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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. DECEMBER 21, 1898 No. 47.

THE CANADIAN CONTRACT RECORD,
PUBLISHED EVERY WEDNESDAY
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Advertising Rates on application.

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

NOTICE TO CONTRACTORS

Tenders Wanted for the Construction Complete of Sewerage and Waterworks Systems for the Town of Oshawa, Ontario.

Tenders, by registered letter only, will be received by the undersigned, Chairman of the Fire and Waterworks Committee, up to the hour of 8 o'clock p.m. on WEDNESDAY, THE FOURTH DAY OF JANUARY, 1899, for the Construction of the Complete Systems of Sewers and Waterworks, comprising the following works, viz.:

SEWERAGE SYSTEM.—Mains, Sub-Mains and Lateral Sewers, including Manholes, Lamp Holes and Outfalls and their appurtenances.

WATERWORKS SYSTEM.—Dam at Raglan Springs; Supply Main from Raglan Springs to the Town of Oshawa; Elevated Storage Tank, 115 feet high; Supply Mains and Branches, together with all Hydrants, Valves and all Specials connected therewith.

Specifications and Drawings may be seen at the Town Hall, Oshawa, Ontario, and at the office of John Galt, Esq., C.E. & M.E., 59 and 100 Canada Life Building, in the City of Toronto, from whom forms of tender and full particulars may be obtained on and after Tuesday, the 27th December inst. Tenders must be in a lump sum.

A marked bank cheque, payable to the order of the Treasurer of the Town of Oshawa, Ontario, for seven per cent. of the amount tendered, must accompany each tender, otherwise it will be ruled out as informal.

The Corporation do not bind themselves to accept the lowest or any tender.

C. FRENCH,
Chairman of Fire and Waterworks Committee.
Oshawa, Ontario, Dec. 19, 1898.

The township clerks of Perth county have formed an association, to be known as the "Municipal Clerks' Association of Perth County." Mr. A. M. Fisher, of North Easthope, is president, Mr. J. H. Jamieson, of Blanchard, vice-president, and Mr. W. E. Binning, of Listowel, secretary-treasurer.

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.

CONTRACTS OPEN.

WESTMEATH, ONT.—R. Goddard intends erecting a new mill.

MOSA, ONT.—Elias Reycraft will build a new residence next spring.

SOUTH FINCH, ONT.—A cold storage warehouse will probably be built here.

ST. IVES, ONT.—A brick residence will be erected next season by John Waugh.

EDMONTON, N.W.T.—Dowlin & Ottewell are seeking a site on which to build a mill.

ESSEX, ONT.—The G. T. R. is reported to be considering the erection of a station here.

PORT ROWAN, ONT.—C. McGillvary is preparing to erect a residence on Ellis street.

TURNERVILLE, ONT.—Henry Shaw purposes erecting a brick residence in the spring.

GLEN STEWART, ONT.—George Warren intends building a residence next season.

NORTH PORTAL, N.W.T.—A school house will probably be built here in the spring.

COOKSHIRE, QUE.—The town will borrow $6,000 to complete the waterworks system.

HUMBERSTONE, ONT.—The Ontario Silver Company purpose erecting another building.

KILMAURS, ONT.—A new residence will likely be built by George Acres, of this place.

ARNPRIOR, ONT.—E. W. Benjamin, of Yarker, Ont., will probably start a hub factory here.

RIDGEWAY, ONT.—Buffalo parties have purchased property here on which to erect cottages.

BALDUR, MAN.—The merchants are considering the question of constructing a telephone system.

RICHMOND, QUE.—Andrew McKenzie will build a brick block at the corner of Craig and Main streets.

CRANSTON, ONT.—J. Beatson and Timothy Mackle will each build brick residences in the spring.

LINDSAY, ONT.—Rider & Kitchener, veneer and excelsior manufacturers of Brampton, Ont., will likely establish a factory in this town.

WOODSTOCK, ONT.—A by-law to raise $7,000 by the issue of debentures has been passed by the council.

BRADFORD, ONT.—John James wants tenders by 1st March next for the erection of a frame barn, 30×45 feet.

NEW BEDFORD, N.S.—Several foundations have been put in for new houses to be erected in the spring.

PRESCOTT, ONT.—Voting on the by-law to raise $15,000 to provide an electric light plant takes place on January 2nd.

WELLAND, ONT.—A by-law has been passed to raise $5,000 by debentures for the extension of the electric light system.

SMITH'S FALLS, ONT.—A by-law to raise $29,250 for the purpose of paying off debentures will be submitted to the ratepayers.

NAPANEE, ONT.—The county council has granted the sum of $100 to assist in rebuilding a bridge over the river at Newburgh.

WINDSOR, ONT.—It is rumored that the G. T. R. will build a branch railway from Belle River through Essex to Kingsville.

WINNIPEG, MAN.—A three storey block will be built next year on the south side of Bannatyne street, between Main and Albert streets.

CHATHAM, N.B.—T. M. Gaynor, town clerk, wants tenders by 6 p.m. on Monday, January 2nd, for the purchase of $10,000 of bonds.

ROSSLAND, B.C.—It is understood that a gentleman is now in England to secure capital to build a smelter in the East Kootenay district.

DIGBY, ONT.—Work has commenced on the new summer hotel, under the supervision of W. S. Troop. The building will cost $20,000.

EGANVILLE, ONT.—Plans are said to have been prepared for a new C.P.R. station and dwelling house here, work to be commenced in the spring.

CAMPBELLTON, N.B.—The construction of a sewerage system is under consideration. Mr. Miles, civil engineer, will submit an estimate of cost of same.

ST. ANDREWS, N.S.—The Marine and Fisheries Department will be petitioned to erect a lighthouse and fog station at the eastern entrance to the harbor.

LENNOXVILLE, QUE.—It is likely that a new building will be built in connection with Bishop's College, as a memorial to the late Robert Hamilton, of Quebec.

HUNTSVILLE, ONT.—It is rumored that a syndicate is being formed to build a large summer hotel in this vicinity. No names have as yet been made public.

