

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/
Couverture de couleur
- Covers damaged/
Couverture endommagée
- Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- Cover title missing/
Le titre de couverture manque
- Coloured maps/
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- Bound with other material/
Relié avec d'autres documents
- Tight binding may cause shadows or distortion
along interior margin/
La reliure serrée peut causer de l'ombre ou de la
distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear
within the text. Whenever possible, these have
been omitted from filming/
Il se peut que certaines pages blanches ajoutées
lors d'une restauration apparaissent dans le texte,
mais, lorsque cela était possible, ces pages n'ont
pas été filmées.
- Additional comments:/
Commentaires supplémentaires:

- Coloured pages/
Pages de couleur
- Pages damaged/
Pages endommagées
- Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- Pages detached/
Pages détachées
- Showthrough/
Transparence
- Quality of print varies/
Qualité inégale de l'impression
- Continuous pagination/
Pagination continue
- Includes index(es)/
Comprend un (des) index
- Title on header taken from:/
Le titre de l'en-tête provient:
- Title page of issue/
Page de titre de la livraison
- Caption of issue/
Titre de départ de la livraison
- Masthead/
Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL OF THE PUBLIC WORKS AND TENDERS ADVANCE INFORMATION AND MUNICIPAL PROGRESS

EVERY THURSDAY

This paper reaches every week the Town and City Clerks, Town and City Engineers, County Clerks and County Engineers, Purchasers of Municipal Debentures and leading Contractors in all lines throughout Canada.

VOL. 7. FEBRUARY 27, 1896 No. 4.

THE CANADIAN CONTRACT RECORD,
PUBLISHED EVERY THURSDAY
As an Intermediate Edition of the "Canadian Architect and Builder."

Subscription price of "Canadian Architect and Builder" (including "Canadian Contract Record"), \$2 per annum, payable in advance.

C. H. MORTIMER, Publisher,
CONFEDERATION LIFE BUILDING, TORONTO.
Telephone 2362.

New York Life Insurance Building, Montreal.
Bell Telephone 2299.

Information solicited from any part of the Dominion regarding contracts open to tender.

Advertising Rates on application.

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

Notice to Contractors

A new and thoroughly revised edition of the *Canadian Contractor's Hand-Book*, consisting of 150 pages of the most carefully selected material, is now ready, and will be sent post-paid to any address in Canada on receipt of price. This book should be in the hands of every architect, builder and contractor who desires to have readily accessible and properly authenticated information on a wide variety of subjects adapted to his daily requirements.

Price, \$1.50; to subscribers of the CANADIAN ARCHITECT AND BUILDER, \$1.00. Address

C. H. MORTIMER, Publisher,
Confederation Life Building, TORONTO.



Notice to Contractors

Tenders for Hydraulic Dredge

Tenders will be received, by registered post only, addressed to the Chairman of the Board of Administration, City Hall, Toronto, and endorsed, "Tenders for Hydraulic Dredge," up to the hour of 11 O'CLOCK, A.M., THURSDAY, THE 27TH OF MARCH, for a

HYDRAULIC DREDGE FOR THE CITY OF TORONTO.

Plans and specifications may be seen and forms of tender obtained at the office of the City Engineer, Toronto, on and after Friday, the 28th of February, 1896.

A deposit, cash or marked cheque, payable to the order of the City Treasurer, for the sum of a 1/2 per cent. of the amount of the contract, must accompany each and every tender, otherwise they will not be entertained. The tenders must bear the bona fide signatures of the contractor and his sureties or they will be ruled out as informal.

The lowest or any tender not necessarily accepted.

DANIEL LAMB,

Chairman Committee on Works.

R. J. FLEMING,
Chairman Board of Administration.

City Hall, Toronto, February 21st, 1896.

TENDERS FOR SEWER PIPES

The Municipal Council for the City of Nanaimo invite proposals up to MONDAY, 9TH MARCH, 1896, endorsed "Tenders for Sewer Pipes," for the supplying of Sewer Pipes from 6inch upwards.
The lowest or any tender not necessarily accepted.
ADAM THOMPSON, City Clerk.
Nanaimo, B.C., Feb. 20, 1896.

TO CONTRACTORS

Marked Tenders (whole or separate) will be received up to noon of MARCH 5TH, by W. Brace, Secretary of the Building Committee of the Wall Street Methodist Church, Brockville, for the

Erection of Church and Alterations to School.

Lowest or any tender not necessarily accepted. Plans, &c., may be seen at the offices of the Secretary and the undersigned.

POWER & SON, Architects,
Kingston.

CONTRACTS OPEN.

NELSON, B. C.—The necessity for the erection of a custom house here is being urged.

COLCHESTER SOUTH, ONT.—John Waters and Andrew Elliott will each erect new residences.

GOLDEN LAKE, ONT.—Preparations are being made for the erection of four or five new houses.

THESSALON, ONT.—The question of constructing a system of waterworks is under consideration.

HARTLAND, N. B.—R. W. Richardson is making preparations to erect a wood-working factory.

BLYTH, ONT.—T. W. Scott, clerk, invites tenders until the 3rd of March for the purchase of \$5,000 of debentures.

VALLEYFIELD, QUE.—The Montreal Cotton Co. will build this spring a three storey warehouse, 90 x 170 feet in size.

FERGUS, ONT.—A by-law has been carried authorizing the council to issue debentures to provide for a public park.

KINCARDINE, ONT.—R. B. Campbell, clerk, invites tenders until the 10th of April for the supply of a quantity of lumber.

LONDON, ONT.—William Brooks is building a two-storey brick veneer residence on the south side of Dundas street, in East London.

EXETER, ONT.—R. McKenzie intends erecting a new block, corner of Main and James sts., 23 x 100 feet, with red brick front and side.

WOODSTOCK, N. B.—A vote of the

ratepayers will be taken at an early date to provide \$10,000 for completing the sewerage system.

CORNWALL, ONT.—A. I. McDonell, county clerk, will receive proposals until the 29th inst. for the purchase of \$10,500 of drainage debentures.

ALBERNI, B. C.—A local company is seeking incorporation to provide the town with water works, obtaining the supply from the Somass river.

NOTTAWA, ONT.—Tenders are invited by Rev. V. Plunkett, of Collingwood, until the 29th inst. for erecting a brick-cased church in this village.

STRATFORD, ONT.—A special meeting of the County Council will be held on the 6th of March to select a site for the proposed county poor-house.

HULL, QUE.—On the 12th of March a vote of the ratepayers will be taken on a by-law to issue debentures for \$108,000 to consolidate the city debt.

