

Justin, of New York, is expected here shortly to make arrangements for its erection.

WINNIPEG, MAN.—G. A. West, Chairman Committee on Works, invites tenders until Thursday, the 12th inst., for the construction of sewers on Cauchon street and 1st Avenue south.—Messrs. W. M. Ronald and Alex. Black have purchased a portion of the Logan estate fronting on Lilly street, and will erect new residences thereon in the spring. Part of this estate is being held for the sanction of the Government for a University site.

LONDON, ONT.—The bridge across the river Thames at Dorchester station has been condemned by the County Commissioner, Mr. F. B. Talbot, and it is probable that a new iron structure will have to be constructed.—Messrs. Robinson & Little have purchased the Connor property adjoining their wholesale establishment on Richmond street and will shortly erect a new building thereon.

HAMILTON, ONT.—At a recent meeting of the Parks Committee of the City Council, it was decided to build a monument to the late Robert Hamilton, and a sub-committee was appointed to get designs and estimates.—Building permits have been granted as follows: E. & W. Buscombe, three two-story brick dwellings on Locke street, north of Barton street, cost \$3,000.

MILWAUKEE, WIS.—The joint boards of the Public Library and the Public Museum of this city invite plans and specifications until the 15th of November next for the public library and museum building to be erected in the Fourth ward in this city. The cost of erecting the building in accordance with the plans submitted must not exceed the sum of \$500,000. Mr. Matthew Keenan is President of the Public Library Board and Mr. George W. Packham of the Public Museum Board.

STRATFORD, ONT.—David G. Baxter, architect, is calling for tenders for the following works: Presbyterian church at Avonton, Ont., cost \$15,000; \$5,000 pipe organ, and water, electric or gas motive power, cost \$800; also for steel construction to support organ and spire, cost \$1,200, and for heating A. Beattie & Co.'s offices in new Myers Block with hot water. The same architect is preparing plans for a stone Methodist Episcopal church at Kalso, Mich., to cost \$3,500, and extensive additions and alterations to A. Beattie & Co.'s store; water power, hoist, etc., cost \$3,000.

MONTREAL, QUE.—The Finance Committee has decided to recommend to Council the purchase of a new pumping engine with a capacity of 10,000 gallons, at an estimated cost of \$55,000.—The Road Committee have been granted the following amounts: \$9,200 for additional paving on Centre street; \$6,000 for paving on Murray street; \$5,100 for paving the streets surrounding the Grand Trunk offices with asphalt, and to macadamize Cedar avenue.—Ernest Marceau, Acting Superintending Engineer, Department of Railways and Canals, will receive tenders until Monday next, the 9th inst., for the construction of a sewer pipe drain along the south side of the Lachine canal above Cote St. Paul bridge.

OTTAWA, ONT.—The Board of Works, at a meeting held last week, decided to report to Council in favor of the Engineers' scheme for a trunk sewer to drain Dalhousie and Wellington wards, the estimated cost of which is \$165,000. The Board also recommended that a by-law be submitted to the ratepayers in January next authorizing the expenditure.—W. J. Code, Barrister, 25 Sparks street, invites tenders on behalf of the County of Carleton Agricultural Society until the 16th inst. for the removal of the Agricultural buildings, fences, etc., from the present site at Bell's corners to the village of Richmond and the erection of the same on the new grounds.—The Minister of Public Works has stated that the Government has in contemplation the widening of the Suspension bridge between Ottawa

and Hull, also of the roadway leading from the bridge to Hull, which is now 16 feet wide. With regard to the erection of a new Custom House and Inland Revenue offices, it has been decided to arrange a conference between the Minister of Customs, the Post-master General, the Controller of Inland Revenue and the Minister of Public Works to consider the question.—At a meeting of the Board of Trade held on Tuesday last, a resolution was passed asking the city to submit a by-law to the ratepayers for the purpose of granting a bonus of \$150,000 to the Gatineau Valley and the Pontiac and Pacific Junction railways to aid in building an inter-provincial bridge across the Ottawa river from Hull to Nepean Point on the Ottawa side of the river.

