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# CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL OF 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. 9.

OCTOBER 5, 1898

No. 36.

## THE CANADIAN CONTRACT RECORD,

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Advertising Rates on application.

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## FOR SALE

Steam Fire Engines—now rebuilding, two medium-sized fire steamers, our own make, for sale below half price, guaranteeing them in practical work, good as new, five years; snap to smaller towns needing good fire protection, long, easy terms. RONALD FIRE ENGINE WORKS, Brussels, Ont.

## Tenders Wanted

Tenders will be received by the undersigned up to noon on MONDAY, OCTOBER 10TH, for the erection of a pair of SEMI-DETACHED VILLAS in Rosedale. Plans and specifications may be seen at the office of the Architect, where all other information may be obtained. The lowest or any tender not necessarily accepted.  
JAS. A. ELLIS, Architect,  
9½ Adelaide St. E., Toronto.

## TENDERS WANTED

Tenders will be received by Secretary W. H. Williamson, Picton, up to noon of OCTOBER 10TH, for

### Seating First Methodist Church

Plans and specifications may be seen and all information had at the offices of the undersigned. Lowest tender not necessarily accepted.

POWER & SON, Architects,  
Merchants Bank Chambers, Kingston.

## DATE OF PUBLICATION.

Architects, Engineers, Municipal Authorities and others are reminded that the CONTRACT RECORD is printed every Tuesday afternoon, and that advertisements should reach the office of publication not later than 2 o'clock p.m. on that day to ensure insertion in the issue of the current week. Advertisements are frequently received too late for insertion, to avoid which special attention is directed to this announcement.

## MACHINERY AND PLANT FOR SALE

Two large double stiff-legged Derricks, with booms; one large guy Derrick; two single stiff-legged Derricks; Wire Cables, about 3,500 lbs. one Swan, 45 x 18 feet, a lot of Steel Wire Falls; Hoisting Machinery, valued at \$225; one Tar Kettle; about 6 tons Rails, and 6 Tram Cars. Apply to G. H. MAY, Accountant, 45 Wellington Street East, Toronto.

## CONTRACTS OPEN.

HINTONBURG, ONT.—W. P. Smith has purchased several building lots.

STOUFFVILLE, ONT.—The Council has purchased a site for a fire hall.

EDMONTON, N.W.T.—A new building will be erected by J. P. Blowey.

FOXWARREN, MAN.—The Dominion Elevator Co. are preparing to erect a large elevator here.

BARRIE, ONT.—J. S. Johnson is preparing to build an addition to his store on Dunlop street.

LONDON, ONT.—J. H. Burrige is erecting a brick cottage on Beecher street, to cost \$1,000.

PARRY SOUND, ONT.—It is understood that a number of new buildings will be erected here next spring.

LIVERPOOL, N.S.—The Dominion government is inviting tenders for a public building to be built here.

BICKLEY BAY, B. C.—G. W. Willis has decided to rebuild his hotel here destroyed by the recent fire.

WALLACEBURG, ONT.—The Council has decided to proceed at once with the construction of granolithic sidewalks.

STRATFORD, ONT.—J. A. Duggan & Co. have purchased part of the Meyers Estate, and will remodel the two streets.

CALGARY, N.W.T.—McLean, Wanless & Carsons have purchased the Calgary flour mill, and will put in new machinery.

PARRSBORO, N. S.—J. W. Broderick has commenced the erection of an hotel near the mouth of Partridge Island river.

NAPANEE, ONT.—R. F. Bicknell is seeking a bonus to assist in the erection of a packing house, estimated to cost \$75,000.

NEW DENVER, B. C.—It is the intention of J. C. Harris to erect an opera house, 30 x 70 feet, with seating capacity for 300.

YMIR, B. C.—The Ymir Waterworks Co. has been incorporated, to construct a system of waterworks for this place; estimated cost, \$2,500.

BOTHWELL, ONT.—Tenders have been taken by W. A. Scott, town clerk, for the erection of a brick fire hall, council chamber and lock-up.

STIRLING, ONT.—It is learned that an engineer to superintend the construction of the proposed waterworks system has not yet been appointed.

PERTH, ONT.—Mr. Stewart has given notice of the introduction of a by-law to raise the sum of \$5,000 for building an addition to the public school.

VERNON, ONT. It is probable that a new Anglican church, of stone, will be built here next spring.

LACHUTE, QUE.—The Lachute Aqueduct Company have submitted a proposition to the Council for furnishing the town with a supply of water for fire purposes.

