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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.

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TO CONTRACTORS

Sealed Tenders, addressed to the undersigned, will be received until noon on

Wednesday, the 24th of January, 1899,

for the construction of Concrete Abutments for two bridges in the City of Elgin, and also for two bridges between the City of St. Thomas and the County of Elgin. Plans and specifications can be seen at the office of the undersigned.

The committee reserves the right to reject any or all tenders.

JAS. A. BELL,
Engineer for County of Elgin
and City of St. Thomas.



Wharf Builders, Etc.

Tenders, addressed to the undersigned, will be received through registered post up to noon on

Thursday, January 12th, 1899,

for the construction of Crib Work required in connection with the filling up of Block "D," being the block bounded by water, bounded by Bay street, Lorne street, the Esplanade and the Windmill Line. Plans and specifications may be seen and all further information obtained at the City Engineer's office. A cash deposit or a marked cheque equal to 2 1/2 per cent on the total amount of the tender must accompany every tender as a guarantee of good faith. Should the contractor or parties whose tender may be accepted fail to furnish satisfactory security for the due fulfilment thereof, their deposit will be forfeited to the city. The deposits of unsuccessful tenderers will be returned. The city reserves the right to reject any or all tenders.

JOHN SHAW (Mayor),
Chairman Board of Control.
City Hall, Toronto, December 25th, 1898.

TENDERS WANTED

Tenders are asked by the County Council of Kent for the construction of a through pin-connected Steel Truss Bridge of two hundred and twenty feet span over the River Thames, at the site of the Moravian bridge, in the County of Kent, Ontario, and of two Masonry Abutments.

Plans and specifications by W. G. McGeorge, County Engineer, may be seen at the office of the County Clerk at Chatham, or specifications may be obtained by applying to him.

Tenders must be in the County Clerk's hands on or before the 24th DAY OF JANUARY, 1899.

No tender necessarily accepted.

J. C. FLEMING,
Clerk County Kent.

Chatham, Dec. 28th, 1898.

TENDERS WANTED

Sealed tenders will be received by the undersigned, on behalf of the County of Huron, until 4 o'clock, p.m., on SATURDAY, THE 21ST DAY OF JANUARY, INST., 1899, at the Wingham post-office, for

Furnishing and Erecting the Super-structure of a Steel Bridge

over a branch of the Maitland River, on the base line, about four miles from the town of Clinton, on the G.T.R. It will rest on concrete abutments (to be 100 feet long between the abutments), of seven panels, joists 3 x 12 inches, floor 3 inches thick, plank from 6 to 10 inches wide, of rock elm or tamarac; required strength 100 lbs. per square foot, with large safety factor; roadway 16 feet wide, railing 4 feet high; 23 feet from bed of stream to floor; bridge to be completed on or before the 1st of September next, 1899; good place to build—hard bottom to the stream.

The lowest or any tender not necessarily accepted. Security required for the due completion of contract. Further information may be had by addressing

JOHN ANSLEY,
County Commissioner.

Wingham, Jan. 2nd, 1899.



NOTICE TO CONTRACTORS

TENDERS FOR CHAIN FERRY

Tenders will be received by registered post only, addressed to the Chairman of the Board of Control, City Hall, Toronto, up to noon on FRIDAY, JANUARY 13, 1899, for the following works in connection with a Chain Ferry at the Queen's wharf channel, Toronto harbor:

(1) The construction, complete, of a barge, with the necessary machinery.

(2) The construction of the necessary crib work and dock for the ferry.

Contents of envelopes containing tenders must be plainly marked on outside.

Plans and specifications may be seen, and forms of tender obtained, at the office of the City Engineer, Toronto, on and after the 7th day of January, 1899.

A deposit, in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 2 1/2 per cent of the value of the work tendered for, must accompany each and every tender, otherwise they will not be entertained.

Tenders must bear the bona fide signatures of the contractor and his sureties, or they will be ruled out as informal.

Lowest or any tender not necessarily accepted.

JOHN SHAW (Mayor),
Chairman Board of Control.

City Hall, Toronto, December 31, 1898.

ARCHITECTURAL DRAUGHTSMAN OPEN
for engagement. 100 DOWLING AVE., TORONTO.

CONTRACTS OPEN.

RIDGETOWN, ONT.—The free library by-law has been defeated.

DIGBY, N.S.—Work has commenced on the new Manhattan hotel.

STANSTEAD, QUE.—A company is being formed to build a skating rink here.

RICHMOND HILL, ONT.—It is probable that a market building will be erected here.

BATHURST, N.B.—It is rumored that a company is being formed to build a pulp mill here.

SMITH'S FALLS, ONT.—The debenture by-law for \$29,000 was voted down by the ratepayers.

LONDON, ONT.—The \$75,000 by-law for a breakwater for West London has been defeated.

METEGHAN RIVER, N.S.—It is understood that Jos. Robicheau intends building a new steamer.

KINGSVILLE, ONT.—It is said that the G.T.R. will build a spur line from Belle River to Kingsville.

SANDWICH, ONT.—The by-law to raise \$1,500 for the extension of water mains was defeated on Monday.

YARMOUTH, N.S.—It is probable that the Yarmouth duck and yarn mill will be enlarged within the next year.

HARRISTON, ONT.—Minto ratepayers will vote on a by-law to abolish statute labor and buy road machines.

CAMPBELLTON, N.B.—C. LeB. Miles, C.E., has offered to prepare plans for a sewerage system for the town for \$500.