PEMBROKE, ONT.—W. C. Irving, Chairman Waterworks Committee, will receive tenders until the 28th inst., for furnishing water works supplies.

FREDERICTON, N. B.—The Provincial government propose making improvements to the House of Assembly after the adjournment of the present session.

NEW EDINBURGH, ONT.—The building committee of the Presbyterian church have a number of plans under consideration for the enlargement of the church and Sunday school building.

LEAMINGTON, ONT.—Henry Foster is preparing plans for three dwellings to be erected this spring. E. M. Bee, of Windsor, has had plans prepared for a new house to be built near here.

EDMONTON, N. W. T.—It is stated that the Dominion government will invite tenders within the next few days for the construction of a steel bridge across the Saskatchewan river, to cost \$75,000.

TORONTO JUNCTION, ONT.—An agreement has been reached with the Galena Oil Works, of Pennsylvania, for establishing a branch of their works here. They agree to erect a factory to cost \$8,000.

GLENBURNIE, ONT.—A new Roman Catholic church will be erected at Hickey's Corners, the work to commence in the early spring. Estimated cost, \$15,000. The Archbishop of Kingston is in charge.

VANCOUVER B. C.—The council has been asked to grant a bonus for the erection of a smelter.—The School Board will ask the City Council for \$70,000 for necessary repairs and additions to school buildings.

FORT WILLIAM, ONT.—F. E. Parker, of Minneapolis, is the promoter of a proposal to erect a 2,000 barrel flour mill on the banks of the Kaministiquia river. The town council is asked to assist the enterprise.

GODERICH, ONT.—A deputation, among whom were Dr. J. R. Shannon and Messrs. McD. Allen, M. Nicholson and E. Camp-

bell last week interviewed the Dominion government requesting an appropriation for repairing and extending the break-water at this place.

HAVELOCK, ONT. The Methodists will erect a new church this summer at a cost of \$5,000. The building committee will be composed of Messrs. A. Miell, Jos. Rose, Dr. W. H. Jeffs, Richard Phillips and James Mark.

LISTOWEL, ONT.—John C. Hay, chairman Finance Committee, is prepared to receive offers for the purchase of \$41,000 of consolidated debentures. The congregation of Christ's church will erect a new edifice to cost upwards of \$5,000.

PORT ARTHUR, ONT.—Mr. Edwards is promoting a scheme having for its object the development of the water power of the Kaminstiquia river. It is said that work in connection therewith will be commenced at an early date.

NEW WESTMINSTER, B. C.—The City Council has received a communication from J. Buntzen, secretary of the Consolidated Railway & Light Co., offering to build an electric railway from Westminister to Stevenson, and to locate the central offices and repair shops in this city.

RENFREW, ONT.—Tenders for additions and alterations to stone building will be received by D. H. McAndrew until the 1st of March.—The plans for the new block to be built by Mr. Mackay have been received. It will be three stories, brick, with Renfrew stone trimmings and plate glass front.

BOWMANVILLE, ONT.—A deputation has requested the Dominion Government to grant an appropriation for a new public building in this town, to comprise a post-office, custom house and inland revenue office. The dredging of Bowmanville and Newcastle harbor by the Government has also been urged.

HALIFAX, N. S.—J. E. Roy is having plans prepared for a large building on Barrington street, extending to Granville street. The building will be five stories on Barrington street and six on Granville street, material to be of white and black marble; first floors for offices, the remaining stories for residences.

WINDSOR, ONT.—Col. F. B. Leys, of London, has purchased the Dougall block, having a frontage of 90 feet each on Sandwich and Ferry streets. It is the intention of the new proprietor to remodel the buildings.—The selection of a site for the proposed Y. M. C. A. building will probably be made this week, after which plans will be prepared.

MONTREAL, QUE.—The town council of Lachine has adopted a by-law granting the Montreal Park & Island Railway running privileges through the streets of the town. It is contemplated to build this line in the spring, and to extend the Outremont line to St. Laurent.—Building permits have been granted as follow: H. Charbonneau, two-story brick tenement bldg., Notre Dame st. east, cost \$1,000; W. Wobjansing, two story bk. tenement building, Knox st., cost \$2,000.

KINGSTON, ONT.—Mr. G. C. Boldt, proprietor of the Woldorf hotel, New York, will build a residence on Hart's Island, River St. Lawrence, this summer, at a cost of \$60,000. One of the features of the mansion will be a pallsade, 175 feet in length and a rotunda at either end.—The congregation of the Johnson street Baptist church have decided to build a new edifice.—Mr. G. F. Gildersleeve will interview the Dominion government with a view of securing a grant towards the building of the Kingston, Smith's Falls and Ottawa railway from Smith's Falls to Ottawa.—The plans for the proposed new eight roomed school call for a stone building. The architect has been instructed to procure tenders for the mason

work, carpentry, painting, tinsmithing and plumbing.

QUEBEC, QUE.—Matters in connection with the proposed electric railway are moving slowly. The Montmorency Electric Co. have agreed to accept the terms offered by Mr. Beemer. The promoters are under bonds to commence construction before May 1st.—Fourteen models and eleven designs have been received for the Champlain monument. These will be submitted next week to a committee of experts.—The City Council have decided to grant liberal inducements to the Cold Storage Co. to erect their building, which will cost about \$50,000.—It is proposed to rebuild the college of Ste. Marie de la Beauce, at a cost of \$15,000 to \$20,000. Messrs. Tanguay & Vallee are the architects.—The construction of the church of the Holy Sacrament has been finally decided upon. Plans prepared by Mr. Tache, of the Crown Lands Department, have been accepted. Messrs. Berliquet & LeMay, architects, will superintend the work.—The Jeffrey Hale Hospital Board are considering plans for erection of new buildings for the hospital.

WINNIPEG, MAN.—The Committee on Works have recommended that debentures for \$10,500 be issued for the erection of a pivot pier and two new abutments to the Main street bridge.—Charles H. Wheeler, architect, is calling for tenders for a new block on Market street, two storeys high, solid brick and stone. Estimated cost, including heating apparatus, \$75,000.—The Committee on Works has given notice of the intention to construct the following street improvements: Assiniboine street, Main to Kennedy, 32 ft. macadam pavement, estimated cost \$9,489; York avenue, Main to Kennedy st., 24 feet, cost \$5,347; St. Mary's avenue, Main to Donald street, 24 feet, cost \$4,109; Graham avenue, Main to Donald street, 24 feet, cost \$4,109; Ellice avenue, Notre Dame to Donald street, cost \$2,377.—The Provincial Legislature will be asked to grant financial aid to the Lake Manitoba Railway & Canal Co., for the construction of a railway from Portage la Prairie to the Lake Dauphin country, west of Lake Manitoba. The proposed road will be about 100 miles in length.—The sum of \$27,000 has already been subscribed for the erection of a Y. M. C. A. building. This amount is not sufficient to carry out the work, and an effort will be made at once to secure the necessary funds. Mr. R. J. Whittle is president of the Association.—The cost of St. Mary's church, of which Mr. Hooper is architect, was given in the RECORD last week as \$1,800. It should have read \$18,000.

