

the Lake could not have been more than 40 feet deep at this place at the era alluded to, and although a great turmoil must have existed, yet a regular under-current could not have been formed in such shallow water so near the shore. Again, near the present shore in this city, the white clay is entirely wanting, and the blue clay is reduced to 8 or 10 feet in thickness, evidencing that an extensive denudation has taken place. This is further proved by fragments of wood and other organic remains being found washed in and deposited upon the blue clay, but take notice, not contained in them, as originally deposited, for such remains are not found where the clay has not been disturbed; within the boundaries of the harbour on the north shore the blue clay is entirely removed; but as has already been shewn, near the southern peninsula the blue clay rises nearly perpendicular, and presents a front to the north almost 30 feet high. Combine these circumstances, and it becomes obvious that the excavating current has come from the northward, or that the excavation of the harbour has been produced by the under-current which we have described. But in the third place, the action of a direct current upon the sand hills north of the city, and of extensive denudation produced by it, is proved by the immense quantity of boulders found at their base. These boulders are of many varieties, but one specimen is extremely prevalent, of which we have not been able to find the rock from whence it is derived. It is a hard-veined sandstone. It may probably belong to some rock in the bed of the Lake subordinate to the old red sandstone shales. It is probable that most of these boulders were first deposited in the sands and gravels, and when these were removed by the denuding action, the greater density of the stones caused them to remain at the bottom of the Lake, and to be rolled up by the current upon the beach.

It is probable that at the time when this basin, now Toronto harbour, was excavated, the blue clay, and the other tertiary formations constituting the southern peninsula were continuous, and extended to the present Lake shore near the mouth of the Humber river, and that the whole of the Humber bay is a denudation of a more modern date, as we shall now endeavour to shew. After the Lake had long remained stationary, at the elevation of 208 feet above its present level, a subsidation of nearly 100

feet had taken place; this subsidation appears to have been gradual, and there is not evidence that so great a deposition of sand had taken place upon the northern shores, as during the former subsidation. The reason appears to be this, during the period when the water of the Lake was stationary at 208 feet above its present level, the river must have cut a level course through all the harder rocks in the chasm of the Niagara river as far up as to the whirlpool; when this last-named subsidation took place, the shales and sandstones which formed the bed of the river could not so long resist its action as to produce much effect by its downward current upon the bed of the Lake. Besides this subsidation brought the level of the Lake down to very nearly the elevation of the plains between Queenston heights and the present shore of the Lake, or, from 8 or 10 miles from the point where the river left the chasm, the Lake was extremely shallow, and we find that during this period of subsidation instead of the current acting upon the central parts of the bottom of the Lake, it had excavated a large basin where the villages of Queenston and Lewiston now stand, or just where it left the chasm. But the action of the current seems to have been even more powerful than before upon the north side of the lake, although its direction was changed, as might be expected by viewing the course of the river at the mouth of the chasm. Its ravages appear to have been chiefly confined to the Humber bay, and then to have opened Toronto harbour to the Lake upon the west, and to have sent a powerful eddy current through it to the south east.—The margin of the Lake during this period, was that hill upon which Mr. Elmsley's house is built; but it is not necessary for our purpose to dwell longer upon this subject. Let it suffice, that the next subsidation had reduced Lake Ontario to its present level, and opened a new course for the Mississippi waters—leaving our Harbour nearly as we now see it, only the bar on the south side of the swamp from the southern peninsula to Scarborough Heights, appears to have been formed by the present currents of the lake—and during the present reduced state of the Niagara River.

We shall now proceed to the second division of our subject, viz: the existing phenomena of Toronto Harbour.

Of these, the currents in the harbour are the