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CANADIAN CONTRACT RECORD

A WEEKLY OF
PUBLIC WORKS • TENDERS •
ADVANCE INFORMATION •
AND MUNICIPAL PROGRESS

EVERY SATURDAY

Vol. 3.

Toronto and Montreal, Canada, December 3, 1892.

No. 43

THE CANADIAN CONTRACT RECORD, PUBLISHED EVERY SATURDAY

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Telephone 2362.

54 Temple Building, Montreal.
Bell Telephone 2299

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

ADVERTISING RATES ON APPLICATION.

At its Convention held in Toronto, Nov. 20 and 21, 1889, the Ontario Association of Architects stipulated its approval of the CANADIAN CONTRACT RECORD, and pledged its members to use this journal as their medium of communication with contractors with respect to advertisements for tenders.

The following resolution was unanimously adopted at the First Annual Meeting of the Province of Quebec Association of Architects, held in Montreal, Oct. 10th and 11th, 1890: "Moved by M. Perrault, seconded by A. F. Dunlop, that we the Architects of the Province of Quebec now assembled in Convention being satisfied that the CANADIAN CONTRACT RECORD affords us a direct communication with the Contractors, Resolved, that we pledge our support to it by using its columns when calling for Tenders."

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.

PEMBROKE WATER WORKS.

Notice to Contractors.

Sealed Tenders will be received by the Chairman of the Waterworks Committee, Pembroke, until 6 p.m. on FRIDAY, DECEMBER 9TH, 1892, for the construction of a System of Water Works for the Town of Pembroke, as follows:—

- A—Intake pipe and well.
- B—Buildings and Chimney.
- C—Pumping machinery and boilers.
- D—Distribution system.
- E—Water tower.

"Bulk Tenders" will also be considered

Plans, specifications contracts, etc. can be seen and forms of tender obtained at the Town Clerk's office, Pembroke, or at the office of the Chief Engineer, on and after 25th instant.

WILLIS CHIPMAN,

Chief Engineer, 103 Bay St., Toronto.

WM. O'NEARA,
Chairman W. W. Committee, Pembroke.

Dated November 18th, 1892.

As a result of his recent visit to different American cities, Street Commissioner Jones of Toronto is in favor of paving residential streets with vitrified bricks instead of cedar blocks.

Street Railway Rails FOR SALE.

Tenders, marked "Tenders for Rails," will be received by the undersigned up to noon of THURSDAY, THE 15TH DAY OF DECEMBER, inst., for the purchase of about

NINETY TONS OF HORSE STREET RAILWAY STEEL RAILS

in good condition. The rails will be delivered at any of the railway stations or other place in the Town of Chatham, as may be desired by the purchaser.

Tenders to state so much per ton. Terms, cash on delivery of rails. The Railway Committee of the Council of the Town of Chatham reserve the right to reject any or all tenders. Address to

JOHN HISSIMAN,

Town Clerk.

Town Clerk's Office, Chatham, Ont.,
1st December, 1892.

CONTRACTS OPEN.

PARKHILL, ONT.—It is proposed to erect a new town hall, at a cost of \$5,000.

BERLIN, ONT.—The street railway system will shortly be changed to the trolley system.

PERTH, ONT.—Archbishop Cleary was in town recently making arrangements for the erection of a convent.

WINNIPEG, MAN.—The congregation of St. George's church contemplate the erection of a new edifice.

AMHERST, N. S.—Nearly \$40,000 has been subscribed for the removal of the Harris car works from St. John to this town.

NEWMARKET, C. T.—The Fire and Water Committee have recommended that another reservoir be put in at the waterworks.

WESTON, ONT.—Mr. E. A. Jaffay contemplates the erection of a fine block of stores at the corner of King and Queen sts. in this town.

ARTHUR, ONT.—The congregation of St. John's R. C. Church intend erecting a handsome residence for their pastor, Rev. Father Doherty.

WHITBY, ONT.—It is stated that Mr. Thos. Deverell contemplates tearing down Woodruff's hotel and rebuilding a brick one on the site thereof.

NORTH TORONTO, ONT.—Extensive alterations will shortly be made to the Jackson hotel. The driving sheds and stables will also be enlarged.

