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CANADIAN CONTRACT RECORD

A WEEKLY JOURNAL OF PUBLIC WORKS AND MUNICIPAL PROGRESS

EVERY THURSDAY

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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C. H. MORTIMER, Publisher,
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Sealed Tenders addressed to the undersigned, and endorsed "Tender for dredging, Collingwood Harbour," will be received at this office until Tuesday, the 7th day of January next, inclusively, for the deepening of the Harbour of Collingwood, to the depths mentioned in the combined specification and form of tender and within the area shown on the plan to be seen at the Harbour Master's Office, Collingwood, and at the Department of Public Works, Ottawa.

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

An accepted bank cheque, payable to the order of the Minister of Public Works, for the sum of five thousand dollars, (\$5,000), must accompany each tender. This cheque will be forfeited if the party decline the contract or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

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

By order,
E. F. E. ROY,
Secretary.

Department of Public Works,
Ottawa, 12th Nov., 1895.

TENDERS WANTED

TO STEAM FITTERS

Tenders for the re-modelling of the Steam Heating of the County Buildings and Jail at Owen Sound, will be received until the 10th inst. Plans can be seen at the office of

W. J. BURROUGHES & CO.,
32 Adelaide St. E., Toronto.



NOTICE TO CONTRACTORS

Tenders will be received by registered post only, addressed to the City Engineer, Toronto, up to 11 o'clock a.m. on SATURDAY, DECEMBER 7th, 1895, for the supply of

100 TON FIELD STONE

to be delivered at the House of Industry, Elm street, in this city, in lots of ten tons and upwards.

Forms of tender may be obtained on and after Saturday, November 30th, 1895, at the office of the City Engineer, Toronto.

A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 5 per cent. on the value of the work tendered for, must accompany each and every tender, otherwise it will not be entertained.

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

DANIEL LAMB,
Chairman Committee on Works.

Committee Room, Toronto, Nov. 26th, 1895



NOTICE TO CONTRACTORS

Tenders will be received by registered post only, addressed to the City Engineer, Toronto, up to 11 o'clock a.m. on SATURDAY, THE 15th of FEBRUARY, 1896, for the supply and delivery of

2350 Feet of Steel or Cast Iron Pipe,

6 feet in diameter, with the necessary flexible joints.

Specifications and plans may be seen at the office of the City Engineer, Toronto, on and after Wednesday, the 11th inst.

A deposit in the form of a marked cheque, payable to the order of the City Treasurer, for the sum of 2½ per cent. on 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.

DANIEL LAMB,
Chairman Committee on Works.

Toronto, Dec. 3rd, 1895.

CONTRACTS OPEN.

RENFREW, ONT. St. Andrews church will build a new manse.

MERIVALE, ONT.—Plans have been prepared for a new school here.

LACHUTE, QUE.—The necessity of a waterworks system is strongly felt by residents.

LEAMINGTON, ONT.—A local company is being formed to establish a beet sugar factory here.

DELOIRINE, MAN.—The Ontario Milling and Manufacturing Co. propose erecting a small flour mill.

MITCHELL, ONT.—John Blowes has purchased property on which to erect in the spring a building suitable for his marble works.

SELKIRK, MAN. It is estimated that upwards of \$50,000 will be expended by the fish companies this winter in the building of new boats, freezers, etc.

WALKERTON, ONT.—John Leggett, of Hancver, is endeavoring to start a chair factory here, and if successful a building 100 x 50 feet will be erected.

STRATFORD, ONT.—Mr. Alan Macdougall, C. E., has under consideration plans for the further extension of the sewerage system of this city.

GREENBANK, ONT.—The trustee board of the Methodist church have decided to erect a new edifice. The sum of \$2,500 has already been subscribed.

NEW GLASGOW, N. S.—At a public meeting held last week it was decided to erect a hospital, at a cost of \$10,000. Jas. M. C. Carmichael is one of the promoters.

KINGSTON, ONT.—Application will be made to Parliament at its next session by the Kingston, Napanee and Western railway to extend the time for its completion.

SARNIA, ONT.—The plans of J. C. Robson, architect, have been accepted by the House of Industry Committee for their new building, which will be erected near this town.

ST. JOHN, N. B.—The city engineer is now preparing plans and specifications for extending the railway track to the ware house. The work is to be let by tender, and will be done by the city.

WOODSTOCK, ONT. The Woodstock college authorities are about to commence the construction of a sewage farm system.—A by-law will be introduced to the Council to issue debentures for \$7,000.

GRAVENHURST, ONT. The by law to grant a bonus of \$10,000 for the erection of the proposed consumptive hospital will be voted on by the ratepayers on the 9th inst. It is anticipated that it will be carried.

