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# THE CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL

PUBLIC WORKS • TENDERS •  
ADVANCE INFORMATION •  
AND MUNICIPAL PROGRESS

EVERY WEDNESDAY

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. 10.

JANUARY 10, 1900

No. 50

**THE CANADIAN CONTRACT RECORD,**  
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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 paper.

## TENDERS FOR BRIDGE

Sealed tenders, addressed to George Stewart, Esq., County Clerk, Peterborough, will be received up to TUESDAY, JANUARY 23RD, 1900, at four o'clock p.m., for

### Floating Bridge and Approaches

over Chemong Lake. Bulk and separate tenders received.

Plans, etc., may be seen at the office of J. E. Belcher, Esq., County Engineer, Peterborough. An accepted cheque for five per cent. must accompany each tender. The lowest or any tender not necessarily accepted.

(Sgd.) E. HAWTHORNE,  
Warden.

## TENDERS

Will be received by the undersigned, on behalf of the County of Huron, at the Wingham Post-Office, until 4 o'clock p.m. on SATURDAY, THE 20TH DAY OF JANUARY NEXT, 1900, for the erection of a

### Steel Bridge

on the boundary line between the Townships of Morris and East Wawanosh, about one-half mile south of Wingham, to be of one span of 100 feet clear between the abutments, roadway 16 feet wide clear between trusses, trusses to have seven panels each, and 18 feet high from pin to pin.

Joists, 3 x 12 inches, placed at two feet centres, to be of rock elm. Floor planks to be 3 inches thick and from 6 to 10 inches wide, securely spiked to all joists (to be of rock elm or tamarac). Wheel guard, 6 x 6 inches, of pine or cedar. Railing to be 4 feet high, of 3 tiers of 1 1/2-inch gas pipe.

The bridge will be supported on concrete abutments, about 12 feet from bed of stream to floor. Bridge finished on or before the 15th of August next. A good place to erect a bridge.

The lowest or any tender not necessarily accepted.

JOHN ANSLEY,  
County Commissioner.

Wingham, Dec. 28th, 1899.



Sealed tenders, addressed to the undersigned, and endorsed "Tender for Extension of West Pier, Eastern Entrance Toronto Harbor," will be received at this office until TUESDAY, THE 23RD JANUARY INSTANT, for extending and repairing the West Pier at the Eastern Entrance to Toronto Harbor, according to a plan and specification to be seen at the office of E. B. Temple, Esq., Resident Engineer, Confederation Life Building, Toronto, and at the Department of Public Works, Ottawa.

Tenders will not be considered unless made on the form supplied and signed with the actual signatures of tenderers.

An accepted bank cheque, payable to the order of the Minister of Public Works, for ten thousand dollars (\$10,000), must accompany each tender. The cheque will be forfeited if the party decline the contract or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

A. GOBEIL, Deputy.

Department of Public Works,  
Ottawa, 3rd January, 1900.

Newspapers inserting this advertisement without authority from the Department will not be paid for it.



## WELLAND CANAL

### NOTICE TO CONTRACTORS

Sealed tenders, addressed to the undersigned, and endorsed "Tender for Improvements at Port Colborne," will be received at this office until 1 o'clock on FRI DAY, THE 20TH DAY OF JANUARY, 1900, for the works of improvement at the upper entrance to the Welland Canal.

Plans and specifications of the works can be seen on and after the 26th day of December, 1899, at the office of the Chief Engineer of the Department of Railways and Canals, Ottawa, and at the Superintending Engineer's office at St. Catharines. Printed forms of tender can also be obtained at the places mentioned. In the case of firms there must be attached to the tender the actual signatures of the full name, the nature of the occupation and residence of each member of same, and, further, an accepted bank cheque for the sum of \$10,000 must accompany the tender. The accepted bank cheque must be endorsed over to the Minister of Railways and Canals, and will be forfeited if the party tendering declines entering into contract for the work at the rates and on the terms stated in the offer submitted.

The accepted bank cheque thus sent in will be returned to the respective parties whose tenders are not accepted.

The Department does not bind itself to accept the lowest or any tender.

Contractors are specially notified that the conditions requiring the works to be wholly completed by the 20th day of June, 1902, will be rigidly enforced and all penalties for delay enacted.

By order.

L. K. JONES,  
Secretary Dept. Railways and Canals.

Department of Railways and Canals,  
Ottawa, December 21, 1899.

Theo. Goulet & Co., contractors, Montreal, have assigned. A meeting of creditors will be held on the 11th inst.

### CONTRACTS OPEN.

PARRSHORO, N. S.—D. Huntley will erect a saw mill.

PERTH, ONT.—The need of an electric fire alarm system is being agitated.

FENWICK, ONT.—L. Jones purposes erecting a fine residence next spring.

