

tract rate for supplying houses is half the Montreal rate, but \$50 per hydrant per annum is paid by the municipality in addition. In other cases, and notably with what is now called St. Denis ward, of Montreal, the present house rates are 75 per cent. of those of Montreal, and no charge for hydrants. The water company has a steam power pumping plant of 5,000,000 gallons daily capacity, on the river side in St. Gabriel ward, Montreal, which draws water through a submerged pipe from the middle of the channel between the main shore and Nun's Island, and supplies St. Cunegonde, St. Henri, Cote St. Paul, Turcot and Westmount, having an aggregate population of over 30,000. On Clarke avenue, at 200 feet elevation above the harbor, there is a sunken tank, or small reservoir holding 180,000 gallons. At this there are two pumping engines of three-million gallons combined daily capacity, which supply the higher levels and discharge into a large reservoir on the Cote des Neiges road, of seven millions capacity and 478 feet elevation above the harbor. The water company has pipes and hydrants in the municipalities of Maisonneuve, St. Louis de Mile End, and St. Denis Ward of Montreal (formerly Cote St. Louis), but having as yet no pumping system for these parts of its territory, it supplies them with water from the Montreal waterworks pipes. The water thus taken is measured by large meters placed on the junctions of the two-pipe systems, and the stipulated price is 40 cents per 1,000 gallons. The company is thus a wholesale buyer of water from the city, and a retailer to its own consumers, but although it quite properly collects for its sales, it strangely refuses to pay for its purchases. The city in its poverty cannot afford to be thus treated, and it would appear at first sight that its simple duty to its own citizens is to promptly shut off the water connections and make the company pay up. The matter, however, cannot be so easily and summarily dealt with, for the people who are dependent on the water have to be considered. In the case of St. Denis ward, shutting down the city valves would be depriving a portion of Montreal's own citizens of water, and in the case of outside municipalities it would be, to say the least, an act too harsh to be lightly done.

The company is constructing a large water-power pumping plant on the Back River, above Sault aux Recollets, from which it proposes to supply all the municipalities with which it already has contracts, as well as any others with which it may yet arrange. The scheme has an important bearing on the future of the waterworks of Montreal, because, if successfully carried out and worked, it obviously limits the Montreal works to the area which they now occupy, and their future increase of capacity to that which may be required by increasing density of the population.

For much of the foregoing information we are indebted to the kindness of Mr. Laforest, superintendent of the Montreal waterworks; Mr. McConnell, ex-superintendent; Mr. Robb, city treasurer; Mr. Keefer, who designed and has so often been consulted in improving the works; Mr. Vanier, recently associated with him, and Mr. Keith, engineer of the Water and Power Company.

PUBLIC WORKS OF THE COMING YEAR

The following are some of the leading items of outlay for railways, canals, and other public works of the Dominion, as foreshadowed in the estimates brought down in the House at Ottawa.

INTERCOLONIAL RAILWAY.

Rolling stock, \$15,000; increased accommodation at Moncton, \$30,500; extension to deep water at Sydney, \$20,000; works at Halifax, \$105,000; Dartmouth branch, \$20,000, and improvements at various stations, amounting to about \$18,000.

CANALS.

Construction Soulages Canal, \$800,000; Cornwall enlargement, \$183,000; Rapide Plat, \$170,000; Guelphs, \$250,000; St. Lawrence channel and surveys, \$20,000; Murray equipment, \$5,000; Trent construction, \$500,000; Sault Ste. Marie construction and equipment, \$44,000; Lachine, \$238,000; Lake St. Louis channel, \$95,000; Grenville enlargement, \$90,000; Welland improvements, \$5,000; Lachine—Stop logs, \$2,100; extending electric lights along canal, \$4,550; providing and planting boundary stone, \$700; Beauharnois—Dredging shovel at upper entrance, \$5,000; replacing cope stones on nine locks, \$1,600; changing circuit of telephone from ground to metallic, \$800; Chambly—Build rubble walls along highway, \$2,500; rebuild abutment walls, etc., lock 8, \$4,000; gravel bank of canal, \$1,500; purchase half acre of land and build shed and fence, \$1,000; to build culvert under canal at St. Johns, \$6,000; Carillon and Grenville—Build a set of spare lock gates, \$2,900; Trent—Build new dam at Chisholm, \$5,500; remove rock in channel at Hastings, \$3,500; build guard booms and piers at Peterboro swing bridge, \$2,500; dredge channel at Katchewanwan Lake, \$2,500; build landing pier at Burleigh, \$2,000; remove rock

in channel at Bobcaygeon, \$3,500; provide hoisting engine and boiler, \$1,000; Rideau—Construct bridge across by wash at Smith's Falls, \$5,000; complete sheet piling at Deep Cut, Ottawa, \$8,500; Welland—Remove sand bars in Dalhousie and Port Colborne harbors, \$4,000; toward building superstructure of piers at Port Dalhousie, \$30,000; rebuild in cement walls of lock No. 24, \$25,300; renew towpath bridge \$5,000; renew one pair of lock gates and raceway bridge, lock 7, old canal, \$5,000; clean and deepen feeder back ditches, \$2,000; St. Lawrence ship channel, \$75,000; River Kaministiquia, \$10,000.

