VARIETIES IN NATURE. SECONDARY LAWS.

DARWIN'S NEW WORK.

ON THE VARIOUS CONTRIVANCES BY WHICH BRITISH AND FOREIGN ORCHIDS ARE FERTILISED BY INSECTS. By CHARLES DARWIN, M.A., F.R.S. With Illustrations. pp. 265. London, 1862. JOHN MURRAY.

PLANTS, whether regarded as individuals, or, as grouped in the field, the garden, and the landscape, are objects of universal interest and delight. The beauty of their forms, the variety of their foliage, the harmony, splendour, and delicacy of colours exhibited in their flowers; the frequency, and the charm of shade, the refreshing verdure, and the convenient shade we owe to them, as well as their more important uses in contributing so largely to our food, our raiment, and our shelter, unite our interests, and even our existence with theirs. The contemplation of plants also, so organised living beings, and an examination with the microscope of the wonderful and intricate structures of which they are made up, cannot fail to excite the most intense admiration, and to raise the mind from its examination of the wild flowers of our fields to the God by whom they were made and who exists. "In the lilies of the field, they toil not, neither do they spin," and yet how truly has it been said, that "Solomon in all his glory was not arrayed like one of these."

In the study of plants, the most careless observers cannot but at once discover many very remarkable and evident distinctions between living beings and inanimate objects. The most evident of these distinctions are the inherent built rather upon a comparison of their mode of existence, than upon an examination of their intimate structure. The ceaseless tendency to change which characterises the life of the flower stands in yet more obvious contrast to the unturning stability of the latter, than does that peculiar arrangement of elementary principles which is the characteristic of living, as regular aggregation of the ultimate atoms which the inorganic world presents. The mountains still remain almost unaffected by the lapse of ages which have rolled over them since their first elevation; but what, in comparison with this permanence, is the duration of any structure subject to the usual laws of vitality? To be born, to grow, to arrive at maturity, to sink into decay, to fade, to perish, is the sum of the history of every living creature. This law applies alike to man in the pomp of royalty, or the pride of learning and philosophy, and to the gaily-coloured butterfly which flies for a few short days in the sunbeams and is seen no more. It applies to the gigantic oak, monarch of the forest for successive ages, and to the insignificant lichen which springs up in an hour and withers in a day. At the best, life is but a "vapour, which appears for a short time, and then vanishes away."

And yet, amid this constant change and succession of individuals, the form and character first impressed by the Creator of all is uninterruptedly transmitted from parent to offspring. "One generation passeth away," but another succeeds; and the plant, structure, and habits, the limits of its existence. The bee orchis of our day is what it was two thousand years ago, despite the "various contrivances" for its "fertilisation by insects," and the astonishing fact that self-fertilisation should not have been an habitual occurrence." The misletoe still flourishes upon the trees of our forests, just as when an object of superstitious awe and veneration in the hallowed groves of our Druid ancestors. The bee builds her comb with the same unvarying regularity, and fills her hive with the same delicious honey, as when her beautiful ancestors first made acquaintance with and the philosopher in those classic ages which have long since passed away. And man, however modified by education, however exalted by the pride of learning and philosophy, and however born the same helpless and dependent being, with the same dormant faculties of mind and body as the first son of our original parents.

Modern Darwinism, which we propose, in another place, to exhibit this uniformity of the operations of nature, and we repeat again to-day that the lark now carols the same song, and in the same tone, as the ancient Grecian bard has enraptured ear to listen to its melody; that the owl first hooted in B flat, and that it still loves this key, and screams through no other notes; that the cricket now sets our teeth on edge the death watch; that all the three noted chirps of the cricket have ever been in "B" since Tubal Cain first heard them in his smithy, or the Israelites in their sub-ovens; that the buzz of the gnat has never varied a note from "A natural," that of the house-fly wing sunk below the first "F;" that the tulip in its first bloom in Noah's garden emitted heat four and a half degrees above the surrounding air, as it does at present day; that the stormy petrel as much delighted to sport amongst the first billows which the ocean ever raised, as it does now; that in the first impulse given to the migrating birds north to south, and flew over the narrowest part of the seas, as they will this autumn; that the cuckoo and the nightingale first began their song together, and that, at the beginning of our April, in the days of Nimrod; that those birds which lived on flies laid bluish eggs in the days of Joseph, as they will two thousand years hence, if the world should not fall from his throne, or the earth not break her harmony with the planetary cars; and that corals have ever grown edgeways to the ocean stream. We might thus go on with an almost endless variety of illustrations of the uniformity of nature's laws in the animal and vegetable kingdoms for countless generations. It would also be easy to show that no organic structure has been, or can be, created, but by a Creator, and that in no species, by lapse of ages, or by artifices of breeding, has passed, or can be made to pass, into another. Did space permit, it would be easy to show that the wild animals do not change in the course of time; that animals known to the ancients are now in existence, exhibiting to this day the same physical characters as of old, and that the Creator, who made them, has as yet but told in the beginning, that the supposed intermediate forms between the species of different geological periods are imaginary beings, and but a creation of the brain, that has put forth every your to sustain a tottering and fanciful theory. The law of variation, to a considerable extent, still remains a mystery, and we say at once that we do not pretend to solve it, but little to explain the origin of all that diversity which we observe in plants and animals.