MONKTON, ONT.—There is talk of a brick block being built here next spring.

LINWOOD, ONT.—Henry Pomeroy purposes building a residence in this village.

BRIDGEBURG, ONT.—The waterworks by-law was defeated by the ratepayers on January 1st.

DRUMMOND, ONT.—Daniel Walsh invites tenders up to 17th inst. for building cheese factory.

ST. HENRI, QUE.—The Merchants Cotton Co. contemplate a further extension next spring.

COOPER'S FALLS, ONT.—It is reported that the store and post office building at Barkway will be rebuilt.

MURRAY HARBOR SOUTH, P.E.I.—A steel bridge is to be erected over the South river at this place.

DAUPHIN, MAN.—The town authorities are considering the purchase of a fire engine and other apparatus.

ORANGEDALE, C. B.—The new brick company have put in the foundations of three large sheds to be built.

MIDLAND, ONT.—The by-law to provide funds for building addition to public school was defeated last week.

DARIMOUTH, N.S.—E. J. H. Pauley has purchased a site, corner Pleasant and Albert streets, on which to build a residence.

ALMONTE, ONT.—The by-law to raise \$10,000, largely for laying granolithic sidewalks, has been defeated by the ratepayers.

WINCHESTER, ONT.—By a vote of the ratepayers, exemption from taxation has been granted on a proposed pork packing factory.

TRURO, N.S.—It is understood that the Truro Foundry & Machine Co. contemplate installing an electric plant for lighting their works.

EPPING, ONT.—Chas. W. Hill desires manufacturers of school desks and seats to write him quoting prices for single and double desks.

PORT ARTHUR, ONT.—The by-law granting \$50,000 for the construction of the Rainy River Railway was carried almost unanimously.

VICTORIA, B.C.—F. G. Vernon has had plans prepared for additions and alterations to the Vernon block, corner View and Douglas streets.

ARTHUR, ONT.—Authority will be asked at the next session of the provincial legislature to issue debentures to pay off indebtedness of the village.

SARNIA, ONT.—By-laws to extend the trunk sewer and the water mains and to

establish a public library were carried by a substantial majority on January 1st. The hall improvement by-law was defeated.

**TREHERNE, MAN.**—B. Eaglewin intends to build a large store.

**VERNON, B. C.**—The corporation is offering for sale \$7,000 of debentures.

**GRAND FORKS, B. C.**—Mr. Newlands, architect, has completed the plans for new hospital.

**WEST SELKIRK, MAN.**—Surveyors have commenced to lay out the C. P. R. line north from here.

**COBOURG, ONT.**—A New York capitalist has purchased property here on which to build summer cottages.

**PORT COLBORNE, ONT.**—It is understood that the Dominion government purposes constructing a breakwater at this place to protect the harbor.

**KAMLOOPS, B. C.**—It is the intention of Hugh Henderson, proprietor of the Le Roi brewery, to erect a large three-storey building, to cost, with plant, \$10,000.

**PORT HOPE, ONT.**—At next session of the legislature the town will make application for authority to raise \$20,000 by debentures for extending the waterworks system.

**NEWCASTLE, N.B.**—J. C. Brown, of Richibucto, was here recently in connection with the project of building a railway from this place to the pulp mill near Chatham.

**TORONTO JUNCTION, ONT.**—The Mayor, in his inaugural address, advocates the discontinuance of the incandescent electric lights and their replacement by arc lights.

**HALIBURTON, ONT.**—The preliminary survey for the railway extension to Whitney is nearing completion, and the work of construction will commence in the early spring.

**CHATHAM, ONT.**—J. L. Wilson & Son, architects, are preparing plans for new residences for D. Winters, of Bothany, Douglas McCoig, of Mull, and John Doyle, of Raleigh.

**SMITH'S FALLS, ONT.**—Willis Chipman, C.E., of Toronto, is preparing plans for another section of the sewerage and waterworks systems. It is the intention to invite tenders early in the spring.

**TRENTON, ONT.**—By-laws granting bonuses to Gilmour & Co., Miller & Co., and the Furniture Manufacturing Company, to assist in establishing industrial works, were carried on January 1st.

**DUNNVILLE, ONT.**—The town will ask authority from the Ontario legislature to raise \$10,000 by debentures for the purpose of assisting Francis R. Lalor in the construction of a canning factory.

**HARRISTON, ONT.**—The town will seek authority from the legislature to grant a bonus of \$20,000 to the Harriston Pork Packing Co., the money to be raised by the issue of debentures.

**ARNPRIOR, ONT.**—The vote on the waterworks by-law resulted in favor of the construction of a system. It is believed that the ratepayers will also approve of the construction of a sewerage system.