CALGARY, N.W.I.—A company is applying to the Dominion Government for incorporation for the purpose of constructing a street railway in this town.

STRATFORD, ONT.—The Board of Trade has decided to support the City Council in its efforts to secure for the city a more efficient system of sewerage.

BROCKVILLE, ONT.—G. T. Fulford, Chairman Finance Committee, will receive tenders until the 28th inst. for the purchase of debentures to the amount of \$245,000.

NEW GLASGOW, N.S.—Tenders are asked for the purchase of debentures to the amount of \$20,000 for the purpose of extending the waterworks system and improving the streets.

ORILLIA, ONT.—E. F. Roy, Secretary Department of Public Works for Dominion, will receive tenders until Monday, the 12th inst., for the construction of a hot water heating apparatus at the public building in this town. Plans may be seen at the Clerk of Works office.

HALIFAX, N. S.—The City Treasurer invites tenders until the 22nd of December for the purchase of \$30,000 worth of debentures, issued for the purpose of building sewers—Plans are now being prepared at Ottawa for the proposed drill hall. It is estimated to cost \$40,000.

FORT QU'APPELLE, MAN.—On Monday of last week the ratepayers of the municipal ty carried a by-law granting a bonus of \$20,000 to aid in the construction of the Wood Mountain and Qu'Appelle railway from this town to the Canadian Pacific Railway, the road to be completed by the 1st of November, 1893.

NIAGARA FALLS, ONT.—It is stated on good authority that an hotel to cost \$40,000 will be erected here by a joint stock company. It will be situated near the Government building. It is also said that the Canadian Pacific Railway Company contemplate erecting a \$125,000 hotel during the coming winter, to be located near the park.

HAMILTON, ONT.—Building permits have been granted as follows:—George Boulter, par two story brick dwellings on Grant avenue, between Main and Stinson streets, cost \$5,000; Trustees Christ Church Cathedral, new Sunday school building, cost \$5,000; Robert Campbell, pottery building on Locke street, between Jackson and Canada streets, cost \$2,000.

ST. CUNYONDE, QUE.—At a meeting of the Town Council held during the past week, the by-law authorizing the Council to proceed with the paving of the remainder of the streets was unanimously adopted. The expenditure for this work will amount to about \$200,000. A deputation will wait upon the Grand Trunk authorities requesting the establishment of a new depot at this place.

WINDSOR, ONT.—The Peoples' Electric Light Company have purchased a site on Robinson street on which they will at once erect a new power house.—The Superintendent of the Canadian Pacific Railway has informed the Mayor that in addition to the erection of an 800 barrel salt plant and cooper shops in this town, at a cost of \$40,000, the company would also expend about the same amount in building a soda ash manufactory.—It is stated on good authority that the Michigan Central Railway Company contemplate the erection of a new depot here, at a cost of about \$20,000.

OTTAWA, ONT.—The sum of \$5,000 has been subscribed towards the Y. M. C. A. building fund.—Government engineers have been engaged during the past week in making surveys for the proposed new bridge across the Ottawa River at Gatineau Point. It is expected it will be located opposite the Grey Nunnery Convent.—The Rocky Mountain Railway and Coal Company will apply to Parliament for legislation to amend its charter so as to construct the railway from Morley station, on the C. P. R., thence north westerly along the foothills of the Rocky Mountains until it intersects the Red Deer river, thence westerly, following the Red Deer river and its

south branch, to the coal mines. It is said that the three lowest tenderers for the construction of Sections 8, 9 and 10 of the Soulages canal are Randolph Macdonald, of Toronto, Rogers & Brockville, and a New York contractor named Finlayson.

LONDON, ONT.—The Board of Health has decided to buy property at the foot of Colborne street as a site for a pest house. The London Township Council have passed the necessary by-law granting the Barnes Company, of England, a license to establish a pork packing establishment. Work will be proceeded with at once on the proposed building.—Mr. H. I. Smallman, of the Street Railway Company, was in Montreal recently interviewing General Manager Sergeant of the C. I. R., with respect to a subway on Ridout street under the G. I. R. track. The City Engineer has estimated that the cost of this work would be \$3,000 for the stonework and \$1,000 for the necessary approaches on Rathurst and Ridout streets.—Mr. O. Graydon, City Engineer, will receive tenders until Thursday next, Dec. 8th, for the construction of a tile drain on York street, from Ridout street to the River Thames, and from Falbot street to Ridout street.

