

NOTICES OF BOOKS.

The Descent of Man, and Selection in Relation to Sex. By CHARLES DARWIN, M.A., F.R.S., &c. In 2 vols.; with Illustrations. London: J. Murray. 1871.

THE first impression with many on opening this work,—the announcement of which has for the last year and a half stimulated the curiosity and excited the most intense interest of the whole scientific world,—will possibly be one of disappointment, that so small a portion of it is devoted to the main subject, an attempt to trace the descent of man from those lower forms of animal life which present the closest relationship to him in structure and in mental development. The book is divided into two parts, of which the first, "On the Descent of Man," occupies only rather more than half the first volume; the second part, "On Sexual Selection," comprising fourteen out of the twenty-one chapters of which the work consists; eleven of these fourteen chapters treating of sexual selection in relation to the lower animals, the last three again applying the principles which have been arrived at to the case of man. No one, however, will read beyond the first chapter without recognising many of those qualities which secured for the author's work "On the Origin of Species" a reception almost without a parallel, and enabled it to effect a revolution all but unexampled on the current of thought in the scientific world. The lapse of twelve years has abated none of Mr. Darwin's industry in collecting a prodigious array of facts from all conceivable sources in support of every proposition which he brings forward; nor has it deprived us of that wonderful combination of humility, confidence, and appreciation of the labours of others, which makes him ever ready even to magnify the importance of facts which appear to tell against his own peculiar views, and never backward to acknowledge when he himself sees reason to change some previously expressed opinion.

Commencing with a detailed account of the homologous structures in man and the lower animals, especially in their rudimentary organs and embryonic development; and with a comparison between the mental powers of the human race and those of the remainder of the animal kingdom, Mr. Darwin then proceeds to discuss the questions of the manner in which man has been developed from some lower form, and of the particular form which has established the best claim to be considered in the light of our remote ancestor. The question naturally arises in the outset,—granted the hypothesis that man has sprung by a process of gradual evolution from some lower form, and does not owe his origin to a separate act of creation,—are we to

attempt to trace this descent in one or more lines? In other words, are all the various races of mankind to be included in one species or in several? It must be borne in mind that this question is not the same as whether mankind are sprung from one original pair. When the evolutionist supposes that one species of animal or plant has been evolved out of a pre-existing closely allied form, it is not necessary to assume that all the existing individuals are descended from some one aberrant off-shoot of the original stock; the whole race may have gradually changed by the operation of the law of the Survival of the Fittest, owing to some alteration in its external environment, so that it may be impossible to draw a line of demarcation between the earlier and the later form. This is doubtless the manner in which all evolutionists must hold that man gradually arose by continuous modifications from his nearest structural relatives, the anthropoid apes; but whether in one or several lines of descent is an open question. Mr. Wallace, in his essay on "The Development of Human Races under the Law of Natural Selection," while stating the arguments on both sides of the question, sums up on the whole in favour of the primitive diversity of man; Mr. Darwin we understand to hold a different opinion. We could have wished that his views on this point had been more explicitly stated; we draw our conclusion rather from his mode of expressing himself than from any definite statement, and from the absence of any allusion to more than one such line of descent. Let us examine his arguments a little more in detail.

Starting with the main principle of the theory of Natural Selection, that all organic species tend spontaneously to vary from the parent form, generally to a very small extent, and that those variations only survive and become hereditarily perpetuated which present some advantageous point of structure in comparison with their fellows, Mr. Darwin applies this principle to the case of man, stating that, "in order that an ape-like creature should have been transformed into man, it is necessary that this early form, as well as many successive links, should all have varied in mind and body. It is impossible to obtain direct evidence on this head; but if it can be shown that man now varies—that his variations are induced by the same general causes, and obey the same general laws, as in the case of the lower animals—there can be little doubt that the preceding intermediate links varied in a like manner. The variations at each successive stage of descent, must, also, have been in some manner accumulated and fixed." One of the earliest changes must have been in the shape of the hands and feet. The hands and feet of the anthropoid apes are admirably adapted for climbing trees and obtaining their food. Baboons, however, which frequent hilly and rocky districts, and only from necessity climb up high trees, habitually use their feet for walking along the ground, and have acquired almost the gait of a dog. In order to enable man to obtain mastery over those arts which have raised him so

