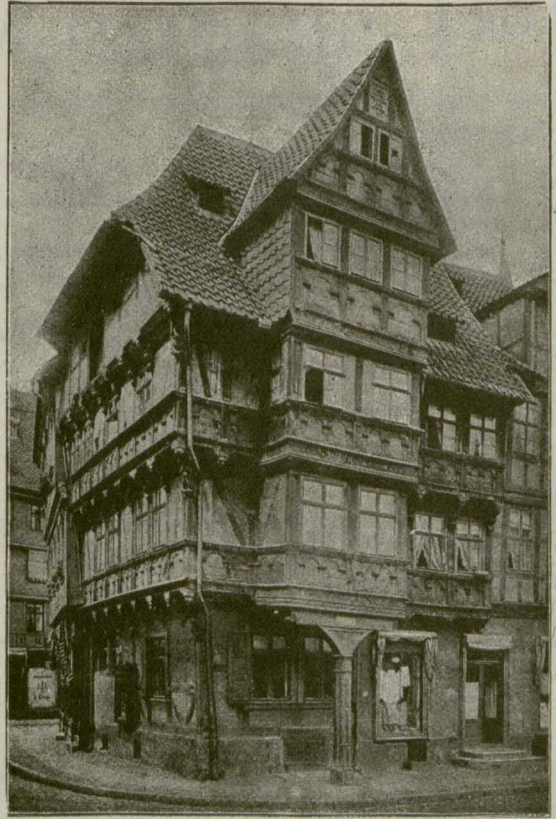
The encouraging statement has lately been published that of the 23,000,000 acres of land granted as railway subsidy by the Dominion Parliament to the Canadian Pacific Railway Company, 9,000,000 acres have already been sold. Most of these lands extend along the line of the railway, but there is also a large tract in Northern Alberta. The rate at which the land is being taken up in the Northwest is the best assurance that in a few years a large population will flow into that territory and develop its agricultural and other resources. With the population will come a steadily increasing demand for the skill of the architect and builder, and for construction materials of all kinds adapted to the climate and the requirements of the people. The illustration pages of this number show the development in this direction which has already taken place at Winnipeg, where some of the leading banks and other financial institutions have erected buildings which in point of cost and dignity of appearance are fit to grace the streets of any city in the world.

The Canadian Exhibit at Buffalo.

The impression given the visitor to the Canadian Building at the Pan-American Exhibition is that Canada is a purely agricultural country where buffalos, bears and all manner of wild animals abound. The building contains only specimens of grain, wild animals and furniture. While it is important that the advan-

ages which we can offer to the farmer, the sportsman and the tourist should be adequately displayed, our capabilities in art and industry should also have prominence, otherwise strangers will receive a wrong conception of our rank among the more highly civilized countries. It is true that the art gallery contains a small exhibit of pictures by Canadian artists, that in the Mining Building are to be seen some excellent samples of Canadian ores, and that in other departments such as live stock and farm and dairy products, Canada is well represented. But these exhibits are divided among various buildings and therefore do not impress the visitor as would a collective exhibit in one building. At least half the available space in the Canadian Building might profitably have been used for small, attractively arranged exhibits which would have served to give the visitor a bird's-eye-view of Canada's resources and development in a dozen or twenty different lines, and a measurably accurate idea of her advantages as a place of residence. People of refinement are loth to remove to a raw country, and it is to be feared that the character of many of the exhibits which we have made at foreign exhibitions has been such as to convey the idea that Canada is that kind of a country. Perhaps the best method of removing any such false impressions would be to inaugurate in Toronto on a suitable scale a Dominion Exhibition, and invite foreigners to come and see for themselves the beauty and capabilities of our country and the skill of our people.

REFERENCE has been made on several occasions to the necessity for a thorough revision and compilation of the enactments of the Toronto City Council for many years past with respect to the erection of buildings. The legislation on this subject has been of a fragmentary character, extending over at least a quarter of a century. When enacted the various by-laws were printed separately on sheets or in pamphlet form. No attempt was made at compilation in one volume. Many of the by-laws are now entirely out of print, and architects, builders and others are consequently unable to learn what are the provisions of the laws which are supposed to govern the construction of buildings. Such has been the confusion which has existed for many years past, that even the officials whose duty it was to see that the laws were observed, were unable to interpret them. The condition of affairs is well illustrated by the fact that there is declared to be no restriction to prevent the erection of factories, livery stables and such like constructions on the most choice residential streets. We have in mind an instance in which the rear wall of a six or seven story block has been built close alongside a well designed and cosy home on an attractive west end street. The owner of this home is thus without warning deprived of beautiful surroundings and much of the actual value of his property. Something might be accomplished if the present shameful condition of things were pressed upon the attention of the council by a joint deputation from the Ontario Association of Architects, the Guild of Civic Art, the Builders' Exchange and real estate interests. It will be remembered that some years ago a new building by-law was drafted and submitted to the council by the O.A.A., and that was the last that was ever heard of it. Although it involved the arduous labor for many months of a committee of the leading architects of the city, it apparently never got beyond the pigeon-hole in some city official's desk. If the council have not the time or disposition to grapple with this important matter themselves, it is due to the many interests affected, that following the example of the city council of Montreal, they should avail themselves of the work which has already been done by public spirited citizens.



HALF-TIMBERED DWELLING HOUSE FROM PRUSSIAN SAXONY.

NOTES FROM THE PAN-AMERICAN EXPOSITION.

As comparison with the World's Fair seems to be inevitable for any one who writes about the Pan-American, this comparison may be made—that the Buffalo Exhibition, from the comparatively small space it occupies is, as a study, more within the range of practical politics. Its area of 350 acres is not far beyond the area necessary and feasible for permanent exhibition grounds, and a study of the sources of its beauty is likely to have practical application in the question, which is a live one, how to improve such grounds.

The popular cry all summer has been about the "colour scheme" and the illuminations. Both are in consequence somewhat disappointing.

After so much talk we expect to find the "Rainbow City" a striking exhibition of colour; but it is not. The colour is harmonious and pleasing, but not bright. One does not think of the buildings as coloured. They are not white, that is all. And being neither white nor coloured—essentially coloured that is to say—they are in that respect out of touch with the spectacular idea; they class, in appearance, with the permanent monuments of architecture and are so far, in spite of their beauty, imperfect. The buildings of the World's Fair were criticized by the French as crudely academic. The more freely designed French Fair buildings may be as good or better, (it is hard to judge from such illustrations as we see,) but it certainly seems, in recollection, as if the very academic character of the Chicago buildings, and their improbable whiteness, was the source of their success. They were an abstraction; something outside of ordinary experience; the sort of buildings that are usually left to painters or poets, "who," as Bacon says, "build at small cost."

The designers of the Buffalo Exhibition adopted colour as part of their plan, with the avowed intention of making a variation from the effect of the Chicago buildings. But to compete with the Chicago buildings;

to approach no nearer to the prosaic, it was necessary to transcend ordinary building material in colour as much as the World's Fair did in purity. It cannot be said that this has been done; the problem of a coloured fair is open for further development, but it will take a mighty man to tackle it.

Apart from the misleading of the popular cry, there is no cause for disappointment in the buildings. After all it is not the buildings that make the Fair so much as the grounds, and these are a triumph of spacious appearance, combined with a real compactness which, to one who toiled over the long distances of the World's Fair, is an unexpected joy. It is the plan of the grounds that is the principal source of beauty and will best repay study, for this gives the key to the successful planning of a pleasure Fair. Buildings are the main motive and give character to the whole, but their architectural function is to form a background for the spaces. A good sky-line and mass, and a play of light and shade, are the principal necessities. It is impossible to take any real detailed interest in the reduplicated enrichments which form the detail of such buildings; they are of use only in the broad way, to mark points in the design and to give it scale. A Fair is an open-air show and the real enjoyment of it is in sitting down and viewing some portion of the scene. A building thus gets real attention only as a whole, as a background for a space.

The grounds should constitute the beauty of a Fair quite as much as the buildings; each is equally dependent on the other, and the Pan-American forms an admirable study of the successful treatment of grounds, to give them interest and beauty and to assist the perception of space. One may deduce from it principles for guidance such as the following: Trees and shrubs are valuable not only for their individual beauty but for the softness of their texture and their rounded forms; a balustrade shows perspective like nothing else, and without insisting too much on hard lines; water is invaluable as a level surface with which everything else is unconsciously compared; all isolated objects near at hand give tone and scale to the distance, and upon these all possible beauty of detail should be lavished, for the eye occupies itself with them particularly. Statues are, of course, capable of the greatest beauty, and their white colour is a gain in the neighborhood of foliage, but dark objects help the sense of space better, and the Pan-American has examples in its band-stands, kiosks, fixed seats, flag poles and lighting posts, of useful objects which are made ornamental and assist the general effect. The advantage of fountains seems to be to a great extent their varying motion; the restlessness of the water produces peace in the beholder. A scene or building is more likely to receive attention and appreciation if there is a fountain in the foreground. Motion is also, no doubt, one source of the pleasure we receive from flags, and a constant irruption of kites in the sky over one corner of the grounds of the Pan-American—which certainly did add to the gaiety of the scene—may have been official and had a scientific intention in the same direction. One is reminded of Mr. Olmsted's prescription of waterfowl for the lagoons at the World's Fair, to induce movement and sparkle in the reflections. At the Pan-American this is carried too far. The fountains in the main court rise from the principal basin and fall back into it, troubling the

water so much that there are no reflections. Is anything quite so useful as a reflection? It makes composition automatically. Who has not seen a familiar bit of common-place roadside turned into a picture, when the melting snow forms a pond large enough to reflect a tree or a bit of sunset? The canal at the Pan-American was too narrow to be of much use in this way, and it did not appear to be an attraction except when the illuminations were on, which brings us back to illuminations, and the consideration of why they disappointed expectation.

In the first place the much-talked of gradual illumination was evidently only a device to save the electrical arrangements from strain. The public seem to have agreed that it was a wonderful spectacle to see the lamps glow a little at first and increase gradually to full power. The present writer experienced nothing but impatience, until the light came out to its proper strength. The genius of electric lighting is for sudden illumination, and if it could have been arranged to flash the whole thing out at once there would have been something to talk about; as it was, it is necessary to record a disappointment.

When the light was out in full force it was certainly fine, especially the tower, where the lights were thickest, giving the effect of massed diamonds. But one did not look long upon it, nor did those people do so whom one heard saying it was worth coming such numbers of miles to see. Why was this?

The truth is that the illuminations were—if one may use the word for anything so splendid—a little dull. They did not illuminate, in the primary and Pickwickian sense of lighting up. The buildings were completely extinguished and in their place appeared rows of lights marking out the main lines of the structure, like a pattern in pin holes held up before a light. It was a transformation scene all right, but when seen it was seen. There was nothing to watch, the lights did not even twinkle.

At the World's Fair, in which the illuminations were rudimentary by comparison, there was one feature which might give a clue to a more interesting mode of illumination. Surrounding the dome of the Administration Building were torches of natural gas, flaming many feet in height, which occupied the eye more than all the rest of the illuminations, not only from their own appearance, but from the play of light they cast upon the dome. Gas torches form part of the iron fence of some clubs in Pall Mall, and the light which the street and buildings receive from them, when the gas is turned on for a great occasion, is peculiarly exciting. It is a question of movement again. The frozen music of the Buffalo illuminations is too frozen to retain attention long, except, by the way, in the canals. These are uninteresting by day, because they are too narrow for the reflection of the buildings along their sides to appear as reflections; a surface of dirty water is all that catches the eye. But at night, when, under the illuminations, the passage of boats ruffling the water makes its surface a surface streaked with dancing fire, the canal, which is deserted by day, becomes popular.

Something of the nature of the waving light from gas torches, cast upon the buildings and grounds, would make a more beautiful scene at night than do the present illuminations, and the interest would be sustained by a sort of liveliness in the light and shade.

But the use of such enormous quantities of gas as would be required seems indefeasible. To use gas is to use material, whereas the production of electricity, where waterpower is available, is a mere matter of the wear of a few engines. Electricity is the available means of lighting. But its possibilities are not confined to strings of lamps, and a hint may be taken from the lighting-up effect of gas.

There are details of the Buffalo illumination which show how lights placed on the retired surfaces, instead of on the projecting surfaces, show up, with delicate tones of light and half light, the places of the building. This by itself would have more in it than the pin-hole system of making out only the leading lines. It is the difference between a line elevation and a perspective in light and shade.

The search light on the tower was also suggestive. The business of the search light was to pick out the statues and fountains in the principal court and show them up against the dark sky. Its efforts were a relief to the monotony of the general illumination. It showed things up instead of concealing them, and showed them up in a striking way. Even the movements of the search light from point to point were worth following. When it was changing its point of application and feeling about for another statue, the green of the grass under its glare was of extraordinary brightness, and suggested how brilliant the scene would be if lighted up by an application of this kind of light.

What is wanted is a combination of methods. There are three that may be used: 1st, the application of diamonds (clear lamps) and pearls (clouded lamps) to the outer surface, as at Buffalo, to decorate such features as should receive particular distinction; 2nd, a general scheme of lighting up surfaces by lamps concealed or withdrawn from view, on reverse or retired planes; 3rd, the use of search lights, that is to say, of lights thrown from an external point, in order to produce pictorial effects, to key up some portions of the scene above the rest, with possibilities of moving or mingling lights and perhaps of a suspicion of colour.

Of these three methods, the designers of the Pan-American Exposition adopted, it may be safely said, that with the least possibilities. We can judge therefore, from the splendour of the Buffalo illuminations, what may yet be done.

W. A. LANGTON.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

At the first regular meeting of the season of the Canadian Society of Civil Engineers, a discussion took place on Mr. Cecil B. Smith's paper on "The Sewage Output of Toronto," read at the last spring meeting.

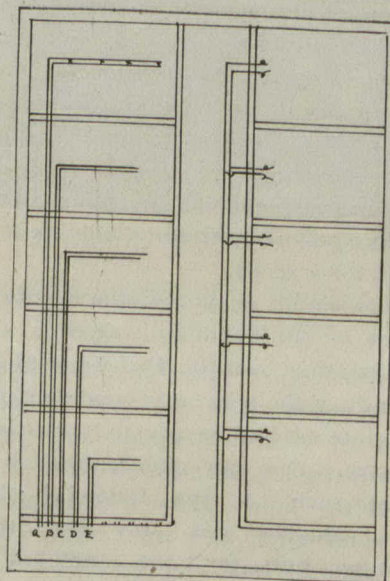
LECTURES ON ARCHITECTURE.

Prof. Capper has commenced the delivery of a series of lectures at McGill University upon "Architectural Styles, their Features, Mouldings and Ornament." The course is preparatory for the examinations qualifying for associateship in the Royal Institute of British Architects, the Royal Institute having announced its intention of holding such examinations at colonial centres. It is intended specially for architects in practice, and their assistants, who may be unable to attend lectures during the ordinary working hours of the university. It comprises a study in detail of the three great divisions of historical architecture, Classical, Mediaeval and Renaissance, in accordance with the programme of the Royal Institute, the lectures being illustrated by diagrams, lantern-slides, and casts. The lectures will be given in the architecture class-room, Engineering building, Monday, Tuesday and Thursday, from 5.30 to 6.30 p.m.