KEMPTVILLE, ONT.—Mr. G. F. Martin, of Smith's Falls, is in town, making surveys, soundings, etc., necessary for the erection of a swing bridge, wharf, enlargement of the basin, and other improvements in connection with the same.

OAKWOOD, ONT. The Municipal

Council of the township of Mariposa have passed a by-law providing for the issue of debentures to the amount of \$3,000 for draining certain lands in the 14th and 15th concessions of said township.

QUEBEC, QUE.—A building permit has been granted to F. Parent for a two-storey brick building. Cost \$1,200.

BUCKINGHAM, QUE.—The residents want a bridge to cost \$10,000, constructed over the Lievre river here. In response to the request of a deputation for financial aid, the Quebec Government promised consideration.

TRENTON, CNT.—The Council have accepted a proposition from A. Brucker, representing a company of German and French capitalists, to establish works for the manufacture of paper, and suitable buildings will be erected.

WELLAND, ONT.—The Mayor and city engineer last week interviewed Dr. Bryce, secretary of the Provincial Board of Health, with regard to the extension of the sewerage system here. The matter will come up for consideration at the next meeting of the Board.

ROSSLAND, B. C.—Surveys are being made for a narrow gauge railroad to run from the mines here to the smelter at Trail. It is proposed to run branches from the main line of the proposed road to the dumps of all the principal mines. Breen & Heinze are the promoters.

HALIFAX, N. S.—Mr. Fell, an English mining expert, is examining the coal fields from Port Hope to Cheticamp, and also the route of the contemplated railway known as the Inverness and Richmond, part of the roadbed of which was constructed a few years ago by Mr. Oakes.

LONDON, ONT.—The agreement between the city and Grand Trunk Railway Company for the erection of the company's shops in East London, has been ratified by the Council and will be forwarded to the company's authorities at Montreal for acceptance. The shops must be erected within one year.—Excavating has begun on the cor. of Richmond and King streets, for a building for the Bank of Toronto, to cost \$20,000. It will be four stories with a basement.—O. A. Graydon has prepared plans for the new London and Port Stanley freight sheds, round house and coal docks at Port Stanley. The whole to cost \$25,000.

DUNDAS, ONT.—Plans for a new fire hall have been prepared by W. A. Edwards, architect, of Hamilton, and the contract will be let in a few days.—The residents have approved of the Port Perry and Kincardine electric railway scheme, and the sum required from the municipality has been subscribed.

HULL, QUE.—The Quebec Government has been asked to grant a charter for an electric railway to extend from Montebello to Hartwell, a distance of 30 miles, the company to be known as the County of Labelle Electric Railway Co. Mr. Poulin, of Montebello, Jos. Bourque, of Hull, and Rev. Father Rochon, of Papineauville, are the promoters.

WINNIPEG, MAN.—It is the intention of the Manitoba Government to place new elevators in the Parliament buildings here, the contract for which, we understand, has not yet been let.—The School Board have recently erected new buildings and tenders for school desks for the same are invited until the 9th of January next. Address Stewart Mulvey, Sec.-Treasurer School Board.

NEW WESTMINSTER, B. C.—Tenders are invited by C. F. Green, Ladner, until the 23rd inst. for the construction of the ditch and dyke and other works in connection with the Delta dyking and drainage scheme. Plans may be seen at the clerk's office, Ladner, and at the residence of A. R. Green, C. E., this city. Pro-

posals are also invited by the above for the purchase of debentures amounting to \$41,220.51.

WALKERVILLE, ONT.—Hiram Walker & Son have offered the county council of Essex a bonus of \$50,000 and a free site for the erection of the county court house and registry office in this town. The buildings, which are now located at Sandwich, require improvements, and it is probable the electors will be asked to vote on the question of their removal.—The Walkerville Brewing Co. is preparing to build a \$20,000 addition to its bottling department.—The town will lay a silax stone pavement on Wyandotte ave., from eastern to western limits.—The Crown Inn will erect a large brick stable.

ST. THOMAS, ONT.—O. W. Shipman, of Detroit, is about to organize a company to put on a line of boats between Port Stanley and Cleveland, and it is said the Lake Erie and Detroit River Railway Co. intend to build a railway from Simcoe to the Niagara River. It is further conjectured that the Walkers, who practically own the L. E. and D. road, will extend the line to the Niagara River and then turn it over to the C. P. R.—A by-law to issue debentures for \$3,000 to build a second bridge between the north and south sections of the city will be voted on at the municipal elections.

BROCKVILLE, ONT.—The Young Men's Christian Association now applying for incorporation, will erect a new building, Mr. John McLaren having subscribed \$1,000.—Power & Son, architects, of Kingston, have prepared plans for the complete remodelling of Wall street Methodist church. The plan also includes the erection of a new building, 90 x 90 ft., stone, 40 ft. ceiling, gallery and a partition of rolling panels. The present building will be utilized for an assembly and Sabbath school room, having four entrances, large ornamental window, and seating capacity of 380. The plan has been approved by the building committee.