**ROSSLAND, B. C.**—Wm. Henderson, Dominion government architect for public buildings in this province, has recommended four sites for the post office and custom house building to be built at this place.

**DUNDAS, ONT.**—The proposed improvements to the Methodist church, according to specifications, include new windows, new floor, addition to gallery and new seats. The cost will be about \$4,000.

**LONDON, ONT.**—The British American Furniture Co., Limited, has been incorporated. The head office is to be in To-

ronto, and the provisional directors include W. R. Hobbs and T. S. Hobbs, of this city.

**WOODSTOCK, ONT.**—Wallace & Little, solicitors, have made application for the incorporation of the Woodstock, Thames Valley & Ingersoll Electric Railway Co., to construct an electric railway connecting the points named.

**PORT HOOD, N.S.**—It is reported that the company which is developing the coal areas at this place will install new machinery and build a large shipping pier next spring. Halifax capitalists are interested in the company.

**ST. CATHARINES, ONT.**—The Board of Trade has passed a resolution asking the council to take steps to secure legislation granting the corporation the right to develop power and erect factories as an inducement to manufacturers to locate here.

**VANCOUVER, B.C.**—Campbell, Rannie & Ironsides have made a proposition to the city to extend the city wharf a distance of 75 feet for the sum of \$4,000.—Ross & Fee are inviting tenders for the erection of two residences on Burnaby street.

**HAMILTON, ONT.**—The Cataract Power Company are considering the extension of the radial railway system to Oakville. It is also probable that the Toronto Railway Company will extend their road to Oakville, thus completing an electric line between Hamilton and Toronto.

**LUNENBURG, N.S.**—The Lunenburg Waterworks Company, which has up to the present been supplying private users only, has made a proposition to the town council to put in 48 hydrants for fire protection purposes. The question will likely be considered at an early meeting of council.

**FORT WILLIAM, ONT.**—The by-laws granting \$50,000 to the Mattawan Iron Mining Co. for the establishment of a blast furnace, and \$85,000 for a copper furnace, have received the approval of the ratepayers.—The council has selected the McKellar property on Main street as a site for the proposed post-office building.

**HULL, QUE.**—Mr. Farley, city engineer, is at present preparing plans for the new electric light power house to be built on Brewery creek. It is the intention of the council to install the necessary plant at once, for which tenders will be invited. There will be two 50-light dynamos, although 75 lamps only will be at first installed. There will be about eight miles of wire.

**QUEBEC, QUE.**—The Quebec Bridge Company will apply to parliament at the coming session for an extension of time in which to build the bridge and for the right to carry electric wires over the bridge.—It is reported that Col. J. T. Outterson and associates, of Watertown, N.Y., have purchased spruce lands in Bonaventure county, and will erect extensive pulp mills. The papers are said to have been signed, and the work of erecting the mill will likely be commenced at once.

**SAULT STE. MARIE, ONT.**—F. H. Clergue, manager of the Sault Ste. Marie Pulp Company, is authority for the statement that the Ontario & Lake Superior Company, composed of New York and Philadelphia capitalists, contemplate establishing at this place reduction works to cost \$1,500,000, chemical works to cost \$500,000, alkali works to cost \$1,500,000, sulphite pulp mill to cost \$250,000, and steel rail mill to cost \$2,500,000. The reduction and refining works are now under construction.

**WELLAND, ONT.**—The School Board have accepted the plans submitted by J. A. Ellis, architect, of Toronto, for a central school building, and instructions have been given to invite tenders for erection,

the plumbing and heating to be a separate tender. The secretary of the School Board is John McGaw.—The Fire & Light Committee has been instructed to communicate with the Welsbach Gas Light Company regarding the lighting of the streets by gas.

**WINNIPEG, MAN.**—The by-law to provide funds for the establishment of a crematory was carried by the ratepayers by a majority of 580.—The Committee on Works has recommended the construction of the following works: Macadam pavement on York avenue, Main to Smith street, cost \$2,800; on Spadina avenue, Priscilla to Pembina street, cost \$8,100; on Harriet street, William street to Notre Dame avenue, cost \$3,600; sewer on Yonge street, Portage to Nellie avenue, cost \$1,700.—C.P.R. surveyors are now making an estimate of the cost of double-tracking the line between this city and Fort William.

**MONTREAL, QUE.**—Mrs. Peter Red path, of Chislehurst, has donated a large sum of money to McGill University for the purpose of building an addition to the present library.—The Harbor Improvement Committee have asked the harbor engineer to report as to whether the widening of Commissioners street, opposite Bonsecours market, and the building of the flood protection wall, could be undertaken this year in connection with the work now commenced and proposed.—The harbor engineer has recommended that additional plant be obtained, to consist of a powerful dredge, a floating derrick, four scows and several smaller items of plant, the whole to cost about \$75,000. Specifications will be prepared and tenders invited in about a fortnight.—Viau & Frere, biscuit manufacturers, have purchased additional property on Notre Dame street and will rebuild on a large scale.

