

ical province of animals or plants, but affects several other surrounding and contiguous provinces. In each of these, moreover, analogous alterations of the stations and habitations of species are simultaneously in progress, reacting in the manner already alluded to on the first province. Hence, long before the geography of any particular district can be essentially altered, the flora and fauna throughout the world will have been materially modified by countless disturbances in the mutual relation of the various members of the organic creation to each other. To assume that in one large area inhabited exclusively by a single assemblage of species any important revolution in physical geography can be brought about, while other areas remain stationary in regard to the position of land and sea, the height of mountains, and so forth, is a most improbable hypothesis, wholly opposed to what we know of the laws now governing the aqueous and igneous causes. On the other hand, even were this conceivable, the communication of heat and cold between different parts of the atmosphere and ocean is so free and rapid, that the temperature of certain zones cannot be materially raised or lowered without others being immediately affected; and the elevation or diminution in height of an important chain of mountains or the submergence of a wide tract of land would modify the climate even of the antipodes.

It will be observed that in the foregoing allusions to organic remains, the testacea or the shell-bearing mollusca are selected as the most useful and convenient class for the purposes of general classification. In the first place, they are more universally distributed through strata of every age than any other organic bodies. Those families of fossils which are of rare and casual occurrence are absolutely of no avail in establishing a chronological arrangement. If we have plants alone in one group of strata and the bones of mammalia in another, we can draw no conclusion respecting the affinity or discordance of the organic beings of the two epochs compared; and the same may be said if we have plants and vertebrated animals in one series and only shells in another. Although corals are more abundant, in a fossil state, than plants, reptiles, or fish, they are still rare when contrasted with shells, especially in the European tertiary formations. The utility of the testacea is, moreover, enhanced by the circumstance that some forms are proper to the sea, others to the land, and others to freshwater. Rivers scarcely ever fail to carry down into their deltas some land shells, together with species which are at once fluviatile and lacustrine. By this means we learn what terrestrial, freshwater, and marine species coexisted at particular eras of the past; and having thus identified strata formed in seas with others which originated contemporaneously in inland lakes, we are then enabled to advance a step farther, and show that certain quadrupeds or aquatic plants, found fossil in lacustrine formations, inhabited the globe at the same period when certain fish, reptiles, and zoophytes lived in the ocean.

Among other characters of the molluscous animals, which render them extremely valuable in settling chronological questions in geology, may be mentioned, first, the wide geographical range of many species