HAMILTON, ONT.—A. W. Peene, architect, is inviting tenders for the erection of a wood and iron wharf at the foot of Sherman avenue for the Hamilton Iron & Steel Co.—A deputation from this city last week requested the Dominion government to deepen the canal. Consideration was promised.—Messrs. Jacobs & Sparrow, of Toronto, are desirous of securing the erection of an opera house in this city, with a seating capacity for 15,000 persons, and costing about \$35,000.—The estimates of the Board of Works have been submitted and include the following: Electric lighting, \$34,110; repairing block paving with macadam, \$5,623; macadamizing streets, \$15,331; snow and street cleaning, \$10,000; new sidewalks and repairing old sidewalks, \$24,000; repairs to streets, \$9,000.—The Sewers Committee have adopted the recommendation of the city engineer to divert the east end sewer to Ferguson ave., at a cost of \$41,900. Tenders for the work will be invited at once.—W. A. Edwards, architect, invites tenders until the 3rd of March for the erection of a brick residence on John street south for James Dunlop.—Tenders for the erection of the Collegiate Institute and Ontario

Normal College building are invited by Alexander Turner, chairman of the building committee, until Monday, the 9th of March. Plans may be seen at the office of William & Walter Stewart, architects, corner King and Hewson streets.—The president of the Hamilton and Dundas Railway Co. will shortly submit a proposition to the city council for the conversion of the road into an electric line. The road extends from Dundas to this city. Arrangements are said to be completed by which the Hamilton, Grimsby and Beamsville Railway Co. will be extended to Grimsby.

TORONTO, ONT.—The Public School Management Committee have decided that the erection of four new rooms to the Rose avenue, Winchester street, Clinton street, Ryerson, Grace, Gladstone avenue and Park schools is necessary. The work will probably be carried out this summer.—The annual report of the Industrial Exhibition Association, presented a fortnight ago, points out the necessity for enlarging the present main building and the machinery hall. The City Council will likely be requested to provide a portion of the necessary funds.—The chief engineer of the Grand Trunk Railway had a consultation with the City Engineer on Tuesday last, regarding the plans for the widening of the Queen street subway, and an early settlement of the question is now probable.—The City Engineer has presented the estimates for the year to the Board of Works. Among the items are the following: Don bidge, Queen street, \$48,000; Cherry street bridge, \$6,000; Strachan avenue bridge, \$23,000; ramps, John street bridge, \$12,000; track from Don to Cherry street, \$4,000; sand pumps, \$18,000; intersecting sewer, Wilton avenue, \$20,000; city's shale York street bridge, \$56,000; extension sewers, \$5,000; Queen's park roadway, \$4,000. At a meeting of the Board on Monday last, the appropriations for the Don, Strachan ave. and Cherry street bridges, and the Wilton avenue sewer, were struck out.—The Waterworks branch requests an appropriation of \$237,000, about half of which is for repairing old services and special work.—Building permits have been granted as follows: C. J. Gibson, architect, bk. add. rear of 108 Yonge st., cost \$1,000; J. J. Jones, alterations to Mission House, Phoebe st., cost \$900; Jones & McKenzie, three 1-storey bk. add. to dwellings, 312 to 316 Spadina ave., cost \$1,600.

OTTAWA, ONT.—Preparations are being made to extend the electric railway to Britannia. It is expected that the road will be completed by the middle of July. Its construction will necessitate the erection of a bridge across the Dechenes rapids.—The government has been requested to grant a subsidy of \$3,200 a mile towards the construction of a section of the Port Arthur, Duluth and western railway, connecting with Rainy Lake.—The Ottawa Forwarding Co. are making arrangements to erect a solid brick, stone or iron structure.—The accommodation at the custom house is said to be insufficient, and steps will probably be taken at an early date to erect an additional wing.—The railway committee have passed the bill to consolidate and amend certain acts relating to the Nipissing and James Bay railway, and to incorporate the Huron & Ontario Railway Co. The latter company propose to construct an electric railway, the bonded power being limited to \$10,000 for a single track and \$16,000 for a double track railway.—An influential deputation has requested the Dominion government to complete at as early a date as possible the deepening of the St. Lawrence canal.—The building committee of the Public School Board have recommended several improvements to school buildings.—Between two and three thousand men will be employed, and \$1,000,000 spent in the con-

struction of the Ottawa, Arnprior and Parry Sound railway this summer.—Albert Phenix, broker, New York, S. S. Oille, G. E. Patterson and J. S. Campbell, of St. Catharines, and Henry A. King, of Toronto, have petitioned for a bill to incorporate the Lincoln Radial Electric Railway Co., with power to take over the assets of the Lincoln Street Railway & Traction Co., of St. Catharines, and to extend their lines.—The tenders for the construction of the second section of the Peterborough and Lakefield division of the Trent Valley Canal are to be sent in by the 21st of March. In this work an iron bridge 224 feet in length, with a span of 112 feet on concrete piers will be constructed at Nassau. At Little Lake it is proposed to place the hydraulic lift lock, which will have a lift of 65 feet. A swing bridge will be required at Warsaw road and at the Norway road. A high level bridge spanning the canal will be required. A second swing bridge will be built at Ashburnham.—Improvements to the Rideau skating rink will be carried out this summer. The building will be extended 30 feet and the shareholders' gallery arranged in balcony style. Cost \$5,000.—The Drainage Committee have decided to ask the finance committee for \$2,000 to pay the costs of a special engineer to report on the drainage scheme.

FIRES.

The furniture factory of T. W. Currier & Co., Rideau street, Montreal, has been damaged to the extent of \$4,000. It will probably be rebuilt in a more substantial manner.—Knox church at Palmerston, Ont., valued at \$10,000, was burned on Sunday last. Loss partially covered by insurance.—Campbell & McNab's roller mill at Douglas, Ont., has been burned. Loss \$5,000.—The paper store house of the Riordan paper mills at Merriton, Ont., was recently damaged by fire to the extent of \$2,000.—The Baptist church at New Glasgow, N. S., has been burned; insurance \$1,200.

CONTRACTS AWARDED.