**OTTAWA, ONT.**—It is the intention of the Ottawa Forwarding Co. to rebuild the steamer Welshman this winter. Oak timber will be used.—Robert Surtees, C.E., late city engineer, has been appointed consulting engineer of the government commission appointed to expend \$60,000 annually in beautifying the city. S. E. O'Brien is secretary of the commission, and the office is at 110 Wellington street.—It is said that twelve tenders have been submitted for the construction of the Trenton-Frankford section of the Trent canal.—W. E. Place is building two detached brick veneered residences on Bay street, to cost \$1,500 each.—It is stated that the Ottawa & Georgian Bay canal will be commenced this year.—E. F. E. Roy, secretary Department of Public Works, will receive tenders up to Tuesday, January 23rd, for the construction of stone piers and two abutments for an iron bridge to be erected over the Ottawa river, opposite Portage du Fort. Accepted bank cheque for \$1,500 to accompany tender.—The secretary of Department of Public Works advises that the contract for the post office and warehouse building at Victoria, B.C., has not yet been awarded.—The building committee of the county council met last week and arranged for the preparation of plans for the proposed addition to court house.—The city engineer is taking levels for the subsidiary drainage system of the city, and the work will be proceeded with in the spring.—The new dredge to be built this winter by the Dominion government will be of British Columbia timber.—Alfred Slack, of Le Breton street, is building a brick veneered dwelling on Patterson avenue, cost \$2,300.—J. L. Morris, C.E., of Pembroke, has been surveying the route of the proposed track for the C.P.R. west of Queen street to the central depot.—It is probable that a factory will be erected at the Chaudiere next spring for the mechanical treatment of sawdust.

**TORONTO, ONT.**—The Robert Simpson Co. are now pulling down two store buildings facing on Yonge street for the purpose of erecting on the site an addition to their large departmental store. Burke & Horwood are the architects.—The plans of J. A. Ellis, architect, of this city, have been accepted for a new central school at Welland, for the erection of which tenders will be invited this week.

The Department of Public Works at Ottawa invite tenders up to Tuesday, 23rd inst., for extending and repairing the west pier at the eastern entrance to Toronto harbor. This is an extensive work, and an accepted cheque for \$10,000 is required with each tender. Plans at office of E. B. Temple, resident engineer, Confederation Life Building.—The Minister of Public Works is considering the advisability of erecting a building for the annual provincial fat stock show.—A meeting to consider the advisability of establishing a college of domestic science in this city was held last week. Mrs. Coleman Stuckert, the originator of the scheme, stated that they had a suitable site for the building in view and that many prominent people had promised financial aid.—A deputation, composed of Rev. Dr. Potts, Rev. Chancellor Burwash, and others, interviewed the Premier a few days ago with reference to the establishment of a women's residence in connection with Victoria University, on a strip of land lying north of the present building. The regents of the university have the sum of \$50,000 to proceed with the scheme, the gift of the late H. A. Massey.—At the next session of the legislature Hon. John Dryden, Minister of Agriculture, will probably bring in some legislation in connection with the establishment of cold storage plants in different parts of the province.—Plans have been completed for the new wharf, freight and baggage sheds and offices to be built for the Richelieu & Ontario Navigation Co. and Hamilton Steamboat Co., and tenders for the work will be invited at an early date. The wharf will be 357 feet long and 54 feet wide, and will support a shed 264 x 54 feet. The cost will be about \$23,000. The Niagara Navigation Co. purpose making alterations and improvements to their present quarters at foot of Yonge street, and it is said that negotiations are pending with the C.P.R. for the erection of an elevator in the same vicinity.—McMurrich, Coatsworth, Hodgins & McMurrich are solicitors for the Huntsville & Lake of Bays Railway Co., which proposes constructing a railway from Lake of Bays to Peninsula Lake and Hollow Lake.—Building permits have been granted as follows: F. B. Poucher, two pair semi-detached two-storey and attic brick dwellings, west side Parliament street, near Duke, cost \$8,000; John Taylor & Company, one-storey brick boiler house and two-storey brick stable, Front street east, near Beachell, cost \$3,500 (Jas. Crang, builder; J. W. Siddall, architect); F. A. Snider Estate, four-storey brick and cut stone warehouse, 78 Bay street, cost \$6,000 (Synmons & Rae, architects; Wickett Bros., builders).—Ald. Spence has given notice that he will move in council that the city engineer be requested to report upon the most desirable plan for an overhead bridge crossing the C.P.R. tracks at the foot of Yonge street.

