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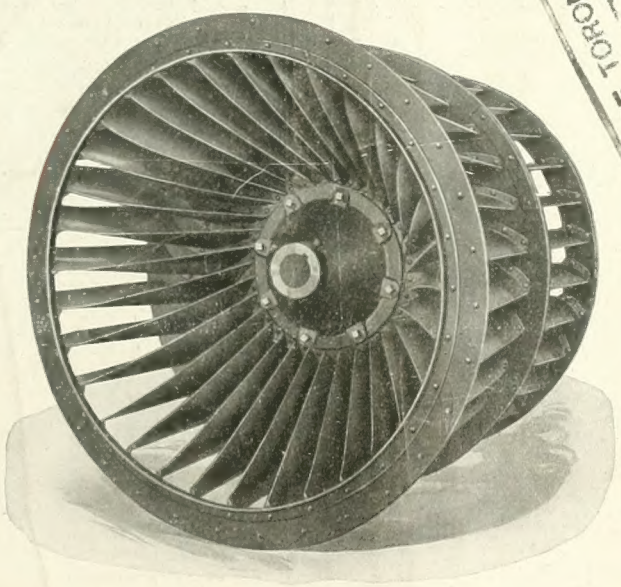
May, 1918

THE CANADIAN BUILDER

Published Monthly by The Commercial Press, Limited, 32 Colborne St., Toronto

Canada's Most Noted

FANS



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For Heating and Ventilating the Factory or Public Building **"Keith Fans"** hold the premier position over all others. This Fan is built to meet the requirements of operation, producing a constant Temperature and varied Air volume according to your needs.

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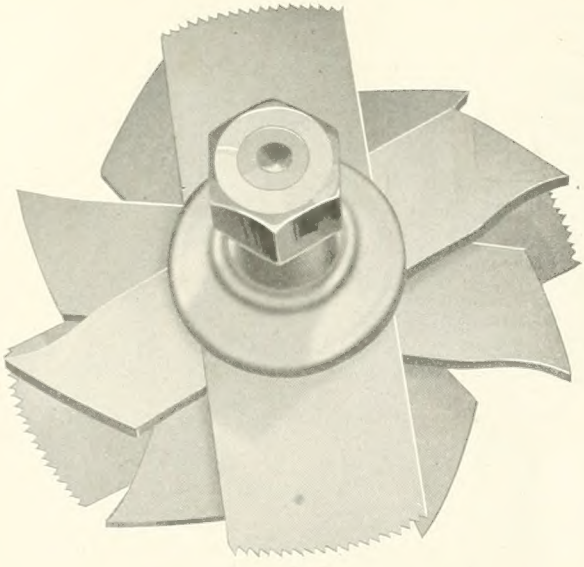

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LIMITED

Notice of Removal

We wish to inform our many customers and users of our woodworkers that we are now in our new premises at

111 Adelaide St. West

and will continue to give good service as usual. Parties desiring machines should order as soon as possible, as the delay in moving has interfered with our output.

The above cut shows a new dado-head, which cuts from 1-1/16" to 1¾," for use with the "Elliot," or can be made for any sized mandrel.

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ELLIOT WOODWORKER
LIMITED

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BISHOPRIC STUCCO BOARD

It takes the place of lath, furring strips, building paper and sheathing lumber, at just about half the cost. You understand that this "four-in-one" building board comes to you ready to be nailed to the studding, lath side out, as a foundation for stucco outside or plaster inside the building. BISHOPRIC STUCCO BOARD is made of kiln-dried lath, bevel-edged, embedded under terrific pressure, in toughened asphalt-mastic, surfaced on the other side with sized sulphide fibre board. The dove-tailed spaces between the lath make perfect keys, and the stucco never cracks nor falls away.

Whether you are figuring on a home, a factory, or a warehouse of stucco, study the possibilities of Bishopric Stucco Board.

More information and samples, free on request.

Bishopric Wall Board Company, Limited
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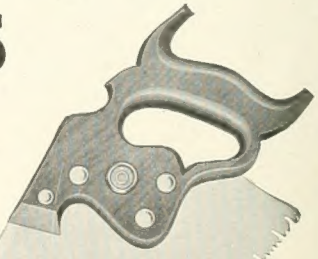
New Saw for Double Duty Work



THIS DISSTON D17 DOUBLE DUTY HANDSAW far excels any other pattern ever made for use in heavy construction work of all kinds—studding up houses, shoring for sewers, making forms for concrete building, railroad work, millwright farm use, and in fact for all general purposes.

The combination of crosscut and rip teeth with the very deep gullets enables this saw to crosscut, rip or cut diagonally across the grain with great ease and rapidity.

The most practical saw of the kind ever made.

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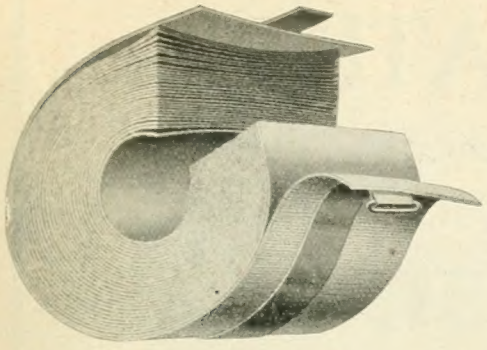

Strength counts almost as much as efficiency — in insulation. Johns-Manville Asbesto-Sponge Felted possesses both.

Figure the life factor of your heat insulation. Its length of service plays a big part, as well as its insulation efficiency. The longer its life, the lower the depreciation charge—and the greater both annual and total returns on the investment.

The high thermal efficiency of Johns-Manville Asbesto-Sponge Felted Heat Insulation has been amply demonstrated by many tests. And actual experience over many years has proven its ruggedness of construction. Designed to meet wide extremes of temperature and to resist vibration without flaking or sagging. Can be removed and replaced without injury. Where ordinary pipe coverings yield lower returns and deteriorate rapidly, Johns-Manville Asbesto-Sponge Felted retains its high efficiency and pays dividends year after year.

There's Johns-Manville Heat Insulation to meet every requirement. Write the nearest branch—you'll be interested in the figures they will give you.

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The Canadian H.W. Johns-Manville Company, Ltd.

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They cannot loosen in the handle, in use or abuse. You have our guarantee.

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14 sizes

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They are as durable as the high-grade steel that composes them, and will render faithful service for generations. The comfortable handle and various lengths of blades make them suitable for all classes of work.

Your dealer can supply you

Let us sena the "Yankee" Tool Book

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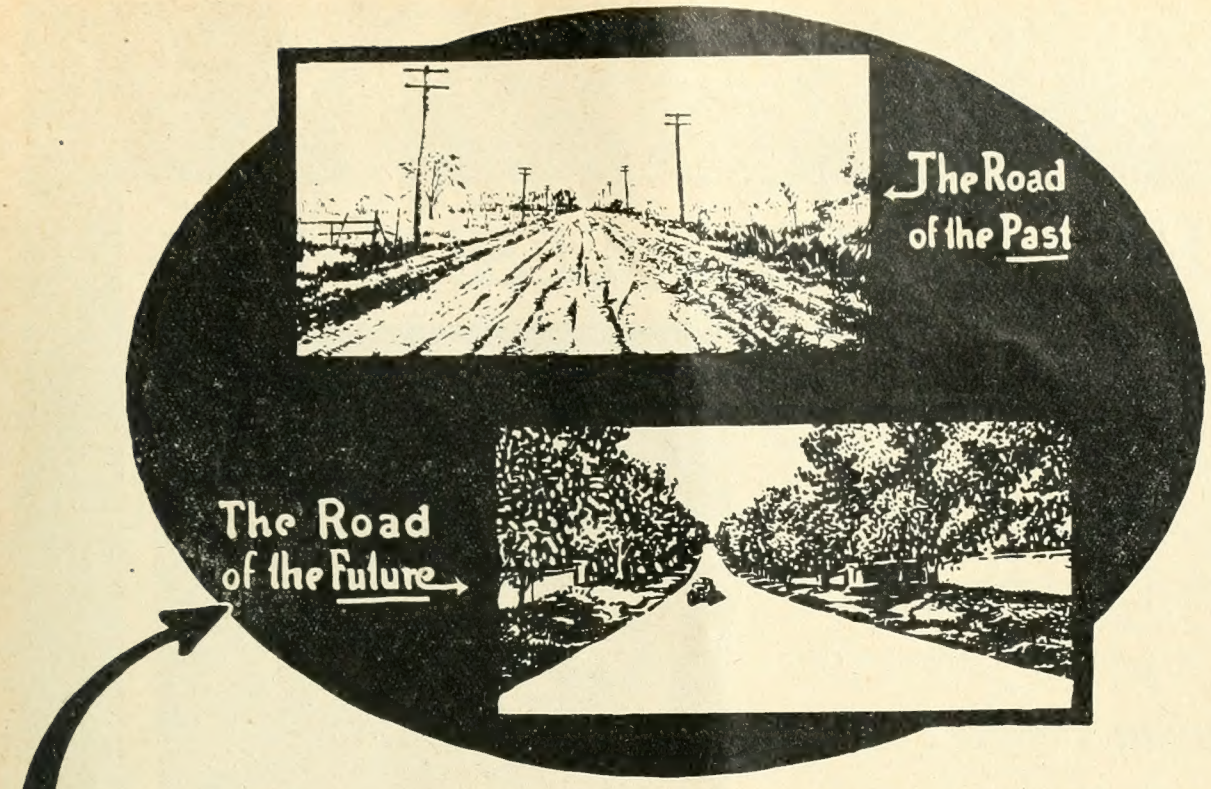


Let's Make it "The Road of To-day"

THE motor car and the farm truck are literally tearing to pieces our old-style roads. The solution—and the only one—is found in Permanent Highways of Concrete.

Concrete forms the only road-bed and road-surface capable of standing the strain of swift-moving cars. Modern traffic conditions present a problem that concrete alone can solve. The time has come for organized action; we must plan now—to build those miles of concrete that Canada so sadly needs.

Concrete has all the advantages: no mud, ruts, holes or dust. Easy to haul on—to ride on. Durable, economical, always ready for use. We have compiled the facts and statistics to prove that concrete has the solidity and strength needed in the road of to-day.

Write us and we will gladly send you copies of our various pamphlets that prove the absolute superiority of concrete for road building.

CANADA CEMENT COMPANY, LIMITED

10 Herald Building, MONTREAL

CANADA CEMENT
CONCRETE
FOR PERMANENCE

PEDLAR'S "PERFECT" EXPANDED METAL LATH

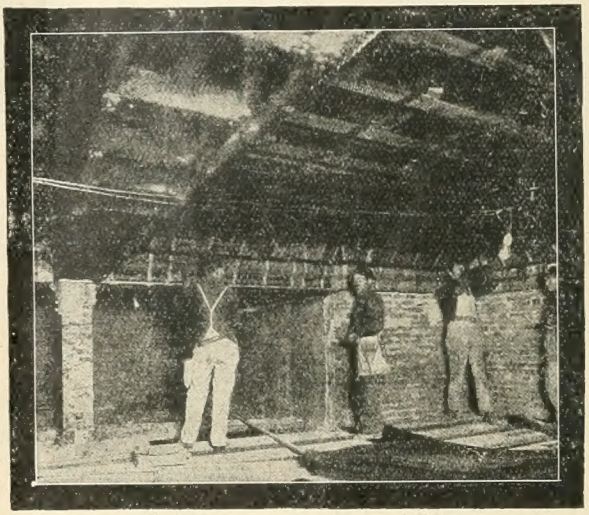
LESS PLASTER and LESS LABOR

are required with Pedlar's "Perfect Expanded Metal Lath. The narrow strands of the neat, small mesh furnish an ideal bonding surface by allowing the mortar to imbed the lath completely on both sides, the clinch bonding on the back.

In attaching this lath to the studs, run the lengths of the strands inward and downward using one inch staples of No. 14 gauge coppered wire. Where it is to be attached directly to iron superstructure, use No. 18 gauge annealed wire for tying.

Pedlar's "Perfect" Metal Lath is made in 26, 24 and 23 gauge, in sheets 97 inches long and 24 wide.

Write for Metal Lath Booklet C.B.



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Established 1861
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Branches: Montreal, Ottawa, Toronto, London
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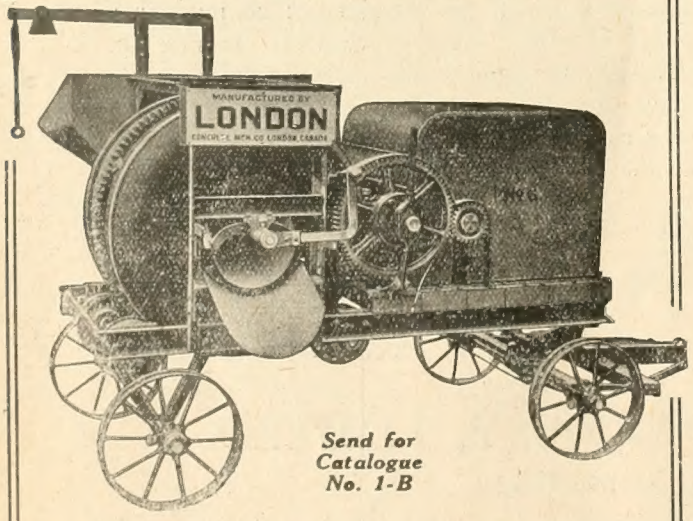
Just the machine for small jobs.



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A big capacity, a small price. Built to last a lifetime. Light, and easily moved from place to place. Can be operated with less men than any other mixer. Capacity 6 cubic ft. per batch, 50 cubic yards per day. WILL SAVE THE PRICE OF ITSELF IN 20 DAYS' USE. You can't afford to be without it.

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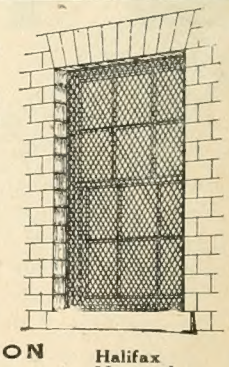

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Toronto Office—36 Lombard Street
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The Canadian Builder and Carpenter
32 Colborne St. Toronto

THE CANADIAN BUILDER

D. O. McKINNON
GENERAL MANAGER

Published by The Commercial Press, Ltd., 32 Colborne St., Toronto, Ont.

G. C KEITH, M.Sc.,
EDITOR

VOLUME 8 | TORONTO, MAY, 1918 | NUMBER 5

Editorial Comment

Many Schools to be Built in 1918

No matter what happens, the learning of the coming generations must be provided for by the erection and equipping of new schools. Our Boards of Education are alive to the fact that the teachings of the three R's must not be neglected.

War tends to stop intellectual growth for the hard grind at the front takes all the time and attention of our men. Thought and education should be encouraged where possible.

Education in every form at home should be given greater attention than never. This fact should be driven home by Canadian builders. In many centres the fact is already realized, and greater provision is being made for the young idea and education in every form. The idea should be general. Retrenchment in education would be a national calamity, and it is to be hoped that Boards of Education and Canadian builders should keep this in mind.

As an example of what some communities are doing, the following items which, of course, is only a very small portion of the work going on, will doubtless be of interest:

Sidney, B.C.—The School Board have been assured by the Provincial Government that funds will be provided for a new school if they are in any way available.

Vancouver—A number of one-roomed schools will be built to accommodate surplus classes.

Rossland—A new $80,000 school is being erected here.

Shawnigan Lake, B.C.—It is proposed to establish a new school district and the following committee has been appointed: Mr. E. M. Boulding, president; Mr. F. A. J. Copley, secretary; Mr. A. H. Graham, Mr. H. H. Hollings and Mr. B. Weeks.

Victoria—A new four room school will be erected at South Wellington.

Raymond, Alta.—The Department of Agriculture, Provincial Government, have secured a site on which they will erect an agricultural school. Minister, Hon. Duncan Marshall, Edmonton.

Regina—During 1917, 149 school districts were established in Saskatchewan, and it is estimated that during the present year 140 to 175 new schools will be erected in the province. There are now 4,029 school districts in Saskatchewan, 894 of these having been formed in the first year of the existence of the province, 1905. The year when the next highest number of school districts was formed was 1912, when 382 districts were established.

