Appendix (V.) 1st July.

hardwood trees. At Port Frank the trend of the coast changes to south west, and again with the adjacent country becomes sandy, presenting innumerable sand dunes, which extend several miles back, and in many instances rise to the height of a hundred feet and more over the surface of the lake. This character prevails to the mouth of the Rivière au Sable (south), and beyond it to within a short distance of Cape Ipperwash or Kettle Point, which is about fifteen miles from Port Frank. Kettle Point displays a few flat rocks coming to the water's edge, but beyond it a fine sandy beach, with high cliffs of clay rising at a short distance back, hold the coast line to within two miles of the entrance of the St. Clair River, where the country again appears to assume an arenaceous character.

In the direction in which we proceeded along this coast, settlements first appear at a short distance to the south of Point Clark, the forest being here and there indented with extensive clearings which increase in size and number, approaching Goderich. South from Goderich the principal settlement we observed was at Bayfield River, but the rest of the coast between that river and Port Sarnia, on the St. Clair, is as yet but thinly peopled. Kettle Point and the neighbourhood are still, I understand, in the possession of the Indians, and are in consequence but little cultivated.

With the exception of Goderich harbour, at the mouth of the Maitland River, and the basin, at the exit of Rivière au Sable (south), there is not a single place of security for any description of vessel between the River Sauguine and the St. Clair. Small boats, I was informed, could enter Big Pine Brook, but no craft of larger size. There are no islands, no coves, no accessible brooks or streams, and with strong winds from the south, west or north, it is difficult, if not impossible, to land boats with safety. At many points the water is very shallow, and large boulders often lie at a long distance out in the lake, while a very heavy sea breaks everywhere along the coast.

Distribution of the Rock Formation.

The rocks exhibited upon that part of the Lake Huron now under consideration, are portions of the whole suite of fossiliferous deposits between the Trenton Limestone (using the New York nomenclature), at the base, and the Hamilton Group at the summit, both inclusive; the superposition, in ascending order, being as follows:

1. Trenton Limestone,
2. Utica Slate,
3. Loraine Shale,
4. Medina Sandstone and Marl,
5. Niagara Limestone,
6. Onondaga Salt Group, or Gypsiferous Limestone and Shale,
7. Corniferous Limestone,
8. Hamilton Group.

1. *Trenton Limestone.*

As already remarked in former Reports, the Trenton Limestone occupies the whole of the Peninsula between Matchedash and Nottawasaga Bays, and the group of islands lying off its extremity, consisting of the Giant's Tomb, Hope, Beckwith and Christian Islands. At the head of Matchedash Bay, near the entrance to the Cold Water River, the limestones are found with a narrow band of green sandstone below them, resting unconformably upon gneiss, and from that spot a nearly straight line, drawn down the Bay to the Giant's Tomb, would mark the lower boundary of the formation, the limestone being seen out-cropping at intervals on the south-west shore, while the islands and mainland on the opposite side display nothing but the older rock in its various granitic and syenitic aspects. The upper members of the Trenton formation were found about eight miles west from Nottawasaga River at McGlashan's Mills, at Hurontario in the Township of Nottawasaga, at the little islands called the Hen and Chickens, and on the coast in the N. W. corner of the Township of Nottawasaga, where they were seen to pass below the Utica slate. The transverse breadth of the formation is thus about thirty miles, and its thickness, supposing the dip to be to the south-westward at the rate of thirty feet in a mile, would be 900 feet. But it is not unlikely that it may be affected by very gentle undulations, and it would therefore be scarcely safe to state the probable amount at more than 600 to 700 feet. That arenaceous portion of the formation, distinguished by the New York geologists as the calciferous sandrock, is usually found at the base, and beds more or less silicious occur at intervals throughout the whole thickness. Green calcareous and argillaceous shales are also frequently met with, usually holding numerous fossils, and alternating with beds of good limestone; the pure limestones are sometimes of a buff color and very fine texture, in which case fossils are scarce, those in such instances most prevalent being small fucoids, generally replaced by calcareous spar, running through the beds vertically to the plane of stratification. Other beds are gray in color, granular and crowded with fossils. Among these beds some hold the tail of a trilobite (*Isotelus gigas*) in great abundance, while others are almost exclusively composed of the remains of a species of *Leptena*. The fossils observed to prevail throughout the formation were several species of *Leptena Cypricardia*, several spiral univalves, orthoceratites, trilobites (chiefly *Isotelus gigas*), encrinites, corals, and fucoids.

In the variations in mineral quality in different parts of the formation, some beds are so very arenaceous and hard as to be altogether unfit for burning into lime, or, where not too silicious for such a purpose, the lime assumes when slacked such a dark yellow color as to unfit it for white-washing, while it permits but a small admixture of sand in forming mortar. Other beds on the contrary are uncommonly free from silicious matter, and are then often bituminous, and sometimes have a slightly argillaceous aspect. The lime from these beds is of excellent quality.

2. *Utica Slate.*

Black bituminous shales come to the surface on the coast of Nottawasaga Bay, in the fourth concession of Collingwood, with beds of close-grained, dark brown bituminous limestone interstratified. The limestones contain fossils, but by no means in such abundance as the shales, which are uncommonly productive, the prevailing fossil being the tail of the *Isotelus gigas*, which greatly predominates, but is accompanied by *Triarthus Beckii, Orthis, Lingula, Orthoceras and Graptolithus.*

3. *Loraine Shale.*

The first exposure of the formation we met with on our route along the coast was near Cape Boucher, in Nottawasaga Bay, where cliffs, rising abruptly to the height of 150 feet, present sections of buff or drab-colored argillaceous shales, interstratified with thin beds of gray yellow-weathering sandstone. It next makes its appearance at Point Rich, and continues exposed, in a high nearly vertical cliff, thence to Point William, where we found