

by travelling over the strata from *a* to *b*, we come upon the outer edges 1, 2, 3, and may trace their order of succession, as they rise from under each other. In ravines and the escarpments of mountains, and in the cliffs on the sea-coast, we are also enabled to trace the position and order of succession of rocks. But, to do this with tolerable correctness, we must have an accurate knowledge of stratification in all its various possible forms. However simple the principles of stratification may, at first, appear, this knowledge, when applied to practice, is not of such easy attainment as some may imagine; and for want of it, geologists of considerable eminence have fallen into the most egregious errors. A knowledge of stratification is, indeed, of far greater importance to the practical geologist, than an acquaintance with the minutiae of mineralogy or conchology.

Though the word *Stratum*, in its original language, and by general acceptation in speaking of rocks, denotes a bed, it is convenient to restrict the term bed to a stratum of considerable thickness; for such beds are often subdivided into several distinct minor strata, and we cannot well describe a stratified stratum.

When a series of strata of a similar rock are arranged, with occasional strata of rocks of another kind intervening which recur in different parts of the series, they are regarded as having been all formed, nearly at the same epoch, and under similar circumstances; and such series are called, by geologists, *Formations*. Thus, the strata of shale, sandstone, and ironstone that accompany beds of coal are called the *Coal formation*. Strata of different kinds, in which a gradation into each other is observed, and which contain similar species of organic remains, also constitute a *geological Formation*. The chalk with flints, the lower chalk without flints, the chalk-marl and the green sand under the chalk, are regarded as members of what is denominated the *Chalk formation*. The student, however, must be careful to distinguish the different meaning of a *rock formation*, as here described, and the formation of a rock: the latter term implies the mode of formation, or the agent by which the rock was formed or consolidated; whether by igneous fusion, as beds of lava; by deposition from water, as beds of clay and sandstone; or by animal secretion, as beds of coral.

In order to obtain a distinct idea of stratification, in its simplest form, let the young geologist take a piece of pasteboard or thin wood, say 12 inches square: let him divide it in the middle into two equal planes, each 12 inches in length and 6 in breadth. Place one of these planes flat on a table with the ends facing the north and south; the sides will of course be at right angles, and face the east and west. Now, if one of the sides be tilted up,—say the western side,—we may suppose the pasteboard plane to represent a stratum, rising to the west and dipping eastward. The lengthwise direction of the plane is called the *line of bearing*; and the declining direction is called the *line of dip*, which is at right angles to the line of