

Neuropters, Orthopters, Coleopters, Lepidopters, Hymenopters; but each was derived from some early comprehensive forms.

The results of degeneration afford other series of facts of the highest importance with reference to the origin of species. Some of them, and a few of the principles they illustrate, are mentioned on pages 717, 931.

*Two systems of evolution.* — LAMARCK, in his system of Evolution (*Phil. Zööl.*, 1809), laid down as one chief cause of variation, the *use and disuse* of organs or parts, — use causing enlargement, and disuse a dwindling even to disappearance; and one of his illustrations was drawn from the difference in length of wing of the tame and wild Ducks. He put forth, as other sources of change, the surrounding physical conditions and their often abrupt changes, and referred also, in an imperfect way, to the effect of biological associations, or the influence of the living species of a region on one another. The importance of the principle of heredity was also recognized. He added to his system the principle — a tendency upward.

DARWIN, in his work of 1859, recognized the obvious causes of variation, but claimed that these, and all means of change, derived their efficiency from action under the principle of "Natural Selection," as indicated in the title of his work. He elucidated the subject of evolution by many illustrations of the effects of breeding and culture under man's care and guidance; by his study of variation among living plants and animals, wild and domesticated, publishing a separate work of great value on *Animals and Plants under Domestication*; by full illustrations of the laws of heredity; and by new facts, almost a revelation to science, relating to the *living* environments of species, and the consequent interdependence and interaction of associated kinds in both kingdoms of life.

According to the principle of natural selection, "an animal or plant that varies in a manner profitable to itself will have, thereby, a better chance of surviving," and of contributing its qualities and progressive tendency to the race, while others not so favored, or varying disadvantageously, disappear. The favored ones, or the "naturally selected," are one or two, or a few, of a herd, or of a region; and the unfavored ones, fated to disappear because unadaptable, include, theoretically, all the rest. The principle of selective breeding is used in the development of the favored ones; for these have to be separated from the rest of the herd for success, as in man's selection. The adaptations are to any kind of condition, whether favorable to the highest or to the lowest developments, so that progress under the principle may be upward or downward. The *origin* of variation is not considered. Everything in nature varies, and changing conditions are always adding to the variations. However produced, the individual that is profited by a variation survives, propagates its characteristics, and becomes the type of a species, while "multitudes" are left behind in the struggle with adverse environments; and thus the new species, in the end, stands widely apart from other species.

In the expression, "preservation of favored races in the struggle for