HAMILTON, ONT.—The Toronto, Hamilton and Buffalo Railway Co. have taken out a permit for their brick freight sheds, to cost \$10,000.—The deputation appointed to examine the heating system in the Collegiate Institute at Pittsburg have returned, and estimate the cost of heating the proposed Collegiate Institute and Normal school in this city at \$10,000. W. Stewart, architect, accompanied the deputation.—Mr. Knickling, C. E., of Rochester, has presented his report on the disposal of sewage, in which he recommends the system of depositing into deep waters of the bay by gravitation and pumping, and estimates the cost at \$326,000, made up as follows: Buildings, \$28,000; pipes, \$60,000; land, \$5,000; intercepting conduit system, \$135,000; cost of operation capitalized, \$98,000. Owing to the cost of the scheme it is doubtful if the work will be undertaken at present, as the City Engineer has been requested to prepare estimates of three plans for abating the nuisance caused by the east end sewer emptying into the coal oil inlet.

TORONTO, ONT.—J. McDougall, C. E., has been authorized by the York County Council to prepare plans for a bridge over the Don river sufficiently strong to support railway traffic.—Mr. Rust, assistant City Engineer, will shortly go to Montreal to inspect the plans of the York street bridge, which are now in the offices of the C. P. R.—The York County Council have granted an extension of time of one year to the Metropolitan Street Railway Co. in which to complete their line to Richmond Hill.—T. Bryce, 284 King street east, wants tenders for the carpenter work of a large frame factory at the foot of Spadina ave., lumber to be supplied.—The Board of Harbour Commissioners have asked the militia authorities at Stanley Barracks to permit of the extension of

a breakwater west from the Queen's wharf.—Mr. T. G. Elgie, real estate agent, Church street, has had plans prepared for semi-detached houses. Mr. G. W. King, Adelaide st. east, is the architect.—Building permits have been granted as follows: P. Griffen, 505 Lansdowne ave., det. 2 story and attic bk. dwelling, 196 St. Helens ave., cost \$1,200; Toronto Granite Co., one story bk. factory and show room, Yonge st., cost \$4,000.

MONTREAL, QUE.—The New York Central is about to secure an independent entrance into Montreal. R. W. Leonard, chief engineer of the South Western railway, has secured departmental approval of the location plans for that portion of the line between Valleyfield and Caughnawaga. This line was chartered in 1888, and is an extension of the St. Lawrence and Adirondac railway, which is now controlled by the New York Central.—The Montreal Street Railway Co. have applied to the Council for permission to extend their line over the Mountain, which will entail an expenditure of \$50,000.—The Young Womens' Christian Association have purchased the building, corner Stanley and Dorchester streets, at present used as a Theological college, and extensive alterations will be made thereto. It is proposed to remodel the entire interior and also to erect a large gymnasium on the vacant lot in the rear of the building. The work will be carried out next summer.—The Canadian Pacific Railway Co. have produced the plans of the new depot and hotel the company purpose erecting at Dalhousie Square, at a cost of \$350,000. The new station will be 300 feet long, 66 feet wide, and built of stone and pressed brick.

OTTAWA, ONT.—The line of the Ottawa and Gatineau railway is surveyed to Desert. As much of the line between Gracefield and Desert as possible will be completed next summer.—The Board of Works have authorized the City Engineer to call for tenders for syenite sufficient to pave Sussex street.—It was reported that the Birkett block had been purchased for the new geological museum.—T. Lindsay is said to have purchased property on Bank street, on which he will erect a large departmental store.—Dey Bros. have purchased six lots on Ann street and propose to erect next summer a large rink, having a span of one hundred feet and a length of about 200 feet, with arched roof. It is said it will be the largest rink in Canada.—The plans for the new wing to the Protestant hospital have been submitted by Arnoldi & Calderon, architects.—The advisability of raising the \$150,000 necessary for the proposed improvements to the waterworks system by the issue of debentures instead of taking the amount out of the city's revenue, was discussed at a recent meeting of the Waterworks Committee. The idea met with approval. The city engineer was instructed to report at an early date, whether a system of auxiliary steam pumps would not be better than increased water power.—The Ottawa Amateur Athletic Club contemplates erecting an annex to their building, at a cost of about \$15,000.—Geo. H. Macdonald, M. P., for Algoma, and W. R. Brock and J. J. Foy, of Toronto, had an interview with the Minister of Railways and Canals in regard to obtaining a subsidy for a railway from Port Arthur to Rainy River. Consideration was promised.

FIRES.

