showing how individual strata might remain horizontal, while others might be tilted or even be thrown into a quite perpendicular position, others again might be bent into the form of arches. The occurrence of crust-inthrows, together with the effects of surface denudation, might give shape to mountains and valleys, plateaux, and low-lying plains. Mountains, he said, might also originate from upward action of the volcanic forces in the crust. In cases of active volcanic eruption, ashy and fragmental rock materials were ejected, intermixed with sulphurous vapours and mineral pitch.

Thus Steno's work already contained the kernel of much that has been under constant discussion during the two centuries which have passed since his death; and if one reads the most recent text-books of geology, it will be evident that science has not yet securely ascertained the share that is to be assigned to subsidence, to upheaval, to erosion, and to volcanic action in the history of the earth's surface conformation in different regions.

Descartes (1596-1650), in his *Principia Philosophiæ*, founded a cosmology upon his famous principle of the constancy of the amount of motion or "momentum" in the universe. The earth, he states, like all other bodies of the universe, is composed of primitive particles of matter in which a whirling motion is inherent, and they have aggregated themselves into the form of a sphere. During the gradual cooling of the earth the outer layers consolidated as a firm crust, while the nucleus still continued incandescent. The coarser and heavier primitive particles of the earth, as they rotated, collected round the centre, while the finer and lighter particles gathered in the outer regions and formed the crust, composed of metallic, saline, and aqueous parts. Crust-rupture has from time to time given origin to continents, seas, mountains, and valleys; according to Descartes, volcanic phenomena and fissure injections are results of the high temperature of the earth's interior.

G. F. Leibnitz (1646-1716), the mathematician and physicist, accepts in his *Protogæa* the Cartesian view, that primitive matter had a fluid consistency owing to the tremendous initial heat, and that the earth's spherical form was derived from the aggregation of whirling ultimate elements or "monads" of matter. In place of the Cartesian principle of momentum, Leibnitz starts from a dynamical basis, and assumes a force