#### FIRES.

Macdonald block at Ridgetown, Ont., occupied by H. M. Green's hardware store, P. Baddin's drug store and several offices; loss on building, \$15,000.—Burnier & West's drygoods store on St. Catharines street, Montreal, damaged to the extent of \$30,000.—Brick block at Dundalk, Ont., owned by J. O. Morgan; loss on building, \$3,000.—Residence of Wm. Corwell, at Eardley, Ont.; loss \$1,200.—Stave mill at Woodslee, Ont., owned by H. C.

Rees; loss \$3,000.—Saw mill of J. McDermott at Old Fort, Ont.; loss \$2,500, no insurance.—Residence of Frank Kirkpatrick, about four miles from Bradford, Ont.; loss \$3,000, insurance \$900.

#### CONTRACTS AWARDED.

**BEAR RIVER, N.S.**—The contract for removing piers at mouth of Bear river has been let to O. S. Clarke.

**MARYSVILLE, N.B.**—Contract for building post-office has been let to Joshua Limerick, of Fredericton.

**REVELSTOKE, B.C.**—W. A. Nettle has secured contract for building fire hall, at \$1,681. The galvanized iron roof will be furnished by W. M. Lawrence.

**MONTREAL, QUE.**—The Harbor Improvement Committee have recommended the acceptance of the following tenders for supplies: Cut stone coping and cut stone for ashler, T. Lessard; broken stone, A. & H. Lionais; cement, St. Lawrence Portland Cement Company; sand, Montreal Sand & Gravel Company.

#### PORTLAND CEMENT MORTARS.

Since about the year 1886 numerous experiments have been undertaken with the object of definitely ascertaining the effect produced by variations in the volumes of mortars composed of Portland cement, one of the greatest constructive materials ever placed at the disposal of the architect, the engineer, and the builder. It was not, however, until very recently that the experiments were extended to the investigation of the same subject in connection with armoured concrete and masonry, which have been applied to so many purposes with perfect success as to constitute a veritable new type of construction. It should be mentioned that the introduction of the metallic element in the mass seriously complicates the whole question and gives rise to the development of internal stresses. Evidently, therefore, in order to thoroughly study the matter, it became imperative to conduct the experiments upon a duplicate system, so as to institute a comparison between armoured and non-armoured specimens, which has just been effected by M. Considere, with results that are both sufficiently interesting and instructive to deserve a short notice and description. The test specimens took the form of prisms armoured and unarmoured. Some were immersed in clean water, and others exposed to the action of the open air, and all variations of their length were recorded by means of a micrometer screw reading to 0.0004 in.

Commencing with the test samples placed in water, four were manufactured, their dimensions being 2.4 in. by 1 in. by 2 ft. in total length. Two of these prisms were composed of pure cement mortar, and the other two consisted of cement and sand in the proportion by weight of nearly one of the former to two of the latter, which is a very usual admixture for specimens made for the purpose of testing. One prism of each separate pair was unarmoured, and the others reinforced by the presence of a rod of iron 0.4 in. in diameter passing through its vertical axis. One of the first results established was that the elongation of the prisms was not

a matter of mere haphazard, but that their extensions obeyed a regular law, accompanied by a daily diminution in the rate of elongation the longer the specimen was under trial. These experiments lasted for two months; but by comparing them with similar tests carried out during some years both in France and Germany, the following conclusions may be fairly relied upon as furnishing a good average satisfactory conclusion. The elongation of the sample pieces of pure unarmoured Portland cement mortar immersed in clean water amounted to 0.02 in. in one month to 0.04 in. in a year, and to 0.08 in. at the end of three years. It should be observed with attention that the dilation of the specimens composed of sand and cement were three times less than that of those of pure cement. It was also ascertained with respect to the armoured specimens that the metallic rods acted like regular dynamometers, and registered very faithfully by their extension the amount of stresses which brought about their elongation. The whole investigation demonstrated that the metallic material in the prism immersed in water take a far greater portion of the tensile stresses, which is just what is constructively wanted in the combination, than is usually allowed for. There can be no doubt that this extension, which places the metallic rods, bars, or whatever section may be employed under an initial tensile stress, is of great advantage to this compound type of construction. It imparts to mortar of pure cement a superiority over all others in the case of armoured samples under water, owing to the fact that its dilatation is considerably in excess of that of all other mortars and concretes.