Oxbow, Sask., (W. Rammell, Box 82)—The Coldridge School District No. 242, will erect a new school.

Yellow Grass, Sask. (Thomas Murray, secretary-treasurer)—A school building will be erected by the Beautiful Plains School District No. 699.

Winnipeg (R. H. Smith, secretary-treasurer)—A stone and brick addition is being built to the John M. King school on Ellice Ave.

Deloraine, Man. (S. T. Holden, secretary-treasurer, Box 349)—The school district of Ridford, No. 456, will erect a brick veneer school.

Hamilton, Ont.—Schultz Bros. & Co. Ltd., 35 Albion St., Brantford, have the general contract for a $3,000 one-storey frame portable school for the Separate School Board. The Provincial Government and the city contemplate the erection of a $300,000 technical school on Wentworth St.

Toronto—Annexes will be built to the Perth Ave. and Queen Alexandra schools.

Fairbank, Ont.—A new school on the Cedarvale estate is proposed.

Dunnville, Ont.—Hall & Tambling, have the general contract for a $5,000 school for the Caistor Township School Board.

Grantham Township, Ont.—Contracts have been awarded in connection with the erection of an addition and alterations to school at a cost of $5,000, for School Section 8. Grantham.

Woodslee, Ont.—Charles Clifford, Tilbury, has the general contract for $8,000 school for the School Board. Secretary-treasurer, A. J. Bennett, Woodslee.

Quebec—The Commercial Academy on Cook St., will be remodelled at a cost of $40,000. Another large permit granted is that to the Roman Catholic School Commission for the completion of the top storey of the St. Maurice School in Limoilou, which is to cost $7,000.

Montreal West, Que.—Watson & Wilson, 1678 Hutchison St., Montreal, have the plastering contract in connection with the erection of a $183,000 high school for the Board of Education. The general contractor is A. F. Byers & Co. Ltd., 340 University St., Montreal.

Dartmouth, N.S.—The School Board has accepted plans for a new twelve room school building to cost $100,000.

Cement was first put on the market in England. In 1875 the use of portland cement in the United States came into commercial prominence. When the product was first placed on the market in competition with that which was being imported from England and Germany, a good price was demanded. However, production in excess of demand soon resulted and it proved a big factor in the price cutting that followed. The second and most important reason for declining prices was due to an improvement in the methods of manufacture. From 1890 up to the present time there have been constant improvements, the use of more economical fuel, the invention of better and more efficient machinery. In a period of 15 years the cement output in the United States has increased over 600 per cent.

Brick house at Westmount.

House on Sydenham Avenue, Westmount

The billiard room, bathroom door arrangement, and sunroom are the features

Builders: Anglins, Limited, Montreal

THE house shown in the accompanying illustration, built by Anglins Limited, on Sydenham Ave., Westmount, is finished in oak.

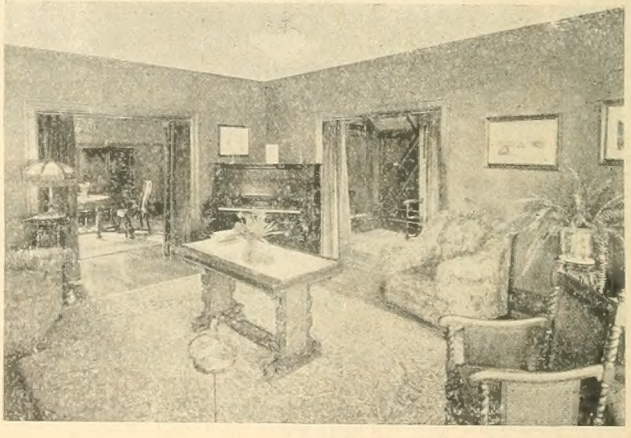
A maids' bathroom and billiard room are located in the basement.

A den is placed off the main hall, the other side having living, dining room and conservatory connected.

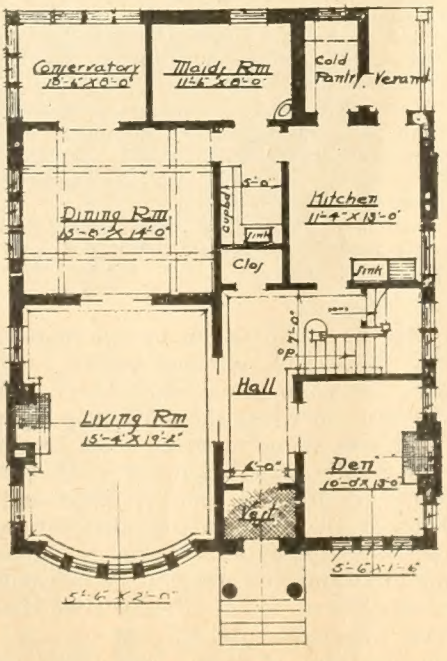
The bathroom, with two doors, is very convenient, as it may be used for a guest bathroom by closing one door.

The billiard room in this case is finished in oak, with a brick fireplace. The bedrooms are done in cream enamel.

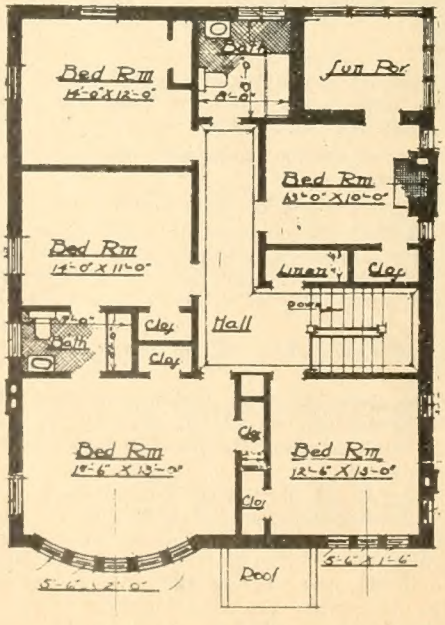
The sun porch is heated and finished in enamel, with a shelf around at the window sills like the conservatory.



Living room of house at Westmount.



Ground floor plan.



Bedroom floor plan.

INDUSTRIAL HOUSING PROBLEMS*

Several unusual features in the construction of a hundred reinforced concrete workmen's houses.

By Leslie H. Allen

IN order to arrive at some working basis to govern the laying out of new houses for workmen, it will be well at this point to consider the essential needs of a workman's family in the light of present-day needs.

It must first be recognized that we have two classes of workmen to be considered: (1) The unskilled workmen, mostly foreigners or negroes, uneducated, unused to our houses and our standards of living, earning a very low wage, and (2) the skilled men, mechanics, machinists, etc., earning a higher wage, mostly Canadians or Americans from the United States, living according to our standards, demanding more and willing to pay more for the comforts that the foreigner does not consider essential. The result of a failure to distinguish these two classes is that at the present time nearly all the houses built are for skilled workmen, and the need for better houses for unskilled labor has remained unsatisfied, resulting in overcrowding getting worse and worse. Here and there, a most excellent attempt has been made to solve the problem of housing the unskilled, low-paid workman. Such examples have not been copied, and only serve to show up more sharply the mistakes of other cities.

Housing Essentials

The essentials of a modern city house may be summarized as follows:

Watertight roof, walls and floors.
Bedroom for parents.
Bedroom for male children.
Bedroom for female children.
Living-room for cooking, eating and general day use.
Private toilet-room with sanitary water-closet and sewer connection.
Suitable heating arrangements.
Running water supply fit for drinking.
Uninterrupted daylight and ventilation through windows in every room.
Sink in kitchen, with running water and waste.

Further additions required by Canadian workmen or Americans from the United States, and considered necessary by them:

Cellars.
Closets.
Bathtub with running water.
Window screens.
Separate parlor.

Desirable improvements which usually are added:

Porches and piazzas.
Lavatory bowl.
Hot-water supply to bath and bowl.
Window shades.
Window blinds.
Dining-room separate from parlor or kitchen.
Electric lighting or gas piping.
Wall-paper.
Laundry tubs.

Need for Economy

Any attempt such as the above to divide essentials from luxuries must come in for a good deal of criticism, as there is bound to be a difference of opinion upon the details of such a list. The classifications suggested will at least serve to indicate the lines upon which the planning of a house should be studied in view of the need for strict economy in designing and building necessary to bring buildings down to a cost that will be remunerative.

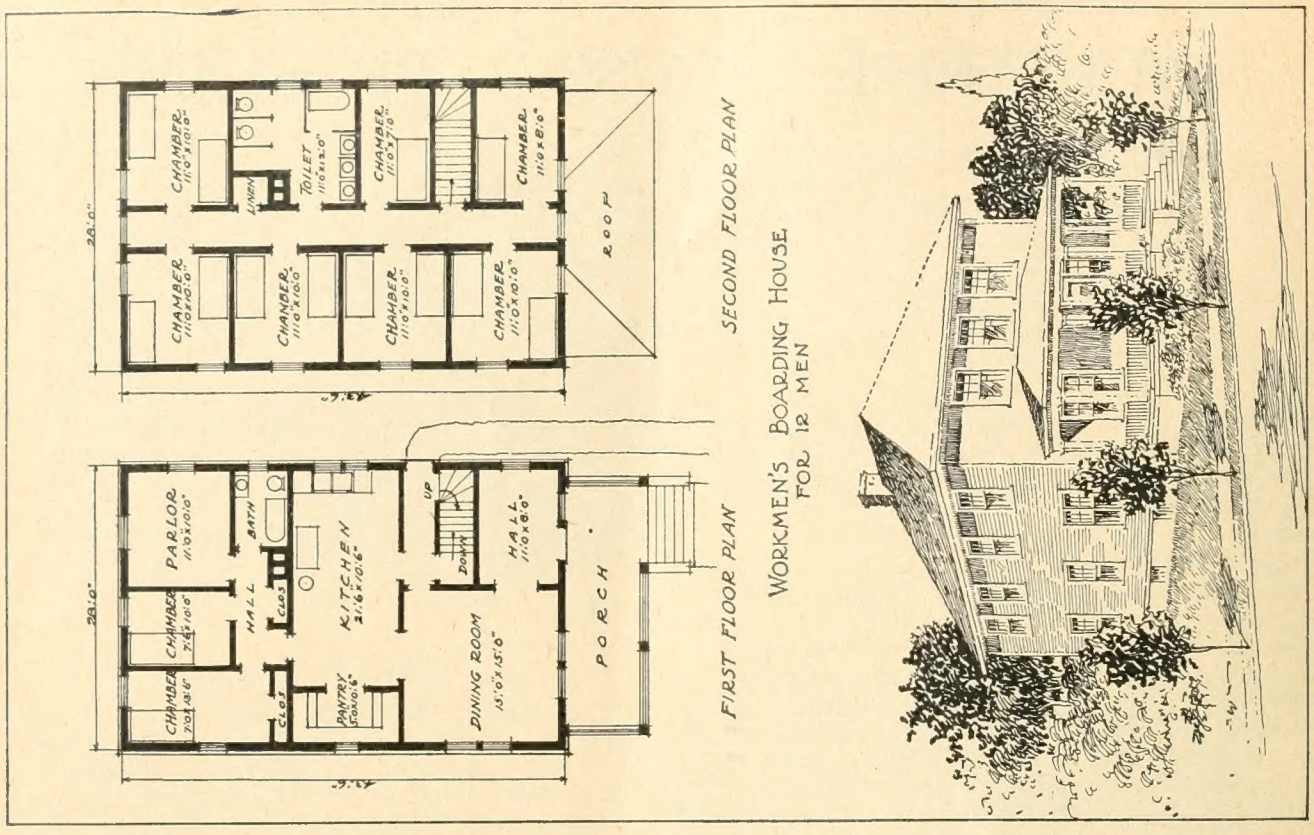
It is generally agreed by economists that the workingman cannot afford to pay more than one-quarter of his monthly wage in rent. This means that the man earning an average of $12.50 a week cannot afford to pay more than $150 per annum. Assuming that a housing operation ought to pay at least 10 per cent. gross per annum, this gives $1,500 for purchase of lot with sewer and street improvements and the building of a house. At the present time a four-room house of good construction cannot be built for this money and it is therefore necessary to plan with the very strictest economy.

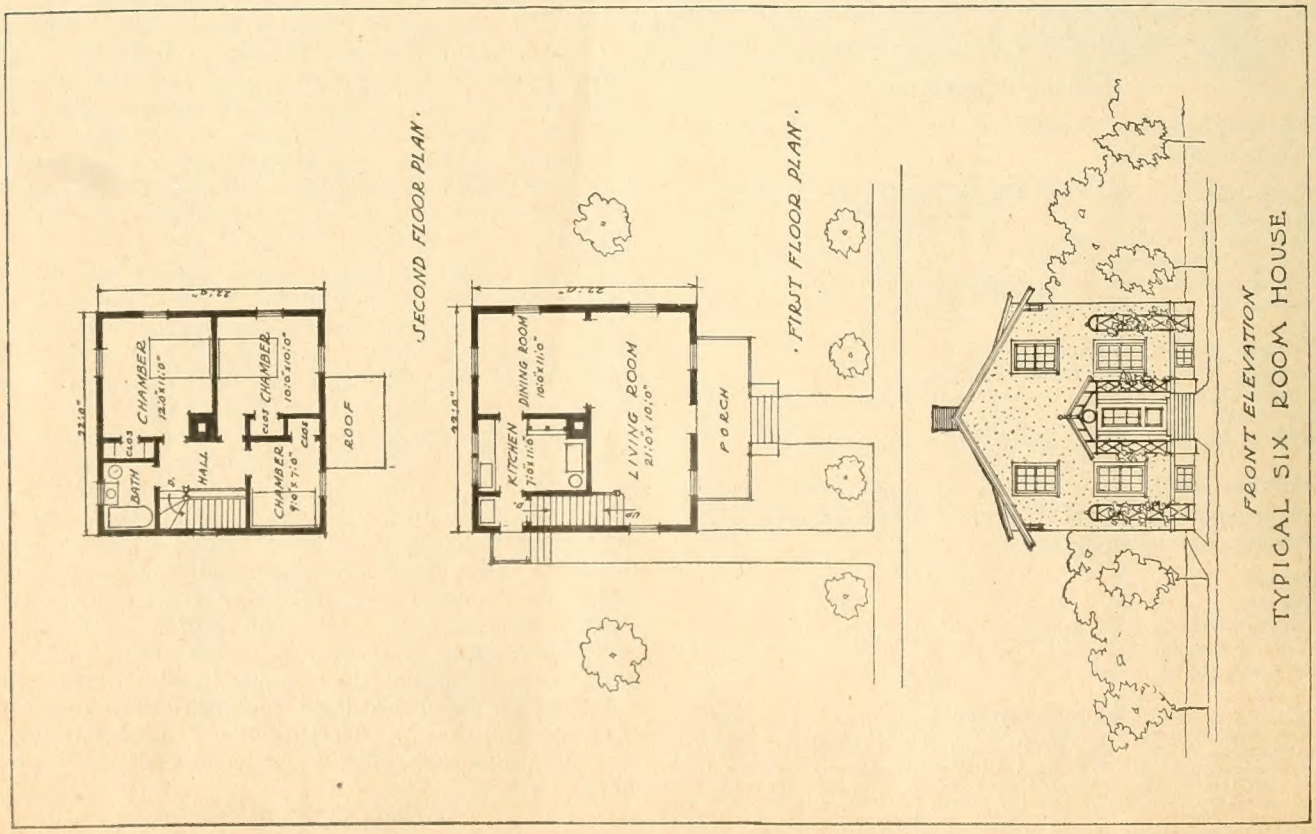
Many of the workmen whose homes we wish to build have come from countries where four walls and a roof are considered a sufficient shelter from the elements to make a home. Although we do want to see them housed in a better manner than this, yet it is not necessary to give them a six-room house, large cellar, furnace heat with running hot water, laundry tubs, lavatory bowls, picture-mouldings, and all the other comforts and luxuries that are required by higher-paid workmen. We do want to house the lowest-paid man in a sanitary and hygienic home, but it is not necessary that this home be furnished with all the conveniences and appurtenances that are being considered necessary in the home of one of our own people. We should give him a house that will not harbor vermin, that will not be damp or unhealthy, a house in which every room has a proper amount of light and ventilation and direct sunlight, and that has decent privacy in its sanitary accommodations and sufficient bedrooms for the sexes to sleep apart.