BELLEVILLE, ONT.—The county council has instructed the clerk to communicate with manufacturers of stone crushers and road rollers, with a view to obtaining prices thereof.

FORT WILLIAM, ONT.—A portion of the waterworks system is completed. Further mains will be laid in the spring.

PICTON, ONT.—The Loyal True Blue Association is calling for tenders for alterations and additions to a building in this town, to be used as a home for children.

KINCARDINE, ONT.—On January 2nd the ratepayers will vote on a by-law to grant a bonus of $4,000 to Hunter Bros., to assist them in extending their bridge-building works.

CHARLOTTETOWN, P. E. I.—The council will probably purchase 1,000 feet of fire hose.—The work of constructing sewers throughout the city will be continued in the spring.

ROXTON FALLS, QUE.—The town has agreed to give a bonus of $20,000 to Rolland Bros., of Montreal, to establish here a manufactory of cabinet hardware, upholstery goods, etc.

ORILLIA, ONT.—At a meeting of the building committee of the School Board held last week, a number of plans were submitted for a new high school. No definite action was taken.

CHATHAM, ONT.—The city council has received a communication from a firm in Belgium desirous of establishing in Canada a factory for the manufacture of window and stained glass.

BILLING'S BRIDGE, ONT.—The petition presented to the council at its last meeting asking for a waterworks system was insufficiently signed, and the matter has been shelved for the present.

CORNWALL, ONT.—An electrical engineer has estimated that the cost of installing an arc lighting plant in connection with the proposed water power will be between $12,000 and $15,000.

CARADOC, ONT.—George B. Burwell has served the Middlesex county council with a writ restraining the council from erecting a bridge over the river Thames, between Caradoc and Delaware.

HAMILTON, ONT.—There is a probability that the Toronto, Hamilton and Buffalo Railway Company will build a spur line to the northeastern part of the city. The cost will be about $40,000.

HALIFAX, N.S.—Charles E. Church, Commissioner of Public Works, has given notice that it is proposed to construct a bridge across the channel leading from Lunenburg Bay to Upper South Cove.

WALLACEBURG, ONT.—The Chatham township council has authorized the clerk to prepare a by-law for borrowing the money necessary for the construction of a new outlet for the Skinner drainage works.

OSHAWA, ONT.—A by-law to raise $110,000 by the issue of debentures for the construction of waterworks and sewerage systems has been passed by the council A vote of the ratepayers will be taken on the question on January 21st.

AMHERSTBURG, ONT.—The treasurer has been authorized to dispose of the Richmond street sewer debentures by tender or otherwise. The town will also issue debentures to the amount of $4,000 to cover the cost of constructing permanent pavements.

SEAFORTH, ONT.—The county commissioner has recommended that a steel bridge, 100 feet long, with concrete abutments, be built at Summerhill next spring. He also recommends that a bridge twenty feet long be built at the boundary of Hullett and McKillop.

VICTORIA, B. C.—Tenders are invited by the Department of Public Works, Ottawa, up to Tuesday, January 10th, for the supply of telegraph poles for a line from Alberni to Cape Beale, a distance of 38 miles. Specifications at office of William Henderson, Clerk of Works, this city.

STAYNER, ONT.—The waterworks by-law was carried by the ratepayers on the 13th inst. The plans for the proposed system, which will cost $24,000, were prepared by Mr. John Galt, C. E. The gravitation system will be employed, the supply to be obtained from the springs in the neighboring hills.

GANANOQUE, ONT.—The town council discussed, at a recent meeting, the question of submitting a by-law to the ratepayers at the municipal elections, providing for the construction of waterworks and sewerage systems. It was decided that before submitting the by-law plans and an estimate of the cost should be prepared.

PEMBROKE, ONT.—Certain citizens interested in the cottage hospital propose to take steps to erect a building at an early date.—Estimates have been received by the council for the superstructure of the Mary street bridge. The chairman of the Public Works Committee has been requested to present a full report thereon at the next meeting of council.

NIAGARA FALLS, ONT.—The Howard block at the corner of Bridge street and Clifton avenue has been purchased by James Dickinson, of the Grand Central Hotel, with whom is associated the O'Keefe Brewing Company, of Toronto. It is said to be the intention of the new proprietor to remodel the block into a first-class hotel of thirty rooms.

WOODSTOCK, N.B.—It is probable that next year an asphalt pavement will be constructed on Main street.—The Mayor has received a communication from an Ontario syndicate, who have in view the erection of a pulp mill in eastern Quebec or New Brunswick. A letter has also been received from a gentleman in Michigan who desires to establish an excelsior factory in this vicinity.

NEW WESTMINSTER, B. C.—D. Murchie is excavating for a two-storey building 66 × 32 feet.—The plans of Gunther & Van Aiken, architects, have been accepted for a new church for St. Paul's congregation. Tenders will be invited immediately for a building 30 × 60 feet, with seating accommodation for 250 people.—The Freemasons' Society have decided to rebuild the Masonic Hall.

GALT, ONT.—The plans for the new G. T.R. station show a brick structure, with brown stone trimmings, comprising ticket office, waiting rooms, baggage rooms, and open space roofed in for luggage. Work will commence in the spring.—It has been found necessary to postpone until January 9th the submission of the by-law to issue debentures for $67,750 to acquire the Galt Gas Light Company's plant.

PORT ARTHUR, ONT.—There are now twelve survey parties at work on the line of the Ontario and Rainy River Railroad. It is expected that by the end of May next the rails will be laid on 20 miles of roadbed, extending from Stanley station to the Mattawan river. The company hope to obtain a grant of $6,400 per mile from the Dominion government at the coming session, in which case an effort will be made to complete the railway within two years.

KINGSTON, ONT.—Ex-Mayor John Carson will probably build an opera house on the corner of Princess and Clergy streets.—A meeting of the Summer Hotel Committee of the Board of Trade was held last week, to consider the erection of a modern summer hotel, to cost about $100,000. It was agreed to take action at once, and a committee, consisting of A. Chadwick, E. J. B. Pense and George Cliff, was appointed to secure options on suitable sites.

