

age of a formation, or of the contemporaneous origin of two deposits in distant places, under very much the same restrictions as the test of mineral composition.

First, the same fossils may be traced over wide regions, if we examine strata in the direction of their planes, although by no means for indefinite distances.

Secondly, while the same fossils prevail in a particular set of strata for hundreds of miles in a horizontal direction, we seldom meet with the same remains for many fathoms, and very rarely for several hundred yards, in a vertical line, or a line transverse to the strata. This fact has now been verified in almost all parts of the globe, and has led to a conviction, that at successive periods of the past, the same area of land and water has been inhabited by species of animals and plants even more distinct than those which now people the antipodes, or which now co-exist in the arctic, temperate, and tropical zones. It appears, that from the remotest periods there has been ever a coming in of new organic forms, and an extinction of those which pre-existed on the earth; some species having endured for a longer, others for a shorter, time; while none have ever reappeared after once dying out. The law which has governed the creation and extinction of species seems to be expressed in the verse of the poet,—

Natura il fece, e poi ruppe la stampa.      ARIOSTO.

Nature made him, and then broke the die.

And this circumstance it is which confers on fossils their highest value as chronological tests, giving to each of them, in the eyes of the geologist, that authority which belongs to contemporary medals in history.

The same cannot be said of each peculiar variety of rock; for some of these, as red marl and red sandstone, for example, may occur at once at the top, bottom, and middle of the entire sedimentary series; exhibiting in each position so perfect an identity of mineral aspect as to be undistinguishable. Such exact repetitions, however, of the same mixtures of sediment have not often been produced, at distant periods, in precisely the same parts of the globe; and even where this has happened, we are seldom in any danger of confounding together the monuments of remote eras, when we have studied their imbedded fossils and their relative position.

It was remarked that the same species of organic remains cannot be traced horizontally, or in the direction of the planes of stratification for indefinite distances. This might have been expected from analogy; for when we inquire into the present distribution of living beings, we find that the habitable surface of the sea and land may be divided into a considerable number of distinct provinces, each peopled by a peculiar assemblage of animals and plants. In the *Principles of Geology*, I have endeavored to point out the extent and probable origin of these separate divisions; and it was shown that climate is only one of many causes on