MONTREAL, QUE.—The Finance Committee have adopted the report for \$15,000 for a new police station in St. Lawrence Ward, and \$10,000 for a new station in Hochelaga Ward.—The City Council are considering the question of enlarging the Bonsecours market.—The municipal council of Lachine have granted to Mr. R. Bickerdike the exclusive privilege for twenty years of an electric tramway. It is to be in operation not later than 1894, and will connect with the system of the Montreal Street Railway company.—The Municipal Council of Notre Dame de Grace is considering the question of the construction of an electric railway round the mountain. Offers have been received from Messrs. Corveau, Bickerdike, Williamson and Yule.—The masonry at the old lower lock gates at the Lachine Canal is to be entirely renewed.—The Police Committee have voted the sum of \$30,000 for the establishment of a patrol system, similar to that in operation in Toronto.—Deputations from the municipalities of Sault Aux Recollet and St. Leonard, Port Maurice recently waited on Mr. A. J. Corveau and presented two largely signed petitions asking him to extend his railway to the lower part of Sault Aux Recollet and to build a branch to Cote Ste. Michael. Both municipalities offered to grant the necessary land.

TORONTO, ONT.—The corporation of this city offers prizes of \$500, \$300 and \$200 for the three best plans for the remodeling and enlarging of St. Lawrence Market. The Board of Health will recommend the construction of a new sewer on Shaw street, from College to Bloor street. The Toronto Ferry Company have purchased from the Hanlan estate the large hotel and lot at the Island and contemplate making some permanent improvements in the spring. The report of the Commissioners of County property states that a new bridge is to be erected over the Humber river at Bloor street.—The Council of St. Hilda's College for women has decided that the present building on Shaw street cannot accommodate the increased number of students and are considering the erection of a new building.—The City

Engineer has presented a report to Council of the cost of extending Queen street into High Park. He recommends the widening and extension of the street, commencing at Roncesvalles avenue, and continuing west to High Park, the width to be 80 feet. The cost is placed at \$50,700.—The Street Railway Company are asking permission to lay a car track to their new stables on Yorkville avenue. The paving for this will cost the city \$2,200.—The Separate School Board has decided to expend the sum of \$20,000 on the erection of a ten-roomed high school on Bond street. The Archbishop has donated a site for the purpose on the east side of the street, between the Cathedral and the convent. Building permits have been granted as follows: Josiah Blackwell, 105 Walker avenue, two story and attic, d. bk. dwellings, s. side Roxborough st., near Yonge, cost \$14,000; Wm. Jones, jr. s. d. 2 story and attic bk. dwellings, n. side Langley ave., near Broadview ave., cost \$6,000; Wm. Tedford, two det. 2 story and attic bk. dwellings, 380-82 Adelaide st. w., cost \$7,800; T. Whittard, 2 story b. f., add. to 407 Dupont st., cost \$1,000; Wm. Dineen, 1 story bk. add. to 124-26 King st. w., cost \$1,000; Jno. R. Wood, alterations 653 Ossington ave., cost \$1,000; John Kamridge six att. 2 story and attic b. f. dwellings, 21 to 31 Euclid ave., cost \$7,200; W. H. Lacey, 93 Macdonnell ave., eight att. 2 story and attic bk. dwellings, 2 to 14 Drummond Place, \$8,000

FIRES.

The saw and shingle mill at Bernedale, Ont., recently purchased by Kennedy Bros., was completely destroyed by fire on Saturday last. Loss, \$6,000; insurance, \$2,000.—The Salvation Army Barracks at Orillia, Ont., was burned last week.—Morningstar's grist mill, situated a couple of miles from St. Catharines, Ont., was destroyed by fire on Friday of last week. Loss, \$7,000; insurance, \$3,500; \$2,000 on mill and \$1,500 on machinery.—The Commercial hotel at Iona, Ont., owned by Mr. J. S. Waddell, was destroyed by fire on Sunday morning last. Loss, \$2,000. Saylor's block at Trenton, Ont., was badly damaged by fire on Tuesday last. The insurance on the block is \$3,000.—Mr. Hugh Jack's cheese factory at Carleton Place, Ont., was destroyed by fire on Thursday last. The total loss is \$7,500, \$2,200 of which is on the building, which was insured for \$1,000.