Various Types of Houses

The various types of houses now in use are as follows:

*Editor's note—This article by Mr. Leslie H. Allen of the Aberthaw Construction Co., who is a member of the National Housing Association and Chairman of the Industrial Housing Committee of the American Concrete Institute, should be read with considerable interest by Canadian builders. At a great many centres workmen's houses are being erected. We might mention Regina, Brantford, New Toronto, Shawinigan Falls, etc. If speculative builders do not take up the erection of more houses at industrial centres, others, namely the manufacturers, will have to take up the work. Canadian builders should find a considerable field in this class of work and should therefore read with interest any articles on the subject of workmen's houses.


CHAMBER 11'0"x10'10"
LINEN
TOILET 11'0"x3'0"
CHAMBER 11'0"x7'0"
CHAMBER 11'0"x8'0"
CHAMBER 11'0"x10'0"
CHAMBER 11'0"x10'0"
CHAMBER 11'0"x10'0"
CHAMBER 11'0"x10'10"
ROOF
28'0"
43'6"
SECOND FLOOR PLAN
PARLOR 11'0"x10'0"
BATH
HALL
CLOS
KITCHEN 21'6"x10'6"
UP
DOWN
HALL 11'0"x8'0"
CHAMBER 7'6"x10'6"
CHAMBER 7'6"x8'6"
PANTRY 5'0"x10'6"
DINING ROOM 15'0"x15'0"
PORCH
FIRST FLOOR PLAN
WORKMEN'S BOARDING HOUSE FOR 12 MEN


22'0"
22'0"
CHAMBER 12'3"x11'0"
CLOS
CHAMBER 10'0"x10'0"
CLOS
BATH
CLOS
HALL
CHAMBER 9'0"x7'0"
CLOS
ROOF
SECOND FLOOR PLAN.
DINING ROOM 10'0"x11'0"
KITCHEN 7'0"x11'0"
LIVING ROOM 21'0"x10'0"
PORCH
FIRST FLOOR PLAN.
FRONT ELEVATION
TYPICAL SIX ROOM HOUSE

(a) Single houses of five to seven rooms.
(b) Two-family houses of four to seven rooms.
(c) Terrace or row of houses of four rooms and up.
(d) Apartment-houses or tenements, two rooms and up.
(e) Boarding-houses for single men.
(f) Hotels.

The single house is the ideal residence for the American family, but is beyond the means of the low-priced unskilled workman. A single house with five or six rooms with 3,000 feet of land cannot be built for less than $3,000 except in the cheapest kind of frame construction, and even at this price it would call for a higher rental than he can afford to pay. For higher-paid men in the plant the single house is very desirable.

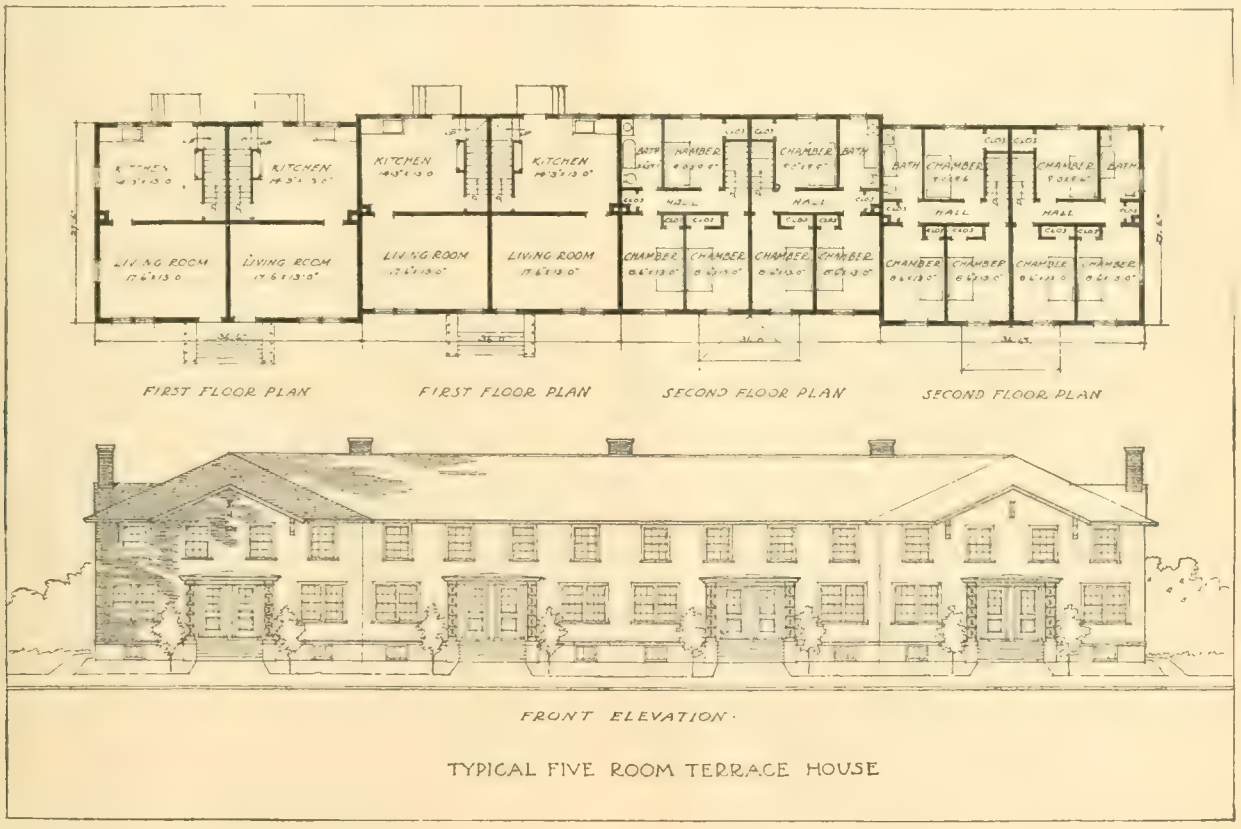
The two-family house is often built for workers who wish to purchase their home. Though not suitable for the unskilled worker, they are quite attractive to higher-paid men who like to buy a two-family house so that the rental received from one-half of the house will help to pay the carrying charges and amortization of the whole house. In some cases these are built side by side with a party wall and in some cases one tenement is built above the other. The first-named is preferable, as there is more privacy.

One of the most successful houses for the unskilled worker is that known as the "Philadelphia" type of house, of which many thousands have been built in Philadelphia, Washington, and other large cities. The typical four-room Philadelphia house is two rooms deep and has a living-room and kitchen downstairs, two bedrooms and bath upstairs. It is built in long rows or terraces with party walls in between. These can be built on as narrow a frontage as 13 ft. 6 in. (a 15 ft. frontage is desirable) on a lot of 900 square feet. The cost of both land and building is much lower than the preceding type. Houses built when prices were normal have been rented for as low as $12 a month and have shown a fair profit.

Suiting the House to the Needs of the Occupant

There should be in every home enough bedrooms for the parents and children of either sex to sleep apart. A good-sized bedroom should be provided for parents (and infant children) and two smaller bedrooms, large enough to accommodate two persons each, for the other children. All families, of course, are not of the same size, and some larger and smaller houses will be needed; but as a rule it will be found that the larger demand is for the four-room, five-room and six-room houses.

It seems to be a matter of habit in many quarters to build nothing but six-room houses; this is a manifest hardship to those who do not need so many rooms. If a man cannot afford to rent a six-room house and does not need the accommodations, yet finds that the six-room house is the only accommodation he can gain, he has to take in lodgers to help pay the rent. From the social standpoint the lodger is generally considered to be a menace and an unmixed evil. We have found that where we built four-room houses these were often taken up first of all by the employees.



TYPICAL FIVE ROOM TERRACE HOUSE

Where houses are built to sell, however, there is not so much demand for the smaller houses and the six-room house is as a rule the smallest house that one can count upon selling without difficulty.

The size of the bedroom should be sufficient to give at least 400 cubic feet of air space per inmate. All bedrooms should open on to a hall and not into each other or into a living-room.

Next, there must be provided at least one living-room (having an area of not less than 135 square feet) for working, eating, washing, and general use. There is much controversy on the subject of separate dining-

rooms and separate parlors, which add much to the attractiveness of the house but also to its expense, and it is not always possible to provide them for the unskilled laborer.

The foreigner does not use a kitchen, dining-room and parlor; what he needs is one large kitchen. It is found that where three living-rooms are provided, two of them are invariably used as bedrooms for the lodgers. It is the habit of most foreigners and indeed of many Americans to live in their kitchens, and this room should be large and well-lighted and ventilated.

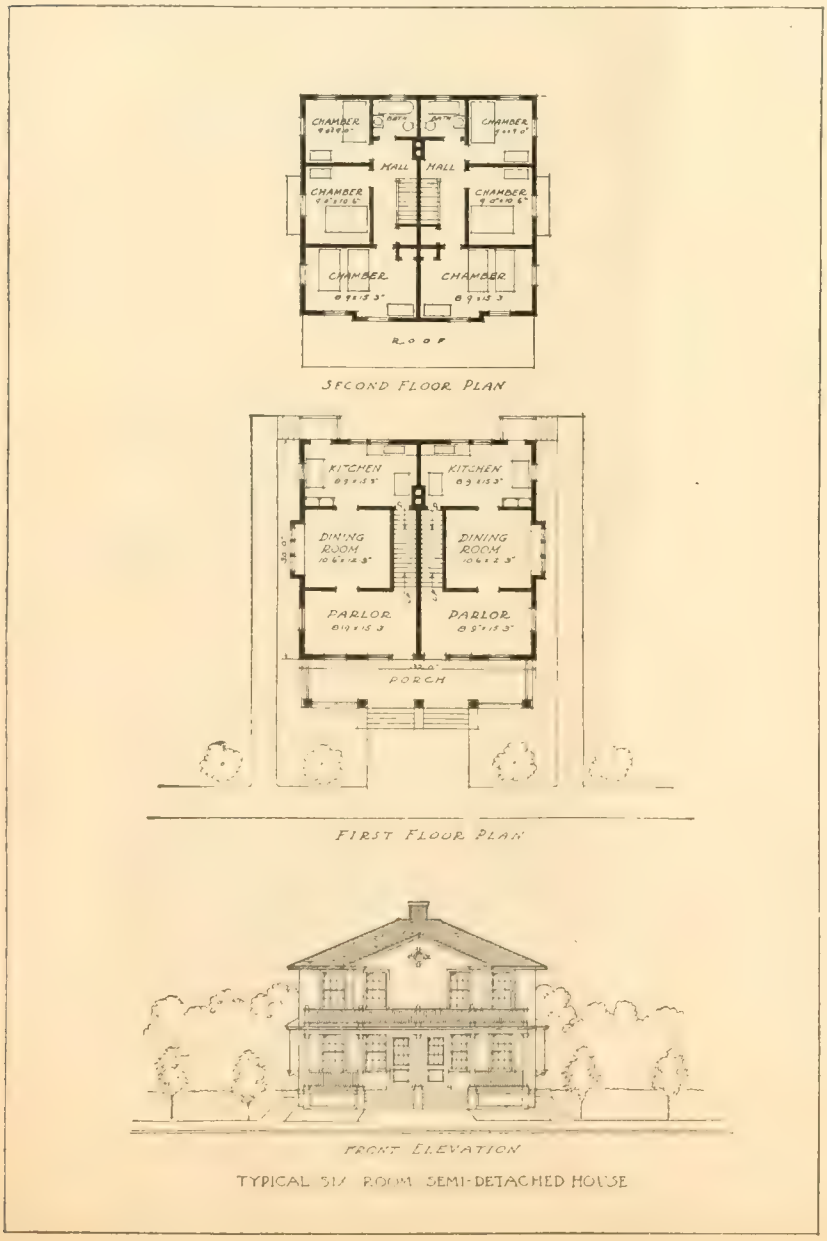
The toilet-room must be planned so that it does not open directly into a living-room or bedroom, but off the stairs if possible.

There is no justification at the present day for the existence of the old-style out-closets or privies. Water-closets connected to cesspools are sometimes satisfactory, but very undesirable, especially in cities. It is much wiser to figure on the construction of a sewer at the time the house is built, as cesspools, unless properly looked after, are a potential source of danger to the water supply and a menace to the public health.

Some comment will naturally be made on the suggested omission of the cellar. We are told that the family needs a cellar for the storage of coal and canned fruit, and that it costs no more to build it than to leave it out, as the foundation walls are the same in either case. In investigating the contents of laborers' cellars the writer has never found large supplies of food or fuel. The laborer is too poor to buy more than two or three hundred pounds of coal at a time, and never lays in stocks of food in advance; instead of this we usually find in his cellar a miscellaneous assortment of most insanitary rubbish and junk, which is not only undesirable but constitutes a serious fire menace. Statistics show that over 80 per cent. of dwelling-house fires start in the cellar in such rubbish piles.

The argument that it costs no more is nearly true where sand and gravel soils are encountered, but in clay or other hard digging the extra cost of digging the cellar mounts up considerably. Cellars are not needed for furnaces where the tenant cannot afford the fuel for them but derives his heat from his kitchen stove.

Where the cellar is omitted a space should be left under the floor, ventilated by gratings in the outside walls which can be closed in cold weather.



TYPICAL SIX ROOM SEMI-DETACHED HOUSE

In houses of this class the tenant usually furnishes his own stove, and as his stove has no hot water front, a system of hot-water piping is of no use to him. Some owners prefer to install the stove with water front and hot-water piping in spite of the increased cost of the house, but all these things help to put up the cost and the resultant rent to a figure higher than the tenant can afford. For the same reasons washbowls in the bath-room, and laundry tubs, though useful, are not necessities. There should, however, be an enameled iron sink in the kitchen, and a bathtub should be provided even if the tenant has not learned how to use it. There should be a proper supply of running water, pure, and fit for drinking, and a water-closet connected with the sewer, and a cast-iron enameled bath.

Materials of Construction

Very little change has been made in recent years in construction methods and materials, the chief alteration being towards the reduction of fire risks and conflagration hazards.

The standard form of wall construction for rural districts continues to be wooden framing. Where city laws do not forbid it, this is used in the cities. The frame is usually lathed and plastered inside and covered with rough boarding paper and shingles or clapboards outside. Cement stucco on wire lath is coming into vogue for exterior finish—at a slightly higher cost; this when put on satisfactorily requires less maintenance and no repainting, but requires expert workmen to make a satisfactory job. In a few cities brick walls are more frequently used, furred on the inside and lathed and plastered. Some

houses have been built with hollow tile, stuccoed outside and plastered inside directly on the tile; some concrete houses have been erected. The most noteworthy instance of concrete houses are the hundred houses at Donora, Pa., built for the American Steel & Wire Co. by the Aberthaw Construction Company. These houses, built with Lambie steel forms, have 6 in. reinforced concrete walls, stuccoed outside and furred and lathed and plastered inside. The forms, however, give such a smooth surface that it is intended on the next job to leave the concrete exterior surface bare, rubbing any irregularities and leaving a smooth concrete surface of even texture and color.

The chief roofing materials in use at the present time are wood shingles, asphalted felt shingles, asbestos shingles, slate, tile, "Ready" roofings, tar and gravel built-up roofings and tin roofings, the last three being used for flat roofs. The asbestos shingle makes a permanent roofing.

The cost of tile and slate roofing is so much higher than the above that they have to be left out of consideration in workmen's houses.

The flat roof covered with a 5-ply built-up tar and gravel roofing is considered a cheap roof, but its appearance is generally objected to. In our large cities, particularly in Philadelphia, it is used extensively. The flat roof should have underneath it a ceiling furred down to give a hollow space of at least 18 in. between the ceiling and the roof surface. This dead air space provides a proper insulation against heat and cold, and is actually cooler in summer and warmer in winter than a pitched roof in which the ceilings of the bedrooms are sloping.