It may facilitate the inquiry on which we have entered, if a few words are now devoted to an explanation of the terms *species*, *secondary laws*, and *race*. The word *species*, from specio, to behold, signifies, literally, the form or appearance, and, in a wider sense, a class or division causing the same, or similar sensations, at sight. This term is used in a *popular*, a *logical*, and a *zoological* sense. In the popular sense, species means any class, either of subjects or objects, which are arranged in a more general class. In its logical sense, by the word species we understand any class of whatever nature, which is distinguished from all other classes by an indefinite multitude of properties, *not deducible from another class, and which is not divisible into other kinds*. In a zoological sense, the words genus, species, and variety, may be thus defined.

A race, or a tribe of plants, marked by any peculiarities of structure which from one generation to another have always been constant and unvarying, is called a species. Two races are described as specifically distinct, if they are distinguished from each other by some peculiarities which the one cannot be supposed to have acquired, or the other to have been deprived of, by any operation of physical causes with which we are acquainted. Under the term species, therefore, are comprised all those animals which are supposed to have sprung in the first instance from a single pair. Cuvier said, years ago, "We are under the necessity of admitting the existence of certain forms which have perpetuated themselves from the beginning of the world without exceeding the limits at first prescribed." All the individuals belonging to one of these forms constitute what is termed a species.

The term *genus* has a much more extensive signification. It is a collection of several species on a principle of resemblance, and it may comprehend a greater or less number of species according to the peculiar views of the naturalist.

Varieties are such diversities in individuals and their progeny as are observed to take place within the limits of species; such varieties in plants and animals may be produced by the agency of external causes. They are congenital. That deviation from the peculiarities of the parent stock which is occasioned by the mixture of breed has been looked upon as a kind of variety; but, throughout the animal kingdom, varieties very often arise as the result of agencies which are not yet explained, but which are hereditary, or transmitted to offspring with greater or less degrees of constancy. Varieties are distinguished from species by the circumstances that they are congenital or permanent, but have arisen within the limits of a particular stock or race. Permanent varieties are such as, having once taken place, continue to be propagated. The term *race* has two leading ideas. *Firstly*, original difference of character. *Secondly*, perpetuity of transmission.

Races are properly successions of individuals propagated from any given stock.

We will quote, in this very interesting and elaborate work of Mr. Darwin. He tells us that his object in writing it is,

"—to show that the contrivances by which orchids are fertilised, are as varied and almost as perfect as any of the most wonderful adaptations in the vegetable kingdom; and, secondly, to show that these contrivances have for their main object the fertilisation of each flower by the pollen of another flower. In my volume 'On the Origin of Species,' I have given only general reasons for my belief that it is apparently a universal law of nature that no hermaphrodite should cross or intercross with another individual; or, which is almost the same thing, that no hermaphrodite fertilises itself for a perpetuity of generations. Having been blessed for proceeding this doctrine by a mass of facts, all of which I had not in that work sufficient space, I wish to show that I have not spoken without having good and ample grounds. I hope, also, that this treatise separately, as it has become inconveniently large to be incorporated with the rest of the discussion on the same subject, will show to those who think that orchids are universally acknowledged to rank amongst the most singular and most modified forms in the vegetable kingdom, the facts to be presently mentioned, which are all connected with one particularly noble of our several native species. An examination of their many beautiful contrivances will widely extend our knowledge of nature's dominions. I fear, however, that the necessary details will be too minute and complex for any one who has not a strong taste for natural history. This treatise affords the means of testing a view thought that the