WOODSTOCK, ONT.—The D. W. Karn Co., Limited, will shortly refit the factory premises with new heating apparatus. They will also put in a 200 h.p. boiler and engine.

SMITH FALLS, ONT.—It is expected that the question of laying granolithic pavements will be taken up by the Council in a business-like manner at an early date.

OWEN SOUND, ONT.—Mr. Middlebro has introduced in Council a by-law to authorize the issue of debentures to the amount of \$23,000, under the Owen Sound Debenture Act.

PETERBORO, ONT.—The engineer has been instructed to prepare an estimate of the cost of constructing an iron bridge, with concrete abutments, over the raceway on London street.

TILBURY, ONT.—A committee has been appointed to arrange for the construction of a dam in the Brule drain, and for the erection of a suitable building for the waterworks engine and boiler.

TRURO, N. S. In connection with the work on the Coast Railway, the river at Barrington Head was recently surveyed for abutments for a railway bridge, on which work will shortly be commenced.

STURGEON FALLS, ONT.—According to the agreement with the government, the Sturgeon Falls Pulp Co. must expend \$1,000,000 on buildings and equipment for the manufacture of paper and pulp.

BROCKVILLE, ONT.—Tenders are invited up to October 22nd for the erection of a stone residence in this city for Mr. G. T. Fulford. It will be built of Gouverneur marble, and fitted with modern improvements.

VERDUN, QUE.—Tenders have been taken by the municipality for the excavation and laying of about 2,750 feet of 10-inch water pipe, in accordance with plans prepared by McConnell & Marion, civil engineers.

THURSO, QUE.—Arrangements have been made by the Stadacona Water, Light & Power Co., of Montreal, for the construction of a waterworks system, to cost \$14,000 and to be completed in November.

SARNIA, ONT.—The new Grand Trunk round-house will be segmental in form, built of brick on stone foundation, with cast iron column supports. The inside of the building will be formed with cast iron columns set in stone foundation.

ST. LAMBERT, QUE.—The St. Lambert Waterworks Company, with a capital of \$100,000, has been incorporated, the promoters being T. J. Drummond, George E. Drummond, C. E. Gudevil, James T. McCall and Napoleon Charbonneau.

**PELEE ISLAND, ONT.**—Tenders for pumps, stone work, excavating, etc., in connection with the Big Marsh drain will be received by Alex. Baird, C. E., Leamington, or John McLellan, clerk of the township of Pelee, up to noon of Wednesday, October 26th.

**NORTH SYDNEY, C. B.**—Mr. J. A. Young, of the Sydney Gas & Electric Co., has floated the Glace Bay Electric Light & Power Co., for the purpose of supplying electric light to the village of Glace Bay. The power house will be located at the abandoned Stirling pit.

**BELLEVILLE, ONT.**—The Belleville Brussels Carpet Co., Limited, have under consideration the erection of a factory in this city for the manufacture of Wilton and Brussels carpets. A bonus will be asked from the city.—A movement is on foot to erect a large covered rink here.

**FREDERICTON, N. B.**—It is reported that the Fredericton Electric Co. are negotiating for property on which to build a new power house.—W. H. Lawrence is endeavoring to organize a joint stock company to undertake the manufacture of brooms upon an extensive scale. A capital of \$5,000 is required.

**DAUPHIN, MAN.**—The ratepayers will vote on by-laws to raise \$5,000 for school purposes and \$3,000 for fire protection.—Work has commenced on the new Presbyterian and English churches.—Mr. T. C. Sutherland, architect, has prepared plans for a four-roomed school, on which tenders will be taken as soon as the by-law is carried by the ratepayers.

**ST. THOMAS, ONT.**—No. 2 Committee has been given permission to award the contract for building sewers on Curtis street, from Hiawatha to Mary street.—The city engineer has reported that four bridges will have to be rebuilt at an early date. A committee has been appointed to confer with the County Council regarding the building of two of the bridges.

**ST. CATHARINES, ONT.**—The question of waterworks improvement is now under consideration, a committee having recommended the installation at the reservoirs of a combined aeration and chemico-mechanical filtration plant, with a daily capacity of 1,000,000 gallons. The cost of this is estimated at \$14,000. The ratepayers will be asked to sanction the expenditure.