VANCOUVER, B.C.—F. T. Schooley has asked the city for permission to erect a building on Harris street for the Royal Soap Works.—The council has exempted from taxation certain C.P.R. properties, in consideration of the company expending $100,000 on permanent improvements in this city. The proposed improvements include a new building.—English capitalists are said to be considering the erection of a large hotel on the northwest corner of Granville and Hastings streets.

ST. JOHN, N B.—The city council has granted the necessary supply of water to the Cushing Sulphite Fibre Company, and consequently the erection of the proposed pulp mill will be proceeded with.—The council has appointed a committee to consider the matter of procuring a new ferry steamer.—George McAvity and G. G. Ruel, of this city, and others, are applying for incorporation as the New Brunswick Cold Storage Company, Limited, with a capital stock of $250,000.

QUEBEC, QUE.—The Minister of Public works has recently authorized the construction of a bridge over the Mistassini river, in the Lake St. John district.—H. Stavely, architect, 92 St. Peter street, invites tenders up to Tuesday, January 3rd, for the erection of a car barn in St. Sauveur for the Quebec, Montmorency and Charlevoix Railway Co.—The city engineer has prepared plans for an ice-house, 20 × 40 feet, to be erected in Victoria park.—E. Martineau has taken out a permit for alterations to his property, corner St. Joseph and Chapel streets, cost $4,000.

MONTREAL, QUE.—The Ogilvie estate contemplate making extensive alterations to the Queen's block on St. Catharines street. The improvements will cost $100,000, and will include the addition of a storey to the present structure and the remodelling of the Empire building. Messrs. A. G. Ross & Co. are agents for the Ogilvie estate.—Mr. Lessard, government inspector, has reported that the civic hospital is uninhabitable, and it is probable that a new building will be erected.—Alexander Robertson, secretary Harbor Commissioners, wants tenders by Tuesday, 27th inst., for the supply of timber and planks. Particulars from John Kennedy, chief engineer.—At a meeting of the harbor commissioners held last week, it was decided to take steps to secure the erection of a grain elevator.—It is stated that the Quebec Central Railway management contemplate building a spur line into Maine.

OTTAWA, ONT.—Haivie & Company, of Toronto, are considering the question of establishing a box factory at the Chaudiere.—The new Maria street bridge will be a steel structure and will cost upwards of $40,000.—The Separate School Board has appointed a committee to report as to the necessity of additional accommodation in the Breboeuf and Guigue's schools.—The parish board of the Church of Our Father has appointed a committee to secure a site for a new church building. G. C. Holland is president of the board.—A proposal has been made to have the new shops of the Canada Atlantic Railway operated by electricity.—The proposed addition to the drill hall will not be commenced before next midsummer, as it will be necessary to obtain an appropriation therefor at the forthcoming session of parliament.—Mr. E. J. Chamberlain, general manager of the Canada Atlantic Railway, states that a number of plans for the proposed central depot have been prepared, but no selection has as yet been made.—At a meeting of the Carleton county council held in this city recently, an agreement was reached whereby the building of a bridge between the townships of Pakenham and Fitzroy will be proceeded with.—Application will be made to parliament for the incorporation of a company to build a railway from Klondike City to Bonanza creek, Indian river and Yukon river, with branches to different points.—The new Congregational church will be located on Somerset street.—Hiram S. Maxim, of London, Eng., and Charles L. James, of Boston, are in the city with a view to

investigating the prospects for a large pulp mill. They examined the water power at Chelsea, which is regarded as a suitable site.

TORONTO, ONT.—Application will be made at the next session of the Ontario legislature for the incorporation of the Haliburton, Whitney & Mattawa Railway Company, to build a railway from Haliburton to Whitney and Mattawa.—Plans for additions and alterations to a building in Picton, Ont., for the Loyal True Blue Association, are on view at the office of Mr. Henry Simpson, architect, 9½ Adelaide street east. Tenders will be received up to January 7th.—The city engineer, in a report presented to the Works Committee last week, estimates the cost of extending the Parkdale sewers into deep water and disposing and treating the sewage at $60,000, with $4,000 as the annual cost of maintenance. The engineer has recommended the construction of an asphalt pavement on Queen street west, from Yonge to John street, at a cost of $34,101, and a twelve-inch tile sewer on Amelia street, at a cost of $346. —It is rumored that the Canadian Motor Syndicate has completed negotiations for the purchase of a block of land in the central part of the city, on which to erect a building 50×60 feet, to be used as a factory.—Mr. W. L. Symons, architect, has forwarded to the Property Committee his estimate as to the cost of providing accommodation in St. Lawrence Hall for the Technical School. By extending two floors of the present hall some distance to the rear, the accommodation could be secured at a cost of $25,000. The estimated cost of an entirely new building is placed at between $75,000 and $85,000.—Building permits have been granted as follows: Confederation Life Association, alterations and new store fronts at building on north-east corner of Yonge and Richmond streets, cost $10,000 (J. Wilson Gray, architect); M. DeLaplante, four attached brick dwellings, 34-45 Mission avenue, cost $3,000; F. Simpson, three storey and basement brick store, 738 Yonge street, cost $9,000.—The Grand River Electrical Power Co., Ltd., has been organized by G. H. Carroll, J. F. Boultbee and A. N. Parney, of Paris, and W. J. Clark and Thomas McLaughlin, of this city. The capital stock is $95,000.—The city clerk has received petitions for a cedar block pavement on Oxford avenue, from Augusta to Bellevue avenue, and against a brick pavement on Division street.

FIRES.

