the succeeding analyses, hydrated sulphuric acid, SO_3HO, is meant.

The earliest quantitative analyses of any of these waters were those by Croft and myself of a spring at Tuscarora, in 1845 and 1847, of which the detailed results appear in Silliman's Journal [2] viii, 364. This, at the time of my analysis in September 1847, contained in 1000 parts, 4.29 of sulphuric acid, and only 1.87 of sulphates; while the previous analysis by Prof. Croft gave approximatively 3.00 of neutral sulphates, and only about 1.37 of sulphuric acid. Similar acid waters occur on Grand Island above Niagara Falls, and at Chippawa.

All of these springs, along a line of more than 100 miles from east to west, rise from the outcrop of the Onondaga salt-group; but in the township of Niagara, not far from Queenston, are two similar waters which issue from the Medina sandstone. One of these is in the southwest part of the township, and fills a small basin in yellow clay, which, at a depth of three or four feet, is underlaid by red and green sandstones. The water, which, like those of Tuscarora and Chippawa, is slightly impregnated with sulphuretted hydrogen, is kept in constant agitation from the escape of inflammable gas. It contained in 1000 parts about two parts of free sulphuric acid, and less than one part of neutral sulphates. This water was collected in October 1849, and at that time another half-dried-up pool in the vicinity contained a still more acid water. Another similar spring occurs near St. Davids in the same township.

In connection with the suggestion made in § 31 as to their probable origin at great depths, it would be very desirable to have careful observations as to the temperature of these acid springs. When, on the 19th October 1847, I visited the Tuscarora spring, the water in two of the small pools had a temperature of 56° F.; but on plunging the thermometer in the mud at the bottom of one of these it rose to 60°.5.

§ 49. It appears from a comparison of the analysis of Croft with my own that the waters of the Tuscarora spring underwent a considerable change in composition in the space of two years; the proportion of the bases to the acid at the time of the second analysis being little more than one third of that in the analysis of Croft. This change was indeed to be expected, since waters of this kind must soon remove the soluble constituents from the rocks through which they flow, and eventually become, like the water