We have now to consider the case of the prisms of simple mortar and cement exposed to the action of the air, which, instead of expanding, are subject to contractive forces, and, in addition, do not follow any regular law or what is termed any mathematical series. But, in contradiction to these examples, the results obtained for armoured prisms of pure cement demonstrate unmistakably that they contract in accordance with a well-defined and regular law, and that they differ in this respect from the unarmoured cements. It has also been proved that the internal tensile stress, which is developed without any apparent signs of injury in a prism of cement by the action of the metallic combination with it, approaches very closely to the breaking stress of an armoured specimen of the same age. It is evident, therefore, that the armoured concrete, to use its best known term, possesses certain qualities which are not to be found in the ordinary simple material. If it were not so, there would not have been so many examples of large span bridges constructed abroad upon that system, and it is a little difficult to account for the fact that hitherto the principle has not been applied to any extent worth mentioning among ourselves.—C. T., in Building News.

Chas. Nardonne, contractor, Longueuil, Que., is reported to have assigned,

# MUNICIPAL DEPARTMENT

## THE MAIN DRAINAGE OF OTTAWA.

(Continued from last issue.)

At the crossing of the Rideau river two 5-foot steel pipes were substituted for the 7-foot brick sewer. The steel pipes used are the same as those on the outfall sewer. They are fastened in place by wrought iron anchor bolts 1 3/8 inches in diameter and of sufficient length to reach from the height of the center of the pipe to a point 3 feet 6 inches below the surface of the rock. The bolts are split at the lower end, and with the necessary wedge, are driven on each side of each pipe and wedged tightly in holes specially bored in rock for that purpose. Passing over the tops of the pipes, and connected to these anchor bolts, are wrought iron bands 4 inches wide and 3/4 inch thick. These bands and bolts are spaced 25 feet center to center along each pipe. After a sufficient length of pipe had been laid, concrete was filled in on both sides of the pipes at the same time in layers not exceeding 6 inches in depth, care being taken to ram and tamp each layer tightly around and under the pipes. This concrete filling was carried up to an elevation of 4 inches above the top of the pipes and for the full length and width of the trench. No concrete was placed under water. This substitution of steel pipes for the brick sewer was made principally to gain 3 feet of head room between the sewer and the bottom of the river for use in case the river should be deepened in the future. The length of this crossing is about 475 feet. At the upper end of the crossing is a connecting chamber between the 6-foot brick sewer and the double line of pipes. It is rectangular in plan, about 8 x 10 1/2 feet in size, and built of brick, except at the bottom, which is of scoria blocks laid on a foundation of concrete. On the lower side chamber is a block of cut stone to divide the flow between the two pipes. There is also a connecting chamber with the 7-foot brick sewer at the lower end of this crossing.

The larger sizes of the sewers are built with three rings of brick work. On steep slopes scoria blocks are substituted for the

(Continued on page 6.)

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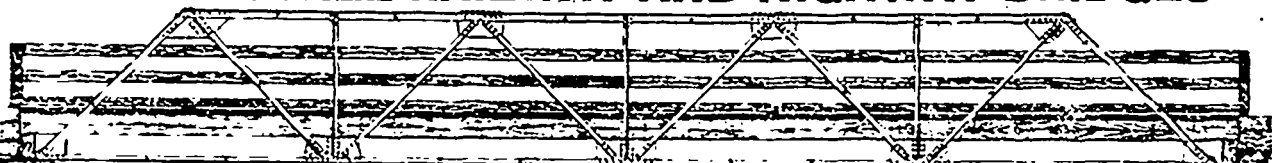
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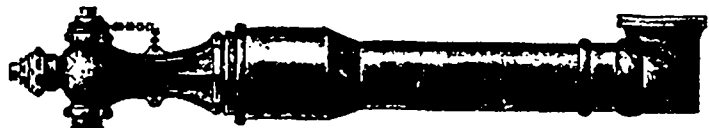
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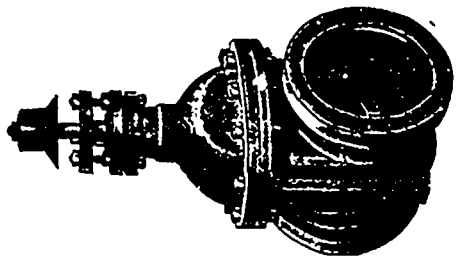