**SHERBROOKE, QUE.**—Mr. Willis Chipman, C.E., of Toronto, has presented to Council a report on the waterworks system of this town. His estimate of necessary repairs, changes and improvements is \$62,000, which includes the following: Larger intake pipe, \$4,000; duplicate of pumping machinery, \$5,000; repairs to reservoir and new main, \$4,000; filtration plant, \$18,000; replacing of water mains, \$33,000.

**HULL, QUE.**—The city engineer has been instructed to invite tenders for the construction of a granolithic sidewalk on Main street.—At the meeting of the City Council on Wednesday last, the question of lighting the streets came up for consideration. It was stated that a plant of 150 32-c.p. lamps could be installed at an annual cost of \$1,200, and a system of 50 arc lamps at a cost of \$4,000. It is probable that tenders for a plant will be invited.

**PORT ARTHUR, ONT.**—Mr. E. S. Jenison is promoting a scheme to build a water power canal from above the Ecarte Falls, on the Kaministiquia river, to the boundary of Port Arthur, where an immense storage reservoir will be built. The intention is to supply electric light and power to Port Arthur, Fort William and other towns in the vicinity. The immediate expenditure for the construction of the canal would be about \$1,000,000.

**HAMILTON, ONT.**—Wm. Stewart & Son, architects, are preparing plans for a residence for A. E. Carpenter, this city.—The city has given notice of its intention

to construct stone curbing on east side of Ashley street and a 12" pipe sewer on Mary street.—Building permits have been granted as follows: F. J. Rastrick & Sons, two-story brick dwelling on Grant avenue, cost \$1,800; Charles Mills, weave mill for the Hamilton Cotton Co., Mary street, cost \$3,000.

**WINNIPEG, MAN.**—Ald. Mitchell has introduced in Council a by-law to raise, by debentures, \$15,000 for the erection of a public library building.—The construction of a pipe sewer on Henry avenue, at a cost of \$1,400, has been recommended.—Mr. C. W. Mellican, C.E., of the Department of Public Works, has returned from Manitou, whither he went for the purpose of laying out a drain. He has reported to the government that the area of the country to be benefitted would not justify the expenditure.

**ST. JOHN, N.B.**—The Common Council have endorsed the scheme of ex-Mayor Robertson for the construction of a dry dock, to accommodate the largest vessels. The city promises a bonus of \$2,500 for 40 years, free site and exemption from taxation. The cost of the work is estimated at over \$1,000,000.—The new Sunday school building for the Mission Church of St. John the Baptist, plans for which are being prepared by H. H. Mott, architect, will cost about \$6,000.

**VANCOUVER, B.C.**—Two by-laws will be submitted to a vote of the ratepayers, one to provide the sum of \$12,000 for the construction of a wharf on Burrard Inlet, and the other to provide \$150,000 for the purpose of acquiring certain lands to be used as parks.—Tenders are being taken this week for the work of constructing sewers to the west of Barclay street, also for supplying vitrified tiles.—The Tramway Co. have purchased property corner Carroll and Hastings street, and will erect a two-story station.

**VICTORIA, B.C.**—Mr. Thomas Deasy, chief of the fire department, has reported to the City Council on the requirements necessary for better fire protection. He recommends the purchase of a steam fire engine and chemical engine, the erection of a fire hall and placing in same of a combined chemical engine and hose wagon, the purchase of ten alarm boxes, twenty hydrants and 1,000 feet of hose, and the erection of a wharf on the water front. These improvements are estimated to cost \$20,000.—The Electric Light Committee has recommended the purchase of a new commutator for the electric light plant.

**NEW WESTMINSTER, B. C.**—Thomas Dunn, of Vancouver, has purchased property, corner Columbia and Front streets, and will erect a brick block thereon.—The Bank of Montreal has purchased the Y.M.C.A. lot, and Mr. Drew the Central Methodist church and parsonage sites, on which to erect new buildings.—Thomas Owens will erect a new building, 33x66 feet, two storeys, with basement.—The Electric Railway Co. are now erecting temporary offices on the corner of Church and Columbia streets.—Mr. F. N. Rattenbury, architect, has been instructed to prepare plans for a new building for the Bank of British Columbia.

**MONTREAL, QUE.**—Mr. W. W. Ogilvie has had plans prepared for a grain elevator, with a capacity of 2,000,000 bushels, to be built opposite the city mills. It is also the intention of Mr. Ogilvie to rebuild the Gould mill.—Alex. Robertson, secretary Harbor Commissioners, will receive tenders up to Monday, October 10th, for supply of timber and plank required during the year 1899.—It has been decided by the Board of Harbor Commissioners that the material of the new pier forming part of the harbor improvement plan shall be of wood. The cost of the work, with timber, will be \$245,750.—The board of governors of McGill University

have decided to erect a memorial tablet in one of the University buildings, in memory of the late Mr. John H. R. Molson.

