Vol. 18. Toronto—NOVEMBER 27, 1907—Montreal No. 39

CANADIAN CONTRACT RECORD

A Weekly Journal of Engineering, Public Works, Tenders, Advance Information and Municipal Progress

"TENDERS" AND "FOR SALE" ADVERTISEMENTS PAGE 3

TENDERS AND FOR SALE DEPARTMENT

TENDERS FOR ANNUAL SUPPLIES

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on TUESDAY, DECEMBER 3RD, 1907, for annual supplies for the year ending December 31st, 1908.

Lumber,	Cedar Posts,
Pit Gravel (screened and unscreened),	Rubble Stone,
Sand,	Stone for Street Purposes,
Cement,	Street and House Numbers,
Sewer Pipe,	Hardware, etc.,
Brass and Bronze Castings,	Sewer Brick,
Brass Work for House Services,	Hydrants,
Lead Pipes,	Lubricating Oils,
Stop Valves,	Rubber Valves, etc.,
Special Castings,	Iron Valves and Stop Cock Boxes,
Crushed Stone,	Iron and Steel,
Paving Bricks,	Asphalt.

Envelopes containing tenders must be plainly marked on the outside as to contents

Specifications may be seen and forms of tender obtained at the office of the City Engineer, Toronto.

The usual conditions relating to tendering, as prescribed by city by-law, must be strictly complied with.

The lowest or any tender not necessarily accepted.

E COATSWORTH (Mayor),
Chairman Board of Control.

City Hall, Toronto,
November 7th, 1907.

For Sale

One No.0 Rear Dump Smith Mixer, Steam Power.
One No.1 Ideal Brantford Mixer.
Both in first class condition, suitable for sidewalks or any concrete work. Apply to BOX 117, CONTRACT RECORD Office, Toronto.

FOR SALE

Pair 30" "Victor Turbine" Horizontal Setting,
48" "Victor Turbine," Vertical, with Harness,
54" "Dominion Turbine," same,
44" "Little Giant Turbine," same,
4" and 5" Shafting, Dodge Frictions, Face Coupling, Steel Rim Pulleys,
2 Sets Waterous Belt Tighteners,
All second hand, in good condition, cheap for cash.

Address P. O. Box 207,
St. Catharines, Ont.

Sealed Tenders

Addressed to A. B. Robertson, Reeve, Nithburg P.O., Ont., marked 'Tenders for Debentures," will be received up to 3 O'CLOCK P.M. SATURDAY, DECEMBER 14TH, 1907, forthe purchase of $3,747.42 and $1,355.15 respectively Drainage Debentures payable at the Western Bank of Canada at St Clements, Ont., being fifteen equal annual Debentures of $348.94 and $126.18 each respectively with 4½ per cent interest included, said Debentures become due and payable the 1st day of March and the 6th day of May, 1907 By-laws were passed the 13th day of June and the 6th day of May, 1906 and 1907. The first annual amounts collected in 1907 both By-Laws

Tenders will be opened Monday, December 16th

The lowest or any tender not necessarily accepted.

PETER F. SCHUMNER,
Township Clerk

St Clements,
November 21st, 1907

TENDERS WANTED

Applications will be received up till DECEMBER 1ST., 1907, for the position of Engineer for a system of waterworks in Chesley, also for drilling 5, 6, 7 or 8-inch holes for test wells in the town of Chesley.

WM. McDONALD,
Clerk of Chesley,
Chesley, Ont.

Architectural Draughtsman wishes re engagement. Good at details and designs, accurate at figures and perspectives. BOX 118, CONTRACT RECORD, Toronto.

FOR SALE

1 Merriman Screw Gang Stone Saw 5ft. x 5½ ft. x 10 ft., nearly new.
1 "MYLES" Concrete Block Machine, nearly new, with 250 Wooden Pallettes.
4 No. 2 Pressed Bowl Wheel Scrapers.
1 No. 1 Smith Concrete Mixer on Trucks with Engine and Boiler.

M. BEATTY & SONS, Limited,
Welland, Ontario.

City of Sherbrooke

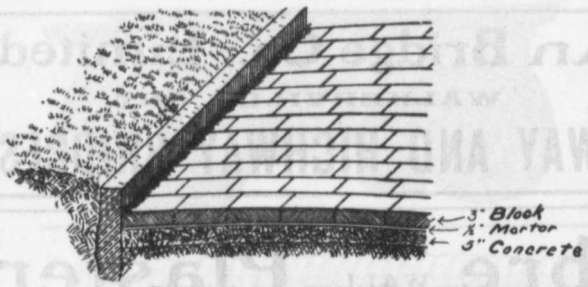
Province of Quebec

Tenders for Pumping Machinery

Tenders will be received by the undersigned up to noon, SATURDAY, DECEMBER, 7TH, for one Waterworks Pump of 2,000,000 gallons (Imp.) to be operated by water power.

Particulars may be obtained from

THOMAS TREMBLAY,
Supt. Waterworks.



A Scientific Pavement

Must Be

Durable and Non-Abrasive.
Non-Absorbent and Nearly Noiseless.
Unaffected by Extremes of Temperature.
Sightly and Sanitary.
Easily Repaired and Easily Cleaned.

These Requirements are Met by

ASPHALT BLOCK PAVEMENTS

SEND FOR DESCRIPTIVE LITERATURE

THE ONTARIO ASPHALT BLOCK CO., LIMITED — WINDSOR, ONT.

J. HARVEY

CONTRACTOR

GREENSVILLE, ONT.

Driller of il, Gas, Salt or Artesian Wells. Deep Wells a Specialty.

20 YEARS' EXPERIENCE IN CANADIAN OIL FIELD

Contracts taken in any part of Canada Several years' experience in Artesian Wells for Municipal Water Works. Estimates or geological information cheerfully furnished.

REFERENCES GIVEN

THE JOHNSON CORRUGATED STEEL BAR

FOR

REINFORCED CONCRETE

Manufactured by

THE CORRUGATED STEEL BAR CO. OF CANADA, LIMITED

Operating under Johnson Patent No. 91650 and by license of Sir Wm. Mather.

Office: Coristine Building, MONTREAL

THE EUREKA CONCRETE MIXER

Feeds automatic. Puts life and ginger into the crew. Nothing to go wrong. Built entirely of steel and iron.

Mixing in plain sight Looks right and goes right.

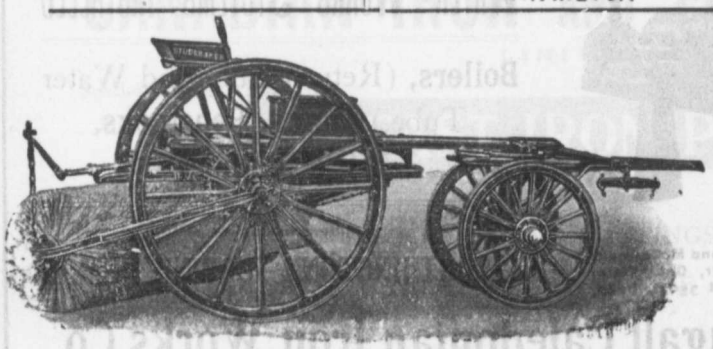
SUITABLE FOR

General Concrete Work, Brick, Block and Tile Pipe Makers.

FOR CATALOGUE AND PRICE WRITE

CLIMAX ROAD MACHINE CO., 37 James South

HAMILTON - CANADA



Stackpole . . . Patent Improved **Street Sweeping Machine** Is the Standard . . . of Perfection

BECAUSE no sweeper so effectually does the work for which it is designed as "The Studebaker." It sweeps clean. No sweeper is constructed with the same degree of care and mechanical precision. It wears well. "The Studebaker" has the smallest number of working parts, and has less gearing than any other sweeper made. It is free from all unnecessary complications. With reasonable care it does not get out of order. Send for complete descriptive catalogue.

Studebaker Sprinkler

(PATENT IMPROVED.)

Does not clog or get out of order. Greatest width of spray. Can be graded from driver's seat to any volume. We also make an . . .

IMPROVED VERTICAL SPRAY

for Pavements

Geo. Heaman, Mfr., London, Ont.

"Frequently Made A Daily Run Of 100 To 110 Yards"

With a

No. 1 SMITH MIXER

Under Trying Conditions.

Read the letter reproduced herewith. It proves our conservative estimate as we list the No. 1 Smith Mixer at 100 yards, preferring to underestimate rather over stimate it's capacity.

THE PROVINCIAL CONSTRUCTION CO.
STRUCTURAL ENGINEERS
TORONTO OFFICE
35 JORDAN STREET

Toronto, November 11th, 1907.

Mussens, Limited,
Montreal, Que.

W. H. C. Mussen,
Dear Sir:-

We are sending in this mail photograph of the warehouse which we are erecting for the Andrew Darling Co. of this city. As you will see, our work is nearing completion, and we wish to say that the plant which you furnished us for this work has proved to be very satisfactory in its operation. We started pouring concrete early in July, and have frequently made a daily run of 100 to 110 yards with the No. 1 Smith Mixer used, which we think is a very good record for this size machine, as it was located in a position which subjected it to most trying conditions.

Yours very truly,
THE PROVINCIAL CONSTRUCTION CO. Limited,
Per Thomas J. Lannen...
President.

Do Not Be Misled,

therefore, in comparing the Smith with other machines, the claims for which are based on what their makers would like them to do, rather than what the machines are actually capable of doing.

Our Claims Are Conservative and Therefore Reliable.

MUSSENS LIMITED

MONTREAL

Branches: QUEBEC, TORONTO, WINNIPEG, VANCOUVER

CANADIAN
CONTRACT RECORD
PUBLISHED EVERY WEDNESDAY
BY
HUGH C. MACLEAN, LIMITED
TORONTO, CANADA.
SUBSCRIPTION PRICE:
Canada and Great Britain, $2.00 per annum, payable in advance.
United States and all foreign countries embraced in the General Postal Union, $3.00.

HEAD OFFICE, Confederation Life Bldg., TORONTO
Telephone Main 2362.
Branch Offices:
MONTREAL Tel. Main 2299 B34 Board of Trade
D. BURNSIDE, Representative.
WINNIPEG Telephone 218 330 Smith Street
ROLAND F. HILL, Representative.
VANCOUVER Telephone 2248 615 Hastings Street
GEORGE A. GALL, Representative.

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

THE LABOR OUTLOOK.