HALIFAX, N. S.—The tender of H. B. Seldon & Co. has been accepted by the Board of Fire Commissioners for the erection of a new engine house.

MONTREAL, QUE.—J. Benjamin Dagenais has been awarded the contract for the erection of three stores and tenements for V. Raby, to cost \$10,000.

OTTAWA, ONT.—The Dominion Government has awarded the contract for the breakwater at Souris, P. E. I., to Messrs. Heney & Smith, of this city. Estimated cost of the work, \$30,000.

WINNIPEG, MAN.—John Shaw has received the contract for erecting a new cold storage warehouse for the Parsons' Produce Co. The sub-contract for woodwork has been let to J. C. Gilker. The building will be 60 feet square and will cost \$20,000. S. Frank Peters, architect.—Charles H. Wheeler, architect, has let the contract for T. D. Lennan's residence to J. C. Gilker. It will be of solid brick and stone, with red stone labels, and inside finish of oak.

The first bridges were of wood, and the earliest of which we have any account was built in Rome 500 years B. C. The next was erected by Julius Caesar for the passage of his army across the Rhine. Trajan's great bridge over the Danube, 4,770 feet long was made of timber, with stone piers. The Romans also built the first stone bridge, which crossed the Tiber. Suspension bridges are of remote origin. A Chinese one mentioned by Kirchen, made of chains supporting a roadway 830 feet in length, was built A.D. 65, and is still to be seen. The first large iron bridge was erected over the Severn in 1777.

MUNICIPAL DEPARTMENT

LOCATING A PUBLIC WATER-SUPPLY.

By DANIEL W. MHAID.
(Continued.)

The drainage system, which was developed prior to the glacial epoch, was greatly altered by the filling of valleys and grinding down of the hills. The Mississippi river valley was partially filled, and its course in many places altered. The Lake Michigan river valley was filled to a point near Chicago, and the smaller drainage valleys of this area were entirely destroyed. The topography had also widely changed; in place of the rugged hills of the pre-glacial epoch, the present prairie land resulted. The drainage system which has since developed was largely marked out and modified by the effects of the ice and by the glacial floods resulting from its melting.

As the Lake Michigan glacier receded, it still rested over the present outlet of the lake, and the lake poured its waters down the present valley of the Illinois river in a flood far in excess of the modern river. The glacial floods also poured through the Mississippi valley, in each case excavating deep in the drift a wide valley, which the modern river but poorly fills.

Having thus briefly considered geological causes, the present geological conditions may be briefly reviewed. In the indurated rock formations, lines of exact demarcation seldom exist between the various strata. One stratum usually grades gradually into another. Changes in the controlling influence which modified deposition were usually not radical ones, but obtained only gradually.

A like condition applies to the character of a stratum throughout its geographic extent; the conditions at one point might favor the formation of limestone deposits, while those more or less remote might be favorable to the formation of shale. Hence we find, if the same stratum be followed up, often even in very limited distances, that it may merge from a sand-

stone to a limestone, or from a limestone to a shale, and the reverse; or from a coarse-grained stone to one of finer and more impervious qualities. The more widespread and universal the conditions controlling deposition, the more uniform the character of a stratum throughout its extent. Hence the character of a rock deposit which we may expect to encounter in drilling is often highly problematic.

The underlying Archæan rocks have a slope in all directions from their outcrop in northern Wisconsin, being about 2,000 feet above sea-level at their highest outcrop. The superincumbent strata follow this general slope to a considerable extent. The surface also follows the general dip of the strata at present, as it has through all past geological ages, the older geological deposits being at their outcrop the higher; in travelling from the original Archæan nucleus in each direction, the traveller will descend in elevation, while he ascends in geological succession, as he approaches nearer the sea-level.


In considering the hydrological conditions of the various strata, it should be noted that all are water-bearing to some extent. Even where the ratio of absorption is comparatively small and insignificant, the cracks and fissures often play an important part. This area, like many others, is marked by an alternation in the position of rocks, varying largely in porosity, strata of high porosity frequently lying between those comparatively impervious. This variation is somewhat equalized by cracks and fissures, but the difference is still so marked as to create a great difference in the character of the flow.

The outcrop of these highly pervious strata, at high elevation on the watershed of the valley, gives rise to hydrostatic pressure within the strata, which is not wholly equalized by the transfusion of waters due to porosity or rupture of the strata. Hence in the lower portions of the valley these waters often come to the surface with considerable head through natural channels as springs or artificial channels as flowing wells.

Of the waters of this region the surface waters are the most obvious. It is found that the stream-flow amounts to from twenty-five to forty per cent. of the annual rainfall, depending on the modifying circumstances herebefore mentioned. From thirty to fifty per cent. of the rainfall is probably evaporated and utilized in plant growth, while the balance is imbibed by the underlying strata.

(To be Continued.)

EUREKA



MINERAL WOOL

SECTIONAL

STEAM PIPE and BOILER COVERING

Gives Dry Steam at long distances without loss of power.

ASBESTOS GOODS ~ ENGINE PACKINGS

EUREKA MINERAL WOOL & ASBESTOS CO., - 124 Bay St., TORONTO

THE G. & J. BROWN MFG. CO.

Railway and Contractors' Plant.

BRIDGE BUILDERS

BELLEVILLE, ONT.

SOME NOTES ON PORTLAND CEMENT CONCRETE.*

By M. J. BUTLER.

In that quaintly written book "Scamping Tricks," by John Newman, under Concrete, occurs the following :

"Have you managed to squeeze any extra profit on the quiet out of concrete?"

"Yes, twenty or thirty years ago, but there is not much to be got now since a few engineers took to writing on the subject. They have reminded or informed others pretty well what to look after, but there were not many thirty years back that knew how it ought to be made, and you see, although one receives the materials, the concrete has to be made with them, manufactured, as it were, on the works, and you can spoil the best Portland cement that is, was or ever will be made in the proportioning, mixing and blending it with bad sand and gravel or dirty broken rock."

With the above quotations for a text, it will be attempted to show what good concrete is, how it is made and to what work it is peculiarly adapted. The first essential is to secure good Portland cement. It is believed that the following specification will insure good cement :

SPECIFICATION FOR PORTLAND CEMENT.

1st. Fineness : Not more than 10% residue will be retained on a sieve of 10,000 holes to the square inch, nor more than 25% on the silk sieve of 22,500 meshes per square inch, other things being equal ; the finer the cement is the better. The residue on the 22,500 sieve has no cementitious value.