A three story building at Sussex, N. B. owned by G. H. White, was recently damaged by fire to the extent of \$20,000—James Brown's lumber mill at Weldford, N. B. has been burned.—A building at Chesley, Ont., used by Brette & Co. for storage purposes, was destroyed by fire on the 1st inst. Loss, \$1,200, covered by insurance.—The building at Amherst, N. S.

occupied by the Sentinel newspaper, and the one adjoining owned by Dr. Black, of Lauglet, were burned on Sunday last. The loss in each case is heavy, partially covered by insurance.

CONTRACTS AWARDED.

WEST MAGDALA, ONT.—A. McDougal has secured the contract for the repairs to the church here.

OTTAWA, ONT.—The issue of \$172,869 worth of debentures have been sold to Osler & Hammond, of Toronto, at 103 2-5 per cent.

TORONTO JUNCTION, ONT.—Tamblyn & Gibson, of this town, have the contract for extending the Suburban Electric Railway to Weston.

BRANDON, MAN.—T. A. Kraemer, of Morden, has secured the contract for building the new bridge over the Assiniboine river at Eighteenth street.

ST. THOMAS, ONT. The Stacey Hardware Co. will fit the Industrial school at Munsey with a hot water system, and also do the plumbing and metal work. Cost, \$3,600.

ST. JOHN, N. B.—The following are the tenders received for the erection of a warehouse, 250 x 70 ft., at Sand Point, Carleton, for the Beaver Line: D. W. Clark & Son, \$4,441; J. B. Whipple, \$4,700; Thomas Thompson, \$4,390; Adams & Belyea, \$4,986; J. O. Stackhouse, \$4,993; Wm. L. Prince, \$5,300. The tender of Thos. Thompson has been accepted, the work to be completed by the 1st of February.

MONTREAL, QUE.—W. McLea Walbank, architect, has awarded contracts for a house at Verdun for Penniston Bros. as follows: Carpenter and joiners' work, N. Lamoureux; brick, Jos. Beland; roofing, Montreal Roofing Co. For alterations and additions to a residence at Dorval for A. W. Morris, M.P.P., to F. X. Demers, and for a summer cottage at Bayview for R. R. Stevenson, to N. Bennet, general contractor.

TORONTO, ONT.—A. B. Ormsby & Co. have just completed a handsome metal ceiling in Ambrose Kent & Sons' new store at 154 Yonge street.—The Fensom Elevator Works are now engaged in placing the elevators in the new Simpson building.—The Beamsville Pressed Brick Co. have been awarded the contract for 40,000 No. 1 red pressed brick for Mr. John Morison's residence, corner of Bloor and Jarvis streets, this city.

BIDS.

TORONTO, ONT.—Four tenders were received by the Fire and Light Committee for a steam fire engine as follows: For the 1,000 gallons engine, tender No. 1, \$5,000; No. 2, \$7,000; No. 3, \$6,100; No. 4, \$5,300. For the 500 gallons engine, tender No. 1, \$3,000; No. 2, \$5,500; No. 3, \$4,900; No. 4, \$4,650. The tenders have been referred to the Chief for a report.

BUSINESS NOTES.

George J. Harris, plumber, Halifax, N. S., is reported to have assigned.

Henry Wildfong, contractor, Berlin, Ont., is reported to have assigned.

Seager & Benson, plumbers, Toronto, have dissolved, J. R. Seager continuing.

SUB-CONTRACTING.

The Master Builders' Association of the city of Boston have adopted the following rules for defining the rights and obligations of principal and sub-contractors for building work.

ARTICLE 1. Obligation of Principal Contractor to Sub-Contractor.—A principal contractor is under obligation to treat upon an equal basis all estimates which he "receives" prior to putting in his own bid. Estimates must be considered as "receiv-

ed" when they come into a principal contractor's possession, either by his direct solicitation or by being accepted by him. The opening of a bid, knowing it to be such, constitutes receipt of the same.

A principal contractor is under no obligation to use a bid which he has not solicited, accepted or received, but if he does not wish to use the estimate of a sub-bidder he should decline it if proffered personally, or should return it unopened if sent to him by mail or otherwise. The retention of a bid should be construed as a receipt of the same.

All bids should be considered "confidential" and a principal contractor revealing any bid received by him to any person whomsoever, without consent of the sub-bidder, will be liable to complaint and discipline under Article 10 of the by-laws of this Association.

A principal contractor, when making up his estimate, is not entitled to receive bids from sub-contractors if he is at the same time making himself their competitor by figuring their portion of the contemplated

work. It is legitimate for a principal contractor to figure all portions of work, depending upon no one for what are usually known as sub-estimates, but it is not legitimate for him to receive bids from others for sub-work if he is himself figuring those portions independently.

ARTICLE 2. Award of Sub-Contracts.—The principal contractor having been awarded a general contract should immediately award the sub-contracts to the lowest bidder in each branch.