From letters appearing in the public press, and from the increasingly large numbers of unemployed who are to be met with on our streets these days, it is daily becoming more evident that the coming winter will be one of hardship for the workingman.

Since 1905 building operations in Toronto have been steadily increasing until two months ago, when the building permits began to show a falling off. Notwithstanding the fact that Toronto has fallen from seventh to fifteenth place among the cities of the continent with regard to house building, yet those engaged in the building trades have had plenty of work. New operations, however, especially in speculative building, have fallen off considerably on account of the stringency of the money markets in Canada and the United States.

There are other causes which labor men declare have materially affected the various trades, namely, the influx of unrequired immigrants who, they allege, are being dumped into Canada at the rate of a thousand a day, and the laying off of mechanics in almost every city by big corporations for the purpose of curtailing expenses for the winter.

A glance over the table of building permits issued during the past three years reveals the fact that Toronto has had its share of prosperity. But during October the permits were almost half a million short of the corresponding month last year, and $300,000 less than for the same month in 1905. Each month for the current year, beginning in March, when building operations opened up, and then on till August, showed general increases over the corresponding months last year, an increase for ten months of almost $2,000,000.

The following table shows how the building permits issued by the City Architect's Department have increased during the past three years:—

	1905	1906	1907
Jan.	$ 289,488	$ 492,065	$ 782,166
Feb.	305,295	344,775	781,135
March ..	594,025	1,081,397	1,508,530
April	898,196	1,427,930	2,044,870
May	1,104,154	1,502,160	2,457,964
June	1,303,208	1,350,142	1,445,525
July	1,157,298	1,193,435	1,219,435
Aug.	1,417,155	1,271,620	1,207,440
Sept.	887,005	902,803	763,440
Oct.	1,009,005	1,536,595	776,555
Nov.	788,771	1,087,692	.....
Dec.	604,950	969,783	.....
Total.	$10,357,950	$13,164,397	$12,980,730

There is scarcely any speculative building going on at present in Toronto, the great bulk of the permits issued during the past couple of months being for warehouses and commercial buildings.

MEN OUT OF WORK.

It is estimated that between 1,500 and 1,800 men in the building trades are out of employment, which does not include those who are not affiliated with any union. Local labor leaders say that it is a difficult problem to form an accurate idea of the number of men that are idle, but so far as they can ascertain from reports the following table would indicate approximately how each union is affected:—

	Union strength.	Out of work.
Plumbers	650	120
Carpenters, Amalgamated	1,300	160
Carpenters, Brotherhood	700	75
Painters and Decorators	600	10
Plasterers	300	50
Bricklayers	950	350
Builders' laborers	935	210
Plasterers' laborers	220	75
Stonecutters	175	40
Structural iron workers	150	65
Electricians	130	20
Stonemasons	260	120
Total	6,360	1,495

With immigration, the closing of navigation, factories here and there curtailing their number of employes, the influx of farm hands, there is a congestion of labor in the city, known to labor leaders as a floating population. The result is that labor conditions are not so favorable for the men in the building trades. Many buildings, for which permits were issued within the past three months, are not yet completed, and some branches of the building trades hope to work into the latter part of next month.

The unions that are first to feel the effects of a stoppage of building operations are the bricklayers, stonemasons and stonecutters, whose work is almost completed when the carpenters, plasterers, plumbers and electricians take possession of the buildings. The bricklayers, having a membership of almost a thousand, declare that the immigration from England and Scotland has resulted in an over-supply in the trade in Toronto, and consequently many of them have been obliged to seek employment elsewhere. So far as the builders' laborers are concerned, they are in hopes of being able to keep busy for a few weeks yet, though the outlook generally to them is not very promising. The carpenters' locals anticipate a dull season. Many of the members of the Brotherhood organization are leaving the city—this organization being composed chiefly of Canadian and American workmen, who, according to the local business agent, have no trouble in finding employment when they go across to Uncle Sam's domain.

"The registration of the unemployed a few weeks ago, when some 500 names were enrolled, is sufficient evidence that labor will have to face a hard winter," said one of the promoters of the scheme. "Many of these were mechanics who have been out of the city for employment, but were forced to return. The bulk of them are plumbers, machinists and other mechanics who were shipped out here while strikes were on. Some are good workmen, others are of the inferior grade. This scheme was inaugurated in order that the actual conditions existing in the labor market here might be brought before the labor bodies in the old country, as an intimation that Canada is now overstocked with undesirable immigrants and mechanics who are practically useless in this country."

THE COMMERCIAL SITUATION

A TIME FOR WISE PREVISION.

(The Toronto Globe.)

It is becoming increasingly evident that the coming winter will be far from a prosperious one for thousands of men engaged in the building trades and in unskilled outdoor work in Toronto. The great wave of immigration during the past two years carried thousands of people into this community who are ill-prepared for three or four months' idleness, and whose scanty savings will be dissipated almost before the winter is entered upon unless they can be reinforced by occasional employment. Practically the only normal outdoor work during the three winter months is snow-shovelling, and that is but a poor source when thousands of men scramble for it.

It would be wise for both public and private employers of labor who are not tied up by difficulties in financing their projects to so arrange their plants that all practicable outdoor work may be gone on with during the winter. The City Council might very well spend money freely on leveling and filling at the Island. Sand can be moved as readily in winter as in summer, and much soil could be carried across the ice cheaply. At the new Christie street park and in various other park works many unskilled workers could be employed. During the boom years there was a great deal of cellar excavation and reconstruction work carried on in winter. Much work of this nature still remains to be done, and it can probably be done more thoroughly and more cheaply during the slack season than after the rush starts again next spring.

There are also a number of big projects on hand that might be begun during the winter. Among them are the demolition of the building on the new General Hospital site, the construction of the civic switching line into Ashbridge's marsh, the continuation of the sea wall cribwork after the ice forms, and the building of a relief street car track into the Exhibition grounds.

Every dollar that can judiciously be expended should be put into public works this winter. By spring the present financial stringency will be past, and the city will go ahead at the assured gait of the past few years, but we should see to it that spring does not find the spirit of the outdoor worker crushed by the hardships of a winter of unemployment. The Board of Control has no more important duty than to exercise a wise prevision over public works, and set them

THE BANK RATE RAISED.

While the United States treasury is filled to overflowing with gold, the reserve far exceeding the certificates in circulation, the Bank of England has been compelled to raise its rate of discount to prevent Europe being drained to meet American demands. Normally the United States is a gold exporting and not a gold importing country, and its tendency to accumulate the precious metal seems to be one of the results of its high tariff. It is a cardinal article of the faith of professors of political economy that imports are paid for by exports. As, however, the United States makes it very difficult to import manufactured goods gold must accumulate in the country or overseas trade must be reduced in volume. The abundance of gold in its turn raises prices, an evil which unfortunately is not confined to the southern half of the continent. Between the tariff and the trusts, indeed, trade in the United States has been forced into unnatural channels to the immense profit of the plutocracy. The system is one which enables the captains of industry and the masters of finance to take toll of the earnings of the ordinary citizen with a ruthlessness which would make the methods of a mediaeval baron merciful in comparison.

THE CROP MOVING QUESTION.

Very much has been said during the past week or ten days regarding the question of funds for moving the crops. Grain men continue to say that they cannot get all the money they want to handle their grains. The general opinion appears to be that the banks have plenty of funds, but that they wish to keep ample supplies in their vaults fearing that developments in the financial world might cause a "run" on the banks. Last year, and previously, grain brokers could draw for the value of a shipment to the Old Country and secure the cash from the banks here. New York would honor the drafts and furnish the necessary funds. This season, however, large grain merchants claim that they must wait until they get the money from the Old Country for the cargoes.

One would imagine that the bankers know their own business best, and that they were doing only what was wise for the safety of the institutions. It so happens, however, that the bankers' business is also the people's business, and the banks are chartered to accommodate the public. If they have plenty of money in their possession, it is a very critical time to hold it back from those upon whom the marketing of our crops depends. Wheat is good enough security for its value, and especially this year, when it is in great demand. It is the people's money that the banks have, and it is the people that demand its proper distribution, now at the season of the year, when the general business interests of the whole country depend upon the prompt marketing of the products of the soil.

If the banks were to curtail loans on grain after the close of navigation, one should not perhaps think so seriously of it, but when they do so at a time when we have only a few days left to ship grain over the lakes, it is more liable to be reckoned as a hold-up than anything else.

Characteristics of Good Building Stones

By R. D. George in the Journal of Engineering.

Strength.

The strength of a stone is measured by its ability to witstand stresses. A stone in a wall is subjected to strains of various kinds. Of these, the most important are the crushing, the tensile, the transverse and the shearing stresses.

Factors determining the strength of a stone and the permanence of its strength are composition, texture, structure and mode of aggregation.

Composition.—The different minerals of which building stones may be composed vary widely in hardness and resistance to crushing force. For example, quartz is harder and has a higher crushing strength than calcite or feldspar. It is harder, but has a lower crushing strength than hornblende. Again, different minerals have different coefficients of expansion under changes of temperature; and the stresses resulting from differential expansion and contraction are more important in a rock composed of several minerals than a rock composed of only one. Some minerals, such as calcite and feldspar, have a very pronounced cleavage; while others, like quartz, have little or none. Cleavage renders a mineral weaker in certain directions than in others.

The solubility of the materials of a rock is an important factor in the permanency of its strength. This is particularly true in the matter of the cementing material in sandstones and other elastic rocks, where the weakening or removal of the bond between the grains would leave a crumbling mass.

Texture.—Other things being equal, coarse textured rocks are weaker than fine textured rocks of the same composition. There is less interlocking of the component grains, more unoccupied space, and the contact planes between the minerals are distributed in fewer directions.

Structure.—The structural feature of most importance in bulding stone is lamination. Stones are stronger and weather better when laid with their lamination planes in a horizontal position.

The crushing stress to which a stone would be subjected in the basal tier of a very high wall is far within the initial crushing strength of any stone which would be considered fit for building purposes. Almost any stone that will stand quarrying and shipment will have a crushing strength high enough for perfect safety in all ordinary structures. Builders will rarely place a stone where the direct pressure upon it will exceed one-tenth its crushing strength.

Stones in a wall are rarely subjected to direct tensile stress, but their ability to withstand transverse and shearing stresses depends largely upon their tensile strength.