OFFICE BUILDING WIRING.

The difficulty is constantly arising in office buildings regarding meters for single offices or en suite. Architects find it difficult to foresee who will probably occupy offices in a building at the time it is wired, and it is impossible to know how to arrange the feeds for meters. If a separate feed is put in each room, some tenant comes along and may require a suite of three rooms or more, or possibly a whole flat, and then arises the difficulty of arranging so that one meter will do for all. At present wires have to be run through the walls from one room to another to accomplish this end, which necessitates a lot of unsightly wires and also damage to the building, and then it is not a job.

By referring to the cut it will solve the trouble. On the right hand side of the corridor the wires shown represent the usual method employed. It will show a feed wire running the length of corridor and a tap running into each office. On the left hand side is the



PLAN OF OFFICES

method I recommend, and which, although familiar to some, is not generally known. I have recommended it and installed it in several cases, and it gives great satisfaction.

At some convenient location on each floor, space is either found or provided to receive all the meters for all offices on the same floor, and the letters A, B, C, D and E represent the circuits radiating from this meter board, to each office. By this means any two or all offices, or in fact any combination required, is made in short order behind meter board without any defacing of walls or make-shift arrangements being resorted to. We have in some cases wired buildings and had all the meters in the building in one cupboard in basement. This is satisfactory for small building, but for large building each floor should be equipped as above.

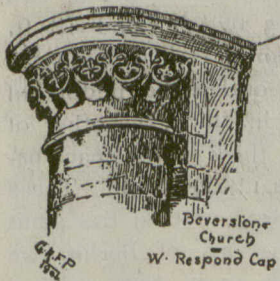
H. F. STRICKLAND.

Toronto, October 10th, 1901.

NOTES.

The management of the Central Canada Fair at Ottawa have decided to purchase yearly a number of pictures from among those sent by artists to the Fair, thus in time to establish a permanent art gallery. This year five hundred dollars worth of pictures were bought. The result has been that a number of well-known artists have signified to the secretary their intention to send each year in future not less than four pictures to the collection at the Fair.

MANITOBA CORRESPONDENCE.



Most of us no doubt have frequently heard the expression, "The unexpected is sure to happen." When all things seem to be running smoothly a break occurs and the whole machinery is out of gear. This in some measure illustrates what has been taking place in this city during the past weeks.

It was news to most of us that there was any trouble between the carpenters and the contractors, and we were looking forward to a good season's work free from strikes or any of those labor clouds which sometimes darken the horizon and obscure the sky of building prosperity.

To measure up and make a fair estimate of the whole subject is not an easy matter. Whichever way the scale may turn there is always the other side to reckon with, so that it is necessary to handle a contention of this nature with great care and intentional impartiality.

We find that a large number of the carpenters have been on strike for the past two months. They contend that they are not paid enough for their labor, and we think in a measure their contention is grounded on a good foundation. That the better class of mechanics in this branch of the building trade should be paid a higher rate of wages is we think allowed by all fair judges of such things, but there seems to be a desire on the part of the men to obtain a high standard wage for very inferior labor.

A man should be paid what he is worth and the times will allow, but good men should not be placed on a plane with inferior men, and to ask for such men 40 cents per hour with the addition of 10 cents, 20 cents or even higher per hour for over time, is out of the question. There is a large amount of unskilled labor in the market, useful and necessary no doubt in its place, but it should be remembered that this labor should not expect to receive the same wage that high-class labor can command.

Some two years ago a carpenters' strike took place here which ended in an arbitration, and the terms were that the minimum wage was to be 27½ cents per hour. This arrangement the men say was not satisfactorily carried out by the contractors. This may or may not have been the case, but the jump from 27½ cents to 40 cents per hour as the minimum wage, is in our estimation too great. Nor do we think the men ever expect to get this, but are really working and striking for the purpose of getting the contractors to acknowledge and treat with their union, which the contractors on their part say they will not do. So the matter rests, and in the meantime men are out of employment, work is delayed, some of it being put off for another season, while a bitter feeling to some extent is growing up between employees and employers.

We think the men as a body made some mistakes from their own stand point. The time selected was not a right or proper time to fix matters of this kind. It should be done before work starts, which would be fair and right to all. Public sympathy would be more likely to follow them than at the present time. Again the effort does not seem to have been a united one on the part of the whole trade, and consequently cannot expect to be the success it otherwise might have been.

Besides as has been stated the minimum wage is set too high, and to make this a lever to compel contractors to acknowledge a union which has no standard of excellence, but only a standard of membership, is bad in principle.

As to the contractors we think some action should be taken by them to try and arrange on a fair basis disagreements regarding wages. Men should be paid a proper remuneration for a fair day's work, good men should be encouraged by good payment, for the class of work done, so that by this means a higher standard may be obtained. If the arrangement of two years or so ago has not been carried out in a fair or honorable manner, then we say it should be, and no advantage should be taken of workmen who have their labor to sell.

A fair and honorable dealing between employer and employees will conduce to a better state of feeling and assist to bring about that happy time when strikes shall be a thing of the past.

Since the above was written the strike has been declared off by the men, but with the notification that the same demand will be made early in the coming year. We cannot estimate on what may or may not take place in the future, but we think the demands of the men must be somewhat altered before they are likely to be accepted by the contractors. We trust that for their own good the men will see this and that another strike will be averted.

The building trade has not been very brisk this fall for some reason or other; we presume the strike has much to do with it. Work let early in the season is being wound up, so that from what may be seen just now building operations will close early.

In our rambles we have noticed in a brick building now nearly completed that there has been adopted a certain class of iron construction. In fact almost the whole work above the basement has been carried on iron girders supported on cast-iron round or box columns. Does it not seem bad practice at this date to depend on cast-iron to support a heavy building? Is there not danger in case of fire? These supports may become heated to such an extent that a stream of cold water striking them would cause fracture, and thus endanger the safety of the structure. From the position of these supports it would seem out of the question to cover them with a proper fire proof covering. Cast-iron unprotected does not seem to be the safest way of supporting bricks and mortar.

During the past summer there have been some heavy rain storms in this city, when such an amount of water fell that some of the sewers were not large enough to carry off the flood, and in consequence the water backed up in the cellars, and in one instance we know of the pressure of the water was such as to lift the cement floor at the centre. On investigation to find the cause of this unusual occurrence it was found that the cover of the catch basin was closed and weighted down by goods, and that the water not having this outlet, spread through the weeping drains, penetrated under the floor and exerted sufficient pressure to lift the cement top and crack it. The question arises should a rain fall of such exceptional character be taken into calculation when figuring up the capacity of sewers to carry off flood water. To work on the basis of an average rain fall would not meet the case, so we presume the only way is to run chances as a thing of this kind may not occur for years. Still it is a factor in general sewer construction, we might do well to consider and in some way arrange for.

Winnipeg, October 5th, 1901.

FIRE PREVENTION.

There recently closed at Berlin an exhibition of materials and appliances designed to prevent destruction by fire. The exhibition was housed in temporary buildings erected for the purpose on a site in the suburbs of Berlin having an area of 80,000 square meters. Some of the exhibits were shown in the grounds surrounding the buildings. The exhibition was divided into six sections, as follows :

1, Fire Extinction ; 2, Assistance in case of Need and Danger ; 3, Street Cleansing, Street Paving and Cognate Works ; 4, Fire Prevention ; 5, the well-being of the personell of Fire Brigades ; 6, Art, Literature and Education.

From the Builder it is learned that " Section 4 was one of the most extensive sections in the Exhibition. A great deal of ingenuity was devoted to the production of novel forms of fire-resisting construction, some undoubtedly valuable from a scientific point of view, others valuable only from a commercial point of view, being merely excuses for building up trade. The use of iron in fire-resisting construction is very generally adopted, and its adequate protection not always sufficiently carried out. There are numerous examples of so-called fire-proof floors, for example, in which the lower flange of rolled iron joists are left exposed, but there are on the other hand, many others in which the protection of the iron is rightly regarded as an imperative necessity.

" One material which is largely employed for the protection of iron, especially in columns and stanchions, but also in girders and joists, in cork-stone, a material made of cork dust and various kinds of cement and plaster. As a non-conductor of heat and a slow burning material, this undoubtedly is not without value. Asbestos, in combination with lime, cement, and plaster, is also largely employed in various forms. Kiesel-Guhr or fossil meal, on account of its valuable non-conductive property, is also used in various forms for the protection of iron, in bricks, sheets, and slabs, formed by a combination of Kiesel-Guhr with some cementing compound. Several firms show iron protected by rope made of asbestos, cork, or Kiesel-Guhr and jute, the chief advantage being apparently the ready application of the material, which is then usually finished with a plastered surface.

" Besides these slow-conductive materials, brick and concrete in various forms and arrangements are also employed. Very considerable use is made by many patentees of porous brick, that is, brick which has been made of clay mixed with sawdust which is consumed in the process of burning the brick, thus rendering it lighter and almost as easily receptive of nails as coke-breeze concrete. Hollow bricks, either of ordinary brick earth or of the porous manufacture, are not uncommon. Dovetailed and keyed bricks or blocks are in bewildering variety, and very considerable spans are shown constructed in this way. Examples of floors of 6 ft. and even 8 ft. span and only 4 in. thick are frequent. In some cases light iron rods or bars, one might almost say laths, for their thickness scarcely exceeds that of hoop iron, are used in the joints of the brickwork to give increased tensile strength to the lower part of the floor's section. An interesting development of this brick construction is seen in self-supported or hanging partition walls, some of which

are quite startling, as, for example, the exhibit of Pruss & Koch, of Berlin, who show a structure of two self-supporting parallel walls 13 ft. span and 18 ft. high, with a cross wall 21 ft. span and 18 ft. high between them, with a doorway cut out in the middle of it. One of the side walls is $2\frac{1}{2}$ in. thick, the other of the two thicknesses each $2\frac{1}{2}$ in. thick with a space between of 6 in. The cross wall is $1\frac{1}{2}$ in. thick. These walls depend largely upon hoop-iron vertical ties ; but in another instance, shown by Lorene, of Berlin, we see walls 12 in. thick and close on 15 ft. span, with a height of 7 ft. 6 in., built of keyed brick alone, without iron. These walls, moreover, carry a brick roof 6 in. thick. Thus the whole structure in this case forms a hut 15 ft. square internally, carried only on four angle piers.

Combinations of iron and concrete are numerous, and in many the construction has but a small amount of iron which is embedded in the lower part of the concrete. As an example of this, we may instance the flooring shown by Paul Zollner & Co., of concrete $4\frac{1}{2}$ in. thick, 14 ft. span, with $\frac{3}{8}$ in. iron rods $4\frac{1}{2}$ in. apart. Another example is that by M. Czarnikow & Co., a floor nearly 20 ft. span of concrete, 9 in. thick, with iron bars $1\frac{1}{2}$ in. by 1-16 in., 2 in. apart. As a tour de force showing what can be done with glass, the Aktien-Gesellschaft for Glasindustrie, of Dresden, have erected a considerable sized pavilion wholly of glass—walls, roof and floor. Glass bricks, hollow and solid, and wired glass of various thicknesses and patterns, are the chief components of this remarkable structure."

A SULPHUR AND SAND CEMENT.

Professor Brown, a St. Louis man, is said to have invented or re-discovered a combination of sand, cement, and sulphur, which he claims possesses qualities far superior to concrete, and which can be produced at less cost than that material.

Professor Brown claims for his new discovery that it is acid-proof, a non-conductor of electricity, waterproof, a non-conductor of heat and cold, and that it is indestructible, being impervious to all attacks of fire, temperature, climate variations, time and decay. The compound can be mixed and moulded upon the spot where it is to be used, and when dried it becomes as hard as granite, and will take a high polish.

Besides being valuable for house construction, the material is available for use in the construction of sewer pipes, electric wire conduits, and water-mains. In art and decorative work it is also expected to be of use.

Professor Brown owns a piece of material which he says is known to have been taken out of a building erected 1,500 years ago, and he declares it to be the same as this new compound.

PERSONAL.

Mr. Edward Harrison, Jr., of Topeka, Kansas, chief of the engineering staff of the Santa Fe Railway, has been visiting Hamilton, Ont., his old home, after an absence of thirteen years. He was once a student in the office of Mr. James Balfour, architect.

Mr. D. Ewart, chief architect of the Public Works Department at Ottawa, has recently returned from Europe, whither he went for the purpose of investigating fire proofing materials and methods. He is reported to have expressed the opinion that none of the systems which he examined while abroad are in any respect superior, but are rather behind the methods in use in Canada.

INTERCOMMUNICATION.

[Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries, neither do we undertake to answer questions in the issue following their appearance.]

NOTE:—Answering H. R. last month regarding cement tanks, it should have been mentioned that the inserted galvanized iron pipes should be made of 24 or 28 gauge iron, and should have the end in the water, closed tight, as the pipes or tubes must contain no water.

From Old Bricklayer:—In answer to "Young Bricklayer," I may say that in this section of the country—near Lake Simcoe—we estimate bricks in the wall as follows, per foot superficial.

For a 4 inch wall (½ brick)	7 bricks
" 9 " (1 bricks)	13 "
" 14 " (1½ bricks)	21 "
" 18 " (2 bricks)	28 "
" 22 " (2½ bricks)	35 "
" 26 " (3 bricks)	42 "

And seven bricks additional for each half-brick added to thickness of walls. To find the number of bricks required for any wall, all we have to do is to find the length and height of wall, multiply these figures, then multiply the quotient by the number of bricks that are given for the thickness of the wall to be built. If it is a 9 in. wall, multiply by 13; if a 14 in. wall multiply by 21, and so on. The openings for windows or doors, if they exceed 2 feet in width should be deducted, all under that should be counted solid. Ten per cent. of the openings should be allowed for waste.

From B. F.:—How should a door be hung with regard to the hinge and stile, to get the best results?

ANS.:—Something will depend on the way in which the door-frame is trimmed. If there are large projecting hand mouldings on the architraves, or if the bare blocks project far out from the line of the door jambs,

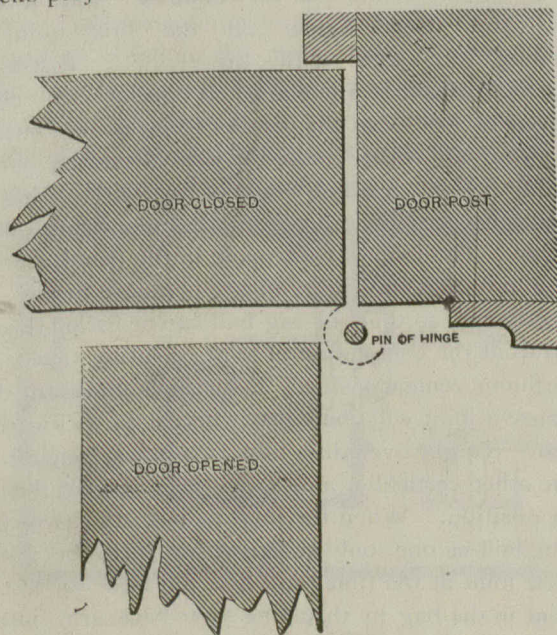


FIG. 1.—DOOR HANGING.

then a wide hinge will be required, and wide winged hinges when possible should be avoided, as any movement in the jamb or door is sure to be intensified where the wide hinges or "butts" are employed. A door, less than 1¾ in. thick should not have more than one-

sixteenth of an inch play on the hinge side, and a trifle less on the lock side. A thicker door will of course require more clearance on the lock side, and still more if wide hinges are used. Doors should fit close, yet swing perfectly free, and this can be more readily done when the knuckle of the hinge is close to the jamb and stile, as shown in the illustration (Fig. 1).