2nd. Specific gravity shall not be less than 3.09 for freshly burned cement (it should be 3.13). This is the only known reliable test for tensile and proper burning of the clinker. Weight per bushel is unreliable and misleading, as a very slight or imperceptible difference in method of filling the measure seriously alters the result.

3rd. Hot bath test : For the purpose of testing the soundness of a cement, unsoundness being caused by the presence of an excess of Caustic lime. Samples are taken and made into thin pats on glass or other impervious material (as per samples submitted herewith.) These samples are left in the air from three to six hours or until set. They are then placed in a covered tank on a rack over water so as to be enveloped in hot vapor for from 6 to 12 hours, after which they are immersed in hot water at a temperature of 110 to 130°F. and allowed to remain for periods of from 12 to 24 hours. Sound samples will not crack or leave the glass. Note : If the sample is prepared with a large excess of water it is quite common to find a crack at the top of the little ridge

* Paper read at the annual meeting of Ontario Land Surveyors.

due to the evaporation of the excess of water while in the air.

4th. Tensile strength : Usually this test is the one which receives the greatest attention and unless taken in connection with the preceding ones is apt to be misleading. The usual plan being to test neat cement, samples are prepared by careful weighing out a sufficient quantity to make five briquettes (about 26 oz.) to which is added 25 to 30% of its weight of water. The cement having been placed on a slab of glass or slate it is then rapidly worked up into a plastic mortar and the moulds are rapidly filled, taking care to press the mortar in carefully with the fingers so as to exclude the air ; the briquettes are then struck off evenly with the trowel, and are then left in the air until set, usually 24 hours, covered with a damp cloth, to check evaporation. They are then carefully removed from the moulds and should be immediately placed in the water until the period for breaking arrives. It is of more importance that a proportionate increase of strength be shown at periods of three and seven days than that a high test be secured at short periods. It is now an easy matter to secure Portland cement that will stand 400

(Concluded on Page 6.)

DEBENTURES PURCHASED

Municipalities issuing debentures, no matter for what purpose, will find a ready purchaser by applying to G. A. STIMSON & CO., 9 Toronto Street, Toronto
Any assistance required in computing calculations in connection with sinking fund, etc., will be gladly given.
N.B.—Money to loan at lowest rates on first mortgage

**EUREKA CONCRETE (=====
====) PAVING COMPANY**

FOR SIDEWALKS,
STABLE FLOORS,
CELLAR FLOORS,
BREWERY FLOORS, ETC

A. GARDNER & CO.

17 Yonge St. Arcade - TORONTO
Telephone 2147

*Water Works
Fire Hydrants
Stop Valves
3" to 36"*

BOILERS, TOWERS & C, ENGINES AND GENERAL WORK

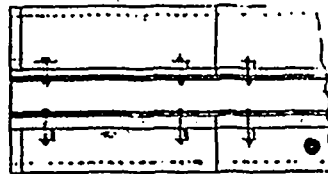
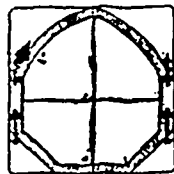
JNO. PERKINS CO'Y

Toronto Engine Works TORONTO

Advertise in the CONTRACT RECORD.

MERCULES INDESTRUCTIBLE CULVERT

20 per cent. more water-way than circular form.



Unrivalled for Strength. Durability Cheapness.

Made in sizes of 20 in., 24 in., 30 in., 3 ft. 4 in. and 5 ft.

Write for prices to **EDWIN W. SMITH**
344 Garth St., Hamilton, Ont.

THE THREE RIVERS IRONWORKS CO.
THREE RIVERS, P. Q.

MANUFACTURERS OF

Cast Iron Water and Gas Pipes

of best quality, from 2 inches in diameter.

HYDRANTS, VALVES and GENERAL CASTINGS.

Drummond McCall Pipe Foundry Company,

MONTREAL

MANUFACTURERS OF

CAST IRON WATER AND GAS PIPES

WORKS: LACHINE, QUE.

PRICES ON APPLICATION.

ST. LAWRENCE FOUNDRY COMPANY Manufacturers of



Front St. East
TORONTO, ONT.

MUNICIPAL DEBENTURES

wanted for foreign clients. We can place Debentures direct with foreign clients without charge to municipalities.

: : : Commission allowed to persons introducing new business : : : :

ÆMILIUS JARVIS & CO. (Member Toronto Stock Exchange) Stock and Bond Brokers. Investment Agents. 23 King St. West, TORONTO

ELECTRIC RAILWAY BONDS PURCHASED.

STOCK EXCHANGE ORDERS PROMPTLY EXECUTED

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

Paving Granite

Granite Sets for Street Paving.
CURBING cut to any shape ordered.
Quarries, St. Phillipe d'Argenteuil, P. Q.

Address all communications to
JOS. BRUNET - COTE DES NEIGES, MONTREAL

W. McNALLY & CO.

Building and Contractors'
Supplies

SEWER PIPES & PORTLAND CEMENTS

PATENT WALL PLASTER—The hardest, quickest
drying and cheapest material made.
Corner McGill and Wellington Streets, **MONTREAL**

DRAIN PIPES

CEMENT . . .

FIRE BRICKS

AND ALL KINDS OF

Builders' Supplies

F. HYDE & CO.

31 Wellington Street, - **MONTREAL.**

HAMILTON AND TORONTO SEWER PIPE CO.



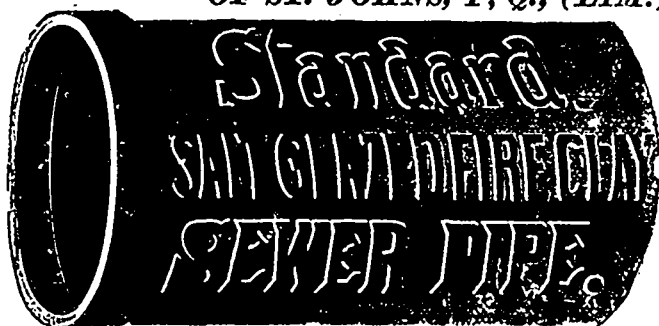
— FOR —
SEWERS,
CULVERTS
AND
WATER PIPES.
INVERTS
Fire Brick Sewers

Write for Discounts.

HEAD OFFICE AND FACTORY: HAMILTON, CANADA.

THE STANDARD DRAIN PIPE CO.

OF ST. JOHNS, P. Q., (L.M.)



Manufacturers of
Salt-Glazed
Vitrified
SEWER
PIPES

Double Strength
Railway Cul-
vert Pipes,
Inverts, Vents,
AND ALL KINDS OF FIRE CLAY GOODS.

