

street, south side, between Ontario and King streets; King street, east side, between Clarence and Johnston streets; Princess street, between King street and Wellington street.

HAMILTON, ONT.—The Hamilton and Toronto Sewer Pipe Co. will make additions to their buildings. Two new kilns will also be erected. The new Catholic church to be built in the west end will be begun this week. It is to cost \$15,000 and will have a seating capacity of 500. Satisfactory progress is being made with the establishment of the proposed smelting works in this city. The syndicate is meeting with opposition by reason of the extortionate demands of the owners of property through which the switch is to run, and the contracts for buildings cannot be let until the switch is arranged.

LONDON, ONT.—Mr. W. J. Clarke will erect a brick residence on Kent street.—Mr. Thomas Smallman contemplates erecting an addition to his Dundas street residence, at a cost of \$4,000. The water for the city is proving to be inadequate to meet the demands, and steps will be taken at once to provide additional plant. New steam pumps, with a pumping capacity of 4,000,000 gallons, will probably be constructed. Mr. Keefer, C. E., has been engaged to make an examination and report.—Messrs. Jones, McBride & Farncombe will let contracts this week for two houses on Queen's avenue for Messrs. Watson & Coles.

TORONTO, ONT.—Right Rev. Mgr. Rooney has purchased the property on the north-west corner of Bathurst and King streets. It is said a private hospital will be erected on the site.—A petition is being circulated amongst the residents of Carlton street for the construction of an asphalt pavement from Parliament street to Yonge street.—The Board of Works has been granted the sum of \$5,000 for the extension of the sewer emptying into Ashbridge's bay.—A petition has been prepared asking for an asphalt pavement on Front street.—Building permits have been granted as follows: A. Robinson, two story brick addition to rear of store, s. w. cor. Harbord and Borden streets, cost \$1,000; Land Security Co., 1 story bk. office building, 26 to 32 Victoria st.; Mr. Earls, pair semi-detached 2 story and mansard brick dwellings, e. side Markham st., near Ulster st., cost \$7,000; Jas Clifford Austin ave., two story bk. store and dwelling, s. e. corner Pape and Austin ave., cost \$1,400.—Tenders are invited by the Land Security Co. until Saturday next for the erection of a building on Victoria street, just south of their present offices. Plans may be seen at the office of G. M. Miller, architect.

MONTREAL, QUE.—The City Council has approved of the purchase of sites for the proposed incinerators.—Twenty-five designs have been received by the Design Committee for the proposed monument to be erected on Dominion Square to the memory of the late Sir John A. Macdonald. We learn that the decision of the Committee is in favor of the design sent in by Mr. George E. Wade, the well known sculptor of London, Eng. The cost of the monument is estimated at \$20,000.—It is estimated that the harbor improvements will cost \$3,000,000 and that three years more will be required to complete them.—Two new elevators are shortly to be placed in the Central post office.—Mr. P. W. St. George, City Surveyor, will receive tenders until Wednesday, the 23rd inst., for the construction of sewers in the following streets: Chenneville street, from Dorchester street to Lagache street; Duluth street, from Cadieux street to Hippolyte street; Dufresne street, from Logan street northward to end of existing sewer; St. Famille street, from Prince Arthur street to Pine avenue; St. Hubert street, from Roy street to Rachael street; St. Jean lane, from Fullum street to Archambault lane; Logan street, from Shaw street to deLorimier avenue; Metcalfe street, from Dorchester street to St. Catherine street; Pantheon street, from end of existing sewers northward to Prince Arthur street; Rachael street, from St. Urbain street to Mitcheson or Clarke street.—Mr. W. Alexander, of Toronto, has purchased property at the corner of University and St. Catherine streets and will erect a large dry-goods store thereon.—Tenders will be received until the 19th inst. for the enlargement of No. 11 police and fire station, corner Ontario and Caedry streets. Messrs Perrault & Lesage will have charge of the work.

OTTAWA, ONT.—The Building Committee of the Protestant Hospital will call for tenders for tinning the walls of the different wards.—Messrs. Arnold & Calderon, architects, invite tenders this week for the erection of a steam power house for the Chaudiere Electric Light and Power Company.—Mr. George Matthews, sr., who is engaged in the pork packing industry, is considering the erection of another large pork packing establishment somewhere in Canada, to cost about \$30,000, and should the City Council grant him sufficient inducements, will locate in this city.—A new Presbyterian manse will be erected in New Edinburgh. It will be solid brick, with stone foundations, 41 x 38 feet in size and two and one half stories high, cost \$4,000. Mr. M. C. Edey will be the architect.—J. H. Balderson, Secretary Department of Railways and Canals, will receive tenders until Tuesday, the 12th of September, for the supply of the following rails: 1,000 tons of 50-lb. steel rails, to be delivered c. i. f. on the Prince Edward Island railway wharf at Summerside; 300 tons of 56-lb. steel rails, to be delivered c. i. f. on the Intercolonial railway

wharf at Richmond. Halifax; 5,000 tons of 67-lb. steel rails, to be delivered on the Intercolonial railway, Princess pier, wharf, at Levis, opposite Quebec.—Major Muishead of the Royal Engineers is expected to reach Ottawa shortly on his way to Esquimalt to supervise the construction of the fortifications at Esquimalt Harbor, B. C. The Dominion Parliament voted \$70,000 for this purpose. Tenders are invited by E. F. E. Roy, Secretary Department of Public Works, until Monday the 28th inst. for the construction of heating apparatus in the Toronto drill shed. Plans may be seen at the office of R. C. Windyler, architect, Toronto.—A by-law to raise funds for the construction of a sewer on Murray street has been passed in Council.—A granolithic sidewalk will be constructed on the south side of Rideau street, from Little Sussex to Nicholas street.