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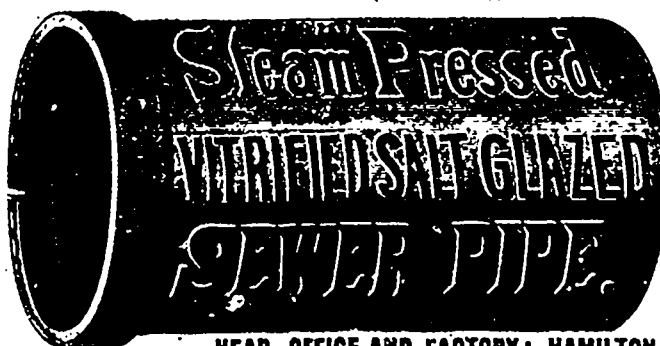
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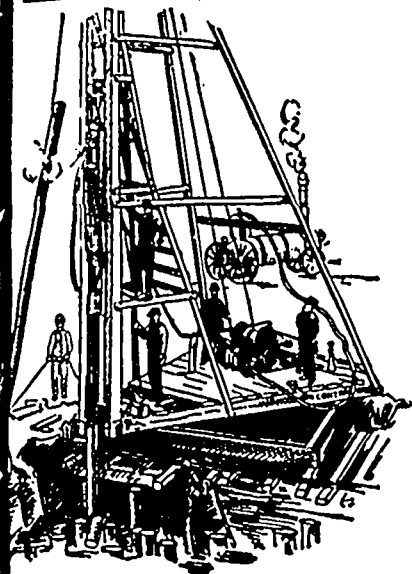
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inside ring of bricks on the invert of the sewer and where the sewers are in rock excavation, the outside ring of bricks is omitted on the lower half of the sewer and concrete is substituted, being packed solid between the bottom of the trench and the sewer. In places on steep slopes the large sewers are built in steps to avoid excessive slopes. These steps are spaced 20 feet apart and are made by means of reversed vertical curves dropping two feet vertical in a horizontal length of 6 feet. The private drain connections are made with tile pipe and enter the sewers at the springing line. In deep trenches in rock cut these branches are carried up vertically several feet to the trench, quarter heads being used at both ends of the vertical portion, the lower one resting on concrete.

All of the work is now under contract. The third section includes a crossing under the Rideau canal, and because of the advisability of making this crossing in winter, when the water was out of the canal, this section was let first. It was let last February to Joseph Bourque, of Hull, for a lump sum tender of \$127,225, and at the present time is under construction. The first and second sections were let last April to O'Leary & Robillard of Ottawa, for a lump sum tender of \$226,119, and the work is progressing favorably. The fourth section was let last July to Stuart & O'Leary of Ottawa, for \$88,653, and a length of about 1,000 feet has been completed at the present time. The total length of the system is about 6½ miles, and has been let as above, for \$441,997. The great cost is on account of heavy rock cutting, which extends over nearly the entire system. On the first section a 34-foot cut is entirely through a refractory limestone rock, and in other places slate-shale is found. The estimated quantity of rock for the entire system is 81,200 cubic yards. The sewers are built in a most substantial manner of the best material, and under rigid inspection. Hard burned bricks are used and are laid in Portland cement mortar made of one part cement and three parts sand.

On sections one, two and three, travelling derricks with steam hoists are used, and on section four, two Moore hoists are in use. Six inch centrifugal pumps, operated by electricity, are used on all of the sections to remove water, and are giving good satisfaction. Pulsometers are in use ahead of the brickwork in rock formation, as they are easily taken out and replaced while blasting. The tributary systems are now being mapped out; the principal one is for a section called "The Glebe," located in the south-western part of the city. Construction work is to begin here next spring, and the estimated cost is about \$100,000.

#### IMPROVEMENTS AT VICTORIA, B.C.

Under the auspices of Mayor Redfern, who has guided the destinies of the city of Victoria for three years, there has been completed a permanent roadway pavement on Fort street in wooden blocks (fir and coal tar), from Government street to Douglas street, on the local improvement plan, the city and the proprietors on each side of the street paying equal portions,

that is, one third each. To do this the roadway was disturbed to a depth of 18 inches—the material removed making a good facing for a new street then forming. A solid concrete foundation of 8 inches was carefully laid down, rammed and graded; 6 in. fir blocks on edge were laid on this after being thoroughly dipped in boiling tar, cement and sand finish, extra care being taken with the rails and sleepers, as this thoroughfare is provided with tram car accommodation. At the conjunction with Government street and for many yards beyond, the car rails were very heavy, 6 in. deep, probably 75 lb. to the yard, laid on sleepers, in such form that an independent support of cement and gravel was provided and worked in under the rails, so that on the decay of the timber sleepers, the rails would still carry, bridge-like.

The permanent sidewalks for the same extent of street are composed of gravel, concrete or rammed earth or broken stone, and finishing with sand and inch cement, to a wood curb. Government street has also been provided with permanent sidewalks to the extent of nearly half its length and a portion with cement gutters. Part of the cost is met by the electric railway company.

To render the improvement more valuable, preparation had been made by

changing and improving water pipes, etc., and numerous brick wells provided to reach the stop cocks to mains. Everyone admires the neatness of appearance of the roadway, the discarding of crossings, the absence of gutters, and the facilities it offers for cleaning.

The street pavement cost in the neighborhood of \$2.75 per square yard, and the foot sidewalk about \$1.75 per foot run. The whole width of sidewalks is from 10 to 12 feet wide.

