It is scarcely necessary to say that I have no confidence in the supposition of unlike composition of the earth's mass on different sides on which Dana has partly based his theory of the origin of continents. The most probable conception seems to be that of Lyell, namely, a molten mass, uniform except in so far as denser material might exist toward its centre, and a crust at first approximately even and homogeneous, and subsequently thrown into great bendings upward and downward. This question has recently been ably discussed by Mr. Crosby in the London Geological Magazine.[1]

In short, the fundamental gneiss of the Lower Laurentian may have been the first rock ever formed; and in any case it is a rock formed under conditions which have not since recurred except locally. It constitutes the first and best example of these chemico-physical, aqueous or aqueo-igneous rocks, so characteristic of the earliest period of the earth's history. Viewed in this way the Lower Laurentian gneiss is probably the oldest kind of rock we shall ever know — the limit to our backward progress, beyond which there remains nothing to the geologist except physical hypotheses respecting a cooling incandescent globe. For the chemical conditions of these primitive rocks, and what is known as to their probable origin, I must refer you to my friend Dr. Sterry Hunt, to whom we owe so much of what is known of the older crystalline rocks[2] as well as of their literature, and the questions which they raise. My purpose here is to sketch the remarkable difference which we meet as we ascend into the Middle and Upper Laurentian.

In the next succeeding formation, the true Lower Laurentian of Logan, the Grenville series of Canada, we meet with a great and significant change. It is true we have still a predominance of gneisses which may have been formed in the same manner with those below them; but we find these now associated with great beds of limestone and dolomite, which must have been formed by the separation of calcium and magnesium carbonates from the sea water, either by chemical precipitation or by the agency of living beings. We have also quartzite, quartzose gneisses, and even pebble beds, which inform us of sand banks and shores. Nay, more, we have beds containing graphite which must be the residue of plants, and iron ores which tell of the deoxidation of iron

[1] June, 1883. [2] Hunt, Essays on Chemical Geology.