the raw Ottawa River water containing 40 parts per million of color and water "A," with a color of 3 parts per million was produced from "B" by precipitating with sulphate of alumina and subsequently filtering. The B. Coli count was made by platting out 10 cubic centimeters of water in neutral red bile salt agar and counting the typical red colonies. Counts were made after 24, 48 and 72 hours, but in this table only the 24-hour count is recorded. The counts at later periods were made to determine whether the organisms were actually killed or the reproductive capacity merely delayed, as was observed on a former occasion. (Journ. Soc. Chem. Ind., July, 1912.) In none of the experiments was any evidence obtained of any revival of the organisms.

TABLE I.

Colonies Per 10 c.cms. of Water. Temp. = 63°F.

Contact Period.	Water "A," Color 3 Available Chlorine p p.m.	Water "B," Color 40 Available Chlorine p.p.m.		
	0.2	0.2	0.4	0.5
Nil	194	194	194	194
5 minutes	121	165	129	66
1 hour	7	95	20	1
5 hours	0	4	0	0
24 hours	0	1	1	0
48 hours	0	0	0	0

To obtain the same result with about one hour's contact at 63° F. it is necessary to use about two and one-half times as much chlorine with a water of color 40 as with one practically free from color. Somewhat similar results have been obtained at Montreal by Harrington (Journ. Am. Waterworks Assoc. Vol. 3, 438). For the greater part of the year St. Lawrence water free from color is obtained at the inlet to the Montreal intake pipe and only requires approximately 0.3 parts per million of available chlorine for satisfactory treatment. During the spring floods the currents are altered and the Ottawa River water is obtained. This requires as much as 1.5 p.p.m. of chlorine but a portion of this high dose is necessitated by the increase of turbidity. During the flood period the color is somewhat reduced but its effect in the chlorination efficiency is more than counterbalanced by the increase in turbidity.

The effect of color upon the absorption of chlorine, in the form of hypochlorite, by water, is well shown in Diagram 1. The absorption takes the form of a monomolecular reaction, the mathematical expression of this law being $\frac{dN}{dt} = KN$ where N is the concentration of the available chlorine in parts per million. Integrating between t_1 and t_2 we get the formula

$$K = \frac{\log. \frac{N_1}{N_2}}{t_2 - t_1}$$

If the compound absorbing the chlorine were simple in character, the value of K found would be constant in each experiment. Instead of that, we find a constantly diminishing quantity which is explained by the fact that the compound acted upon is not simple but a mixture of complex molecules having different affinities for oxygen.

Temperature.—The effect of temperature on a culture of B. Coli in unsterilized water (color 40) is well illustrated in the two following tables.

TABLE II.—EFFECT OF TEMPERATURE.

Colonies Per 10 c.cms. of Water. Available Chlorine 0.4 p.p.m.

Contact Period.	Temperature Degrees Fahrenheit 36.	70.	98.
Nil	424	424	424
5 minutes	320	280	240
1.5 hours	148	76	12
4.5 hours	38	14	3
24 hours	2	0	0
48 hours	2	0	0

TABLE III.

Colonies Per 10 c.cms. of Water. Available Chlorine 0.2 p.p.m.

Contact Period.	Temperature Degrees Fahrenheit 36.	70.	98.
Nil	240	240	240
5 minutes	240	250	235
1 hour	245	235	195
4 hours	215	190	170
24 hours	143	130	115
48 hours	130	59	19
72 hours	...	28	..
96 hours	...	16	..
120 hours	...	6	..

In the 70° F. experiment, the sample, after 3, 4 and 5 days' contact, was inoculated into lactose bile and lactose broth with the following results:—

Contact Period.	Lactose Bile.	Lactose Broth.	B. Coli Per 10 c.c. Most probable number. Lactose Bile.	Lactose Broth.	Colonies per 10 c.c. on Rebipelagar.
72 hours	2/5	5/5	5	20	28
96 hours	0/5	4/5	1	16	16
120 hours	0/5	2/5	1	5	6

When these results are calculated to the most probable numbers by McCrady's method (Journ. Inf. Dis., 1915, 17, 183-212) some interesting comparisons are obtained. The lactose broth and rebipelagar plates are in close agreement but yield results very much higher than the lactose bile. If lactose bile only takes account of virile organisms it must be assumed that the majority of the B. Coli remaining after 72 hours' contact, are attenuated. This dictum would appear to be somewhat arbitrary and empirical.

The effect of temperature upon the absorption of the available chlorine is shown in Diagram 2.

Aftergrowths.—In connection with chlorination many well-authenticated reports have been made that after the preliminary germicidal action has subsided a second phase occurs in which there is an accelerated growth of organisms. This is usually known as aftergrowth. When there is only a short contact period between chlorination and consumption, the reaction does not proceed beyond the first phase, but when the treated water is stored in service reservoirs the second phase may ensue and is usually ascribed to a change in pabulum effected by the action of the chlorine or oxygen on the organic matter. Regarding the nature of this aftergrowth there has been considerable difference of opinion; some hold that it is the result of the multiplication of a resistant minority of practically all the species present in the untreated water; others, that it is partially due to the bacteria being merely "slugged" or "doped," *i.e.*, in a state of suspended animation, and afterwards resuming their anabolic functions, whilst others believe that with the proper dose of chlorine only spore-forming organisms escape destruction and that the aftergrowth is the result of these cells again becoming vegetative. The aftergrowths obtained under the usual working conditions vary according to the dosage of chlorine employed and none of the above hypotheses alone provides an adequate explanation. When the dosage is small a small number of active organisms in addition to spore-bearers will escape destruction, and others, as was shown by the writer in a previous paper (Journ. Soc. Chem. Ind., 1912, 31, pp. 611-616), will suffer a reduction of reproductive capacity. The flora of the aftergrowth in this case will only differ from the original flora by the elimination of species that are very susceptible to chlorine As the dose is increased these two factors become relatively less important until a stage is reached when only the most resistant cells, the spores, are left; the resultant aftergrowth must necessarily be entirely composed of