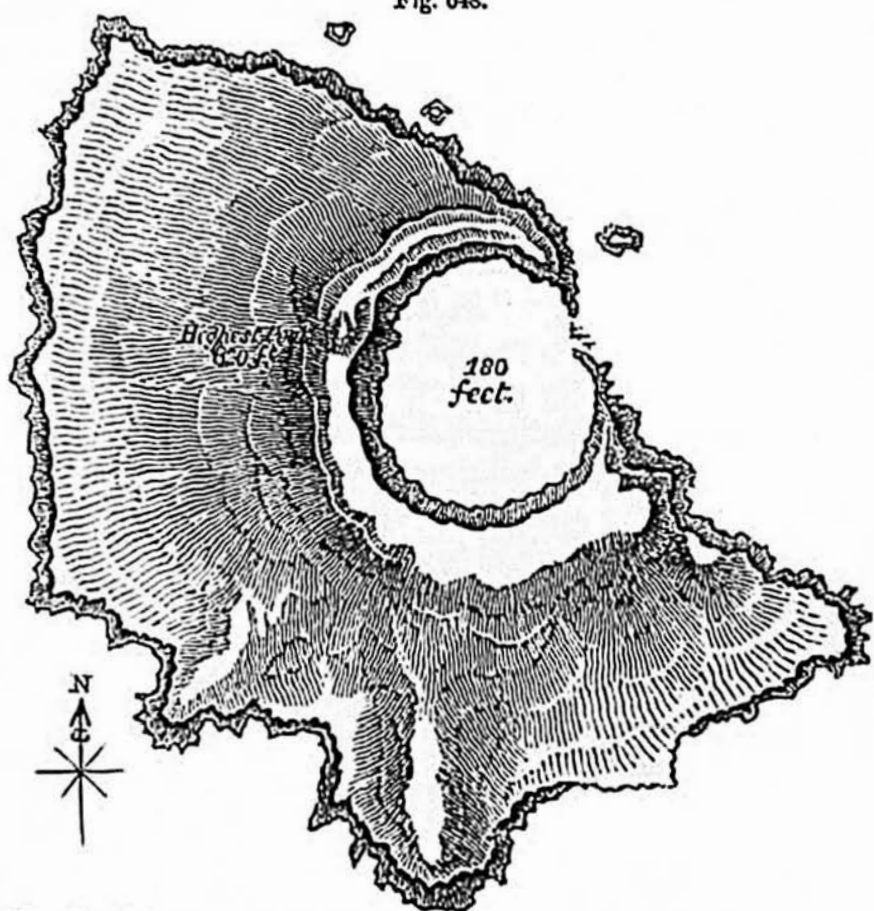


on the east and west coast, and are many of them nearly as naked and barren of vegetation as when they first flowed. The tendency in volcanic vents to assume a linear arrangement, as seen in the volcanoes of the Andes and Java on a grand scale, is exemplified by the cones and craters of this small range in Palma. It has been conjectured that such linearity in the direction of superficial outbreaks is connected with deep fissures in the earth's crust communicating with a subjacent focus of subterranean heat.

By discussing at so much length the question whether the sea may or may not have played an important part in enlarging the Caldera of Palma, I have been desirous at least to show how many facts and observations are required to explain the structure and configuration of such volcanic islands. It may be useful to cite, in illustration of the same subject, the present geographical condition of St. Paul's or Amsterdam Island, in the Indian Ocean, midway between the Cape of Good Hope and Australia.

Fig. 648.



Map of the Island of St. Paul, in the Indian Ocean, lat.  $88^{\circ} 14' S.$ , long.  $77^{\circ} 37' E.$ , surveyed by Capt. Blackwood, R. N., 1842.

In this case the crater is only a mile in diameter and 180 feet deep, and the surrounding cliffs where loftiest about 800 feet high so that in regard to size such a cone and crater are insignificant when compared to the cone and Caldera of Palma or to such volcanic domes as Mounts Loa and Kea in the Sandwich Islands. But the Island of St. Paul exemplifies a class of insular volcanoes into which the ocean now enters by