tological study, having therefore the successional lines which such study ascertains; but different in method, the change in species being dependent, in his view, on creative acts, and not on natural variation. All students of nature, with a rare exception, then believed in permanence; for Lyell's chapter against the transmutation of species, in the successive editions of his *Principles of Geology*, had seemingly settled the question against Lamarck by scientific argument. It was not till 1859 that Darwin's work was published on the *Origin of Species by means of Natural Selection, or the Preservation of Favored Races in the Struggle for Life.*

The principles above stated are all in accord with a theory of evolution; and, through the added facts of later years, they favor the view of *evolution by natural variation.* Some of these added facts are the following: Botanists find numerous cases among existing species in which, owing to the many varieties, no line can be drawn between allied species; and other cases in which modern species of plants are but slight modifications of fossil Tertiary species, some too slight to be called distinct species, and others more divergent up to those of good distinctive characters. Similar facts occur as a consequence of migrations, among animals as well as plants. Arctic America contained, in Tertiary time, plants so much like species existing in the forests of both temperate North America and Japan (page 939), that the former have been pronounced the undoubted progenitors of the latter. Along the Pacific coast and Gulf coast of Central America there are so many identical and nearly related species of aquatic animals that migration during a time of submergence of the narrow strip of land, with subsequent variation, is regarded as the only reasonable explanation. These and other observations have proved sufficient to make all zoölogists of the present day, like the botanists, believers in a system of *Evolution by variation.*

It is admitted that in the geological record cases of unbroken gradation between species are of rare occurrence. But the geological record bears evidence, in all parts, of imperfections. It is imperfect, (1) because, under the most favorable circumstances, only a small part of the existing species could have been fossilized; (2) because in all lands there are great breaks in the series of rocks, as is known from comparing the rocks of different continents, and even different regions on the same continent; (3) because fossiliferous rocks are almost solely of aqueous origin, and consequently they contain exceedingly little of the terrestrial life of the ancient world — one species of Bird being all yet discovered in the world's rocks of the Jurassic period, and two species of Mammals all that are known from the American Triassic beds; (4) because marine strata that were formed around the land when it was at a higher level than the present are now buried in the ocean, and are therefore inaccessible, a condition that has affected half the borders of a continent for several successive periods; (5) because only a small part of the rocks of a continent are open to view. This subject has been abundantly illustrated in the preceding history of the formations and their life.

But transitions have been nearly filled in so many cases, and are indi-