The fires of the past week included the following: The Western Milling Company's elevator at Pense, N.W.T.; totally destroyed.—Dwelling house of John Chaplow, three miles from Thamesville, Ont.—North Star Hotel at Magnetawan, Ont., owned by Adams & Burns, of Toronto, loss $2,000, small insurance.—The Superior school building at Dorchester, N.B., totally destroyed.—Brunswick Hotel at Wabigoon, Ont., owned by Kennedy Bros.; loss $5,000, insurance $3,500.—Factory of the Hamilton and Toronto Sewer Pipe Company at Hamilton, Ont., loss $12,000, covered by insurance. Three drying kilns were saved.—Residence of V. E. Wensley at Belleville, Ont.; loss $2,500.—Arthur Ludlam's sash and door factory at Leamington, Ont., damaged to the extent of several thousand dollars.—Factory of the Ontario Wind Engine & Pump Company on Liberty street, Toronto, partially destroyed.—The Music Hall at London, Ont., owned by Alexander Harvey, damaged to the extent of $2,000.—The Methodist church, corner Elizabeth and Toronto streets, Barrie, Ont., partially destroyed. It is expected that the church will be rebuilt.

CONTRACTS AWARDED.

ALLENFORD, ONT.—The township of Amabel has received $900 premium on $22,000 of 3½% debentures.

BROCKVILLE, ONT.—W. & J. Sheridan have secured the contract for galvanized iron roof for new skating rink.

BADEN, ONT.—Ernest Albert has the contract for building a residence for John Brennaman, near New Hamburg.

CRYSLER, ONT.—C. T. Gagnon, of Moore Creek, was the successful tenderer for the Blue Creek and Butternut Creek drains.

THESSALON, ONT.—The tender of N. Dyment for the purchase of $13,000 of debentures has been accepted, at a premium of $200.

WINNIPEG, MAN.—Tenders for sewer pipe were received by the city council as follows: J. H. Ashdown, $1,202; W. F. Lee, $909 (accepted).

NEW GLASGOW, N. S.—Three tenders were received by the town council for an iron tower for an electric fire alarm, that of John Stuart, at $748, being the lowest.

PERTH, ONT.—Sub-contracts for the new addition to the public school have been let as follows: Masonry, George & Richard Smith, $2,400; carpenter work, W. J. Robb, $2,930.

ST. AGATHA, ONT.—Contracts for building the R.C. church have been let as follows. Carpenter work, Forler Bros., of Philipsburg; stone and brick work, Wunter Bros., of Baden.

ST. JOHN, N. B.—George Appleby, of Darling's Island, has been awarded the contract of removing the St. John bridge and the railway tracks in connection with the I.C.R. improvements.

LONDON, ONT.—Four tenders were received for construction of a sewer to Waterloo street. The tender of Harding & Leathorne, at $849, and 20 cents for side drains, has been accepted.

NELSON, B.C.—The contractors for the Nelson-Bedlington Railway have let subcontracts for grading, exclusive of timber work, to McLean Bros., Breckenridge & Lunn, MacBeath & Peters, and Gus. Carslon.

NEW WESTMINSTER, B. C.—Tenders were received as follows for the erection of a municipal hall for Matsqui: Joseph Burgess, Mt. Lehman, $3,943; John Israel & Son, Mt. Lehman, $1,571; D. D. Grant, New Westminster, $1,375.

HALIFAX, N. S.—Herbert E. Gates, architect, has awarded contracts as follows for a new building for C. E. Reveril at Dartmouth, N. S.: Carpenter work, F. Bauld; masonry, Alex. Hutchinson; painting, James Leahy; plumbing, Crimp & Ritchie. The contract for painting A. P. Torrence's houses has been let to David Roche. The other trades will be carried out by day labour.

ACTON, ONT.—Tenders for the purchase of $6,000 of electric light debentures were received as follows, the accrued interest being also allowed in each case: Andrew T. Drummond, Kingston, $5,735; James A. McKay, Toronto, $6,050; H. O'Hara & Co., Toronto, $6,105; Geo. A. Stinson & Co., Toronto, $6,105.50; Merchants' Fire Insurance Co., Toronto, $6,125, W. H. Brouse, Toronto, $6,201; Ontario Mutual Life Assurance Co., Waterloo, $6,210. The tender of the Ontario Mutual Life Assurance Company has been accepted. The council has accepted the tender of R. & W. D. Anderson for roofing and plastering the power house.

Mr. John Ross, C. E., of Ottawa, was recently married to Miss Ethel Mattice, of Cornwall.

Mr. F. T. Ure, of Woodstock, Ont., has been appointed county engineer for Oxford, in succession to Mr. W. M. Davis.

MARKET CONDITIONS.

The trade in builders' supplies is quite as large as could be expected at this season of the year. *Prices do not show any material change.* From Montreal comes the report of several enquiries from the west for round lots of cement for prompt delivery. Pig iron is weaker if anything, and in galvanized iron business is very light. There is a good enquiry for iron pipe, and a fairly good demand for glass. An advance is noted for all descriptions of enamelled and colored fancy glass. A steady advance in the primary markets has compelled jobbers to make an advance of 2c. in turpentine, and further advances are anticipated. The prices of all other staples are firm.

PILE-RINGS AND METHOD OF PROTECTING PILE-HEADS IN DRIVING.

A committee of the Association of Railway Superintendents of Bridges and Buildings makes the following report on Pile-Rings and Method of Protecting Pile-Heads in Driving:

"First.—We find that the best way to protect the pile-head is to use a 1" x 3" ring, made out of the best iron that can be obtained at the place where used. We recommend, where a railroad company have a steam-hammer in their shops, that they make their pile-rings out of hammered-iron from old car axles. The cost of a 1" x 3"—14" diameter ring is $1.75, while the same size ring made out of best bar-iron costs $2.00. A pile ring made out of hammered iron will last to drive 75 oak piles and at least 300 cedar piles. The rings made out of best bar-iron usually last to drive 50 oak *piles and 200 cedar piles; in fact one of your* committee had 50 pile-rings made out of old car-axles four years ago, and since that time has driven 250 oak piles and 6,000 cedar piles without any renewal of pile rings. A pile driver should carry on the tool-car 60 pile-rings, 10 pile rings 15", 30—14", 10—13½", and 10—13" in diameter.

"The 14" diameter are the ones most used, 14" being the width of caps used by most roads. It is not necessary to have the pile-head larger in diameter than the cap is wide.

