Professor Hall was well seconded by Professor Mather, afterwards chief director of the Geological Survey of Ohio, and subsequently (in 1845, 46, and 47) a resident on the shores of Lake Superior, observant of the meteorology and change of level of that Lake, from whose reports and other writings I extract the following hurriedly condensed particulars respecting Lakes Erie and Superior:*

"A tradition exists that there is a periodical rise and fall in Lake Erie, through a certain number of years. If it is trueand there are reasons for believing that it may be so, to a certain extent-it is orident that the present rise (1838) is higher than has occurred for many years before, for extensive tracts of forest are now overflowed, and timber killed in consequence, the trees of which indicate a long period of growth. The causes that may concur to produce such a variation in the level of the Lake are: -1st, An obstruction to the drainage to the usual quantity of water, in consequence of which, if the usual supply continues, the water must rise. 2d, The increased or diminished supply of water, dependent on the wetness or dryness of the season, the relative temperature, and amount of evaporation, both from the surface of the Lake and the country which receives its drainage waters, and the amount of water supplied by the Lakes above, as Lakes Huron, Michigan, and Superior,-the amount of water contributed by which is due to the same general causes, with the possible addition of an increasing water-way from the cutting down of their outlets, and pouring down an additional supply. 3d, Another possible cause may be taken into account in the varying level (or upheaval) of the solid earth itself-examples of which are menuioned in various works on geology, as to be seen in part of the coast of Sweden, where it is said to be slowly rising at the present time."

To this the Professor well adds:—" It is considered an object of great importance to determine what are the causes of this effect; and it was therefore intended, if the Legislature had made an appropriation corresponding to the estimate, and with provisions to the Bill which was reported last Session, to have set in train a series of observations in several localities on the Lake coast, and in-different parts of the States, so that by the period for the close of the survey, a determination of the causes of the rise and fall of the Lake may have been attained. All the aid which the various branches of meteorology could have secured would also have decided the question as to the small tides, which are said to be very sensible in some places."

To the foregoing remarks of Professon Mather, I may be permitted to add that it is much to be regretted that any circumstances should have prevented his excellent suggestion from being carried into effect; but that such having unfortunately been the case, it now remains for the *British* province of Canada to have the credit of completing so desirable a work, on a far more extended scale.

Turning again to Lake Superior, I am happy to be able to quote the following (abridged) remarks by the same writer:†

"The great rise and fall of the level of the waters of the great Lakes, through a series of years has been long noticed. The cause is doubtless due to a greater quantity of snow and rain, or of a lower mean temperature and diminished evaporation during the period of rise, and the reverse during the time of fall of the water-level. During 1838-39, the waters were higher than they had been before for at least two centuries. This is demonstrated by the large tracts of land that were inundated which were covered with forest trees, many of them the growth of ages. These trees were destroyed by the overflow round Lakes Erie and Huron, and on the Ste. Marie river, between Point Detour and the Sault Ste. Marie.

"We have no accounts of Lake Superior at that time; but there are facts that indicate a marked variation within a few years. In 1845 a rock in the middle of the entrance of Eagle Harbour, showed itself only in the trough of the waves; and the narrow outlet between the west end of Porter's Island and the mainland at Copper Harbour, was of such depth that loaded boats could enter without touching the rocks. In 1846, the rock at the mouth of Eagle Harbour was one-and-a half feet above water; and boats could not get into Copper Harbour. In June, 1847, the rock above-mentioned was still more above water, and the outlet to Copper Harbour could be crossed by stepping on the projecting points of the reef, without wetting the feet; and during some depressions of the water by barometrical waves, it was laid almost entirely dry. From the 18th of •June to the 6th of September there was a rise of full twelve inches. It has been observed on this Lake that the water is lowest in spring and highest in autumn. This is readily explained by the fact that in winter most of the ordinary supplies of water from the drainage of the surrounding country are cut off, by being converted into ice and snow; while evaporation from the surface of the Lake by the dry northern winds continucs to carry away a very sensible quantity of water. During the spring, on the contrary, the snow and ice melt, and the accumulated stores of winter flow into the Lake in greater quantity than to compensate for the evaporation and the drainage at the outlet. . . During a century past the waters of Lako Superior cannot have been more than four feet above the level of 1847, for any considerable time, as is evident by the growth of trees of two feet in diameter at Porter's Island, which would have died had the ground around them been inundated for any great length of time."

To descend once more to Lake Erie. I am next indebted to Colonel Whittlesley, Topographer to the Geological Survey of Ohio for the following, confined to the annual and daily fluctuations in that Lake, with a variety of other acceptable details respecting particular sudden floods, as well as for a concise but imperfect tabular view of the *reported*, combined with the *known* annual variations in the level of its waters from 1796 to 1838.[†]

"The general belief amongst navigators and residents on the Lakes appears to be uniform against the existence of any law by which these fluctuations are governed or may be predicted. The scanty information collected tends to the conclusion that these general elevations and depressions are *fortuitous*, and the result of accidental disorder in the seasons throughout the Lake country. It is, however, well established that there is in Lake Erie an *annual* tide, independent of the general state§ of the water, which rises from eight to fifteen inches in the mean. The minimum occurs about the time of the breaking up of the ice, late in winter, and the maximum late in spring or early in summer and fall. In the winter less change is perceptible; but early in spring it rises very fast, and with great regularity, till it reaches the maximum. Alt measurements should be taken subject to this change; but I am unable to fix a mean surface for the year,

^{*} See Geological Report of Professor Mather for 1838.

[†] See Report of Geological Survey of Ohio for 1838-39; and an article in the American Journal of Science for July, 1848.

¹ See Colonel Whittlesley's Report for 1838-39.

[&]amp; Stage is the word used, meaning "level," I presume .- R. L.