PUBLIC BUILDINGS.

Halifax Drill Hall, \$100,000; Marysville, N.B., Public Building, \$8,000; Tracadie Lazaretto, N.B., \$1,000; Grosse Isle quarantine station, \$6,000; Montreal Dominion Public Buildings—Improvements, alterations, renewals, repairs, etc., \$12,000; Quebec Post Office—New wing, and repairs and alterations to old building, furniture, etc., \$2,500; Richmond Q., Post Office and Customs and Inland Revenue offices—Re-vote of \$14,000 lapsed—To complete, \$14,000; Rimouski Post Office, Custom house, etc.—To complete, \$10,000; St. Vincent de Paul Penitentiary, \$7,000; Dominion Reformatory, Alexandria, Ont., \$30,000; Picton, Ont., Post Office, Custom-house, etc., \$13,000; Portage la Prairie Post Office, etc., \$20,000; Regina, lock-up and police accommodation, \$2,000; Moosomin Court-house—Additions, etc., \$3,000; Prince Albert Court-house and Jail accommodation—New works and repairs, \$13,000; New Westminster Drill Hall, \$6,000; Victoria Drill Hall (re-vote), \$4,000; Victoria new Post Office, \$100,000.

HARBORS AND RIVERS.

Digby, N.S., pier, \$2,800; Georgeville, N.S., extension of wharf, \$3,000; Grand Etang, N.S., \$5,000; Kier's Shore, P.E.I., extension of pier, repairs and dredging, \$2,500; Souris—Reconstruction of the breakwater at Knight's Point, \$37,500; Burnt Church, N.B.—Wharf, \$2,000; Gardiner's Creek—New wharf, \$3,150; Negro Point Breakwater, St. John Harbor, \$20,000; River St. John, including tributaries, \$16,000; Anse a l'Eau—Tadousac pier, \$1,500; Baie St. Paul—To complete wharf at Pointe aux Corbeaux, repairs, etc., \$2,500; Etang du Nord—Repairs, etc., \$1,000; Grande Riviere—To complete harbor of refuge by strengthening and extending the wharf, etc., \$2,000; Laprairie—Works in connection with ice piers, dredging steamboat channel, etc., \$10,000; Phillipsburg pier, the municipality having contributed \$4,000, \$1,000; Piers—Lake St. John, including improvement of approaches, \$2,500; River Richelieu—Belœil channel guide piers, \$3,000; River St. Maurice—Improvement of channel between Grandes Piles and La Tuque, dredging plant, \$5,000; St. Jean, Ile d'Orleans, \$400; Collingwood—Repairs to breakwater, \$2,850; Kingston, Ont., harbor, \$5,000; Lake Simcoe and Couchiching—Regulation of waters of, \$5,500; Owen Sound harbor—Dredging, etc., \$20,000; Toronto harbor—Works at eastern entrance, etc., the city of Toronto having contributed \$100,000, \$50,000; Wharves on Lake Winnipeg, \$8,500; Columbia River—Improvements above Golden, \$4,600; Victoria Harbor—Dredging in inner harbor, \$10,000; Fraser River—Improvements of ship channel, \$10,000; Skeena River, \$3,500; New dredging plant, \$40,000; Dredge vessels, repairs \$30,000; Dredging—Nova Scotia, Prince Edward Island and New Brunswick, \$50,000; Quebec and Ontario, \$40,000; Manitoba, \$8,000; British Columbia, \$15,000; General service, \$5,000.

ROADS, BRIDGES, AND MISCELLANEOUS.

Bridges, Ottawa city, \$7,000; bridge at Edmonton, over Saskatchewan, \$50,000; bridge over Burlington canal, \$15,600; telegraph line, north shore St. Lawrence, \$1,000; artesian well boring in N.W.T., \$7,000.

The above items do not include the usual appropriations for repairs, maintenance, etc., in the various departments.

THE ENGINEER.

Editor CANADIAN ENGINEER

SIR,—The experience of no one man, no matter how extensive his practice or how varied his opportunities, will cover much of the aggregate field of engineering. Think for a moment how little of your knowledge of engineering is based upon your own unaided efforts and experience. How many of the rules which you use did you work out for yourself from data derived only from your own practice? When you have a piece of work to do that is entirely different from anything you have attempted before, what do you do? You hunt for an instance where somebody has successfully done such work before; or, if no such case exists, you lay out the work as best you can in the light of what has been done, taking the result of other men's tests as to strength of materials, propor-