and the fine dust thrown out into the air during eruptions, is sometimes referable to these most minute organic substances, brought up from considerable depths, and sometimes mingled with small particles of vegetable matter.

In what manner did the solid coverings of these most minute animalcules, which can only originate and increase at the surface of the earth, sink down and penetrate into subterranean cavities, so as to be ejected from the volcanic orifices? We have of late years become familiar with the fact in the process of boring Artesian wells, that the seeds of plants, the remains of insects, and even small fish, with other organic bodies, are carried in an uninjured state by the underground circulation of waters, to the depth of many hundred feet. With still greater facility in a volcanic region we may conjecture, that water and mud full of invisible infusoria may be sucked down, from time to time, into subterranean rents and hollows in cavernous lava which has been permeated by gases, or in rocks dislocated by earthquakes. It often happens that a lake which has endured for centuries in a volcanic crater, disappears suddenly on the approach of a new eruption. Violent shocks agitate the surrounding region, and ponds, rivers, and wells are dried up. Large cavities far below may thus become filled with fen-mud chiefly composed of the more indestructible and siliceous portions of infusoria, destined perhaps to be one day ejected in a fragmentary or halffused state, yet without the obliteration of all traces of organic structure.*

Herculaneum. - It was remarked that no lava has flowed over the site of Pompeii, since that city was built, but with Herculaneum the case is different. Although the substance which fills the interior of the houses and the vaults must have been introduced in a state of mud, like that found in similar situations in Pompeii ; yet the superincumbent mass differs wholly in composition and thickness. Herculaneum was situated several miles nearer to the volcano, and has, therefore, been always more exposed to be covered, not only by showers of ashes, but by alluviums and streams of lava. Accordingly, masses of both have accumulated on each other above the city, to a depth of nowhere less than 70, and in many places of 112 feet.

The tuff which envelopes the buildings consists of comminuted

richte) of the Royal Acad. of Sci. Berlin, 1844, 1845, and an excellent abstract of his papers by Mr. Ansted in the Quart. Journ. of the Geol. Soc. London, No. 7., Aug. 1846. In regard to marine infusoria found in volcanic tuff, it is well known that on the shores of the island of Cephalonia in the Mediterranean (Proceedings, Geol. Soc. vol. ii. p. 220.), there is a cavity in the rock, into which the sea has been flowing for ages, and many others doubtless exist in the leaky bottom of the ocean. The marine cur-

* See Ehrenberg, Proceedings (Be- rent has been rushing in for many years, and as the infusoria inhabiting the waters of the Mediterranean are exceedingly abundant, a vast store of their cases may accumulate in submarine caverns (the water, perhaps, being converted into steam, and so escaping upwards), and they may then be cast up again to furnish the materials of volcanic tuff, should an eruption occur like that which produced Graham Island, off the coast of Sicily, in 1831.

† Hamilton, Observ. on Mount Ve-suvius, p. 94. London, 1774.