**QUEBEC, QUE.**—The Quebec Bridge Co., through its secretary, Ulric Barthe, invites tenders up to Monday, January 2nd, 1899, for the construction of a combined railway and highway bridge across the river St. Lawrence, near this city. Plans, etc., may be seen at the secretary's office.—The Federal government is said to have decided to replace the upper and lower light-ships by permanent light-houses, to be placed upon properly constructed wharves.—The Electric Light & Power Company are building a large power house at St. Gabriel Falls, where it is proposed to establish three pulp mills.—A meeting of the directors of the Montmorency Cotton Co. was held last week, at which it was decided to erect a large addition to the mill at Montmorency Falls.

**OTTAWA, ONT.**—The Department of Indian Affairs wants tenders by Tuesday, 11th inst., for the purchase of 25,000 cedar railway ties, 6" face, 2,500 cedar posts, 1,000 cedar saw logs and 200 cords of pulpwood. Address J. B. McLean, secretary.—The vestry of St. Albans church is considering the question of purchasing property on which to build a rectory.—A joint stock company is being formed, composed largely of English capitalists, to erect an extensive brewery in this city. It is said that Mr. Gustavus Llewellyn Williams, of Burton-on-Trent, will be manager of the company.—E. F. E. Roy, secretary Department of Public Works, invites tenders up to Wednesday, 19th inst., for the construction of a public building at Liverpool, N. S. Plans at above department and at custom's office, Liverpool.—In connection with the construction of the main drainage system, the city council has decided that the plans should be prepared by Mr. Surtees, city engineer, he to engage two assistants and a consulting engineer when found necessary.—It is rumored that the C.P.R. contemplates building a station and hotel on property facing on Rideau and Little Sussex streets.

**TORONTO, ONT.**—James McDougall, county engineer, has made a survey for an overhead crossing over the G.T.R. at Aurora, for the Metropolitan Railway Company. It has not yet been definitely decided to carry out this overhead work.—R. J. Edwards, architect, has taken tenders on the building of a large refrigerator.—Mr. C. Masten has purchased a lot, 50x198 feet, on the south-east corner of Bedford road and Lowther avenue. It is understood that Mr. Masten will erect a residence, to cost about \$7,000.—Messrs. McPherson, Clark, Campbell & Jarvis have applied for an act to incorporate the Toronto Elevated Railroad Co., to construct a system of elevated railways in Toronto and adjoining municipalities.—The city engineer has recommended that the council provide the sum of \$10,000 to carry out the work of concreting the bottom of the Rosehill reservoir. This work has been recommended by the Medical Health Officer.—The Public School Board, at a meeting held last week, decided to let tenders for the construction of a dais in the new board room.—Mr. Aemilius Jarvis, representing the syndicate which proposes to erect a palace hotel on King street, states that the stock has been fully subscribed, and that the erection of the building will be proceeded with as soon as an agreement is arrived at with the city.—The city engineer has recommended the placing of a number of new hydrants, and the construction of some water mains in outlying districts.—Mr. J. A. Ellis, architect, is preparing plans for a residence for Mr. Wilson, principal of the public school at Toronto Junction. He is also engaged on plans for a residence for Mr. W. F.

Langworthy, barrister, Port Arthur.—Mr. F. H. Herbert, architect, has prepared plans for remodelling store property at 123 and 125 Yonge street for the Henry Cavithra Estate.—The Board of the House of Industry are about to put in two boilers for heating the addition to their building, now in course of construction.—The following building permits have been issued: James McIntosh, seven two-story dwellings, corner Arthur and Given streets, cost \$9,000; A. M. Orpen, addition to hotel, corner King and Simcoe streets, cost \$2,000; Toronto Carpet Company, new factory, corner King street and Fraser avenue, cost \$50,000. The value of permits issued during the month of September was \$130,920, as compared with \$59,195 for the corresponding period of last year. The total amount to date this year is \$1,507,340, an increase of \$721,399 over the same time of 1897.—In connection with the proposed improvements to St. Lawrence market, Alderman Denison advises that the section between Front and the Esplanade streets be constructed first, at an estimated cost of \$80,000. The total cost is placed at \$150,000.—The city wants tenders by Wednesday, November 9th, for the supply of a complete electric lighting plant, or for the various portions of the work, viz., engine equipment, counter shaft and pulleys, belting, boilers, feed pump and condensers, water and steam piping, economizers, dynamos and station electrical apparatus, arc lamps, mast arms and lamp attachments, poles and overhead circuits, conduits and cables. Tenders are also asked until same date for the supply of electric energy to be used for electric lighting, heat and power.—The Board of Control have again thrown out the tenders for elevators for the new municipal buildings, and will invite contractors to submit tenders for hydraulic machines.—The work of surveying and preparing plans of the C.P.R.'s proposed line from Klienberg to Sudbury, or virtually from Toronto to Sudbury, which has been in progress all summer under the direction of chief engineer H. D. Lumsden, is now about completed.