CONTRACTS AWARDED.

AVLMEY, QUE.—The Roman Catholics have awarded the contract for a new church, to cost \$30,000.

BELLEVILLE, ONT.—The County Council have awarded the contract for a new iron bridge at Tweed, to the Peterboro Bridge Company, whose tender was \$2,325.

MARKDALE, ONT.—Messrs. Post & Holmes, architects, Toronto, have let the contract for a new R. C. church to cost \$4,000 to Mr. J. C. Whitten, of Shelburne.

NEW WESTMINSTER, B.C.—The contract for the new Industrial school at Chilliwack, plans for which were prepared some time ago by Mr. Thos. Hooker, has been awarded to A. Ackerman, of this city, at the price of \$17,000.

OTTAWA, ONT.—The tender of Mr. James Summers has been accepted for the construction of the public swing bridge at Oliver's Ferry, the Government to supply all the material. The bridge will have oak piers and iron superstructure.

TORONTO, ONT.—The Works Committee of the City Council have accepted the following tenders for general supplies: Loan, Taber Bros., 10 cents per cubic yd., delivered east of Yonge st. and 65 cents west of Yonge street; Macadam stone, P. Wilson, \$10.50 per ton delivered at Portland street yard, J. Goulding, \$8.40, delivered at Frederick street yard, crossing stone, A. J. Brown, 24 cents per lin. ft.; ironwork, Ontario Foundry, \$1.60 per 100 lbs. for castings and \$2.50 for wrought; sand, A. W. Godson, 95 cents per cub. yard; wire nails, Ontario Lead and Barb Wire Co., \$27.65 per 100 lbs.; lumber, Wm. Bryce & Co., \$12.78 per M. ft.; B. M. for gang 1 inch plank and the same price for scantling, pressed spikes, F. W. Unit, \$3.20 per 100 lbs. for 7x4 and 8x4; gravel, Taber Bros., 95 cents.

both east and west of Yonge street: sewer pipe, Standard Drain Pipe Co., 6 in. 8 1/2 cents, 9 in. 14 cents, 12 in. 22 cents, 15 in. 22 cents, 18 in. 48 cents. Inverts, 18 and 27 cents. Stoppers, 6 and 9 in. 4 and 5 cents. Curves 6 and 9 in. 20 and 35 cents. Bends and elbows, 12, 15 and 18 in., 80 cents, \$1.20 and \$1.50. Junctions, 2 ft. lengths, from 80 cents to \$1.70. The contract for the Bathurst street sewer, from the C. P. R. to Convalescent Home, was awarded to Messrs. Smith & Wilson, at \$860.

THE STRENGTH OF MATERIAL.

In estimating the strength of different parts of buildings, it should be borne in mind that beams decrease in strength much faster than the length is increased, for instance. If a beam of any given size, twenty feet long, will sustain a load of 100 pounds per foot, one of the same size and forty feet long will only sustain 25 pounds per foot, and that with much more deflection, while the same beam cut down to ten feet in length, would carry four hundred pounds to each foot in length.

With posts, the ratio of strengths to their lengths differs somewhat with different proportion; but roughly speaking, posts of sizes in common use diminish in strength as they increase in length, in a ratio of about 1 to 2, that is if a post of a given size and 10 feet long is capable of supporting 12 tons, one of the same material and size but 20 feet long will support but 4 tons. The comparative strength of rods sustaining loads by suspension is not materially affected by their length; a long rod of a given size is nearly as strong as a short one of the same dimensions.

