

masses, are very old volcanoes, and near being extinguished; and that rounded tops, in the form of domes, or bells, indicate those problematic porphyries, which are supposed to have been heated in their primitive position, penetrated by vapours, and forced up in a mollified state, without having ever flowed as real lithoidal lavas. To the first class belong Cotopaxi, the peak of Teneriffe, and the peak of Orizava in Mexico. In the second may be placed Cargueirazo and Pichincha, in the province of Quito; the volcano of Puracey, near Popayan; and perhaps also Hecla, in Iceland. In the third and last we may rank the majestic figure of Chimborazo, and, (if it be allowable to place by the side of that colossus a hill of Europe,) the Great Sarcouy in Auvergne.

In order to form a more exact idea of the external structure of volcanoes, it is important to compare their perpendicular height with their circumference. This, however, cannot be done with any exactness, unless the mountains are isolated, and rising on a plain nearly on a level with the sea. In calculating the circumference of the peak of Teneriffe in a curve passing through the port of Orotava, Garachico, Adexe, and Guimar, and setting aside the prolongations of its base towards the forest of Laguna, and the north-east cape of the island, we find that this extent is more than 54,000 toises. The height of the Peak is consequently one twenty-eighth of the circumference of its basis. M. von Buch found a thirty-third for Vesuvius; and, which perhaps is less certain, a thirty-fourth for Etna.* If the slope of these three volcanoes were uniform from the summit to the base, the peak of Teyde would have an inclination of $12^{\circ} 29'$, Vesuvius $12^{\circ} 41'$, and Etna $10^{\circ} 13'$; a result which must astonish those who do not reflect on what constitutes an average slope. In a very long ascent, slopes

* Gilbert, *Annalen der Physik*, B. 5, p. 455. Vesuvius is 133,000 palms, or eighteen nautical miles in circumference. The horizontal distance from Resina to the crater is 3,700 toises. Italian mineralogists have estimated the circumference of Etna at 840,000 palms, or 119 miles. With these data, the ratio of the height to the circumference would be only a seventy-second; but I find on tracing a curve through Catania, Palermo, Bronte, and Piemonte, only 62 miles in circumference, according to the best maps. This increases the ratio to a fifty-fourth. Does the basis fall on the outside of the curve that I assume?