

# The Canadian Engineer

A weekly paper for Canadian civil engineers and contractors

## SOME ASPECTS OF CHLORINATION\*

IN VIEW OF THE INCREASING USE OF LIQUID CHLORINE OR HYPOCHLORITE FOR THE STERILIZATION OF WATER, THE OBSERVATIONS OF THE AUTHOR OF THIS PAPER SHOULD BE OF CONSIDERABLE INTEREST TO WATERWORKS ENGINEERS.

By **JOSEPH RACE**,  
City Bacteriologist, Ottawa, Canada.

**A**LTHOUGH the treatment of water by chlorine or hypochlorite has been very extensively practised for several years it is a regrettable fact that comparatively few investigations have been made into this process with a view to elucidating the basic principles and the modifications required to meet various conditions.

When chlorination was first introduced for the sterilization of water and sewage, all that was required was the addition of the hypochlorite; after this the process was supposed to take care of itself.

Now we realize that to obtain the best results the process requires careful supervision and close attention to certain points. It is the purpose of the writer to draw attention to some of these details in this paper.

**Mechanical Admixture.**—Due attention has not always been given to this phase of the chlorination problem because of the prevalent opinion that the all-important point was contact period. The writer has previously recorded (Journ. Soc. Chem. Ind., 1912, 31, 611-616, and 1915, 34, 931-934) experiments made for the purpose of comparing the importance of these two factors. In 1914, a sedimentation basin was placed in operation at the mouth of the Ottawa intake pipe and during July the hypochlorite solution was added at the entrance to this basin. The method of addition was by means of a perforated pipe which stretched across the entrance to the basin and the bleach solution and water were there mixed as thoroughly as was possible without having recourse to mechanical methods. The basin was baffled and had a normal capacity

equal to approximately two hours' consumption (1.7 million Imp. gallons). The results obtained were as follows:—

Available Chlorine = 1.88 p.p.m. Bacteria per c.c.

	Agar 3 days at 20°C.	Agar 1 day at 37°C.	B. Coli Index per c.c.
Raw water	410	104	0.280
Treated water	49	26	0.036
Percentage purification..	88.2	75.0	87.500

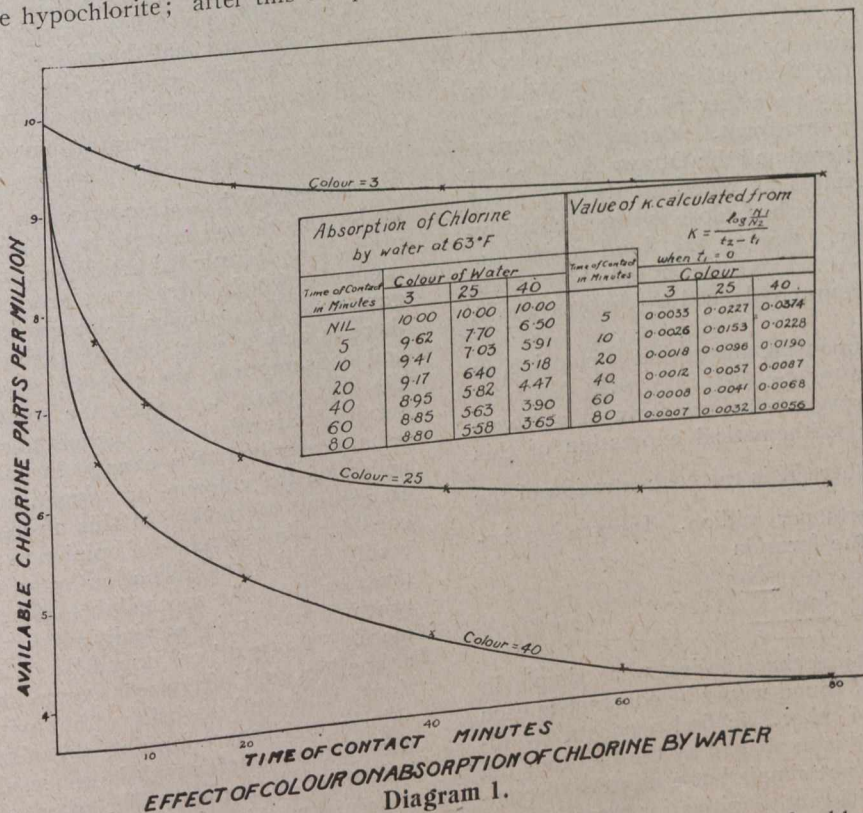
During August the connection at the entrance to the basin was closed and the bleach liquor added directly to the suction of the low-lift pumps, which take water from the sedimentation basin and place it in the intake pipe under a small positive pressure until it reaches the high-lift pumps. During both months the samples of treated water were taken from the well which receives the mixed discharges of the low-lift pumps. These results, which are the averages of daily analyses, show that the efficient mechanical admixture produced much superior results with

a smaller consumption of chlorine. The results for August were:—

Available Chlorine = 1.55 p.p.m. Bacteria per c.c.

	Agar 3 days at 20°C.	Agar 1 day at 37°C.	B. Coli Index per c.c.
Raw water	448	100	0.600
Treated water	26	12	0.005
Percentage purification..	91.9	88.0	99.200

**Color.**—The effect of color, as is well known, is to reduce the efficiency of chlorination and to necessitate the use of a much larger dose. This is well exemplified in the following table, which gives the results of chlorination experiments on B. Coli seeded into water. Water "B" was



EFFECT OF COLOUR ON ABSORPTION OF CHLORINE BY WATER  
Diagram 1.

\*Read before the American Waterworks Association, June 8th, 1916.