

It must, therefore, be understood that there is no land for boulevards in Schemes 3, 4 and 5 and that in Schemes 1 and 2 we have included the cost of land for boulevards, and whatever grading and filling are included in Cook's contract and nothing else.

Contractors' Claims.—These being the same for all five cases, have not been included.

Frazil.—Messrs. Ernest Marceau and John Kennedy, in their report, dated May 6th, 1907, addressed to Mr. Frank Dowd, secretary of the water committee of the city of Montreal, say in their last paragraph:—

"The details of the works at the entrance of the aqueduct and the intake of the conduit are not yet fully worked out, but from the fact that the position of the present aqueduct intake is a very favorable one, and that no trouble has ever been experienced from frazil entering it, we are of the opinion that the works can be so designed and built, that their operation will not be seriously interfered with by frazil."

Mr. F. Clifford Smith, in his official history, "The Montreal Water Works, 1913," page 35, quotes Messrs. J. H. Harrington and Thos. L. Hickey, as follows:

"We have given considerable attention to the question of whether or not the frazil or slush ice would make any complications as regards the entrance of the river water through submerged ports, protected by wooden slats or screens. A considerable number of personal observations by Messrs. Janin and Lesage have been made by holding a screen in the water in this vicinity at times when frazil is known to occur at other places. Available data indicate the comparative absence of complications as to frazil. In recommending the construction of an intake 1,200 feet from shore, we beg to state that we have considered this matter with respect to the purification of the

supply. Taking everything into consideration, we are convinced, as above stated, that it will be wise to carry out Mr. Janin's recommendations for the outer intake."

The ratepaying engineers, in their report of 1916, paragraph 7, say:—

"Serious operating troubles, due to frazil and other ice, are inevitable. These will greatly reduce the maximum output below 7,000 horse-power and may cause complete stoppage of the plant during a more or less protracted period every winter."

These opinions are from high authorities who are better acquainted than we are with the conditions at the entrance of the aqueduct.

The engineers who have studied and recommended the enlargement of the aqueduct have provided for a long extension of the cribwork at the entrance, to prevent the formation and admission of frazil. We have omitted the cost of this cribwork, as it may be built after the works have been in operation and conditions studied.

It is certain that frazil and anchor ice will give trouble, and to the best of our knowledge there is no way to prevent same. We have, therefore, provided for an auxiliary steam plant to furnish power during times of ice trouble. For the purpose of estimating, we have assumed that on the average there will be a decrease in hydraulic power equivalent to a complete shut-down of 2.4 months each year.

Dredging.—Any dredging needed for Schemes 1, 2 and 3, at outlet of tailrace, has been provided for in our estimates.

Consumption of Water by City.—The average quantities per day of water pumped during the years 1903-1913 are shown on the table at the top of the next page. The percentage of increases are also shown.

Present and Future Power Required for Pumping and Lighting by City of Montreal

Power actually used by city, pumping 60 million Imperial gallons per day, and for lighting.

Description.	Pump'g.	Light'g.	Totals.
Pumping, Atwater Avenue ...	4,710	....	....
Filtration, Atwater Avenue ...	2,960	....	....
Total	7,670	....	....
Electric pumps	2,000	....	....
Total for water supply ...	9,670	....	....
Sewers	520	....	....
Total pumping for city of Montreal	10,190	....	....
Lighting city .....	....	2,890	....
Total pumping & lighting Montreal W. & P. Co. System	5,600	....	....
Outremont, Westmount, Maisonneuve, Verdun .....	....	1,064	....
Total for pumping city and Montreal W. & P. Co. systems	15,790	....	15,790
Total for lighting .....	....	3,954	3,954
Total horse-power .....	....	....	19,744
			say, 20,000 h.p.

Power needed in near future, pumping 100 million Imperial gallons per day, and for lighting.

Description.	Pump'g.	Light'g.	Totals.
Pumping, Atwater Avenue ...	8,570	....	....
Filtration, Atwater Avenue ...	3,270	....	....
Total	11,840	....	....
Electric pumps	2,500	....	....
Total for water supply ...	14,340	....	....
Sewers	520	....	....
Total pumping for city of Montreal	14,860	....	....
Lighting city .....	....	4,330	....
Total pumping & lighting Montreal W. & P. Co. System	8,960	....	19,190
Outremont, Westmount, Maisonneuve, Verdun .....	....	1,600	....
Total for pumping city and Montreal W. & P. Co. systems	23,820	....	23,820
Total for lighting .....	....	5,930	5,930
Total horse-power .....	....	....	29,750
			say, 30,000 h.p.