Now, with these general principles in mind, let us remember as a base of calculation a few examples. Take first a mill 50 feet wide, three 10-foot stories in height, of the usual "mill construction," center posts and beams 8 feet between centers, making beams 25 feet long from posts to wall. To safely carry the ordinary load of 200 pounds per square foot the beam should be of Southern pine, 12x16 inches, with round posts, 11 inches in diameter or 10 inches square, posts in the first story to support the second and third story and roof; 10-inch round posts, or 9x9 in the second story for the support of the third floor and roof, and 9 inch round or 8-inch square to carry the roof. A 15-inch I-beam 150 pounds per yard, this length would be of about the same strength as the 12x16-inch beam. A 6-inch round wrought iron column of 3/8-inch shell, or a 6 inch cast-iron column, free from defects, with a 1/2-inch shell, would be the same strength as the 10x10 inch posts, cast-iron being stronger in columns than wrought-iron, except where they are very slender. Iron will not resist heat as long as wood, wrought-iron becoming soft and pliable and cast-iron cracking with heat and water. If a brick pier is to carry the load of 10x10 inch posts it should be of good masonry, 2 feet square, or at least 20x24 inches, and it will resist the action of heat longer than any other of the materials mentioned. A 1 1/4-inch iron rod will safely support by suspension the same amount of floor surface of a single floor as is carried by one of these posts.

If it is desired to use this building for a warehouse, to be filled with barrels of flour, it should be estimated at 400 instead of 100 pounds to the square foot, and it would require another row of posts between the center posts and outer wall, thus making the beams about 12 feet between bearings, the beams remaining the same size and the posts increased a little, the wood about 1 inch, or 1/2 inch for the iron. *National Builder.*

LEGAL DECISIONS.

A case of great importance to the building trade and others who make use of Belgian girders has been determined on appeal in the Edinburgh Courts. A firm of builders in Glasgow entered into a contract with Messrs. P. & W. Maclellan, the well-known iron merchants of that city, to supply beams and girders for new tenement buildings. One of the conditions was that

the girders were to be delivered "at such times as may be required by the mason." There was some difference of opinion as to the meaning of the words, but when the case was first tried it was held that what was intended was that the rate of delivery was to be regulated by the needs of the masons, in order that the works might not be blocked up by the girders, which would be the case if all were supplied at one delivery by Messrs. Maclellan. The girders were obtained from Belgium; some arrived in good time, but owing to strikes and other causes the supply was retarded. Afterwards it became necessary to take an action for the recovery of the balance of 24 1/2 due on the account, whereupon the builders took a counter action for damages on account of the delay. The sheriff who tried the case held that Messrs. Maclellan had proved that it was a custom in the trade that the buyer in such cases took the risk of delay from strikes and other unforeseen causes beyond the seller's control, and in both actions judgment was given in favor of Messrs. Maclellan with costs. The builders appealed. The judgment of the courts below was affirmed on the ground that Messrs. Maclellan had exercised due care in placing the order for the iron with a proper and suitable manufacturer in Belgium; that they were not responsible for the delay which occurred, not having been able to anticipate its causes; that they were therefore not chargeable with breach of contract in unduly delaying delivery. It will be observed that in the judgment of their lordships the custom of the trade is not recognized, and that the issue was made to depend on the facts stated in evidence.

Thin brass tubing used for gas fixtures is fashioned into the various complicated ornamental shades required for such purposes by placing the tube between two steel moulds which are heavily clamped, and then the tube is expanded by hydraulic pressure reaching as high as 10,000 pounds to the square inch. The shell of this tubing is about 1-16th of an inch in thickness, and made of highly annealed brass. In order to complete the process for some of the more complicated forms, it is necessary to apply the water pressure four or five times, annealing the tube between each operation. The use of pressure for expanding a pipe is not fundamentally novel, as that is the method used in lining cotton hose with rubber. The lining is carried through the hose and expanded by steam-pressure, which completes the vulcanization of the rubber and presses it into the fabric so firmly that it adheres closely.

Stones of uniform texture commonly decay by disintegration at the surface, losing grain by grain in proportion to time and exposure. But they sometimes suffer a singular change, as if baked at the surface. An external enveloping crust is thus formed, as at Stonehenge, where the interior is soft, but the exterior hard. This process appears to render such a stone durable, but if carried further, so as to produce a new texture of the surface, the external shell separates from the interior mass, desquamates and falls off, leaving a rough, soft inner core. This happens even to molded surfaces, like those of balusters. Stones composed of parts unequally mixed suffer unequal waste in different parts. Shell, corals, concretions and crystallized masses thus appear prominent from limestones, and indicate the general fact that in proportion to the force of molecular aggregation in the stone is the resistance which it offers to decay. Again, the circumstances under which a stone is exposed in a building influence its conservation. It is not the amount, but the kind of exposure which governs the decay. The southern and western parts of our cathedrals yield, while the northern and eastern resist. Prominent cornices often are perfect, while below them the moldings are reduced to shreds. The drip-moldings remain and are even hardened, while parts which it was destined to protect have mouldered away.—*The Architect.*

MUNICIPAL DEPARTMENT.