Transverse stress is stress applied at right angles to the length of the block. The cracking of stone and brick walls is usually due to transverse stress resulting from unequal support throughout their length. In the cracking and separating of the two parts of a wall there is usually a component of tensile stress, but it is seldom great.

Transverse stress generally results from the settling of foundations or from the failure of the building to give the stone uniform support from end to end. As shearing is a change in the form of a mass without change of volume, it is evident that the tensile stress is an index of the shearing strength, since no change of form can take place until the cohesion of the component particles of the rock is overcome, or, in other words, until the tensile strength is exceeded.

Durability.

The durability of a stone depends chiefly upon its ability to withstand the climatic conditions to which it is exposed. The principal agencies of disintegration and decay may be divided into two classes:

(a) Mechanical, including: Temperature changes, water, wind, mechanical wear in the place where it is used.

(b) Chemical, including: Water, atmospheric gases, organic acids, etc.

Temperature Changes.—Change of volume in response to change of temperature is one of the most important causes of rock disintegration. It is more effective in crystalline rocks than in non-crystalline rocks of the same composition. The coarser the texture, the greater the strain. Rocks composed of several different minerals suffer more than those containing only one. A granite may contain quartz, feldspar and hornblende. The coefficients of expansion of these minerals are proportional to 36, 17 and 28, and as a result unequal stresses will be set up within the rock whenever expansion or contraction takes place in response to change of temperature. In a rock composed of but one mineral there is but one coefficient of cubical expansion, and the strain is more uniform. The coarser the grain of the rock, the greater the liability to disruption.

The coefficient of lineal expansion of a mineral grain is different in the direction of the different crystal axes. These unequal expansions create similarly unequal stresses in the different directions.

A porous rock will probably suffer less from this force than will a compact one of the same composition, expansion will be accommodated by the intergranular spaces. On the other hand, the area of intergranular contact is less in the porous rock, and consequently the work to be accomplished in separating the grains is less.

Stone is a poor conductor of heat, and under the influence of a midday sun the outer surface may be brought to a high temperature before the opposite side of the block has felt the effect of the sun. This causes a differential expansion which tends to weaken the stone. The north wall, not getting the direct rays of the sun, heats up more slowly and uniformly, and the resulting differential strain is much less. In winter the inside surface of a wall may have a temperature of 70° F., while the outside may be at 30°. In large fires, stone walls may become intensely heated. If water is turned on the hot stone, it splits in layers parallel to the outer surfaces. Under such conditions granite prob-

(Continued on page 22.)

CEMENT AND CONCRETE

[NOTE.--Contributions suitable for publication in this Department are invited from subscribers and readers]

Municipal Concrete Pavements

By GEO. S. HANES, B.Sc., City Engineer, Windsor, Ont.

Concrete pavements have been successfully constructed in Windsor, Ont., and are giving entire satisfaction to the municipality and to the public. They are clean, smooth and entirely sanitary, and they present an appearance similar to sheet asphalt. Both Park and Chatham streets are paved with concrete and together contain about 17,000 square yards of surface. These streets have been open to traffic for some time and are giving entire satisfaction. They are not so dangerous or so slippery as some other high class pavements.

The contract price is 99 cents per square yard, including excavating. This is an exceedingly cheap pavement for one that has so many good qualities. The concrete, of course, will improve with age and should last an indefinite length of time, where the traffic is not excessive. The writer makes this statement because several pieces of concrete work have been observed under conditions of heavy traffic, at alleys and street crossings, and they have shown no signs of wear after eight or ten years. The main object in constructing these pavements is to obtain a medium grade of concrete, not too rich and not too weak.

SPECIFICATIONS TO FIT THE CONDITIONS.

In order to obtain the best results, the writer has followed the practice of varying the specifications in different cases. In the Chatham street work, for example, specifications were as follows:

Foundation, one part by volume of Portland cement; three parts by volume of clean river sand; seven parts by volume of crushed stone, 3 inches to 1-4 inch.

Top layer, one part by volume of Portland cement; two parts by volume of clean river sand; four parts by volume of screened river gravel, 1-4 inch to 1 inch.

The surface was floated with a wooden float and troweled. Expansion was allowed for by making the joints 1 inch wide and filling them with paving pitch. These joints are placed from 40 feet to 80 feet apart. The writer is now having a 1-4 inch strip of wood, 6 inches deep, inserted in the pavement crosswise every 15 feet, and left flush with the surface. This will allow for contraction without cracking. Park street was paved under the same specifications as those for Chatham street.

Church street specifications are as follows:

Bottom layer, composed of concrete, 1:3:7, using stone.

Middle layer, 1:2:4, using gravel, screened.

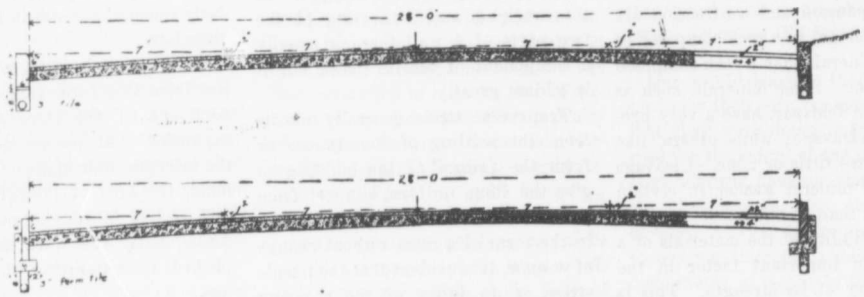
Top layer, 1:2. Surface troweled and floated.

Wyandotte street east:

Bottom layer, 1:2:4.

Top layer, 1:2.

If the mortar or surface is made much richer than 1:2, the tendency would be to make the surface too smooth or slippery.



CROSS SECTION OF PAVEMENT, SHOWING CONSTRUCTION.

CONCRETE GREATLY SUPERIOR TO MACADAM.

The city of Windsor has been constructing macadam pavements with a limestone base for the past seven years, and these pavements have averaged about $1.10 per square yard in cost. The pavements of macadam have been very objectionable to the majority of the citizens, especially in the central portions of the city, where there is considerable traffic and where people are continually crossing the streets.

Park street, Church street and Chatham street are in the central portion of the city and were originally on the schedule for macadam paving. The writer suggested the use of con-

crete to the council. When it was learned that concrete pavements could be constructed at the same price as a 12 inch macadam road, the suggestion was adopted. I believe that these pavements are the first of the kind to be constructed in Canada.

The writer would suggest that in sections of the country where there is clay, or other soil of a soft nature, it would be a splendid experiment to try some concrete roadways, instead of the macadam which is being put down under the good roads system. Concrete pavement would give a good, hard foundation and would be an improvement of a permanent nature. I have seen a concrete city pavement that has been in use for twelve years. It showed no appreciable signs of wear and appeared as if if would last for an indefinite length of time.

MAKING A CEMENT FLOOR

By John Upton in The National Builder.

We sometimes read articles in papers and books which aim to tell how to do cement work; but after reading some of them we are apt to think that we have not learned much about the work, because the writer failed to make clear some important details. It is just these important details which I shall try to explain in these and other articles. I hope I may do this in a way which may be of some help to my readers, as I have had experience in this class of work. I recently worked where we used 50 barrels of cement to make a floor in a barn and stable. The barn drive floor was 34 x 16 and the stable 40 x 60.

It was necessary to make the floor in the barn rather heavier than the stable floors are usually made, since it is to be used for threshing and perhaps for pressing hay. This accounts for the large amount of cement used.

As there are some new and important points to be considered in making such a floor, we will speak of this first. The stable was an addition at the rear of an old barn, and as the ground sloped so that the wooden floor was 2 feet higher than the stable floor could be made, without a large amount of filling in, it was decided to remove the wooden floor and put in one of cement. By doing this the floors were made on the same level.

This is one great advantage the cement floor has over the wooden one. It may be placed as desired, while a wooden floor at the same height would be a continual expense because of the sleepers or joists rotting.

It was necessary to lay a wall under the cross sills of the barn, partly to support them and partly to hold the floor. The capacity of almost any hay barn could be increased by raising it up, laying a wall under it and putting in a cement drive floor after cutting out the sills at the doorways. This old barn had been raised up at some time, as there was quite a steep incline at the front doors. The woodwork being removed and the wall laid, work was commenced on the floor; and right here let me give you a few hints. First, you may be able to figure pretty closely on how much cement will be required for a floor. If you count on a barrel making 55 square feet of stable floor and allow a sack or two extra for the gutters, you will not be far wrong; and even if a barrel more than you figured is required it is no great matter, since one can easily draw a few sacks extra and take them back if not used. Do not try to estimate very closely as to the amount of stone or gravel required. It will be all right to say that a certain amount will be needed, but do not say that it will be sufficient. When stones are pounded and broken after being thrown into a hole, they settle down more than you may think. So have plenty of stone where they may be secured easily if needed.

Remember that if you have underestimated the job so that an extra barrel of cement is required, at least a load of gravel will be needed to mix with it and this last load of gravel may cost more than the barrel of cement in time and money, if you discharge your gravel man too soon.

It is generally a safe rule to draw a little more material than you think you need, and this rule applies well to cement work.

Second, in drawing gravel, it is best to get a fine grade so that about one-quarter of it will pass through a screen having a quarter inch mesh. If you can get good, sharp gravel, such as this, you will not need to get sand, as this fine part will be all right for the top coat. But if good gravel can not be had, or if crushed stone alone is used for aggregate, some good coarse sand should be secured.

In drawing gravel it is not necessary to throw out any stones larger than one's fist. Those the size of a hen's egg are all right, even if there are lots of them. It is not necessary that a large part of the gravel should be fine; if a large amount is coarse it will be all the better. There is two or three times as much grouting in a floor as there is of the top coat, so you need not be afraid of getting too much coarse material, for the fine, unless the gravel is wet when screened.

This being a rule there are exceptions to it. You may wonder what they are; so do I. We are told that in concrete the finer parts of the mixture should fill the voids between the coarser parts, and that we should use one part cement, three of sand and six of gravel or stone, or some similar figures. This can not well be done unless all material is screened.