"Second.—In fitting the pile-ring, the pile should be neatly sawed off square; the pile should be neatly chamfered down at least 5" from the end, so the ring will just catch on and let the pile hammer do the rest. This is a *little hard on rings, but in this way you are* sure to get a good fit of the ring and the pile-head is best protected.

"The face of the pile-hammer should be concaved to the depth of 1½" in the centre, and run out to nothing 2" from outside of the hammer; this will drive the fibre of the wood down slightly over the edge of the ring and make a neat fit of the hammer, and if the piles are kept exactly under the hammer there is very little danger in fracturing the pile. The best weight of a pile-hammer is 3,300 pounds. The height of the blow should not exceed 12' in driving cedar piles, or 20' in driving oak piles. It will be found that short quick blows will drive the pile as quickly as long blows, and are less liable to injure the pile. The pile should be neatly prepared before driving it; the knots should be neatly trimmed off and the pile sharpened to a 4" square point for hard driving, the point to be made as near straight with the pile as possible. Piles should never be over-driven. When a pile does not go over 1" at a *fall of 10' with a* 3,300 pound hammer, the blow should be shortened to 6', and the pile carefully driven until it stops going or does not go over ¼" at a blow. The driving of piles for railway traffic, and for all kinds of

structures, requires a great amount of judgment to do good work. The use of the iron cap for driving piles in trestles that are in use is not very practicable, as you cannot drive the piles up so close to the stringer with them as you can without them. It is too much extra work to move the stringers so as to use the iron caps and follower, but for driving piles for foundations and dock work, or any place where there is no obstruction, we think Wm. T. Casgrain's patent cap and follower an excellent device. It is especially adapted in driving foundation piles, as that class of piles are generally short —not over 25' in length, and with the patent cap they will not need any togles to keep them right, and they are good protection to pile heads, as the piles in foundations should be driven home until they stop and the hammer bounces on them. In driving piles through shell-rock or soapstone or hard pan, where piles require shoeing, the best way is to use old arch-bar iron, welding four pieces together and drawing the end to a point and flaring the four pieces out to fit the four sides of the pile. Have some holes punched in the strap to fasten the points on the pile with boat spikes; this kind of a point will go through hard substances where the round cast-iron point will not work. These kinds of points have been used by some of your committee to drive through concrete around piers to great advantage, and any one having occasion to drive piles through hard substances too hard for piles should not neglect to shoe them with points made out of old flat iron. A little practice will soon teach one how to make them."

GREEK MASONRY.

What must be observed in the edifices of Greece is the high finish of all the parts. In them the object which is not intended to be seen is wrought with as much care as the exterior composition. The junctures of the blocks which form the columns of the Parthenon are so perfect as to require the greatest attention to discover them, and they leave a mark no thicker than the finest thread. In order to attain this extraordinary perfection, the marble was first reduced to its proper shape by a chisel. Afterwards the two pieces were rubbed one against the other, and sand and water thrown upon the centre of friction. The courses, by means of this practice, were placed with incredible precision, and this precision in the shaft of the columns was determined by a square pivot of olive wood. The roses, the plinths, the mouldings, the astragals, all the details of the edifice exhibit the same perfection. The lines of the capital and the flutings of the columns of the Parthenon are so sharp that you would be tempted to suppose that the entire column has passed through a lathe. No turner's work in ivory can be more delicate than the Ionic capitals of the Erechtheum, and the Carytides of the Pandroseum are perfect models.

MUNICIPAL DEPARTMENT

WATER SUPPLY FOR MONTREAL WEST.*

By William Thompson.

The subject of my paper for this evening is not altogether of my own choosing, but it is nevertheless presented to you for consideration with a great deal of pleasure. Ever since I first arrived here seven years ago, this subject has forced itself upon my attention, and it is to-day just as important a question as it was then. While a great deal of attention and study has been devoted by me to this question, with the idea of providing your town with a permanent and satisfactory water supply, the importance of the whole question before us has not in any way decreased. I can hardly imagine anyone failing to realize the great importance of securing an abundant supply of fresh water for domestic purposes, even for individual uses; how much more important, then, becomes the question of water supply when towns and villages are concerned, and particularly towns that are situated as is Montreal West—inland from rivers or lakes. Still, if your town is ever to be successful, either with present or increased population, some source of efficient water supply and drainage must be provided.

Allow me to consider my subject under separate and distinct headings. Let us first discuss water supply and usual requirements in a general way. We will divide the source of supply of all natural waters intended for town and domestic supply into four classes:

1. Rain water.
2. Surface waters, including rivers and lakes.
3. Ground waters, including shallow wells.
4. Deep-seated water, including deep wells, artesian wells, etc.

* Paper read by special request as a farewell address to the residents of Montreal West, Que.

Under each of these heads let us briefly study the advantages and disadvantages of each particular class, and the liability of pollution and contamination, and then endeavor to apply the knowledge gained to our particular case.

Before proceeding with this discussion, let us briefly for a few minutes consider in a general way the connection which exists —or, we will say, is supposed to exist— between drinking water and disease, because our question really resolves itself into this form, and to save time we will drop all intermediate and connecting points. Waters containing a very considerable quantity of dissolved substances, such as could be properly designated mineral waters, are not thought of for the purpose of a public water supply, and consequently we can entirely eliminate these from our discussion. Small amounts, however, of mineral matter are by many authorities considered necessary for the health of the consumers. This must not be regarded as being at all necessary, as experience has repeatedly shown that distilled water properly aerated is not only perfectly wholesome but equally healthy. It is evident also that soft sur-

(Continued on page 6).

MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

TO MUNICIPAL OFFICERS.

