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The Variation of Plants and Animals under Domestication; by CHARLES DARWIN, M.A., F.R.S., &c. American edition. 2 vols. 1868. (Orange Judd & Co., New York). – In his "Origin of Species" the author promised to give us some of the details of the changes produced in animals and plants by Men's selection, and this promise is redeemed in the work before us. The first volume is devoted to a consideration of breeds and varieties of various domestic animals and plants; the second relates to the variability of species in nature, the inheritance, crossing, hybridism, methodical selection, &c., the whole concluding with certain hypotheses and speculations.

The first volume will perhaps be most prized by naturalists, as it treats mostly of unquestioned facts concerning varieties, their characteristics, history, &c., but so arranged that they continually suggest and support the author's theory.

The second volume, it seems to us, will be most valued by practical breeders of animals and cultivators of plants, men whose professions have made them familiar with the class of facts recorded in the first. We will not at this time consider the author's well known views respecting species, and their origin, as the hypotheses and speculations referred to can hardly be discussed, or even explained, within the narrow limits of the present notice. At

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present we restrict our attention to some observations recorded in the first volume.

Naturalists have generally assumed that the different breeds of domestic cattle constitute but one species; and the same of dogs, horses, sheep, &c., while practical breeders of each have as generally assumed the contrary. The author after a careful consideration of the facts, concludes that cattle, dogs and hogs are each derived from more than one wild species; but that horses, rabbits, pigeons, fowls, &c., have each descended from but one parent species. The evidences given in favour of these views are rather historical than in anything indicated by the characteristics of the breeds themselves; for there is a greater difference between the extreme breeds of pigeons than those of cattle, and the difference between the different breeds of horses, is greater "than between the six or seven other living species of the genus *Equus*."

We are led to infer that he believes that sheep also have not descended from a single species. It is certain that by far the majority of successful sheep-breeders are of this opinion; and after stating the views of various authors upon this subject, some of whom believe that all the breeds are derived from a few original species, and others from many, he adds,

"under such a hopeless state of doubt it would be useless for my purpose to give a detailed account of the several breeds." We regret that he did not consider the variation of some breeds within known periods.

The histories of English breeds furnish ample materials. The honest and careful observer, who will record the experience of American sheep breeders within the last eighty years, will do a great service in our Natural History. The changes that have been effected step by step, in the improvement of the "Infantado" merinos in late years, the changes wrought in the Saxon and other breeds a few years ago, the effects of transplanting well marked breed from the hills of the extreme Northern States to the plains of Texas and California, are not only subjects of immense practical importance to our industry, but also embrace a class of facts which ought not to be lost to science. Mr. Darwin treats at some length of domestic rabbits, agreeing with other naturalists, that they are all descended from the wild rabbit of Europe. We are all familiar with the remarkable difference between the breeds, some being four or five times as large as others; in color, habit and disposition, they are not less diverse. Mr. Darwin finds corresponding changes in the bony and nervous system. Paleontologists would consider the skulls of the different breeds to indicate well marked species, if they were found fossil. In the half lop-eared breeds the skull has a lateral curvature; in most breeds the capacity of the brain cavity has decreased relatively to the size of the animal or to the length of the skull. He gives a curious table of measurements illustrating this. In one breed this decrease is 23 per cent, considered relatively to the weight of the animal, and 54 per cent relatively to the length of the skull. He says, "I found on comparing the skulls of ten species of hares in the British Museum, that they differed from each other chiefly in the very same points in which domestic rabbits

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vary, - namely, in general proportions, in the form and size of the supraorbital plates, in the form of the free end of the malar bone, and in the line of the suture separating the occipital and frontal bones." Other parts of the skeleton show equal variation.

The varieties of domestic pigeons are described in detail; but any abstract of these chapters would be unsatisfactory. They constitute an important part of the volume, and must be read entire.

Besides mammals and birds, a few fishes and insects are considered. If the statements of bee-keepers in this country can be credited, they have attained a much greater success in breeding to points, than is here claimed for European experts.

Mr. Darwin's theories have perhaps been more kindly received by botanists than zoologists, and yet we find in the work before us, (as in his "Origin of Species.") much more space devoted to the variations of animals than of plants, in fact, but a fourth of this volume is devoted to the latter. Perhaps, like the shrewd lawyer, he elaborates his argument most where it is most wanted. Doubtless the facts relating to the geographical distribution of plants have had great weight with botanists; but it is equally true that plants vary much

more than animals; whether these variations are more remarkable or not, they are certainly no less striking.

We are reasonably certain what wild species were the parents of most of our domestic animals, and also of birds. "There is in fact, only one kind of domesticated bird, namely, the Chinese goose or *Anser cygnoides*, of which the parent form is said to be still unknown or extinct." Far different is it with plants. The original wild forms of many have either become extinct, or their cultivated progeny have varied so widely that it is no longer possible to recognize their parentage. In 1855, DeCandolle gave a list of 157 of the most useful cultivated plants. Of these he believes that 85 are almost certainly known in their wild state, but on this head other competent judges entertain great doubts. Of 40 of them, he admits that the origin is doubtful, and 32 are ranked as quite unknown to their aboriginal condition. This is a large proportion. One fifth are admitted to be of unknown origin, and nearly one half doubtful. This list does not include ornamental plants, nor many useful varieties which present ill defined characters.

We cannot notice variations of plants further than of certain cucurbitaceous species, which have been so extensively investigated by Mr. Naudin, who considers *Cucubitas pepo* to be the most variable plant in the world. "The fruit of one variety exceeds in volume that of another by more than two thousand fold," and the other variations are as remarkable. Some varieties are slender vines, others erect, some with tendrils and others without. There is not an important organ that has not undergone great variations in some one or another of the varieties, and to describe all these variations would require a large volume, and yet, each of these modified forms is reasonably permanent in cultivation. Melons and cucumbers vary nearly as much. Concerning these variations, Mr. Darwin pertinently quotes Mr. Naudin's remark, that "this extraordinary production of races and varieties by a single species,

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and their permanence when not interfered with by crossing, are phenomena well calculated to cause reflection."

Apropos to this family we notice an unaccountable mistake on p. 430, where, as on the corresponding page in the English edition, the water-melon is said to be *Cucurbita moschata*! This entails a misunderstanding on p. 432, where the *C. moschata* spoken of is the squash to which that name belongs, and perhaps also on the following page, where the "endless varieties of the melon" (meaning of course musk-melon, *Cucumis Melo*) are referred to. If we rightly remember, an erratum in the English edition corrected this wrong name of the water-melon; but it seems to have been overlooked in the reprinting on both sides of the water. This "authorized" American edition is from the second English edition, containing the corrections and additions in that, together with some new corrections by the author. It has a preface by the author, and an introductory note by Prof. A. Gray. It is reasonably well printed, and furnished at less than half the cost of the English edition.

W.H.B.