to build up formations. For example, several thousand feet of strata were deposited during the Lower Silurian period, between two catastrophes. The periods of disturbance must have been very short, and the interval of repose very long. 3. The deposits appear generally not to have been disturbed by any elevating force while in a state of formation, as this would have changed the character of the organic remains.

There are instances where there seems to have been a quiet, gradual elevation for an immense period, without catastrophes. But often this elevation has been sudden and very great. Some single local dislocations are of enormous size, amounting to 3,000 or 4,000 feet; as in the Penine region of the north of England; and it is difficult to conceive how such faults could have resulted from a succession of minor forces acting through long intervals.

Inference 3. *Catastrophes have generally corresponded to changes in fossils.*

Elie de Beaumont has long maintained that the changes in the zoological and botanical characters of the formations correspond in general to the epochs of elevation; that is, the period of elevation seems to have been the time for the destruction of one group of organic races and the introduction of new species. The progress of Palæontology tends greatly to increase the number of distinct systems of life, and it may not be possible in all cases to find evidence of any great geological disturbance at the close of all the life periods. Yet D'Orbigny, who contends for the largest number of these, still maintains, by a course of strong arguments, that the faunas and floras have all been destroyed by catastrophes, such as the sudden elevation of mountains, though they may have taken place at a distance, and the destruction may have resulted from the great inundating waves that spread far and wide from the center of disturbance. He believes, also, in the existence generally of a long interval between the destruction of one group and the creation of a new one. "We can not then explain," says he, "the annihilation of all the faunas which have succeeded each other twenty-seven times, but by powerful geological disturbances. We have seen that whenever in past ages a dislocation of the crust has taken place, capable of effecting a displacement of the seas, the existing fauna has been annihilated by the movement of the waters at the points dislocated, and even in other points not dislocated."

These decided views may need some modification when the whole subject of the disappearance of species has been more fully studied. At present we know not how to resist the evidence adduced by D'Orbigny in his *Cours Elementaire de Paleòntologie et de Geologie.*

Inference 4. *The whole period since life began on the globe has been immensely long.*

Proof 1. There must have been time enough for water to make depositions more than ten miles in thickness, by materials worn from previous rocks, and more or less comminuted. 2. Time enough, also, to allow of hundreds of changes in the materials deposited: such changes as now require a long period for the production of one of them. 3. Time enough to allow of the growth and dissolution of animals and plants, often of microscopic littleness, sufficient to constitute almost entire mountains by their remains. 4. Time enough to produce, by an extremely slow change of climate, the destruction of several nearly entire groups of organic beings. For although sudden catastrophes may have sometimes been the the immediate cause of their ex-