

hundred feet,) would be equal to that of one thousand atmospheres; and M. Daubuisson, who has made the calculation, states, that if an opening were effected in the volcano at the level of the sea, under the above pressure, the lava and stones would be forced out, with a velocity equal to two hundred and seventy metres, or eight hundred feet per second.—Tome i. p. 173.

The elevation of volcanic craters varying, as Humboldt observes, from six hundred to eighteen thousand feet, must not only influence the frequency of their eruptions, but must modify also the quality of the substances ejected.—“Some volcanoes, like Teneriffe, eject lava only from their sides, although it has a crater on its summit; others have lateral eruptions, as I observed at Antisana in Quito, at the height of thirteen thousand feet, and their summit has never been pierced. Others, although, as many phenomena indicate, equally hollow in their interior, act only mechanically on the surrounding country, breaking the strata and changing the surface of the soil. Thus, the volcanic mountain of Chimborazo, with its dome of volcanic porphyry, (*trachyte*,) at the height of twenty two thousand two hundred feet, has no permanent aperture on its summit or its sides: the small crater by which its eruptions are effected, is placed on the Plain of Calpi. The volcano of Pichinca, fifteen thousand feet high, and which I have particularly studied, has never ejected a current of lava since the excavation of the present valleys. On the contrary, the volcano of Popocatepetl in Mexico, sixteen thousand (according to Lieutenant Glennie, near eighteen thousand) feet in height, pours out narrow currents of lava, like those from the smaller volcanoes of Auvergne or Italy.”

Submarine volcanoes are preceded by a violent boiling and agitation of the water, and by the discharge of volumes of gas and vapour, which take fire and roll, in sheets of flame, over the surface of the waves. Masses of rock are darted, with great violence, through the water, and accumulate till they form new islands. Sometimes, during an eruption, the crater of the volcano rises out of the sea. In 1783, a submarine volcano broke out near Iceland, which formed a new island; it raged with great fury for several months. The island afterwards sunk, leaving only a reef of rocks. In December, 1720, a violent earthquake was felt at Terceira, one of the Azores; the next morning, a new island nine miles in circumference was seen, from the centre of which rose a column of smoke: it afterwards sunk to a level with the sea. A small island was formed in 1811, by a submarine volcano, at a little distance from St. Michael's, one of the Azores: the captain of the Sabrina frigate, who witnessed its formation, described it as a mass of black rock, equal in height to the high Tor at Matlock. A gentleman who visited the Azores in 1813, informs me that it has sunk down and disappeared: there is now eighty fathoms of water in the place.