

the island at that point. At the end of the stream three cinder-cones formed from the contact of the lava with the water, and Captain Dutton calls special attention to the fact that not only in this instance, but in other examples among the Hawaiian lavas which have reached the sea, there is clear evidence of the formation of ordinary volcanic craters by the accidental contact of lava with water.⁶⁷ The lavas of Etna and Vesuvius have also protruded into the sea, but, owing probably to their more viscous and lithoid condition and lower temperature, they do not seem to have given rise to explosive action at their seaward ends. Thus a current from the latter mountain entered the Mediterranean at Torre del Greco in 1794, and pushed its way for 360 feet outward, with a breadth of 1100 and a height of 15 feet. So quietly did it advance, that Breislak could sail round it in a boat and observe its progress.

By the outpouring of lava, two important kinds of geological change are produced. (1) Stream-courses, lakes, ravines, valleys, in short, all the minor features of a landscape, may be completely overwhelmed under a thick sheet of lava. The drainage of the district being thus effectually altered, the numerous changes which flow from the operations of running water over the land are arrested and made to begin again in new channels. (2) Considerable alterations may likewise be caused by the effects of the heat and vapors of the lava upon the subjacent or contiguous ground. Instances have been observed in which the lava has actually melted down opposing rocks, or masses of slags on its own surface. Interesting observations, already referred to (p. 385), have been made at Torre del Greco under the lava-

⁶⁷ U. S. Geol. Report for 1882-83, p. 181.