LEGAL DECISIONS AFFECTING MUNICIPALITIES.

The County Council of Elgin, has decided to defend the validity of the by-laws granting aid to high schools, action to set aside which has been taken; to petition the Ontario Legislature to amend the High School Act making only those portions of a country not in a high school district liable for the maintenance of county pupils, and to petition the Dominion Parliament to require ditches to be opened up through Indian reserves; also to require railways to open culverts under the roads where there are natural water-courses.

SUSKEY V. TOWNSHIP OF ROMNEY.—Judgment on motion by Suskey to quash a by-law of the township of Romney assessing upon the lands of certain rate-payers a sum of \$3,000 paid by the township out of its general funds for extra work upon a drain after it had been constructed and completed. The Chancellor holds that the by-law falls fairly within the scope of sec. 573 of the Municipal Act of 1892, which gives power to amend a drainage by-law when sufficient means have not been thereby provided for the completion of the work, so as to make it an efficient work, though there may be some deviations and variations or addition to the work as originally planned by the engineer. Application dismissed with costs.

REG. V. ABELL, REG. V. HUGIL, REG. V. MCKENZIE.—A motion by the defendants to make absolute the rules nisi granted in these cases in respect to the conviction of the defendants for illegal collection of tolls on the Vaughan road. The defendant Abell is the president, and the other defendants are toll-keepers of the Vaughan Road Company, between whom and the township of Vaughan a dispute had arisen with regard to the company's right to collect tolls. It was contended by the residents of Vaughan that the road company could not collect toll until the township engineer certified that the road was in a proper state of repair. A Justice of the Peace endorsed this view and fined all the defendants for collecting toll while their road was in a state of unrepaired and condemned by the township engineer. The judges held that the fine was correctly imposed and that the defendants were barred from collecting any toll until their road is put in a proper state of repair and certified by the township engineer. Motions dismissed with costs.

BRIDGE BUILDING IN AMERICA.

Mr. T. Kennard Thomson, C. E., writing on the above subject in the *Engineering Magazine*, among other things says: "In this country to day the best practice in bridge building is to use eye-beams for spans up to 18 ft., plate girders for spans 18 ft. to 80 ft., or even 100 ft., lattice or open riveted girders from the last limit to 120 ft.; pin-connected trusses to 350 ft.; cantilevers from this limit to a span somewhere between 1,000 ft. and 1,500 ft.; after which economy requires suspension bridges. Continuous girders, or bridges connected or made continuous over two or more spans, have gone out of favour, owing to the ambiguity of strains, least settlement of a pier rendering the strains uncertain. Of course, where these bridges are built they are provided with adjustable shoes, so that if the piers settle the bridge can be raised, but this requires great watchfulness. The above limits are necessarily subject to change, owing to local circumstances, such as the difficulties of erection, etc. For instance, in the Lachine Bridge, where the St. Lawrence River made false work out of the question, the two channel spans of 408 ft. each were built as cantilevers, but turned into continuous girders when coupled up or completed.

The inspection of a bridge from the first drawing to the last coat of paint cannot be too thorough. Many think it un-

MUNICIPAL ENGINEERS, CONTRACTORS, AND MATERIALS.

necessary to inspect the erection, but this is very important. I was once instructed to inspect the erection of a long bridge of which the first span of the approach had already been completed. The field riveting had been so badly done that the superintendent of construction was instructed to go over the work himself, and was kept going over it until he had marked and cut out about 400 bad rivets. The riveting on the work thereafter was really well done; the bad work had cost too much.