JOHN McDOUGALL CALEDONIAN IRON WORKS **MONTREAL, P. Q.**

WORTHINGTON PUMPS



BOILERS
ENGINES

. . . . MACHINERY OF ALL KINDS

STEAM AND POWER

FOR ALL DUTIES



NORTHEY Co.
LTD.

TORONTO, ONT.

THE LAURIE ENGINE CO., MONTREAL
Sole Agents for Province of Quebec.

The Central Bridge and Engineering Company, Ltd.

Capital Stock ± PETERBOROUGH, ONT. ± \$200,000.00



WM H LAW Manager and Engineer.

Manufacturers of

RAILWAY
... **HIGHWA BRIDGES**

Viaducts, Piers, Roofs, Turntables,
Girders and Architectural Work.

:: CAPACITY: 5,000 TONS PER ANNUM ::

G. N. REYNOLDS, Toronto Agency,
North of Scotland Chambers, 20 King St
West. Telephone 111.

lbs. per square inch at the end of seven days, provided the operator understands the work of testing, for it is by no means the easy simple task it appears, to properly test a cement; it requires experience and care. It is usual and necessary that the temperature of the room and water be kept as nearly uniform as possible, say 70° F., in order that comparable results may be had. Professor Unwin, in a recent paper, questions the utility of such rigorous conditions, claiming that cement is subjected to all sorts of conditions in work and that the test ought to conform to the use to which it is to be subjected. Other able men have doubted the benefit of the hot water test. It is obvious that usually cement will not be used where hot water is flowing freely, hence the query naturally arises, why test cement with it? The answer is: that hot water accelerates the weak points in developing; that what would require several weeks or months to be learned from cold water can be had in from 24 to 36 hours by using hot water. Further, in this country it is frequently necessary to use hot water and heated sand in building during the winter months. The extraneous conditions affect small samples to a greater degree than in the large masses in works, and, after all, tests are merely for comparison, it being rightly considered that the best samples will give the best results on a large scale. Other points, such as color, etc., have really no significance. Here are two samples of the same cement and a slight difference in treatment has produced a marked difference in the color. One was immersed in a vapor bath immediately after mixing, the other was first allowed to be set in the air before being placed in the vapor bath; the first one is very light and the other quite dark.

Sand: The second ingredient of concrete is sand, and it is quite as important to use good sand as good cement; it should be clean, sharp and of varying sizes of grain, largely silicious, excluding rigorously mica, pyrites, loam or other soft friable material. Calcareous sands are seldom or never fit for concrete.

Gravel: May be clean, pit gravel, or lake shore pebbles, or better broken syenite, trap, granite or hard limestone. The principal point requiring care is to have the materials clean and that the size shall not be larger than what will pass a ring of 2½" to 3" in diameter for the largest pieces from that size down to the size of a pea or lima bean. A varying sized aggregate will give a more economical and denser concrete.

DESCRIPTION OF PROCESS IN CONCRETE MAKING.

The concrete described below is such as is advised for bridge piers, abutments, chimney foundations, engine beds, etc. Proportions to be by measure, one part Portland cement, two parts clean sharp sand and five parts broken stone or clean gravel. The *modus operandi* found to give successful results has been as follows. Spread evenly on a board platform or in a water tight box, two barrels of sand, on this spread one barrel of cement; mix thoroughly by turning over the sand

and cement at least three or four times, do not heap it, then add water, mixing as you do so (it is best to use a rose in putting on the water) until enough is present to make the mortar such that it will retain the impress of the hand when rolled into a ball. Spread into an even layer, then add the gravel by spreading it as even as possible. Turn the whole mass at least three times. It is not well to heap it to the centre as is usually done, the larger stones work to the outside and do not receive the proper complement of mortar. Load into barrows and sacks and place into position as quickly as possible, now ram thoroughly to place; if the concrete is too wet it will work up around the rammer and will not pack. The proper test is that after being well rammed it should jelly, better have it too dry than too wet, as it can be easily wet down. The coping course should generally be made of richer material, one part of cement to two parts of sand giving good results. Usually the coping course is from two inches to four inches thick, depending upon the whim of the engineer in charge.

During the past season the writer constructed two bridge abutments as follows: First, piles were driven, the tops being cut off four feet below low water mark. The piles were then capped with 10" x 12" hemlock and rag-bolted to each pile with ¾" square by 20" long from rag bolts, running transversely with the capping, a floor of hemlock 10" was lain, the floor being fully rag bolted to the caps, curbing was then built on the floor to temporarily retain the concrete, corner piers were 4" x 6" studding 2" x 6", spaced 2 ft. centres, the whole being lined with 2 inch plank at the corner; 6" strips were nailed in to give a bevel corner, and at the coping a bevel piece was nailed to the sheeting so as to leave a wash edge; the abutments were 4' 6" thick by 20 ft. long by 5 ft. high to the bridge seat, a ballast wall 5 ft. high by 18 inches thick completing the abutment. Three days after the coping was laid on the abutment a heavy steel bridge was placed upon it and 10 days later it was crossed with a work train. A second sample was an old abutment which had to be renewed. It was scoured out in places three feet below the stone work. The work of repairing was, first, to carefully build a strong curb about two feet away from the abutment; an effort was made to deaden the current with puddle, bag after bag of concrete was then carefully lowered into the holes and pushed to place, the bags were slitted, and in a short time it became a homogeneous mass. A toe was then formed to the curb, and it is believed all possibility of future scouring has been checked.

A third example was as a foundation for a brick chimney—no curbing being required the sides of the excavation serving the purpose of a curb. The concrete work merely stood one day when the brickwork was immediately started. Although the completed chimney weighs some 200,000 lbs., giving a pressure of about 4,900 lbs. per square foot, and has been subjected to some very high wind at

times, it has given a very satisfactory job, not a crack or appearance of settlement having occurred.

Another example of the advantage to be had from concrete is in engine beds or foundation for generators in electric power and light work, a number of which have been built under the writer's supervision. In fact wherever stone or gravel can be had concrete can be economically made. It is peculiarly adapted to trying and difficult locations, as in bridge piers, abutments, chimney caps, foundations under water for dams, docks, wharves, &c. A less section can generally be taken than is required for stone from the fact of its mono-lithic character, greater weight and strength. A principle for guidance is to so design the work as to never leave a sharp or thin corner. In conclusion, a description of a recent test made under the writer's direction will be given as a proof of its unsuitability for fireproofing. A small slab of first-class concrete 2 ft. wide, 3 ft. long and 3 in. thick was very carefully made about 10 months ago, the slab has been kept in an office since it was built and was therefore very hard and dry; for the test a small chamber was built of terra cotta blocks with three closed sides and an ordinary stove-pipe chimney. The slab was used for a cover. A slow, easy fire was kept going for about 3 hours, when the slab had grown quite warm, say about 130 F. It was then fired hard with dry pine for about 20 minutes, when three or four pails of water were thrown on the under side of the slab. The result was a great many cracks appeared in the slab. It was then carefully turned over, when it broke into a great many pieces. Upon further drenching each piece again broke up into smaller ones, which would go to show that concrete is an unsafe and unreliable material where it is liable to be heated and then drenched with water, as would be the case in any building where a fire might occur.

