at Toronto. This advantage will be still further increased by the addition which will, no doubt, be made in other parts of the United States to the number of stations.

These circumstances render it peculiarly desirable that the observations at Toronto should not be suspended; and the undersigned are instructed to express to your Lordship the earnest wish entertained by the Academy, that the requisite appropriations for their continuance should be made by Her Majesty's Government, and the hope that the Royal Society will exert its great influence to this end.

We have the honour to remain,
With the highest respect,
Your Lordship's obedient servants,
EDWARD EVERETT,
WM. CRANCH BOND,
A. GUYOT,
JOSEPH LOVERING,
JON. P. HALL,
Committee.

The Earl of Rosse,
President of the Royal Society.

Notes on the Geology of Toronto: by H. Y. Hind, Professor of Chemistry in the University of Trinity College.

(Read before the Canadian Institute, January 22nd, 1853.)

Mr. President, and Gentlemen,—

I must beg of you to accompany me on an imaginary trip to the shores of Lake Ontario, where the scene of our enquiries may be near the low cliff which rises abruptly from the waters of the Lake about a quarter of a mile to the west of the New Garrison. Standing at the base of the cliff, which at some places is nearly perpendicular, we may see a belt of yellowish clay about fifteen feet thick reposing upon numerous thin layers of rocks. We will select a spot where a very narrow beach of pebbles and shingle affords us standing room; the waters of the Lake, to our right and to our left, washing the low range of stratified rocks before us. The total height of the cliff, or rather bank, is about 20 feet. The uppermost layer of greyish sandstone rock immediately beneath the clay is about five feet from the Lake level, but if we progress westward towards the Humber, we shall find that it dips in that direction as well as towards the south, and either disappears below the waters of the Lake or is covered and concealed by superimposed yellow clay and sand. If we examine into the history of the yellow clay we shall find that it is of very recent origin, and belongs to what is termed the Drift formation. A careful search will assure us that it contains the remains of vegetables and animals whose species still live upon the face of the earth. In the City of Toronto, well-diggers have frequently found branches and even trunks of trees at depths varying from ten to forty feet in the Drift formation. It is not my intention to dwell upon the nature of the Drift as developed near Toronto, it is sufficient for present purposes to note the epoch during which it accumulated, and which is known geologically under the name of the Tertiary period. But what of those narrow bands of sandstone and shale which underlie the drift, and which present such marked features of regular stratification? they belong to what are termed Lower Silurian rocks; a name which plunges us at once into the almost illimitable field of geological speculation and history. When we see the clay reposing so evenly upon the surface of that narrow band of sandstone, we naturally suppose that some short period after the stripe of hard rock had been established by the slow process of deposition at the bottom of a lake or sea, the yellow clay was drifted upon it by the action of some violent current, at a time when the land around us was covered by the waters of the lake. Not so, however. Geologists inform us that countless ages passed away between the formation of the narrow stripe of sandstone and the superimposed Drift clay.

But how do they know it? Examine the narrow stripe of sandstone, separate a small block with a chisel from the layer of blue shale upon which it reposes, and we see below it numerous round bodies, which upon examination appear to be delicately organized and to possess a beautiful cellular structure. They are corals, and are to be found in vast numbers and of diversified forms throughout those narrow bands of shale and sandstone. If we examine more minutely lower layers of the shale, we shall find numerous shells of many varieties, none however of kinds known now to possess living inhabitants in any of our lakes or seas. Upon further search we may discover a multitude of obscure vegetable forms, called fucoids, some of them possessing considerable dimensions, others smaller and less distinctly preserved. In whatever remains of animals or vegetables we meet with, we fail to recognize any alliance between them and those living species with which we are familiar. We infer then, that a vast difference in point of age exists between the Drift clays and the subjacent rocks. But how great may we suppose this difference in age to be? What interval of time has elapsed between the period when those ancient shells had living occupants, or those fucoids grew in a brackish sea, and the date of the accumulation of the vast mass of recent Drift which now presses upon them? In order to approach the answer to this question, we must refer to geological writers for their descriptions of other kinds of rock which are ascertained to be less ancient than the one we are now contemplating, and to the science of Palæontology which treats of fossil remains.

Having now introduced you to the rocks which are exposed in the neighbourhood of the New Garrison, and which form the foundation of the whole country between Toronto and the Rivers Rouge and Credit to the east and west, let us return to the lecture room where we may study more at our ease the history of those ancient deposits, and contemplate some of those remains of organic life of which they are the vast and enduring sepulchre.

First, then, with respect to the age of those rocks.

I need not remind you that geological ages are very indefinite periods of time, and relate to epochs in the history of the world which carry us far, very far beyond the period of man's history.

Geologists generally recognize thirteen groups of stratified or fossiliferous rocks, each group containing several members or formations which were probably deposited at different epochs at the bottoms of extensive seas or fresh water lakes. Each group is distinguished by numerous fossil remains which are peculiar to it. The thirteen groups are divided into three grand divisions named respectively,

I. Tertiary or Cainozoic, containing three groups.

II. Secondary or Mesozoic, containing four groups.

III. Primary or Palæozoic, containing six groups.

The Silurian constitutes the fifth group in descending order of the Primary or Palæozoic division. When we contemplate the enormous thickness of the various groups of fossiliferous rocks, and remember that they have all, most probably, been deposited one after the other at the bottom of seas, we can scarcely form any conjecture respecting the great antiquity of the rocks which form the foundation of the Drift upon which this city reposes. The members of this group are themselves of vast extent and thickness. They have been found to exist in various parts of the world, in Wales (whence their name, as forming a part of the ancient kingdom of the Silures,) in Bohemia, in Canada and in the Valley of the Ohio and Mississippi, &c. Silurian rocks have