

In such cases, the different rocks that occur in the same geological position, have been called equivalents of each other. An instance, mentioned in a preceding chapter, may serve to explain what is meant by a geological equivalent. In the beds of transition limestone at Llanymynah, which are very regularly stratified, one stratum of the best limestone suddenly terminates, and its place is supplied by a bed of marle of equal thickness; in the same manner as we might suppose part of a course of bricks to be taken out of a wall, and its place filled up with clay; the clay would be the equivalent of the course of bricks.

In many of the lower conformable rocks, there is a tendency to reproduction in the upper parts of the series: thus, though the regular order of succession may be granite, gneiss, mica-slate, and slate (the clay-slate of Werner), we often find beds of granite among gneiss and mica-slate, and sometimes even in slate. When, however, we consider, that the chemical composition of all these rocks is very nearly the same; that silex forms on the average three fourths of their constituent parts, and alumine about one sixth or one eighth,—the proportions of the remaining parts cannot greatly affect the condition of the mass; and it is to the circumstances (whatever they may be) which have occasioned a more or less rapid consolidation of the parts, that we ought, probably, to attribute the formation of granite in one part of a mountain, and of gneiss, mica-slate, or slate in another, and the re-appearance of granite above the latter rocks. An enquiry naturally suggests itself, on observing that the order of succession in rocks is not invariably the same in distant countries. Are the similar rock formations in distant parts of the world contemporaneous? or were rocks of different classes forming at the same period? Is the granite of England, for instance, more or less ancient than the granite of the Alps? Or, are the secondary strata of one country as old as the primitive rocks of another?

Were it not for the organic remains in different rocks, we could not (as Cuvier has well observed) be certain that all rock formations were not contemporaneous. With respect to those rocks which contain no organic remains, and under which there are no other beds containing organic remains, we cannot ascertain whether they were contemporaneous, or formed at different and distant epochs. The beds of granite which are nearly vertical in mountain ranges, must have acquired a considerable degree of solidity, before the period when the beds were raised: but if we date their age from the epoch of their elevation, we shall be obliged to admit the different ages of granite mountains, and that the granite of Charnwood Forest is more ancient than that of the Alps. Of this we have as direct proof as we could possibly require. In the Alps, the beds of the upper secondary strata, analogous to our magnesian limestone, lias, and oolite, where they approach the central granitic range, are raised into nearly a vertical position conformable to that of the beds of granite, and