ARTICLE 3. Penalty for not Awarding Contract to Lowest Sub-bidder.—A principal contractor, failing to award a sub-contract to the lowest sub-bidder to whom he is under obligation as previously provided, should be liable to pay damages to the said lowest bidder, in amount not less than 10 per cent. of the amount of the estimate.

Payment of such damages will not relieve the principal contractor from liability to discipline under provisions of Article 10 or the by-laws of this Association.

ARTICLE 4. Contracts with Sub-con-

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MUNICIPAL ENGINEERS, CONTRACTORS AND MATERIALS

tractors. The principal, immediately after executing a general contract with the owner, should for his own protection, as well as the protection of the sub-bidder, execute some satisfactory form of contract of agreement with each lowest sub bidder.

ARTICLE 5. Payments to Sub-Contractors. Unless the contracts made with sub-contractors otherwise provide, payments during the progress of the work should be made by the principal contractor to the sub-contractors upon the same basis of payment, in relation to amount of work performed, as is prescribed in the contract made by the principal contractor with the owner.

Final payment to a sub-contractor should be considered as due at the expiration of thirty days after the completion of his work and its approval by the architect or owner, unless otherwise provided by the sub-contract or agreement.

ARTICLE 6. Submission of Bids by Sub-Contractors.—Sub-contractors in submitting bids to principal contractors should enclose them in the envelopes prepared by this Association and kept on hand for the use of sub-bidders, or should endorse the envelope in which they are enclosed in such manner that principal contractors may know whom the bids are from, what portion of the work they comprehend, and the particular building they apply to.

Sub contractors who fail to so enclose and endorse their bids cannot claim protection or redress under the first article of this code.

ARTICLE 7. Obligation of Sub-Contractor to Principal Contractor.—Should a sub-contractor refuse to contract at the amount of the estimate he has given to a principal contractor, who has used the said estimate in good faith, he then should be liable to the said principal for damages in amount not less than the difference between the amount of the estimate which was submitted by him and the amount at which the principal contractor may be obliged to contract the work.

Payment of such damages will not relieve the sub-contractor from liability to discipline under provisions of Article X. of the by-laws of this Association.

ARTICLE 8. Obligations of Sub-Contractors to each Other.—Any sub-contractor suspected of unfair treatment of his fellow sub-contractors will be liable to complaint and discipline under Article X. of the by-laws of this Association.

ARTICLE 9. Trading Sub-Bids.—Trading upon sub-bids will be considered sufficient cause for complaint and discipline as provided by Article 10 of the by-laws of this Association.

Article 10. Bids to Architects or Owners.—When bids for separate departments of work on a building are solicited by the architect or the owner, they should be submitted with the understanding that they are direct estimates, for which direct contracts are to be made by the owner with the lowest bidder, and no other disposition of such bids should be permitted without consent of the bidder submitting the same.

Sub-bids should be given only to the principal contractors who are estimating the work in question, and should not be left with architects or owners for the inspection and information of principal contractors. Sub-contractors must understand that bids thus left with architects or owners are in great danger of losing their confidential character, and that if they so leave them they cannot claim protection or redress under the first article of this code.

SUGGESTIONS.—Members of this Association having sub-contracts to let or material to buy should, as far as may be consistent with business principles, deal only with members of the Association, or

at all events give their fellow members an opportunity to compete, and then give them the preference, other things being equal.

All bidders should take cognisance of the danger they may be subjected to through the practice, so prevalent in some architects' offices, of making changes in plans or specifications, or in both, during the progress of estimating. Correction of this pernicious practice can only be obtained through refusal by contractors to estimate under such conditions.

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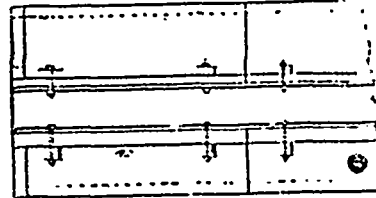
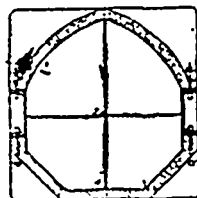
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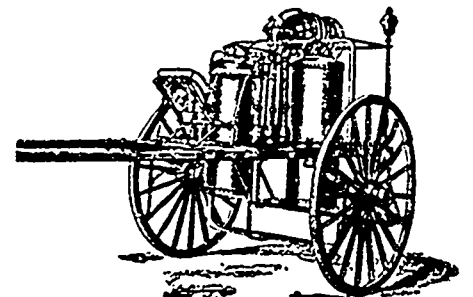
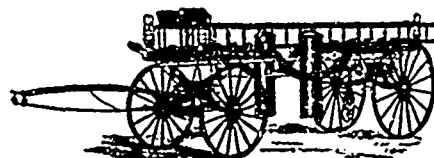
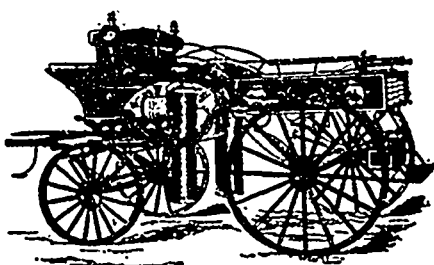
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MUNICIPAL DEPARTMENT