Within the past two years a good many buildings have been "fire-proofed" with concrete, and it would seem that it is a dangerous material for such services. Further experiments on a larger scale and with the usual conditions incidental to city buildings are required before much faith should be given to concrete as a fireproof material. It merely remains to be said that the cost of concrete is much less than good stone or brickwork, requires little or no mechanical skill in the work, one expert mason for a foreman, the rest of the work being done with common labor.

The items that go to make up the cost of a cubic yard of concrete are as follows:

1½ bbls. Portland cement, average cost in car lots \$2.30 per barrel.....	2.87½
½ cubic yard of sand, average conditions, say.....	.37½
1 cubic yard of gravel or broken stone, (average conditions) say.....	.75
Labor, common labor \$1.25 per day, foreman \$3.00, 10 men in gang.....	1.50
Curbing, ordinary simple work as in highway or railway bridges without specially difficult foundations, etc., per cubic yard of concrete.....	.72

Total \$6.22

The writer has had piers and abutments erected complete in place at as low a cost as \$5.00 per cubic yard and as high as \$6.50, local conditions affecting the cost slightly.

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

LAW BROS. & Co.

FOUNDERS AND MACHINISTS



OTTAWA, ONT.
Hydrants
Valves
Waterworks Supplies
Specials

Also CASTINGS of every description.

Send for a copy of the second edition of the CANADIAN CONTRACTOR'S HANDBOOK. Price, \$1.50; to subscribers, \$1.

MERRIFIELD & WESTCOTT
ENGINEERS and CONTRACTORS
— FOR —

WATER WORKS AND GAS PLANTS
269 Front Street East, TORONTO.

WILLIS CHIPMAN, B. A. Sc.,
M. Can. Soc. C. E.; M. Am. Soc. C. E.;
M. Am. W. W. Ass'n.

CIVIL AND SANITARY ENGINEER
Water Works - Sewerage
Sewage Disposal
103 BAY STREET - TORONTO.

GEO. WHITE - FRASER
C.E., D.T.S., A. AM. INST. ELEC. ENG.
CONSULTING

ELECTRICAL ENGINEER
Electric Railways and Electric Light.
SPECIALTY: Specification and Superintendence of
MUNICIPAL PLANTS.
18 Imperial Loan Building - TORONTO

DAVIS & VAN BUSKIRK
Graduates Royal Military College of Canada
- - Civil Engineers - -

SPECIALTY: Municipal Engineering, including
Drainage, Sewerage, Sewage Disposal, Water-
works, Roadways and Bridges.
W. F. Van Buskirk, A. M. Can. Soc. C. E., Stratford.
Wm Mahlon Davis, M. Can. Soc. C. E., Woodstock.

JOHN GALT, C.E. & M.E.
(Member Can. Soc. C. E.)
Consulting Engineer and Expert

Specialties:
Water Supply and Sewerage, etc.
Electric Power, Lighting, Railways, etc.
Offices:
Canada Life Building - TORONTO

ALAN MACDOUGALL
M. CAN. SOC. C. E. M. INST. C. E.

CIVIL AND SANITARY ENGINEER
ABERDEEN CHAMBERS,
35 East Adelaide St. - TORONTO
New Telephone Number, 1252

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

Architects. Ontario Directory..... 111 Quebec Directory... .. ii	Contractors' Plant and Machinery Rice Lewis & Son.... IV	Heating. Gurney Foundry Co 34 McDougall & Co., R. xi King & Son, Warden.. iv Ormsby & Co., A. B. 1 Toronto Radiator Mfg Co..... iii	Roofing Materials Ormsby & Co., A. B. 1 Metallic Roofing Co... vii
Architectural Sculptors and Carvers. Dom. Art Woodwork Company... .. v. i Holbrook & Mollington... .. i Lamar & Metc... .. ii McCormack, W. N. ... ii	Cements. Bremner, Alex..... IV Currie & Co., W. & F. P. xii Maguire Br... .. i Owen Sound Portland Cement Co. ix Rathbun Co., The.... II	Iron. Currie & Co., W. & F. P. xii Ontario Lime Association... .. 111	Reflectors Frink, I. P..... ii
Architectural Iron Work. Dominion Bridge Co. I Chanteloup Mfg. Co. I	Cut Stone Contractors. Isaac Bros..... 111 Oakley & Holmes 111	Legal. Denton & Dod... 111	Roofers Ormsby & Co., A. B. 1 Douglas Bros... .. ix Duthie & Sons, G. ix Hutson, W. D..... ix Rennie & Son, R..... ix Stewart, W. T..... ix Williams & Co., H..... ix
Art Woodwork Dom. Art Woodwork Company..... vii Southampton Mfg. Co. ix	Drawing Tables. Laughlin-Hough Drawing Table Co... .. 11	Mantle Tiles and Grates. Rogers, Son & Co. Charles..... ii	Sanitary Appliances Toronto Steel Clad Bath & Metal Co..... viii
Bricks (Pressed) Beamsville Pressed Brick Co. i Burlington Press'd Brick & Terra Cotta Co. vi Morison, T. A..... xii	Drain Pipe Bremner, Alex..... IV Currie & Co., W. & F. P. xii Hamilton and Toronto Sewer Pipe Co... .. II Maguire Bros.....	Machinery Petrie, H. W..... 111	Shingle Stains Cabot, Samuel..... IV
Bulldozers' Supplies. Bremner, Alex..... IV Currie & Co., W. & F. P. xii Clatworthy, Geo. xi Maguire Bros..... i Ontario Lime Association... .. 111 Rice Lewis & Son.... IV	Elevators Fenson, John..... IV Leitch & Turnbull... I Miller Bros & Toms. v	Ornamental Plasterers. Hynes, W. J..... vii	Stained and Decorative Glass Castle & Son..... v Dominion Glass Co... v Horwood & Sons, H... v McCausland & Son, . v McKenzie's Stained Glass Works..... v Longhurst, H..... v Lyon, N. T..... v
Building Stone Dealers. Clark, Wm..... x Dartnell, E. F..... viii Fish, C. E..... x Samuel & Co., The... iv Turner & Brown... IV	Electric & Gas Fixtures. Keith & Fitzsimmons IV	Paints & Varnishes. Muirhead, Andrew... i	Shingles and Siding Metallic Roofing Co. vii Ormsby & Co., A. B. 1
Builders' Hardware. Gurney, Tilden Co... iv Rice Lewis & Son.... IV	Engravers. Can. Photo-Eng Bureau... .. xii	Painters. Gilmor & Casey... 111	Terra Cotta Rathbun Co., The.... II
Cresote Stains Cabot, Samuel.. . . . IV	Fire Brick and Clay Bremner, Alex..... IV Currie & Co., W. & F. P. xii Maguire Bros..... i	Plasterers Hynes, W. J..... vii	Interior Decoration Castle & Son..... viii Ehott, W. H..... vi
Church and School Furniture. Can. Office & School Furniture Co..... v Snider, J. B..... v	Floor Deafener Lazier & Sons, S. A. 111	Plate Glass McCausland & Son... v The Consolidated Plate Glass Co. ii	Wall Plaster Alabastine Co., The. IV Albert Mfg. Co..... x Hannaford Bros. Mfg. Co..... x Rathbun Co., The.... II
Chimney Topping. Bremner, Alex. IV Currie & Co., W. & F. P. xii	Galvanized Iron Workers. Douglas Bros... .. ix Ormsby & Co., A. B. 1	Parquetry Floors Elliott, W. H..... vi	Window Blinds Seaman, Kent & Co. . v Semmens & Evel... ix
	Grates and Tiles. Holbrook & Mollington i Rice Lewis & Son... IV	Plumbers Ballantyne, James... ii Douville, E..... ii	
	Granite Brunet, Jos..... ii	Prismatic Glass. Prismatic Glass Co... 34	
		Patent Medicines. Ripan's Chemical Co... v	