#### FIRES.

The fires of the past week included the following: Blenkhorn's axe factory at Canning, N. S.; loss \$4,000, insurance \$1,200.—P. Maher's large stables on Bloor street, Toronto, loss \$5,000.—At Treherne, Man., hotel owned by the Molson's Bank, residence of George Kearns, hardware store of D. Engelvin, and J. F. Roger's general store; loss \$50,000, partially covered by insurance.—American Hotel at Wolfville, N.S., partially destroyed.

#### CONTRACTS AWARDED.

WALLACEBURG, ONT.—\$5,000 debentures: H. O'Hara & Co., of Toronto, purchasers.

NAPANEE, ONT.—The Council has purchased a Sawyer-Massey road grader and an eight-ton roller.

HAMILTON, ONT.—W. W. Lachance, architect, has let contracts for a store at Beamsville for W. Gibson.

GANANOQUE, ONT.—Cottage on Star Island for Rev. Dr. Eaton: Mitchell & Wilson, this town, contractors.

QUEBEC, QUE.—Construction of addition to Victoria Park conservatory: J. W. Peters, contractor, \$1,674.

SHERBROOKE, QUE.—G. D. Loomis & Sons have secured the contract for the Sun Life building to be erected on Factory street.

INGERSOLL, ONT.—The contract for new post-office has been let to Robert Carroll and J. H. McKnight, of Toronto, at the price of \$13,437.

CHATHAM, ONT.—The following ten

ders were received for \$10,190 of local improvement debentures: R. W. Smythe, \$10,250; H. O'Hara & Co., \$10,286; G. A. Stimson & Co., \$10,201; F. Marx, \$10,375 (accepted).

PENROCKE, ONT.—Belt & Bobier, contractors, of Ottawa, have secured contracts for several residences to be built here.—J. W. Munro, this town, has received the contract for bridge work on the Montreal & Ottawa short line between Montreal Junction and Vaudreuil. There will be required from 32 to 36 bridges.

MONTREAL, QUE.—The Grand Trunk Railway authorities have awarded Messrs. McCormick & McLeod, of Bracebridge, a three years' contract for ties for the northern division and the main line between Toronto and Montreal. About 450,000 ties will be required. The contract for paving Maisonneuve street has been let to the Sicily Asphalt Co.

OWEN SOUND, ONT.—Tenders for \$10,000 of debentures were received by the town as follows: A. T. Drummond, Kingston, 102.31 (accepted); Hanson Bros., Montreal, 101.95; R. Wilson Smith, Montreal, 101.77; Bank of Hamilton, 101.27; George A. Stimson & Co., Toronto, 101.17; W. H. Brouse & Co., 100.25; Aemilius Jarvis & Co., 100.

BARRIE, ONT.—Thos. Kennedy & Co., architects, have let contracts as follows for alterations and additions to store in this town for Frawley & Deviers: Carpenter work, Rodgers & Gallie; brickwork, J. Stapelton & Son; stone work, Jas. Craig; plastering, W. Ainley; painting, A. Bowen; heating, H. W. Petrie, Toronto; plumbing, J. Melands; metallic ceilings, Pedlar Metal Roofing Company, Oshawa.