far above even the most intelligent of his nearest relatives, it was necessary that his hands should not be used for the purpose of locomotion, and hence that he should acquire the habit of walking erect on his hind legs. This great change having become effected in the course of countless generations, the rest followed more easily, and probably more rapidly. "The pelvis would have to be made broader, the spine peculiarly curved, and the head fixed in an altered position, and all these changes have been attained by man. Professor Schaafhausen maintains that 'the powerful mastoid processes of the human skull are the result of his erect position;' and these processes are absent in the orang, chimpanzee, &c., and are smaller in the gorilla than in man. Various other structures might here have been specified which appear connected with man's erect position. It is very difficult to decide how far all these correlated modifications are the result of natural selection, and how far of the inherited effects of the increased use of certain parts, or of the action of one part on another. No doubt these means of change act and react on each other; thus, when certain muscles, and the crests of bone to which they are attached, become enlarged by habitual use, this shows that certain actions are habitually performed, and must be serviceable. Hence the individuals which performed them best would tend to survive in greater numbers." The increased use of the hands and hand-made weapons, and the consequent decreased use of the jaws and teeth in fighting, would tend at once by disuse to a reduction of the great development of the jaws, and especially of the canine teeth of the males, which is the most conspicuous element in the facial difference between the higher apes and man. The absence of hair on the back and other parts of the body, which presents so great a difficulty to Mr. Wallace, arose probably from that sexual selection which Mr. Darwin enters into so largely in the latter part of the book, originating in the female from a dawning sense of beauty in the male, and hence becoming transmitted by inheritance to both sexes. With the increased use of the hands and gradual discovery of the arts, the social instincts were developed, man became more and more dependent on his fellow, the brain was brought more and more in requisition, and hence, together with the skull, increased in size; the intellect became increasingly developed, and hence half-savage man gradually emerged into definite existence.

To return to the question of the single or plural origin of man; there is much to be said in favour of the former idea. The fertile interbreeding of all races with one another; the discovery of the use of fire and of other arts in pre-historic times, and many other circumstances, point to this conclusion. On the other hand, there are many grave difficulties in the way, if we look to natural or sexual selection as the only means by which man has raised himself above the level of the brutes. Our nearest living relatives, the anthropoid apes, belonging to the section *Simiadae*, include the orang, the gibbons, the chimpanzee,

and the gorilla. Of these the gibbons, or *Hylobates*, comprise half-a-dozen species scattered over the Islands of Java, Sumatra, and Borneo, the Malayan Peninsula, and a portion of the Continent of Hindostan; the true *Simia*, or orang, is found only in Sumatra and Borneo; while the *Troglodytes*, or chimpanzee and gorilla, belong to North Africa. Fossil remains of other anthropoid apes have also been found in South Europe; so that we may consider the family to have extended at one time over the whole of the warmer portions of the Old World. Now, seeing that the raw material, so to speak, of the human race had this wide distribution, it is difficult to explain the fact,—if we suppose with Darwin that no internal predisposing cause has been at work,—that in one spot only in this vast region have the circumstances been sufficiently favourable to evolve from the pre-existing materials the more highly developed form. The ordinary course of nature would have been for one race of men to have become developed in the Islands of the Indian Archipelago, another in Africa, and another possibly in South Europe, so distinct that they could not be confounded with one another, and each adapted to the circumstances in which he was placed. We may take a similar instance from the equine tribe, which, until the discovery of the fossil *Hipparion*, was considered to be a family without near relatives in past or present times. The equine progenitor, however, the *Hipparion*, has become developed into the horse, the ass, the zebra, and some other forms, forming species so absolutely distinct that they either refuse to interbreed or produce only sterile hybrids.

