

subterranean fire, and that littoral situations only favor the eruption by forming the margin of a deep sea basin, which, covered by strata of water, and lying many thousand feet lower than the interior continent, can offer but an inconsiderable degree of resistance.

The present active volcanoes, which communicate by permanent craters simultaneously with the interior of the earth and with the atmosphere, must have been formed at a subsequent period, when the upper chalk strata and all the tertiary formations were already present: this is shown to be the fact by the trachytic and basaltic eruptions which frequently form the walls of the crater of elevation. Melaphyres extend to the middle tertiary formations, but are found already in the Jura limestone, where they break through the variegated sandstone.\* We must not confound the earlier outpourings of granite, quartzose porphyry, and euphotide from temporary fissures in the old transition rocks with the present active volcanic craters.

The extinction of volcanic activity is either only partial—in which case the subterranean fire seeks another passage of escape in the same mountain chain—or it is total, as in Auvergne. More recent examples are recorded in historical times, of the total extinction of the volcano of Mosychlos,† on the island sacred to Hephæstos (Vulcan), whose “high whirling flames” were known to Sophocles; and of the volcano of Medina, which, according to Burckhardt, still continued to pour out a stream of lava on the 2d of November, 1276. Every stage of volcanic activity, from its first origin to its extinction, is characterized by peculiar products; first by ignited scorïæ, streams of lava consisting of trachyte, pyroxene, and obsidian, and by rapilli and tufaceous ashes, accompanied by the devel-

\* Dufrenoy et Elie de Beaumont, *Explication de la Carte Géologique de la France*, t. i., p. 89.

† Sophocles, *Philoct.*, v. 971 and 972. On the supposed epoch of the extinction of the Lemnian fire in the time of Alexander, compare Buttmann, in the *Museum der Alterthumswissenschaft*, bd. i., 1807, s. 295; Dureau de la Malle, in Malte-Brun, *Annales des Voyages*, t. ix., 1809, p. 5; Ukert, in Bertuch, *Geogr. Ephemeriden*, bd. xxxix., 1812, s. 361; Rhode, *Res Lemnicæ*, 1829, p. 8; and Walter, *Ueber Abnahme der Vulkan. Thätigkeit in Historischen Zeiten*, 1844, s. 24. The chart of Lemnos, constructed by Choiseul, makes it extremely probable that the extinct crater of Mosychlos, and the island of Chryse, the desert habitation of Philoctetes (Otfried Müller, *Minyer*, s. 300), have been long swallowed up by the sea. Reefs and shoals, to the northeast of Lemnos, still indicate the spot where the Ægean Sea once possessed an active volcano like Ætna, Vesuvius, Stromboli, and Volcano (in the Lipari Isles).