From P. McD.:—I want to lay out a curve having a long radius; the curve measuring from a straight line will have a rise of six inches, the chord being eight feet long?

ANS.—This is very simple when the method is understood. Let A C in the diagram, Fig. 2, be the length of span—8 feet—then on the centre line B raise a perpendicular 12 inches, twice the height required, then

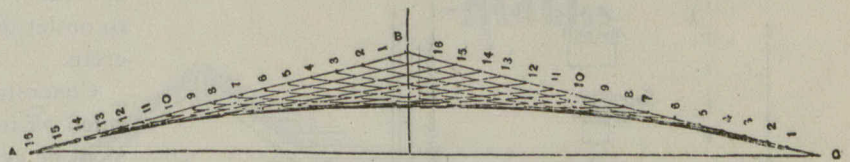


FIG. 2.—STRIKING A CURVE.

space from A to B any number of equal divisions. Do the same from B to C; next take a straight edge and draw lines from the spaced points, 1 to 1, 2 to 2, 3 to 3, and so on until all are lined off. The intersections of these lines will give the points through which the curve may be traced. It will be noticed the divisions are numbered from 1 at C, upwards to B, and from 1 at B downwards to A.

From J. B.:—Will you please inform me as to some method by which I may determine accurately whether or no a room or house is damp, and if so, how damp?

ANS.—Salt is a good substance to test the presence of dampness. Every housekeeper knows that the table salt sticks together in damp weather. It will also do the same in a damp room. Chloride of lime will turn liquid in a damp place. The rapidity of the change will enable one to judge of the degree of dampness. We do not know of any rule by which the degree of dampness may be determined. A room in which soiled clothing or shoes will mould may be considered damp. There are costly instruments, we believe, that may be employed to measure the moisture of the air, but they are chiefly in chemical laboratories.

From S. McV.:—I am desirous of building a wood-working factory in a town containing about 6,000 inhabitants, and would like to have your views regarding size of shop, lay-out of machinery, and probable cost of whole outfit. The factory of course will be two stories, the ground floor to accommodate engine, necessary machinery and small dry kiln. The upper floor to be for work benches, etc.?

ANS.—We submit the following scheme of building (Fig. 3), and layout of machinery. It is considered a good plan of shop and of distribution of machinery, and was prepared by an expert. The building is 36x100 feet, the engine room 20x24 feet, and the drying kiln 12x16 feet. The building itself need not be a heavy structure, but it should rest on good solid foundation, and all the machines should stand over a solid concrete or masonry bed. The main floor should be as high from the roadway as the top of a wagon body, which

will be found handy in loading and unloading stuff. The total cost of a factory of this kind, including machines described, a 70 horse power engine, line shafting, belts, a good blower system, dry kiln and all

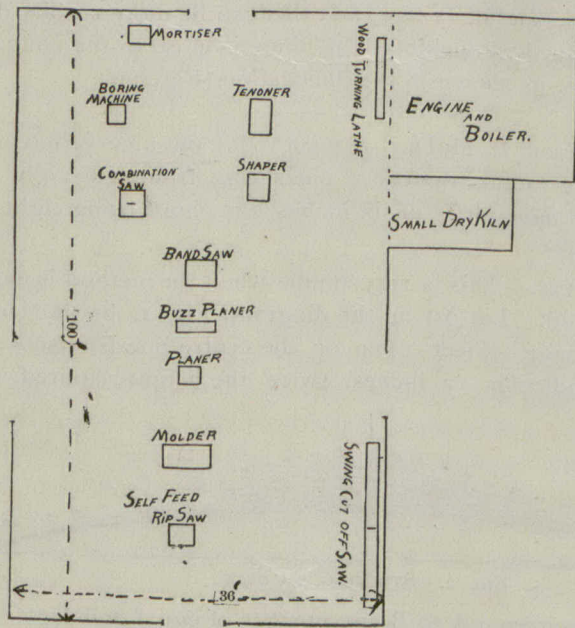


FIG. 3.—PLAN OF WOOD-WORKING FACTORY.

buildings complete, will be somewhere between eight and nine thousand dollars. Machines and engine to be up-to-date and new. We will be pleased to hear from experienced factory men on this subject. Perhaps some useful suggestions as to machines and placing them, can be offered to S. McV.

LAYING HOUSE DRAINS.

A drain may be watertight, but if not properly laid, deposits will occur, and, sooner or later, a stoppage will result. The main drain should be straight and laid to a regular gradient. Before breaking ground, it is necessary, says an English builders' journal, to strain a line on the surface over the intended site of the drain. By so doing, when the bottom of trench is reached, there will be no need to cut under at different parts of the trench in order that the line may strain clear of the sides. The width of trench should not be less than 2 feet.

The trench being excavated to its approximate depth, the next thing is to fix an interceptor, for from this we must determine the fall. Before fixing the interceptor, that part of the drain that connects the trap to sewer must be tested for clearness by passing rods through. In fixing the interceptor, don't fix it at a dead level, but with a slight fall to sewer; it assists in passing solid matter quicker through the trap.

From the inlet of this trap we now take our fall for the main drain, which should be about one in forty, or $1\frac{1}{2}$ in. in 5 feet. Sometimes, however, there is only just sufficient depth from the trap to the upper end of drain for a slight fall, and this has to be evenly distributed throughout the length of drain. To know how much we have for a fall we must take a level along the surface of ground from the point above the trap to the upper end of drain, measure down from level to bottom of inlet of trap, also from level to bottom of drain at upper end. Deduct the depth of upper end from the depth at lower end, and the remainder will give the amount of available fall. For example, suppose the interceptor is 3 feet below surface, and allow 11 feet below surface at upper end, and the length of

drain is 100 feet, then $3 \text{ feet} - 1 \text{ foot} = 2 \text{ feet}$, thus we have 2 feet fall. Now $100 \text{ feet} \div 2 \text{ feet}$ gives us $1\frac{1}{2}$ in. in 6 feet 3 in. Now get a straightedge 6 feet 3 in. long, nailing on one end a piece of board $1\frac{1}{2}$ in. thick, and place this end level with the lower part of inlet of the trap, and at the other end you drive a peg in the middle of trench so that the straightedge can rest upon it. By noting when level will be the proper height of the first peg, continue throughout the length of drain, the pegs standing 4 feet 6 in. above the bottom of trench for concrete. The branch drains need not be of the same gradient as the main drain. They generally come up sharper from the junction to the gully or fixture. The proper way to determine the fall is by fixing the gully temporarily in its proper position, also the junction with its branch inlet well above the bottom of trench. A line or straightedge from inlet of junction to outlet of gully will be the gradient level for concrete.

Concrete is next laid in to level of pegs—in fact, ruled off to top of pegs, so that the pipes, when laid, shall be even on the top. When the concrete is set, the next thing is to drive a long chisel by the side of the interceptor and another at the upper end of drain; then strain a line from these two points at the height of centre of sockets. All is now ready for laying the pipes, the most important part of which is making the joints.

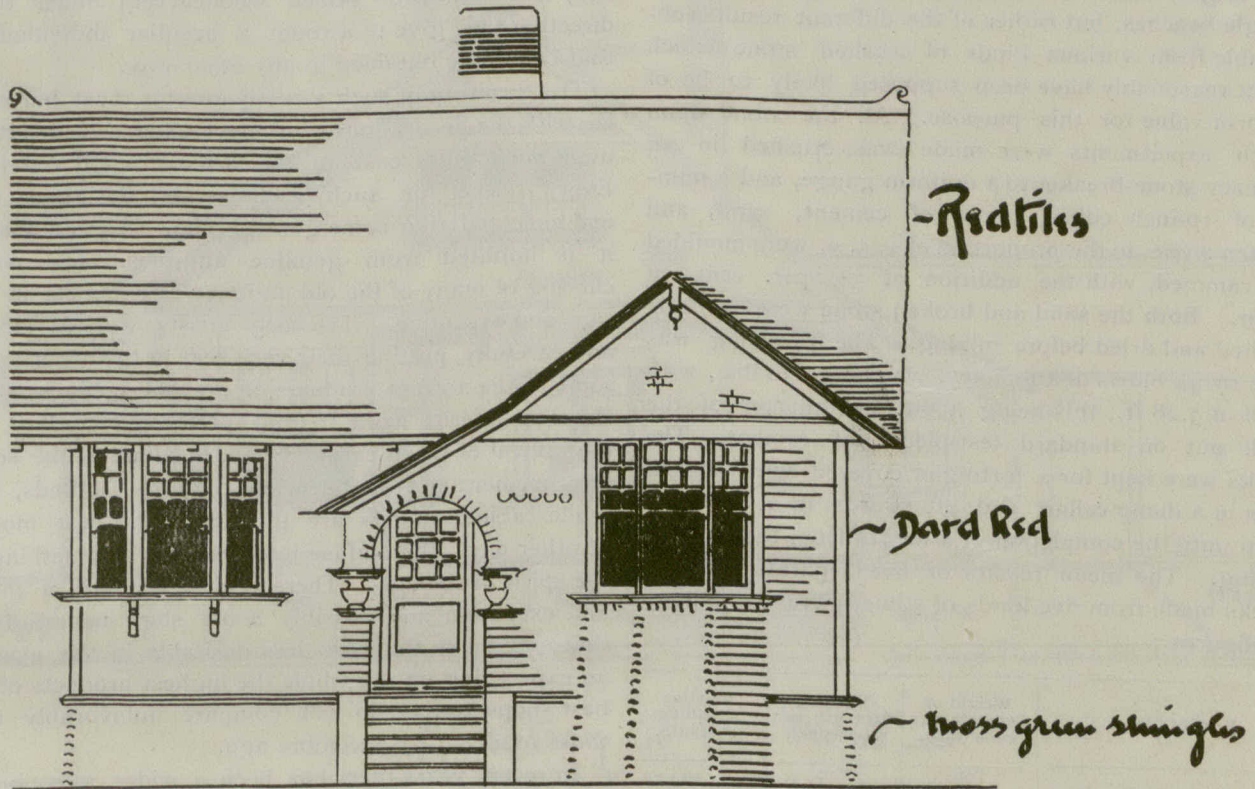
In making and finishing joints proceed as follows: Tap each pipe for soundness before laying, rake out a little concrete near the joint of pipe so that the hand can be got well under the socket; fill in the socket of pipe with cement all round flush with the bore of pipe; then insert the spigot end, forcing it well against the shoulder of the socket, causing the cement to fill out the joint in every part. Do not finish the joint at once, but proceed to lay another pipe, taking care that the inside of pipe is cleared after making every joint. By the time the second pipe is in position the first joint will be getting stiff; fall back on this joint and form a ring of cement well sloped all round it. Lay a third pipe, and then finish off the first joint by "ironing" it well with the trowel, leaving it neat and clean. In fixing a gully or closed trap you cannot clean the inside of joint as in a straight pipe; you must either make the joint from the outside caulking it first, or a ball made of rag with string attached must first be inserted in the drain before fixing the trap. The joint is then made in the usual manner, taking care that the end of string is placed in the trap before fixing, so that the rag ball can be pulled through the trap at the completion of joint, clearing away any superfluous cement inside. Sometimes under the floor of house a joint will come just where it is awkward to get at. To get over this, take two pipes, placing one in the other vertically, and make the joint in this upright position. When the joint is hard, the two pipes can be laid as one, only sufficient cement to be gauged for one joint at the time, and it is as well to test the cement in the bag by thrusting your bare arm into it. It should be comfortably warm.

In some cases the joints are first caulked with gasket, and the cement added afterwards, but generally and preferably the joints are made with cement alone, for this reason: The sockets are about $1\frac{1}{4}$ in. in depth, and, in inserting the gasket the depth becomes less, with a corresponding reduction in the volume of cement

when added, and should there be a long run of 6 in. main drain with a good fall, when the water test is applied you have a pressure of a ton or more forcing the joints. Now, by using cement alone in this way, a butt joint is formed in the socket of each pipe, so that when the water is applied it does not penetrate the joint beyond the bore of pipe, thus reducing the pressure on each joint considerably.

Manholes and inspection chambers are now generally constructed in a new system of drainage. Should there

air that was in the drain previously to charging cannot escape, so the water remains constant in the gulley. In order to charge the drain one of the branch inlets must be unsealed, or a piece of compo. pipe, bent so as to pass the water seal in the gulley, must be inserted. This allows the air to escape. The drain being found correct and the pipes covered with concrete, the next thing is filling in. Never use a rammer, at any rate, not for the first 2 ft. or 3 ft., for it stands to reason that though the soil may be moderately fine, yet the



Elevation, to Road

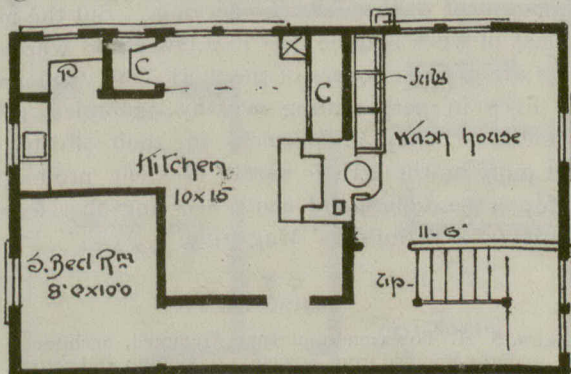
DESIGN FOR A COTTAGE.—R. M. FRIPP, F.R.I.B.A., ARCHITECT.

be a manhole in front, or where the interceptor is fixed, and no inspection chamber at the back of the house, it is best to continue the main drain to the surface of ground, with an easy bend for clearing purposes, fixing a stone on the top.

The drain completed, the next thing is to test it by fixing a stopper at the interceptor, or the first pipe if

weight of rammer coming over joints conveys a force on the pipes which is best avoided. Use water for filling in lower part of trench.

A few words in reference to the iron covers of manholes and inspection chambers may not be out of place. Always treat the cover as a trap, for practically that is what it is or should be in order to prevent the smell of drain escaping and possibly finding its way into the dwelling. The manhole, as a rule, is built outside the house, so that the cover is trapped by rain or other surface water; but when the manhole is inside, the groove or channel in the frame must be filled with soft soap, or oil, or sand, &c., in order to form a permanent seal when the cover is laid on. There must be a fresh air inlet at the lower end of drain and an outlet at upper end. Outlet is generally taken off a soil pipe and continued up the building clear of windows.