The objection to the flat roof on account of its lack of architectural pretensions is not an insuperable one. Conditions of this sort should be a challenge to architects to overcome.

Wood lath and plastering continue to be the customary method of finishing walls and ceilings. Plaster board covered with a finish coat costs very little more, and where speed is essential can be put on and dried out much more quickly. The various wall boards and composition boards offered as substitutes for plastering are not satisfactory for industrial houses. The cost per square foot is low, but the waste in cutting is very great unless specially ordered, and the result is not so permanent.

Interior woodwork is best stained and varnished and not painted, as it is less easily soiled.

Wall-papers add nothing to the comfort or health of the tenant, but do add to the rent he has to pay, besides proving a harborage for vermin. Kitchen and bathroom walls are best painted with lead and oil, while many owners leave all other rooms bare or tint them with cold water paint.

In planning a house the square plan bounded by straight lines is the cheapest and most economical. As the plan changes from square to oblong, the ratio of walls to floor space increases, and with it the cost. Any departure from the right angle means increased labor and waste of material in cutting.

Porches should be so designed that they do not shut off sunlight from any room. In many row houses a continuous porch is built right across the front, with the result that sunlight never enters the front room on the ground floor. As sunlight is the greatest foe of disease germs, it will be seen what a detriment this is to the health of the inmate.

Valleys and dormers in a roof not only add to its cost but to its maintenance, as these angles in the roof are the points where leaks first make their appearance.

No applied architectural ornament can equal the beauty of permanence of a careful planting of trees, shrubs and vines. The plainest of houses suitably planted with quick-growing vines on permanent trellises, and with a good shade-tree in front will look far better than the most ornate building elevation and cost much less. In studying photographs of successful housing developments it will be seen that those which win the most general approval are those in which this feature has been given careful attention.

Reading Board Measure with the Steel Square

One of the handy uses to which a steel square may be put is in the reading of board measure, and the carpenter who likes to use his square for everything may be interested in this "kink."

Take a long-bladed bevel and apply it to the square, the end nearest the screw passing through the number 12 on the tongue of the square. The bevel always passes through the tongue at the number 12 no matter what the dimensions of the board may be.

Now move the bevel until it registers the length of the board in feet on the body of the square, the bevel blade still intersecting 12 on the tongue of the square.

Now move the bevel to the number on the tongue of the square which corresponds to the width of the board in inches, but care must be exercised to keep the bevel parallel to its original position. Read the number on the body of the square through which the bevel passes; this number is the board measure for a board of the required length and width, but with a thickness of 1 in. To find any required thickness, this number is multiplied by the thickness of the board in inches, which gives the result.

For example, to find the board measure of a stick 16 ft. long, 7 in. wide, and 1 in. thick, the first thing to do is to set the bevel at 12 on the tongue (the invariable number) and 16 on the blade (the length of stick). Then move the bevel up to 7 on the tongue (the width of stick) and read the number indicated by the bevel on the blade of the square, which is 9 4/12, or 3 ft. 4 in. This result is then multiplied by the thickness of the board in inches. In a board 1 in. thick, 9 ft. 4 in. or 9 1/3 × 1 equals 9 1/3 B.M. With a board 2 in. thick, 9 1/3 × 2 equals 18 2/3, or 18 ft. 8 in. Boards less than 1 in. thick are considered as 1 in. thick in measuring, but certain sizes or grades of fractional inch size sometimes carry a reduced price.

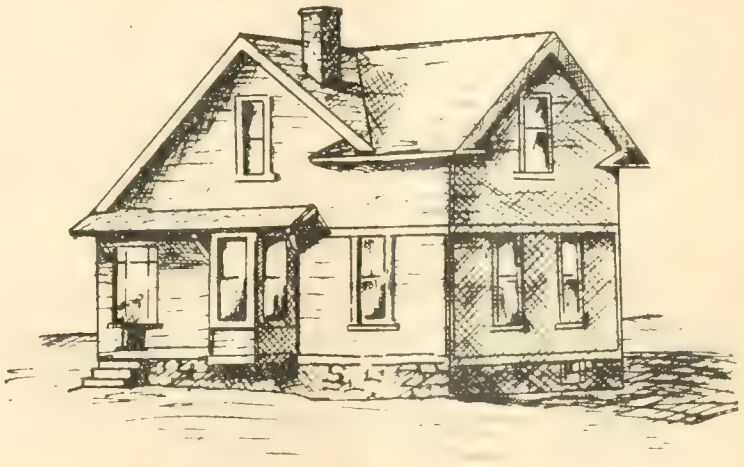
By using mathematics, the same result can be obtained by multiplying the thickness times the width (both in inches) and dividing the result by 12, this answer is then multiplied by the length in feet, which gives the board measure.—Building Age.

Men in High Places

Many a good man has lost his life or been permanently injured because his hat blew off when he was working at some height. You see, he naturally makes a grab for it and may lose his balance.

Rope your hat on if necessary.

Industrial bulletin No. 1-1 issued by Ontario Safety League Royal Bank Building, Toronto



WESTERN CANADA 5-ROOM HOUSE

Design suitable for farm or any rural location

AN ideal home, at a moderate price, is shown herewith. The public are looking for just such houses, and the wise builder follows the pulse of the market when choosing a design of a house which is to be put up for sale.

In the house illustrated, the bay window in the parlor makes a very attractive room.

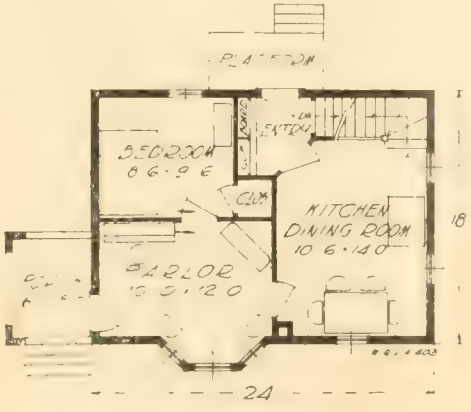
The pantry is combined with the rear entrance making a large kitchen 10 ft. 6 ins. by 14 ft.

On the ground floor is a bedroom, 8 ft. 6 ins. by 9 ft. 6 ins. This arrangement makes this house especially adaptable for a western farm house, where ground floor bedrooms are often desirable. For a town house this design would probably require some changes, which could readily be made.

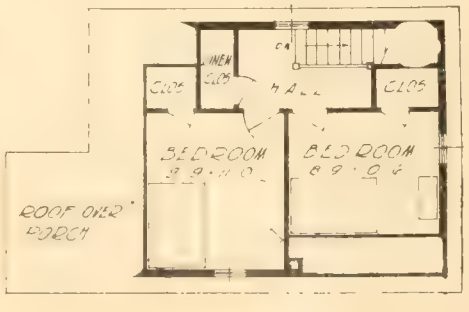
The stairway leads from the dining room to two large bedrooms, each supplied with a commodious closet. There is also a linen closet of large size.

The house has a full basement. The porch on this house is especially convenient for screening in.

The plans are published by courtesy of the Western Retail Lumbermen's Association, Winnipeg.



Ground floor plan



Bedroom floor plan

KEEPING REINFORCING BARS *in* POSITION

By A. M. Wolf, C.E.
in Building Age

A MATTER which is too often slighted in re-inforced concrete structures is the holding of the re-inforcement in the proper position while the concrete is being placed so as to insure a finished structure in accordance with the design. The concrete members are carefully computed with the steel definitely located, but unless the bars occupy that position in the finished structure, the strength of the same will be a doubtful quantity. The labors of the best designer and detailer can be easily set at naught by the carelessness of those in charge of the construction while placing steel and concrete .

Such facts as these must be taken into account by the designer, and provision should be made as far as possible to make the design "fool-proof." It is, of course, impossible to make anything that will pass this "acid test" but many times notes and suggestions regarding construction placed on drawings even though they appear unnecessary, aid the inspector and constructor in obtaining a more nearly correct finished product.

Very often much time is spent in carefully designing and detailing the re-inforcement for a building or other structure, and the all-important matter of getting and keeping the steel in correct position is disposed of by a simple note such as the following: "All re-inforcement to be bent and placed, as shown on plans, and to be securely fastened or tied with wire ties to prevent displacement during the pouring of concrete and to insure proper position of re-inforcement in the finished structure."

In such cases, it is left entirely to the discretion of the construction foreman to devise a means of keeping the bars in position. This, incidentally, adds to the troubles of the inspector who has enough other matters to occupy his time without having the added duty of a continual fight with the contractor about keeping bars in position. The strength of a concrete structure may, therefore, depend almost entirely on the foreman's knowledge or ability, rather than on that of the designer. If the bars are placed too near the surface, the fireproof qualities of the structure are impaired. If placed closer to the neutral axis than assumed in design the strength will be decreased rapidly, since the resistance co-efficient of the member is the quotient obtained by dividing the bending moment by the breadth times the effective depth squared.

In the early days of the use of re-inforced concrete, no special means of holding bars in position were employed. Sometimes an inch or so of concrete was placed, the bars laid on this and the remainder of the concrete poured. Then, again, the upper portions of bent bars were supported on blocks of wood which were removed, or rather intended to be removed, after nearly all the concrete was in place. In many cases these were forgotten and left in the concrete. Another practice which is still current in many districts is to place the re-inforcement directly on the forms and start pouring concrete. After an inch or more is poured the bars are raised an indefinite amount by a common laborer armed with a hooked bar made for this purpose.

Anyone can readily see that all of the above mentioned methods are nothing more than makeshifts and deserve only condemnation. Where such shiftless methods are used, the actual position of the bars is very likely to be much different than that assumed by the designer, and the strength of the structure is more or less of a "gamble."

This is neither good practice nor economy. The method and means of supporting the re-inforcing bars should be clearly indicated on plans, these details being just as important as the proper location of the bends of bars and stirrups. Where bars are bent up into the tops of slabs and beams they can be best supported by cross bars of relatively small size resting on concrete blocks of a height to insure the exact location of bars. Bars in the bottoms of slabs can be kept at the proper height by small Z-shaped metal clips and spacing bars, to which the re-inforcing bars are wired.

Where re-inforced concrete columns with spiral hooping are used it is essential the spiral be held rigidly from end to end so as to have the pitch of same uniform. This is easily done by the use of continuous spacers (of which there are various kinds) attached to the spirals at the time of fabrication. Three such spacers are sufficient for spirals of small core diameter (say up to 24 in. dia.), while for larger columns the spirals should have four spacers. The old practice of wiring the spiral at intervals to two or more of the longitudinal bars requires very rigid inspection to insure a good job, and even then there is great danger of the spirals being spread apart or misplaced while concreting the column. When the spirals are kept in shape by continuous spacers, they can be used as a form to wire the longitudinal bars to at the proper spacing, thereby making the entire column re-inforcement a unit and eliminating the danger of the steel becoming misplaced while the concrete is poured. The entire re-inforcing unit for the column should then be wired to the forms in such a way as to keep the outside covering of concrete as near uniform as possible.

Before a concrete structure can be properly erected, someone must devise a means for holding bars in position during construction, and as a general rule a good designer is more capable of handling these details satisfactorily and to good advantage than anyone else. If such detail work is left to the contractor, the owners, if the contractor is a careful bidder, pay very dearly for this "designing service." In many cases it is very poor; on the other hand, if the contractor is not wide-awake, he pays the bills. This, it can readily be seen, is neither fair nor economical, and is sure to add to the frequent occurrence of "wild" and "unbalanced" bids, especially on large contracts.

If the architect and engineer expect the builders to bid intelligently and desire to have all contractors en-

ter their bids on the same basis, it is imperative that these details be shown on the general plans, when the work is at all complicated or important. The double purpose of keeping the re-inforcing bars in the proper position and the obtaining of more balanced and uniform bids, is at once fulfilled by showing these details for supporting bars on both the general and detail plans. For this reason the practice should be encouraged and be more in evidence than in the past.

For a re-inforced concrete floor the bars should be supported at regular intervals rather than by "hit" or "miss" methods. In the flat slab construction it is highly imperative that bars be kept in the proper position, namely, in the top of slab around column heads in the regions of negative moment and in the bottom of the slab at points between columns where the tension occurs in the bottom of the slab. This can be done for the portion where bars are in top of slab, by using previously moulded concrete blocks, upon which the supporting bars for the re-inforcement in top of slab are laid. Bars in the bottom can be held up from the forms by occasional Z-shaped clips or chains of steel ,the bars being wired to transverse spacing bars.

When such methods are used the architect engineer and owner can rest assured, other conditions being properly attended to, that the strength of a structure is more nearly in accordance with that computed than if the bars are blocked up temporarily on wood blocks which are removed as concreting progresses.

The Strength of Ferro-concrete Structures in Peace and War

Ferro-concrete has been proved to withstand damage to a remarkable extent. One need only refer briefly to its excellent behavior during the earthquakes, during subsidence of foundations, etc. This is due to the monolithic character of the work and its great cohesion. The following example will give a clear idea of the possibilities of ferro-concrete in that respect. In 1909, a monolithic building was erected from Messrs. Mouchel & Partners' designs at Northwich, a district famous for appalling subsidences due to the extraction of brine from the lower strata. The building, box-like fashion, rested on 20 foundation piers, but without connection with them, and it was arranged that the piers should be kept under observation, so that if any showed signs of subsidence packing should be inserted and the building jacked up. In December, 1915, signs of subsidence were detected, and a joint inspection was made by the surveyor of the Northwich Salt Compensation Board and the author, when the almost incredible fact was revealed that out of the 20 piers 12 had subsided and parted with the superstructure, the latter remaining supported on eight piers only. Enormous strains must have developed in the portions of the building thus transformed into big cantilevers, but the report stated that "thorough inspection of the whole building, with special attention to mainbeams, secondary beams and ceilings failed to reveal any trace of weakness or strain." Such is the resiliency, the power of accommodation to new circumstances, of ferro-concrete. Again, in 1907 an 8,000-ton steamer crashed into a ferro-concrete jetty in the river Thames. The engineer, Mr. C. S. Meik, M.Inst.C.E., stated at the time that if the jetty had been a timber one, the steamer must have gone right through it. As it was, the only damage was the destruction of a few piles and about 20 square feet of decking. It must be understood that damage to ferro-concrete work is always of a most localized nature. At the time of the great explosion at Silvertown, in January, 1917, a steel girder weighing nearly one ton was blown up and fell headlong upon a ferro-concrete wharf some 50 yards away. It went through a panel of the decking, but the hole made was hardly more than 1 foot by 2 feet, the adjoining beams not suffering in the slightest; the damage was therefore insignificant and most easily repaired. This localization of damage, which is extremely important in ship construction, is borne out by observation of the effects of shell fire on ferro-concrete. On the western front a ferro-concrete water tower 52 feet high formed for a long time a convenient observation post for the Germans and a prominent target for our guns. When in March, 1917, the Germans proceeded with their so-called "victorious retirement," they took good care to bring down the tower by dynamiting its legs, the tank proper falling from its full height to the ground. But according to written statements, the shells which had struck the tank merely made circular holes through the sides and bottom, and the fall to the ground caused only local cracks. After small repairs the tank could be used either on the ground or jacked up gradually to its original position.

Such local damage as may occur in ferro-concrete ships will be most easily repaired, the hole being blocked up by providing a small timber shuttering and filling the hole with new concrete, after having added if need be, a few strengthening bars. By using a very rich mixture of concrete, the patch will be able to stand the water pressure in a couple of days or even less, and if need be, one may not remove the shuttering before putting to sea again, for further safety. Such a repair may even be carried out under water. Cementing or concreting repairs to quay walls or jetties under water are by no means processes unknown to civil engineers.—Engineering.

Use Clean Re-inforcing Bars

The necessity of understanding the bonding properties of re-inforcing bars or metal of any shape used in connection with concrete are hardly realized by any but the expert.

"Prevent re-inforcing metal from becoming covered with clay, mud, or rust," says the Universal Portland Cement Company in some of its published advice to users, "as such coatings keep the concrete from bonding to the reinforcement and thus partly destroy its value."

This is advice that it is well for the builder to take to heart. He should take it upon himself to see that the bars are laid ready for the concrete only when they are clean.