FOREST, ONT.—Both by-laws providing for the establishment of an electric light plant were voted down on Monday.

PRESCOTT, ONT.—A by-law to raise \$15,000 for a municipal electric light plant has been carried by the ratepayers.

CHATHAM, ONT.—The ratepayers defeated a by-law guaranteeing \$15,000 bonds of the Chatham Cold Storage Company.

HAMPSTEAD, ONT.—Dr. Wilhelm purposes building a brick residence next summer.—T. McDonald will build a veneer cottage.

BRANTFORD, ONT.—A by-law to raise \$5,000 for an addition to the John H. Stratford hospital has received the sanction of the ratepayers.

NAPANEE, ONT.—The pork-packing by-law was carried by the ratepayers on Monday, and steps will now be taken to establish the works.

HINTONBURG, ONT.—The by-law to raise funds for the construction of a water-works system will be voted on by the ratepayers shortly.

MACLEOD, H.W.T.—The mayor recently interviewed the Minister of Public Works asking for the erection of a court house at this place.

OSHAWA, ONT.—The proposed Presbyterian church to be commenced next spring will cost \$10,000. The pastor is Rev. James Hodges.

KINCARDINE, ONT.—Hunter Bros. have been granted a \$4,000 bonus to enable them to extend their works. The by-law was carried on Monday.

MORINVILLE, QUE.—At a public meeting held last week, it was decided to form a joint stock company, with a capital of \$15,000, to build a roller flour mill.

THOROLD, ONT.—The by-law to raise by debentures the sum of \$5,000 for the extension of the electric light system was defeated at the municipal elections.

NOVAN, QUE.—The New York Central Railway will likely build a branch line from Burlington through this place, connecting with the Canada Atlantic Railway.

PEMBROKE, ONT.—The result of the vote on the by-law to provide for sewerage extension has not yet been learned. The estimated cost of the proposed work is \$13,000.

MICHIPICOTEN, ONT.—The Great Northern Mining Company and the Lake Wa-Wa Mining Company will each erect a custom mill and compressor plant in the spring.

SEAFORTH, ONT.—Gadke Bros., of Woodham, have purchased the red mill property, and intend enlarging it.—The ratepayers have voted in favor of providing a library.

KAMLOOPS, B. C.—A local stock company is now in course of formation for the purpose of providing Kamloops with a first-class hotel. J. T. Robinson has the matter in hand.

SHELburne, ONT.—Beaumont Jarvis, architect, of Toronto, has reported on the condition of the public school, and as a result a new building, to cost \$8,000, will probably be erected.

HULL, QUE.—The by-law to raise \$7,000 for the installation of a municipal electric light plant has received the sanction of the ratepayers. The funds will be raised by debentures.

ST. CATHARINES, ONT.—At a meeting of the directors of the St. Catharines Electric Light Company, it was decided to add to the plant a new engine and boiler, at a cost of \$6,000.

NELSON, B. C.—The Board of Works have recommended that extensive public works be undertaken immediately, on the ground that they can be more cheaply carried out during the winter.

LINDSAY, ONT.—The ratepayers on Monday last approved of the by-law granting a \$2,000 bonus to Rider & Kitchen, of Brampton, to establish an excelsior and veneer factory here.

FORT WILLIAM, ONT.—Up to the time of going to press, the result of the vote to provide for the issue of debentures to the amount of \$5,000 for the maintenance and repair of streets has not been learned.

ORILLIA, ONT.—The High School Board has decided to accept the plan for a new school submitted by Siddall & King, architects, of Toronto, on condition that it shall not cost more than \$8,500.

THREE RIVERS, QUE.—A frame church is to be built next spring at Anse aux Gascons (Gaspe), size 75 x 40 feet. David Ouellet, architect, of Quebec, has the order to prepare plans and specifications.

ST. MARGARET'S BAY, N. S.—A company has been formed to erect a pulp mill in this locality, and to supply electric light and power. It is stated that the power house will be located at Rockingham.

MERRITTON, ONT.—By-laws to raise \$20,000 for street improvements, and \$2,600 for the purchase of a road roller, were defeated on the 2nd inst. The one

to raise \$6,000 for water works extension was carried.

WHITBY, ONT.—Representatives of the Toronto Street Railway Company were recently in town in connection with a proposal to extend that railway to Whitby and Oshawa, with a branch to connect with the C.P.R. at Myrtle.

ANTRIM, ONT.—A. Murphy will receive tenders up to January 14th for the taking down of the old bridge and the building of a new one across the Carn river, on the side road between lots 10 and 11, in the 7th concession of Fitzroy.

VANCOUVER, B. C.—Tenders are invited up to January 4th for the erection of a 2-storey brick block for Charles Wiegand.—Col. Tracey, city engineer, has purchased a lot, corner Hastings and Howe streets, presumably as a building site.

ROSSLAND, B. C.—The British Columbia Electrical Supply Co. will apply for incorporation, to supply water, electric light, etc., and construct works for same purpose. Daly & Hamilton, of this city, are solicitors for the company.

EDMONTON, N. W. T.—On January 14th the ratepayers will vote on a by-law to grant a site to the Dowling Milling Company on which to erect a flour mill. The money with which to purchase the site is to be raised by debentures.

ALMONTE, ONT.—Grey & Jamieson, solicitors, are applying for the incorporation of a company to construct the North Lanark railway, from some point on the Kingston and Pembroke railway near Mill Lake to a point near Arnprior.