Basement

in a manhole, and filling the drain with water. Should the branch inlets be sealed off, a difficulty will arise. You pour in a pail or so of water, and all at once the water rises in the gulley to the top and there remains. This is a good sign, and shows that the drain is air and watertight, and is brought about by the fact that the

THE QUALITY OF STONE USED FOR CONCRETE.

Of all the uses to which stone is put in the present day, few are of greater importance, says The Quarry, than the manufacture of concrete. Whether used for ordinary building purposes, for great engineering undertakings, or for the manufacture of the many varieties of artificial stone and paving-slabs, concrete manufacture is destined to form a very large part of

our stone industry. It is, therefore, of peculiar interest to note the influence upon the strength of concrete of different varieties of stone. It appears from experiments which have been carried out in the testing shops of the Royal Technical High School in Stockholm, that all kinds of broken stone are by no means of equal value for making concrete. These experiments did not include the examination of the different results obtained from crushed stone and from shingle, which is very largely used for concrete in the neighbourhood of shingle beaches, but rather of the different results obtainable from various kinds of crushed stone which might reasonably have been supposed likely to be of uniform value for this purpose. All the stone upon which experiments were made was crushed in an ordinary stone-breaker to a uniform gauge, and a number of 10-inch cubes, made of cement, sand, and broken stone, in the proportion of 1, 3, 5, were moulded and rammed, with the addition of $5\frac{1}{2}$ per. cent. of water. Both the sand and broken stone were carefully washed and dried before mixing. The ramming was done by 44 blows of a monkey, weighing 130 lbs., with a fall of 3.28 ft., this being about one-quarter of the work put on standard test-pieces of cement. The blocks were kept for a fortnight covered with soaked mats in a damp cellar, and afterwards in a dry cool room until the completion of a month from the time of mixing. The mean results of five separate tests of blocks made from five kinds of stone, gave the following figures :

Kind of Stone.	Weight of Concrete per cubic yard.	Crushing Strength per square inch.	Relative Crushing Strength.
	Ton.	Ton.	
Hornblende granite, from Byviken on Rindo	1.79	1.125	100
Diorite (greenstone), from Edholmen	1.79	0.965	86
Hornblende granite, from Rindo redoubt	1.74	0.958	85
Pegmatite, from Edholmen	1.72	0.894	79
Pegmatite, from Ytterby ..	1.70	0.685	61

Individually, the five specimens of greenstone concrete showed the greatest variation both in weight and crushing strength. The strongest was more than half as strong again as the weakest, although the weight per cubic yard did not differ by more than 4.4 per cent. This important result points to the great necessity of ramming in order to secure the greatest possible density. The relative strengths given by the different kinds of stone in the above table also show great differences. Between the two kinds of hornblende granite, for example, there is a difference of 15 per cent., the only difference observable in the stone being that the weaker specimen was of coarser grain. The pegmatites, which gave the poorest results, were also coarser in grain than the other varieties. The structure of the stone employed for concrete appears, therefore, to play a most important part in determining its strength, and coarseness of grain is not a desirable quality. To this fact we call the attention of all engineers and concrete manufacturers, for it is obvious that not all kinds of crushed stone are capable of giving the best results. Efforts will doubtless be made to utilise many kinds of quarry waste of various kinds. But it behoves all who contemplate embarking in this industry to look carefully to the quality of their stone if they wish to compete with the best products of established reputation.

WOOD CARVING.

The taste for wood carving has been reviving in recent years, and the tendency is toward more general use of the genuine artistic wood carved furniture and interior decorations. Where no expense is considered hand wood carving enters elaborately into the decoration of the home. A scheme of wood carving for staircases, wainscoting and ceiling decorations is generally carried out by designers who are artists in their line, and then with skilled woodcarvers under their direction they give to a room a peculiar individuality that cannot be obtained in any other way.

The furniture of such a costly interior must harmonize with the decorations, and most expensive furniture owes much of its cost to the artistic wood carving. Every piece for such a home is designed and executed after some general plan. A good deal of it is imitated from genuine antiques. The wood carving of many of the old antiques is exquisite in design and execution. The early artists worked slowly and carefully, putting their very best in their work, but some of the ancient products of the old cabinet shops show far inferior work to that performed to-day. In the revival of wood carving there is bound to be some improvement and modification of past methods, and while cabinet-makers are guided by the best models of other days, they infuse into their work something of the spirit of the age. There is more freedom of choice and execution and possibly some slighting of detail that may make the work less desirable in the eyes of an expert, but on the whole the highest products of the best shops to-day do not compare unfavorably with those of a century and more ago.

In recent years there has been a wider selection of woods for hand carving. Originally mahogany and oak were used almost exclusively for this work, and most of the hand carved antiques come down to us in one of these two woods. Some of the early cabinet-makers used willow for their chairs, but these were not so generally carved as the other furniture. Mahogany and oak took the best polish, and the woods were so hard that delicate edges could be cut out of them without making them so frail as to chip off on the slightest wear. To-day the cabinetmakers carve in both oak and mahogany, but a single armchair of either wood may cost from \$50 to several hundred dollars, according to the amount of work put in the carving. But the highest class of work is done only in a few shops where the artists are genuine lovers of the work, and they spend their lives in perpetuating worthy examples of an ancient art. They are tireless in their efforts, and count more on the artistic merits of their productions than upon the dollars and cents accruing therefrom.—Architects' and Builders' Magazine.

PERSONAL.

Messrs. S. H. Townsend and John Gemmell, architects, Toronto, recently cycled from Lewiston to Buffalo and return, and spent a few days at the Pan-American Exhibition.

The death is recorded of Mr. Wm. Richard Powell, builder, of Hamilton, at the age of 69 years. He had been a resident of Hamilton for half a century, and was highly esteemed.

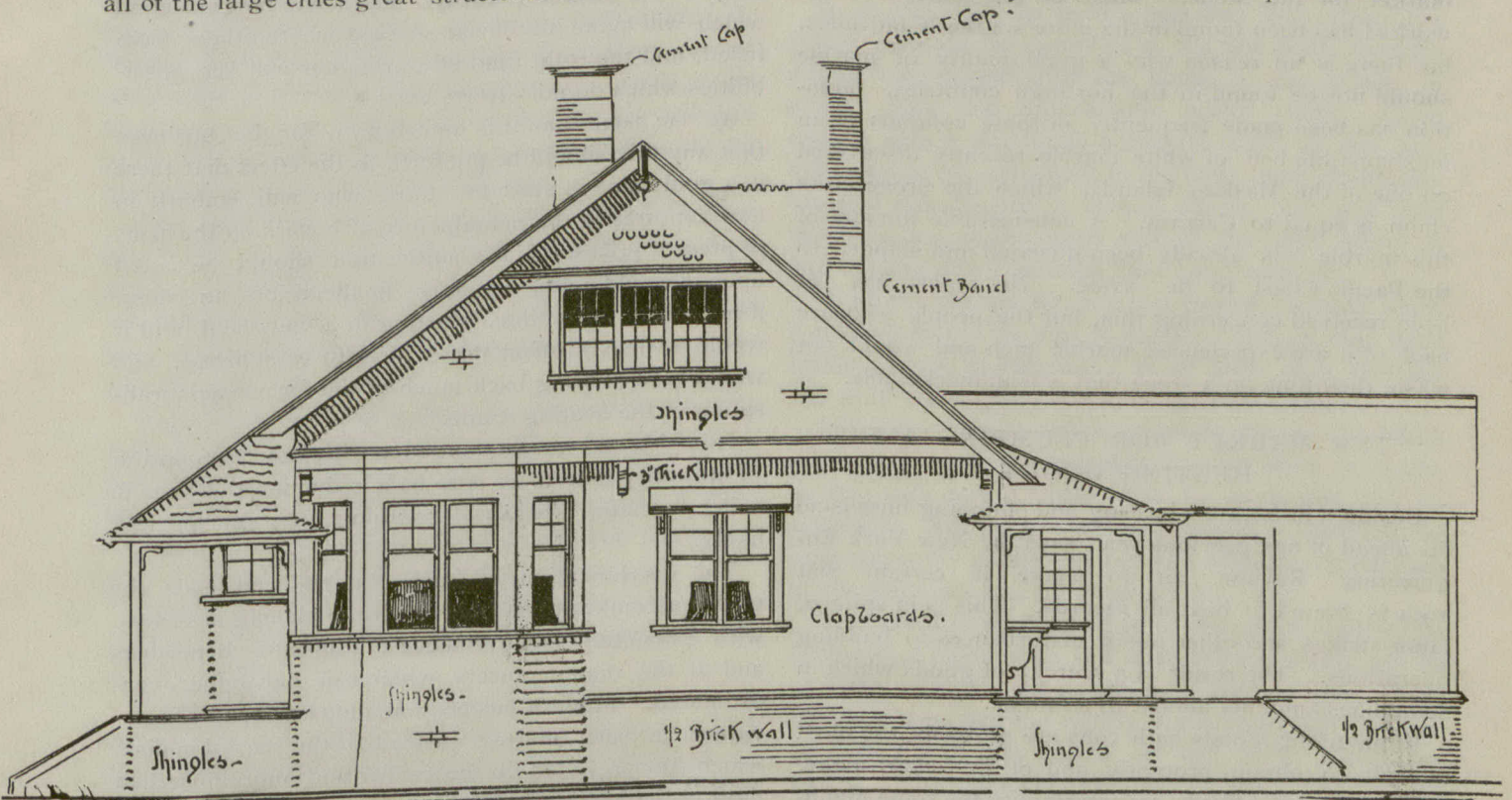
Mr. Alfred Gardner, of the firm of A. Gardner & Company, paving contractors, Toronto, died very suddenly of acute meningitis at his residence in that city a few days ago. Mr. Gardner was 47 years of age and was a native of Wolverton, Lancashire. He had resided in Toronto for about 15 years. His firm had the contract for all concrete work in connection with the new city hall as well as the new hotel on King street.

MARBLE IN BRITISH COLUMBIA.

Nothing shows in a more striking manner the general prosperity the country is enjoying at the present time, says Stone, than the vast amount of elaborate construction work already undertaken or planned. In all of the large cities great structures of stone are go-

striking commentary on the growing favor of stone for building material. One such instance is so notable as to call for some comment.

In the little town of Nelson, British Columbia, there is to be build a business block, costing \$200,000, to be constructed entirely of white marble quarried in the

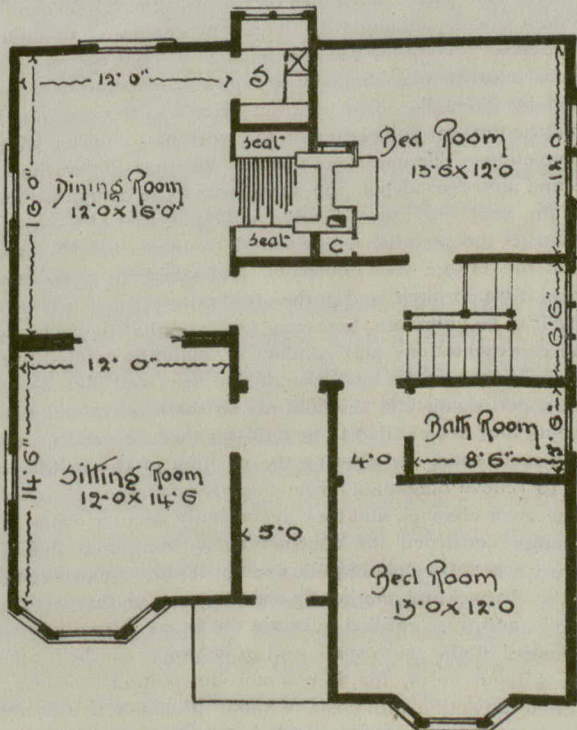


Elevation to the West

DESIGN FOR A COTTAGE.—R. M FRIPP, F.R.I.B.A., ARCHITECT.

ing up, many of them costing millions of dollars. The smaller cities are following their lead and it is not surprising that there should be complaints of a lack of stone in many quarters. A record of the notable stone

Kootenay region. It is to be erected with English and French capital, and the money is already available. A little over a year ago Mr. Ernest Mansfield, of Nelson, purchased the marble quarry of the West Kootenay Brick and Lime Company, opposite Kaslo, on Kootenay Lake. This produces a marble of high grade, and Mr. Mansfield proposes to open the quarry on a large scale. In order to demonstrate its quality, both as a building stone and for interior decoration, it will be used entirely in the construction of this block at Nelson. Plans have been prepared by Messrs. Cane & McDonald. The building will be 50x120 feet, and the front will be of finely dressed and carved marble. The columns, cornice and architraves will be of polished marble. An arcade will be run through the centre of the building with entrance through a massive arch, with polished columns on either side. Large light wells will illuminate the centre of the building, and these will have moulded and fluted pilasters of polished marble which will run the full height. The staircase will also be of polished marble. No other material but this will be used in the interior. The party walls will be of rock-faced marble and the rear elevation will be of bushed marble with rock-faced pilasters. From this brief description it will be seen that the building will be by all odds one of the most elaborate and striking to found in the province.



Ground Floor Plan

buildings planned, or in process of construction in the smaller places, that have heretofore contented themselves with brick and frame structures, would furnish a

As yet little has been done in the way of quarrying in the Canadian provinces. That there are valuable deposits of stone is certain, and with improved railroad facilities quarries will doubtless be developed and worked. The great Northwest territory is yet in its

infancy, but the mining industry is full of promise for the future. The local demands for stone have not been sufficient as yet to warrant the opening of quarries, but this will come with the development of the region, and then there may be an opportunity to seek a wider market for the stone. Most of the marble so far worked has been found in the more southerly latitudes, but there is no reason why a good quality of marble should not be found in the northern countries. Mention has been made frequently in these columns of an inexhaustible bed of white marble recently discovered on one of the Alaskan Islands, which the prospectors claim is equal to Carrara. A considerable amount of this marble has already been quarried and shipped to the Pacific Coast to be sawed. No report has yet been received concerning this, but the people who are back of it are experienced marble men and would not waste their time on a stone that was unmarketable.

THE MARKET FOR PLUMBING AND HEATING GOODS.

Business in both the heating and plumbing lines is so far ahead of any previous year, says the New York Engineering Review, as to make it certain that 1901 is bound to beat all records. This is in spite of labor strikes and other minor disturbances to building operations. The result is a scarcity of goods which in some lines amounts almost to a famine.

In plumbing goods bath tubs are probably the most difficult to obtain promptly and of first-class make. This situation affords an opportunity for some manufacturers, who have not hitherto been recognized as producers of first quality goods, to get into the market in a way that would, under normal conditions, be impossible. The consequence is that some inferior goods will probably be used this fall in places where the high-grade article was really wanted, and could be had by the exercise of a little patience.

Radiator valves and other heating and plumbing brass goods have been in short supply, but not sufficient to interfere with the carrying out of contracts. Wrought iron pipe has been and still is, very scarce, but even that will probably be forthcoming in sufficient quantities to permit the completion of the year's work.