Man presents a very singular exception to the general law, that widely distributed species belong to genera which include a large number of species; in other words, have many very near relatives. A case of extreme differentiation, similar in some respects to that of man, is furnished by the giraffe; but Mr. Mivart has shown in his "Genesis of Species" the difficulties in the way of the theory that the giraffe has been developed from other African genera of *Ungulata* by the operation of natural selection alone.

Again, the gap between the higher apes and man is, by the admission of all who have studied the subject, so enormous, that we might fairly expect that geological researches would have laid bare some of the intermediate links. Remains of anthropoid apes have been discovered in Greece, but they are manifestly those of anthropoid apes and nothing else. Remains of man have been found of enormous antiquity, contemporary with the mammoth and the woolly rhinoceros, but we have the authority of Professor Huxley (who has probably given the subject more attention than anyone else, and who is assuredly not biassed against the developmental hypothesis) for asserting that the Engis and the Neanderthal skulls "can in no sense be regarded as the remains of a human being intermediate between

man and the apes," and that "they do not seem to take us appreciably nearer to the lower pithecoïd form." Nor does the ordinary reply of the imperfection of the geological record seem to us to apply here. The remains of the animal or animals which formed the link between man and the apes would be preserved in the most recent formations, nearest the surface, where they would have been subjected to the least destructive influences; and it is strange that no trace of them has yet rewarded the labours of the many diligent searchers in this field.

It may be some comfort to sensitive persons to hear that we need not look in the Zoological Gardens or elsewhere for any one species of ape to which we are bound to offer the homage of paternity, that the gorilla, chimpanzee, orang, and gibbons are, after all, nothing more to us than very remote cousins of the same generation, but deprived of the same advantages of circumstances or of education. Mr. Darwin believes that "man is descended from a hairy quadruped, furnished with a tail and pointed ears, probably arboreal in its habits, and an inhabitant of the Old World;" though again we are not specifically informed whether this creature is the missing link between some extinct anthropoid ape and ourselves, or the common ancestor of the whole of the *Simiadæ*. If the former, how do we arrive at the development of the tail? the suppression of which Geoffroy St. Hilaire believed to be indispensable to the enlargement of the opposite extremity of the spinal cord.

The subject of Sexual Selection is treated at great length, and with a most instructive wealth of illustration, in the volumes before us. In the lower divisions of the animal kingdom sexual selection appears to have done little or nothing; it commences its operation apparently with the lowest classes of the *Arthropoda* and *Vertebrata*, and its development runs to some extent parallel with that of the intellectual faculties. "In the most distinct classes of the animal kingdom, with mammals, birds, reptiles, fishes, insects, and even crustaceans, the differences between the sexes follow almost exactly the same rules. The males are almost always the wooers; and they alone are armed with special weapons for fighting with their rivals. They are generally larger and stronger than the females, and are endowed with the requisite qualities of courage and pugnacity. They are provided either exclusively or in a much higher degree than the females, with organs for producing vocal or instrumental music, and with odoriferous glands. They are ornamented with infinitely diversified appendages, and with the most brilliant or conspicuous colours, often arranged in elegant patterns, whilst the females are left unadorned. This surprising uniformity in the laws regulating the differences between the sexes in so many and such widely separated classes, is intelligible if we admit the action throughout all the higher divisions of the animal kingdom of one common cause, viz., sexual selection." Some of the most interesting chapters in the whole book are those in which Mr.

Darwin details the varied contrivances which are found in different sections of the animal kingdom, by which the male is enabled to please or to charm the female by superiority in colour, in adornment, in form, or even in voice; and shows that the female does exercise a power or choice in selecting the male which pleases her best. He follows Montague and Bechstein in affirming that "the males of song-birds and of many others do not in general search for the female, but, on the contrary, their business in the spring is to perch on some conspicuous spot, breathing out their full and amorous notes, which, by instinct, the female knows, and repairs to the spot to choose her mate;" and that "the female canary always chooses the best singer, and that in a state of nature the female finch selects that male out of a hundred whose notes please her most." With an admirable method and logical sequence, Mr. Darwin traces his phenomenon through the animal kingdom, and points out the effect it must have had in gradually improving the race by giving the more fortunately endowed males a preference as the parents of the next generation. Many of the peculiarities of the human species are traced to the same cause, and especially the gradual diminution in the amount of hair in both sexes, through the development of the sense of beauty.

