

relative movement in the rocks. (Book III. Part I. Section iv. § 3.)

Breccia—a rock composed of angular, instead of rounded, fragments. It commonly presents less trace of stratification than conglomerate. Intermediate stages between these two rocks, where the stones are partly angular and partly sub-angular and rounded, are known as *brecciated conglomerate*. Considered as a detrital deposit formed by superficial waste, breccia points to the disintegration of rocks by the atmosphere, and the accumulation of their fragments with little or no intervention of running water. Thus it may be formed at the base of a cliff, either subaerially, or where the débris of the cliff falls at once into a lake or into deep sea-water.

The term Breccia has, however, been applied to rocks formed in a totally different manner. Angular blocks of all sizes and shapes have been discharged from volcanic orifices, and, falling back, have consolidated there into masses of brecciated material (volcanic breccia). Intrusive igneous eruptions have sometimes torn off fragments of the rocks through which they have ascended, and these angular fragments have been inclosed in the liquid or pasty mass. Or the intrusive rock has cooled and solidified externally while still mobile within, and in its ascent has caught up and involved some of these consolidated parts of its own substance. Again, where solid masses of rock within the crust of the earth have ground against each other, as in dislocations, angular fragmentary rubbish has been produced, which has subsequently been consolidated by some infiltrating cement (Fault-rock). It is evident, however, that breccia formed in one or other of these hypogene ways will not, as a rule, be apt to be mistaken for the true breccias, arising from superficial disintegration.

Sandstone (Grès)¹¹⁶—a rock composed of consolidated sand. As in ordinary modern sand, the integral grains of sandstone are chiefly quartz, which must here be regarded as the residue left after all the less durable minerals of the original rocks have been carried away in solution or in suspension as fine mud. The colors of sandstones arise, not so much from that of the quartz, which is commonly white or gray, as from the film or crust which often coats the grains and holds

¹¹⁶ See J. A. Phillips on the constitution and history of grits and sandstones. *Quart. Journ. Geol. Soc.* xxxvii. (1881), p. 6. For analyses of some British sandstones used as building stones, see Wallace, *Proc. Phil. Soc. Glasgow*, xiv. (1883), p. 22.