PORT ARTHUR, ONT.—According to the by-law passed by the ratepayers on January 2nd, Mr. E. S. Jenison is to have the right to supply the town with water and electric light for thirty-five years. He proposes to spend \$1,000,000 in building a canal from Kakabeka Falls to Port Arthur.

ST. THOMAS, ONT.—E. McCredie purposes erecting next spring a block of stores, two stories high.—The by-law to provide funds for the establishment of a municipal electric light plant was defeated by the ratepayers on Monday. The by-law for the construction of bridges was carried by a large majority.

MIDDLETON, N. S.—Arrangements are being made for the erection of the proposed pork-packing establishment. Nothing will be done this winter towards erecting the buildings, but contracts for building material will be awarded so that work can commence in the spring. Mr. E. D. Davison, of Bridgewater, is president of the company.

HAMILTON, ONT.—The city council has granted to the Toronto, Hamilton & Buffalo Railway a rebate on its taxes to the extent of \$1,000 a year for ten years, in consideration of the construction by the company of a line to connect with the factories and other industries in the north-east section of the city. The Hamilton & Toronto Sewer Pipe Company have also been granted concessions to induce them to rebuild on a more extensive scale.

STRATFORD, ONT.—It is learned that the Whyte Pork Packing Co. agree to erect a brick building 112 x 96 feet and three storeys high, with stone basement. In addition, there is to be a slaughter house 50 x 50 feet, two storeys and basement, and an engine room 50 x 36 feet. The by-law granting a bonus to the company for the establishment of the pork-packing industry received a majority vote of the ratepayers on Monday.

OWEN SOUND, ONT.—John Rutherford, county clerk, wants tenders by January 24th for re-roofing the court house, according to plans prepared by Mr. J. C. Forster, architect.—The C. P. R. steamship fleet will receive a general overhauling during

the winter months. Besides installing the Alberta a new electric light plant numerous minor repairs to the deck cabin work, and engines, will be made on each of the boats. It is estimated that the work will involve an expenditure between \$15,000 and \$20,000.

QUEBEC, QUE.—David Ouellet, architect, of this city, is preparing plans and specifications for the following work, to be performed in the new building for the Hotel Dieu of Levis (South Quebec), 105 x 55, 4 stories and basement: Plumbing—baths, basins, w.c., wash tubs, pumping engine, hot water service, boilers, tanks, etc.; heating apparatus—hot water boilers and radiators; electric lighting—dynamo, etc.; steam engine—boilers 15 lbs. h.p.; elevator, 1,800 lbs.; dumb waiter, 7 lbs. Tenders will be called for about January 15th.—Mr. A. Drolet has purchased the vacant lot adjoining the residence of Mr. Thompson, on Maple avenue, and will build a villa on it, from plans prepared by Mr. Bussieres.—The extensive property on Haldimand street, known as the Lord Mount Stephen property, has been purchased by A. H. Peters, representing the firm of Simon Peters. The new proprietors intend erecting a row of twelve modern buildings on this property. Plans have been drawn and work will begin early in January.

MONTREAL, QUE.—It is learned that no contracts have as yet been awarded for the new office building of the Grand Trunk Railway Co., to be built in city. The architect is Mr. R. A. Wainwright, Windsor Hotel.—The parish of St. Denis has been formed, and steps will be taken at once to erect a new R. C. church.—It is understood that American capitalists will probably invest a considerable sum of money in the Richelieu & Ontario Navigation Company, and that, as a result several hotels and a new steamer will be built.—It is stated that a representative of the T. Eaton Co. has been in the city inspecting the site of the Greenshield block, with a view to erecting a departmental store thereon.—Henry Morgan & Co., the St. Catharine street merchant, have taken the preliminary steps toward the erection of a large extension to the present store. Plans are now being prepared by a local architect, and it is expected that the work of construction will be commenced early in February.—The Canada Steamship Company, which has organized a trans Atlantic line between Milford Haven, Wales and Paspebiac, has prepared plans for the construction of an elevator at the latter place. It is intended to build it of corrugated iron. Its capacity will be 1,000,000 bushels grain.

OTTAWA, ONT.—A site has been chosen on Lorne avenue for the Dominion House of Studies, although the construction of the building will not commence until next fall.—The Free Committee of the Separate School Board have not yet selected a site for the new school to replace the LaSalle school recently sold to the Christian Bros. The new school will consist of twelve classrooms, and will cost \$10,000.—It is calculated that several millions of bricks will be required for the construction of the main drainage sewer.—Lieut.-Col. T. Dale's project to connect Lakes St. C. and Erie by a canal will come before parliament at the next session.—The Bedlington & Nelson Railway Co., which has a British Columbia charter, will apply to parliament for Dominion incorporation.—A company is asking incorporation to construct telegraph lines: Yale and the Kootenays.—J. Brisson, who is acting as agent for a Michigan firm of manufacturers of machinery, is looking for a site in Canada for a factory for the company.—Rev. Dr. Constantineau, rector of the university, has received from Mr. L. Z. Gauthier, an

of Montreal, the plans for the new scientific building which will be erected next spring on Wilbrod street. The new structure will be of grey stone, with 85 feet frontage, 98 feet depth, and four storeys in height, with a tower 130 feet high. The contract for the building will be awarded in a few weeks, and the work will commence early in the spring.—Debentures will probably be issued by the city for park improvements.—The last survey by the Pontiac & Pacific Junction Railway Company for the projection of their line from Aylmer to Hull has been made.—The Trustee Board of the Nepean public school in Birkton has decided to take steps to secure the erection of a collegiate institute or high school.—The Baptists in the south end of the city purpose erecting a new church on Fourth Ave. next spring. A site has been purchased.—Building permits were last week issued as follows: Jos. Boucher, brick veneered house, Gilmour street, cost \$2,000; Cowie & Wilson, brick veneered house, Gilmour street, cost \$2,000; Bank of Commerce, brick addition, Wellington street, cost \$3,500.

