fore, whether or not it is to be regarded as evidence of an actual volcanic outbreak at the locality, he is not liable to the same uncertainty among the fragmental eruptive rocks. Putting aside the occasional brecciated structure seen along the edges of plutonic intrusive masses, he may regard all the truly fragmental igneous rocks as proofs of volcanic action having been manifested at the surface. The agglomerate found in a volcanic neck could not have been formed unless the vapors in the vent had been able to find their way to the surface, and in so doing to blow into fragments the rocks on the site of the vent as well as the upper part of the ascending lava-column.[6] Wherever, therefore, a bed or a series of beds of tuff occurs interstratified in a geological formation, it points to contemporaneous volcanic eruptions. Hence the value of these rocks in interpreting the volcanic annals of a region.

The fragmentary ejections from a volcano or a cooling lava-stream vary from the coarsest agglomerate to the finest tuff, the coarser materials being commonly found nearest to the source of discharge. They differ in composition, according to the nature of the lavas with which they are associated and from which they have been derived. Thus, a region of trachyte-lavas supplies trachyte-tuffs and trachyte-breccias; one of basalts gives basalt-breccias, basalt-agglomerates, basalt-tuffs; one of obsidians yields pumiceous tuffs and breccias. The fragmentary matter ejected from volcanic vents has fallen partly back into the funnels of discharge, partly over the surrounding area. It is apt, therefore, to be more or less mingled with

[6] It is conceivable that where a mass of lava was injected into a subterranean cavern, fragmentary discharges might take place and partly fill that cavity; but such exceptional cases are probably extremely rare.