The main pumping station is situated on the bank of the St. Lawrence and the water is received direct from the river through a 36-inch wooden pipe into two wells, one under the steam plant and one under the electric plant.

The equipment consists of the following pumps:—

Holly crank and flywheel, 4 cylinder cross compound pump—capacity 1,000,000 gallons per 24 hours. (Very old, not in use.)

One Snow duplex compound low duty pump—capacity 3,000,000 gallons per 24 hours, and one of 2,000,000 gallons.

Northey triplex geared electric pump, driven by S. K. C. Synchronous motor—capacity 5,500,000 gallons per 24 hours.

Northey duplex geared electric pump, driven by same motor as triplex—capacity 2,500,000 gallons per 24 hours.

Northey triplex geared electric pump, driven by Bullock induction motor—capacity 5,750,000 gallons per 24 hours.

The discharge of these pumps is conducted through three mains—12-inch, 14-inch and 24-inch—respectively, to the north side of the Lachine Canal where they feed the distributing system. A 36-inch steel main is being laid at present parallel to the 24-inch, and will be completed by 1st August, 1907.

The overflow from this system is conducted through two 14-inch pipes to a well at the Clarke Avenue pump station, at an elevation of 200 feet from the river.

The 36-inch main above mentioned will be continued up to feed this Clarke Avenue station, as the capacity of the two 14-inch mains is insufficient to meet the rapidly increasing consumption.

At Clarke Avenue station there are two Mather and Platt high lift turbine pumps, one two chamber running at 740 r.p.m., and having a capacity of 5,500,000 gallons per 24 hours, and one six chamber running at 350 r.p.m., and having a capacity of 6,500,000 gallons per 24 hours. These are both run by induction motors, also made by the Mather & Platt Company.

The larger turbine is provided with a Belliss & Morcom triple expansion engine, which can be coupled up by means of a flexible coupling in case of failure of electric power.

These pumps supply the high levels in Westmount and the towns north and east of the mountain, the surplus going into the reservoir, situated in Cote des Neiges, which has an altitude of 460 feet.

There are 106 miles of main pipe in the system and 23,587 service branches. The population supplied is 128,000, and the average daily consumption is about 14,000,000 gallons.

PUMPING BY GAS AND OIL POWER.

The advent of the centrifugal and turbine pump has made it practicable to drive direct or by belt from a steam oil or gas engine or electric motor. When the enormous economy which could be effected by substituting suction gas or oil for steam became more fully recognized, many new pumping plants were installed, until to-day they are found working satisfactorily in varied capacities. So great have been the advantages derived from them, that in many cases the old style of pumping is being given up in existing pumping stations, and new pumps driven by these engines are being installed in their place.

In cases where power is required for a short time only suction gas plants and gas engines are eminently suitable The engine can be got under way within a reasonably short time by lighting the fire in the generator and the consumption of coal ceases as soon as the work is done.

Mechanical engineers are now giving much attention to the economical results that be developed in the working of gas, gasoline, and oil engines for higher powers, from petroleum and its products and from producer and other cheap gases.

It is now a question of how to adapt and design these engines to derive a wider range of usefulness and economy since steam from an economical standpoint, for small and intermediate power, is being left far behind in the race for supremacy. A case is cited in England where recently the pumping was done by steam-driven pumps, the coal bill amounting to about $5,000 per annum, gas engines and suction plants were substituted, and the total cost of coal per year since has been $750. The time is past when an engineer can afford to accept steam as the source of power without consideration of other means. Gasoline or oil engines, electric motors, where current can be cheaply obtained, and gas producer plants, all demand consideration with a justification, in each case, depending on local conditions. With the present price of gasoline in Canada this source of energy can hardly be considered in any but small plants. Crude oil engines, at the present price of this fuel, have much to commend them for small installations, but cannot usually compete in economy with plants of other types. Notwithstanding that the operation of producer plants is much simpler than steam, it seems to be difficult at present to obtain attendants who appreciate the requirements and are in sympathy with this type of apparatus.

MANAGEMENT OF FILTER PLANTS.

Samples of water from different sources when subjected to careful analysis each have their own peculiarities. A careful study of each case in all its phases is therefore essential before the work of filtration is commenced. Sand is the actual filtering medium in nearly all plants. There is the slow sand filter where the water flows on the beds in its natural state; and the more rapid type where the water has had a previous preparation. In each case the sand is depended on for the actual work of filtering.

The usefulness and safety of a mechanical filter plant depends almost entirely upon how it is operated. The condition in which the filtering material is kept will govern the efficiency of any form of plant. It must therefore be operated by an experienced man since the great question of life and health depend upon his efficiency.

Carelessness in the management of a plant will produce water quite as bad as the raw water itself and in possible cases even worse, since foul filter beds may become a more excellent breeding ground for bacteria than the raw water itself.

The manager of a filter plant should be well trained and able promptly to meet rapidly varying conditions which affect the quality of effluent. This class of waterworks engineering cannot be governed by any fixed rules. One condition of water might be purified by a time method, while another would not. The operator should not only be thoroughly familiar with every detail of his plant, including the working of pumps, coagulant feeding devices, washing machinery, etc., but he should have a good working knowledge of water analysis. The ability to make these tests is almost an absolute necessity in order that he might know at all times whether the filter devices are working satisfactorily. Filtration of public water supplies is fast coming into favor, and in a great many places where the water supply is diminishing will soon be an absolute necessity.

Damages for the diversion of underground waters are claimed in a suit brought against East Orange, N.J., by Mr. Frank W. Meeker, a farmer of Livingston, N.J. Mr. Meeker asks for $10,000 damages on account of the alleged drying up of springs on his farm subsequent to the use by the East Orange waterworks of twenty wells sunk by the department at White Oak Ridge, in the township of Milburn, about one-quarter mile from his place. The springs were used for watering cattle and cooling milk. He also claims that the yield of certain hay fields has been reduced in the ratio of 20 to 6. It is said that this is the first lawsuit of the kind brought in the State of New Jersey.—Engineering News.

NIAGARA POWER RUNS TORONTO PUMPS.

The pumps in connection with the sewage disposal plant at the Woodbine, Toronto, were run by electric power from Niagara on Thursday morning last, and the pumps worked satisfactorily. This is the first civic plant to be operated by Niagara power.