TORONTO, ONT.—It is stated that the Metropole hotel, corner King and York streets, is to be remodelled.—Plans are being prepared in the Works Department for a temporary bridge over the Don, to be used during the period of the construction of the new bridge should the \$62,000 law meet with the approval of the ratepayers.—The city invites tenders up to noon on January 12th for the construction of crib work required in connection with the filling up of block "D," bounded by Bay street, Lorne street, the Esplanade and the Windmill line, and up to 13th st. for construction of a barge, with necessary machinery, and crib work and dock for the ferry.—The promoters of the proposed consumptive sanatorium to be built near Toronto have secured a site near High Park, and expect to commence in the spring the erection of the administration building and several cottages.—Among the bills to come before the Ontario legislature at the coming session are the following: Bill to amend the act for the improvement of Napanee river; bill for guaranteeing Goderich Elevator and Transit Company a bonus of \$50,000; bill to incorporate the Toronto Elevated Railway; bill respecting Haliburton, Whitney and Mattawa Railway; bill to incorporate the Hamilton and Caledonian Railway Company; bill to allow Seaforth to borrow money for a packing house; bill to incorporate the Thunder Bay, Michigan and St. Joe Railway; bill to incorporate the Toronto, Lindsay & Pembroke Railway.—The money by-laws were carried by the ratepayers on Monday. They were three in number, and called for an expenditure of \$150,000 on the remodeling of St. Lawrence Market, \$62,500 on the erection of a new bridge over the Don at Queen street, and \$40,000 for the construction of the waterfront improvements between Bay and Lorne streets. All of these works will be proceeded with as plans can be prepared.

FIRES.

Recent fires included the following: Dwelling house at Sussex, N. B., owned by J. D. O'Connell.—Brick stores in Ottawa East, owned by F. H. Cluff, of Ottawa; damage \$3,000.—Gardner Tool Works at, Sherbrooke, Que., totally destroyed; loss \$25,000, partially insured.—Ogilvie Milling Company's elevator at Pierson, Man., totally destroyed.—The Quinte House at Trenton, Ont., owned by O. Proctor, of Brighton; loss \$2,000.—Simpson & Brocque's butter factory at Hudson, Que.; total loss, fully insured.—Biscuit factory, corner Albert and Vinet streets, Montreal, owned by Joseph Luttrell, damaged to the extent of \$1,500.—Cutchings & Riley's saddlery establish-

ment at Calgary, N.W.T., damage \$2,000.—Flour mill of John Gordon at Wallaceburg, Ont.; loss \$8,000.—Residence of Edward Phipps near Fairfield, Ont.—St. George's cathedral at Kingston, Ont., totally destroyed; loss \$100,000, insurance \$25,000.—Toronto Rubber Company's factory at Port Dalhousie, Ont., damaged to the extent of \$100,000. It is said that an effort will be made to induce the company to rebuild in St. Catharines.

CONTRACTS AWARDED.

ELORA, ONT.—The contract for the construction of an iron bridge here has been let to Mr. Lindsay, of Kincardine.

ACTON, ONT.—\$6,000 of electric light debentures have been sold to the Ontario Mutual Life Assurance Co., of Waterloo, at 103½.

NEW WESTMINSTER, B. C.—Gilley Bros. have been awarded the contract for driving the piles for the foundation of the Columbian Packing Company's new fish freezing establishment on Front street. Work on the superstructure will shortly be commenced.

HALIFAX, N. S.—Herbert E. Gates, architect, 58 Bedford Row, has awarded the following contracts for the erection of a large residence at Dartmouth, N. S., for His Honor Judge Johnstone: Carpenter work, F. Bauld; mason and plaster work, Thomas Leahy; painting, James Leahy; plumbing, Crimp & Ritchie. Electric wiring will be done by day labor, as a new England method is to be employed.

CHATHAM, ONT.—Debentures amounting to \$19,652.77, bearing 4½ per cent. interest and covering periods of 10, 15 and 20 years, have been sold to H. O'Hara & Co., of Toronto, at \$20,875. The other tenders received were as follows: W. F. Buller, London, \$20,036; R. Wilson Smith, Montreal, \$20,429.60; G. A. Stimson & Co., Toronto, \$20,646; F. Marx, Chatham, \$20,700. This price includes the accrued interest.

BUSINESS NOTES.

John Monahan, plumber, of Toronto, is announced to have assigned to H. W. Anthes. The liabilities are small.

Craig, MacArthur & Co., wholesale dealers in plumbers' supplies, Toronto, have assigned to Henry Barber. No statement of affairs has been yet prepared by the assignee.

IRON STANCHIONS IN BRICKWORK.