The annual meeting of the Master Carpenters' Section of the Toronto Builders' Exchange was held on April 18th. Officers were elected as follows: President, W. Clark, Jr.; first vice-president, T. Painter, Jr.; second vice-president, C. B. Jackson; treasurer, J. Brown; representative to Board of Directors, T. Painter. It was decided to increase the scale 5 cents per hour, the maximum not to exceed 60 cents. This section will hold a luncheon on May 2nd.

MAKING *every* BUILDING WALL *a* FIRE-WALL

Closing up the openings when not in use by fire doors, steel shutters, etc., reduces fire risk.

DAMAGE by fire in a building can be greatly reduced by the effective use of fire doors, steel shutters, etc. The National Fire Protective Association believes every manufacturer should take ordinary precautions to prevent the spread of fires. Among the suggestions they make are these:

"Every advantage should be taken of existing walls to make them effective fire stops.

"This can be done by protecting all necessary openings such as doors, windows, shaft holes and so on and closing permanently all unnecessary openings.

"There are standard fire-doors of many kinds designed to conform to all conditions. Fire doors sliding vertically or horizontally, swinging doors, rolling steel doors, are available to meet varying conditions and have been classed as standard after examination and tests by Underwriters Laboratories.

"Wood tin-clad doors are in common use for protecting large openings in important fire-walls. Solid steel doors are also used for this purpose as well as for smaller openings. Sheet-metal and hollow steel doors of various patented forms are also available for openings where lack of space prohibits the use of doors of other types.

"For lighting purposes it may be necessary in some cases to retain a window in an internal wall. Approved fire-windows (wired glass in standard metal frames) are available for this purpose. They offer considerable resistance to fire."

Study Your Property

At a foundrymen's convention sometime ago, Mr. Franklin H. Wentworth, secretary of the National Fire Protective Association made these suggestions:

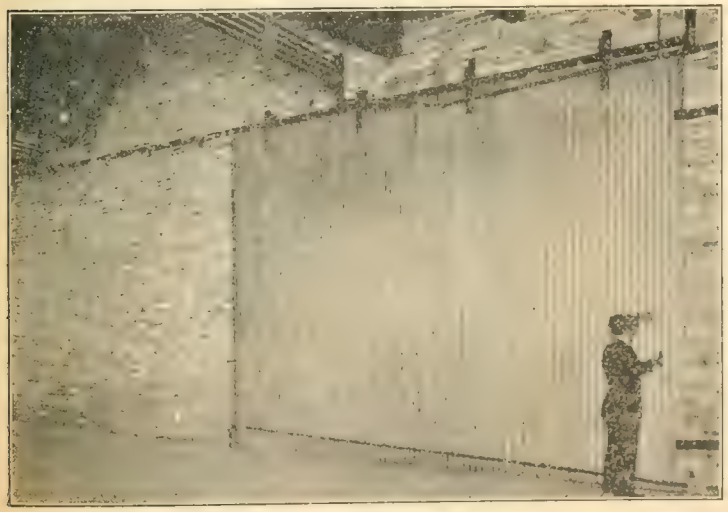
"**Exposure Hazard**—If your premises are surrounded or exposed to property that is inflammable or otherwise hazardous, you are paying for this danger in your insurance rate. Study your location and your exposure hazard and the reasonable means of bettering your own property, such as fireproofing doors and windows and outside walls, extending fire walls above roof, noncombustible roofs, and so on, so as to minimize this physical exposure hazard.

"**Construction**—A large part of your insurance rate is always based on deficiencies in physical construction of your property. Study this (such as unprotected and horizontal openings, too large areas undivided by fire walls, concealed spaces, and so on) and ascertain how they may be reasonably remedied, and how such improvement will reduce your insurance rate.

"**Protection**—The best located and constructed property in the world without adequate fire alarm and extinguisher facilities may suffer from fire either in building or contents, or both. Burning contents often ruin so-called fire-proof buildings. Study the deficiencies of your property in this respect and better them (by installing metal waste and ash cans, fire buckets, chemical extinguishers, automatic sprinkler or standpipe systems, and so on), and you may find the investment highly profitable in the reduced hazard and rate."

In a test by the British Fire Prevention Committee of a hollow steel door, the temperature at a distance of twelve inches from the outside of the door was only 130 degrees Fahrenheit, while the temperature within the test chamber on the inside of the door was 148 degrees Fahrenheit, a condition which existed after one and one-half hours of constantly rising temperature. This shows the small amount of heat radiation in this style of door.

Danger from adjoining properties is considered by insurance companies when writing fire policies. There-



This door covers an opening 18 ft. x 13 ft. 6 in., protected on one side by one door and a pair of doors on the opposite side.

Double vertical sliding counter-balanced elevator door, with opening 5x7

fore, in protecting himself practically every manufacturer may also take extra precautions to guard his plant against any neighboring hazards.

The National Fire Protection Association suggests:

"In congested city districts or in other cases where the neighboring exposure is severe, it is important that the outer wall openings of a building be protected against the entrance of fire from the burning of a neighboring building.

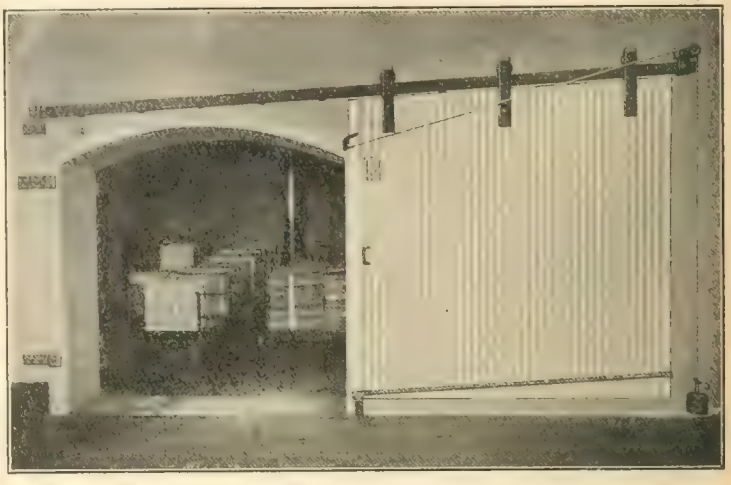
"For this purpose standard tin-clad, solid steel, sheet metal or rolling steel fire shutters should be used.

"For the more moderate exposures, standard fire windows may be used."

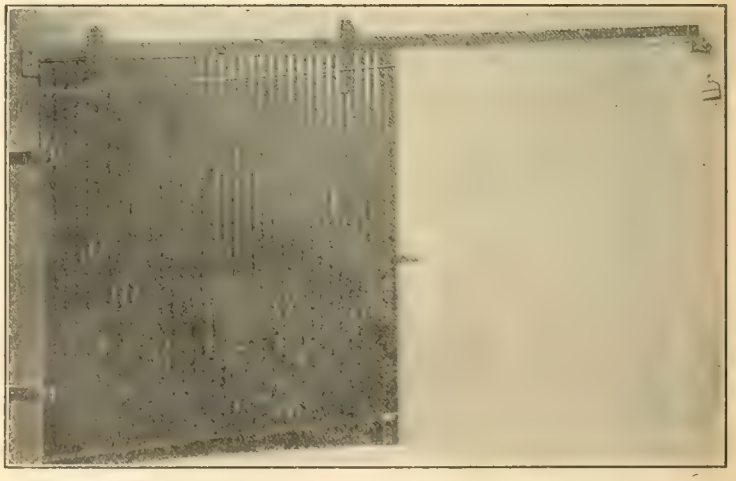
Some Fire Door and Fire Shutter Installations

Accompanying this article are a number of different designs of steel firedoors. They include doors divided vertically and horizontally, vertical sliding elevator doors and right and left sliding fire doors, etc. In addition, fire doors are made single or double swinging, rolling, trolley, sliding, etc. In fact a design may be chosen to suit any installation.

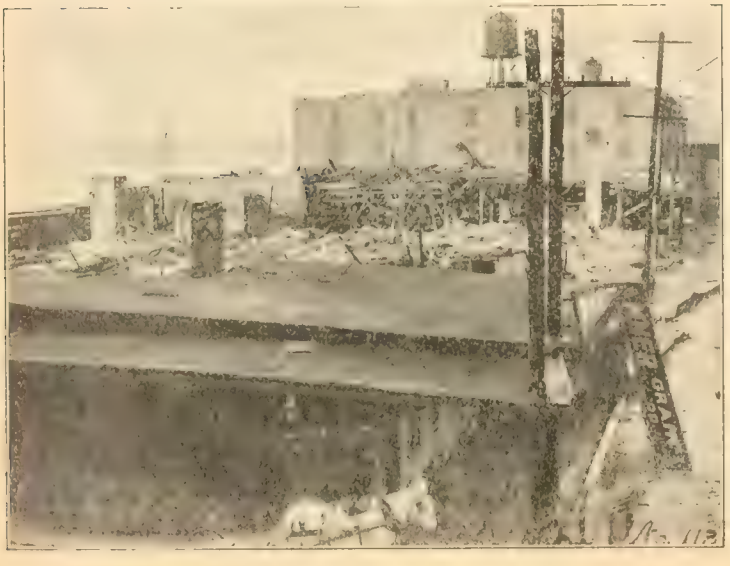
Vertical sliding elevator door.



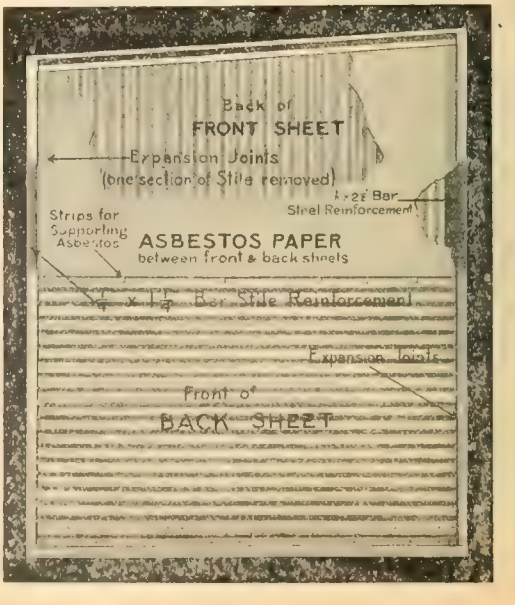
Single gravity sliding right-hand fire door—open.



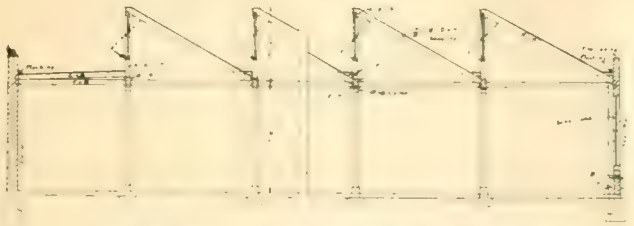
Saino fire door, in plant of the St. Lawrence Pulp and Lumber Co., Chandler, P. Q.



Showing how steel window shutters stood fire test, saving this mill in background



Sectional view of Saino fire door manufactured by the Pedlar People, Limited, Toronto.



Uniform saw tooth roof used on the new buildings.

Putting Miscellaneous Buildings Under One Roof

How such a job was done at No. 1 factory of the Dominion Forge & Stamping Co., Ford, Ont., without interfering with production.

IN many cases the increase in production has necessitated the erection of an immediate addition. By the time this is repeated a few times a manufacturer finds that he has quite an assortment of small buildings arranged around his main plant. This sooner or later brings up a problem which can be solved in only one way.

A number of examples might be cited, showing how Canadian manufacturers have co-ordinated the buildings. A very interesting example of re-modelling a manufacturing plant without stopping or seriously hampering production is that carried out at plant No. 1 of the Dominion Forge & Stamping Co., Ford, Ont., by Wells & Gray Limited, engineers and contractors, Toronto.

The portion of the plant re-modelled consisted of a number of one-storey buildings as shown in the plan, adjoining a four-storey re-inforced concrete building. They were used as machine shop, sheet metal stamping factory, etc.

As seen from the floor plan of the original buildings, the property was irregular in shape, and the small buildings which had been added on from time to time, created dark corners and waste spaces. The roofs were of different construction and also different levels. One of the larger departments had a high lantern roof. The other buildings had flat roofs with occasional skylights.

Brings Departments Under One Roof

More factory space being required, the scheme of taking off the old roofs and tearing out all the cross walls, also squaring up the irregular angle at the southwest corner by rebuilding the walls on the property line, was decided on. The total floor area of the old buildings was twenty-three thousand square feet and that of the new scheme was only two thousand additional. But there were other advantages. The clear floor space in the re-constructed building, not only allowed room for a few additional machines, but also provided room to place the machines from a department in another building which occupied a space of seven thousand five hundred feet, without appearing to be as crowded as they were before. An idea of the advantages may be judged by a glance at the floor plan of the reconstructed building.

Construction Did Not Interfere with Production

Construction work was started on July 1st, 1917, and finally completed August 31st, a period of two months from start to finish. The work had to be done in two operations, one half being torn down and rebuilt at a time, the machinery being moved in to the completed portion over a week end, so that production was not interfered with to any extent.

The type of roof adopted was the style known as saw tooth, shown herewith. This gives excellent lighting, which, coming from overhead, does not limit the width of a building. Thus, therefore, allowing full use of the property.

The construction was of wood, this being decided on, partly on account of the high price of steel and also on account of it allowing more rapidity of construction. A sprinkler system was installed for fire protection. This, with the nature of the business (being all metal products), a proper night watchman system, and the large open area where fire could be discovered at a glance, it is felt that the fire risk is nominal.

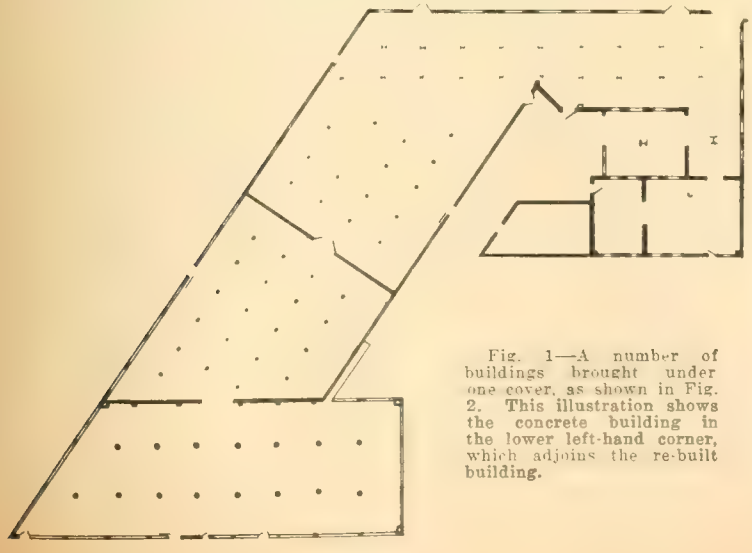


Fig. 1—A number of buildings brought under one cover, as shown in Fig. 2. This illustration shows the concrete building in the lower left-hand corner, which adjoins the re-built building.

Fig. 2—Buildings all under one roof. This adjoins the concrete structure not indicated in this drawi g

Lt. John A. Gibson Makes Supreme Sacrifice

ACCORDING to information received on Thursday April 4, Lieut. John A. Gibson, of the 116th Canadians, died of gunshot wounds in clearing station No. 57, France.

Lieut. Gibson was one of the group of officers who recruited the 126th (Peel) Battalion and went to England with that Battalion. Later he was transferred to the 116th under Col. Sam Sharpe, and had been in service in France since February last. He was gassed and slightly wounded on a former occasion. For some months he had been acting captain, and had been

Lieut. John A. Gibson

taking a special course just prior to the last German offensive.

For several years prior to the war, Lieut. Gibson was a member of the staff of The Commercial Press, Limited, starting in a junior capacity. His earnestness, aggressiveness and keen intelligence, however, had lead to such steady advancement that at the time he left for active service he was one of the advertising managers in connection with the technical papers published by this company.

A man of most serious purpose, "Jack" Gibson always held the love and respect of all his fellow-workers in the company. His death will be learned too, with deep regret by hundreds of advertisers in our papers, as he had the habit of winning the warm regard of the man he did business with.