The Railroad Commissioners of the State of New York have done good service by condemning many unsafe bridges and requiring the railroad to have the strains calculated on all their bridges. Every state should have a similar commission for both railroad and highway bridges. As most railroads have some sort of inspection, however poor, and most highway bridges have none, the latter are, as a rule, much more dangerous than the former.

CONVICT LABOR IN ROAD MAKING.

The Georgia Road Congress has adopted a resolution approving of the use of convict labor in road making, and holding that labor and property should each bear their fair proportion of road duty, the latter to be an ad valorem tax. Each county is to decide as to the amount and character of the work to be done and own and furnish the tools to be used. A complete revision of existing roads laws is earnestly recommended. At the congress the Highway Improvement Association was formed, with all citizens of Georgia eligible to membership on the payment of 50 cents per annum.

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MUNICIPAL OFFICIALS

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WELLAND CANAL ENLARGEMENT,
RESIDENT ENGINEER'S OFFICE,
WELLAND, April 17th, 1884.

JOHN BATTLE, Esq. Thorold.

Dear Sir.—Yours of yesterday, relative to Thorold Hydraulic Cement, is received. In reply, I beg to say that my tests of the Thorold Hydraulic Cement have extended over a period of twenty-eight years, and have been on a large scale, as exemplified in the locks, bridges, culverts and other masonry on the Welland Canal and Welland Railway and that the record which has been invariably satisfactory, is to be found in examination of the structures. The necessity tearing down of masonry and concrete, during the Welland Canal Enlargement, has afforded abundant evidence of the reliability of the Thorold Hydraulic Cement, both in masonry and concrete, and at once and under water. I desire no better cement for the class of work referred to.

I am, dear Sir, yours truly,
W. G. THOMPSON,
Resident Engineer.

ISAAC USHER & SON,
THOROLD, ONT.

Manufacturers of

QUEENSTON CEMENT

Proved by Government tests to be the best Canadian natural cement. Write for prices, &c.

DEBENTURES WANTED.

Municipalities issuing debentures, no matter for what purpose, will find a ready purchaser by applying to G. A. STANSON, 9 Toronto Street, Toronto. N.B.—Money to loan at lowest rates on first mortgage.

R. E. H. BUGKNER,

32 Adelaide St. East, - TORONTO.

PATENT CAST IRON GULLIES,

Vitrified Clay Sewers - Dust Bins - Sewer Pipe
Cements - Steam Road Rollers - Stone
Breakers - Street Scrapers
Horse Brushes, etc.

ASPHALT PAVING

We are prepared to do first-class work on WALKS, FLOORS, CELLAR BOTTOMS, &c., with ROCK ASPHALT, which is conceded to be the best for this class of work.

H. WILLIAMS & CO.,

Roofers and Pavlers,

4 Adelaide Street East, - TORONTO.

DIRECT IMPORTERS AND
DEALERS IN
SCOTCH FIRE CLAY-
BRICK,



DRAIN AND WATER
PIPES,

Double Strength for rail-
way culverts, etc.

Sewer Bottoms or Invert Blocks, Cement.
NOTE—Only pure SCOTCH unglazed Fire Clay
lanings will be kept in stock; any other quality is
worthless for resisting heat. Correspondence invited.
Quotations promptly furnished.
Office: 31 Wellington St., Montreal.

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FOR CELLARS, FLOORS, STABLES, ETC.

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CIVIL ENGINEERS.

Bridge and Structural Iron Work. Steel Beams kept in stock.
Plans, Estimates and Specifications.
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CORRUGATED SOIL PIPE AND FITTINGS (PATENTED).



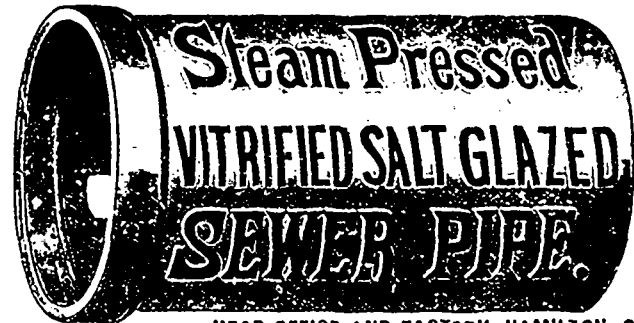
This improvement marks an era in sanitary reform. Universal certificates in its favor from Architects, plumbing inspectors, master plumber associations, and others. Costs no more; more economical to use.