In practice we find people mixing one bushel of cement with six bushels of the gravel, which does not pass through the seive, unless the gravel appears to be too coarse, then some of the finer or unscreened material is substituted. It is easy enough to see that a certain batch is too coarse, but it is not so easy to always guess just how much material (fine material) should be used to make it right. I am aware that in an ideal mixture, 6 bushels of gravel, 3 of sand, 1 of cement, would make about 6 bushels of concrete, so the proper amount of sand may be present and not be noticeable, but let me remind you that 6 bushels of gravel and 1 bushel of cement would also measure 6 bushels and the absence of a part of the sand would not be noticeable. So I think it is generally best to screen all ma-

(Concluded on Page 26)

CANADIAN PLUMBER HEATING AND LIGHTING ENGINEER

[NOTE.—Contributions suitable for publication in this Department are invited from subscribers and readers.]

Lavatory Installation

The accompanying illustrations show the various means employed in running waste and vent lines to lavatory fixtures located on a number of floors.

As seen, the majority of the illustrations deal with conditions affecting what is known as the half-S trap. The method of venting and running the waste and vent lines of the full S trap is, however, clearly shown in Fig. 1.

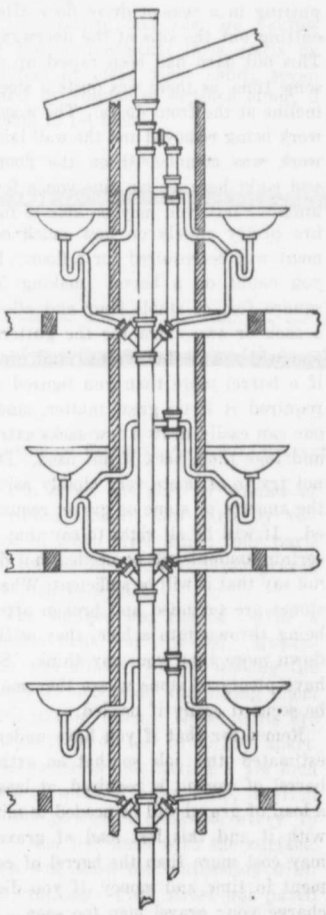
The branch vent from the fixture should have an upward pitch as it leaves the trap, which should be continued until it enters the main vent line, to allow any condensation that may form to drain into the trap. In order to obviate any possibility of waste from the fixture passing off through this vent, in the event of the stoppage of the trap or waste pipe, the vent should be connected into the main vent line at a point above the fixture.

Where the vents of a group of fixtures connect into a main branch vent, it is good practice to run the main branch vent in such a manner that the lowest vent fitting shall be located two or three inches higher than the top of the highest fixture in the group.

The use of lead for vent work is being superseded by iron or brass for branch and individual fixture vents or two inches or less in size, while lead is used in connection with lead traps, with short connections to the iron or brass pipe.

A proper and economical method of connecting fixtures which are located on two floors, on the opposite sides of a partition, is shown in Fig. 2. Separate waste stacks are run to the fixtures on the different floors in this method of installation, the stacks being continued up to serve as vent pipes.

Attention is called to the manner of connecting the traps of the two fixtures on the upper floor. Connection is made into what would ordinarily be the main vent line, which in this instance becomes a waste below the fixtures and a vent above. By this arrangement, what would ordinarily be a waste stack becomes in reality a vent line for the fixtures on the lower floor, which discharge into it. This style of work can only be applied to two floors, since it would be necessary to discharge the fixtures on the third floor into either one of the two vertical stacks. In such an event, the stack employed as waste could not, of course, perform the duties of a vent line.



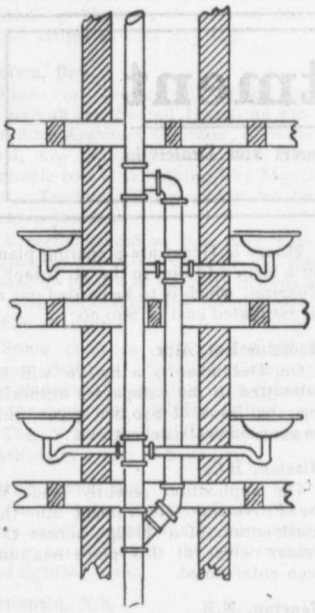
THE LAVATORY, WASTE AND VENT CONNECTIONS, FIG 1.

The provision of a system of vents for the purpose of supplying air to the fixture traps is made necessary in order that the seals of the traps may not be disturbed by siphonic action.

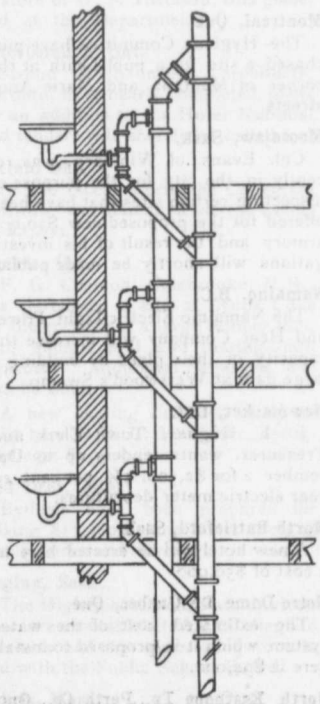
Objections have been raised to the usual system of trap venting with full S-traps from the fact that a large number of vents have been found, at the end of a few years of service, to be nearly stopped up, and it is with the object of remedying this evil that the systems using the half-S trap, as shown in Figs. 2 to 5, have been designed.

When the half-S trap is employed, it is customary to take the vent off the shortest leg of the trap and continue it horizontally to the stack. In work of this kind, stoppages of the vent openings have been found to be inappreciable in comparison with the other method.

Fig. 3 shows a method of running the waste and vent branches from the half-S trap attached to fixtures located on three floors. The method is clearly shown, the outlet of the trap being connected with a waste fitting, which is vented at the top.



THE LAVATORY, WASTE AND VENT CONNECTIONS, FIG. 2.



THE LAVATORY, WASTE AND VENT CONNECTIONS, FIG. 3.

Where the work is concealed, either cast or wrought iron is customarily employed, brass being used on exposed work. In all work of this character the vent is a continuation of the waste line.

Fig. 4 shows the same method employed as in Fig. 3, where double lines of fixtures on the opposite side of a partition are installed. The same waste fitting receives the waste from each of two adjacent fixtures, a branch waste and vent being run from this fitting to the main waste and vent line.

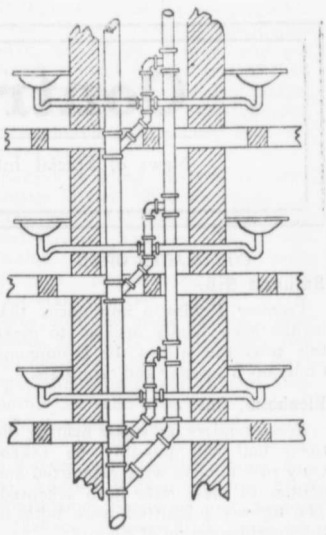
Another method of installation for fixtures located on the opposite side of a partition on three or more fixtures is shown in Fig. 5.

The running of separate stacks to each floor, as shown in Fig. 2, would be too expensive and cumbersome. To obviate this, a soil and vent stack are run which are connected at the intermediate floors, a sanitary cross being used in the connecting branches. The wastes of both fixtures on the first floor are connected directly into the vent stack, which not only simplifies the construction, but cleanses the vent stack of rust scales or any foreign matter that might lodge there. On the top floor the vent stack receives the wastes from both fixtures.

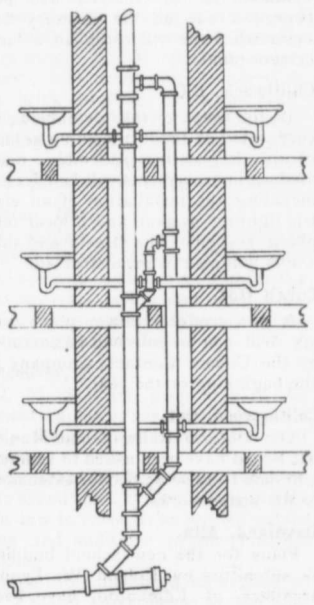
An advantage in the methods of installation, as shown in the accompanying illustrations, lies in the fact that, with the exception of the short lengths of waste pipe from the fixture traps to the wall, all of the waste and vent pipes are concealed in the partition.

In addition, the manner of running the waste pipe from the fixture direct to the wall has the advantage of freeing the floor space beneath the fixture of pipes.—Engineering Review.

A leak in a lead pipe can be stopped while the water is still running, by the following method: Enlarge the opening of the leak and force into it, in the direction from which the water comes, small pieces of dry wheaten bread until the outflow of water is stopped. Then quickly solder a patch over the opening. While this may last for a long time, it is only an emergency repair that should be replaced, as soon as possible, by a plumber's job.



THE LAVATORY, WASTE AND VENT CONNECTIONS, FIG. 4.



THE LAVATORY, WASTE AND VEN CONNECTIONS, FIG. 5.

The building permits issued by the City Architect of Toronto during October totalled $773,555 in value. This was a falling off of $763,040 as compared with the value of the permits issued for the same month in 1906, when the total was $1,536,595.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies.

CONTRACTS OPEN.

Bathurst N.B.

Premier Robinson announces that it has been finally decided to make this town the site of the Drummond Company's smelter and terminals.

Blenheim, Ont.

Fresh tenders for steam heating the town hall will possibly be taken. Only two tenders were submitted and neither of these have been accepted. The figures submitted were both in the neighbourhood of $900.

Calgary, Alta.

It is understood that a prominent manufacturer of Indiana has purchased a site on the Brewery flats upon which he will establish a large cement plant.

Chilliwack, B.C.

In the event of the town being incorporated at the forthcoming session of the Legislative Assembly, many modern improvements will be effected, including the installation of an electric lighting system and a local telephone system. The streets and sidewalks will also be reconstructed.

Cobalt Ont.

A gas producer power plant with six drill compressor will be installed by the Cobalt Contact Company at the beginning of the year.

Collingwood, Ont.

The Ontario Railway and Municipal Board have been asked to sanction a by-law to raise $3,800 for extensions to the water works.

Daysland, Alta.

Plans for the new school building as submitted by Roland W. Lyons, architect, of Edmonton, have been accepted by the local authorities.

Edmonton, Alta.

The newly-formed Grand Theatre Company have purchased the store now occupied by Samuel Nankin, secretary treasurer of the concern, and will entirely remodel the same as an up-to-date theatre building.

Gracefield, Que.

