

The fourth edition of Dr. Charles Darwin's "Origin of Species by Means of Natural Selection; or, The Preservation of Favored Races in the Struggle for Life," is just published by Murray. The *London Reader* remarks that this is far from being a mere reprint of the famous book. + The additions and corrections are numerous and important, and the author has thrown most of them into tabular form for convenient reference.

Amongst the recent observations which help Dr. Darwin's theory, those of De Candolle on the variability of the oak-genus are not the least interesting:

DE CANDOLLE'S RESEARCHES.

He first gives in detail all the many points of structure which vary in the species, and estimates numerically the relative frequency of the variations. He specifies above a dozen characters which may be found varying even on the same branch, sometimes according to age or development, sometimes without any assignable reason. Such characters of course are not of specific value, but they are, as Asa Gray has remarked in commenting on this memoir, such as generally enter into specific definitions. De Candolle then goes on to say that he gives the rank of species to the forms that differ by characters never varying on the same tree, and never found connected by intermediate states. After the discussion, the result of so much labor, he emphatically remarks: "They are mistaken who

repeat that the greater part of our species are clearly limited, and that the doubtful species are in a feeble minority. This seemed to be true, so long as a genus was imperfectly known, and its species were founded upon a few specimens, that is to say were provisional. Just as we come to know them better, intermediate forms flow in, and doubts as to specific limits augment." He also adds that it is the best known species which present the greatest number of spontaneous varieties and sub-varieties. The *Quercus robur* has twenty-eight varieties, all of which, excepting six, are clustered round three sub-species, namely, *Q. pedunculata*, *sessiliflora*, and *pubescens*. The forms which connect these three sub-species are comparatively rare; and, as Asa Gray remarks, if these connecting forms, which are now rare, were to become extinct, the three sub-species would hold exactly the same relation to each other as do the four or five provisionally admitted species which closely surround the typical *Quercus robur*. Finally, De Candolle admits that out of the three hundred species which will be enumerated in his *Prodomus* as belonging to the oak family, at least two-thirds are provisional species—that is, are not known strictly to fulfil the definition above given of a true species.

Perhaps no idea has been so much laughed at as the one that a mere sensitiveness to light produced the eye, instead of the eye being made to see. But Dr. Darwin says:

THE EYE.

To suppose that the eye, with all its inimitable contrivances for adjusting the focus to

different distances, for admitting different amounts of light, and for the correction of spherical chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest degree. When it was first said that the sun stood still and the world turned round, the common sense of mankind declared the doctrine false; but the saying of *vox populi vox Dei*, as every philosopher knows, cannot be trusted in science. Huxley tells me that if numerous gradations from a perfect and complex eye to one imperfect and simple, each grade being useful to its possessor, can be shown to exist; if further, the eye does vary ever so slightly, and the variations be inherited, which is certainly the case, and if any variation or modification in the organ be ever useful to an animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could have been formed by natural selection, though insuperable by our imagination, can hardly be considered real. How a nerve comes to be sensitive to light hardly concerns us more than how life itself first originated; but I may remark that, as some of the lowest organisms, in which nerves cannot be detected, are known to be sensitive to light, it does not seem impossible that certain elements in their tissues or sarcode should have become aggregated and developed into nerves endowed with special sensibility to its action.

Here is a fresh passage, which touches upon the highest problems of creation:

DARWIN'S NEW HYPOTHESIS.

With respect to the view that organic be-

ings have been created beautiful for the delight of man—a view which, it has lately been pronounced, may safely be accepted as true, and as subversive of my whole theory—I may first remark that the idea of the beauty of any particular object obviously depends on the mind of man, irrespective of any real quality in the admired object; and that the idea is not an innate and unalterable element in the mind. We see this in men of different races admiring a different standard of beauty in their women; neither the Negro nor the Chinese admires the Caucasian beau-ideal. The idea also of beauty in natural scenery has arisen only within modern times. On the view of beautiful objects having been created for man's gratification, it ought to be shown that there was less beauty on the face of the earth before man appeared than since he came on the stage. Were the beautiful volute and cone shells of the Eocene epoch, and the gracefully sculptured ammonites of the Secondary period created that man might ages afterwards admire them in his cabinet? Few objects are more beautiful than the minute siliceous cases of the diatomaceæ; were these created that they might be examined and admired under the higher powers of the microscope? The beauty in this latter case, and in many others, is apparently wholly due to symmetry of growth. Flowers rank amongst the most beautiful productions of nature; and they have become through natural selection beautiful, or rather conspicuous, in contrast with the greenness of the leaves, that they might be easily observed and visited by insects, so that their fertilization might be favored. I

...their fertilization might be favored. I have come to this conclusion from finding it an invariable rule that when a flower is fertilized by the wind, it never has a gaily-colored corolla. Again, several plants habitually produce two kinds of flowers; one kind opened and colored, so as to attract insects; the other closed and not colored, destitute of nectar, and never visited by insects. We may safely conclude that, if insects had never existed on the face of the earth, the vegetation would not have been decked with beautiful flowers, but would have produced only such poor flowers as are now borne by our firs, oaks, nut and ash trees, by the grasses, by spinach, docks and nettles.

One of the most popular tales of natural history, which has afforded a text for moralists of every age, is sharply assailed by Dr. Darwin. He says: "I hear from Professor Wyman, who has made numerous careful measurements, that the accuracy of the workmanship of the bee has been greatly exaggerated; so much so, that, as he adds, whatever the typical form of the cell may be, it is rarely, if ever, realized."

The experiments of Sir John Lubbock on *Chlœon dimidiatum*, are commented upon at great length; in fact they have compelled the whole chapter on "Embryology and Development" to be entirely rewritten. Dr. Darwin remarks: "Fritz Müller who has recently discussed this whole subject with much ability, goes so far as to believe that the progenitor of all insects probably resembled an adult insect, and that the caterpillar or maggot, and cocoon or pupal stages, have subsequently been acquired: but from this view many naturalists—for instance, Sir J. Lubbock, who has likewise recently di-

Lubbock, who has likewise recently discussed this subject—would, it is probable, dissent.”

But Darwin's ideas as to the probable na-

ture of our own common ancestor, derive fresh strength from the conjectures of Muller on another point. “It is probable,” Darwin says, “from what we know of the embryos of mammals, birds, fishes, and reptiles, that all the members in these four great classes are the modified descendants of some one ancient progenitor, which was furnished in its adult state with branchiæ, had a swim-bladder, four simple limbs, and a long tail fitted for an aquatic life.”