Victoria, B.C., a city of 25,000 inhabitants, expended \$40,000 on the fire department during the first nine months of this year. Headquarters fire hall contains six pieces of fire apparatus, valued at \$30,000, and eleven horses. It is the largest and best equipped fire hall on the Pacific coast.

Mr. Hugh Sparks, of Hintonburg, Ont., has invented a machine for distributing sand on sidewalks. It has been tested by the city engineer of Ottawa, who believes that it will result in a saving to the city. The machine consists of a hopper mounted on two wheels and drawn by a horse. The hopper is filled with running sand, which, by means of vibrating power, drops through a horizontal disc, which moves as the hopper is drawn along. The sand is sprinkled evenly or varied to suit the circumstances.



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" black.....	7 50	6 50
Terra Cotta Tile, per sq.....	20 00	25 00
Ornamental Black Slate Roofing.....	8 80	6 80

### CEMENT, PORTLAND, ETC.

Portland Cement -			
German per lb.....	2 90	3 10	2 55 2 65
London ".....	2 90	3 00	2 25 2 45
Newcas ".....	2 70	3 00	1 95 2 10
" Josen's Brand Portland ".....	3 25	3 25	2 70 2 80
" Dyckerhoff ".....	3 05	3 25	2 75 2 90
North's "Condor".....	4 05	4 10	2 65 2 80
English, artificial, per bbl.....	2 85	3 00	2 35 2 45
Belgian, natural, per bbl.....	2 10	2 25	2 00 2 20
Canadian, artificial, ".....	2 85	3 00	2 60 2 70
Roman ".....			2 20 2 25
Parian ".....	1 75	5 25	5 75 5 75
Keene's Superfine "Whites".....	1 10	12 00	0 10 10 00
Keene's Coarse "Whites".....	8 00	8 50	8 50 9 00
" Karlstadt " (German).....	3 05	3 25	2 75 2 90
" Germania " (German).....	3 05	3 25	2 75 2 90
" Rooster " (Belgian).....			2 15 2 20
" Keystone " (Belgian).....			2 15 2 20
" Anvil " (Belgian).....			1 95 2 05
" Burham " (English).....	2 95	3 00	2 25 2 45
Hydraulic Cements -			
Thorold, per bbl.....	1 50		1 65
Queer-stone, ".....	1 50	1 50	1 60
Napanee, ".....	1 50		1 50
Hull, ".....	1 50		1 50
Ontario, ".....	1 25		

Fire Bricks, Newcastle, per M.....	30 00	35 00	16 00	21 00
" Scotch.....	30 00	35 00	16 00	21 00
Lime, 100 lbs., Grey.....			25	
" " White.....			30	
Plaster, Calcined, N. B.....			2 00	1 00
" " N. S.....			2 00	1 00
Hair, Plasterers', per bag.....	80	1 00		

### HARDWARE.

The following are the quotations to builders for nails at Toronto and Montreal:

Cut nails, 50d & 60d, per keg.....	2 65
Steel " " ".....	2 75

### CUT NAILS, FENCE AND CUT SPIKES.

40d, hot cut, per 100 lbs.....	2 65
10 to 12d, hot cut.....	2 75
8d, 9d, " ".....	2 80
6d, 7d, " ".....	2 95
4d to 5d, " ".....	3 05
3d, " ".....	3 30
2d, " ".....	3 65

Cut spikes, 10 cents per keg advance.  
Steel Nails, 1c. per keg extra.  
Wire nails, 3-40 base price.

### Iron Pipe:

Iron pipe, 1/2 inch, per foot.....	6c.
" " 3/4 " ".....	7
" " 1 " ".....	8 1/2
" " 1 1/4 " ".....	12
" " 1 1/2 " ".....	17
" " 2 " ".....	24
" " 2 1/2 " ".....	30
" " 3 " ".....	43

### Lead Pipe:

Lead pipe, per lb.....	7c.
Waste pipe, per lb.....	7 1/2 cent.

### Galvanized Iron:

Adam's-Mar's Best and Queen's Head and Opolds	
16 to 24 gauge, per lb.....	4 1/2c. 4 1/2c.
26 gauge, ".....	4 1/2c. 5 1/2c.
28 ".....	5 5 1/2c.
Gordon Crown -	
16 to 24 gauge, per lb.....	4 1/2c. 4 1/2c.
26 gauge, ".....	4 1/2c. 4 1/2c.
28 ".....	4 1/2c. 5 1/2c.

Note.-Cheaper grades about 1/4c. per lb. less.

### Structural Iron:

Steel Beam, per 100 lbs.....	2 75
" channels, ".....	2 85
" angles, ".....	2 50
" tees, ".....	2 80
" plates, ".....	2 55
Sheared steel bridge plate.....	