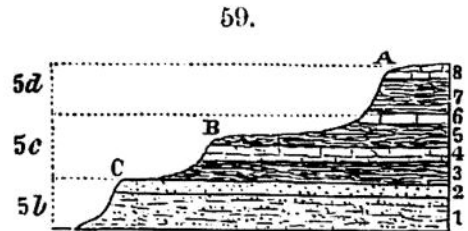


region has remained for ages as permanent dry land, without interior seas, little or no deposits have been made over the surface; and the little that has come through the winds or rains or igneous ejections. So, also, where the deep oceans have been located, the deposits have been relatively thin. The earth's coat of stratified material is hence a very irregular and ragged one.

In the description of a formation, the term *stratum* (from the Latin for *bed*, *strata* in the plural) is used for each section of the formation that consists throughout of approximately the same kind of rock-material. Thus if shale, sandstone, and limestone succeed one another in thick masses, each is an independent *stratum*. A *stratum* may consist of an indefinite number of *beds*, and a *bed*, of numberless *layers*. But the distinction of layer and bed is not always obvious.

The series of formations in the earth's structure is divided into *series*, *groups*, *sub-groups*, and *stages*, according as breaks in the history of higher and lower grade may require. The *series* are the grander divisions; e.g., the Devonian series, the Carboniferous series. The study of the succession of strata or of beds in the rocks of a region, in order to ascertain their original order and the characteristics of the beds, is a stratical or *stratigraphical*¹ investigation. The following are some illustrations:—

Fig. 59 represents a section of the *strata* as exhibited along Genesee River, at the falls near Rochester. The height of the section is 400 feet. (1) The stratum at bottom is sandstone; next above it (2) lies a hard, gray stratum, which has been called the *Gray Band*. On this rests (3) a thick stratum of greenish shale, fragile and imperfectly slaty; and (4) a compact limestone. Above this (5) is another greenish shale, much like that below; then (6) another great stratum of limestone; (7) another thicker stratum of shale; and, finally (8), at the top, is limestone wholly different from those below. The transition from one stratum to another is quite abrupt; and, moreover, each may be traced for a great distance through the adjoining country. It must be here remembered that these transitions in the rocks indicate extended changes in the conditions of the rock-making seas; that when a pure limestone was in progress, the sea was free from currents bringing in mud or sediment; when making shale, the currents carried in fine sediment; when sand, a coarser sediment; so that alternations in depth, limits, and exposure to waves and currents, or not, through the successive periods, were the source of the alternations in the strata.



The succession of strata in stratified rocks is exceedingly various. In other sections, as at Trenton Falls, N.Y., there are only limestones in sight; but, were the rocks in view to a much greater depth, sandstone would be seen. In still other regions, there are alternations of conglomerates and

¹ The latter adjective is a mongrel word, half Latin and half Greek; but it has probably been too long used to be displaced.