The fact of stanchions, posts, columns, etc., of wrought and cast iron and steel, playing such a prominent part in large modern buildings, seems to detract for the moment from the importance of the subject of strength in brickwork. Stanchions are generally concealed in brickwork as a protection from fire. Though such uses of iron economises space in the building, and admits of larger window areas for lighting the interior, yet it should never be left exposed, as is too often done, to the danger of a fire occurring in the building. In cases, however, where concealed stanchions do not support the heavy iron girders, brissummers, fireproof floors, garden roofs, etc., the half of the weight of such heavy parts is borne by the masonry walls, pilasters, piers, etc. The recent unfortunate accident in Orchard street, Westminster, draws closer attention to the importance of the subject of brickwork strength in large buildings, not only in walls, but

likewise because of its fireproof qualities giving it a preference for interior piers.

When weights of hundreds of tons, more or less concentrated, as occurs in so-called fireproof buildings, have to be safely supported by brickwork, sufficient strength in it for the purpose becomes an important enquiry. Such accidents emphasize the great need of safe data under practical building conditions that are not misleading. Unfortunately too many of the investigations into the safe strength of brickwork are based upon exceptionally favorable conditions of testing which are never met with in building construction. The resulting data are therefore dangerously misleading.

HOW THE PLUMBER FIXED THE BILL.

There is a plumber in Sullwater who is determined that no one shall get the best of him, and recently he demonstrated to one of his customers that it was useless to throw his bills in the waste basket, according to the Gazette. Some time ago he presented a bill to a well known logger, and just for a joke the logger tore the bill into shreds and deposited the remnants in the waste basket. The plumber watched the proceeding without cracking a smile, but deep down in his breast he vowed that the next bill would not be destroyed so easily. Accordingly he secured a large piece of tin and on this the bill was made out.

A Canadian genius claims to have discovered a method of casting granite in a mold. The only secret about it, he says, is in the construction of a furnace melting the stone. The molds are prepared in damp sand in the same manner as for iron or steel molding, and the liquid granite is poured in from ladles. The inventor claims that he can produce columns and fancy cornice pieces cheaper than rough blocks of stone cost delivered at an operation. This is possible because he utilizes the shippings and waste stone about a quarry.

A novel method of moving a tank is described in a recent issue of the Genie Civil. The tank was used to hold petroleum, was 82 feet in diameter, 32 8 feet high, and weighed 140 tons. To remove it 131 feet, a wall 2 feet high and 1 foot thick was built on the level surface of the porous sandy soil, so as to enclose the old and new masonry foundations, which stood a few inches above the surface of the ground. The tank was built with a flat bottom and curved top, from plates 0.16 inch to 0.47 inch thick. It was first filled with air at a pressure of 8 inches of water; then water was pumped into the artificial pond enclosed between the temporary walls until it floated the tank from its foundations, the tank then drawing 8.2 inches. More water was pumped in to raise the tank 4½ inches, and it was then hauled by a windlass and rope to its new site. It was held against a semi-circular row of piles driven around the new foundation until it sank in its permanent position as the water was slowly drawn out of the pond. The tank was uninjured, and its removal occupied a few minutes only.

SHEARING OF MASONRY.

The term shearing in masonry is apt to be used in a confused sense. The idea of a shear strain (vertical) is properly represented when one unsupported part of a wall ruptures vertically and drops below the level of the adjacent supported stationary parts, or, in another case, when a girder template, or a column base, by reason of an excessive unit load, cuts vertically through the brickwork wall which was intended to sustain it. The shear of this kind would usually take place in the vertical line of joints or "perpends," and hence the sheared section of brick material is, roughly, half the brickwork exerting the stress. Strictly speaking, it is the cumulative thickness of the bed-joints in the height of the brickwork less than half of the brickwork height. Tests of this kind of stress on bricks are rarely made. A strain, which is sometimes called shearing, is that which occurs when the interlaps of the ends of the bricks in the courses above and below are drawn horizontally apart in the line of the bed-joints, so that a shearing action takes place in the mortar of this joint. The utmost proportion of the bed-joints of a brick which can be sheared in this manner is half a brick in the stretcher course of chimney bond, or the intermediate stretcher courses of the flying or Yorkshire variety of English bond. In the heading courses the half-brick is in bond, though only showing a quarter-brick on face, and must, therefore, only be reckoned as equivalent to a quarter-brick bond. In other brick bonds there is only a quarter-brick lap to resist shearing of and in the line of the bed-joints. The shearing of this kind, so-called, occurs generally by excessive settlements of the end or ends of the wall, thereby pulling the walls in its upper parts apart lengthways. The rupture or fissure in such a case increases upwards in width.

Properly, however, this strain must be distinguished as a frictional shear, as its force of resistance depends upon the unit intensity of the insistent weight acting upon any particular bed-joint. It is, therefore, equal to a constant force of half the amount of the extreme force acting

at the level of any bed-joint in question. It may be 75 to 80 per cent. of the insistent weight, according to the coefficient of friction of the material and of the mortar joint adhesion. In high or heavy brick walls the adhesion of ordinary lime mortar bed-joint adds little to the frictional resistance of the bricks because of its weakness or softness, liability to disintegration, and to remain soft in the interior, and thus to act as a lubricator.

ROMAN CONCRETE WALLS.

