The turbidity consisted of a hard, blue clay, free from organic matter. This was pulverized in a mortar and well rubbed up into a smooth paste with a small quantity of water before addition to the tank.

The sewage of Imhoff effluent used for the pollution of the water was a characteristic type of Toronto city sewage. The storage in the Imhoff tank was not more than 20 minutes, and as the sewage is pumped directly from a flowing sewer to the tank, it was in a fresh condition when used.

Summary.—A summary with conclusions arising out of these experiments is now given in order to keep the information under different headings, and in a more accessible form. The manufacturers of the apparatus, the R.U.V. Co., of New York, do not advise the apparatus for use with unfiltered water, requiring a filter effluent or water with zero turbidity and free from suspended matters. Generally speaking, if the apparatus were limited in this manner, by being incapable of treating slightly turbid waters, the use of it for water sterilization would be very much restricted. All filter units are liable to break down, and at such a time as when several units are out of commission at once and only part of the supply is filtered, the emergency or follow-up treatment must be capable of handling the error, otherwise the system as a whole does not give a safe supply nor meet with the sanitary requirements of a municipality.

Many municipalities, especially those situated on the Great Lakes, have a water supply which is at most times clear, but which on occasion may be subjected to light turbidity due to storm conditions on the lake. The probability of pollution at these times increases, and when a chemical disinfectant is used, great difficulty is experienced in obtaining proper dosage without objectionable taste. Filtration in such a municipality could not be dispensed with unless there were a system of water protection which would be satisfactory in its action during this time of abnormal water conditions. In view of these facts extensive work was done with the R.U.V. apparatus in order to determine the effect of turbidity upon per cent. bacterial removal.

The proportion of work done with filter effluent was small compared with the work done with waters carrying some slight turbidity. There were a few samples taken with the 110-volt installation, when a clear filter effluent alone was used. For the most part, the tap water was fairly clear, but owing to the sewage added, it was to a certain extent clouded. The turbidity of this class of water in the results with the 500-volt lamp, is under 1 part per million. At times it was slightly over this, but never more than two, unless stated. No filter effluent was supplied to the 500-volt apparatus, the supply available not being sufficient for its capacity.

The graphs on Fig. 11 show the effect of turbidity on water treated by the ultra-violet ray up to turbidity (according to the American Public Standard) of fifty parts per million, the color at the same time being 21. Mr. Geo. C. Whipple states in his figures relative to the Aesthetic Deficiency of Water that when these conditions are encountered, about 55 per cent. of the consumers will object to the quality of the water and that some means has to be adopted to improve the appearance. The ultra-violet ray treatment showed up very satisfactorily for these turbidities. In the small apparatus water with turbidity of 50 was treated, with a consequent reduction of 97.4 per cent. in the 37.5° C. count, and 95.2 per cent. in the Colon. In the large apparatus water with turbidity of 30 was reduced in bacterial count by 94.9 per cent., 91.3 per cent. and 99.46 per cent. in the 18-22° C. count, 37.50° C. count and colon fermentation respectively. It is, therefore, apparent that irregularities in the action of filter plants by a secondary treatment with U.V.R., (some such additional protection being a recognized necessity for all filter plants handling seriously polluted waters) can be well taken care of; also slight irregularities in the condition of raw water supplies can be handled directly by U.V.R. without preliminary filtration.

MUNICIPAL IMPROVEMENTS IN MOOSE JAW, SASKATCHEWAN.

THE report is in hand of the City Commissioners of Moose Jaw, Sask., for the ten months ended October 31st, 1915. It is interesting in that it shows continued progress in municipal affairs accompanied by greater economies in each department, without material sacrifice in the efficiency of utilities or serious curtailment of necessary works. The Commission consists of Messrs. James Pascoe, mayor; George D. Mackie, who is also city engineer, and W. F. Heal.

The report shows that, in general, controllable expenditures have been reduced 17 per cent. over 1914, practically every department showing a reduction in running expenses. The city engineer's department effected a creditable saving of 47 per cent. The work of this department is roughly divided into three groups, *viz.*, the board of works, sewers and sewage disposal and waterworks. The first involves street maintenance and cleaning and maintenance of storm sewers. During the year the overhead bridge at Eighth Avenue was completed, its construction having been commenced about the end of 1914. The total expenditure upon it has been $97,375, of which the city paid about one-third.

There are twelve miles of graded streets without curb and gutter, 24 miles with curb and gutter and about five miles of pavements in the city. This year the only road building carried out was about 2,000 lineal feet of road 30 ft. wide, connecting two parks, in addition to a small amount of pavement repair.

The city has now 7.2 miles of storm sewers, of which 1½ miles were constructed this year. A storm sewer, the main portion of which varies in diameter from 24 to 30 inches, was built to relieve the business section of the city west of Main Street. The work was done by day labor, which, including material, cost $28,928.

There are 28½ miles of wood walks in Moose Jaw, about 900 ft. having been added this year.

The total amount expended on pavement repairs in 1914 amounted to only $201.

Early in the year a slight shortage of water supply was met by the Snowdy Springs storage. In 1914 the city engineer had recommended an increase of water supply, but the financial stringency made it impossible at that time. The Snowdy Springs supply contains much suspended matter, but apart from this it is a good supply for domestic purposes. To rectify the defect, a battery of two filters with a capacity of 500,000 gallons per day are now being installed by the Roberts Filter Co. at a total cost of about $8,000. The installation will be put into operation before the close of the year.

The city derived about 95 per cent. of its supply this year from the Sandy Creek supply. The average daily consumption has been reduced by 15 per cent., now amounting to about 706,000 gallons per day. The number of consumers increased by 3 per cent. The expenditure of