

volcanic mountains are now destitute of craters, or in other cases, because the lava has welled up in dome form covered perhaps with masses of scorïæ, but without the production of a definite crater. Mount Ararat, for example, is said to have no crater; but so late as the year 1840 a fissure opened on its side whence a considerable eruption took place. The trachytic puy of Auvergne are dome-shaped hills without craters.

Though the interior of modern volcanic cones can be at the best but very partially examined, the study of the sites of long-extinct cones, laid bare after denudation, shows that subsidence of the ground has commonly taken place at and round a vent. Evidence of subsidence has also been observed at some modern volcanoes (*ante*, p. 395). Theoretically two causes may be assigned for this structure. In the first place, the mere piling up of a huge mass of material round a given centre tends to press down the rock underneath, as some railway embankments may be observed to have done. This pressure must often amount to several hundred tons on the square foot. In the second place, the expulsion of volcanic material to the surface may leave cavities underneath, into which the overlying crust will naturally gravitate. These two causes combined, as suggested by Mr. Mallet, afford a probable explanation of the saucer-shaped depressions in which many ancient and some modern vents appear to lie.¹¹³

The following are the more important types of volcanic cones:¹¹⁴

¹¹³ Mallet, Q. J. Geol. Soc. xxxiii. p. 740. See also the account of "Volcanic Necks," in Book IV. Part VII.

¹¹⁴ Von Seebach (Z. Deutsch. Geol. Ges. xviii. 644) distinguished two volcanic types. 1st, Bedded Volcanoes (Strato-Vulkane), composed of successive sheets of lava and tuffs, and embracing the great majority of volcanoes. 2d, Dome Volcanoes, forming hills composed of homogeneous protrusions of