FIRES.

The Imperial Straw Works at the foot of Bay street, Hamilton, were damaged by fire last week to the extent of \$3,000. The roof of the building was burned off.—Lee's opera house, the City hotel, Dumphy's hotel, Palmer's tannery and Estey's warehouse, at Fredericton, N. B., were destroyed by fire on Saturday morning last. Several other buildings were badly damaged. Loss \$20,000, small insurance.—The residence of Hugh Cameron at Fingit, Ont., was burned to the ground recently, with all its contents. The loss is heavy, there being no insurance. McRae & Co.'s saw mill at Calabogie, Ont., sixteen miles from Renfrew, was totally destroyed by fire on Saturday last. The loss will be about \$8,000.—A three-story furniture manufactory, with contents, including machinery, at Ste. Cenevonde, Que., belonging to Messrs. Lajoie, was totally destroyed by fire on Monday last. Mr. Lajoie estimates the damage at \$15,000, and the insurance at \$5,000.—J. W. Green & Son's saw mill at Kingsville, Ont., was burned to the ground on Tuesday morning last. Loss, \$2,000; insurance, \$400.—The Clinton organ factory at Clinton, Ont., with all machinery, stock and tools, was destroyed by fire last week. The loss above the insurance, which is \$4,500, will be about \$5,000.—Mr. J. K. Page's residence, near Welland, Ont., in Pelham township, was burned recently.—The residences of Aaron Hall and James Harris, at Delaware, Ont., were destroyed by fire a few days ago. Loss about \$4,000, with very little insurance.—A disastrous fire occurred at Ottawa on the 13th inst., commencing in the rear of J. B. Abbott's carriage factory at the corner of Wellington and Bay streets, a three-story wooden building, which was destroyed. J. Latremouelle's tailor shop and dwelling was entirely destroyed, and the stores of F. F. Grant and C. W. Willemot were badly damaged. The loss is estimated at \$30,000.—The residence of Mrs. Smith, situated on Wingham street, Ingersoll, was totally consumed by fire recently. The loss is partially covered by insurance.

CONTRACTS AWARDED.

TORONTO, ONT.—The sub-committee of the Parks and Gardens Committee has accepted the tender of R. Forsyth for a granolithic sidewalk on Queen street avenue, at \$1.57 per lineal foot.

HALIFAX, N.S.—The contract for trenching for the new pipe line has been awarded to Mr. A. McKinnon. The prices are: Earth, 28c per yard, \$1,333.92; rock, \$1.97c per yard, \$9,551.65; total, \$10,885.57.

ARNPRIOR, ONT.—The contract for constructing the road-bed of the Ottawa, Arnprior & Parry Sound Railway from Brudenell ten miles westerly has been awarded to Mr. William Heald, who will begin work at once.

LONDON, ONT.—Messrs. Jones, McBride & Farncombe, architects, have awarded the following contracts: Hardwood fittings for store in St. Thomas, Messrs. Pennington & Baker, Hamilton, house for Murray Anderson, Ed. Martyn, brickwork; I. Sergeant, carpenter work; J. Lucas, painting; Gould & Stratford, plastering; Smith Bros., plumbing.

MONTREAL, QUE.—The following tenders were received for the construction of the Colerette ladder: E. Chanteloup, \$4,326; Messrs. Lariviere, \$4,500; Mr. Ledoux, \$4,400. The contract has been awarded to Mr. Chanteloup.—Messrs. Perrault & Lesage, architects, have awarded the contract for alterations to residence for Mr. Alex. Bourgeau to Mr. Louis Beaudry, at the price of \$5,000.

OTTAWA, ONT.—Contracts have been awarded as follows for additions and improvements to the Stewarston Presbyterian Church. Masonry and brickwork, W. Stewart; carpenter work, H. Reynolds; painting and glazing, J. Sheppard; heating and plumbing, Douglas Bros. The contracts for electric lighting, seats and furniture have not yet been let, estimated cost of proposed improvements, \$2,500.

WINNIPEG, MAN.—The contracts for the new building for the Canadian Rubber Co. of Montreal, have been awarded. Messrs. Rourke & Cass will do the masonry, and Mr. Melvin the carpenter work; cost \$12,000. S. Frank Peters, architect.—Work has been commenced on the new manse for St. Andrews' church, to be erected on the corner of Jemima and Ellen streets. The contractors are: stonework, J. Brunell, superstructure, W. A. Charlesworth; estimated cost, \$5,000.