PURIFICATION OF SEWAGE BY RIVER-WATER SUPPLIES.*

Coming more particularly to the discharge of sewage into rivers which are sources of water supply, and the consequent objection to such supplies on account of impurity, we are immediately brought face to face with the fact that in such circumstances the self-purifying power of rivers cannot be relied on to remove all cause of danger, and that no amount of dilution will render sewage polluted water safe,† but that a safeguard must be sought in a process of efficient filtration previous to supply. This fact has been demonstrated in this country only so recently as within the past few years. In the last report of the medical officer of health to the Local Government Board, attention is drawn to the pollution of the River Trent and the water supplies of populations on or near the banks in connection with the occurrence of enteric fever, which shows clearly the danger incurred by drinking unfiltered river water. And the experience which we have from America is equally convincing. The river water which is supplied to the city of Lawrence was, previous to the year 1893, unfiltered, although largely contaminated by sewage discharges from towns situated above that point. The consequence of this was that "for many years the death-rate from typhoid fever was three times higher than that of others towns of the same size." That the disease was water-borne was clearly shown by it invariably appearing at a later date at Lawrence than at Lowell—a town higher up the river and this was still more conclusively proved by the fact that a preliminary process of filtration through sand resulted in a reduction in the death-rate from typhoid fever "to 40 per cent of the former mortality, and it has also been shown that of this remaining 40 per cent nearly one half of the cases are attributable to the use of unfiltered water drawn from the canals."^{††}

But while the ordinary effect of sand filtration is to minimise danger by reducing enormously the number of organisms, which number may be still further reduced by sedimentation in storage reservoirs, and while we have on record many cases in which it has been productive of highly beneficial results in times of disease, yet there are certain reasons why absolute reliance cannot be placed upon its uniform efficiency. Under the most favourable conditions, sand filtration does not entirely remove the bacteria which are so abundant in river water, and it is quite possible that among such number remaining after that process some may be of a pathogenic

character. Apart from this possibility, the entire removal of these organisms is not necessary. Dr. Koch is of opinion that water containing not more than 100 germs per cubic centimetre is sufficiently pure, while Migula, after a large number of examinations of water from various sources, maintains that when the number of species does not exceed 10, there is no reason to regard the water with suspicion, unless such species differ from those ordinarily met with. The percentage of organisms commonly removed by the several water companies in London varies from 93 to 99, the actual number of bacteria per cubic centimetre in the water supplied varying from a very small number to several hundreds, sometimes rising during winter months to thousands, and in the report of the last Royal Commission on the Water Supply of the Metropolis, after reference has been made to a general removal of 98 and 99 per cent., the following expression occurs: "Occasionally the efficiency falls far short of this, and the water is delivered in an unsatisfactory condition.

Further, the process of purification being a vital one, time is necessary for the formation of colonies of bacterial life in number sufficient to remove the organic matter contained by the water passing through the filter, such time being found to vary from two to three days; and supposing that the filter has attained such maturity as to ensure a good result under ordinary conditions, yet the water flowing from it may be unsatisfactory, owing to it having been allowed to pass through at too rapid a rate and under too great a pressure, with a consequent high percentage of organic life. Added to this, the operation must be conducted with regularity or with but slight variation, any striking increase in the volume of water supplies being found to have a disturbing influence on the action of the purifying organisms, which require time to adjust themselves to altered conditions. Moreover, every care must be taken to save the surface layer from disturbance, as it is upon this layer, consisting as it does, of nitrifying organisms in the zoogloea condition, that the successful action of the filter depends. But while the above facts are sufficient to show that the process of sand filtration is one which at all times requires great care and attention, without which the filters quickly get out of order, yet the factor which most seriously interferes with their proper working is a period of frost, at which times it will be noticed that water which has presumably been passed through contains an abnormally large number of organisms. During the past winter Dr. Frankland, in one of his monthly reports to the Registrar-General, while remarking that the purity of London water confessedly depends upon the perfection of its filtration, stated that the very low temperature had prevented most of the filters from working efficiently, and he further drew attention to the fact that "while in both December and in February alike the deep-well water of the Kent Company contained only eight microbes per cubic centimetre, the filtered water of the East London Company contained in