Lieut. Gibson is the third member of the sales staff of this company who volunteered for service out of a definite sense of duty to his country, and who has given his life for the sake of liberty. Lieut. L. M. Connell was killed early in 1916, and Sergeant R. E. Howson, in August, last year.

To one who has known intimately such splendid young men, the horror of war is made very real indeed. At the same time the sacrifice of such lives lays upon the community the obligation that their deaths shall not be in vain; that such further sacrifices be made as shall ensure the defeat of the war lords of Germany, so as to be a guarantee of the future peace of the world.

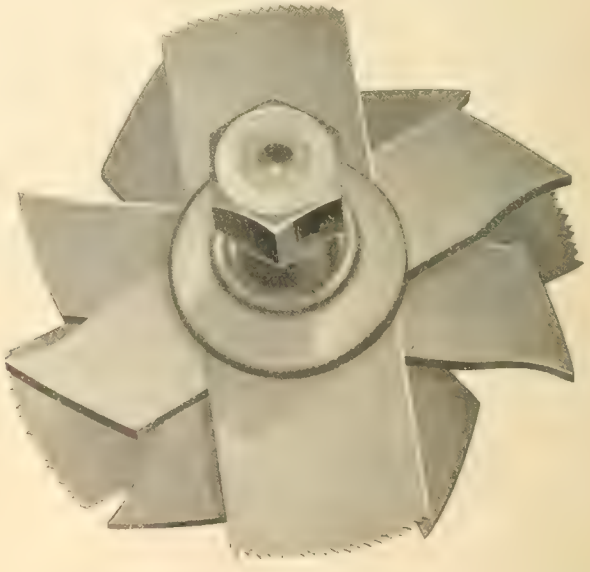
Elliot Woodworker in New Quarters

The Elliot Woodworker Ltd., is now located at 111 Adelaide St. W., Toronto, where factory and offices are all on one floor. The factory is well lighted, and there are better arrangements for manufacturing. The equipment of the building in which they are now located, includes a new power elevator, which is a considerable help in the rapid handling of materials.

The central location will permit visitors to Toronto a chance to inspect the machine without undue loss of time. A woodworker is always in operation for use in the factory and for demonstration purposes.

The Elliot Woodworker Ltd., are now sole manufacturers of woodworkers in Canada, as the Hutchinson Woodworker which was claimed to be an infringement on the Elliot, has been taken over by them.

The Elliot Woodworker will do a wide range of work. It may be used to cross-cut, rip, joint, groove, run moulding, bore, grind tools, house out stair stringers, dado for doors, window frames, shelving, etc. In fact, with all its equipment it is a complete woodworking plant suitable for heavy and light work on a building or in a carpenter or woodworking shop.



For dado work a new dado head has been devised which cuts from 1 1/16 in. to 1 1/4 in. for use with the Elliot woodworker. It can be used on any sized mandrel.

Mr. Elliot has disposed of his United States plant at Detroit, and patent rights for the United States. In future he will devote all his time to Canadian business. The Woodworker was originated by him here, and he will continue to manufacture it here where a large demand has been built up for it. A full line of spare parts and attachments is kept on hand for ready shipment, and all orders for these will receive prompt attention.

On page 8 of the April issue of The Canadian Builder, in the article on the savings of using woodworkers over hand labor, the reference to Fig. 7 should be Fig. 3, the Elliot machine. The tables of performances given were accomplished on this make of woodworker.

VENTILATION FOR CONCRETE BARNS

How dampness troubles are eliminated, etc.

BUILDERS who are considering the erection of concrete dairy barns often hear advanced the objection that concrete buildings are damp and that moisture is found on the inside surfaces of the walls.

This trouble in a concrete (or any masonry) barn is due to lack of ventilation and is not caused by moisture penetrating from the outside. The amount of moisture exhaled by a cow or horse is very large, and when a considerable number of animals are confined in one room, the aggregate amount of moisture is astonishing.

This exhaled moisture, when not removed by a ventilating system, condenses into water when it comes in contact with the cool walls of the barn. Since this condensation is not apparent in a wood barn, the owner is blissfully unaware that ventilation, by the removal of moist foul air, would add materially to the health of his cattle.

Probably the most generally used system of ventilation for barns is that originated by Prof. F. H. King, Madison, Wis. This is well adapted to concrete barns and gives excellent results.

An examination of Figs. 1 and 2 will show the location of these air passages. It will be apparent that the fresh air enters the barn near the level of the ceiling, thus having an opportunity to become warmed before being breathed by the animals. The exhaled moist air laden with CO_2 is conducted out through openings situated near the floor level.

By having the inlet and outlet openings at different levels draughts are avoided and fresh air is distributed uniformly.

It has been found that the amount of air required by animals is as follows: Horses, 70 cu. ft. per min. for each one; cows, 60 cu. ft., and sheep, 15 cu. ft. Air passes through the ducts at a velocity of 300 ft. per min. By using these figures the size of the duct can readily be determined. For example: The barn is to have space for 10 horses and 70 cows:

10×70 cu. ft.$=$ 700 cu. ft. of air
70×60 cu. ft.$=$4,200 cu. ft. of air

Total .....4,900 cu. ft. of air

The total area of inlet air passages$=$

$$\frac{4.900}{300} = 16 \text{ sq. ft.}$$

Hence, there should be provided eight inlet ducts 1 ft. x 12 ft. and the same number and size of outlet passages. A less number of each may be provided by enlarging the size, but it is not best to make them too few, since the distribution of air would not be so nearly uniform.

In concrete barns the ducts may be conveniently located in the walls by using sheet iron flues or chimney flue tile, and casting the concrete around them. The inside of the air passage should be as smooth as possible, in order to prevent the accumulation of dust and to make easy the passage of air.

Another method of constructing these passages is to use stucco on wood or metal lath. In this case the inside is lined with sheet metal, nailed to the upright wooden studs and the stucco applied on the lath nailed to the outside faces of the studs.

For regulating the amount of air, sliding wooden shutters pass over the duct openings. With ventilating systems it is sometimes necessary to supply artificial heat to the barn. This may seem an unnecessary

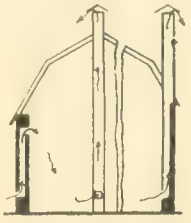


Fig. 1. Two methods of installing ventilating system.

Fig. 2.—How the ventilating system can be used on concrete barn.

expense, but the slight added cost is more than compensated for by the improved health of the animals when supplied with pure air at an even temperature. The heat maintained need not be high—never over 55 degrees F.

Don't Waste Cement—Use Less Mixing Water

Waste is useless consumption. Habits of waste are at all times repugnant to sound, economic welfare. In times of war, economy is forced upon us, but waste is just as vicious in times of peace. It is not good economy or good business to countenance, much less encourage, waste in the use of any product. This applies to cement as well as to any other material. It is not necessary that a product be actually thrown away to be wasted; for example, in the use of cement, if more is used than necessary or the full strength is not developed from what is used, there is waste just as real as though a certain quantity of cement had been thrown away.

In every batch of concrete in which too much water is used a large part of the cement is wasted, for only a portion of it becomes effective to produce strength in the concrete. There is no greater source of waste in the use of cement than through the use of too much mixing water. Less mixing water will make better and stronger concrete, for a larger amount of the cement used will be made effective.

The Master Mason's Section of the Toronto Builders' Exchange held a very enjoyable social evening on April 18th at 6.45, at the Hotel St. Charles. Mr. Geo. Stocker, president, occupied the chair. A program of songs and readings was followed by a helpful discussion of labor, and other problems relative to the building industry. Several applications for membership were received.

Concrete Barns are Rat Proof

Barns built of concrete help to exterminate rats. They cannot gnaw it. Concrete walls, foundations and floors defy rats and have proven the most effective means of starving them out. Farms once overrun with rats have been made rat free by building concrete floors and foundations for the farm buildings. Rats deprived of their hiding places are easily exterminated by poisoning, trapping or killing, but frequently, with the advent of concrete, they leave voluntarily for more promising locations.

Concrete foundations and floors for farm buildings pay big dividends. At least ten cubic feet of concrete can be placed each year for the food wasted by one rat. Placing this ten cubic feet of concrete in a floor 4 inches thick, it will make 30 square feet of floor. Surely many corn cribs contain more than one rat for every 30 square feet of floor space, and in such cases concrete floors and foundations will pay for themselves in less than one year's time. Concrete is not only a good investment, but it will save vast quantities of badly needed food, which in the present emergency is worth more than its mere money equivalent.

Hardening Concrete Quickly

Often in building a structure of concrete it is desirable to shorten the time of hardening.

Tests have shown that this can be done by using a 4% solution by weight of calcium chloride in place of mixing water which will materially accelerate the hardening of concrete, but does not appreciably affect the time of setting.

The time saved varies somewhat with different cements. For example, with one cement where the batch was mixed at the ratio 1:2:4 it was found that the strength increased about 100% in 24 and 48 hours.

The use of this hardening solution increases the cost of concrete from 12 to 15 cents a cubic yard.

In order to get the best results it is important that the concrete be mixed to a quaking or mushy consistency, but it should not be fluid.

In re-enforced concrete work the calcium chloride should be used with great caution, as its presence accelerates any corrosion of the re-enforcement.

"Portland" with a Small "p"

The Portland Cement Association suggests that there is no good reason for writing "portland cement" with a capital "P," since the product is not made in Portland, Me., Portland, Ore., nor Portland, Eng. The Association recommends this practice to members in the following paragraph:

"The emphasis resulting from the capitalization of the letter "P" contributes to the erroneous impression so prevalent that portland cement is all made by a single corporation—hence such frequent expressions as, "Oh, yes! you are with the Portland people," or "What is the address of the Portland Cement Company?" The word "Portland" is properly to be considered as a qualifying adjective used to distinguish a kind of cement, not a brand of cement or a trade-mark. The case is quite similar to that of "macadam roads," where the word "macadam" has become a common adjective, though derived from MacAdam, the name of the man who invented this type of road.

The Decreased Cost of Concrete for Farm Buildings

In sharp contrast with most of the things which farmers have to purchase, concrete is comparatively cheaper to-day than ever, as the tables and chart below will illustrate, and these figures should be convincing in discussing with the farmer why he should build now. Two years ago the receipts from a carload of medium grade steers would have paid for three monolithic silos 14 feet in diameter by 40 feet high. To-day a similar carload will pay for five silos of the same size and leave enough to buy a silage cutter. In 1916, 518 bushels of wheat or 602 bushels of rye had an exchange value which to-day is represented by 295 bushels of wheat or 223 bushels of rye. To-day the 518 bushels of wheat will not only pay for a silo of the dimensions stated but also for a concrete feeding floor 100 by 33 feet, and a large concrete stock watering tank.

The decreased cost of concrete, as expressed in exchange values of farm products, makes the present time a decidedly opportune one to make all-concrete farm improvements.

Market prices of farm commodities at Chicago:

	1916	1918
Steers—per cwt.	$6.50	$14.25
Hogs—per cwt.	9.85	17.35
Wheat—per bu.	1.08	2.20
Corn—per bu.	.72	1.27½
Oats—per bu.	.43	.90
Rye—per bu.	.93	2.91
Barley—per bu.	.69	1.87

Average cost, complete, of a monolithic concrete silo, 15 by 40 feet, in terms of farm commodities:

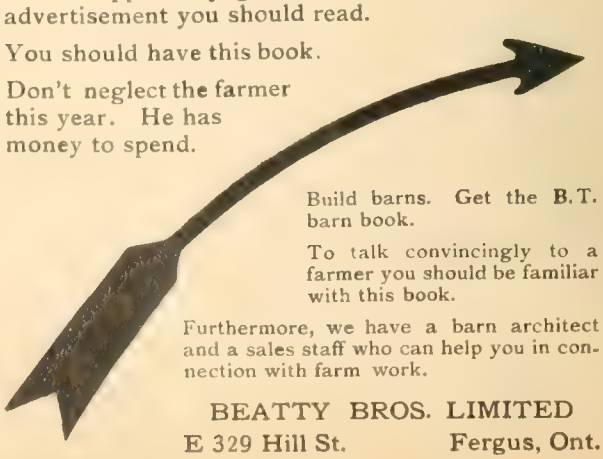
	1916	1918
Steers	8,620 lbs.	4,570 lbs.
Hogs	5,680 lbs.	3,750 lbs.
Wheat	518 bus.	295 bus.
Corn	778 bus.	510 bus.
Oats	1,300 bus.	723 bus.
Rye	602 bus.	223 bus.
Barley	813 bus.	347 bus.

BUILDERS

On the opposite page there is an advertisement you should read.

You should have this book.

Don't neglect the farmer this year. He has money to spend.

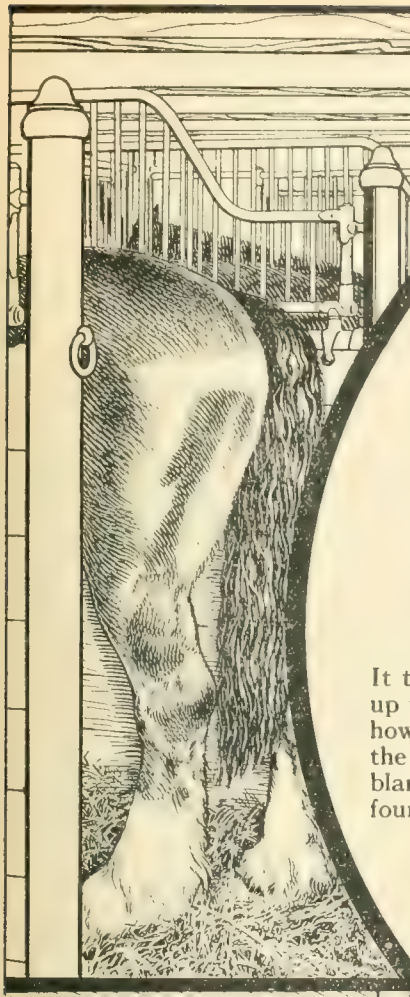


Build barns. Get the B.T. barn book.

To talk convincingly to a farmer you should be familiar with this book.

Furthermore, we have a barn architect and a sales staff who can help you in connection with farm work.

BEATTY BROS. LIMITED
E 329 Hill St. Fergus, Ont.



Steel Horse Stable Fittings Last Forever

Steel Horse Stalls Posts withstand the kicking of the horses. Steel Guards and Steel Mangers are not injured by cribbing. These Steel Horse Stable Fittings last as long as the barn and always look well.

You will be proud of your horse stable if you fix it up with BT Steel Fittings. You will be proud to show it to a neighbor or buyer. Best of all your horses will show up to best advantage. Horses never look well in dark, rickety stalls. In a stable like that above, where lots of sunlight floods through the steel guards and everything is neat as a pin, a buyer will always see your horses at their best.