NEWCASTLE, N. B.—The contract for the erection of the new academy building has been awarded to Messrs. J. K. McDonald & Co., of New Glasgow. The building, with heating and ventilation and furniture, is estimated to cost \$18,000. It will be 60x50 feet in size, two stories and basement, with a tower in front, the top of which will be 68 feet from the ground. The architects are Messrs. J. C. Dumaresq and H. H. Mott, of Halifax.

MUNICIPAL DEPARTMENT.

THE DISINFECTION OF TOWN SEWAGE WATER BY MEANS OF LIME.*

BY PROF. PÉRIE.

Many towns, in default of irrigation farms, are compelled to purify their sewage by chemical means before its discharge into rivers; and it would seem from the transactions of the German Public Health Society that, as a rule, more attention has hitherto been paid to clarification than to disinfection. The author remarks that in certain cases, as for instance, where typhoid fever or cholera may be present, it is most important that the sewage water should be disinfected, as it might otherwise communicate the germs of those diseases to persons using the river water mingled with the effluent for drinking or for domestic purposes. Among the chemical substances most largely used in sewage treatment is lime, itself an excellent disinfectant; but it seemed doubtful whether this material, in the way in which it is now employed, really serves to destroy the bacilli of typhoid fever and cholera. In order to determine the question, the author investigated the proportions in which lime must be added so as to effect object. Attention is directed to his previous experiments with lime, in which he found that the addition of 1 per cent. of milk of lime (which was equivalent to 1.37 per mille of slaked lime) was sufficient to disinfect the Berlin sewage water containing the bacilli of typhoid fever. It was, however, necessary to complete the investigation of this subject, and to carry out the experiments more fully. Previous tests had shown bouillon to be more favorable to the development of the germs than either gelatine or agar-agar, and the cultivations therefore took place at blood-heat in bouillon. The Berlin sewage water, when in a fresh condition, is dark grey in color, and has a sickly, disagreeable smell. It was, in all cases, slightly alkaline, and needed 1 per mille of normal acid to render it neutral. After sterilisation of the sewage water, at a temperature of 160 deg. C., and at a pressure of five atmospheres, the alkalinity was slightly increased. In each case 50 cubic centimetres of sewage water received one quarter of a cubic centimetre of a 24 hours' old bouillon-culture of typhoid fever or cholera bacilli. The liquid thus contained about the same number of germs as did the fresh sewage water. It was necessary first to sterilize the sewage water, in order to study the behaviour of these special bacilli without the interference of the numerous other species usually present. For reasons given, the lime was used in the form of a dry powder, obtained by calcining marble, and slaking 100 grammes of the same with 60 per cent. of distilled water. After the introduction of the lime, the flask, with its contents, was kept in constant movement, to prevent the settling of the suspended matters and the precipitate. Several flasks of each test were filled simultaneously to give parallel results. The lime was used in the proportion of 1-5, 1-2 and 1 per mille. To determine the rapidity with which the lime did its work, the author withdrew samples for culture at stated intervals. From the first set of tests, which are recorded in the form of a table, it is seen that only the 1-per-mille dose of lime was fatal to the germs under all conditions, though the ½-per-mille solution destroyed all germs after two hours' exposure, and subsequent experiments proved that even 1½ hours' action of the lime was sufficient. In a second

table are shown the results of adding lime to sterilized sewage water into which a proportion of typhoid and cholera germs had been introduced on agar-agar, and therefore in the absence of nutritive bouillon. In this case also the lime proved as efficacious as before.

In a further series of experiments the author investigated the influence of lime upon sewage water not previously sterilized. For this purpose 12 samples of fresh sewage were collected in flasks, and the contents of six of these flasks were sterilized, the others remaining untreated. To four of the sterilized flasks 1 2 per mille of lime was added, and to the other two 1 per mille. The six flasks of untreated sewage had in each case 1-2 per mille more lime than the former ones—namely, four of them 1 per mille, and two of them 1 2 per mille of the lime. The contents of all the 12 flasks having received a fragment of agar-culture of typhoid or bacilli, were examined at intervals of one hour and 1-1-2 hour, and from these tests also it appeared that a dose of 1 per mille of lime was needed to destroy all germs of cholera and typhoid fever in from 1 to 1½ hours; it being a condition, moreover, that the liquid should remain throughout this time in motion. For sewage at rest, the author's experiments led him to the conclusion that not less than 3 per mille of lime would be needed. At no existing sewage works is the lime employed at present in sufficient quantities to destroy the pathogenic germs, and its value as a disinfectant is often partially neutralised by the use with it of sulphate of alumina. The author points out that a valuable index of the sufficiency or otherwise of the lime treatment is afforded by the alkalinity as tested by titration of the effluent with normal acid, and he has calculated a scale for this purpose.

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*Abstract of a paper from "Zeitschrift für Hygiene" in the Proceedings of the Institution of Civil Engineers.