

they could be seen at a distance of twenty-four miles. Enormous masses of rock were torn up and scattered around. Similar masses may be seen round the now inactive mud volcano of Monte Zibio, near Sassuolo, in Northern Italy. The secondary condition of repose has been maintained for upward of fifteen centuries in the mud volcanoes of Girgenti, the *Maccalubi*, in Sicily, which have been described by the ancients. These salses consist of many contiguous conical hills, from eight to ten, or even thirty feet in height, subject to variations of elevation as well as of form. Streams of argillaceous mud, attended by a periodic development of gas, flow from the small basins at the summits, which are filled with water; the mud, although usually cold, is sometimes at a high temperature, as at Damak, in the province of Samarang, in the island of Java. The gases that are developed with loud noise differ in their nature, consisting, for instance, of hydrogen mixed with naphtha, or of carbonic acid, or, as Parrot and myself have shown (in the peninsula of Taman, and in the *Volcancitos de Turbaco*, in South America), of almost pure nitrogen.*

Mud volcanoes, after the first violent explosion of fire, which is not, perhaps, in an equal degree common to all, present to the spectator an image of the uninterrupted but weak activity of the interior of our planet. The communication with the deep strata in which a high temperature prevails is soon closed, and the coldness of the mud emissions of the salses seems to indicate that the seat of the phenomenon can not be far removed from the surface during their ordinary condition. The reaction of the interior of the earth on its external surface is exhibited with totally different force in true volcanoes or igneous mountains, at points of the earth in which a permanent, or, at least, continually-renewed connection with the volcanic force is manifested. We must here carefully distinguish between the more or less intensely developed volcanic phenomena, as, for instance, between earthquakes, thermal, aqueous, and gaseous springs, mud volcanoes, and the appearance of bell-formed or dome-shaped trachytic rocks without openings; the opening of these rocks, or of the elevated beds of basalt, as

* Humboldt, *Rel. Hist.*, t. iii., p. 562-567; *Asie Centrale*, t. i., p. 43; t. ii., p. 505-515; *Vues des Cordillères*, pl. xli. Regarding the *Maccalubi* (the Arabic *Makhlub*, the *overthrown* or *inverted*, from the word *Khalaba*), and on "the Earth ejecting fluid earth," see Solinus, cap. 5: "idem ager Agrigentinus eructat limosas scaturigenes, et ut venæ fontium sufficiunt rivis subministrandis, ita in hac Siciliæ parte solo nunquam deficiente, æterna rejectione terram terra evomit."