

in vast quantities during the eruption of Santorin in 1866.²⁴ Among the tuffs of the Eifel region, small bombs, consisting mostly of granular olivine, are of common occurrence, as also pieces of sanidine or other less fusible minerals which have segregated out of the magma before ejection. In like manner, among the tuffs filling volcanic necks, probably of Permian age, which pierce the Carboniferous rocks of Fife, large worn crystals of orthoclase, biotite, etc., are found. When the ejected fragment of lava has a rough irregular form and a porous structure, like the clinker of an iron furnace, it is known as a slag.²⁵

The fragmentary materials erupted by a volcano and deposited around it acquire by degrees more or less consolidation, partly from the mere pressure of the higher upon the lower strata, partly from the influence of infiltrating water. It has been already stated (p. 240) that different names are applied to the rocks thus formed. The coarse, tumultuous, unstratified accumulation of volcanic débris within a crater or funnel is called *Agglomerate*. When the débris, though still coarse, is more rounded, and is arranged in a stratified form on the slopes of the cone or on the country beyond, it becomes a *Volcanic Conglomerate*. The finer-grained varieties, formed of dust and lapilli, are included in the general designation of *Tuffs*. These are usually pale yellowish, grayish, or brownish, sometimes black rocks, granular, porous, and often incoherent in texture. They occur interstratified with and pass into ordinary non-volcanic sediment.

Organic remains sometimes occur in tuff. Where volcanic débris has accumulated over the floor of a lake, or of the sea, the entombing and preserving of shells and other organic objects must continually take place. Examples of this kind are cited in later pages of this work from older geological formations. Professor Guiscardi of Naples found about 100 species of marine shells of living species in the old tuffs of Vesuvius. Marine shells have been picked up within the crater of Monte Nuovo, and have been frequently observed in the old or marine tuff of that district. Showers of ash, or sheets of volcanic mud, often preserve land-shells, insects, and vegetation living on the area at the time. The

²⁴ Darwin, "Geological Observations on Volcanic Islands," 2d edit. p. 42. Fouqué, "Santorin," p. 79.

²⁵ On the ratio between the pores and volume of the rock in slags and lavas, see determinations by Bischof, "Chem. und Phys. Geol." supp. (1871), p. 158.