A deputation recently waited upon Hon. Charles Devlin, minister of lands, forests and fisheries for Quebec, with a view to obtaining the construction of a bridge at this place.

Grand Valley, Ont.

A referendum vote will be taken at the forthcoming election concerning the advisability of spending some $15,000 on a water works system.

Guelph, Ont.

The Railways and Manufacturers' Committee have been in communication with a large American pickling company who are anxious to find a suitable site for a Canadian branch factory.

Hamilton, Ont.

The Board of Works have decided to submit to the ratepayers next January a by-law to raise $225,000 for a civic lighting and power plant.

Hintonburg, Ont.

The ratepayers have defeated a by-law to raise $10,000 for extensions to the waterworks and other purposes.

Huntsville, Ont.

It is reported that Bigwin Island has been practically decided upon by the G.T.R. as the site for their new summer hotel.

Kingston, Ont.

Fred Gelinas, Secretary, Department of Public Works, Ottawa, will receive tenders up to December 6th for the construction of Servants' Quarters, at the Royal Military College. Specifications may be seen at office of H. P. Smith, architect, this city, and at the Department.

Plans are being prepared for the erection of a large hotel to cost in the neighborhood of $120,000.

London. Ont.

The City Engineer has been instructed by a special committee of the council to prepare a detailed statement and estimates in connection with the distribution of Niagara power.

A by-law calling for the expenditure of $393,500 for extensions to the waterworks has been given its second reading.

By the narrow vote of six to five the council have ordered a by-law to be prepared to raise $6,000 towards the cost of the consumptives' sanatorium to be erected jointly by the city and Middlesex County.

Moore & Henry are preparing plans for a large addition to the St. Joseph's Hospital, which is to be carried out at an estimated cost of $40,000.

Medicine Hat, Alta.

On December 9 a by-law will be submitted to the ratepayers authorizing the issue of $40,000 5 per cent. 20 year sidewalk debentures.

Mission, B.C.

The application recently made to the Provincial Government for the construction of a bridge across the Fraser river at this place has not been entertained.

Moncton, N.B.

The Board of Trade have passed a resolution recommending a bonus of $15,000 to the Higgins' boot and shoe company, who will likely remove to this city from Yarmouth.

Montreal, Que.

The Hygiene Committee have purchased a site for a public bath at the corner of Mentana and Marie Anne streets.

Moosejaw, Sask.

Col. Evans, of Winnipeg, was recently in the city for the purpose of inspecting certain sites that have been offered for the proposed new $20,000 armory and the result of his investigations will shortly be made public.

Namaino, B.C.

The Namaimo Electric Light, Power and Heat Company will increase the capacity of their plant by building a large dam at Westwood's Swamp.

Newmarket, Ont.

J. E. Hughes, Town Clerk and Treasurer, wants tenders up to December 2 for $2,500, 4½ per cent 20 year electric meter debentures.

North Battleford, Sask.

A new hotel will be erected here at a cost of $50,000.

Notre Dame De Quebec, Que.

The estimated cost of the water system which it is proposed to install here is $94,000.

North Easthope Tp., Perth Co., Ont.

The council have been asked to undertake the dredging of part of the

river Avon, according to a report submitted by Engineer Roger, of Mitchell; estimated cost $15,145.

Ottawa, Ont.

Plans for the rebuilding of the Church of the Sacred Heart, as prepared by Architect Gauthier, of Montreal, are awaiting approval. The probable cost is something like $150,000. Tenders will probably be let early in January.

A recommendation has been submitted to the City Council by the Board of Health in favor of a by-law to raise $25,000 for the erection of a public abattoir.

Some credence is attached to a rumor that A. J. Small & Company are planning the erection of a theatre on the south side of Rideau street.

The Y.M.C.A. will erect a new institute at a cost of $220,000.

Parry Sound, Ont.

The Ontario Railway Board have been asked to confirm a by-law authorizing extensions to the waterworks and lighting plant.

Pennfield, N.B.

Tenders will be received by C. H. LaBillois, Chief Commissioner, Department of Public Works, Fredericton, up to December 9th for rebuilding the Buckman bridge. Specifications at store of W. S. Tustasan, this place, and at the Department.

Peterborough, Ont.

Stroud & Saunders, architects, Toronto, have nearly completed plans for an addition to the Hotel National and tenders will shortly be called for.

Picton, Ont.

In the recent storm the Collegiate Institute was damaged to the extent of $2,000.

Quebec, Que.

F. G. Coarson, Colebrooke, N.H., has purchased a site at Lynds Cove for the erection of a large lumber mill, with shingle mill and rossing mill attached. Additional wharves will also be built.

A new skating rink will likely be built here by M. G. Martineau, estimated cost $14,000.

Red Deer, Alta.

By-laws have been prepared for raising $17,300 for the installation of water works and sewerage systems.

Regina, Sask.

The High School Board are anxious to secure a suitable site for a Collegiate Institute and are negociating to this end with the Public School Board.

Souris, Man.

The municipal authorities are considering a proposition to generate power on the Souris River.

It is reported that a large apartment house will shortly be built here by Barry and Bond. Accommodation will be provided on the top flat for an opera house.

Stratford, Ont.

The proposal to establish a branch factory in this city for the manufacture of ladders and implements, made by Allen Boyle, of Goshen, Ind., has been accepted by the council and building operations have already commenced.

St. Mary's, Ont.

A measure will be voted upon on December 9th to determine whether the town shall loan $6,000 to S. L. Doolittle for the establishment of a handle factory.

Ste. Therese, Que.

C. Jerome, Secretary-Treasurer, invites tenders up to November 30th for water works at this place. Specifications at office of V. H. Dupont, civil engineer, 62 St. James street, Montreal.

St. Vital, Man.

The contract with the Winnipeg Electric Street Railway Company for the construction of a street railway has been cancelled and estimates are to be prepared for a municipal street car system.

Thamesville, Ont.

The ratepayers have defeated the proposition to give a bonus of $7,500 to Davies and Galloway for the establishment of a handle and box factory.

Toronto, Ont.

The Chairman of the Board of Control, Mayor Coatsworth, will receive tenders up to December 3rd, for sewer construction on Bowden street, Lane street, Castle Frank crescent and O'Connell, Hambly, and Fenwick avenues. Specifications at office of City Engineer.

The Ontario Jockey Club will effect considerable improvements at the Woodbine racecourse, including the building of a number of new stables, which will be commenced in the spring.

F. B. Robbins, real estate agent, has disposed of sixty acres of land north of St. Clair avenue, upon which will be erected a large manufacturing plant, also a block of working men's houses.

The Toronto General Hospital have just taken tenders for a 1-storey brick building on Bay street.

H. H. Suydam, real estate agent, reports the sale of a site on Chestnut Park road, upon which a fine residence will shortly be erected; also of several lots on Admiral road for building purposes.

It is possible that the congregation of the North Parkdale Methodist church, at Galley avenue, will put through a deal for the sale of their property to the Alpha Masonic Lodge. In the case of the sale being effected, a new church will be built near the present building.

Recent building permits include: Minister Myler Shoe Company, 4-storey brick warehouse, Simcoe & Pearl streets, $30,000; Thos. McIllwaine, 2 detached 2-storey brick dwellings, Roncesvalles avenue & West Marion street, $6,000; R. B. Storey, 2-storey brick dwelling, Muir avenue, $2,000; G. E. Alexander, pair semi-detached 2½-storey brick dwellings, Admiral crescent, $6,000; Wm. Booth, pair semi-detached 2½-storey brick dwellings, Summerhill avenue, $5,000; A. W. Waters, 2-storey brick dwelling, Vermont avenue, $2,500; Andrew Wilson, 1-storey brick billiard room, Beaumont road, $2,500; E. Jackson, 3-storey brick hotel, corner Bloor street & Brunswick avenue, $20,000; T. J. Sproule, pair semi-detached 2-storey roughcast dwellings, brick fronts, Westmoreland avenue, $3,000; George Huntley, 2-storey and attic brick dwelling, corner Roncesvalles avenue and Marmaduke street, $3,000; John Alexander, 2-storey & attic brick dwelling, Rusholme road, $5,800; James Worts, 2-storey brick dwelling, Avenue road, $14,000; C. Muffitt, pair 2-storey semi-detached brick stores and dwellings, $6,000.

Trenton, Ont.

G. Collins, the manager of the Central Ontario Railway Office asks for tenders up to December 2nd for the grading, track-laying and other work in connection with the Whitney extension of eighteen miles.

Vancouver, B.C.

D. M. Stewart, proprietor of the Pioneer Laundry, has filed plans for a new fire-proof structure to cost $30,000.

The Board of the General Hospital have asked the City Council to prepare a by-law to raise $130,000 for extensions and additions to the hospital building.

A petition has been forwarded to the Federal Government by the Liberal Association asking for improvements to the harbor at an estimated cost of $1,000,000.

Recent building permits include: Prowse & Hudson, alterations, Robson street, $1,200; D. Gibb & Son, seven frame cottages, Homer street, $11,500; C. J. Loewen, frame cottage, Barnard street, $1,200; Skipper & Moir, frame dwelling, Twelth street, $2,000; Joseph Rainey, frame dwelling, Third street, $3,600; P. P.

Findley, frame dwelling, Eleventh street, $2,000; L. B. Wood, frame dwelling, Ninth avenue, $2,500; P. McAllister, addition, Haro street, $1,700; Irad S. Burton, frame dwelling, Fifth avenue, $2,100; E. Shergold, frame dwelling, Sixth street, $1,350; M. D. Campbell, concrete dwelling, Bridge street, $4,500; David McNair, frame tenement, Harris street, $4,000; Morley Forshee, frame cottage, Sixth street, $1,000; P. J. McGovern, frame dwelling, Eighth street, $3,600.

Vaunda, Sask.

A by-law has been passed for raising $15,000 by debentures for the installation of a waterworks system.

Walkerton, Ont.

P. A. Malcolmson, Clerk, Bruce county, invites tenders up to December 11th for $20,000 five per cent 20-year bridge debentures.

Welland, Ont.

A by-law is to be submitted to the ratepayers for the provision of a trunk sewer for the district east of the canal.

A site has been purchased in this town for the erection of a new post office building.

Winnipeg, Man.

A site has been acquired on Heaton street by a Toronto firm for a large biscuit factory, the building of which they will commence early next season.

Woodstock, Ont.