Manufacturers of house-heating boilers are, as a rule, behind their orders, a few of them are seriously so, and in no cases are the stocks on hand excessive. This is of interest as bearing upon a mistaken idea entertained by some in the trade that there is likely to be a reduction this year in the price of boilers. The profits on this class of goods are not so large as to justify manufacturers in reducing them. While the old estimate of 100 per cent. for selling expenses has been greatly cut down, there is still a fixed expense connected with the marketing of heating apparatus as to render very inaccurate the estimates of those who, looking at the subject from an outsider's point of view, see a magnificent profit in the difference between the selling price of a boiler weighing 2,000 pounds and the cost in iron and labor of a ton of castings.

Under such conditions it is unfortunate that a trade paper should put forth the suggestion that the ruling prices of boilers are such as to make the present a propitious time for foundrymen not now engaged in making boilers to take up that class of work. It is a matter of history that when most of the boiler making in this country was being prosecuted at a considerable

loss, new manufacturers came into the field with a frequency that has not been seen in later years. Promoters may be encouraged by real or imaginary profits in a field within their contemplation, but they are not often discouraged by reported losses, because the right kind of an inventor always has something in mind which will make his device succeed where others have failed, and the right kind of a promoter will see possibilities which do not always exist.

At the same time it is unfortunate for the business that any talk should be put forth to the effect that there is a gold mine in store for those who will embark in new ventures in the manufacture of boilers on the basis of present prices. If the suggestion should be acted upon it would entail a positive financial loss to most, if not all, of those thus starting in a new field and it would seriously affect those already established, and would tend to bring back much of the former demoralization of the heating trade.

It is also an error to announce with any assumption of authority that there is to be a reduction this year in boiler prices, because nothing is much less likely.

The dissemination of such "news" misleads the trade and makes them hold back the placing of orders, with a resultant inconvenience and loss to themselves and to the manufacturers which can hardly be over-estimated. Modern business methods demand conservatism in such matters instead of the sensationalism which has prevailed in the earlier and more unsettled days of the heating business.

LEGAL.

NEW YORK AND OTTAWA CO. v. COLLINS BAY RAFTING AND F. CO.—Judgment (C.), by Chief Justice Armour in the Court of Appeal at Toronto, on appeal by plaintiffs from judgment of Street, J. Action for damages for breach of contract between the companies for the removal of the latter of the two wrecked spans of a bridge of the former in the south channel of the River St. Lawrence, just above the Town of Cornwall, and a direction to defendant Lesslie, manager of defendant company, to endorse over a deposit receipt for \$20,000, balance of contract price, and an order on defendant company to repay \$5,000 paid to them on account by plaintiffs. The contract price was \$25,000, and it is alleged the time for completion of the work has expired without its completion. The question raised is whether under the contract and correspondence the work was to be completed in the fall of the year 1899; the defendants alleging that at the time of the contract the plaintiffs represented to them that the middle span of the bridge was unbroken, and could be raised whole, whereas it was broken, and in the attempt to raise it whole, believing it to be unbroken, time was lost, and that they are owing to the representations and conduct of plaintiffs entitled to take out the said span in the best practicable way, and that doing so will be a performance of the contract on their part, and that at all events they are entitled to be paid for their services in removing the south span, and altering the position of the middle span so as to relieve defendants from claim for damages for obstructing the river channel, and they accordingly counter-claim. The trial judge construed the contract as meaning that defendant company was "to be paid \$5,000 as soon as either span is removed from the channel and another \$5,000 as soon as either span is put ashore"; and were entitled to retain the \$5,000 already received for removal of the south span, and to judgment on their counter-claim, without costs, for \$5,000 more for putting it ashore, and dismissed the action with costs without prejudice to any action, save as to the \$5,000 already paid, for any breach shown to have been committed after the commencement of this action. Held, Osler and Maclellan, J.J.A., dissenting, that upon the proper construction of the contract the appeal should be allowed with costs, and deposit receipt directed to be endorsed over to plaintiffs with costs. Counter-claim dismissed with costs, and costs of defendant Lesslie to be paid by his co-defendants.

LEAD PIPES BREAKING CROSSWAYS.

That the subject of transverse fractures in lead cold water service pipes is an important one is evidenced by the numbers which occur, and the cause being so frequently attributed either to defects in the pipes or to an inferior quality of lead being used in their manufacture. During the last 25 years, writes Prof. J. Wright Clarke in *The Plumber and Decorator*, several cases have come under the present writer's notice, some of these being met with in the course of his ordinary work, others being examples or specimens brought by his students or sent by manufacturers.

Four specimens were brought to him some little time ago by a houseowner, who had entered an action against a plumber for using inferior lead pipe, and who refused to pay the writer his fee for an opinion, as the writer declined to appear in court excepting as a hostile witness.

One of our very largest pipe manufacturers recently submitted about ten samples of fractures in $\frac{1}{2}$ -inch lead pipes, weighing 6 lbs. per yard, and which has been laid from a water main to some houses in a London street. In the written opinion of these examples, the following line of reasoning was taken up :

If there was dross or dirt mixed with the lead in the pipe press, this would affect the pipe lengthways and not crossways.

If other metals, which melt at or about the same temperature, were mixed with the lead, an alloy would be formed, and the only injury that could occur would be by a chemical action, or decomposition by electrolysis. Some metals could not possibly mix with the lead, as by their lighter specific gravity and higher melting point they would float in the melting pot and be skimmed off with the dross and oxide of lead which invariably accumulates on the surface.

As the cracks were not lengthways in the pipe, they could not be attributed to the method of manufacture.

The statement may appear absurd, as it is so obvious, that if the pipe is subjected to a compressive strain in its length, it would be shortened by squeezing molecules of lead closer together, or bulging the sides of the pipe. But the absurdity disappears if the problem is reversed, and it is assumed that the pipe is subjected to a tensile strain. Even if a lead pipe had a crack across it, the crack would not be visible until it was opened, and thus exposed to view, by being stretched lengthways.

If a lead pipe is strained between two fixed points, and a power is gently applied with a view to pulling the pipe asunder, the pipe will lengthen considerably and become thinner by the flow of the lead, but it will not crack square across the section.

But if the strain is suddenly applied and then as suddenly removed, and these operations are quickly repeated during a considerable period of time, an entirely different action takes place, and if the pipe is in a state of tension, it will eventually break across.

When the houses in Cadogan-square were built a few years ago, several of the service pipes on one side of the square cracked across close to the front walls of the cellars, under the sidewalk, and these pipes had to be renewed. The pipes were solidly built in the walls, and then laid in the ground to the iron main in the roadway. They were thus fixed at the ends. As the roadway was a new one, and made on virgin ground, it had to be consolidated by the use of a steam roller.

The vibration caused by the roller on the soft springy ground in which the pipe was laid, caused the fractures that have been described. The repaired parts of the pipes were laid through drain pipes built in the cellar walls, the spaces well puddled with clay, and no further fractures occurred.

In another case the service pipe was laid under the gravel path, on the same line as the new drain, through a long front garden from the house to the street, in which there was considerable heavy traffic. From time to time it was found necessary to fill up the hollows caused by settlement in the path, and eventually the pipe was cracked in several places. In each case the crack was in the under side of the pipe where it had bagged down between hard solid supports.

In all the present writer's experiences he never knew a cold water service pipe to crack crossways when fixed inside a house or building. In all cases such damage has occurred to pipes laid in the ground.

Hot water service and waste pipes frequently break when they are firmly or rigidly fixed or built in walls, so that they cannot freely move by expansion and its opposite. But the granular appearance of the fractured ends generally present an entirely different appearance to the fractures in cold water service pipes.

The moral to be deduced from the above experiences is that lead pipes when laid underground should not be perfectly straight, but be laid on a zig-zag line. They should not be tied too tightly at the ends, nor be laid on solid points with hollow or soft earth spaces between. The pipes are enveloped in earth and are influenced by any local movement of the earth, and should not be tied so that they cannot partake of the earth's motion.

PRACTICAL HINTS.

Take some cheese, well wash it, let it lay in water to soften it, rub it well together in a mortar with a wooden pestle, add a little quicklime, and it will make a glue and stopping which is impervious to water.

To relacquer old brasswork first boil a strong lye of wood ashes, which you may strengthen with soap lees ; put in your brasswork, and the lacquer will immediately come off, then have ready a pickle of aquafortis and water strong enough to take off the dirt, dip in the article, and wash it immediately after in clean water ; dry it well, and lacquer it.

For painting over tarred surfaces or timber which has been treated with creosote, mix the pigments as follows : If the tarred or creosoted work is to be painted white, procure 14 lbs. of pure zinc white in paste and mix with it $1\frac{1}{2}$ pints of boiled linseed oil, $\frac{1}{2}$ pint of deodorised or coal tar naphtha, and $\frac{1}{4}$ pint of cheap oak varnish. Mix well, and apply two coats in the same way as ordinary paint. Any paint may be prepared in a similar manner by using the above proportions of materials, omitting the zinc white and replacing with a strong staining paint ground to a paste in oil.

NOTES.

Incorporation has been granted the Longford Quarry Co., Limited, with a capital of \$50,000.

One of the essentials of doing good trade advertising is to know when and where to advertise, as well as how. Good advertising in poor publications is on a par with poor advertising in good papers.

THE CANADIAN ARCHITECT AND BUILDER

BY THE WAY.

At the Canada end of the arch bridge across the Niagara River just below the Falls may be seen one of the most striking bulletin signs that has recently been erected writes Edward Hurst Brown in the Painters' Magazine. It is built in front of the ruins of the Clifton Hotel that was destroyed by fire several months ago, and is fully thirty feet high by somewhat over a hundred feet long. It is intended to advertise the International Navigation Company, which runs a line of steamboats from Buffalo to Slaters Point, in Canada, some two miles above the falls. From the American side one would almost imagine that a steamboat has been transported to the top of the cliff, two hundred feet above the river, so realistically has the bulletin been painted. It represents the steamboat New York, of the line, painted in natural colors, with flags flying and crowds of people upon her decks. Above the top of the bulletin the steamer's funnel projects, and the two masts that rise above her upper decks are carried upward as real masts, from which two large flags float in the breeze, adding to the naturalness of the effect. The American flag at the stern is painted, but at a little distance cannot be distinguished from the real flags of bunting, save for its brighter colors and the absence of motion of its drapery. It is only after a second glance that one loses the sense of startling reality and begins to have the truth impressed upon him that after all this is but an advertisement, and that the painted announcement of the company's steamers and their hours of departure forms a part of the picture. Perhaps it is wrong, from an æsthetic standpoint, to intrude this example of the bulletin painter's art amid the sublime grandeur of the scenery of Niagara Falls, but nevertheless it is a most effective advertisement and a remarkably clever example of the possibilities of the work of the modern sign writer. The man who could conceive and execute a bulletin sign like this is no mere mechanic, but is well worthy of the name of artist.

x x x

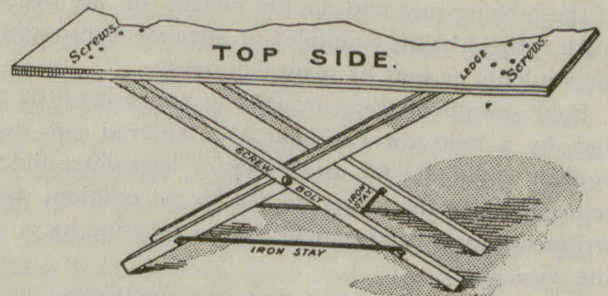
The opinion prevails that a much better result might have been secured at equal cost in the decoration of King and Yonge streets on the occasion of the Duke of York's visit. The business men and property owners on these streets consented to an assessment of 90 cents per foot to cover cost of decorations. The decorations consisted of barrels filled with sand placed twenty feet apart with wooden masts about 3 inches in diameter in the centre of each barrel, the barrels and masts being covered with cheese cloth and the masts wreathed with tissue paper. Suspended from the top of these masts were festoons of tissue paper carrying small flags and incandescent lamps. Leaving out of account the festoons between the masts, it will be seen that the cost of the barrels and masts amounted to upwards of \$15.00 apiece, for which sum it is believed that it would have been possible to have obtained properly designed masts covered with staff and fitted at the bottom with stands. Whoever was the contractor for the work as carried out must have realized a very handsome profit.

PRACTICAL HINTS.

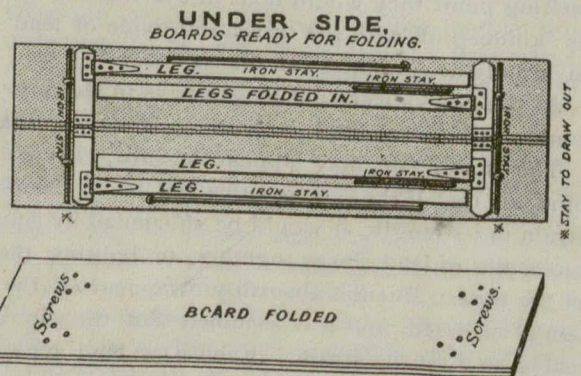
STRENGTH OF WINDING ROPE.—A one and one-eighth inch round steel rope, weighing two pounds per foot, and with a breaking strain of 84,000 pounds, should sustain itself with a length of 42,000 feet before breaking from its own weight. Taking the usual factor of safety of seven, then the safe working length of such a rope would be 6,000 feet. If a weight of three tons is hung on the rope, equivalent to a loaded cage, the maximum length at which such a rope could be used, with a factor of safety of seven, would only be 3,000 feet

PAPERHANGER'S FOLDING PASTE BOARD.

A cheap, light and useful table, as shown in the sketch, can be made in the following manner. Select two planed boards, yellow pines for preference, half an inch in thickness and about 7 ft. long, as free from knots as possible. At about 9 in. from each end screw from the front side of board ledges, $1\frac{1}{2}$ in. thick, then select a piece of sound red deal $1\frac{1}{2}$ in. thick, cut four legs, each $1\frac{1}{2}$ in. x $1\frac{1}{2}$ in. x 5 ft. long, fix four good



T hinges to the ledges, as shown in sketch, leaving room for the legs to pass each other when folded in. A useful height for the boards is 2 ft. 6 in., and from the floor at the point where the legs cross, bore a small hole, and put a nut and bolt through to keep it together. This can be removed when necessary. Having got the table together, proceed with strong butt hinges to connect both the boards, obtain four iron stays and fix on the same, two for the stays about 2 ft. 10 in. long at hooked end similar to window stays, also two for the ends as shown in sketch, fixing the latter about 9 in. higher than the side stays so as to give greater strength. These can all be so fixed as to fold in with the legs when taken down. To render the



top secure, fix two staples in the side of ledge and slide an iron rod through the ends of the width of the table, fitting as tightly as possible. This table can be put up in a minute or two and taken down as quickly and it will last for years.

NOTE.

Old London Bridge, around which so many historical incidents and associations linger, is to be widened by 12 feet, to accommodate the ever growing traffic. Statistics show that more than 100,000 persons and 22,000 vehicles pass over this bridge each day. It is proposed to devote 9 feet of the extra width to the use of foot passengers. The bridge rests on the wooden piles of an older bridge, and soon after it was reared, in the 'thirties of last century, the foundations made an unequal settlement. The defect was put right, and the present architects are confident that the new burden can be safely added. The alteration is expected to occupy three years and to cost £100,000,

A CANADIAN ARCHITECT IN KOREA.