J. McDOUGALL, C. E.,
ENGINEER OF THE COUNTY OF YORK
GENERAL MUNICIPAL ENGINEER
Consulting Engineer for Municipalities in regard to
Electric Railway and other Franchises.
Specialties: Bridges, Foundations, Electric Railways,
and Roads. Surveys made; Plans, Specifications and
Agreements prepared, and work superintended.
COURT HOUSE, - TORONTO.

E. GARL BREITHAAPT
CONSULTING
Electrical Engineer
ASSOC. MEM. AM INST. E. E.
Electric Lighting and Railway Work
BERLIN, ONT.

FOR ARTIFICIAL STONE PAVEMENTS, ROOFING GRAVEL,
CONCRETE, ETC.
USE CRUSHED QUARTZITE
SILICA SAND & GRAVEL CO.
MONTREAL
Telephone 2444
15 Mill Street.
..... Write for prices delivered in your town.

ARTIFICIAL
STONE
PAVEMENTS.
CORPORATIONS
Will do well to consider our work and prices before
letting contracts.
THE SILICA BARYTIC STONE COMPANY OF ONTARIO, LTD.
Head Office: Ingersoll, Ont.
WALTER MILLS, General Manager



SIDEWALKS
A
SPECIALTY.

Prices of Building Materials.

CONDITION OF THE MARKET.

TORONTO: No improvement can be reported in the general market for builders' supplies. The import glass trade shows the most activity, but as yet is not active. Paints and oils also meet with some demand. Plumbers' supplies are very restricted, particularly for city trade. Galvanized iron, iron pipe and soil pipe and fittings are steady, but devoid of special features.

MONTREAL: Hardware has witnessed some activity in the past week. In glass and paints and oils business is up to the average for the season of the year. The demand for cement continues slow, and the market dull and featureless.

LUMBER.

CAR OR CARGO LOTS.

Toronto, Montreal

Table with columns for item description and prices for Toronto and Montreal. Includes items like clear picks, spruce culls, and various shingles.

VAID QUOTATIONS.

Table with columns for item description and prices for Toronto and Montreal. Includes items like mill cull boards, shipping cull boards, and hemlock scantling.

B. M.

Table with columns for item description and prices for Toronto and Montreal. Includes items like flooring, sawn lath, and various woods.

BRICK—Per M

Table with columns for item description and prices for Toronto and Montreal. Includes items like common walling, good facing, and pressed brick.

Toronto, Montreal.

Table with columns for item description and prices for Toronto and Montreal. Includes roof tiles, ridge tiles, and various building bricks.

SAND.

Table with columns for item description and prices for Toronto and Montreal. Includes per load of 1/4 cubic yards.

STONE.

Table with columns for item description and prices for Toronto and Montreal. Includes common rubble, large rubble, foundation blocks, and various ashlar stones.

SLATE.

Table with columns for item description and prices for Toronto and Montreal. Includes roofing slate in red, purple, and black.

PAINTS. (In oil, per lb.)

Table with columns for item description and prices for Toronto and Montreal. Includes white lead, red lead, venetian, vermilion, and various oils.

CEMENT, LIME, etc.

Table with columns for item description and prices for Toronto and Montreal. Includes portland cements from German, London, and Newcastle.

Toronto, Montreal.

Table with columns for item description and prices for Toronto and Montreal. Includes portland cements, hydraulic cements, and various plasters.

HARDWARE.

Table with columns for item description and prices for Toronto and Montreal. Includes cut nails, steel, and various hardware items.

FINISHING NAILS.

Table with columns for item description and prices for Toronto and Montreal. Includes various sizes of finishing nails.

SLATING NAILS.

Table with columns for item description and prices for Toronto and Montreal. Includes various sizes of slating nails.

COMMON BARREL NAILS.

Table with columns for item description and prices for Toronto and Montreal. Includes various sizes of common barrel nails.

CLINCH NAILS.

Table with columns for item description and prices for Toronto and Montreal. Includes various sizes of clinch nails.

SHARP AND FLAT PRESSED NAILS.

Table with columns for item description and prices for Toronto and Montreal. Includes various sizes of sharp and flat pressed nails.

STEEL WIRE NAILS.

Table with columns for item description and prices for Toronto and Montreal. Includes steel wire nails with 75% discount.

Iron Pipe:

Table with columns for item description and prices for Toronto and Montreal. Includes iron pipe of various diameters.

Lead Pipe:

Table with columns for item description and prices for Toronto and Montreal. Includes lead pipe of various diameters.

Galvanized Iron:

Table with columns for item description and prices for Toronto and Montreal. Includes galvanized iron of various gauges.

Structural Iron:

Table with columns for item description and prices for Toronto and Montreal. Includes structural iron beams and plates.