At the January elections the ratepayers will vote on a by-law for the expenditure of $27,000 upon a distributing plant for Niagara power, and to provide a new motor and electric pump.

Wolsely, Sask.

J. A. Hill, Secretary-Treasurer, wants tenders for $18,000 five per cent 20 year town debentures.

CONTRACTS AWARDED.

Calgary, Ont.

William Head and Company, of this city, have obtained the contract for heating the new high school at $9,370.

Toronto, Ont.

Simpson & Young, architects, 17 Toronto street, have let a contract for the re-building of 145 Church street, recently damaged by fire, to Cairns & Firth at about $5,000; and to the same firm a contract for alterations and additions to the Toronto Hat Factory at about $6,000.

The successful tenderer for the proposed alterations to the General Post Office was George Henry, of this city, at $20,00.

Vancouver, B.C.

Ironside, Rannie & Campbell have secured the contract from the B.C.E.R. for the double-tracking of the Granville street bridge.

FIRES

Factory building of A. R. Ives & Co., William street, Montreal, loss $50,000.

Livery stables of H. McKay, Brandon, Man., loss $5,000.

Buildings of H. O. Janzen, Berlin, Ont., loss $4,000.

Factory of the Seaman Kent Company, Meaford, Ont., totally destroyed, loss not stated.

Building and machinery of Lyman Bros. & Company, Toronto, loss including stock, $6,000.

Property of Rat Portage Lumber Company, Frost and Wood, Dyson Pickle Factory, and Merrick-Anderson Company, loss, including stock, $144,000.

Factory of Burrow, Stewart and Milne, Hamilton, Ont., building loss $5,000.

Buildings and plant of F.B. Mahler, Ridgetown, Ont., loss $8,000.

Wharf and sheds of Manchester Shipping Line, Montreal, Que., loss $2,000.

Buildings of Convent school, Belleville, Ont., total loss $25,000.

Box factory of the Beck Manufacturing Company, Toronto, Ont., loss $5,000.

Cheese and butter factory at Kohler, Ont., owned by A. E. Breunen, of Brandon, Man., loss $1,500.

NEW COMPANIES.

Canada Webbing Company, Limited, Toronto, Ont., incorporated capital $100,000. Incorporators, F. H. Lytle, R. W. Hart, O. H. King, O.F. Page, all of Toronto, and others.

Harwich Oil and Gas Company, Limited, Chatham, Ont., incorporated capital $100,000. Incorporators G.W. Bowie, A. E. Campbell, D. McCallum, G. W. Weiss, H. G. Scriber, all of Detroit, Mich., and others.

Sussex Packing Company, Limited, Sussex, N.B., incorporated, capital $150,000. Incorporators, S.H. White, A. J. Mathews, George W. Hoegg, W.J. Mills and Howard Robinson, all of Sussex.

Crown Lithographing Company, Limited, Ottawa, Ont., incorporated, capital $100,000. Incorporators, H. E. Holland, T.R. Slee, A.W. Walker, Lewis Stone, all of Ottawa, Ont., and H. J. Cloran, of Montreal, Que.

Fort William Car Company, Limited, Fort William, Ont., incorporated, capital $1,500,000. Incorporators, H. E. Borradaile, J. H. Redpath, J. A. MacKay, F. H. Lewis and Wilfred Bovey, all of Montreal.

A. F. MacLaren Cheese Cutting Machine Company, Limited, Ottawa, Ont., incorporated, capital $60,000. Incorporators, W. H. Scott, G. W. Hunt, both of Ottawa, and others.

Daisy Mining Company, Limited, Ottawa, Ont., incorporated, capital $20,000. Incorporators, J. B. Lewis, Victor Rogers, J. MacCraken, F. J. Merrick, all of Ottawa, Ont., and P. B. Winning, of Plantagenet, Ont.

BUSINESS NOTES.

That the tightness of the money market could be considerably eased for municipalities by their arranging popular loans, subscribed entirely by citizens, is the opinion of Alderman Stevely, of London, Ont., and it is more than likely that the Forest City will adopt this novel means of bridging over their financial difficulties. A motion to empower a committee to consult with the city solicitor concerning such a loan was carried unanimously.

Paul Martin, lumber manufacturer, of Bonfield, Ont., is reported to have assigned to J. H. McCurry, of North Bay.

Further assignments reported are The Stark Telephone, Light and Power System, Limited, Toronto, T. H. DeCew & Son, lumber manufacturers, Bruce Mines, Ont., and Joseph Decarie & Son, brick manufacturers, Montreal, Que.

Toussaint, Glibert & Paye, sewer contractors, Montreal, Que., have registered.

J. B. McManus, Limited, the New Brunswick contractors, who had the contract for double-tracking the Intercolonial line from Painsec to Moncton, and whose failure was recently reported, have made their creditors an offer of forty cents on the dollar, which it is probable that they will accept. The liquidators have fixed the firm's liabilities at $143,000 and their assets at $68,000.

The assets of the Canadian Boiler & Radiator Company, Limited, Hastings, Ont., are advertised to be sold by tender.

Dinelle & Company, roofers, of Montreal, and Lacroix & Bouthilier, painters, same city, have dissolved.

A charter has been obtained by the Lumsden & Last Mountain Valley Telephone Company, Lumsden, Sask.

BUILDING NEWS.

The Montreal Fire Committee at a recent meeting discussed the draft of a by-law authorizing the inspection of buildings with a view to preventing fires. The by-law will permit officers of the fire brigade to make a general inspection of buildings, and to note what should be done to lessen the danger from fire. Cellars and basements will be visited, as well as the main floors and attics of warehouses, and a record kept of the same. The attention of proprietors will be drawn to what should be done for greater fire security, and after a certain time another visit will be made to see if the orders have been complied with. The by-law will be sent to the City Council.

Owing to the splendid natural location of L'Etang, N.B., the C.P.R. are said to be seriously considering this place for an Atlantic terminal. L'Etang is situated about fifty miles west of St. John and has a fine harbor. Impression is lent to the report by the recent purchase of the New Brunswick Railway, which runs within six miles of L'Etang.

The Royal Commission, which for several weeks has been conducting an exhaustive investigation into the works of the Phoenix Bridge Company, in connection with the Quebec disaster, have issued a report in which the cause of the catastrophe is attributed to an engineering miscalculation, proper provision not having been made for the support of the extra span. The fall of the bridge is laid directly to the change in the unit stresses. In ordinary railroad bridges, the "unit stress" is usually 12,000 or 15,000 pounds per square inch. In the Cooper specifications for the Quebec bridge, the "unit stress" is shown to have been 24,000 pounds per square inch. When estimating the stress upon any bar or chord or other member in a bridge, the cross section of the piece is taken and the total stress divided by the number of square inches. The result is the "unit stress." In an ideal bridge, the load is supposed to be evenly divided over the entire structure. For example, when a train crosses every part of the bridge, every important piece of metal bears its share of the strain. The "unit stress" is therefore constant all over the bridge, and expresses itself both in compression strains and in tensile strains.

Application is being made for the incorporation of the Alberta North Western Railway Company to construct and operate lines in Alberta, Saskatchewan and British Columbia; also for the incorporation of the Ontario and Michigan Power Company to develop power on the Nepigon, Black Sturgeon and Pigeon Rivers.

The Church of the Sacred Heart, Ottawa, which was destroyed by fire last June, is to be replaced by an imposing edifice of Roman architecture and fireproof construction at a cost approaching $150,000. Architect Gauthier, of Montreal, prepared the plans, which have been sent to Rome for the approval of the heads of the order. Contracts will be let as soon as this formal approval is obtained, so that building operations may commence early in the spring.

While an increase of $1,877,712 is recorded in the civic building department of Toronto from January to October of the current year as compared with the same period of last year, the building permits issued dnring October, 1907, totalled only $776,555, whereas the figures reached in October, 1906, were $1,536,595. From January to October, 1907, there were issued in the "Queen City" 243 permits in excess of the total for the first ten months of 1906.

The Canadian Northern Railway have applied for Parliamentary sanction to increase their capital stock by $19,250,000, also for authority to carry out extensive construction plans in the west.

The contract was signed by Mayor Scott at Ottawa last week for the construction of the new Grand Trunk station and hotel in that city.

Edison's scheme for building concrete houses within twelve hours at a cost of $1,000 to $1,200 has attracted the attention of Henry Phipps, a wealthy steel manufacturer of New York city, who will likely co-operate with the inventor and form a company for the erection of these dwellings.

In order to increase their water supply, the municipal authorities of Campbelltown, N.B., have purchased a lake surrounded by sixty acres of land. It is estimated that this will augment the reserve supply by two billion gallons. A large concrete reservoir was built last year, and now, with the present additions, the town has one of the best water systems in the province. Campbelltown can also boast of an up-to-date sewer system and the best and most economical lighting system in New Brunswick.

A sum of $68,000 has been expended at Fort William, Ont., in the purchase of 115 acres of land, which will be applied to free sites for factories.

The new $50,000 Collegiate Institute at Picton, Ont., was badly damaged by hurricane last week. The pediment was blown down, crashing through the two main stories of the building and wrecking it to the extent of $2,000.

A new cement bridge has been constructed at St. Thomas, Ont., which will be called the "King's Bridge" in honor of King Edward. The local authorities have decided to draft a resolution expressing their appreciation of the work of Engineer Bell who designed the structure.

The building of the new $70,000 Y.M.C.A. institute at St. John, N.B., will entail the demolition of an historic old building, the Chipman house, which was the scene, nearly half a century ago, of lavish entertainments in honor of the present King Edward, then Prince of Wales.

Winnipeg seems to be particularly unfortunate of late in the matter of fires. Hardly has the city had time to recover from the conflagation of the Winnipeg Paint & Glass Company when another great blaze has occured at the Rat Portage Lumber Company's factory, on Higgins Avenue, where the ravages of the flames brought about a loss of $144,000. The origin of the disaster has not yet been discovered. While some people are inclined to attribute it to incendiarism others more charitably assign the cause to sparks from a C.P.R. locomotive. The buildings destroyed and damaged were: The Rat Portage Lumber company's factory, wholly destroyed, $82,000 worth of stock; the Frost & Wood warehouse, wholly destroyed, valued at $1,000; the Dyson pickle factory, damaged by smoke, fire and water to the extent of $3,000; the Merrick-Anderson track warehouse, damaged to the extent of $5,000 on building and $25,000 on stock. Other minor losses amounted to $2,000. The insurance on the burned properties is estimated as follows: Rat Portage company, $115,00, Frost & Wood, $1,000, Merrick - Anderson, $20,000, total $136,000.