The friends of Mr. H. B. Gordon, of the firm of Gordon & Helliwell, architects, Toronto, who left Toronto in June last for a temporary residence in Korea, will be pleased to learn of his safe arrival and good health. Korea, as our readers are aware, is a peninsula jutting out from the northern part of China. The capital, in which Mr. Gordon makes his headquarters, is Seoul. Here is the centre of the missionary work in Korea, conducted by the American Presbyterian Missionary Society, in whose employ Mr. Gordon is at present, having been commissioned to design and superintend the erection of a number of buildings for the Society, including a hospital and houses for the missionaries. Mr. Gordon writes that sketches of several of these buildings have already been prepared, but not finally approved. He is at present in China in connection with proposed improvements to the Society's property there. Of the native architecture of Korea, as represented by the hotel in which he is quartered, Mr. Gordon writes as follows:—

“The hotel is a one story Korean gentleman's house built in Korean style. The compound is enclosed by a wall and has a gate house—nothing very stylish. The buildings consist of the main part built around a court or garden and the servants' quarters built out separately. The walls are a strong frame resting on stone work, and the spaces in frame filled in with 4½ inch brickwork in two colors, viz., red and dark grey. The roof is the strangest and strongest combination of posts and large beams, with rafters made of round beams, covered with small pieces of wood and about 6 ins. to 1 foot of mud, and then roofed with tiles. The spaces between the rafters and the inside walls are plastered and then the whole thing papered. The house

looks quite picturesque from the outside and very quaint within. There are very few two story buildings here, except the foreign houses and the palaces. It is not considered etiquette for a common man to live in a two story house.”

KING ALFRED WAS AN ARCHITECT.

The Manchester Society of Architects have presented to the Free Reference Library of that city a chaplet to be hung below the statue of King Alfred, accompanied by the following explanatory notes by the president: “It is not generally known, perhaps, that King Alfred was an architect. William of Malmsbury, in his ‘Chronicles,’ speaks of him as ‘not only a lawyer, a philosopher, mathematician and poet, but also a complete architect.’ Of course we know that he rebuilt London, and also really built the towns of Winchester and Dorchester. He was, in fact, a real architect as well as a great many other things. It struck me, as President of the Manchester Society of Architects, that it would be a nice thing to honour his memory, and the society has sent the chaplet, which is made of laurels to indicate his victorious character, and white flowers to indicate his high morality. The society declared that the chaplet should be accompanied by the statement that it was from the President of the Manchester Society of Architects as a token of high respect for the memory of the great monarch, who was the pioneer of English architecture.”

A correspondent writing from the newly opened district of Temiscaming in Northern Ontario, states that deposits of a peculiar blue clay have been discovered suitable for brick making, as well of clay specially adapted to the manufacture of pottery and sewer pipe. It is said that capital is being raised with which to establish a pottery.

CANADA FOUNDRY

COMPANY, LIMITED,

(SUCCESSORS TO ST. LAWRENCE FOUNDRY COMPANY OF TORONTO)

Engineers, Founders and Machinists

STRUCTURAL IRON ^{AND} STEEL WORK

Beams, Channels, Angles, Tees and
Cast Iron Columns always in stock.

WRITE OR 'PHONE FOR ESTIMATES AND PRICES

—THE—
CANADIAN ARCHITECT AND BUILDER

A Monthly Journal of Modern Constructive Methods.

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF
ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS,
DECORATORS, BUILDERS, CONTRACTORS, MANUFACTURERS OF AND DEALERS IN BUILDING
MATERIALS AND APPLIANCES.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited.
Publishers,

Confederation Life Building, - TORONTO, CANADA.

Telephone Main, 2362.

Branch Office: IMPERIAL LIFE INSURANCE BUILDING, MONTREAL.

Bell Telephone 2299.

SUBSCRIPTIONS.

THE CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States on the following terms: Architects' Edition, \$3.00 per year; Regular Edition, \$2.00 per year. The price to foreign subscribers is: Architects' Edition, 16 shillings; Regular Edition, 12 shillings. Subscriptions are payable in advance. The Journal will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrears of subscription paid.

ADVERTISEMENTS.

Prices for advertisements sent promptly on application. Orders for advertisements should reach the office of publication not later than the 12th, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

Subscribers who may change their address should give prompt notice of same. In doing so, give both old and new address. Notify the publishers of any irregularity in delivery.

ONTARIO ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1901.

PRESIDENT	-	GRANT HELLIWELL, Toronto.
1ST VICE-PRESIDENT	-	F. S. BAKER, Toronto.
2ND VICE-PRESIDENT	-	JOHN A. PEARSON, Toronto.
TREASURER	-	W. A. LANGTON, Toronto.
REGISTRAR	-	W. R. GREGG, 94 King St. West, Toronto.

COUNCIL:

FRED HENRY	-	-	-	London.
A. H. GREGG	-	-	-	Toronto.
LAWRENCE MUNRO	-	-	-	Hamilton.
EDMUND BURKE	-	-	-	Toronto.
GEO. W. GOUINLOCK	-	-	-	Toronto.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

OFFICERS FOR 1901.

PRESIDENT	-	G. E. TANGUAY, Quebec.
1ST VICE-PRESIDENT	-	J. VENNE, Montreal.
2ND VICE-PRESIDENT	-	W. E. DORAN, Montreal.
SECRETARY	-	G. A. MONETTE, Montreal.
TREASURER	-	J. S. ARCHIBALD, Montreal.

COUNCIL.

PROF. S. H. CAPPER	-	-	-	Montreal.
C. DUFORT	-	-	-	Montreal.
ALCIDE CHAUSSE	-	-	-	Montreal.
D. BROWN	-	-	-	Montreal.
A. H. LAPIERRE	-	-	-	Montreal.
J. P. OUELLET	-	-	-	Quebec.

AUDITORS—C. DUFORT, Montreal; J. H. LEBRON, Quebec.

TORONTO BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

THOS. CHRISTY, President.	JAS. CRANG.
JAMES B. THOMSON, 1st Vice-President.	JOHN LOGAN.
JOSEPH RUSSELL, 2nd Vice-President.	GEO. DUTHIE
DAVID WILLIAMS, Treasurer.	W. J. HYNES.
R. G. KIRBY.	BEN. BRICK.
J. M. FAIRCLOTH.	JOHN VOKES.
JAS. J. O'HEARN.	WM. PEARS.
J. C. GILCHRIST.	

LONDON BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

THOS. JONES, President.	WM. TYTLER.
JOHN NUTKINS, 1st Vice-President.	E. FITZGERALD.
GEO. HOWE, 2nd Vice-President.	ED. MARTYN.
GEO. S. GOULD, Secretary-Treasurer.	JOHN WHITTAKER
	WM. JEFFERY.

MONTREAL BUILDERS' EXCHANGE.

BOARD OF DIRECTORS:

C. T. WILLIAMS, President.	H. R. IVES.
C. W. HUGHES, Vice-President.	JAMES PATON.
G. J. SHEPARD, Secretary-Treasurer.	N. T. GAGNON.
JOHN WIGHTON.	JOSEPH LAMARCHE.

WINNIPEG MASTER CARPENTERS' ASSOCIATION.

BOARD OF DIRECTORS

A. MACDONALD, President.	H. ELLIOTT, Secretary.
A. G. AKIN, 1st Vice-President.	J. G. LATIMER, Treasurer.
A. SUTHERLAND, 2nd Vice-President.	

VANCOUVER BUILDERS' EXCHANGE.

BOARD OF DIRECTORS

E. COOK, President.	C. P. SHINDLER.
A. E. CARTER, Secretary.	K. M. FRASER.
H. A. BELL, Treasurer.	E. G. BAYNES.
T. BRADBERRY.	D. SAUL.

BOOKKEEPING FOR JOINT STOCK COMPANIES.—A practical and comprehensive treatise on the organization forms and bookkeeping entries required to meet the varying conditions of Joint Stock Companies of all kinds, together with an analysis of the Dominion and Ontario Acts governing such corporation, by David Hoskins, Chartered Accountant, Principal of British American Business College, Toronto, and Vice-President of the Institute of Chartered Accountants of Ontario. Published by the Federated Business Colleges of Ontario, Limited, Toronto, Price, \$1.50.

The author of this work has, we are pleased to see, avoided the error into which most writers of bookkeeping texts have fallen, namely, that of arranging the matter in such a way as to necessitate a large amount of mechanical work being performed before any practical benefits can be obtained; on the contrary, his explanations are so clear and concise and so excellently indexed that the busiest of men can obtain full information on any of the many technical points of joint stock company bookkeeping or law, in a surprisingly short time. The whole subject has been treated in a thoroughly practical and business-like manner and shows a masterful grasp of the entire range of company accounting. The chapters dealing with the conversion of business concerns into Limited companies and the Amalgamation of Companies are particularly good ones, while the many illustrations of Financial Statements used by the leading Canadian mercantile and manufacturing institutions cannot fail to be of great value both to the business man and the accountancy student. A first-class idea, in this book is that of including the questions set on the examinations of the Institute of Chartered Accountants of Ontario. Mr. Hoskins is to be congratulated on his important addition to accountancy literature.

If you are looking for a high grade Finish for Floors

Granitine Floor Finish

Is unsurpassed in Durability and Beauty of Finish for Natural Wood and Parquette Floors, Linoleums, Oil Cloth, Cork Matting, &c.

Its transparency reveals the grain of the wood, and its preserving qualities increase the life of the floor.

Its sanitary properties are highly commended, as it closes thoroughly the pores of the wood against disease germs, and permits the floor to be kept thoroughly clean.

It is easier applied, more durable, makes better finish than wax preparations, and is free from all unpleasant slipperiness.

Moving furniture or boot heels do not leave white marks; nor does soap, mud or water destroy its fine appearance.

Manufactured only by

The Imperial Varnish & Color Co., Limited
TORONTO, ONTARIO, CANADA.

"LINCROSTA WALTON AND COMEIOD."

A visit to the show rooms of Messrs. Fred'k. Walton & Co., Limited' No. 1 Newman street, London W., patentees and sole manufacturers of above well-known material, is always a source of both pleasure and profit. It is well said that an Englishman's home is his castle. Messrs. Walton have done much in recent years to enable the public to make their homes beautiful and artistic at little cost. One very important feature or "Lincrusta Walton" is that it can be fixed to any surface and will stand any climate, and the fact of it being absolutely solid both in color and relief, enables it to be placed on walls which are subject to heavy traffic and hard wear. "Lincrusta Walton" **CANNOT WEAR OUT**, and when properly fixed will last as long as the building it beautifies. It is worth remembering that this material can be made in almost any color to order, solid throughout, this being a decided advantage for a hurried job, besides saving the cost of painting. Comeoid is the latest material in high relief for walls and ceilings, and the Company may well claim that for lightness in weight and firmness of relief this decoration cannot be excelled. The works are now busy preparing many new and important designs for season 1902, which will be ready shortly. To meet the rapidly increasing demand for cheap embossed materials, Messrs. Walton have a very useful selection of low relief patterns in Comeoid, from 6d per yard.



LINCROSTA WALTON IN SITU.

For Sale

The Manufacturing Rights, patented in Canada, of a valuable appliance extensively adopted by Electric Lighting Companies and users of high steam pressure in Great Britain. Full particulars from WOOD & GREGORY LTD., Dukes Road, London, England, W.C.

For Information About
MAIL CHUTES

WHICH ARE
A Necessity in Office Buildings and Hotels,
Write to the sole makers
THE CUTLER MFG. CO., ROCHESTER, N. Y., U. S. A.
PATENTED AUTHORIZED



**CABOT'S
CREOSOTE SHINGLE STAINS**

The Original and Standard Shingle Stains are made only by **SAMUEL CABOT, of Boston, Mass.** Every package bears his trade mark, and every gallon is guaranteed. Used and proved in every climate for nearly twenty years. Also

**CABOT'S
Sheathing and Deafening "Quilt"**

the most perfect insulator of heat and deadener of sound on the market. Decay, moth and vermin-proof, and unflammable.

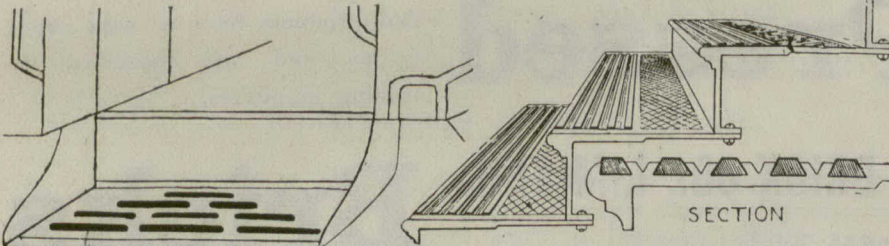
Samples, Catalogue and full information upon application to the manufacturer or his

CANADIAN AGENTS:

- ANDREW MUIRHEAD, 82 Bay St., Toronto.
- SEYMOUR & CO., Montreal.
- C. G. HENSHAW, Vancouver.
- F. H. BRYDGES, Winnipeg.
- W. H. THORNE & CO., St. John
- E. D. ADAMS Halifax.

A New Idea in Stairs and Car Steps

ARCHITECTS Why not specify **The Hamilton Improvement** for Stairs and Car Steps, and avoid Accident through Slipping.



Patented in United States and Canada.

Patented in United States and Canada.

Write or Phone for Particulars. **H. J. HAMITON, (93 York Street) Toronto, Can.**
PHONE 8786.

Don Valley Brick Works

ROBERT DAVIES, Proprietor

UNDER NEW MANAGEMENT. PLANT INCREASED. CAPACITY GREATER THAN EVER.

Fine Grade Pressed Bricks in Standard Colors.

*Vitrified Paving Bricks.
Foundation Bricks.*

*Ornamental Bricks for Mantel Purposes.
Stock Bricks.*

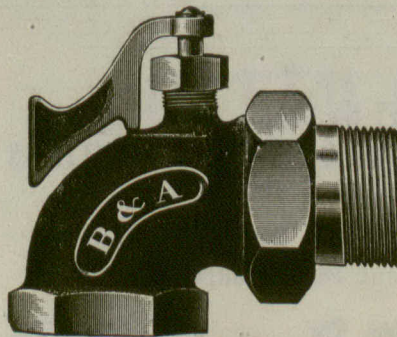
Examine our Foundation Brick before specifying stone. A cordial invitation is extended to visit the yard.

WORKS, DON VALLEY. OFFICE, 34 TORONTO STREET, TORONTO

Combination Union Valve Elbow

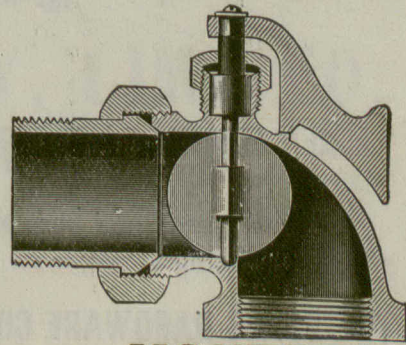
Patented January 30, 1900

For Hot Water



Is more elegant in design than a Valve or an Elbow. It is quick opening (Qr. turn) and adjustable to either end of the radiator. It has a true curved, full sized water way which reduces friction. It is neatly and compactly made of valve metal and packed ready to use. It has rough body, with finished trimmings and is nickel plated all over.

