

the theory of motion. If, as I believe, we are justified in regarding the revolving meteor-asteroids (aërolites) as portions of our planetary system, their fall upon the earth constitutes the sole means by which we are brought in contact with cosmical substances of a recognizable heterogeneity.* I here refer to the cause which has hitherto rendered terrestrial phenomena less amenable to the rules of mathematical deduction than those mutually disturbing and readjusting movements of the cosmical bodies, in which the fundamental force of homogeneous matter is alone manifested.

I have endeavored, in my delineation of the earth, to arrange natural phenomena in such a manner as to indicate their causal connection. In describing our terrestrial sphere, I have considered its form, mean density, electro-magnetic currents, the processes of polar light, and the gradations according to which heat increases with the increase of depth. The reaction of the planet's interior on its outer crust implies the existence of volcanic activity; of more or less contracted circles of waves of commotion (earthquake waves), and their effects, which are not always purely dynamic; and of the eruptions of gas, of mud, and of thermal springs. The upheaval of fire-erupting mountains must be regarded as the highest demonstration of the inner terrestrial forces. We have therefore depicted volcanoes, both central and chain formations, as generative no less than as destructive agents, and as constantly forming before our eyes, for the most part, periodic rocks (rocks of eruption); we have likewise shown, in contrast with this formation, how sedimentary rocks are in the course of precipitation from fluids, which hold their minutest particles in solution or suspension. Such a comparison of matter still in the act of development and solidification with that already consolidated in the form of strata of the earth's crust, leads us to the distinction of geognostic epochs, and to a more certain determination of the chronological succession of those formations in which lie entombed extinct genera of animals and plants—the fauna and flora of a former world, whose ages are revealed by the order in which they occur. The origin, transformation, and upheaval of terrestrial strata, exert, at certain epochs, an alternating action on all the special characteristics of the physical configuration of the earth's surface; influencing the distribution of fluids and solids, and the extension and articulation of con

* *Cosmos*, vol. i. (Harper's edit.), p. 33-65, 136.