

THE AERATION AND COMPOSITION OF NIAGARA RIVER WATER ABOVE AND BELOW NIAGARA FALLS.

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The great height of Niagara Falls and the churning up of its waters at the base with the large volumes of air mechanically carried down into the deep basin below the Falls appeared to afford a good opportunity of examining into the question of the aeration so produced, and the chemical changes, if any, resultant therefrom.

With these objects in view, and with the assistance of Dr. F. P. Vandenberg, the City Chemist of Buffalo, I collected duplicate samples of the water both below and above the Falls. The former were taken on the American side at a point so near the Falls that we were well wet with the spray during the short interval required to secure the samples; the latter were collected at the upper end of Goat Island. The collection was made July 9th, 1890.

The dissolved gases were as follows :

IN ONE LITRE: VOLUMES STATED IN CUBIC CENTIMETERS.

	Above the Falls.			Below the Falls.		
	(1)	(2)	Mean.	(1)	(2)	Mean.
Carbon Dioxide	0.96	0.79	0.875	0.89	0.84	0.865
Oxygen	4.93	5.22	5.075	5.02	5.29	5.155
Nitrogen	11.94	13.00	12.47	12.12	13.05	12.58
Total Gases	17.83	19.01	18.42	18.03	19.18	18.605

On making a comparison of the mean results, it would appear that the sum total of the air in the water collected below the Falls is 0.185 cubic centimetre per liter greater than in the water above; the oxygen is 0.08 c. c. more, and the nitrogen is 0.11 c. c.

greater. The ratio of the dissolved nitrogen to the dissolved oxygen in both sets of samples is nearly 72.3 to 27.7. This is a low ratio for the oxygen, and is to be considered in relation to the character of the Niagara River water, which has a yellow color, due to a considerable amount of peaty extractive matter.

The three constituents which it was thought might have experienced sufficient change as to admit of the detection of the alteration by chemical analysis were the ammonia, the albuminoid ammonia and the organic matter as measured by the oxygen required to effect its oxidation. The results were as follows :

IN PARTS PER 100,000.						
Above the Falls.				Below the Falls.		
	(1)	(2)	Mean.	(1)	(2)	Mean.
Ammonia.....	Lost.	0.0056	.....	0.0058	0.006	0.0 59
Albuminoid ammonia.	0.0114	0.0106	0.011	0.0108	0.011	0.0109
Required oxygen.....	.....	0.226	.....	.....	0.226	.....

It would not answer to draw any inferences from these figures as to a change of composition due to the contact with a slight increase of dissolved oxygen during three or four seconds' interval. Samples taken below the Whirlpool, which is some distance below the Falls, might exhibit quite a different result.