Operated with the foot. Costs no more than a valve. Every one warranted.



THE ROBERT MITCHELL CO., LIMITED
Sold to the Trade Only. Sole Licensees for the Dominion of Canada

MONTREAL
Send for Discounts.

NOTES.

A combination is said to be in process of formation to control the world's supply of window glass.

Contracts aggregating about \$11,000,000 for construction work on the buildings and grounds of the Louisiana Purchase Exposition will be awarded about December 1. About \$7,000,000 of this amount will be expended on the buildings and about \$4,000,000 on the grounds. The first contracts to be let will be for the four big exhibit buildings which, with their surroundings, will, it is estimated, cost about \$4,000,000. The main buildings will be larger than those of any previous exposition in Europe or America. Some will exceed similar buildings at former expositions by over 25 per cent.

Official intimation has just reached Mr. Edwin O. Sachs, chairman of the British Fire Prevention Committee, that a large silver portrait medal accorded by Her Majesty, the German Empress, in connection with the Fire Congress in June last, has been presented to the Executive of the Committee as a mark of appreciation for the services rendered by that body in the demonstration of scientific and economic aspects of fire protection. It will be remembered that a deputation of the committee comprising Mr. Edwin O. Sachs, (chairman), Mr. Ellis Marsland, Mr. F. R. Farrow, and C. E. Goad, accompanied by the secretary and engineer, visited Berlin in the summer, and that an important exhibit of technical models and photographs was loaned to the German authorities for the exhibition held in connection with the Congress.

GOLD WATER PAINT for OUTSIDE and INSIDE USE.

**Weather Proof.
Fire Proof.**



Durable.

Standard; Matchless Quality.

WHITE AND COLORS.

W. A. FLEMING & CO.,

COLOR CARDS AND PARTICULARS FROM

771 Craig St., Montreal.

Milton

DR. ROBERTSON, PRESIDENT.

J. S. MCCANNELL, MANAGING DIRECTOR.

ARCHITECTURAL TERRA COTTA

BRICK MANTELS



FLOOR TILE

High-Grade Pressed and Ornamental Bricks in red, buff, yellow, salmon, brown, and special shades. : : :

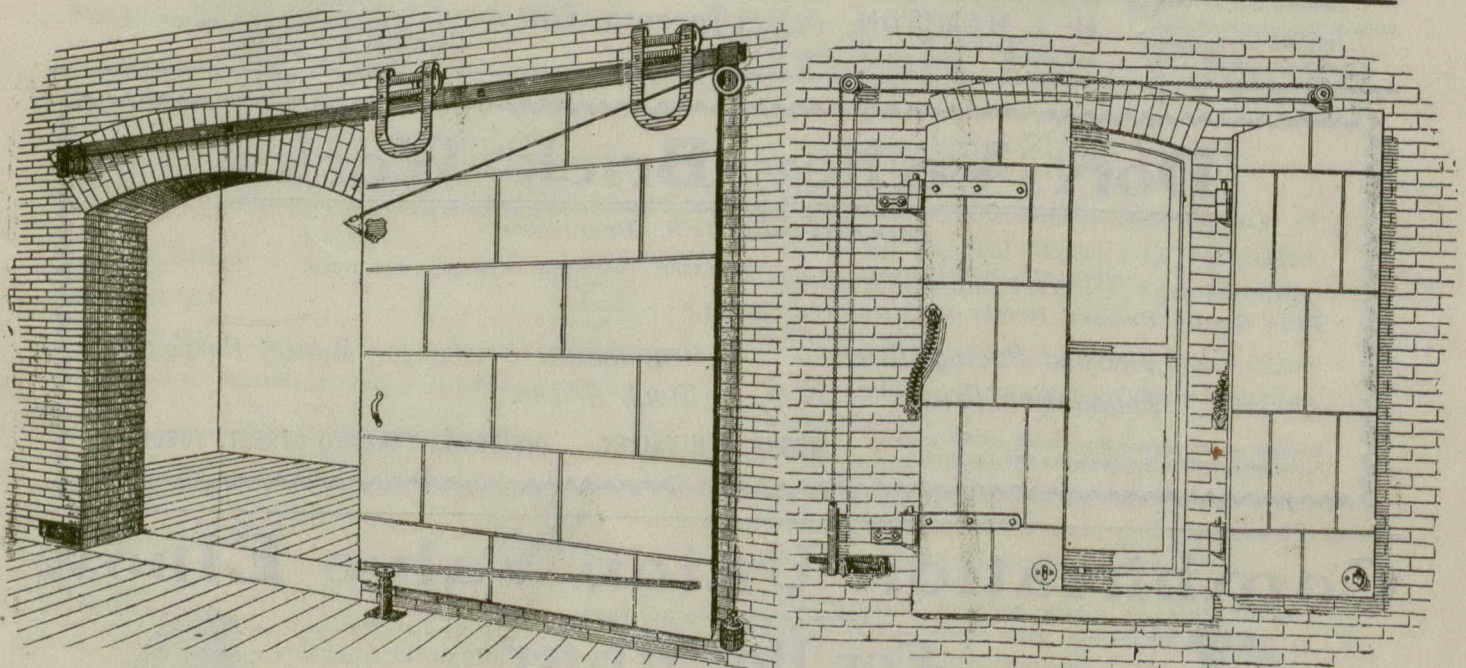
Pressed

Our products have a wide reputation and are specified by leading architects. : :

THE MILTON PRESSED BRICK CO., LIMITED

Works and Head Office: MILTON, ONT.

Bricks



Double Swing Shutters.

"ACME" AUTOMATIC FIRE DOOR FITTINGS, (SET No. 99) "ACME" AUTOMATIC FIRE SHUTTER FITTINGS SET No. 444
SELF-CLOSING BY HEAT.

We manufacture the Best Kinds made of Acme Automatic Self-Closing Fire Door and Shutter Fittings. Write us for Catalogue and Prices. Use Acme Fittings and Save Insurance.

THE VOKES HARDWARE CO., Limited, - - Cor. Yonge and Adelaide Sts., - - TORONTO.

LUXFER SUPPLEMENT

Building Materials

“The Best at Cost of Ordinary”

See our Samples and get our prices for :

Luxfer Prism Window Lights.
Luxfer Prism Sidewalk Lights.
Art Glass Copper Electro Glazed.
Art Glass Lead Glazed.
Staple Glass, Plate and Sheet.
Fancy Glass, All Kinds.
Expanded Metal for Fencing and Screens.
Expanded Metal Lath.
Expanded Metal Fire-proofing.
Pressed Brick for Facing.
Pressed Bricks for Mantels.
Terra Cotta (Perth Amboy).
Marble Mosaics and Tiling.
Pulp Plaster.
Ornamental Iron Grilles, &c.
Bronze Castings, Busts, &c.
Doors, Veneered, Patent Process.
Mica Pipe and Boiler Covering.
Bank and Office Fittings.

Never any trouble to show samples, submit sketches and give prices. We only expect to secure business on merits of goods and prices.

LUXFER PRISM COMPANY, LIMITED,

98-100 KING STREET WEST,
TORONTO.

LEGAL.

In reply to a correspondent the American Architect states that unless an architect copyrights his designs, the law will not prevent the client for whom they were prepared and who has paid for them, from giving copies of them to his friends. The general tendency of judicial decisions in the United States courts is said have been against the establishment of implied copyrights of any kind.

ACADEMY OF ARCHITECTURE AND BUILDING.

1742 Chouteau Ave., St. Louis.

An institute for the technical education of building tradesmen and draughtsmen. Students may commence at any time. Graduates are assisted in obtaining positions as draughtsmen, superintendents, foremen, etc. LESSONS BY MAIL, for home instruction. Send 25 cents in stamps for a useful book of interest in self-instruction. Mention the CANADIAN ARCHITECT when writing.

Principal H. MAACK, Architect.

Author of a } Stair Scale (\$r.) No dividers.
} No Figuring.
} Joist and Rafter List (roc), easy method.

Frink Reflectors

Awarded Silver Medal
Pan-American Exposition,
Buffalo, N. Y., 1901.

I. P. Frink, 551 Pearl St., New York

Art Glass Domestic Ecclesiastical
Plate Glass
Window Glass
Mirrors
HOBBS HARDWARE CO.
London, Ontario.

SPECIAL

ARCHITECTS are respectfully invited to specify the "AMBERITE" Varnishes for high class work, the Canada Paint Company's DIAMOND GRAPHITE for Iron, and the Canada Paint Company's Creosote SHINGLE Stains for all work where roofing stains are indicated.

THE
CANADA
PAINT
COMPANY
LIMITED

Montreal and Toronto.

FIRE-PROOF
GLASS
WINDOWS

THAT
ARE
FIRE-PROOF

Many practical tests have proved it's efficiency.

Used in conjunction with our hollow sheet-metal frames and other fire-proof fittings, it gives the most perfect protection available.

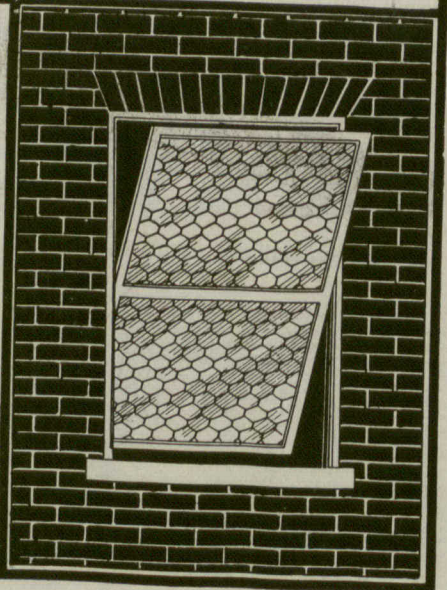
It's adoption lessens insurance rates.

If you want to know more about "fire-proof windows," write us, it's an interesting subject.

... THE ...
Metallic Roofing Co.,
TORONTO. LIMITED.

These windows in a fire-proof building, complete the security, and in any building will thoroughly prevent the spread and advancement of the fiercest flames.

Better than iron shutters (even if they happened to be closed at the needed time); fire-proof glass remains intact, resisting both the intense heat of the fire and the action of water.



KINDLY MENTION THIS PAPER WHEN CORRESPONDING WITH ITS ADVERTISERS.

WINDSOR PLASTER CO.

LAND PLASTER

WINDSOR, N.S.

WINDSOR PLASTER CO. CALCINED

WINDSOR, N.S.

MANUFACTURERS OF

CALCINED AND LAND PLASTER

ENGLISH SELENITE CEMENT

FOR PLASTERING WALLS AND CEILINGS.

ALWAYS READY.

HARD AS STONE.

WINDSOR PLASTER CO., WINDSOR, N. S.

THE S. Knechtel Wood Turning Co.



Southampton,
Ontario.

Manufacturers of

Moorish Fret-Work

Spindle Grilles

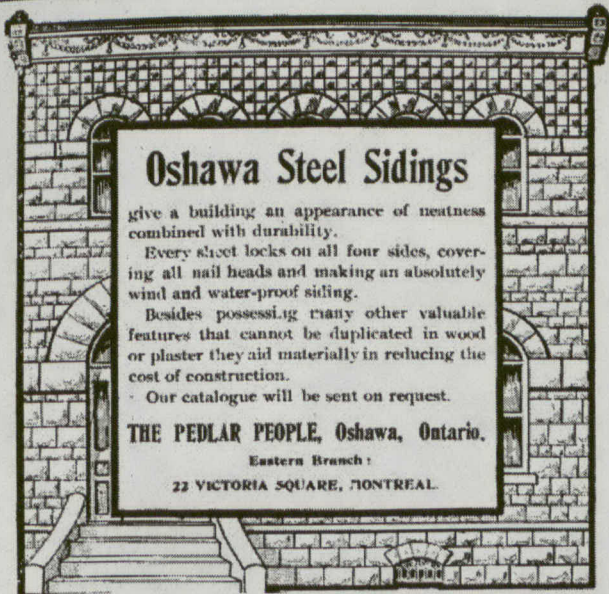
Embossed Mouldings

Newels and
Balusters
Dowels, Etc.
Turned
and Twisted
Mouldings



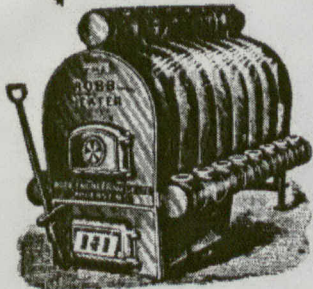
The only factory in Canada making a specialty of this class of work.

Write for our new Catalogue, containing full particulars and illustrations of all the different lines of goods we manufacture.



Please Mention this Paper when Corresponding with Advertisers.

Easy to Regulate.



A CUSTOMER SAYS:

"I have much pleasure in testifying to the good qualities of the Robb hot water heater I got from you last fall. It did not require cleaning all winter and was easy to regulate. I consider it much superior to the one I have been using for a number of years."

Robb Engineering Co., Limited
 AMHERST, N. S.

Glass Painting
 Memorial Windows
MCKENZIE'S STAINED GLASS WORKS
 8 AND 10 MAIN STREET EAST
 Church and Domestic
 Ornamental Glass. Hamilton, Ont.
 Original Designs made to suit all classes of work.

MCGAUSLAND STAINED GLASS CO., LIMITED
 87 King Street West, TORONTO
Decorative Leaded Glass
Superior Metallic Glazing
Memorial Figure Windows

HENRY BLOOMFIELD & SON..
ART GLASS WORKERS
 BOX 414 - VANCOUVER, B.C.
 SKETCHES AND PRICES ON APPLICATION.

ART GLASS WORKS
 ESTABLISHED 1876.
 Memorial Church Windows,
 Geometrical and Quarrle Windows,
 Art Glass for Residences, etc.
 Send for designs and prices to
H. HORWOOD & SONS PRESCOTT, ONT.
 of Bank Street, and Ogdensburg, N.Y. OTTAWA.

B. LEONARD
 MANUFACTURER
STAINED GLASS
 FOR
 Churches, Private Houses, Etc.
 53 ST. JOHN ST. - QUEBEC
 Estimates and Designs furnished on application.



WOOD FIBER PLASTER

A Hard Wall Plaster, unexcelled in quality and durability. Hundreds of tons now in use on Public Buildings and Residences giving the very best of satisfaction. It can be applied

Any Season of the Year.

SEND FOR PAMPHLET AND PARTICULARS.

Manufactured by

W. A. Bradshaw, 109 Front Street East. TORONTO.

WIRE LATH

The only perfect Lathing, for the reason that the Wire is completely embedded in Mortar and CANNOT RUST. It is the only Lathing that will stand the test of time.

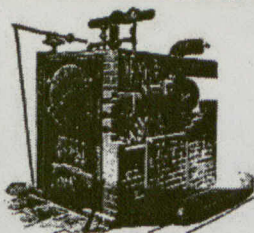
THE B. GREENING WIRE CO.

(LIMITED)

Hamilton, Ont. - Montreal, Que.

