

But the most remarkable phenomena which this deluge, and most probably the accompanying volcanic action upon the eastern shores of the continent had produced, were, that it left this great valley of North America so encircled by heights that it remained covered with water, and became a great inland sea, the surface elevation of which, in its earliest condition, must have been about 1000 feet above the level of the ocean. That these inland waters were left by this denuding deluge is proved by this fact, that the tertiary clays, and other formations, which were no doubt deposited by the inland waters, rest immediately and conformably upon the denuded strata.

About two years ago, I read a paper from this place, upon the former extent, and the successive subsidations of these inland waters;—therefore I shall not dwell further upon this subject at present.

The tertiary formations above alluded to, which are everywhere found in the Lake countries, consist of, from below upwards—first, blue clay or marl, from 80 to 100 feet thick;—second, white clay, 3 or 4 feet thick—both these are regularly stratified; third, brown surface clays, sands, and boulders, generally stratified, but upon the ridges, and where currents have acted, washed together in unstratified masses.

The great inland waters had flowed off, and had subsided down to the level of Lake Ontario at thirteen different and distinct periods, (see section) more or less remote from each other. In some instances the subsidation had been gradual, in other instances it must have been very rapid. In the earliest periods, it is now satisfactorily shewn that the discharge must have been through the Cheemung valley, i. e. the Susquehanna river; but after the waters had subsided to a less elevation than 900 feet above the level of the sea, the chasms of the Hudson and of the St. Lawrence rivers appear to have been partially opened, most probably by those volcanic agencies, of which there are such overwhelming evidences in the eastern parts of the continent; and one or both of these openings had subsequently become the medium of discharge. The present course of the Mississippi river does not appear to have been opened up until the period of the final catastrophe which laid dry the Mississippi valley, and reduced Lake Ontario to its present level. Previ-

ously to this period, and during all the long interval when the waters of Lake Ontario were subsiding down from the elevation of Queenston Heights to their present level, the whole discharge from the Mississippi valley had passed through Lake Michigan, over the Falls of Niagara, and through Lake Ontario.

It was necessary so far to enter upon the general geology of North America, in order to illustrate what we shall now advance concerning the formation of Toronto Harbour.

The harbour of Toronto is about 2½ miles in length from the Government wharf to the peninsula hotel, and about 1½ miles in breadth from the end of Church Street to the southern peninsula. The water gradually deepens from the north shore. At the distance of 1000 feet from the shore it is about 15 feet deep, and at the distance of about half a mile from the shore it is about 30 feet deep; farther out it deepens to 33 feet, and continues to maintain these depths for about a mile farther, when as we approach to the southern peninsula the depth suddenly declines from 28 and 30 feet water to 5, 6, and 7 feet water. (See sections.) The same basin-like form is observable when we approach to the eastern peninsula, as when we approach to the north shore, and near the entrance of the harbour the deep water narrows. The greatest depth at the entrance is 14½ feet, and the width of deep water from the Government wharf to the buoy is about 300 feet. The bottom along the north shore is black bituminous shale, interstratified with dark calcareous stone as above described. This same formation underlays, and in a great measure forms the peninsula or height which separates the harbour from the swamp upon the east; but the southern peninsula is entirely different, the black bituminous shale formation being overlaid by the common tertiary blue clay, or marl; and the blue clay is overlaid by masses of sand and other alluvial deposits, clearly proving that the southern peninsula is not a bar of sand across the bay, similar to the bar of sand across the mouth of Burlington Bay, for it proves that Toronto harbour is an excavated basin, separated from, although connected in some measure with the basin of Lake Ontario; in other words, speaking geologically, it is a separate Lake, and must have been excavated by powers which have ceased to act, since the waters of Lake Ontario have subsided to their present level.