

longing to the upper formation in the Caldera, would leave behind them few pebbles. Nearly all of these perishable deposits would be swept down in the shape of mud into the Atlantic. Even the hard rounded stones, since they were once angular and are now ground down into pebbles, must have lost more than half their original bulk, and bear witness to large quantities of sedimentary matter consigned to the bed of the ocean. We saw in the Caldera blocks of huge size thrown down by cascades from the upper precipices during the melting of the snows, a fortnight before our visit, and much destruction was likewise going on in the lower set of rocks by the same agency. We also learnt that a great flood rushed down the Barranco in the spring of 1854, shortly before our arrival, damaging several houses and farms, and I have therefore no doubt that the erosive power even of rain and river water, aided by earthquakes, might in the course of ages empty out a valley as large as the Caldera, although probably not of the same shape. I am disposed to attribute the circular range of cliffs surrounding the Caldera to volcanic action, because they forcibly reminded me of the precipices encircling three sides of the Val de Bove, on Etna; and because they agree so well with Junghuhn's description of the "old crater-walls" of active volcanoes in Java, some of which equal or surpass in dimensions even the Caldera of Palma. The latter may have consisted at first of a true crater, enlarged afterwards into a caldera by the partial destruction of a great cone; but if so, it has certainly been since modified by denudation. Nor can any geologist now define how much of the work has been accomplished by aqueous, and how much by volcanic agency. The phenomenon of a river cutting its channel through a dense mass of ancient alluvium formed during oscillations in the level of the land is not confined to volcanic countries, and I need not dwell here on its interpretation, but refer to what was said in the 7th chapter. (See p. 84.)

There remains, however, another question of high theoretical interest; namely, whether the denudation was marine or fluviate. It was stated that the materials of the great cone or assemblage of cones in the north of Palma are of subaerial origin, as proved by the angularity of the fragments of rock in the agglomerates; but it may be asked, whether, when the Caldera was formed long afterwards, it may not, like the crater of St. Paul's (fig. 649, p. 509), have had a communication with the sea, which may have entered by the great Barranco, and if, after a period of partial submergence, the island may not then have risen again to its original altitude. In such a case the retiring waters might leave behind them a conglomerate, partly of river-pebbles, collected at the points where the torrent successively entered the sea, and partly of stones rounded by the waves. The torrent may have finally cut a deep ravine in the gravel and associated lavas when the land was rising again. Such oscillations of level, amounting to more than 2000 feet, would not be deemed improbable by any geologists, provided they enable us to explain more naturally than by any other causation, the