MECHANICAL GRAVITY FILTRATION AT SASKATOON

TYPICAL RECORDS OF PLANT OPERATION WITH RESPECT TO QUANTITY OF WATER FILTERED, CHEMICAL TREATMENT, BACTERIAL REMOVAL AND COSTS.*—DESCRIPTION OF THE PLANT

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THE city of Saskatoon obtains its water supply from the south branch of the Saskatchewan River. This river and its tributaries are being polluted by the sewage from a number of towns and cities, including Calgary, McLeod, Lethbridge and Medicine Hat. In addition to being contaminated, the water of this river is very turbid at certain seasons of the year, and it is generally believed that a turbidity in the water such as is presented in this case, consisting to a large extent of fine quartz particles, predisposes to enteric conditions.

For these two reasons, therefore, namely, periods of excessive turbidity and danger of contamination, the civic authorities decided that it was advisable to take the necessary steps to purify the water, and the writer was requested by the city to report on the subject of filtration. Before doing so, some filtration plants of different types were visited, including among others those at Albany, N.Y.; Hackensack, N.Y.; Harrisburg, Pa.; Philadelphia, Pa., and Columbus, Ohio; and the outstanding features of each were noted.

Requirements of Water Being Used for Domestic Purposes.—Water which is required for domestic purposes should possess the following qualities:—

(1) It should be free from disease-producing germs.

(2) It should be free from those allied organic forms, which are not conducive to health, although they may not as yet be recognized as accompanying disease.

(3) It must be uniformly clear and free from turbidity, whether such be produced by mineral or organic matter.

(4) It must be free from color, odor and taste.

The methods adopted by the city of Saskatoon to accomplish these results may be divided into three steps, viz., sedimentation, filtration and sterilization.

Sedimentation.—The sedimentation basin has a capacity sufficient to give the water 8 hours' subsidence, when the filter is working at full capacity, and is divided into two parts by a weir wall across the centre. In the north half of the basin, plain sedimentation takes place, and in the south half, sedimentation and coagulation.

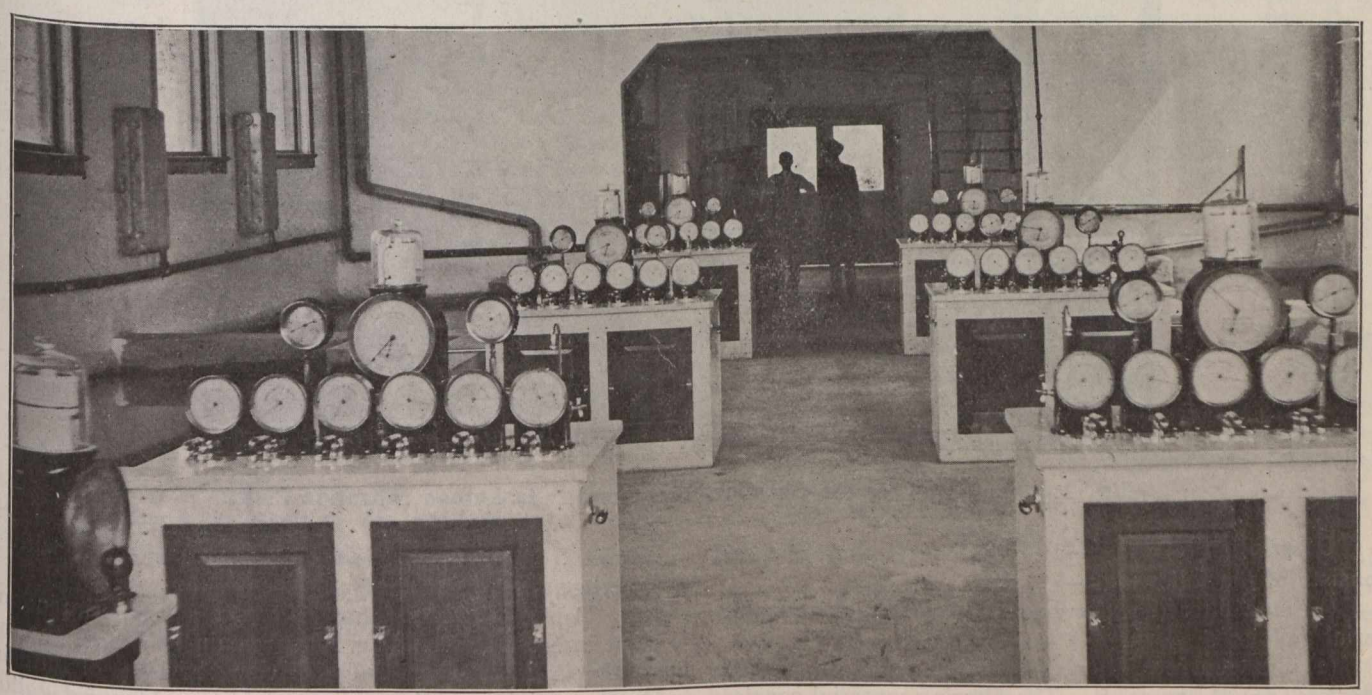

Fig. 1.—Section of Laboratory, Saskatoon Filtration Plant.

The coagulant used is sulphate of alumina, because the water has a sufficient alkalinity content, so that sulphate of alumina presents the necessary reaction to form an alumina hydrate, which, in precipitating, coagulates much of the organic matter, and drags down the finer suspended matter.

Provision has been made for applying the coagulant at three points: (1) When the water enters the basin; (2) when it passes over the weir; (3) just before it enters the filters.

The solution of sulphate of alumina used is 350 lbs. to 1,980 Imperial gallons of water or 1.8% solution.

Filtration.—The three best known types of filters were duly considered before a decision was arrived at, as to which one was best suited to our purpose. A very

* These Tables formed the basis of Mr. Clark's paper to the Canadian Public Health Association in Regina last month.