

them belong to an entirely different series, being acid rocks, belonging to the group of hornblende-andesites, while the subaerial rocks are augite-andesites. The acidity of these lavas has been largely increased by the infusion into them of much silica, chiefly in the form of opal. They differ much in aspect, being sometimes compact, scoriaceous, hard, like millstone, with perlitic and spherulitic structures, while they frequently present the characters of trass impregnated with opal and zeolites. Among the fragmental ejections there occur blocks of schist and granitoid rocks, probably representing the materials below the sea-floor through which the first explosion took place (pp. 341, 363, 417). During the eruption of 1866 some islets of lava rose above the sea in the middle of the bay, near the active vent. The rock in these cases was compact, vitreous, and much cracked.¹³¹

Among submarine volcanic formations, the tuffs differ from those laid down on land chiefly in their organic contents; but partly also in their more distinct and originally less inclined bedding, and in their tendency to the admixture of non-volcanic or ordinary mechanical sediment with the volcanic dust and stones. No appreciable difference either in external aspect or in internal structure seems yet to have been established between subaerial and submarine lavas. Some undoubtedly submarine lavas are highly scoriaceous. There is no reason, indeed, why slaggy lava and loose, non-buoyant scorïæ should not accumulate under the pressure of a deep column of the ocean. At the Hawaii Islands, on 25th February, 1877, masses of pumice, during a submarine volcanic explosion, were

¹³¹ Fouqué, "Santorin."