crease of density from the upper surface to the center of the Earth.

The consideration of the increase of heat with the increase of depth toward the interior of our planet, and of the reaction of the interior on the external crust, leads us to the long series of volcanic phenomena. These elastic forces are manifested in earthquakes, eruptions of gas, hot wells, mud volcanoes and lava currents from craters of eruptions, and even in producing alterations in the level of the sea.* Large plains and variously indented continents are raised or sunk, lands are separated from seas, and the ocean itself, which is permeated by hot and cold currents, coagulates at both poles, converting water into dense masses of rock, which are either stratified and fixed, or broken up into floating banks. The boundaries of sea and land, of fluids and solids, are thus variously and frequently changed. Plains have undergone oscillatory movements, being alternately elevated and depressed. After the elevation of continents, mountain chains were raised upon long fissures, mostly parallel, and, in that case, probably cotemporaneous; and salt lakes and inland seas, long inhabited by the same creatures, were forcibly separated, the fossil remains of shells and zoophytes still giving evidence of their original connection. Thus, in following phenomena in their mutual dependence, we are led from the consideration of the forces acting in the interior of the Earth to those which cause eruptions on its surface, and by the pressure of elastic vapors give rise to burning streams of lava that flow from open fissures.

The same powers that raised the chains of the Andes and the Himalaya to the regions of perpetual snow, have occasioned new compositions and new textures in the rocky masses, and have altered the strata which had been previously deposited from fluids impregnated with organic substances. We here trace the series of formations, divided and superposed according to their age, and depending upon the changes of configuration of the surface, the dynamic relations of upheaving forces, and the chemical action of vapors issuing from the fissures.

The form and distribution of continents, that is to say, of that solid portion of the Earth's surface which is suited to the luxurious development of vegetable life, are associated by intimate connection and reciprocal action with the encircling

* [See Daubeney *On Volcanoes*, 2d edit., 1848, p. 539, &c., on the so-called *mud volcanoes*, and the reasons advanced in favor of adopting the term "salses" to designate these phenomena.]—*Tr.*