TORONTO, ONT.—The Board of Control accepted tenders on Saturday last as follows: Cedar block pavements on Queen street, from Gladstone to Niagara, Dominion Paving and Construction Company, \$7,993; on Humbert street, from Dundas to Dovercourt road, Dominion Paving and Construction Company, \$1,037; on Bathurst street, from Front street to Niagara, Construction and Paving Company, \$3,760; on Elliott street, from Bulton avenue to Broadview avenue, \$1,239; Clinton street, from Mansfield avenue to College street, Dominion Paving and Construction Company, \$997; asphalt pavement on Queen street, from Niagara street to Bathurst, City Engineer, \$15,036.—Six tenders were received for dredging the lagoon in rear of the Lakeside Home, as follows: \$750, \$773, \$890, \$900, \$1,340 and \$1,490. The lowest tender, submitted by Geo. Phillips, was accepted.—F. H. Herbert, architect, has just awarded contracts for a detached stone and brick residence to be erected on the west side of Jarvis street, south of Bloor street, for John Morison, at a cost of \$8,000.—Mr. J. A. Ellis, architect, has accepted the tender of Thomas Wright for all trades in connection with alterations and additions to residence for Arch. Campbell, M.P., Toronto Junction.

#### BIDS.

SHERBROOKE, ONT.—Tenders for iron work of the new bridges on Sherbrooke and Dalhousie streets were received by the council as follows: Hamilton Bridge Works, Sherbrooke street, \$415, Dalhousie street, \$538; Dominion Bridge Co., both bridges, \$888. A committee has been appointed to report on the tenders.

BRANTFORD, ONT.—Tenders for sections A, C and D of the flood prevention works were opened on Monday from the following: McDonald & McDonald and William Grant & Company, of Toronto; Wm. Gibson, of Beamsville; Elliott & Workman, Elliott & Wingate and Schultz Bros., of this city. Alternate tenders were submitted, for the work to be completed this fall, and also in the spring. It is understood that the figures for the fall work were from \$2,000 to \$3,000 higher than the Innes tender, which was accepted by the board originally, and then thrown up by the contractor. For spring work the figures were about the same as those submitted by the original tenderers. The tender submitted by William Gibson, M. P., of Beamsville, was the lowest both for fall and spring work, and it is expected the Board of Works will recommend the acceptance of his tender.

#### ADVANCE IN CEMENT AND GLASS.

Belgian and German makers of cement have advanced prices 4d. to 1s. per cask, owing to the active inquiry experienced at primary points both on foreign and domestic account. In Montreal and Toronto quotations have not as yet advanced, but there is a decided firmness to the market. The arrivals at Montreal last week were 7,722 barrels Belgian and German and 2,500 English, as against 30,745 Belgian and German and 850 English for the previous week, making a total to date for the season of 200,805 Belgian and German and 26,140 English. Sales reported are one lot of 2,000 barrels of German; one lot of 1,000; one lot of 800 Belgian, and several other lots of from 400 to 600 barrels, all on western account at full prices. We quote: English brands, \$2.25 to \$2.35; German, \$2.35 to \$2.50, and Belgian, \$1.85 to \$2.05 per barrel, ex wharf. In Toronto jobbers have also advanced the price of window glass, present quotations being 10 cents per box higher on 50-foot boxes and 20 cents on 100-foot boxes star glass, and 25 cents per box on double diamond.

#### BUSINESS NOTES.

George A. Fader, builder, Halifax, N. S., is reported to have assigned.

Morel & Belanger, painters, Montreal, have registered partnership.

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According to the Italians, the principal door of a building has no determinate dimensions, but varies according to the grandeur of the building and its possessor or its use. Palladio agrees with Vitruvius that the height from the floor to the ceiling should be divided into three parts and a half, that two parts should be given to the height of the aperture and to its breadth one, after deducting from it the twelfth part of the height. Muet proposes the least breadth of the principal door to be  $7\frac{1}{2}$  ft., the largest 12 ft., the height to be one and a half of the breadth, or rather the double of it. With regard to rooms, Palladio has laid down these rules for the doors. The least breadth of the aperture should be 2 ft., the greatest 3 ft., and the height agreeable to the least 5 ft.; to the greatest  $6\frac{1}{2}$  ft. Muet is of opinion that the least breadth should be  $2\frac{1}{2}$  ft., and the height suitable to it,  $5\frac{1}{2}$ . The breadth, from 3 ft. to 4 ft., requires the height to be twice as much. In a royal palace the breadth of 5 ft. or 6 ft. may be allowed to the opening, and the height may be double of it or sometimes less than double by a fifth or fourth part of the breadth.

The city council of Winnipeg, Man., has decided to offer the English bond holders of the Winnipeg Water Works Company's bonds the sum of £40,000 for the purchase of the entire plant.

The Standard Drain Pipe Co., of St. Johns, P.Q., have commenced the manufacture of paving brick for the construction of sidewalks. Being salt glazed and vitrified they are said to be as hard and equally durable as asphalt, while at the same time being less expensive.

