

geologists between deposits of a chemical, and those of a mechanical, origin. By the latter name are designated beds of mud, sand, or pebbles produced by the action of running water, also accumulations of stones and scorix thrown out by a volcano, which have fallen into their present place by the force of gravitation. But the matter which forms a chemical deposit has not been mechanically suspended in water, but in a state of solution until separated by chemical action. In this manner carbonate of lime is often precipitated upon the bottom of lakes and seas in a solid form, as may be well seen in many parts of Italy, where mineral springs abound, and where the calcareous stone, called travertin, is deposited. In these springs the lime is usually held in solution by an excess of carbonic acid, or by heat if it be a hot spring, until the water, on issuing from the earth, cools or loses part of its acid. The calcareous matter then falls down in a solid state, incrusting shells, fragments of wood and leaves, and binding them together.*

In coral reefs, large masses of limestone are formed by the stony skeletons of zoophytes; and these, together with shells, become cemented together by carbonate of lime, part of which is probably furnished to the sea-water by the decomposition of dead corals. Even shells of which the animals are still living, on these reefs, are very commonly found to be incrustated over with a hard coating of limestone.†

If sand and pebbles are carried by a river into the sea, and these are bound together immediately by carbonate of lime, the deposit may be described as of a mixed origin, partly chemical, and partly mechanical.

Now, the remarks already made in Chapter II. on the original horizontality of strata are strictly applicable to mechanical deposits, and only partially to those of a mixed nature. Such as are purely chemical may be formed on a very steep slope, or may even incrust the vertical walls of a fissure, and be of equal thickness throughout; but such deposits are of small extent, and for the most part confined to vein-stones.

Cementing of particles.—It is chiefly in the case of calcareous rocks that solidification takes place at the time of deposition. But there are many deposits in which a cementing process comes into operation long afterwards. We may sometimes observe, where the water of ferruginous or calcareous springs has flowed through a bed of sand or gravel, that iron or carbonate of lime has been deposited in the interstices between the grains or pebbles, so that in certain places the whole has been bound together into a stone, the same set of strata remaining in other parts loose and incoherent.

Proofs of a similar cementing action are seen in a rock at Kelloway in Wiltshire. A peculiar band of sandy strata, belonging to the group called Oolite by geologists, may be traced through several counties, the sand being for the most part loose and unconsolidated, but becoming

* See Principles, Index, "Calcareous Springs," &c.

† Ibid. "Travertin," "Coral Reefs," &c.