But, granting the establishment of this principle, what do we gain by it? It seems to us, indeed, to throw the difficulty of accounting for the origin of the higher forms of life only one step backward. The best favoured males are selected in preference by the females; but whence comes the power of the female to discriminate between her rival wooers? It is obvious that for a hen canary to distinguish between the song of one bird and another, which even to our ears present only a slight shade of difference, or for the turkey hen to pick out her partner who struts in the most fascinating style or displays the most gorgeous plumage, requires the assumption of the possession on her part, not only of powers of observation of a very high order, but also of a not contemptible æsthetic principle, which must gradually have been produced by insensible accumulations, and cannot have been, according to Darwinian principles, an innate gift or power. Do we, then, arrive any nearer to a solution of the principle which lies at the base of a continuous organic improvement of the race, when we carry back our position from a gradual advance in external characters in the male to a gradual advance in the female of a mental power of appreciating these external characters? We think not. While sexual selection appears abundantly sufficient to account for the one, to what cognate principle can the followers of Mr. Darwin point to explain the other? Is not the mental development of the female, in fact, a harder problem to solve than the physical development of the male?

Darwin's "Descent of Man" is a work that will long hold a place in our literature as a monument of patient and laborious research, and of great impartiality and candour in the results

adduced. As the basis from which other inquirers will start their labours, it will always be invaluable. The line of argument pursued is throughout rigid and consistent; and if the conclusions arrived at are ever shown to be erroneous, it will be not so much by discovering any flaw in Mr. Darwin's line of argument, as by a substitution of other premisses for those on which he founds his hypothesis; in other words, by the discovery of some organic law or laws governing the evolution of organic forms, of which we are at present ignorant.

Whether the dogma that Natural and Sexual Selection are of themselves sufficient to account for the evolution of the lower forms of animal life, and of man from those orders which are most nearly allied to him, the progress of future research only will show.

General Outline of the Organisation of the Animal Kingdom, and Manual of Comparative Anatomy. By THOMAS RYMER JONES, F.R.S.; 4th Edition; Illustrated by 571 Engravings. London: Van Voorst, 1871.

A Manual of Zoology for the Use of Students, with a General Introduction on the Principles of Zoology. By HENRY ALLEYNE NICHOLSON, M.D., D.Sc., &c. Edinburgh and London: Blackwood and Sons, 1870.

OF the two books which we have here bracketed together, the first is a new edition of a well-known and deservedly popular text-book of Comparative Anatomy. Since the first edition of the work was published, great advances have been made in the study of zoology; the improvements in the construction of microscopes has much advanced our knowledge of the *Infusoria*; the researches of Van Beneden and Siebold have opened new fields in the embryogeny of the *Tæniadæ*; while the discovery by Steenstrup of the alternation of generation of the *Hydrozoa* has thrown a new light on many organic problems. More recently the investigations of Huxley and others have necessitated, in the present edition, a re-arrangement of the lower divisions of the animal kingdom; the separation of the *Protozoa* from the ciliated *Infusoria*; the abolition of the *Radiata* of Cuvier as an independent sub-kingdom, and establishment of the *Cœlenterata*; and the transference of the classes *Rotifera* and *Cirripedia* into close proximity with the *Crustacea*. For the general reader, as well as the scientific student, Professor Jones's book is perhaps the very best general hand-book for study or for reference; and for the benefit of those who do not already know it, we may briefly indicate its general plan. Commencing at the bottom of the scale, the author takes each class in succession, and after a general description of the class, describes in detail the anatomy of some typical species, including, in the case of the higher