A bridge, the construction of which possesses several features of interest, has just been completed at Bizerte, Tunis, under the direction of French engineers. For a long time ferry boats were utilized at the entrance of the canal between the Mediterranean and Bizerte Lake, and the authorities hesitated to permit the construction of a swinging bridge, the manipulation of which, it was thought, would involve loss of time. The problem was solved by M. Arnodin, who invented the structure, which was turned over to the public on June 19. The two steel towers have been erected on opposite sides of the canal, each sixty-five meters (213.22 ft.) in height, and by means of an arrangement of cables and pulleys the car or bridge proper is quickly elevated to the top of these towers on the approach of a vessel, the latter easily passing under. A 6 h.p. engine elevates the car in forty seconds, and the loss of time is reduced apparently to a minimum. The bridge is of special importance, as the Government is establishing a naval station at the port of Bizerte.

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**TREATMENT OF FRESH PLASTER.**—Says a correspondent of the *Mahler Zeitung*: Freshly plastered cement surfaces on walls I have treated as follows, which method has been found to be excellent during my practice of about 15 years: The freshly plastered surface first remains without any coating for about 14 days, then it is coated with a mixture of 50 parts water and 10 parts ammonia carbonate dissolved in hot water; leave this coat alone for a day, paint it again and wait until the cement is taken on a uniform gray color, which takes place as a rule in 12 to 14 days. Then prime the surface thus obtained with pure varnish and finish the coating, after drying, with ordinary varnish paint or turpentine paint. This method has always given good results.

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# MUNICIPAL DEPARTMENT

## IMPROVED METHODS OF SEWAGE DISPOSAL.

By CHARLES G. HORETZKY, C.E.

The following paper on the most recent methods of sewage disposal now in operation in the United States, being to some extent the outcome of experiments made by the Massachusetts State Board of Health, with remarks upon their adaptability (in whole or in part) to cities in Canada, was read at the annual meeting of the Association of Executive Health Officers of Ontario, held at Ottawa on September 27th, 1898:

At your tenth annual meeting, held at Belleville, Ontario, in 1895, I read a paper upon methods of sewage disposal then used in some of the provincial institutions of Ontario.

In December, 1895, I was one of the consulting engineers with reference to the disposal of the sewage of the city of London, Ontario, and then recommended a system of land disposal or filtration, my recommendation being largely based upon the successful working of the Brockton, Mass., plant then in operation, and upon the very doubtful success of several chemical systems visited upon a tour of inspection through the United States in October of that year.

Since 1893 further, and most important discoveries in this direction have been made by the Massachusetts State Board of Health at their experimental station at Lawrence, Mass., where the last few years have been devoted to researches upon the capabilities of gravel and coke filters aided by forced aeration. A description of these experiments would be interesting, but out of place here, and can be seen in the different annual reports. It will suffice to say that the conclusions arrived at offer a great incentive to the practical engineer of all those interested in the construction and maintenance of sewage disposal plants.

It has been demonstrated that filters of gravel of an effective size of 5.40 M.M. can produce a most satisfactory effluent, and remove from 60 to 85% of the organic matter of strong city sewage, at the rate of 400,000 gallons daily per acre.

(Note: In a sample of sand or gravel, the effective size is the maximum diameter in millimeters of the finer ten per cent. of the sand grains, or gravel.)

Coke breeze (screenings from commercial coke) has also been found of immense value as a filtering and straining medium, and possesses the advantage of being fully as valuable for purposes of combustion after its use as a sewage strainer and sludge retainer as before. This will be discussed further on. As regards the forced aeration applied to these experimental filters, pipes were passed through, and within 6 inches of the bottom. A fan blower driven by electricity was attached, and, while the fan made 3,600 revolutions per minute, an air current capable of sustaining 3 inches of mercury was forced through the filters. By frictional loss the force of the current was reduced fully one-third. In the experiments with the coke filters up to January 1st, 1895, the average rate of filtration was 260,000 gallons per acre daily for six days in the week, while the

average removal of organic matter (albuminoid ammonia) and bacteria was 95 and 98 per cent. respectively.

In 1894 Col. Waring instituted experiments upon sewage purification aided by forced aeration at Newport, R. I. These were continued during five months from May till October, and the results set forth in a pamphlet, which also contains a synopsis of the chemical work and investigation carried out simultaneously by Mr. George W. Ralfe, A.M. (Harvard).

