

cases there may be scarcely a single shell common to the three different deposits, we do not hesitate to refer them all to one period (the Post-Pliocene), because of the very close agreement of the fossil species in every instance with those now living in the contiguous seas.

To take another example, where the fossil fauna recedes a few steps farther back from our own times. We may compare, first, the beds of loam and clay bordering the Clyde in Scotland (called glacial by some geologists), secondly, others of fluvio-marine origin near Norwich, and, lastly, a third set often rising to considerable heights in Sicily, and we discover that in every case more than three-fourths of the shells agree with species still living, while the remainder are extinct. Hence we may conclude that all these, greatly diversified as are their organic remains, belong to one and the same era, or to a period immediately antecedent to the Post-Pliocene, because there has been time in each of the areas alluded to for an equal or nearly equal amount of change in the marine testaceous fauna. Contemporaneousness of origin is inferred in these cases, in spite of the most marked differences of mineral character or organic contents, from a similar degree of divergence in the shells from those now living in the adjoining seas. The advantage of such a test consists in supplying us with a common point of departure in all countries, however remote.

But the farther we recede from the present times, and the smaller the relative number of recent as compared with extinct species in the tertiary deposits, the less confidence can we place in the exact value of such a test, especially when comparing the strata of very distant regions; for we cannot presume that the rate of former alterations in the animate world, or the continual going out and coming in of species, has been everywhere exactly equal in equal quantities of time. The form of the land and sea, and the climate, may have changed more in one region than in another; and consequently there may have been a more rapid destruction and renovation of species in one part of the globe than elsewhere. Considerations of this kind should undoubtedly put us on our guard against relying too implicitly on the accuracy of this test; yet it can never fail to throw great light on the chronological relations of tertiary groups with each other, and with the Post-Pliocene period.

We may derive a conviction of this truth not only from a study of geological monuments of all ages, but also by reflecting on the tendency which prevails in the present state of nature to a uniform rate of simultaneous fluctuation in the flora and fauna of the whole globe. The grounds of such a doctrine cannot be discussed here, and I have explained them at some length in the third Book of the Principles of Geology, where the causes of the successive extinction of species are considered. It will be there seen that each local change in climate and physical geography is attended with the immediate increase of certain species, and the limitation of the range of others. A revolution thus affected is rarely, if ever, confined to a limited space, or to one geograph-