The chief objection to rubble and concrete walls is the roughness of the surface. The ancient Romans got over the objection in various ways; at first they faced them with large blocks of tufa, such as had previously been used in the time of the kings (rubble walls only came in with the Republic); afterwards, in the latter days of the Republic and in the early Empire, they faced them with small wedge-shaped blocks of tufa; the square surfaces of these small blocks were placed diamond-wise, resembling in appearance a small net, hence called network, or reticulated work. Afterwards they used brick or tiles of a triangular shape, with the long surface outwards, and thus these also formed a sort of wedges, but the mortar held them so tight that even if held by the point only the brick or the block of tufa will break before it can be pulled out. The smooth surfaces are then frequently plastered and painted, or covered with marble. In building such a wall the wedge-shaped blocks or tiles were placed in order and filled up with the broken stones to the depth of about a yard before the cement or hot-lime grouting was poured in. The whole was thus bound together in one solid mass, with openings left for doors and windows.

SUBTERRANEAN QUARRIES.

The labyrinth of the Petersberg, near Maastricht, in Dutch Limburg, is a very interesting curiosity. Geologically the formation belongs to the Senonian chalk, and the Maastricht tuft, as it is called, consists of coarse grained, yellow marls, which resemble sandstone in appearance

—the people talk of sand hen which are lined with rows of large always lying on their flat side. The forms a fair building material, which very easily quarried. The quarries back to the most remote ages, though it is not certain that what is to-day pointed out as a Roman or a Celtic quarry deserve such a denomination. Of recent years the use of the marl has declined. Everybody had, in the middle ages, the right to quarry on his ground without having to pay any royalties. That is one of the reasons why the hill is so strangely honeycombed with passages that one may wander for days, it is said, without touching the same point. The marl is usually quarried in blocks 21 in. by 21 in. by 11 in. A furrow is made, a wedge inserted and the rest is done with the help of a steel saw. Houses built of these blocks have a neat appearance. After about 10 years the mauve yellow turns greenish grey; they can then be scraped and cleaned tidily again. The walls are firm, but not to be knocked about. Yet ruins of castles prove that the stones can stand a good deal.

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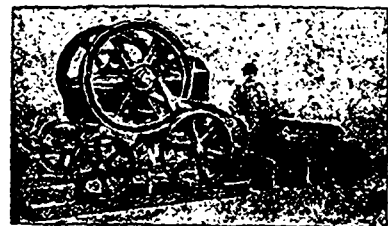
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DRESSED GRANITE FOR PAVING.

The Department of Public Works in Chicago has decided that in issuing contracts for the paving of streets with granite, only the so-called "dressed" granite will be permitted by the specifications in future. This granite is quarried in Wisconsin, and consists of blocks about four inches wide, eight inches long, and with an unvarying depth of six inches. These are dressed very smoothly on all sides, like brick, so that when embedded in the sand they will settle to a uniform depth and be perfectly even on top. The space between the blocks is never more than one-fourth of an inch in width. The crevices are filled in with sand and asphaltic paving pitch, which when hardened firmly holds the blocks on all sides. The work, as being done, consists of a foundation of cement concrete eight inches thick covered with a layer of sand, in which the granite blocks are imbedded, and it is as smooth and even as asphalt or brick pavement, and yet it has sufficient roughness to prevent horses from slipping in wet weather. The cost of constructing streets with the new granite is greater, but it is said that the durability of the paving will make up for the excess in cost.

LEGAL DECISIONS AFFECTING MUNICIPALITIES.

In the Court of Appeal at Toronto last week, the Stratford Gas Co. appealed against a decision of Judge Street, a dismissal action, against the city of Stratford. In 1891 the Reliance Co. established a gas plant in Stratford, which, a couple of months later, was bought out by the Stratford Gas Co. The latter made a contract with the city by which 275 lights were to be used. It had the staff, machinery, coal, etc., to produce that number of lights, but the city only made use of 250. Consequently the company sued for the difference between the revenue the contract warranted and that actually received. The trial judge decided the claim could not be entertained, as, the city, not requiring 275 lights, the contract was impossible of accomplishment.

Judgment has been given in the Drainage Court at Chatham, Ont., in the case Orford vs. Howard. This case arose by Orford appealing from the assessment made by the engineer of Howard, for improvements in the Cranberry Marsh drain in Howard, about four miles from Orford. There is a natural waterfall running across the town line into Howard and shedding water into the territory drained by the Cranberry Marsh drain. The watercourse in both townships had been cleaned out by farmers, and a question arose as to whether the effect

was to increase or diminish the flow of water in Howard. Many prominent men in Orford and one in Howard stated that the flow into Howard was decreased by absorption which took place in Orford in tilling the soil. This evidence was contradicted by some residents of Howard. Orford was never before assessed for work under similar circumstances, when the work is several miles from the land assessed. In this case the assessment was 13 cents per acre for all land shedding water into the watercourse in Orford. The referee delivered judgment at the close of argument, and held that the law had been so changed since a decision in Orford vs. Howard, given several years ago, as to enable Howard to assess Orford for the full 13 cents per acre, and for the full number of acres from which water may come into the watercourse. The referee found, however, that Howard's engineer had computed an excess of acreage to the extent of 120 acres, and had disallowed that much of assessment, representing \$120. Otherwise the appeal was dismissed, each township to pay its own costs.

SHELL CONCRETE FOR PAVEMENTS.