Building permits issued in Montreal last month aggregated $1,091,-344.

At Moosejaw, Sask., an addition which was being made to the civic power house suddenly collapsed, bringing instant death to a workman named Nethercott and causing serious injury to Contractor Lawrence, who had the work in hand, and to a carpenter named Fenwick.

The Avenue road Presbyterians, Toronto, have just completed the erection of a fine new church at a cost of $50,000. It is built of Kingston limestone and is of Gothic architecture. A feature of the construction is the roof, which is entirely of steel bridge work resting upon the walls as its only support. The architects were Symons & Rae, of Toronto.

CHARACTERISTICS OF GOOD BUILDING STONE.

(Continued from page 13.)

ably suffers most and sandstone least of the common building stones. Limestones, dolomitic limstones and marbles suffer comparatively little to a temperature of 900° to 1,000° F., providing they are not suddenly cooled. Above this temperature they are likely to be changed to quicklime, and slacked when exposed to moisture. The behavior of sandstones under similar tests is usually good, though sudden cooling with water seems to cause a greater degree of disintegration than in the case of limestones.

Water.—As an abrading agent, water has very little effect upon the stones in the walls of buildings. But water within the stone may be the most powerful agent of mechanical disintegration to which building stone is exposed. This water, apart from changes of temperature involving freezing, is quite unimportant as an agent of mechanical disintegration. But in freezing, water expands about 9%—100 volumes of water forming 109 volumes of ice. The force of this expansion is equal to a pressure of about one ton per square inch, and as it acts between the grains of the rock, its effect is to break the bonds holding them together and so cause crumbling. It is a severe test of the tensile strength of a rock.

But the destructive effects of freezing are not proportional to the amount of water a stone can absorb and retain. Much depends upon the character of the pores or openings containing the water, and upon the degree of saturation of the stone at the time of freezing. While rocks with very small pores retain the absorbed water longer, they take it up much more slowly and are less likely to become saturated with storm waters than are those with larger pores. All things considered, it is well to avoid stones having a high absorption ratio, and especially if they are of fine texture.

Certain rocks contain measurable quantities of readily soluble salts. In others, such salts are formed by chemical reactions between some of the constitutents of the stone and those of the atmospher. Under ordinary atmospheric conditions these salts are crystallized, dissolved, and recrystallized within the stone, and the mechanical strain accompanying the process loosens and separates the grains of the rock. This is a very important consideration in connection with the laying of foundations in alkali-rich soil. The ground water carries the salts into the stone and, when the water evaporates, they crystallize with expansion, developing a force similar to that exerted by water freezing.

Many minerals, when exposed to the action of water, become more or less hydrated. As a rule, this change involves change of volume, and as each mineral has its own ratio of expansion from hydration, and as some minerals are more likely to become hydrated than others, it is plain that the process of hydration will cause unequal stresses. The mechanical effect is similar to that of expansion from rise of temperature, but there is not the alternate expansion and contraction which accompanies temperature changes. The upper walls of a building are not likely to suffer appreciably from hydration, but the stones of the foundation may be saturated for long periods of time, and, as a result, become partially hydrated.

Mechanical Wear in Doors, Steps, etc.—Of the commoner building stones, granite and quartzite are most resistant. The wearing qualities of sandstones will depend upon the cement between the grains and the strength of the bond it affords. Those having a siliceous cement are most durable, especially if the cementing silica is united with the grains by crystal growth. Limestones are, as a rule, unsatisfactory floor and step stones, owing to their softness.

Chemical Agencies.—The principal agencies of chemical disintegration are: 1. The normal constituents of the atmosphere—nitrogen, oxygen, carbon dioxide and water vapor. 2. The impurities, or accidental constituents—ammonia, nitric, sulphurous and sulphuric acids. 3. The compounds formed by reactions between members of groups one and two, and the constituents of the stone. 4. Organic compounds derived chiefly from plant life.

Of the first group, oxygen, water and carbon dioxide are important. For convenience their work is frequently referred to under the headings: Oxidation, hydration and solution, carbonation. But it is not likely that any one of these processes would be important without one or more of the others, and it may be doubted whether, under natural conditions, any one of these goes on separately. The chemical breakdown of a rock is a very complex process, involving many reactions and interactions.

It is, perhaps, as a medium through which other chemical reagents may work, that water plays its most important part in the chemical breakdown of rocks. From the air it gathers oxygen, carbon dioxide, sulphuric and nitric acids. From the soil and disintegrating rocks it derives organic acids and mineral salts. All these are carried by it to the rocks with which it comes in contact. But this is, in part, mechanical, and in part chemical. Solution and hydration are other important phases of the work of water.

As a solvent, pure water has very little effect upon rock-making minerals, but the waters which come in contact with building stones are rarely pure. They have become dilute acids, and their solvent power is greatly increased.

Limestones and marbles, sandstones with ferruginous and calcareous cement, the feldspars and ferromagnesian minerals of granite and other igneous rocks are most readily attacked. Ordinary pure, compact, nongranular limestones are not so seriously affected. The texture prevents the acidulated waters from penetrating far into the stone before evaporation checks its course. But the porous, crystalline granular limestones and sandstones offer more favorable conditions for the work of solution. The water penetrates the intergranular spaces, dissolves or weakens the bond between the grains, and prepares the way for crumbling.

Under ordinary conditions carbon dioxide is probably the most important aid water has in its work of solution. This is due to its universal

presence, and to its very general, though slow, solvent action upon the rockmaking minerals.

As a rule, the dark minerals—hornblende, biotite and pyroxene—of the granite break down before the feldspar and quartz. In this process many secondary minerals are formed and may completely fill the space once occupied by the dark minerals. Under certain conditions the new minerals formed require more space than the original, and so mechanical strain results from their formation, but in most cases a part of the constituents will be removed in solution. No matter what the process may be, the result is generally the weakening of the stone.

Hydration, apart from oxidation and solution, is probably of little importance except where long-continued saturation occurs. So far as building stones are concerned, only those used in foundations are likely to suffer. Even here, the mechanical effects of hydration are more important than the chemical.

Sulphuric, sulphurous and nitric acids are present in appreciable amounts only in the atmosphere of large cities where the consumption of coal is large. Careful tests made on scrapings from the partially disintegrated surface of the Bedford (Ind.) linmestone in the older buildings of the University of Chicago, which have stood for ten or eleven years, show 2.33% of sulphuric anhydride—an amount almost incredibly large. Making allowance for loss by solution in the process of change, it is evident that approximately 3% of the surface of the original limestone has been converted into gypsum.

Sixteen analyses of the Bedford stone show no trace of sulphur. A microscopic examination showed that considerable intergranular matter had been carried away by solution, but it was impossible to determine satisfactorily the effective agency.

THE EFFECT OF MOISTURE ON THE STRENGTH AND STIFFNESS OF WOOD.

Very little is definitely known about the influence of moisture on the strength of wood, even by those experienced in handling the material. Since the whole subject is one of great importance, the Forest Service has been making a thorough study of it during the past three years and is about to publish the results of its investigation in an exhaustive technical bulletin entitled "Effect of Moisture upon the Strength and Stiffness of Wood."

The chief points presented by the study are:

1. The relation of moisture to strength follows a definite law which can be graphically expressed. Proper drying very greatly increases the strength of all kinds of wood, the amount of increase in strength depending upon the species and the dryness. The increased strength given to green wood by thoroughly drying it, is so great that it will surprise many. For example, the strength of a piece of unseasoned red spruce may be increased over 400 per cent. by a thorough drying at the temperature of boiling water. Strength decreases again, however, as the wood reabsorbs moisture. Air-dried wood, protected from the weather, and containing 12 per cent. of moisture, is from 1.7 to 2.4 times stronger than when green, varying with the species. Stiffness is also increased by drying. These conclusions, however, are drawn from small-sized pieces not exceeding 4x4 inches in cross-section such as are used in vehicle work, tools, etc. Large timbers require years of drying before the moisture is reduced to the point where strength begins to increase. It must be taken into consideration that more or less checking always occurs when large timbers dry; and if this checking is excessive it may cause weakness to counterbalance, partially or entirely, the strength gained in drying. Consequently, it is not safe to assume that the average strength of large, so-called seasoned timbers is much greater than that of green or wet ones.

2. The fiber saturation point of a number of species has been determined. This point, which varies with conditions and species of wood, designates the percentage of water which will saturate the fibers of the wood. It has been found that, under normal conditions, wood fiber will absorb a definite amount of moisture; beyond this the water simply fills the pores of the wood like honey in honeycomb. Only that water which permeates the wood fiber has an influence upon the strength.

3. Prolonged soaking in cold water does not reduce the strength of green wood below that of its fiber satuaration point, provided it remains in perfect condition. When wood has been dried and is resoaked, it becomes slightly weaker than when green.

4. Wood soaked in heated water absorbs more moisture because the amount of water which the fiber will contain is increased. This causes a reduction in strength and stiffness, as in wood that is heated or steamed for bending.

EXPERIMENT WITH NEW ROAD ENGINE.

Quite an interesting innovation in road making has ben introduced in the county of Kent, where a new road engine, to which is attached five cars, has been put to work on the improvements which are being made on the country road. The cars are supposed to carry five wagon loads each, the entire outfit therefore hauling the same load as twenty-five wagons. This road train will make two trips a day,

which will keep the three crushers busy to provide the necessary loads. The cars are so constructed that by the use of a crank an aperture is opened in the bottom to allow the emptying of the cars in a manner which will distribute the material evenly on the roadbed.

A man will travel with the outfit to attend to the distribution. The wheels of the wagon are fourteen inches in width, and are so arranged that they are not in line and will serve to further harden the road by rolling it on their trips. The outfit was purchased from the J. I. Case Company. Formerly a large number of teams were used, and men were engaged to spread the material. By the new process the material is spread, and the number of men employed is decreased. The new outfit is supposed to curtail the expenditure by about $25 a day.

A BARN OF CIRCULAR FORM.

There has recently been completed in the vicinity of Osakis, Minn., a farm barn that is perfectly round in shape, this form being adopted in order to better resist the severe windstorms prevalent in that section of the country. The building is constructed of native lumber and pine, is 48 feet in diameter and the posts are 21 feet high. There are stalls for 10 cows and 5 horses, and a pen for calves and young cattle. The cost of the structure is said to have been $1,000, and the hay loft has a capacity of 50 tons.

