of the axis of disturbance, and none in the Laramide Range of British America, and the same is true in a large part of mountain-making. In the Wasatch the igneous effusions were a final *effect*, not an agent of change.

Moreover, the pressure from any igneous intrusions, or their power of compression, is feeble. Plastic rock is little better for pressure than any pasty material; when extruded it is hurried out of the way by the compression of any other agent, or escapes, if it can, by gravity. When it cannot escape, it bulges up the overlying beds and makes laccoliths (page 301), and this is almost its limit of mechanical work. The heat also is wholly inadequate for plicating and faulting rocks in mountain-making style, whether the liquid rock be granitic or of any other constitution; the laws as to heating and cooling are the same for all kinds.

2. The Contraction Theory.

1. *The source of lateral pressure.* — The source of the pressure according to the contraction theory is the contraction of the earth's crust as a consequence of cooling. The theory was suggested by Descartes in his *Principia Philosophiæ* in 1644, and by Newton in 1681, and was adopted in geology by James Hall, of Edinburgh, in 1812, and advocated by De La Beche in 1834. The contracting crust derives the lateral pressure from the cooling and solidification that is going on underneath it — the crust being forced to adapt itself to an interior which is becoming smaller by the earth's gradual refrigeration. Mountain-making, according to the theory, is a consequence largely of the earth's shrinkage.

The author's contributions to the subject, including also that of the *Origin of Continents and their Features*, appeared first in the years 1846, 1847 and 1849, and were continued in 1856 and 1873. The development of the structure of the Appalachians through Virginia and Pennsylvania by the Professors Rogers afforded the first geological demonstration in favor of the contraction theory; and the results they published, although leading the investigators at the time to a theory based on forced movements in the earth's liquid interior, underneath a thin crust, afforded the author illustrations of the views in his early papers.

Since the earth has oceanic basins and continents of diverse dimensions and features, this lateral pressure would work with direct reference to continental lines, and generally have its shoving and relatively resisting sides in epochs of orographic work. If the pressure acted thus unequally from the two opposite directions, it would make inequilateral mountain structures, or those having a front-and-rear character, like the Appalachian Range.

Moreover, the movements would have their limits determined by, or related to, the lengths of continents, or great continental regions, and, in this respect, they accord with the actual characters of mountain chains. The Laramide system, over 4000 miles in length, along the western continental border of North America, is an example; and perhaps another 4000 miles