BEAMSVILLE BRICK & TERRA-COTTA CO.
 A Peerless Pressed Brick of all forms and Colors required **RED-BROWN BUFF**.
 GEORGE CRAIN, Proprietor

E. Leonard & Sons - London, Canada

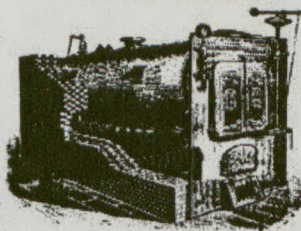


Vance Steam and Hot Water Heating Boiler

Used for Public Buildings, Residences, Hotels and Bank

Made of steel plate and tested to 150 lbs. pressure.

For Hot Water or Steam, and of any capacity.



Leonard Steam Heating Boiler.

Write for Catalogue No. B. B. C.

The Canadian Portland Cement Company, Limited

Manufacture "RATHBUN'S STAR"

"BEAVER" "ENSIGN"

WORKS:

Strathcona, Ont.; Maribank, Ont.

CAPACITY:

500,000 Barrels per Annum

—For Prices, write, wire, 'phone or call on our Sales Agents:

THE RATHBUN COMPANY
 310-312 Front Street West
 TORONTO, ONT.
 Telephone Main 1399.

St. Lawrence Portland Cement Co.
 2664 Notre Dame Street West
 MONTREAL, QUE.
 Telephone Main 3987.

Please Mention the CANADIAN ARCHITECT AND BUILDER

when corresponding with Advertisers.

The Toronto Pressed Brick and Terra Cotta Works,

BRICKS

ROOFING AND FLOORING TILES, CRESTING, FINIALS AND CHIMNEY TOPS

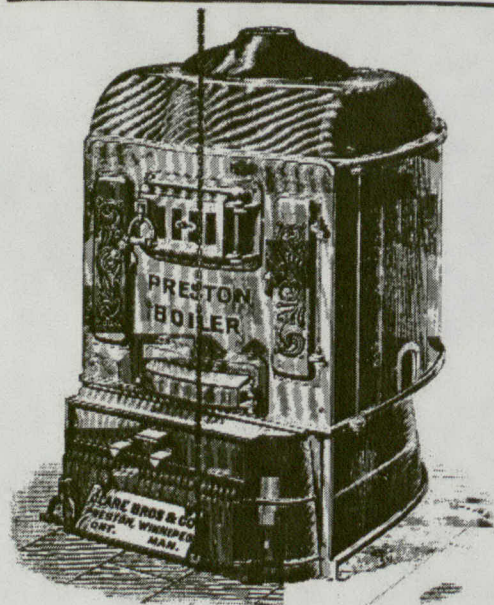
Send for Samples and Prices. * Special and prompt attention given to Architects Terra Cotta Drawings.

Write: **Toronto Pressed Brick Works**

Montreal Agent: E. F. DARTNELL, 180 St. James Street.

Head Office: **MILTON, ONT.**

C. J. LEWIS, Proprietor.



A HEATER WITHOUT A JOINT

Is what we offer you in

THE PRESTON HOT WATER BOILER

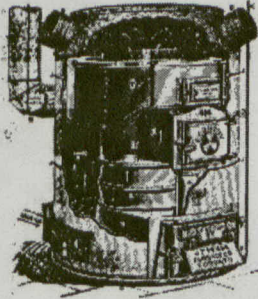
The advantages of this feature in its construction are self-evident. There can be no leaks on account of bad packing, nor is there any opportunity given for expansion or contraction to open up joints. The water chamber is made in ONE SOLID CASTING, and so designed as to give a VERTICAL CIRCULATION. By making use of this NATURAL LAW we greatly increase the efficiency of the heater.

A post card to us will bring our booklet with a full description.

CLARE BROS. & CO., - PRESTON, ONT.

IF YOU WANT THE BEST

Warm Air Furnace or Combination Heater obtainable anywhere, then your choice must be the



Pease "Economy"

These Heaters are not made to sell at a lower price than any other apparatus in the market. The sole aim of the manufacturers is to make them Better than Any Other. It is true that there are light-weight Furnaces in the market that are sold at a lower price, but the slight difference in price is out of all proportion when worth is considered.

SEND FOR CATALOGUE

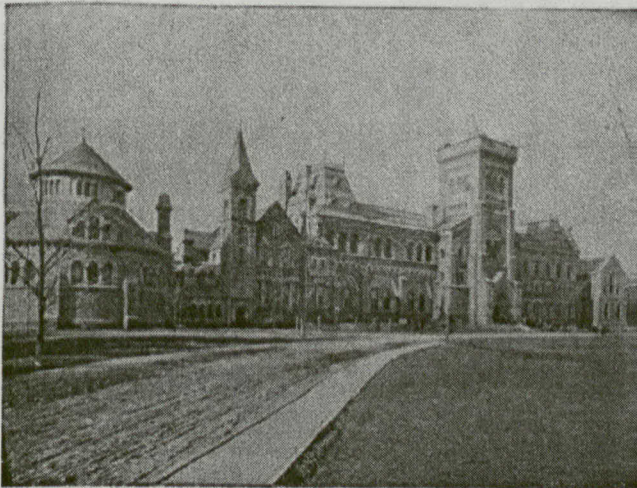
J. F. PEASE FURNACE CO., LIMITED

193-198 Queen Street East

TORONTO, ONT.

USE English Selenite Cement

DO YOU USE ENGRAVINGS?



The leading
Newspapers and
the leading
Advertisers in
Canada use those
made by

THE ALEXANDER ENGRAVING CO.,

Successors to Moore & Alexander

Engravers, Designers and Commercial Photographers

Write for Prices....

16 Adelaide St. West, TORONTO.

ALBERT MANUFACTURING CO.

MANUFACTURERS OF

MANUFACTURERS OF

**PATENT
ROCK WALL PLASTER**



**"HAMMER BRAND"
CALCINED PLASTER**

HILLSBOROUGH, N. B., CANADA

DIRECTORY OF LEADING STONE AND GRANITE DEALERS

Amherst Red Stone Quarry Co.
AMHERST, N. S.
Amherst Red Stone
Samples Sent Free Hardens with Age
Correspondence Requested

**C. PICKARD
BROWN STONE**
LARGE DIMENSION STONE
A SPECIALTY
SACKVILLE, N. B.

JOHN KLINE
—DEALER IN—
ROUGH AND DRESSED GRANITE
Heavy blocks a specialty. Street paving and curbing. Also granite for monumental and building purposes. Estimates and samples on application.
JOHN KLINE, Granite Dealer, HALIFAX, N.S.

GRANITE
Red and Rose Pink
Fine Rich Colours for
BUILDING and MONUMENTAL PURPOSES
and **GRANITE PAVING**
can be had at low figures from the
St. Phillippe d'Argenteuil Quarries.
Send for quotations and samples to
JOS. BRUNET
Cote des Neiges, Montreal, Que.

MORT RED—Sand Stone.
BLACK PASTURE—Buff.
NOVA SCOTIA—Blue Grey.
BATH—Box Ground Grey.
Selling Agents for Canada—
Thos. Samuel & Son,
A. G. MOONEY, Manager,
Temple Bldg., MONTREAL.
Telephone Main 2448.

JAMES BRODIE & CO.
Quarries and Manufacturers of . . .
**Canadian Quinsy, Ebony
and Stanstead Granite**
Monumental Building, Curbing, Paving,
etc. — Rough Stock a Specialty.
Mount Johnston, Que.

**BROWN AND OLIVE
FREE STONE**
Any dimensions and finest quality.
for **BUILDING PURPOSES**, from
our New Brunswick quarries.
Pulp Stones
SAMPLES ON APPLICATION
WM. HOOD & SON
10, Richmond Sq., MONTREAL

D. ROBERTSON & CO.
Credit Valley Quarries, Cataract, Ont.
**BROWN AND GREY
FRZESTONE**
Sills, Heads, Coursing and Dimension Stone
our Specialties. Lime Works at Milton, Ont.
Offices: Toronto, Cataract and Milton

For Prices of Unoccupied Spaces in the above Directory address the CANADIAN ARCHITECT AND BUILDER, Toronto.

CREDIT FORKS STONE CO.

84 Adelaide St. W.

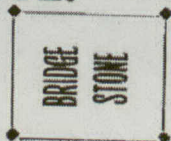
TORONTO

Brown Stone Quarries,
✠ ✠ ✠ **Credit Forks, Ont**

Supply the
Best . . .

BROWN STONE IN . . . CANADA

DIMENSION **COURSING**
RANDOM **SHODDY**
HEADS, SILLS **RUBBLE**



OFFICE:
84 Adelaide St. W.
TORONTO
Telephone 208.

Classified Directory of Montreal Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

E. F. DARTNELL,
Stone, Pressed and Common Bricks, Mineral Wool, etc.
Telephone 2382. 180 St. James Street.

T. A. MORRISON
Pressed and Paving Bricks, Porous Terra Cotta,
Stone, &c. Telephone 2147. 118 St. Peter Street.

GEO. A. COWAN,
Building Supplies.
Telephone 2463. Office, 59 Temple Building.

JAS. W. PYKE & CO.
Importers Structural Material - Iron and Steel
Telephone 312. Merchants Bank Bldg.

BUILDERS and CONTRACTORS

JOHN QUINLAN, General Contractor and Builder,
6722 Wellington St., Montreal. Estimates given
on all kinds of Cut Stone and Masonry; Jobbing
promptly attended to. Bell Telephone 8275.

Subscribe for the ARCHITECT AND BUILDER.

PLUMBERS and STEAMFITTERS

JAMES BALLANTYNE & CO.
Practical Plumbers, Gas, Steam and Hot Water Fitters,
152 St. Antoine St., Montreal. Bell Telephone 2469.

ROOFERS

D. NICHOLSON & CO., Roofers, 679 St. Paul
Street, Montreal. Gravel Roofing a Specialty.
Repairs of all kinds promptly attended to.
Bell Telephone 2665.

Classified Directory of Toronto Contractors and Dealers in Builders' Supplies

BUILDING MATERIALS

GEORGE RATHBONE, 2 Northcote Ave. Pine,
Hemlock and Hardwood Lumber; Laths, Shingles
and Cedar Posts; Sawin Veneers. Re-sawing up to 30
inches wide a specialty.

Ontario Lime Association

Manufacturers and Dealers in
Grey Lime, Guelph White Lime,
Ontario Cement, Portland Cements
Plaster Paris, Hair, Fire Brick,
Fire Clay, Sewer Pipe, etc.

Telephone 920. 111 Esplanade St. E., Toronto

BUILDERS and CONTRACTORS

JAS. NURSE, BUILDER. Estimates given on all
kinds of Brick and Stone Work, Content Walls,
Curb, and Ceiling Floors. 22 SALISBURY AVE.,
TORONTO.

GEORGE OAKLEY, **FREDERIC HOLMES,**
OAKLEY & HOLMES, Contractors
Telephone North 063. 1111 Yonge St., TORONTO.
Estimates given for Cut Stone, Brickwork, Etc.

MANTLES, GRATES and TILES

Toronto Hardware Mfg. Co.
1100 Queen St. W.
ALSO PLUMBER'S SUPPLIES.

ROOFERS

ROBT. RENNIE & SON,
Terra Cotta Tile,
SLATE and GRAVEL ROOFERS, &c.
Every description of Roofing Slate always on hand.
Galvanized Iron Ridges, Valleys and Flashings supplied.
Telephone 2344. 376 Berkeley St., TORONTO.

H. WILLIAMS & CO., TORONTO.
23 Toronto St.
ROOFERS
With Slate, Felt and Gravel; also Williams' Flat Slate
Roof—the best. We lay ROCK ASPHALT on cellar
bottoms, floors and walks—the best material for this
work. Telephone No. 511.

W. T. STEWART & CO.

Felt and Slate Roofers,
Dealers in Felt, Pitch, Tar, Sheathing Paper, Carpet
Paper, and all kinds of Lining Paper.
Office: Cor. Adelaide and Bay Sts., TORONTO.
Estimates furnished. Telephone No. 698.

G. DUTHIE & SONS,

Terra Cotta Tile, Slate and Felt Roofers,
Cor. Widmer and Adelaide Sts., - TORONTO.
GALVANIZED IRON FURNISHINGS SUPPLIED.
Telephone 1936.

ESTABLISHED 1856

Slate and Felt Roofing.
FORBES ROOFING CO. 153 Bay St.

DOUGLAS BROS.

SLATE, TILE and METAL ROOFERS.
Sheet Metal Work, Metallic Ceilings, Skylights, etc.
124 Adelaide Street West, TORONTO.
Telephone 380.

PIONEER GALVANIZED IRON WORKS

ESTABLISHED 1855.
GEORGE RINGHAM
23 and 25 Edward Street, TORONTO
Copper and Galvanized Iron Cornices,
Skylights, Etc., Metal Ceilings
Felt and Slate Roofing. Phone 2572.

MOVERS

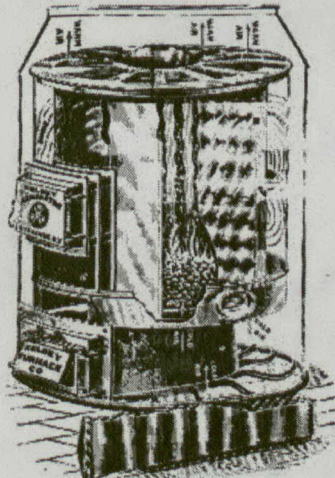
I. WARDELL & SON
450 Spadina Avenue,
Move Frame and Brick Houses and Machinery.

PLUMBERS and STEAMFITTERS

BATES & ROBINSON CO.
Plumbing, Steam and Hot Water Heating; Outside
Work a Specialty. 128 Bay St., Telephone 1227.

Advertise in the ARCHITECT AND BUILDER

"BUILT ON RIGHT LINES"



Every thoroughly practical man must agree that the above statement is only applicable to

KELSEY CORRUGATED WARM AIR GENERATORS (Pat'd)

Winnipeg, Man., May 16th, 1907.

The James Smart Mfg. Co., Brockville, Ont.

Gentlemen,—When erecting our School Board Office Building in the fall of 1906 your agent suggested we should use the "Kelsey" warm air generator. The Chairman of our Building Committee, Mr. John McKechnie, a thoroughly practical man, owner of the Vulcan Iron Works, and myself made a careful examination of the furnace, and we agreed it was what we wanted. It was in use all last winter and we are satisfied. It is a good heater, having a large radiating surface, is free from soot or dust, sent heat into most distant part, the attic, and we had to provide a register opening into the basement in order to warm it sufficiently for use.

From a large experience in heating plants I have no hesitation in saying the "Kelsey" is bat on right lines.

Yours truly,

J. B. MITCHELL,

Inspector of School Buildings and Supplies.

KELSEYS are being shown at the Pan-American Exposition.

Send for PRINTED MATTER giving experience of satisfied users.

THE JAMES SMART MFG. CO., LIMITED,
BROCKVILLE, ONT.

EXCLUSIVE MAKERS FOR CANADA.

Over 1,600 KELSEYS in use in
its home city, Syracuse, N. Y.

PAGES

MISSING