Send For The New Barn Book

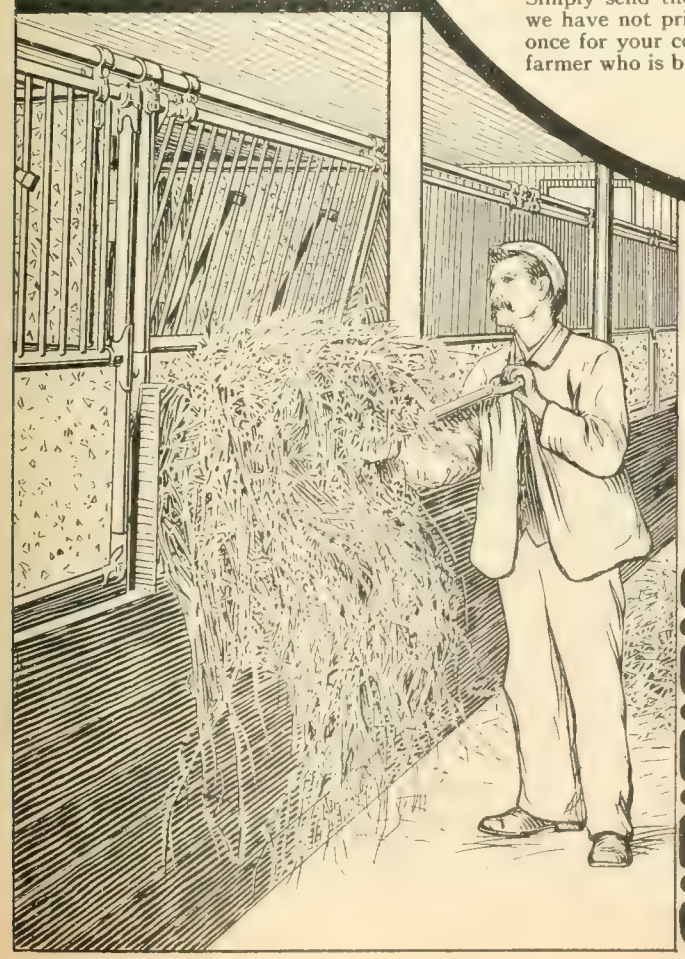
It tells how to fix up your Horse Stable. It shows dozens of photos of Stables fitted up with the Steel Guards, Steel Posts, Steel Columns so you can see for yourself just how well these steel fittings look. It illustrates all sorts of handy arrangements for the Horse Stable, such as steel swinging front, steel ventilators, steel wall troughs, blanket racks, and steel harness pegs. It tells how to build the barn, how to make the foundations, measurements for concrete and how to build the upper structure.

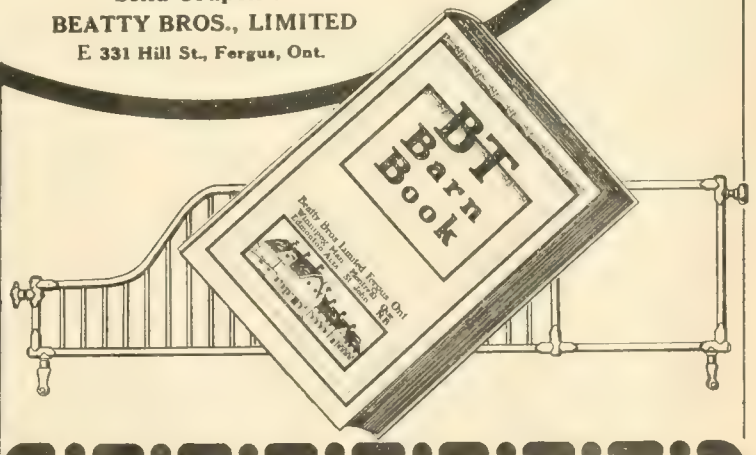
IT IS FREE

This big book—352 pages, illustrated in colours and bound in hard covers and worth $1.00—is free to any man who is building or remodelling his barn. It is free to any man who wants to improve the appearance of his horse stable.

Simply send the coupon. As the cost of printing the book is great, we have not printed a great many, so be sure to send the coupon at once for your copy. We want to place a copy in the hands of every farmer who is building his barn or who wants to improve his old barn.

Send Coupon to
BEATTY BROS., LIMITED
E 331 Hill St., Fergus, Ont.





FREE COUPON

Beatty Bros., Limited **E 331 Hill St., Fergus, Ontario**

Gentlemen: Send me your new 352 page barn book, giving full particulars about Horse Stable Fittings, without charge or obligation. I have filled in the blanks below.

Are you thinking of building a barn . . . . . .
If not are you going to remodel your Horse Stable .....
When will you start .....How many horses do you keep.....
Put an X after the kind of equipment you are interested in.....
Steel Horse Stable Fittings.....) (Manure Carrier.....)
Steel Stalls.....) (Water Bowls.....) (Hay Carrier.....)
Your name.....
P. O. . . . . Province . . . . . .
Township . . . . . Lot . . . . . Concession.....

Price List of Building Materials—Revised to Date

EDITOR'S NOTE—Great care is exercised in obtaining prices for this department. They are as accurate as it is possible for us to make them. We know, however, that because of varying conditions, different dealers' prices are bound to vary somewhat; and our purpose in publishing this department is to give readers an idea of prices, rather than absolutely definite information.

PRICES AT MONTREAL

Hemlock lumber—		
2x4 in. to 2x12 in., 8 to 14 ft.	$40.00	
2x4 in. to 2x12 in., 16 ft.	41.00	
2x4 in. to 2x12 in., 18 ft.	42.00 to	43.00
No. 1 hemlock decking	42.00 to	43.00
No. 2 hemlock dimensions and 1 in.	34.00 to	37.00
Pine—		
1 in. common and better pine 8 to 12 in. wide, rough	50.00 to	70.00
2 in. white pine, mill stock	46.00 to	54.00
7/8 x 8 and 10 in. pine shelving	62.00 to	67.00
7/8 x 12 in. pine shelving	77.00	
No. 1 white pine flooring	50.00 to	55.00
No. 1 spruce flooring	46.00 to	52.00
No. 1 pine decking, D2S	44.00 to	53.00
No. 1 pine V or beaded sheeting	60.00	
No. 2 pine V or beaded sheeting	50.00	
Pine trim for paint finish—		
4 in. casing, per 100 ft.	3.00	
5 in. casing, per 100 ft.	4.00	
8 in. pine base, per 100 ft.	5.50	
10 in. pine base, per 100 ft.	7.50	
4 in. pine window stool, per 100 ft.	3.75	
Shingles, lath, roofing, etc.—		
No. 1 pine lath	6.50	
No. 2 pine lath	6.00	
No. 1 spruce lath	5.50	
XXX B.C. shingles	5.50	
Cedar posts—fence—		
5 in. at small end, per ft.	.05	
7 in. at small end, per ft.	.07	
Hardware—		
Nails, wire, common, base	5.50	
Nails, cut, common, base	5.70	
Sash weights, cast iron, per 100 lbs. (solid)	3.10	
Tarred felt paper, per roll	.75 to	1.25
Building paper, per roll	1.20	
Brick, tile, terra cotta, sewer pipe—		
No. 1 dry pressed red bricks	18.00	
No. 1 dry pressed buff bricks	21.00	
Red stock bricks	15.00 to	18.00
Cement brick, grey	22.00	
Fire brick	60.00	
Sewer pipe, 4 inch, per ft.	.15	
Sewer pipe, 6 inch, per ft.	.22½	
Cement, plaster, stone, etc.—		
Cement (bags extra) car lots, bbl.	3.00	
Sand, for cement or brick work, ton	1.10	
Lime, per ton	15.00	
Hydrated lime	20.00	
Mortar color, bbl.	6.50	
Plaster of paris, bbl	3.15	
Crushed stone, 2 in.	1.40	
Crushed stone, 1 in.	1.65	
Crushed stone, 3/8 in.	1.75	
Hardwall plaster, per ton	17.00	
Gravel, per ton	1.20	
Hair (plaster) per lb.	.15	

PRICES AT TORONTO

Hemlock lumber (sized)—		
2x4 in., to 2x12 in., 12 to 14 ft.	$40.00 to	$41.00
2x4 in., to 2x12 in., 16 ft. and 10 ft.	41.00 to	42.00
2x4 in. to 2x12 in., 18 ft.	42.00 to	43.00
1 in. hemlock, No. 1, 6 in. wide	41.00	
1x8 in. and 1x10 in., 10 ft. to 16 ft.	42.00	
No. 1 hemlock decking	42.00 to	43.00
No. 2 hemlock dimensions and 1 in.	34.00 to	37.00
Pine—		
1 in. common and better pine 8 to 12 in. wide, rough	50.00 to	70.00
2x4 to 2x12, pine common	46.00 to	54.00
7/8x8 and 10 in., pine shelving	67.00 to	72.00
7/8x12 pine shelving	75.00	75.50
White pine flooring	47.00 to	58.00
Spruce flooring	42.00 to	48.00
Pine decking, D2S	44.00 to	56.00
Spruce decking	42.00 to	50.00
No. 1 pine V or beaded sheeting	50.00 to	62.00
No. 2 pine V or beaded sheeting	50.00 to	52.00
No. 1 Common long leaf yellow pine—		
2x4 in. to 2x12 in., 10 to 16 ft.	50.00 to	54.00
2x4 in. to 2x12 in., 18 to 20 ft.	52.00 to	56.00
2x4 in. to 2x12 in., 22 to 24 ft.	54.00 to	60.00
Yellow pine finish—		
4/4 x 6, 8, 10 and 12 B. & B. smoke dried	68.00 to	72.00
5/4 x 6, 8, 10 and 12 B. & B. smoke dried	73.00 to	77.00
6/4 x 6, 8, 10 and 12 B. & B. smoke dried	73.00 to	77.00
8/4 x 6, 8, 10 and 12 B. & B. smoke dried	73.00 to	77.00
4/4 x 6, 8, 10 and 12 B. & B. steam dried	68.00 to	72.00
5/4 x 6, 8, 10 and 12 B. & B. steam dried	73.00 to	77.00
6/4 x 6, 8, 10 and 12 B. & B. steam dried	73.00 to	77.00
8/4 x 6, 8, 10 and 12 B. & B. steam dried	73.00 to	77.00
Pine trim for paint finish—		
4 in. casing, per 100 ft.	2.75 to	3.25
5 in. casing, per 100 ft.	3.25 to	4.75
8 in. pine base, per 100 ft.	4.75 to	6.00
10 in. pine base, per 100 ft.	6.00 to	8.00
4 in. pine window stool, per 100 ft.	4.00 to	4.50
Hardwood trim, flooring, etc.—		
Quotations will be given on request. See editor's note above.		
Shingles, lath, roofing, etc.—		
XXX B. C. cedar shingles, per M.	5.50	
N. B. extras	5.50	
No. 1 pine lath, per M.	7.00	
No. 2 pine lath	6.50	
No. 1 spruce lath	6.00	
Roofing:		
1 ply, per sq.	1.25 to	1.90
2 ply, per sq.	1.50 to	2.50
3 ply, per sq.	1.75 to	3.00
Cedar posts—fence—(8 ft.)		
5 in. at small end, each	.40	
6 in. at small end, each	.40	
7 in. at small end, each	.60	
Hardware—		
Nails, wire, common, cwt.	5.45	
Nails, cut, common	5.80	
Sash weights, cast iron (solid)	3.00	
Sash cord, No. 8 and up, lb.	.70	
Tarred paper, roll	.75 to	1.25
Building paper, plain	1.20	

Glass—(Ontario and Quebec prices.)

United inches	Star	D.D.
Up 25 (per 100 ft box	$16.80	$22.90
26- 34	17.60	24.85
35- 40	18.35	26.40
41- 50	23.50	30.00
51- 60	24.60	30.80
61- 70	26.50	32.70
71- 80	29.70	35.40
81- 84		45.45
85- 90		48.85
91- 94		49.80
95-100		58.55
101-105		65.35
106-110		73.10

Wired glass, per sq. ft.	.16	
Brick, tile, terra cotta, sewer pipe—		
No. 1 dry pressed red bricks, per M.	$18.00 to	$20.00
No. 1 dry pressed buff bricks	18.00 to	20.00
Red stock bricks	14.00 to	16.00
Sand lime bricks	9.00 to	10.50
Grey stock bricks	13.00 to	15.00
Sewer bricks	12.50	
Wire cut brick for foundation work	12.50 to	14.00
Porous terra cotta bricks	12.00 to	15.00
No. 1 enamelled bricks, all colors, standard, from	80.00 to	115.00
Enamelled bricks (shapes)	100.00 to	200.00
Brick salt glazed, carload lots floor and wall, standard, per M.	30.00 to	50.00
Shapes	50.00 to	150.00
Fire brick	75.00 to	85.00
Fire clay, per ton	16.00	
Rough texture brick	20.00 to	35.00
Sewer pipe, 4 inch, per ft.	.15	
Sewer pipe, 6 inch, per ft.	.22½	
Verandah post caps, 16 in. each	1.45	
Verandah post caps, 20 in., each	1.75	
Chimney caps, 1 flue in 1 piece, each	2.00	
Chimney caps, 2 flues in 2 pieces, each	3.50	
Chimney caps 3 flues in 3 pieces, each (Excelsior)	6.00	
Cement, plaster, stone, etc.—		
Cement (bags extra) (5 bbl. lots)	3.35	
Sand, for cement or brick work, per ton	.95 to	1.00
Lime, ton, gray	12.00	
Lime (ton) white	14.00	
Hydrated lime (Canadian), per ton	16.00	
Mortar color:		
Black, cwt.	6.50	
Red, cwt.	2.50	
Plaster of paris	3.25	
Crushed stone, 2 in.	1.55	
Crushed stone, 1 in.	1.70	
Crushed stone, 3/8 in.	1.70	
Hardwall plaster, per ton	14.00	
Sanded	8.00	
Gravel, per ton	1.10 to	1.50
Hair (plaster), per lb.	.15	

WINNIPEG PRICES

Corrected to May 8th, 1918, by the Building Material Dealers Association, of Greater Winnipeg, 305 Scott Block, Winnipeg.

Terms—All goods are payable on delivery of same. Without waiving or modifying this term, accounts may be rendered monthly on the first of each month.

Discount—Unless otherwise specified, the prices noted herein are subject to a discount of 5 per cent., in respect of all goods paid for, on or before the 15th day of the month following the month in which same are delivered, and time is the essence of this provision.

Interest—Interest at 8 per cent. per annum will be charged on the price of all goods from the last day of the month following the month in which same are delivered.

Delivery—All quotations are based on curb delivery only. If carried over 20 feet, there will be a minimum charge of 50c per ton.

Sand, gravel and torpedo sand—

	Per yard
Delivered	$ 2.50
F.O.B. yard	1.60
Carload	1.35

Crushed stone, crushed and screened gravel, 1½ in. to 2 in.—

Delivered	2.80
F.O.B. yard and F.O.B. cars, city	2.40

Crushed stone, crushed and screened gravel, 3/4 in. to 1 in.—

Delivered	3.05
F.O.B. yard and F.O.B. cars, city	2.60

Stone dust—

Delivered	2.75
F.O.B. yard and F.O.B. cars, city	2.35

Roofing gravel—

Delivered in city or F.O.B. cars	3.00

Note—All material quoted above is delivered in 2 yd. loads; for deliverey of less than 2 yd. loads add 50c net extra per load.

Rubble stone—	Per cord
Delivered	$14.20
F.O.B. yard and F.O.B. cars, city	12.95

Lime in bulk—White lime, grey lime, Moosehorn and Bowman lime—

Lime in bags 2c per bush. over bulk price.

	Per bush.
Delivered	$ .45
F.O.B. yard	.42
F.O.B. cars at kiln	.31

*Note—All above delivered prices are for loads containing 40 bushels or more; for less than 40 bushels delivered add 50c net per load.

Lime is sold by measure only.

Lime in barrels (including barrels)—

Diamond and Star Brands.	Per bbl.
Delivered	2.90
F.O.B. yard	2.80
F.O.B. cars city in car lots	2.45
Moosehorn and Bowman Brands—	
Delivered	2.90
F.O.B. yard	2.80
F.O.B. cars, city in car lots	2.45
Kelly Island Brand—	
Delivered	2.35
F.O.B. yard	2.25

Above delivered prices are based on load lots.

Note—A barrel of lime weighs 200 lbs. gross, or about 180 lbs. of lime.

Hydrated lime in paper bags (50 lbs.)—

Bags included in price, but not returnable.

	Per ton
Delivered	$20.50
F.O.B. yard	19.50
F.O.B. cars, city	18.35

Hydrated lime in cotton bags—(100 lbs.), bags included in price.

	Per ton
Delivered	$28.00

F.O.B. yard $26.50
F.O.B. cars, city 25.00
Sacks returnable 30c each.

Portland cement in bags— Per bbl.
Delivered $4.60
F.O.B. yard 4.50
F.O.B. cars, city 4.40
Carloads on track direct on job, $4.00 per barrel.
Note—Four sacks make a barrel, 350 lbs.

Mortar cement in bags— Per bag
Delivered ..... $ .68
F.O.B. yard ..... .66
F.O.B. cars, city ..... .58
Note—1 sack mortar cement weighs 70 lbs. Delivered in ton lots; less than ton lots 50c extra.