H. R. Ives & Co., - Montreal.

HAMILTON AND TORONTO SEWER PIPE CO.

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



Write for Discounts.

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Drummond McCall Pipe Foundry Company,

MONTREAL
MANUFACTURERS OF

CAST IRON WATER AND GAS PIPES

WORKS: LACHINE, QUE.

PRICES ON APPLICATION.

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OF ST. JOHNS, P. Q., (LIM.)

Manufacturers of

Salt-Glazed,
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SEWER
PIPES



Double Strength
Railway Cul-
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Inverts, Vents,

AND ALL KINDS OF FIRE CLAY GOODS.

Canadian Bridge & Iron Co.

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Architectural Ironwork a Specialty. Pleased to furnish estimates.

THE J. G. EDWARDS

Vitrified Terra Metallic Paving Brick

STABLE, COACH HOUSE, BOILER HOUSE, BREWERY FLOORS AND YARDS,
Also all places of heavy and light traffic.

The only Genuine Vitrified Brick. The best in the world for Sidewalks & Street Crossings
FROST-PROOF, WATER-PROOF, TIME-PROOF

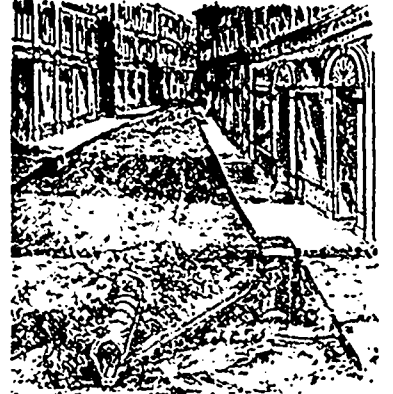
JOHN S. CUTHBERTSON, AGENT FOR CANADA,
Room 64, Temple Building, Montreal.
PRICES ON APPLICATION.

CENTRAL BRIDGE AND ENGINEERING COMPANY (LIMITED) Peterborough, Ont. WM. H. LAW, Manager and Engineer. MANUFACTURER OF

RAILWAY AND HIGHWAY BRIDGES Viaducts, Piers, Roofs, Turntables and Girders in Steel and Iron. Tension members forged without welds. Riveting done by hydraulic or compressed air machines. Specialties: Good workmanship and strict adherence to specifications and drawings. CAPACITY: 2,000 TONS PER ANNUM.

St. George's Patent Sectional VITRIFIED CLAY SEWER

CAST IRON STREET GULLEY. Over 5000 Gulleys are now in use in the following towns: Montreal, Toronto, Ottawa, Quebec, St. Cuthbert, St. Henri, Peterboro, Owen Sound, Sarnia, Cote St. Antoine, Sherbrooke, London, New Glasgow, N. S. A saving of \$22 on each gully over the brick gulleys.



LEWIS SKAIFE, Engineer and Contractor, New York Life Building, - MONTREAL. AGENT.

Prices of Building Materials. LUMBER. CAN OR CANGO LOTS. Toronto, Montreal. Table listing prices for various lumber types like clear picks, Am. ins., 1 1/2 to 2 clear, etc., with prices in \$ and ¢.

Toronto, Montreal. Table listing prices for various building materials like cutting up planks, cedar for block paving, common walling, pressed brick, roof tiles, and various types of bricks and shingles.

SAND, STONE, BRICK, PAINTS. Table listing prices for sand, rubble, foundation blocks, and various types of paints like white lead, zinc, red lead, etc.

Toronto, Montreal. Table listing prices for various types of cement, plaster, and iron products like cut nails, steel, and iron pipes.

INDEX TO ADVERTISEMENTS. In the "Canadian Architect and Builder." Table listing various advertisements for architects, cement, galvanized iron, plumbing supplies, roofing materials, iron pipes, laundry tubs, lime and stone, cut stone contractors, chimney topping, drain pipe, builders' supplies, boiler covering, building stone, blue print paper, builders' hardware, church and school furniture, gratings and tiles, and ornate stoves.

Toronto, Montreal. Table listing prices for various types of nails, iron products like structural iron, and other building materials.