February 5,200, and that of the Southwark Company 6,260." And he also stated that it was only in some of the filters of the Grand Junction Company that the number was brought within the standard limit of 100 per cubic centimetre. That this uncertain action of filters during times of frost may have fatal results has already been demonstrated. In connection with the outbreak of cholera in Hamburg and Altona in 1892-93, which has been so largely quoted as showing the immense advantages consequent upon filtration through sand, it will be remembered that a sudden and unaccountable outbreak occurred at Altona—which town had been almost entirely free from cases during the time the disease was rampant in Hamburg—and that such outbreak was ultimately found to have arisen from the failure of a filter to keep back the bacillus during a season of frost. It may be here mentioned that the results of experiments recently conducted at the Paris Municipal Laboratory confirm others already obtained in showing that frost has but little influence as regards the destruction of pathogenic organisms, and the fact would seem to be firmly established, at any rate so far as the microbes of typhoid and anthracis are concerned, that even long and repeated periods of frost will have little or no appreciable effect upon them.

It is also further necessary in considering the effect of frost upon sand filters to remember that it is during the winter months that the number of organisms present in unfiltered river water reaches the maximum, and an examination of reports for some years will reveal the fact that they are far more abundant in the months from November to March than during the milder seasons of the year, and consequently it is at this time that (disregarding the seasonal curves of mortality peculiar to various diseases) danger from a river-water supply is most to be feared.

(To be Continued.)

AUSTRALIAN WOOD PAVEMENT IN NEW YORK.

Alfred Marks has been authorized to put down a pavement of West Australian wood on certain streets in New York City designated by the Commissioner of Public Works. If the pavement is not a success at the end of six months it must be taken up and the street repaved by Mr. Marks. In our issues of August 27, 1892, and April 15, 1893, some mention was made of experience in London, England, with pavements of Australian jarrah wood. It was found to wear well, and in Fulham, blocks which had been down four years stood from one-half inch to 1 inch above deal pavements laid at the same time alongside and subjected to the same wear. The karri, another Australian wood, is considered by English experimenters to be superior to the jarrah as a pavement.

The Construction and Paving Co. have laid down a sample of a new kind of pavement at the intersection of York and Wellington streets, Toronto, which is called asphaltina. It is claimed that it can be laid on any good macadam road without preparing a foundation of concrete, thus materially reducing the cost.

*Abstract of paper by Stuart H. Davies in the Contract Journal.

†See report, Massachusetts State Board of Health, p. 283.

††Knowledge, April, 1895.

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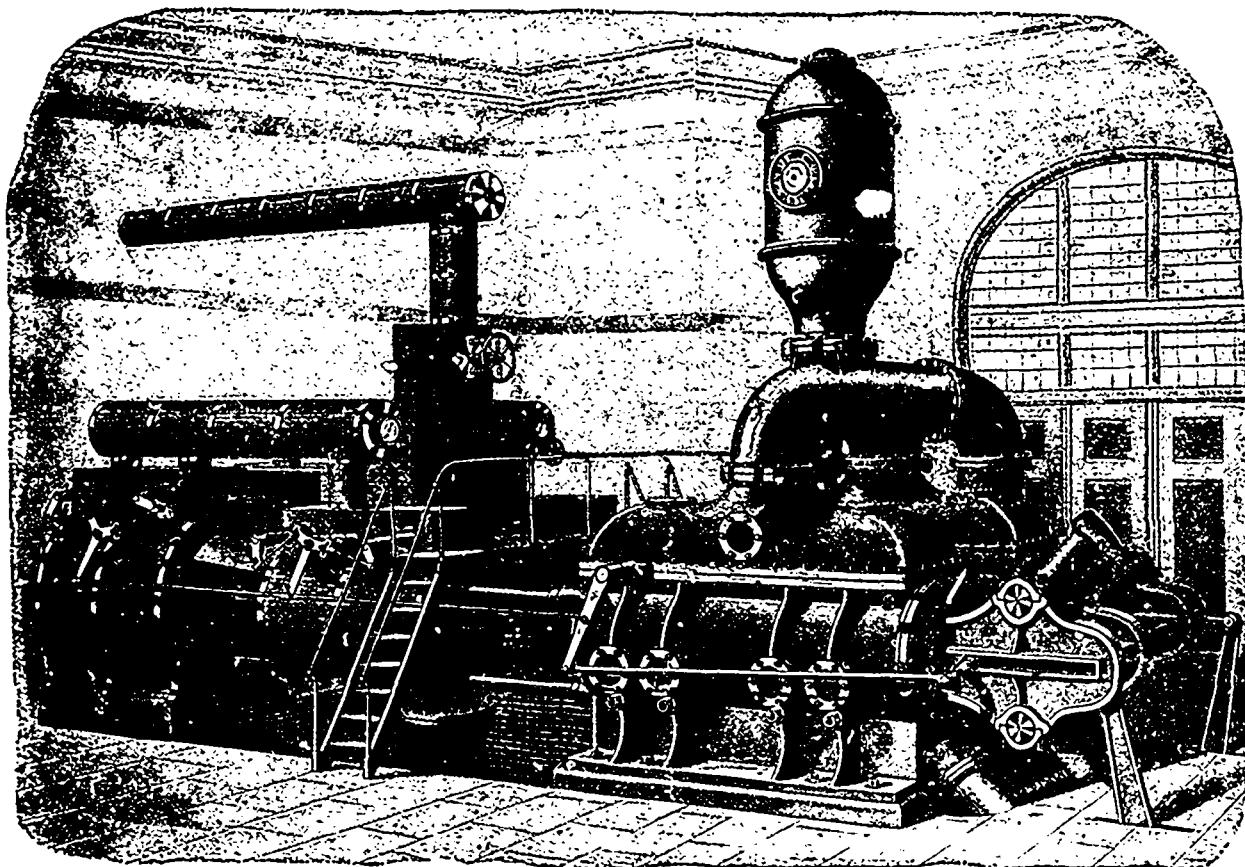
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CONDITION OF THE MARKET.