TORONTO, ONT.—It is again rumored that a syndicate is being formed to erect a new palace hotel, and that negotiations are in progress for the purchase of the old palace boarding house on Front street, between York and Simcoe streets, as the proposed site. The affairs of the syndicate are being looked after by Mark H. Irish, formerly of the Rossin House.—Rev. Mr. Carruthers, on behalf of the Dovercourt mission, recently asked the Toronto Presbytery for permission to build a \$3,000 church on Dovercourt Road near Bloor street. The matter was postponed for further information.—The City Engineer has recommended the construction of a cedar block pavement on Carr street, from Esther street to end of Carr street, also that the sewer on Bathurst street under the railway tracks be constructed by day labor, at an estimated cost of \$5,000.—The Board of Works will ask for an appropriation of \$6,000 to improve the discharge mains at the new pumping station.—Tenders are wanted for excavating for addition to Toronto Brewing and Malting Co's premises. Particulars at Brewery office on Simcoe street.—The Medical Health officer has recommended to the Board of Health that the Yonge street sewer be extended out into the bay to the edge of the windmill line.—It has been decided to enlarge the Argonaut Club House by an addition of 60 feet to the north side of the building.—The following building permits have been granted: B. McGregor, 755 Dufferin st., pr. det. 2 story brick dwellings, and four det. 2 story r. c., s. side Lindsay ave., w. of Gladstone ave., cost \$4,800; Henry Hodson, 2 story boat house, s. w. cor. Esplanade and Brock st., cost \$7,000.

FIRES.

The large glue factory of J. T. Huber & Co., at Berlin, Ont., was completely destroyed by fire on Monday last. Loss, \$20,000; insurance \$3,000.—L. J. Shroud's & Co.'s evaporator at Wellington, Ont., was burned last week. Loss, \$3,000; insurance, \$1,600.—The County Academy at Lunenburg, N. S., was completely destroyed by fire on the 27th ultimo. Loss, \$10,000; insurance, \$5,000.—John McConachie's saw mill at Peninsular Portage, Ont., was burned last week. Loss, \$3,000; no insurance.—S. M. Elliott's saw mill situated about two miles from Port Elgin, Ont., was destroyed by fire on Wednesday last. Loss, \$2,000.—The axe factory at Canning, N. S., owned by Blinkhorn & Sons, was burned on the 29th ultimo. Loss, \$7,000; insurance, \$1,000.—The main exhibition building of the North Simcoe Industrial Association, situated at Stayner, Ont., was destroyed by fire last week.

CONTRACTS AWARDED.

WINNIPEG, MAN.—The Board of Works have awarded the contract for paving Albert street, from Notre Dame to Bannatyne streets, to Messrs. Doidge & Co., at the price of \$5,250.

CHATHAM, ONT.—The contract for dredging the Little Bear Creek, on the town line bridge between Chatham and Doyer, has been awarded to the Chatham Dredging Company, at the price of \$18,250.

TORONTO, ONT.—On Saturday last the Board of Works awarded the contract for the paving of Broadview ave., from Queen

street to Gerrard street, with cedar blocks on concrete, to Messrs. Burns & McCormick, at the price of \$6,849.

LIMOILOU, QUE.—On Saturday last the village council awarded the contract to Messrs. E. L. de la Vallee & Co., of Montreal, for building a system of waterworks for Limoilou, Hedleyville and Stadacona. This firm was \$17,000 lower than the next tenderer.

OTTAWA, ONT.—Only two tenders have been received by the Department of Railways and Canals for the construction of lock gates at the Sault Ste Marie canal. Messrs. Hugh Ryan & Co. are the lowest tenderers, and will in all probability be awarded the contract.—The construction for the steel superstructure of the railway bridge across the above canal has been awarded to the Hamilton Bridge Company. The contract price is understood to be in the neighborhood of \$25,000.

MONTREAL, QUE.—Dunlop & Heriot, architects, have let contracts for two 2 story residences on Sherbrooke street for C. J. Brown, as follows: Masonry, Wighton & Morrison; carpentry, M. Folmie; plumbing and heating, McCrae & Watson; brickwork, A. Wand; plastering, J. Bremner; painting, G. Blackwell.—Perrault & Lesage, architects, have let contracts for a three story building containing three stores and three dwellings, on Notre Dame street west for Stanley C. Bagg Estate as follows: Masonry, Plante & Dunlop; brickwork N. Racette; carpentry, L. Beaudry; roofing, Montreal Roofing Co.; plastering, Lesage & Frere; ironwork, Dominion Bridge Co.—W. McLea Walbank, architect, has awarded contracts as follows for a residence on Elm ave., for G. R. Lighthall: Masonry, G. Turner & Co.; carpentry, James Shearer; roofing, Drapeau & Savignac; Brickwork, H. Boon; plastering, F. Decary & Co.; painting, L. Z. Mathieu, also for three story building on St. Catherine street, for H. H. Lyman: Masonry, P. Lyall & Son; carpentry, James Shearer; roofing, Geo. W. Reed; plumbing and heating, McCrae & Watson; brickwork, Jas. Brunet & Son; plastering, John McLean; painting, J. B. Owens.

MUNICIPAL DEPARTMENT.

