carbonaceous material arises from the alteration of the remains of plants (fucoids) or animals (frequently graptolites). The marcasite so abundantly associated with these organisms decomposes on exposure, and the sulphuric acid produced, uniting with the alumina, potash, and other bases of the surrounding rocks, gives rise to an efflorescence of alum, or the decomposition produces sulphurous springs like those of Moffat. The name Graywacke-slate has been applied to extremely fine-grained, hard, shaly, more or less micaceous and sandy bands, associated with graywacke among the older Palæozoic rocks. Whet-slate, Novaculite, Hone-stone, is an exceedingly hard fine-grained siliceous rock, some varieties of which derive their economic value from the presence of microscopic crystals of garnet. The various forms of altered clay-slate are described at p. 309 among the metamorphic rocks.

Porcellanite (Argillite) or baked shale—a name applied to the exceedingly indurated sometimes partially fused condition which shales are apt to assume in contact with dikes and intrusive sheets or bosses. For an account of this form of contact-metamorphism see Book IV. Part VIII.

3. Volcanic Fragmental Rocks—Tuffs

This section comprises all deposits which have resulted from the comminution of volcanic rocks. They thus include (1) those which consist of the fragmentary materials ejected from volcanic foci, or the true ashes and tuffs; and (2) some rocks derived from the superficial disintegration of already erupted and consolidated volcanic masses. Obviously the second series ought properly to be classed with the sandy or clayey rocks above described, since they have been formed in the same way. In practice, however, these detrital reconstructed rocks cannot always be certainly distinguished from those which have been formed by the consolidation of true volcanic dust and sand. Their chemical and lithological characters, both megascopic and microscopic, are occasionally so similar, that their respective modes of origin have to be decided by other considerations, such as the occurrence of lapilli, bombs, or slags in the truly volcanic series, and of well water-worn pebbles of volcanic rocks in the other. Attention to these features, however, usually enables the geologist to make the distinction, and to perceive that the number of instances where he may be in doubt is less than might be supposed. Only