TORONTO: The price of sheet glass laid down in Toronto has advanced, and Belgian manufacturers will not quote for shipment later than March. The demand is good, owing to the completion of new buildings. A steady trade is reported for builders' supplies generally, but no unusual activity has taken place. Iron pipe up to 2 inches in size is moving freely.

MONTREAL: A good jobbing trade is announced in general hardware, and shelf goods are active. The heavy iron and metal market continues quiet, iron pipe being in most demand. A quiet winter season in cement is predicted, but as soon as the supply on the wharves are stored, an advance is probable. Firebricks are steady at \$15 to \$21 per 100.

LUMBER.

CAR OR CARGO LOTS.

Toronto. Montreal

Table listing lumber prices for various types of wood, including clear picks, uppers, pickings, and different sizes of culls and shingles.

VAID QUOTATIONS.

Table listing mill cull boards and scantling prices, including shipping cull boards and various sizes of scantling and joists.

B. M.

Table listing dressed and undressed lumber prices, including sawn lath, clapping, and various types of shingles.

BRICK—M

Table listing prices for common walling, good facing, sewer, pressed brick, and various types of red and buff bricks.

Toronto. Montreal.

Table listing prices for roof tiles, hip tiles, ridge tiles, and various types of building bricks and ornamental tiles.

SAND.

Table listing prices for sand per load of 1 1/2 cubic yards.

STONE.

Table listing prices for common rubble, large flat rubble, foundation blocks, and various types of freestone and granite.

OHIO FREESTONE, FROM THE GRAPTON STONE CO.'S QUARRIES.

Table listing prices for various types of Ohio freestone, including Buff Promiscuous, Buff Dimension, and Blue Promiscuous.

SLATE.

Table listing prices for roofing slate, terra cotta tile, and ornamental black slate roofing.

PAINTS. (In oil, @ lb.)

Table listing prices for various types of paint, including white lead, red lead, vermilion, and yellow ochre.

CEMENT, LIME, etc.

Table listing prices for various types of portland cement, including German, London, Newcastle, and English artificial cement.

Toronto. Montreal.

Table listing prices for various types of portland and hydraulic cements, including Belgian, Canadian, Roman, and Parian.

HARDWARE.

Table listing prices for cut nails and steel.

CUT NAILS, FENCE AND CUT SPIKES.

Table listing prices for various sizes of cut nails and spikes, including hot cut and cold cut.

FINE BLUED NAILS.

Table listing prices for fine blued nails in various sizes.

CASING AND BOX, FLOORING, SHOOK AND TOBACCO BOX NAILS.

Table listing prices for casing and box nails, flooring nails, and shook and tobacco box nails.

FINISHING NAILS.

Table listing prices for finishing nails in various sizes.

SLATING NAILS.

Table listing prices for slating nails in various sizes.

COMMON BARREL NAILS.

Table listing prices for common barrel nails in various sizes.

CLINCH NAILS.

Table listing prices for clinch nails in various sizes.

SHARP AND FLAT PRESSED NAILS.

Table listing prices for sharp and flat pressed nails in various sizes.

STEEL WIRE NAILS.

Table listing prices for steel wire nails, with a 75% discount from printed list.

Iron Pipe:

Table listing prices for iron pipe in various sizes, with a 65% discount from printed list.

Lead Pipe:

Table listing prices for lead pipe, with a 7% discount from printed list.

Galvanized Iron:

Table listing prices for galvanized iron, including Adam's-Mar's Best and Queen's Head, and Gordon Crown.

Structural Iron:

Table listing prices for structural iron, including steel beams, channels, angles, tees, plates, and sheared steel bridge plate.