The CONTRACT RECORD is desirous of publishing, as far as possible, advance information regarding projected works of construction in all parts of Canada, such as sewerage and waterworks systems, railways, street pavements, public and private buildings, etc. Municipal officers would confer a favor upon the publisher by placing at our disposal particulars of such undertakings which are likely to be carried out in their vicinity, giving the name of the promoter, character of the work, and probable cost. Any information thus furnished will be greatly appreciated.

face water, rain water, and moderately hard spring or well water are all wholesome, and can be drunk with impunity and without inconvenience by persons who have become accustomed to their use. It is true, however, that persons accustomed to drinking hard water generally experience some derangement of their digestive organs on beginning to use soft water. But this cannot be taken as an argument against the use of soft waters, as the same derangement is liable to occur when conditions are reversed.

It is contended by many that the human system needs salts of lime, etc., and that these compounds are furnished in an assimiable form in water, and that consequently a somewhat hard water is most advantageous for town supply. I will allow this contention to pass without remark, except to say that a hard water whose hardness is due to the presence of sulphate of lime is not well suited either for drinking or domestic use, and is injurious to most persons.

Waters containing much vegetable matter are also said to be injurious, causing malarial and other fevers. The attention of sanitarians and water experts is, however, directed principally to the effect of water which is polluted by the waste materials from manufactories and dwellings, or by the sewage from towns and cities, and the idea is very generally held that waters thus polluted may be, and frequently are, the cause of specific diseases, such as malarial fever, typhoid fever, diptheria, etc. This is a matter open for considerable discussion and expression of opinion among those who have studied the question, and which I may say cannot at this present stage of science be either absolutely proven or disproved. But the duty of any engineer who is called upon to decide the question of water supply is perfectly clear, and that is, to err on the side of safety by admitting that specific diseases may be conveyed by means of drinking water, and to guard all sources of domestic water supply from the possibility of contamination from these sources.

"However views may differ," says Nicolls, "as to the possibility of injury from this or that particular form of contamination, we are safe in accepting the two following principles as fundamental guides in the selection of a water for domestic supply: (1) A water suitable for domestic supply must be free from all substances which are known to produce an injurious effect on the human system, or which are suspected with good reason or on good authority to produce such an effect. (2) The water should be as far as practicable free from all substances and from all associations which offend the general aesthetic taste or sense of the community, and thus affect the system through the imagination."

The first of these principles needs no argument to justify it. With regard to the second, while there is no doubt of the power of the imagination and its effect on the physical system, common sense must fix a limit to the application of this principle, and reasonable latitude must be allowed the engineer, according to the circumstances surrounding each particular case. Undoubtedly, the best water for drinking is a moderately soft spring water, in which all possibility of contamination is out of the question. Unfortunately, it is seldom that such water can be obtained in sufficiently large quantities. Many spring waters are so hard that, while pleasant and suitable for drinking purposes, they are unsuitable for manufacturing and general domestic purposes, and I hold it is a serious mistake to claim that a water which is best for drinking must be chosen at all hazards for town supply.

RAIN WATER AS A SOURCE OF SUPPLY.

The collection of rain water as a source of public supply is in our case, for manifold reasons, beyond consideration. In many cases, however, where there is no public supply, and wells are out of the question, the collection of rain water by the individual householder becomes a necessity. This is also the case where the public supply is too hard for washing and similar purposes. The collection and storage of rain water is attended by many changes. Rain which falls even in the open country is often far from being pure, as it absorbs from the air both gaseous and solid substances. And when the rain is collected from roofs near habitations, the impurities may be considerable and a serious menace to health. Particularly is this the case after a dry spell, and where first portions of the rain-fall are collected and used. Besides these sources of contamination to which rain water is naturally and unavoidably liable, there are accidental sources of contamination, all of which tend to render the collection of rain water undesirable except in very exceptional cases.

The storage of rain water presents just as much room for exercise of care as does the collection, and while I might wish to enlarge upon this phase of my subject, I feel that time is too limited to further refer to this.

SURFACE WATERS AS A SOURCE OF SUPPLY.

This question is of itself of the greatest importance, but unfortunately the town of Montreal West is so situated that no available supply of this description can be reached unless at enormous and extravagant expense. For the sake of time, that we may more fully discuss the latter portions of our subject, I will pass over this important source of supply and the study of its various advantages or disadvantages.

GROUND AND DEEP-SEATED WATERS.

Let us now consider the third and fourth divisions I have made on this question. I intermingle these to better illustrate local conditions, a study and description of which is the real object of this paper. A certain proportion of the water which falls as rain or snow sinks into the earth, and where the surface deposit is gravel or other porous material, overlying an impervious body, the water collects to form the ground water of that particular locality. But while a portion of the water encounters impervious stratum, another portion of the water precipitated from the atmosphere falls upon the edges of up-turned rocky strata or upon rocky deposits, which are either porous or so fissured that they afford a more or less free passage for the water. And when this fissured or pervious stratum has an outcrop at some lower level, the water may issue in the form of springs, the flow of which will be more or less copious. And when the course of the water has not been such that it has been heavily charged with mineral matter, such springs furnish one of the best sources of water supply. The advantages of spring water over surface water for domestic supply is considered by many experts of sufficient importance to guarantee the spending of considerable sums of money in order to secure it.

When the water precipitated from the atmosphere is absorbed by a pervious stratum situated between two impervious strata, the water may exist under considerable hydrostatic pressure, and the occurrence of a "fault" in the upper strata may allow the water to rise to the surface of the ground as springs, but very often the water can be utilized only by sinking or boring artesian wells.

Allow me to remark that the term "artesian well" is often misapplied in this connection. An artesian well is a well which is sunk or bored through an impervious stratum so as to reach water bearing strata in which water is under hydrostatic pressure, and as soon as this stratum is reached and the well is opened the water rises under hydrostatic pressure, to or higher than the surface of the ground. A well of this kind is very properly called artesian, when, as nearly always occurs on the Island of Montreal, with a few exceptions, the force or hydrostatic pressure is not sufficient to force the water to the surface of the ground (and such is the case with the first well sunk at Montreal West, where the water rises to within 200 feet of the surface, and no higher). Then, wells of this kind, no matter what the depth of the water may be, can only be classed as deep wells, and the term artesian is improperly applied.

(To be Continued.)

Prices of Building Materials.

LUMBER.

VALID QUOTATIONS.