Best Bros. Acme and No. 1 Keenes cement in bags— Per bag
Delivered $2.50
F.O.B. yard or cars, city 2.25

Empire Keenes cement in 100 lb. bags—
Delivered $2.25
F.O.B. yard or cars, city 2.10
Note—a sack contains 100 lbs. gross.

Fine Keenes cement in bags— (3 sacks per bbl.) Per bbl.
Delivered $13.10
F.O.B. yard or cars, city 12.25

Superfine Keenes cement in bags— (3 sacks per bbl.)
Delivered 15.50
F.O.B. yard or cars, city 14.70

Gypcement— Per ton
Delivered $17.00
F.O.B. yard 16.00
F.O.B. cars, city 15.00

Hardwall plaster Nos. 1 and 2, wood fibre plaster, ivory finish,, gold dust finish— Per ton
Delivered $21.00
F.O.B. yard 20.00
F.O.B. cars, city 19.00

Empire finish plaster, Peerless prepared finish, Sinite finish plaster (in bags)—
Delivered 25.00
F.O.B. yard 24.00
F.O.B. cars, city 23.00

Plaster of paris and Stucco (in bags)—
Delivered $24.00
F.O.B. yard 23.00
F.O.B. cars, city 22.00
Note—20 sacks make 1 ton gross.
Delivered in ton lots; less than ton lots 50c extra.

Plaster of paris in barrels— (Price includes barrels.) Per bbl.
Hammer Brand, 320 lbs. gross $4.40
Empire and Peerless, 250 lbs. gross 3.70

Plasterers' hair—
Per bale $3.30
Per bush. ..... .90

Mortar color— Per 100 lbs.
Red $5.00
Black 5.50
Buff 5.50
Chocolate 6.50

Drain tile—
3 in. delivered or at yard, each ..... $ .06
4 in. delivered or at yard, each ..... .08
Each tile is one foot long.

Wood lath—
No. 1, delivered, per M. $6.00
No. 2, delivered, per M. 5.25

Gypso fibre— Per M. ft.
¼ in. x 32 x 36—
Delivered $32.25
F.O.B. yard 27.20
F.O.B. cars, city 26.15
5/16 in. x 32 x 36 x 48 and 60—
Delivered 33.00
F.O.B. yard 28.60
F.O.B. cars, city 27.25
⅜ in. x 32 x 36 and 48 and 60—
Delivered 36.30
F.O.B. yard 32.70
F.O.B. cars, city 30.80
½ in. x 32 x 36 and 48 and 60—
Delivered 41.50
F.O.B. yard 37.00
F.O.B. cars, city 35.00
Note—If delivered in more than 2,000 feet lots, $2.00 per M. less.

Plaster blocks— Per 100 sq. ft.
3 in. hollow tile—
Delivered or F.O.B. yard $10.50
F.O.B. cars, city 8.50
4 in. hollow tile—
Delivered or F.O.B. yard 11.50
F.O.B. cars, city 9.50
6 in. hollow tile—
Prices on application—
2 in. furring tile—
Delivered or F.O.B. yard 8.50
F.O.B. cars, city 6.50
2 in. solid tile—
Delivered, or F.O.B. yard 10.50
F.O.B. cars, city 8.50
Terra Cotta tile prices on application.

Fire clay—
Delivered or F.O.B. yard, per 100 lbs. 1.25
Per ton 25.00

Fireclay (Canada)—
Delivered, per M. $70.00
F. O. B. yard 67.50
F. O. B. cars 65.00
In quantities less than 1M, 7½c each.

Fire brick—(American) Per M.
Delivered $90.00
F.O.B. yard 87.50
F.O.B. cars, city 82.50
Less than M. delivered, per 100 ..... 9.50
Special prices on fire blocks and specials on application.
Common clay brick 15.00
Chimney and select brick 16.50
Veneer brick 18.00
Sandlime brick 14.50

WINNIPEG GLASS DEALERS' ASSOCIATION

Prices of window glass sheet boxes.
Effective April 24th, 1918.

United Inches	16 oz. Single or Star	21 oz. or Double Diamond
10 - 25	$13.50	$18.50
26 - 40	14.50	21.00
41 - 50	18.50	23.75
51 - 60	19.50	24.25
61 - 70	20.50	25.75
71 - 80	.....	27.75
81 - 84	.....	34.75
86 - 90	.....	37.00
91 - 94	.....	37.75
96 - 100	.....	44.25
101 - 105	.....	49.00
106 - 110	.....	54.75

100 ft. Cases of one Size of Even Inch Glass

26 oz.		32 oz.	
Up to 100 in...	.47	Up to 100 in...	.60
Over 100 in. ..	.55	Over 100 in. ..	.67

Saskatoon and Swift Current

16 oz. Winnipeg prices plus 80c freight per case.
21 oz. Winnipeg prices plus $1.10 freight per case.

Calgary and Edmonton

16 oz. Winnipeg prices plus $1.05 freight per case.
21 oz. Winnipeg prices plus $1.50 freight per case.

PRICES AT VANCOUVER

Shingles, lath, etc.—
XXX B. C. cedar shingles, per M. $3.00
Lath, per M. ..... $2.50 to 4.00
Brick, tile, terra cotta, sewer pipe—
No. 1 dry pressed red bricks, per M. ..... $33.00 to 45.00
No. 1 dry pressed buff bricks, per M. ..... 40.00 to 45.00
Red stock bricks ..... 14.50 to 16.00
Fire brick ..... 45.00 to 50.00
Fireclay, per ton (car lots) 16.00
Sewer pipe, inch, per ft. ..... .15
6 in., per ft. ..... .25
8 in., per ft. ..... .35
10 in., per ft. ..... .45
12 in., per ft. ..... .55

Cement plaster, stone, etc.—
Cement, Portland (bags extra), per bbl. ..... $ 2.80
Keenes cement, per bbl. (sacks extra) .. 9.00
Lime, per bbl. 8.00
Hydrated lime, per ton 16.00
Alca lime, per ton 16.00
Plaster of paris, per bbl. 4.50
Hardwall plaster, per ton (car lots, bags extra) 16.00

H. W. Johns-Manville Co.'s Branches

The H. W. Johns-Manville Co. have opened a new branch at 1015A St., Tacoma, Wash., where a complete stock of asbestos packings, etc., will be carried. The office at Memphis, Tenn., has been removed to 804-5 Exchange Bldg., Cor. Madison Ave. and 2nd St., Since opening the Tacoma branch, the H. W. Johns-Manville announce that their company "covers the continent."

Builders Offer 3,000 Men for Farm Work

To increase the production of cereals in Canada the Montreal Builders' Exchange proposes that the large supply of idle men, machinery, and capital in the country be devoted to developing Western idle lands, and the Exchange claims that the men and machinery are assured if the Government or moneyed people provide the capital.

The idea is to break up 540,000 acres for a crop next year by the aid of 3,000 men, this number to be forthcoming without taking any from the farmers now needing help.

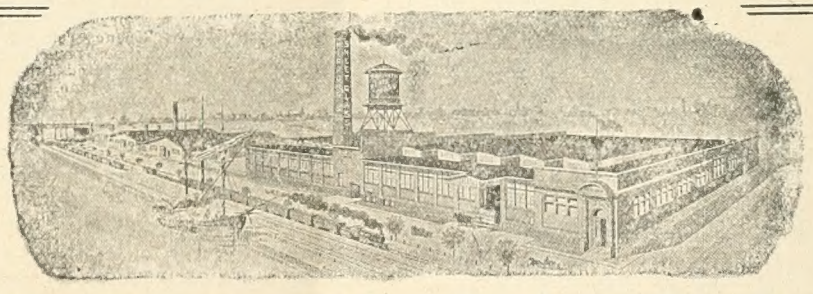
The secretary of the Montreal Builders' Exchange has, on instructions by the Board of Directors, written to the Hon. Mr. Carvell, Federal Minister of Public Works, asking that all tenders for public works undertaken by his department be opened in the presence of the various competing contractors.

The Imperial Oil Co. have started the erection of thirty houses at Regina. C. A. Moore is superintendent.

Beautiful gateway manufactured by the Dennis Wire & Iron Goods Co., Limited, London, Ont.

Index to Advertisers

RED S BRAND WINDOW GLASS



GLASS BENDERS TO THE TRADE

THE TORONTO PLATE GLASS IMPORTING COMPANY, LIMITED

Plate, Window, Figured, Stained, Wired, Bent, Mirror and Ornamental Glass

DON ROADWAY TORONTO

MILTON BRICK

Have you seen our "Milton Rug Brick"? If not, call at our Toronto Office, or write for samples. It's to your interest as well as ours that you see this beautiful range of brick.

Toronto Office: 50 ADELAIDE STREET W.

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THE "PEACE" PATENT IMPROVED

METAL WEATHER STRIP FOR WINDOWS AND DOORS

Is an imperishable fixture, and excludes dust, draughts, wet, and stops the rattling of windows, which slide with perfect freedom. It dispenses with the expense and trouble of storm sashes, which prevent a proper and necessary ventilation, which may be obtained continuously by this uncostly equipment.

Write for illustrated pamphlet or further information to

WILLIAM PEACE CO. LTD.

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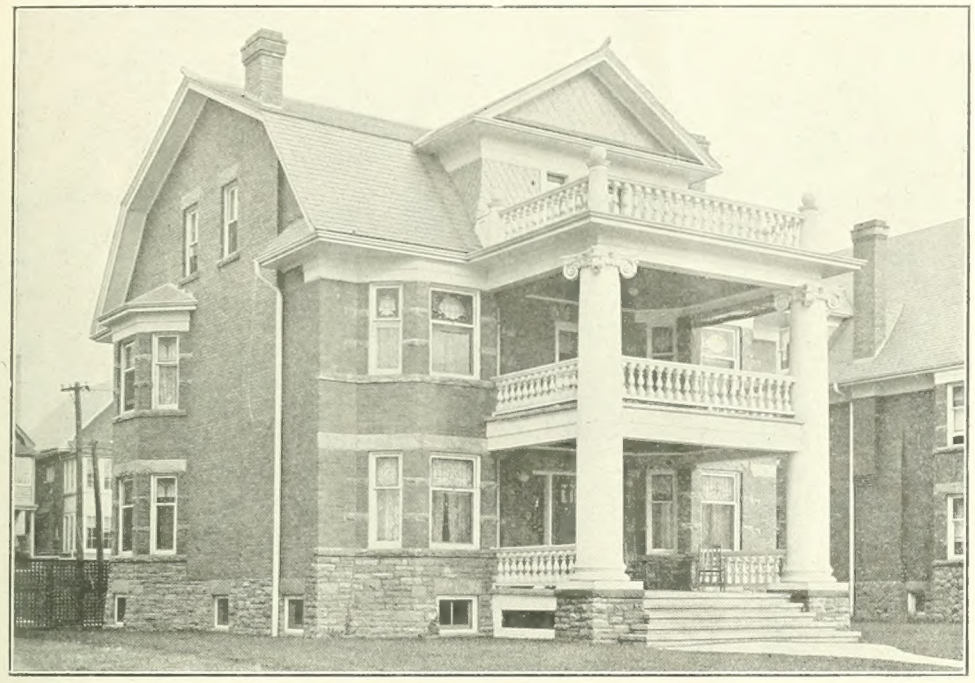
PORT CREDIT BRICK

Send for samples and prices of our brick



For permanency and beauty Port Credit Brick have no rival. They give to the building a dignity, a refinement, yet retain that expression of permanency.

Builders in using Port Credit Brick create a prestige and distinction with their customers.

Port Credit Brick make a buildingimpervious to the elements.

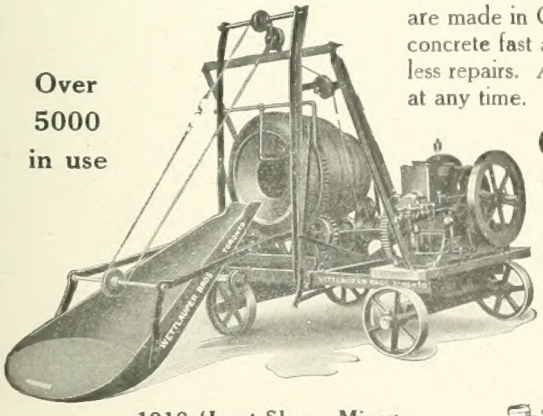
Port Credit Brick Co.

McKinnon Bldg.

TORONTO

OUR FAMOUS HEART-SHAPE MIXERS

Over 5000 in use



1918 Heart-Shape Mixer

are made in Canada by a Canadian firm. Mixes your concrete fast and right. Outwears other mixers with less repairs. A mixer you cannot afford to be without at any time. Al our machines are guaranteed.

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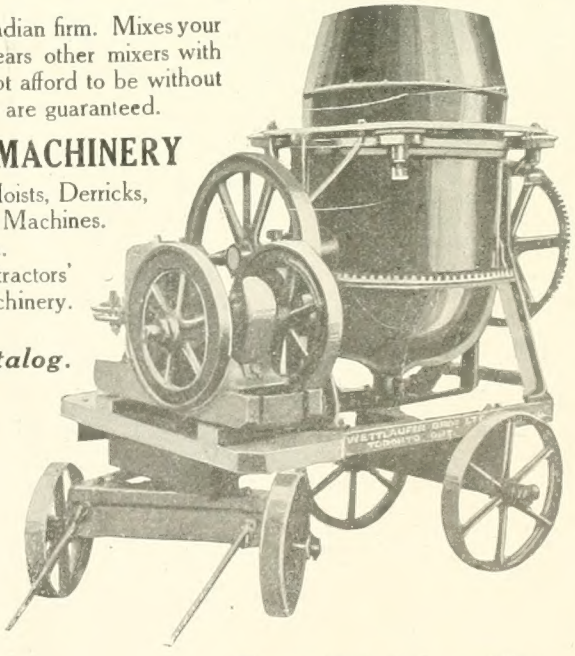
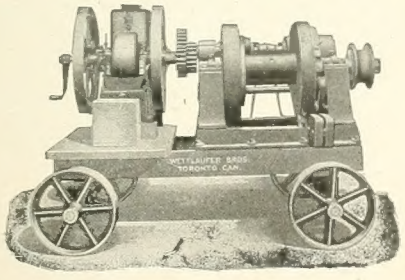
Crushers, Rolls, Hoists, Derricks, Brick, Block, Tile Machines. Cement Tools, etc. Full line of Contractors' and Builders' Machinery.

Write for catalog.



Famous Little O. Power Mixer



Hoist (all sizes and styles)

Hand Mixer

Pays for itself in 7 days

WETTLAUFER BROS., Limited

178 K Spadina Ave TORONTO, ONT.

Made in Canada

Barrett Specification Roofs

Barrett Specification Roof on Hochelaga Power House, Montreal Tramways Co., Montreal. Roofers: McFarlane Douglas Co., Limited, Montreal; Geo. W. Reed & Co., Limited, Montreal; Gen. Contractors, Raymond Construction Co., Limited; Laurin & Leitch, Montreal

No Building is Better than its Roof—

TO demonstrate our confidence in Barrett Specification Roofs we now *guarantee them for twenty years.*

This guarantee means that owners of buildings are exempt from all expense of maintenance or repairs for that period.

This protection is absolute because it is covered by a Surety Bond issued by the U. S. Fidelity & Guaranty Company, one of the largest surety companies in America.

A roofing contractor in order to secure this Surety Bond for the owner must be satisfactory to us and must construct the roof *under the supervision of one of our inspectors.*

This insures good workmanship, the proper amount of waterproofing materials, and will result in a roof that will last *far longer than the guaranteed period.*

We now give this bond on all roofs of fifty squares or over in all towns of 25,000 population and over, and in *smaller places where our Inspection Service is available,* the only provision being that The Barrett Specification dated May 1, 1916, shall be strictly followed.

If you want a roof that will last for twenty years or over, give your architect or roofing contractor a copy of The Barrett Specification dated May 1, 1916, and tell him to lay such a roof and secure for you a 20-Year Surety Bond. Then your building will be covered with the best and most economical roof it is possible to lay.

Further information upon request to nearest office.

A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request.

The Barrett Company
LIMITED

MONTREAL TORONTO WINNIPEG VANCOUVER
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