

as a man's head or larger. German geologists distinguish as "schotter," a shingle containing dispersed boulders, and "schotter-conglomerate," a rock wherein these materials have become consolidated.¹¹⁵ All these names are applied quite irrespective of the composition of the fragments, which varies greatly from point to point. As a rule, the stones consist of hard rocks, since these are best fitted to withstand the powerful grinding action to which they are exposed.

Conglomerate (Puddingstone)—a rock formed of consolidated gravel or shingle. The component pebbles are rounded and water-worn. They may consist of any kind of rock, though usually of some hard and durable sort, such as quartz or quartzite. A special name may be given according to the nature of the pebbles, as quartz-conglomerate, limestone-conglomerate, granite-conglomerate, etc., or according to that of the paste or cementing matrix, which may consist of a hardened sand or clay, and may be siliceous, calcareous, argillaceous, or ferruginous. In the coarser conglomerates, where the blocks may exceed six feet in length, there is often very little indication of stratification. Except where the flatter stones show by their general parallelism the rude lines of deposit, it may be only when the mass of conglomerate is taken as a whole, in its relation to the rocks below and above it, that its claim to be considered a bedded rock will be conceded. The occurrence of occasional bands of conglomerate in a series of arenaceous strata is analogous probably to that of a shingle-bank or gravel-beach on a modern coast-line. But it is not easy to understand the circumstances under which some ancient conglomerates accumulated, such as that of the Old Red Sandstone of Central Scotland, which attains a thickness of many thousand feet, and consists of well-rounded and smoothed blocks often several feet in diameter.

In many old conglomerates (and even in those of Miocene age in Switzerland) the component pebbles may be observed to have indented each other. In such cases also they may be found elongated, distorted or split and recemented; sometimes the same pebble has been crushed into a number of pieces, which are held together by a retaining cement. These phenomena point to great pressure, and some internal

¹¹⁵ See, for example, an account of the schotter-conglomerates of Northern Persia by E. Tietze, *Jahrb. Geol. Reichsanst. Vienna*, 1881, p. 68.