	Toronto.		Montreal.	
	$	$	$	$
Mill cull boards and scantling	9 00	10 00	10 00	12 00
Shipping cull boards, promiscuous widths	12 00	13 00		13 00
Shipping cull boards, stocks	15 00	16 00		16 00
Hemlock scantling and joist up to 16 ft	10 00	12 00		10 00
Hemlock scantling and joist up to 18 ft	11 00	2 00	12 00	3 00
Hemlock scantling and joist up to 20 ft	12 00	13 00	13 00	14 00
Cedar for paving, per cord		5 00		5 00
Cedar for kerbing, 4 x 14, per M		14 00		14 00
Scantling and joist, up to 16 ft		14 00		14 00
" " 8 ft		15 00		16 00
" " 20 ft		16 00		16 00
Scantling and joist, up to 22 ft		17 00		17 00
" " 24 ft		19 00		19 00
" " 26 ft		20 00		21 00
" " 28 ft		22 00		23 00
" " 30 ft		24 00		25 00
" " 32 ft		27 00		27 00
" " 34 ft		29 50		29 50
" " 36 ft		31 00		31 00
" " 38 ft		33 00		33 00
" " 44 ft		35 00		36 00
Cutting up planks, 1½ and thicker, dry	25 00	28 00	25 00	30 00

B. M.

1½ in. flooring, dressed, F M.	34 00	36 00	28 00	31 00
1½ inch flooring, rough, B M.	18 00	22 00	18 00	22 00
1½ " dressed, F M.	25 00	28 00	27 00	30 00
1¼ " undressed, B M.	18 00	19 00	18 00	19 00
1 " dressed	18 00	20 00	18 00	22 00
1 " undressed	12 00	15 00	12 00	15 00
Beaded sheeting, dressed	20 00	35 00	22 00	35 00
Clapboarding, dressed		14 00	8 00	12 00
XXX sawn shingles, per M 16 in	2 40	2 35		3 00
XX sawn shingles	1 60	1 50		
Sawn lath, No. 1	1 75	2 00	2 50	2 60
Cedar		2 90		2 90
Red oak	30 00	40 00	30 00	40 00
White	37 00	45 00	35 00	55 00
Basswood, No. 1 and 2	28 00	30 00	18 00	20 00
Cherry, No. 1 and 2	70 00	90 00	70 00	80 00
White ash, No. 1 and 2	24 00	35 00	30 00	35 00
Black Ash, No. 1 and 2	20 00	30 00	18 00	30 00
Dressing stocks	16 00	22 00	16 00	22 00
Picks, American inspection		30 00		40 00
Three uppers, Am. inspection		50 00		50 00

(Continued on Page 8.)

Prices of Building Materials.

(Continued.)

	Toronto.		Montreal.	
BRICK—₩ M	$	$	$	$
Common Walling	7 25	7 50	7 50	8 00
Good Facing		8 50		8 50
Sewer		8 50	8 50	9 00
PRESSED BRICK, PER M.				
Red, No. 1 f.o.b. Milton		13 00		19 00
" " 2		11 00		17 00
" " 3		8 50		15 00
Buff No. 1, f.o.b. Milton		15 00		20 00
" " 2		13 00		8 00
Sewer		6 00		
Hard building		6 00		
F. O. B. DON VALLEY.				
Red A		18 00		24 00
Red B		16 00		20 00
Red C		13 00		17 00
Trojan and Corinthian		21 00		28 00
Pompeiian		22 00		29 00
Athenian and Egyptian		25 00		31 00
Tyrian		35 00		4 00
Sicilian		40 00		45 00
Roman		35 00		40 00
Carthaginian		40 45		45 00
Ornamental	30 00	100 00	30 00	100 00
Common insides		6 00		
Hard sewers		7 00		
Vitrified pavers, 1sts		16 00		22 00
" " 2nds		10 00		15 00
F. O. B. BRAMSVILLE.				
Peerles Facing		15 00		15 00
Red, No. 1		16 00		12 00
" " 2		14 00		10 00
" " 3		9 00		8 00
Buff		2 00		20 00
Brown		24 00		20 00
Roman Red		30 00		
" Buff		33 00		35 00
" Brown		40 00		35 00
Sewer		8 00		
Roof Tiles		22 00		
Hip File (each)		20		
Ridge Tile "		60		
SAND.				
Per Load of 1½ Cubic Yards		1 25		75
STONE.				
Common Rubble, per toise, delivered		00		11 00
Large flat Rubble, per toise, delivered		14 00		18 00
Foundation Blocks, per c. ft.		30		50
Ballochmyle	80	90	65	75
New York Blue Stone				1 05
Granite (Stanstead) Ashlar, 6 in. to 12 in., rise 9in., per ft.				25
Moat Freestone			60	70
St. Oldhelm, Bath Freestone			50	60
Black Pasture, Freestone				70
Thomson's Gatelawbridge, cu. ft.			75	80
Clark's N. B. Brown Stone, per cubic foot, f.o.b.		1 15		1
Brown Free Stone, Woodpoint, Sackville, N.B., per cub ft.		1 15		90
Amherst Red Sandstone, Amherst, N.S., per cub. ft.		1 10		75
Elgin Town Quarries, Olive Freestone, cu. ft				85
MadocRubble, delivered, per toise	14 00	14 50	14 00	14 50
Madoc dimension floating, f. o. b. Toronto, per cubic ft.	30	32		
"Scoriæ" Paving Blocks, 8"×3½"×5"		55 00		
"Scoriæ" Paving Blocks, 8"×3½"×4"		45 00		
Masillon		30 00		
OHIO FREESTONE.				
No. 1 Buff Promiscuous		90		1 10
No. 1 Buff Dimension		95		1 05
No. 1 Blue Promiscuous		60		70
No. 1 Blue Dimension		65		75
Sawed Ashlar, No. 1 Buff any thickness, per cub. ft.		1 10		1 20
Sawed Ashlar, No. 1 Blue, any thickness, per cub. ft.		80		90
Sawed Flagging, per sq. ft., for each inch in thickness.		06½		07½
Above prices cover cost freight and duty paid. For small lots add 5 to 10 cents per cubic foot.				
CREDIT VALLEY STONE.				
Rubble, per car of 15 tons, at quarry				7 00
Brown Coursing, up to 10 inch, per sup. yard, at quarry		1 50		1 75
Brown Dimension, per cub. ft., at quarry				60
Grey Coursing, per sup. yard				1 00
Grey Dimension, per cub. ft.				45
LONGFORD STONE.				
Rubble, per 30M car, f.o.b. quarries				5 00
Ashlar, per cub. yd f.o.b. quarries				2 00
Dimension, per cub. ft. " "				18
Kent Freestone Quarries Moncton, N.B., per cu. ft., f.o.b.		1 00		95
River John, N. S., brown Freestone, per cu. ft., f.o.b.			95	95
uebec and Vermont rough granite for Qbuilding purposes, per c.ft. f.o.b. quarry.			40	1 0
For ornamental work, cu. ft			40	
Granite paving blocks, 8 in. to 12 in. x6 in. x4½ in. per M			50	00
Granite curbing stone, 6 in. x 20 in. per lineal foot				70
SLATE.	Toronto.		Montreal.	
Roofing (₩ square).				
" red	17 50			20 00
" purple	8 50			10 00
" unfading green	8 50		7 00	8 00
" black	7 50			6 50
Terra Cotta Tile, per sq	20 00			25 00
Ornamental Black Slate Roofing	8 80			6 80

INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

	Toronto.		Montreal.	
Ontario, "		1 10		
Keene's Coarse "Whites"	5 50	6 00	5 00	5 50
Fire Bricks, Newcastle, per M	27 00	35 00	16 00	21 00
" Scotch "	27 00	35 00	19 00	21 00
Lime, Per Barrel, Grey		40		
" " White		50		80
Plaster, Calcined, N. B		2 00		1 50
" " N. S		2 00		1 50
Hair, Plasterers', per bag	80	1 00		1 00

PAINTS. *(In oil, ₩ lb)*

White lead, Can., per 100 lbs.	5 10	6 00		5 75
" zinc, Can., " "	6 50	7 50		7 25
Red lead, Eng	00	5 00	4 00	4 50
" venetian, per 100 lbs	1 60	1 75	1 60	1 75
" vermillion	90	1 00	75	90
" Indian, Eng	10	12	8	10
Yellow ochre	5	10	3	5
Yellow chrome	15	20	15	20
Green, chrome	7	12	7	12
" Paris	20	25	14	20
Black lamp	15	25	12	25
Blue, ultramarine	15	20	12	18
Oil, linseed, raw, by bbl. ₩ *Imp. gal*	52			48
Oil, linseed, b'l'd, by bbl., ₩ *Imp. gal.*	55			57
Oil, linseed, refined, ₩ *Imp. gal* (Less than bbl., 5c. per gal. advance.	76	85	75	75
Putty	3¾	3½	2¾	2½
Whiting, dry, per 100 lbs	60	80	60	75
Paris white, Eng., dry	90	1 25	90	1 00
Litharge Eng	5	6	4 50	5 00
Sienna, burnt	10	15	10	12
Umber, "	8¼	12	10	12
Turpentine	57			45

CEMENT, LIME, etc.

Portland Cements—				
German, per bbl	2 90	3 10	2 55	2 65
London "	2 95	3 00	2 25	2 45
Newcastle "	2 70	3 00	1 95	2 10
"Joseon" Brand Portland	2 95	3 25	2 70	2 80
North's "Condor"	2 95	3 10	2 65	2 80
English, artificial, per bbl.	2 85	3 00	2 35	2 45
Belgian, natural, per bbl.	2 85	3 00	2 00	2 20
Canadian, artificial, "	2 85	3 00	2 60	2 70
Roman "			2 10	2 25
Parian "	5 25	5 25	5 75	5 75
Superfine "	1 25	7 50	8 25	9 00
Hydraulic Cements.—				
Thorold, per bbl		1 50	1 25	1 5
Queenston, "		1 50	1 50	1 6
Napanee, "		1 50		1 5
Hull, "		1 50		1 5

HARDWARE.

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

Cut nails, 50d & 60d, per keg	1 80	1 85
Steel " " " "	1 90	1 95

CUT NAILS, FENCE AND CUT SPIKES.

40d, hot cut, per 100 lbs	1 85	1 85
10 to 12 d, hot cut	1 95	1 95
8d, 9d, " "	2 00	2 00
6d, 7d, " "	2 15	2 15
4d to 5d, " "	2 25	2 25
3d, " "	2 85	2 85
2d, " "	2 85	2 85

Cut spikes, 10 cents per keg advance.
Steel Nails, 10c. per keg extra.
Wire nails, 185 base price.

Iron Pipe:

	6c.	6c.
Iron pipe, ¼ inch, per foot	7	7
" " ⅜ " "	8½	8½
" " ½ " "	12	12
" " ¾ " "	17	17
" " 1 " "	24	24
" " 1¼ " "	30	30
" " 1½ " "	43	43
" " 2 " "		

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

Lead Pipe:

Lead pipe, per lb	7c. } 25 per
Waste pipe, per lb	7½ } cent. dis.

Galvanized Iron:

Adam's—Mar's Best and Queen's Head:			
16 to 24 guage, per lb	4½c.	4¾c.	4¾
26 guage, "	4¾	5	4½
28 "	5	5¼	4¾
Gordon Crown—			
16 to 24 guage, per lb	4¾	4½	4¾
26 guage, "	4½	4¾	4½
28 "	4¾	5	4¾

Note.—Cheaper grades about ½c. per lb. less.

Structural Iron:

Steel Beams, per 100 lbs	2 75	2 0
" Channels, "	2 85	2 30
" Angles, "	2 50	2 6c
" tees, "	2 80	2 65
" plates, "	2 55	2 3c
Sheared steel bridge plate		2 3c

CORRECTED UP TO DECEMBER 20TH.