The shell concrete pavements of Mancon, Ga., are attracting considerable attention at present, and the following particulars concerning them appear in an engineering exchange: The material used is a shell limestone similar to the coquina of which buildings were constructed in St. Augustine while it was a Spanish colony. There is a bed of this stone about thirty miles from Mancon, which was discovered during the construction of the Georgia Southern and Florida railroad, some years ago. Part of the roadbed of that railway was made of it, and it hardened into such a durable form that several carloads were brought to Mancon and laid about the freight station, where it resisted the wear of the heavy traffic unusually well. After it had been in service for four or five years, the city paved a street with it having one of the heaviest grades in Mancon, and this first street gave such satisfaction that several more have since been paved in the same manner. About 35,000 square yards are now in use, and petitions for 10,000 yards more are on file. The stone is crushed and laid on the sub-grade excavated to receive it. The layer is about seven inches deep at first, and is consolidated by a 15-ton steam roller to a thick-

ness of six inches, being sprinkled at intervals. On heavy grades a gutter is formed by mixing cement with the stone. The pavement costs from fifty to sixty cents a square yard, which includes crushing and labor, and is reported to last well and remain unusually free from ruts. It has been found to require comparatively little sprinkling and to sweep well, although a softer broom than is generally employed for street sweeping must be used on.

DOMESTIC FILTERS.

Domestic filters may or may not be sufficient to safeguard a household against water-borne diseases. Sometimes they are simply culture beds for bacteria, as is proved by the investigation of the Maryland State board of health. One example reported by that body is worth quoting—that of a citizen of Baltimore. This man first sends the whole water supply of his house through a large filter, and then filters the drinking water in a small domestic filter. A test showed that on a day when the city taps were running to bacteria to the cubic centimetre, the large filter was delivering 9,900 bacteria in the same quantity of water. When the large filter was repacked, only nine bacteria per centimetre got through it, but this water, when passed through the small filter, came out with 71 bacteria per centimetre. Another Baltimorean made use of a filter of high reputation; but its effectiveness was so doubtful that its owner continued to observe the precaution of boiling the water after it had been filtered. The State board report, however, does not say whether or not the owners of the filters had exercised a proper amount of care in keeping them cleansed from accumulation of impurities which collect after a certain length of time, especially when the filters are in constant use and the water is by no means free from suspicious elements. As a rule the use of domestic filters is to be encouraged unless the water supply has been filtered by some reliable process.

The county council of Pontiac has decided to take action against the town of Clarendon for an account involving \$800,000. The suit arises out of a question of valuation. It will be remembered when the council passed a bonus of \$1,000,000 towards the Pontiac and Pacific Railway some years ago, each municipality throughout the county was upon to give their share according to valuation. The township of Clarendon was to have only a valuation of \$200,000, the county contended that this amount was very much below the mark, \$800,000 being a more correct figure. Clarendon's council refuses to pay its share of the bonus unless upon a \$200,000 valuation, and leaving the matter in abeyance for some time the county has finally decided that a proper valuation may be determined. Mr. J. M. McDougall has been engaged as counsel for the county.

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1/2 in. flooring, rough, B M.	12 00	15 00	12 00	15 00
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XX sawn shingles, per M				
16 in.	2 40	2 35		3 00
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sawn lath, No. 1.....	2 75	2 0	2 50	2 60
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Table with 2 columns: Name, Location. Includes Ontario Directory, Quebec Directory.

Architectural Sculptors and Carvers.

Table with 2 columns: Name, Location. Includes Holbrook & Molling.

Architectural Iron Work.

Table with 2 columns: Name, Location. Includes Dominion Bridge Co., Ives & Co.

Art Woodwork.

Table with 2 columns: Name, Location. Includes Southampton Mfg. Co.

Artists' Materials.

Table with 2 columns: Name, Location. Includes The Art Metropole.

Builders' Supplies.

Table with 2 columns: Name, Location. Includes Bremner, Currie & Co., Ontario Lime Association, Rice Lewis & Son, Toronto Directory, The Hardwood Lumber Co.

Building Stone Dealers.

Table with 2 columns: Name, Location. Includes Amherst Red Stone Quarry, Brodie, Credit Forks Mining & Mfg. Co., Cleveland Stone Co., The Longford Quarry Co.

Builders' Hardware.

Table with 2 columns: Name, Location. Includes Malleable Iron Co., Rice Lewis & Son.

Contractors' Plant and Machinery.

Table with 2 columns: Name, Location. Includes Rice Lewis & Son.

Church and School Furniture.

Table with 2 columns: Name, Location. Includes Can. Office & School Furniture Co.

Cements.

Table with 2 columns: Name, Location. Includes Bremner, Currie & Co., Owen Sound Portland Cement Co., The Rathbun Co.

Oronoto Statues.

Table with 2 columns: Name, Location. Includes Cabot, Samuel.

Drain Pipe.

Table with 2 columns: Name, Location. Includes Bremner, Currie & Co., Hamilton and Toronto Sewer Pipe Co.

Elevators.

Table with 2 columns: Name, Location. Includes Fensom, Leitch & Turnbull, Miller Bros & Toms.

Electrical Apparatus.

Table with 2 columns: Name, Location. Includes Barrie & Co., Alex.

Engravers.

Table with 2 columns: Name, Location. Includes Can. Photo-Eng. Bureau, Fire Brick and Clay.

Folding Partitions.

Table with 2 columns: Name, Location. Includes Springer, O. T.

Galvanized Iron Workers.

Table with 2 columns: Name, Location. Includes Ormsby & Co., A. B.

Grilles and Rattings.

Table with 2 columns: Name, Location. Includes Dennis Wire & Iron Co., Malleable Iron Co., Toronto Fence & Ornamental Iron Works, Southampton Mfg. Co.