THE FILTRATION OF WATER.*

The Imperial Board of Health in Berlin was led by the violent epidemic of cholera in Hamburg to compile, some months ago, the principles derived from the experience of waterworks employing sand filtration. The most important of these principles are as follows:—

(1) Sand filters do not deliver the water totally free from microbes; they restrain only a certain number of them, including the microbes of the cholera; therefore the filters should never be overworked.

(2) The velocity of filtration ought not to exceed 4 inches (100 mm.) per hour.

(3) The stratum of the filtering sand should never be less than 12 inches (30 cm.) thick.

(4) When a filter has been cleaned, or filled up with new sand, it is necessary to waste the first filtered water with its high number of germs.

(5) The effect of filtration must be daily controlled by bacteriological tests of each filter. If the bacteriologist finds suddenly a greater number of germs or unusual species of microbes in the filtered water, such water should not be used at all.

(6) If these principles are carefully followed the danger of the microbes of cholera passing through the filtering sand stratum is exceedingly small, as has recently been proved by the Altona waterworks compared with Hamburg.

The author of this publication is believed to be Dr. Robert Koch, of Berlin, the discoverer of the microbes of phthisis and of cholera, who has for many years been making inquiries into the effect of filtration, and these rules are, therefore, the result of a large experience. The writer is sure that the majority of his colleagues who are busy with filtration will,

in conformity with their own experience, accept most of them, but some will be in doubt whether all the rules are exactly correct.

The publication of the Board, really a governmental order in Germany, limits the maximum velocity of filtration to 4 inches per hour, or 8 feet per day, or 60 U.S. gallons per square foot per day. As far as the writer is instructed about the rate of filtration now used in English waterworks, he finds these numbers corresponding with those in use there, as an average in some works, but as a maximum in others. It is not very many years ago that in England the average quantity of filtration was about 50 per cent. more than 8 cubic feet per square foot of the filtering area; and this quantity has been delivered in Germany, too, chiefly by waterworks having a water with few earthly ingredients. Why shall we take the 4-inch velocity as a standard for a safe and sure filtration?

Mr. Bertschinger, chemist and bacteriologist of the corporation of Zurich, published a paper in 1889 concerning "The Working of Sand Filters in Zurich." In this paper he approves, after a long series of trials, velocities of from 9 to 44 feet per day.

Mr. Piefke, engineer of the Stralau station, Berlin Waterworks, writes in 1887 that his filter delivers the water nearly sterile at a velocity of 30 inches per day; that the velocity of 4 feet 9 inches to 6 feet 4 inches per day would be for his works tolerable; but 8 feet per day should be the maximum for new works. Notwithstanding, it is stated in another paper, issued by Dr. C. Fraenkel and Mr. Piefke, that on March 12th, 1889, the Stralau works filtered with a velocity of 17 feet 11½ inches per day. The bad working of the filters caused the authors named to make a series of trials with pathogenic and non-pathogenic microbes, from which they stated that the pathogenic microbes pass the filter even at a very low velocity of filtration; but, it may be added, under the supposition that the raw, unfiltered water be mixed with the microbes at the rate of 500 to 700 cu. cm., and the filter be ill-treated, as it was by the authors of these tests. Messrs. Fraenkel and Piefke conclude from their experiments that filters should not be worked with a velocity exceeding 4 feet per day.

Mr. Piefke two years later repeated the experiments, without repeating the mistakes of the first series. The result was nearly the same; but he worked again with a water containing a number of pathogenic microbes such as we absolutely cannot find in a polluted river or pond used for water delivery.

The writer himself has also made a great number of trials to find the best velocity for the filtration of water. To avoid every error or mistake resulting from the difference in the quality of the unfiltered water he built three experimental filters, filled with the same filtering materials, all conditions being exactly the same, only the velocity of filtration being different. As soon as the three filters were in good condition the experiment began, the water running through the filters at a velocity of 4, 8 and 16 feet per day. The number of the microbes varied with a 4-foot velocity from 11 to 97; with an 8-foot velocity from 5 to 79; and with a 16-foot velocity from 7 to 72 per cu. cm. The difference is not sufficient to declare the one velocity better than the other, and therefore the writer cannot agree that the velocity of 8 feet is, beyond doubt, the maximum of safe filtration. Notwithstanding, the writer accepts this standard as long as better experiments do not prove it to be false, because he believes the danger of a trespassing pathogenic microbe is much more trifling at the lower than at the higher velocity; and, besides, that the best velocity is not the same for different qualities of water. He is sure that the difference in the mineral, vegetable and animal admixtures is of high importance in this connection, and that we should endeavor to find out the best velocity for each waterworks.

[To be Continued.]