verge from the focus; but around the vent where the rocks have been most exposed to concussion, the fissures sometimes intersect each other in all directions. In the great eruption of Etna, in the year 1669, a series of six parallel fissures opened on the side of the mountain. One of these, with a width of two yards, ran for a distance of 12 miles, in a somewhat winding course, to within a mile of the top of the cone.[44] Similar fissures, but on a smaller scale, have often been observed on Vesuvius and other volcanoes.[45] A fissure sometimes reopens for a subsequent eruption.

Two obvious causes may be assigned for the pushing upward of a crater-floor and the fissuring of a volcanic cone—(1) the enormous pressure of the dissolved vapors or gases acting upon the walls and roof of the funnel and convulsing the cone by successive explosions; and (2) the hydrostatic pressure of the lava-column in the funnel, which may be taken to be about 120 lbs. per square inch, or nearly 8 tons on the square foot, for each 100 feet of depth. Both of these causes may act simultaneously, and their united effect has been to uplift enormous superincumbent masses of solid rock and to produce a widespread series of long and continuous fissures reaching from unknown depths to various distances from the surface and even opening up sometimes on the surface. These results of the expansive energy of volcanic action are of special interest to the geologist, for he encounters evidence of similar operations in former times preserved in the crust of the earth (see Book IV. Part VII. Sect. i.).

Into rents thus formed, the water-substance or vapor

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[44] For fissures on Etna, see Silvestri, Boll. R. Geol. Com. Ital. 1874.

[45] For a description of those of Iceland (which run chiefly N.E. to S.W., and N. to S.) see T. Kjerulf, Nyt. Mag. xxi. 147.