

whatever cause proceeding, if it be in any degree profitable to an individual of any species, in its infinitely complex relations to other organic being, and to external nature, will tend to the preservation of that individual and will generally be inherited by its offspring." This principle by which each slight variation, if useful, is preserved has been called "Natural Selection." The term "struggle for existence" must be understood in a wide and metaphorical sense, including the efforts a being has to put forth to accommodate itself to its environment, its dependence on other beings, the life of the individual, and its success in leaving offspring. More individuals are produced than can possibly survive; therefore, in every case there must be a struggle for life, one individual with another of the same species, or with individuals of a different species, or with surrounding physical conditions. In fact the life of every organism is a continual struggle with its environment. The relations existing between organic beings are often very complex. I will just give one instance noted by Mr. Darwin: "I have reason to believe that humble-bees are indispensable to the fertilization of the hearts-ease (*Viola tricolor*) for other bees do not visit this flower. From experiments which I have lately tried, I have found that the visits of bees are necessary for the fertilization of some kinds of clover; but humble bees alone visit the red clover (*Trifolium pratense*), as other bees cannot reach the nectar. Hence I have very little doubt, that if the whole genus of humble-bees became extinct or very rare in England, the hearts-ease and red clover would become very rare, or wholly disappear. The number of humble-bees in any district depends in a great degree on the number of field-mice, which destroy their combs and nests; and Mr. H.

Newman, who has long attended to the habits of humble-bees, believes that more than two-thirds of them are thus destroyed all over England. Now the number of field-mice is largely dependent, as every one knows, on the number of cats; and Mr. Newman says: 'Near villages and small towns I have found the nests of humble-bees more numerous than elsewhere, which I attribute to the number of cats which destroy the mice.' Hence it is quite credible that the presence of a feline animal in large numbers in a district might determine, through the intervention first of mice and then of bees, the frequency of certain flowers in that district!"

Now in what way does this struggle for existence act in regard to variation? Just in this way. If any being vary, even slightly, in any way favorable to itself under the conditions in which it may be placed, this being will have a better chance of surviving in the struggle, and will thus be naturally selected. "It may be said that Natural Selection is daily and hourly scrutinizing, throughout the world, every variation, even the slightest; rejecting that which is bad, preserving and adding up that which is good; silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life." From the strong principle of heredity any useful variation will have a tendency to be reproduced in the offspring, and so any selected variety will tend to propagate itself with its new characteristics intensified.

In addition to natural selection the general result of the struggle for existence, another important factor comes into play, where a desire for propagation is concerned, which Mr. Darwin calls "Sexual Selection." This depends upon a struggle between