Granite.

Table with 2 columns: Name, Location. Includes Brunet, Brodie, James.

Heating.

Table with 2 columns: Name, Location. Includes Boston Blower Co., Dominion Radiator Mfg. Co., Gurney, Tilden Co., Ormsby & Co., A. B., Wallberg, E. A.

Interior Decoration.

Table with 2 columns: Name, Location. Includes Elliott & Sen Company.

Lime.

Table with 2 columns: Name, Location. Includes Currie & Co., W&F.P., Ontario Lime Association.

For ornamental work, cu. ft. 40
Granite paving blocks, 8 in. to 12 in. x 16 in. x 4 1/2 in. per M. 50 00
Granite curbing stone, 6 in. x 20 in. per lineal foot. 70

SLATE.

Toronto. Montreal.

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Roofing, Red, Purple, Untinting green, Black, Terra Cotta Tile, Ornamental Black Slate Roofing.

PAINTS. (In oil, @ lb)

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes White lead, Zinc, Red lead, Venetian, Vermillion, Indian, Yellow ochre, Yellow chrome, Green chrome, Paris, Black lamp, Blue, ultramarine, Oil, linseed, raw, by bbl., Imp. gal., Oil, linseed, b'd, by bbl., Imp. gal., Oil, linseed, refined, Imp. gal., Putty, Whiting, Paris white, Litharge, Sienna, burnt, Umber, Turpentine.

CEMENT, LIME, etc.

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Portland Cement, German, London, Newcastle, "Jensen" Brand Portland, North's "Condor", English, artificial, per bbl., Belgian, natural, per bbl., Canadian, artificial, Roman, Parian, Superfine, Hydraulic Cements, Thorold, Quebecston, Napante, Hull.

Luxfer Prisms.

Table with 2 columns: Name, Location. Includes Luxfer Prism Co.

Legal.

Table with 2 columns: Name, Location. Includes Denton & Dods, Quinn & Morrison.

Mantles, Grates, and Tiles.

Table with 2 columns: Name, Location. Includes Chat. Rogers & Sons Co., Holbrook & Mollington, Mosaic Marble & Enamel Co., Rice Lewis & Son.

Mail Chutes.

Table with 2 columns: Name, Location. Includes The Cutler Mfg. Co.

Mortar Colors and Shingle Stains.

Table with 2 columns: Name, Location. Includes Cabot, Samuel, Muirhead, Andrew.

Ornamental Iron Work.

Table with 2 columns: Name, Location. Includes Dennis Wire & Iron Co., Ives & Co., H. R., Malleable Iron Co., Toronto Fence & Ornamental Iron Works.

Painters.

Table with 2 columns: Name, Location. Includes Montreal Directory, Toronto Directory.

Plasterers.

Table with 2 columns: Name, Location. Includes Hynes, W. J., Muirhead, Andrew.

Paints & Varnishes.

Table with 2 columns: Name, Location. Includes Muirhead, Andrew.

Parquet Floors.

Table with 2 columns: Name, Location. Includes Elliott & Son Company.

Plate Glass.

Table with 2 columns: Name, Location. Includes Lyon, N. T., The Consolidated Plate Glass Co.

Plumbers.

Table with 2 columns: Name, Location. Includes Montreal Directory, Toronto Directory.

Roofers.

Table with 2 columns: Name, Location. Includes Friok, I. P., Reversible Windows.

Roofing Materials.

Table with 2 columns: Name, Location. Includes Ontario, Keene's Coarse "Whites", Fire Bricks, Newcastle, per M, Scotch, Lime, Per Barrel, Grey, Plaster, Calcined, N.B., "N. S.", Hair, Plasterers', per bag.

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Table with 2 columns: Name, Location. Includes Ontario, Keene's Coarse "Whites", Fire Bricks, Newcastle, per M, Scotch, Lime, Per Barrel, Grey, Plaster, Calcined, N.B., "N. S.", Hair, Plasterers', per bag.

HARDWARE.

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

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Cut nails, 50d & 60d, per keg, Steel " "

CUT NAILS, FENCE AND CUT SPIKES.

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes 40d, hot cut, per 100 lbs, 10 to 12d, hot cut, 8d, 9d, 6d, 7d, 4d to 5d, 3d, 2d, Cut spikes, 10 cents per keg advance.

Steel Nails, 10c. per keg extra.

Wire nails, 18s base price.

Iron Pipe:

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Iron pipe, 1/2 inch, per foot, " " 3/4 " " " " " " 1 " " " " " " 1 1/2 " " " " " " 2 " " " " "

Toronto, 65 per cent. discount.
Montreal, 70 per cent. discount.

Lead Pipe:

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Lead pipe, per lb., Waste pipe, per lb.

Galvanized Iron:

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Adam's-Mar's Best and Queen's Head, 16 to 24 gauge, per lb., 26 gauge, 28, Gordon Crown, 16 to 24 gauge, per lb., 26 gauge, 28.

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

Structural Iron:

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Steel Beams, per lbs., channels, angles, tees, plates, Sheared steel bridge plate.

Toronto. Montreal.

Table with 4 columns: Description, Price in Toronto, Price in Montreal, and another Montreal price. Includes Ontario, Keene's Coarse "Whites", Fire Bricks, Newcastle, per M, Scotch, Lime, Per Barrel, Grey, Plaster, Calcined, N.B., "N. S.", Hair, Plasterers', per bag.

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