GOOD ROADS FUND GOES QUICKLY.

The Peel County Council met at Brampton lately. The reports of the various commissioners having charge of the construction of the 100 miles of good roads in the county were presented. So far nearly $25,000 has been expended but only one mile of road constructed.

The building of this mile of road cost $4,000, and was built on the lake shore near the township of Etobicoke. The balance of the money has been spent on culverts and bridges. At the present rate of going it will require very much more than $100,000 to make the 100 miles of road.

MAKING A CEMENT FLOOR.

(Continued from page 15)

be saved by the use of a box without a bottom for a measure; this may be of any shape, but must hold a known amount."

We would assume that you are using Portland cement in sacks, mixing the concrete 1, 3, 6. A sack of cement contains about 1,900 cubic inches. For a box to hold 3 sacks, make it 2 feet square inside and 10 inches high; 24 x 24 x 10 equals 5,760; 1,900 x 3, 5,700. Fll the box only level full of sand. Fll twice with the gravel. For different proportions make the box according. Right here you save as much time as it takes to screen the gravel. When the sand and gravel are measured, spread them out evenly, and spread the cement evenly over them. Then mix by shoveling with square shovels. Shovel three times over, then add the water and shovel twice more. Do not get the mixture too wet. It should be soft enough so it will not stay piled up, but not so as to run off the bottom. If the aggregate is dry and dusty sprinkle it before using. You will want the stones pounded down and leveled off to form 3 to 5 inches lower than the surface of the floor is to be. To do this for a narrow floor, say 16 feet, a wider one must be divided. Place two sticks 4 x 4 a few inches from each side, and fasten them by placing stones under the wedges behind them, so that they can not be moved by accident, but may be readily taken up after the space between them is filled with concrete. You want a 2 x 4 long enough to reach from the other of the sticks. This should be straight and smooth on one edge, as it is used to level off the top coat. By laying it across the floor it may be used as a guide in leveling the stone and grouting. If you have plenty of coarse aggregates sprinkle some on top of the coarse stone. You may mix a good sized batch of grouting, say two sacks of cement, but do not mix too much of the finishing coat, for it may set before you use it. If it does use it for grouting by mixing in a little gravel. Use a wheelbarrow to get the concrete to place. Tamp the grouting solidly with a block of heavy wood fitted with

a handle. Keep it an inch or more below the top of the 4 x 4's and bottom of straight edge. If it is desired to have the floor slant in any direction, place the 4 x 4's accordingly. Sprinkle the stone before putting on the grouting and sprinkle the grouting before putting on the top coat. Level the top off by drawing the straight edge over it. This will require a man at each end. By tipping it backward so as to raise the corner a smooth surface may be made. In running it back take a little mortar before it. Fill the low places with a trowel.

After the main part of the floor has become hard, remove the 4 x 4's and fill in the sides. As soon as the surface can not be dented with the finger the floor should be sprinkled. After a day or two water may be thrown over by the pailful. When the floor is partly set, grooves can be made in it, one foot apart, by laying blocks on the 4 x 4's and plank on these, across the floor, so a man could drive a groover down beside the plank. This groover is made from three pieces of boards 4 feet long, two of them 2 inches wide and one a little wider and beveled on one edge, the widest one in the middle, all set on edge and nailed together.

SHIFTING SHORES OF ISLAND.

The continually shifting shores of the island at Toronto was the main feature of the evidence of Constable Ward in a recent Assize Court case. Mr. Ward gave a general review of the changes in outline of the Island since 1862. Points of land on which buildings were erected in those days now lie 1,800 feet south of the beach, in deep water. The general movement of the Island seems to have been shorewards, but according to Mr. Ward there are cases of the lake beach having been built up in places, as well as torn down in others. In 1874 a Mr. Montgomery occupied a shack 700 feet south of his present residence. This spot is now in deep water. "In 1862 the lake broke through at what is now known as the 'Eastern Gap,'" said Mr. Ward, "and this gap deepened so quickly that vessels could use it the same year."

IRON AND STEEL.

The British Board of Trade have issued a return showing the production and consumption of iron ore, pig iron and steel in the United Kingdom and the principal foreign countries. In 1905 the total output of iron ore in the world was estimated to amount to 114,000,000 tons, the United States, Germany, the United Kingdom and Spain (in the order given) producing 78 per cent. of the whole. The world's output in 1906 is estimated at 125,000,000 tons, or an increase of 11,000,000 tons. The United States produces more iron ore than Germany and the United Kingdom combined. In 1905 the output in the States showed an increase of about 15,000,000 tons on the previous year, and in 1906 there was a further increase of 7,000,000 tons, bringing the total production to nearly 50,000,000 tons. Germany produced 26,000,000 last year, showing an increase of 3,000,000 tons; and the output of the United Kingdom was 15,590,000 tons, being an increase of a million tons. In tons the production of pig iron and steel was as follows in the three countries in 1906: United States, pig iron 25,307,000 tons, steel 23,365,000 tons; Germany, pig iron 12,096,000 tons, steel 10,956,000 tons; United Kingdom, pig iron 10,149,000 tons, steel 6,482,00 tons. The output of steel in the United States shows an increase of nearly 10,000,000 tons compared with 1904, the increases in Germany and the United Kingdom in the same time being 2,120,000 and 1,451,000 tons respectively. Last year the imports of manufactures of iron and steel into the United Kingdom amounted to only 205,766 tons, being a decline of 7,187 tons on the previous year. In the matter of exports from the United Kingdom there was an increase under every head last year except in railroad iron, the decrease in the export of rails amounting to 86,241 tons. There was an increase of 679,944 tons in the export of pig iron from this country last year, mainly due to increased shipments to Germany, the United States and Canada. Germany imported 38,000 tons of tinplate last year, and this it obtained almost wholly from the United Kingdom.

Prices of Building Material

PRESSED BRICK, Per M.

TORONTO PRESSED BRICK AND TERRA COTTA WORK

	F.O.B. Milton, Ont.
Red No. 1	$13 00
" 2	11 50
" 3	10 00
Buff No. 1	17 00
" 2	13 00
Brown	25 00
Roman Red	30 00
" Buff	35 00
" Brown	40 00
Hard Building	8 50
" Sewer	8 00
" Parking	7 00

Moulded an l Ornamental from $2.00 to $5.00 per 100.
Terra Cotta String Courses and Frieze, from 50c. to $2.00 per ft. run.
Roofing Tiles, $20.00 per 1,000.

DON VALLEY BRICK WORKS.

Nos. 1, and 2, Red Pressed Bricks
Nos. 1 and 2 Buff Pressed Brick
No. 1 Brown Pressed Brick
Pompeiian Red, Buff and Brown Pressed Bricks
Ornamental Bricks of all kinds for Mantel purposes
Enameled Bricks of all Colors
Porous Terra Cotta Fireproofing of all Descriptions
Vitrified Street-Paving Bricks
Semi-Vitrified Foundation Bricks
Common Stock Red and Grey Bricks
Sewer Bricks
Stone or Macadamized Roadways

Please write to head office, 34 Toronto St. Toronto, for catalogue and prices.

BEAMSVILLE BRICK AND TERRA COTTA CO.

	F.O.B. Beamsville.
Red Peerless Facing	$16 00
" No. 1	14 00
" No. 2	12 00
" No. 3	10 00
Brown Peerless Facing	20 00
" No. 1	18 00
Buff Peerless	20 00
" No. 1	18 00
" No. 2	15 00
Moulded and Ornamental Brick from $3 to $10 per C	
Roman Red (Size 12 x 4 x 1½ in.)	30 00
" Buff " " "	30 00
" Brown " " "	35 00
Vitrified Paving Brick No. 1	18 00
" " " No. 2	15 00
Sewer	8 00
Roofing Tile	22 00

Sackett Plaster Board, 32" x 36" in size, sold at about 2c. per square foot.

LUMBER

CAR OR CARGO LOTS, F.O.B. TORONTO.

	Per M. Ft.
1 inch No. 1 Pine cuts and better	$49.00 to $51.00
1½ to 2 inch No. 1 cuts and better	54.00 58.00
2 inch No. 2, Pine cuts and better	48.00 50.00
1½ to 2 inch No. 3 cuts and better	42.00 46.00
1 inch Pine Dressing and better shorts	28.00 30.00
1 x 4, 6 and 8 Common	27.00 28.00
1 x 10 and 12 Common	34.00 36.00
1 inch mill run sidings	28.00 29.00
1 x 10 and 12 mill culls	22.00 23.00
1 inch dead cull sidings	15.00 16.00
1½ inch Flooring	32.00 34.00
Hemlock, 1 x 4 to 8 inch	19 00 20.00
2 x 4 to 8 inch, 12 to 16 feet	22.00 23.00
2 x 4 to 10 inch, 18 feet	23.00 25.00
1½ inch No. 1 4 ft. Pine Lath	4.75 5.00
1½ inch No. 2 4 ft. Lath	4.25 4.50
1½ inch No. 1 4 ft. Hemlock Lath	4.00
XXXX Pine Shingles	3.50 3.75
XX Cedar Shingles	2.50 2.75
B.C. Shingles:	
XXX 6 butts to 2 inch	3.85
XXXX 6 to 25-16 inch	4.07
XXXXX 5 to 2 inch	4.50

HARDWOODS—PER M. FEET CAR LOTS.

Ash, white, 1sts and 2nds, 1 to 2 inch	$35.00 to $38.00
Ash, black, 1sts and 2nds, 1 to 1¾ inch	33.00 35.00
Birch, M. R. 1 inch	21.00 22.00
" 1¼ inch to 2	23.00 24.00
Basswood, Common and better, 1 to 1¾ inch	25.00 26 00
Basswood, 1¼ to 2 inch	26.00 28.00
Elm, soft, mill run, 1 to 1¾ in	23.00 24.00
Elm, rock, mill run, 1 to 1¾ in	26.00 28.00
Maple, common and better, 1 to 1¾ inch	22.00 23.00
Oak red plain, 1sts and 2nds, 2 to 4 inch	46.00 50.00
Oak, white, 1sts and 2nds, 1 to 1¾ inch	44 00 46.00
Oak, quartered, 1sts and 2nds	70.00 80.00