The Willow Grove Park (15 miles from Philadelphia) sewage disposal plant was constructed by Col. Waring upon the principles evolved by the Newport experiments. It is simply composed of a set of "strainer" and "aerator" beds  $\frac{1}{2}$  acre in extent in all. The sewage applied daily is assumed to be from 60,000 to 100,000 gallons. The resulting effluent at date of my visit on 6th September was very good, clean and odorless, and the most of it was in daily use for sprinkling the lawns and roadways at Willow Grove. I found, however, that the receiving well was clogged with hard, compact sewage to the depth of 4 feet. This will have to be removed eventually by hand, as it cannot be pumped up. The man in charge informed me that the plant had been one year in operation, and that the "strainer" beds have to be overhauled every season (every six months), and the material washed and returned to its place. This, he says, occupies three men during a week.

As to the conclusions arrived at by the chemist in charge during Col. Waring's Newport experiments, they indicate that a "strainer" tank can remove 40% of the nitrogenous matter in ordinary sewage, if this sewage, roughly strained and free from mud, is applied continuously, at a minimum rate of 3,000,000 gallons daily per acre; and that an "aerator" bed one acre in extent, with nitrification properly established, and proper manipulation, will remove 95% of the organic nitrogen of a "strainer" effluent, applied at the rate of at least 800,000 gallons daily. It will do so for an indefinite period, under, of course, proper conditions of working. This means that  $\frac{1}{4}$  acre of strainers, and 1 acre of aerators ( $1\frac{1}{4}$  acres in all) will suffice for the treatment of the sewage of 10,000 people at the rate of 80 gallons per capita.

I have been unable to obtain the cost of the Willow Grove plant, now about one year in operation, which includes the pump house, pump, blower, masonry and concrete work, filtering material, and all accessories; hence, it is difficult, nay, impossible, to compare it in the large and practical way with other methods which will be discussed further on; but, from my own actual observation, and the statements of the man in charge, I am of the opinion that the conclusions reached by the experimenters are quite in accordance with the actual working of this very valuable system of "Artificially Aerated

Bacterial Filters," as claimed by the inventor.

Reverting to the Massachusetts State Board of Health experiments with coke, I now quote an extract from page 480, report 1896, which sums up the immense value of this material as an aid to sewage purification, and especially as a sludge retainer:

"When coke breeze can be obtained, and the sewage given a preliminary treatment before sand filtration by being passed through this breeze at a high rate in gallons daily per acre, the organic matters can be removed from the entire body of the sewage as completely as chemical precipitation removes them from the main body of the sewage. There is no resulting sludge liquor from this coke straining process, and the clogged coke can be removed from time to time and burned, the sludge being of course held by, and burned with it. During some of the experiments, 13.8 cubic yards of coke per million gallons of sewage filtered were removed, dried, and could have been used as ordinary fuel. By straining through coke we have removed during 1895 54 per cent. of the sludge (albuminoid ammonia) of the sewage. The latter has been strained at an average rate of one million gallons per acre daily, and the coke strainer contained from 6 to 8 inches in depth of coke. The coke is known as breeze (screenings from ordinary coke). At the Lawrence Gas Works, where it is obtained, it is used under the boilers, and estimated to be worth one-fourth as much as the steam coal, or from \$1 to \$1.25 per ton; the amount used has been 10 cubic yards per million gallons of sewage strained, and, as a ton of coke occupies about 2.3 cubic yards, the sewage has been purified, to the extent given, at a cost for coke of \$5.43 per million gallons of sewage strained, estimating the coke to be worth \$1.25 per ton. By this method we remove the sludge from the entire body of liquid, and get rid of the concentrated sludge liquor which results from sedimentation, or any chemical precipitation process, and it seems that the coke is as valuable for combustion after use in the strainer as before."

I may add that in the coke filter experiments of 1895, the removal of organic matter and bacteria, at a rate of 260,000 gallons per acre daily, for 6 days in the week, was 95 and 98 per cent. respectively.

Now, sludge resulting from sedimentation or chemical precipitation contains 90 per cent. of water, the latter being separated from the solids by a most expensive and dirty method of pressing. Even then the resulting cake contains 50 per cent. of water, and, using the lime and alum precipitation process (probably the best), the pressed sludge will amount to 8 tons per million gallons treated, equal to 40 tons as swept from the tanks. As one-half of the pressed cake consists of water, the dry solids are equal to four tons per million gallons of sewage.

(To be Continued)

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