

In conclusion Mr. Janin states: "I have admitted the usefulness of a filter sooner or later." If Mr. Janin will only cross out the word "later" and substitute "the sooner the better," he will satisfy us and bring himself into line with all the leading authorities upon the question of treating raw river waters in order to render them safe and beyond suspicion.

THE WATER SUPPLY PROBLEM OF MONTREAL.

By George Janin, Chief Engineer and Superintendent of the City of Montreal Water Works.

The water supply of the city, with the exception of St. Denis, Delorimier, St. Henry, St. Cunegonde and Mount Royal Wards is under the control of the municipal administration, which owns the aqueduct and imposes a rate for payment. The above said wards and the suburbs are supplied from a private company, the Montreal Water and Power Company.

The area included in the limits administered by the city corporation is about 10,000 acres, containing a population of 390,000 souls, not counting any of the large suburban municipalities, which are not separated from the city by any natural boundary but really form part of the city, and which, if annexed to the city, as they soon must be, would bring the population to 500,000 souls.

As for all old cities, the aqueduct of Montreal had a very modest beginning. Towards 1,800 the water from springs was diverted from Mount Royal and distributed through some of the streets of the city in wooden pipes. In 1815 this precarious supply was replaced by a system of distribution of water pumped from the river and raised into tanks containing 240,000 Imperial gallons. In 1845 the city bought this system from a private company, after which an epoch of progress was begun by the construction of a reservoir containing 3,000,000 Imperial gallons and situated at that time outside of the city at a place called "Côte à Baron." This reservoir, now abandoned, has been turned into an ornamental fountain in one of the squares of the city (St. Louis Square).

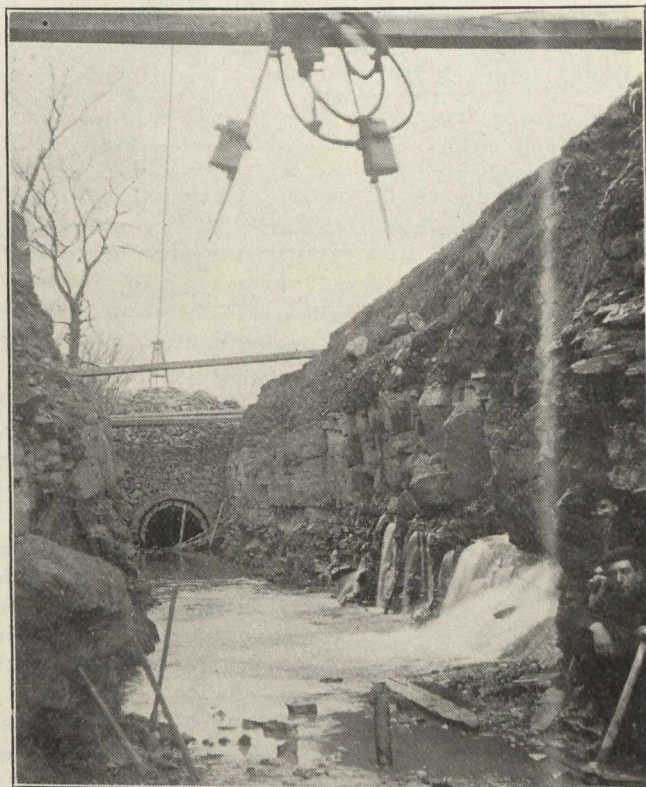
The time had now arrived when the intake from the river, in the middle of the harbor, and consequently exposed to all sorts of pollutions, could no longer be used with hygienic safety to supply a city full of future promise and anxious for the health of its inhabitants. As early as 1847 it had been proposed to take water at the Lachine Rapids, above the city, and to make use of the power of these rapids to raise the water, but this scheme, and others similar, were not seriously considered until 1853, when the city council concluded to confer upon Mr. T. C. Keefer, civil engineer, the duty of preparing plans for an aqueduct capable of supplying 5,000,000 Imperial gallons daily. The study of this project, its examination by consulting engineers, etc., postponed the beginning of its construction to the year 1853, and its termination to the year 1854.

The system then established included an open canal $4\frac{3}{4}$ miles long, having its entrance about one mile above the Lachine Rapids, at an elevation of 37 feet above the level of the harbor of Montreal. The dimensions of the canal were 40 feet wide at the water surface and 8 feet deep.

At the time of its construction this canal supplied more than sufficient water to develop 300 horse-power, and to raise 200 feet above the level of the water in the harbor 5,000,000 Imperial gallons of water, being at the rate of 40 Imperial gallons per capita for a population double what it was then (60,000). At the end of that canal were situated the settling

basin and the wheel house, about as they stand to-day. The hydraulic motive power was utilized by two breast wheels working six pumps to raise the water to a reservoir situated on the slope of Mount Royal along McTavish Street, forming the present low level reservoir, which is but an enlargement of the original one. That reservoir had then a capacity of 15,000,000 Imperial gallons.

The whole of this system had been well devised for the quality and quantity of water necessary for a limited future, sufficient in fact for a population double what it was then; but the rapid increase of population, which has nearly increased ten times since, and the inconveniences produced by the severity of our winters on the wheels, have necessarily obliged the authorities of the water works to substitute turbines for breast wheels, and also to construct an auxiliary steam plant, with a view to replacing hydraulic power during the times of low water in summer, and during the winter on



Showing Infiltration Through Rock.

account of ice, frazil, etc. The steam plant was also found to be necessary to provide for the insufficiency of the water power, when the consumption of water by the city exceeded that for which provision had been made when the canal was constructed.

Meanwhile the increasing population of the city was extending itself upon the heights situated east of Mount Royal, at an altitude too great to be supplied by the system whose summit was at the McTavish Reservoir.

This state of things necessitated the establishment of the present high level system, that is, the construction of the reservoir at midway on the mountain slope, and of a pumping station to carry the water from the low level system to the high level distributing service, to a height of 422 feet above the level of water in the harbor. A Werthington steam pump, with a daily capacity of 500,000 Imperial gallons, was then sufficient to supply the high level system.

As the changes were being made to the low level machinery, as mentioned above, several schemes were prepared to put