

## WALLACE ON NATURAL SELECTION.\*

THE question whether man has indeed descended from the monkey, or rather whether men and monkeys have not a common ancestry, is the one really involved in the various discussions taking place nowadays about evolution, natural selection, the survival of the fittest, and the origin of species. Hence the interest with which every thinking man regards the speculations of Darwin, Huxley, and—last, not least—that modest but able writer, Alfred Russell Wallace.

In the present work, by the author just named, the question of creation by laws is treated with a simplicity, a clearness, and a reverence of tone, which make it, on the whole, the most interesting book to the general reader which has yet appeared on the subject. The first essay, "On the law which has regulated the introduction of new species," is the celebrated one which appeared originally, in 1855, in *The Annals and Magazine of Natural History*, anticipating by four years the publication of Darwin's still more famous "Origin of Species." The object of this suggestive paper, the importance of which was not generally recognized until attention was drawn to it by the discussions arising out of Darwin's book, is to show that every species of plants and animals has come into existence coincident both in time and space with a *preëxisting, closely-allied species*. By this law, the author thinks, the natural system of arrangement of organic beings, their geographical distribution, their geological sequence, the phenomena of represented and substituted groups, and the most singular peculiarities of anatomical structure, are all explained. The enunciation of this splendid generalization came before the scientific world at a time when thinkers were beginning to grasp the still more general law of CONTINUITY which governs the universe, and which holds good alike in astronomy and in literature, in the history of our planet and in that of the United States, in the development of humanity, and in the unfolding of the mind of Newton. The scientific discoveries made in the nineteenth century had given glimpses of a law as universal in time as that of gravitation in space—the law of continuous progress. Then came Wallace and Darwin, who took up one department of science, and showed that continuity and gradual change characterize the history of living beings, even as Lyell had shown that they do the history of the earth's strata.

These authors assume, what no naturalist will dispute, that, in addition to the obvious law governing the succession of living beings, viz., that "like begets like," there is also a tendency on the part of offspring to wander in a slight degree from the type of the parents, thus producing what naturalists style varieties; and they argue that, in the struggle for existence, useful variations will tend to increase, useless or hurtful variations to diminish; hence that superior varieties will ultimately extirpate the original species. This theory has been tested in various ways during the past fifteen years, and has been found to be a key which fits so many locks that it has grown in favor with naturalists; and although some, like Agassiz and Dawson, are understood to reject it, a large majority of the most eminent living men of science are Darwinians. Natural Selection does not, indeed, explain all the mysteries of life, but it accounts for many of the phenomena of Nature which have long puzzled naturalists, while new facts, new problems, new difficulties, as they arise, are accepted, solved, or removed, by this theory; and its principles are illustrated by the progress and conclusions of every well-established branch of human knowledge.

This law of the survival of the fittest, Mr. Wallace applies in the work before us to the explanation of mimicry and other protective resemblances among animals, and the chapter in which the facts relating to this subject are brought out is one of the most interesting in the book. Concealment, he remarks, is useful to many animals, and absolutely essential to some. Desert animals, for example, are generally desert-colored. The lion is a typical example of this, and must be almost invisible when crouched upon the sand or among desert rocks and stones. Any deviation from the tint best adapted to conceal a carnivorous animal would render the pursuit of its prey more difficult, would place it at a disadvantage among its fellows, and in time of scarcity would probably cause it to starve to death. It is among insects, however, that mimicry is carried to the greatest extent. In the wonderful genus *Phyllium* (the "walking-leaf"), not only are the wings perfect imitations of leaves in every detail, but the thorax and legs are flat and leaf-like, so that, when the living insect is resting amid the foliage on which it feeds, the closest observation is often unable to distinguish between the animal and the vegetable. Mr. Wallace is of opinion that natural selection will account for all the cases of protective resemblance in Nature. This, however, is not the only philosophical explanation of the variety of color in the animal world, the bright colors, according to Darwin, being due in many cases to "sexual selection," color being universally attractive, and thus leading to its propagation and increase. In this connection the author makes the striking remark that, if the colors which please us also attract the inferior animals, and if the various disguises which deceive us are equally deceptive to them, both their powers of vision and their faculties of perception and emotion must be essentially of the same nature as our own.

Following up the same train of thought, in the chapter on the philosophy of birds'-nests, the author expresses his belief that "birds do not build their nests by instinct; that man does not construct his dwelling by reason; that birds change and improve when affected by the same causes that make men do so; and that mankind neither alter nor improve when they exist under conditions similar to those which are almost universal among birds." The fact that in the United States no new style of architecture has been invented is an illustration of the latter remark, while, on the other hand, a curious example of change of habits among birds has recently occurred in Jamaica. "Previous to 1854, the palm-swift inhabited exclusively the palm-trees in a few districts in the island. A colony then established themselves in two cocoa-nut palms in Spanish Town, and remained there till 1857, when one tree was blown down, and the other stripped of its foliage. Instead of now seeking out other palm-trees, the swifts drove out the swallows that built in the piazza of the House of Assembly, and took possession of it, building their nests on the tops of the end-walls and at the angles formed by the beams and joists, a place which they continue to occupy in considerable numbers. It is remarked that here they form their nests with much less elaboration than when built in the palms, probably from being less exposed." Mr. Wallace concludes, from the consideration of many facts like the foregoing, that the phenomena presented by birds in their mode of building nests, when fairly compared with those exhibited by the great mass of mankind in building their houses, indicate no essential difference in the kind or nature of the mental faculties employed.

\* Contributions to the Theory of Natural Selection. By Alfred Russell Wallace. New York: Macmillan & Co. 12mo, 384 pp.

This view of the identity of mental operations in men and brutes agrees with the theory of the origin of man adopted by the modern school of naturalists—a theory which the author indicates in the following passage: “Man may have been, indeed I believe must have been, once a homogeneous race; but it was at a period of which we have as yet discovered no remains, at a period so remote in his history that he had not yet acquired that wonderfully-developed brain, the organ of the mind, which now, even in his lowest examples, raises him far above the highest brutes; at a period when he had the form but hardly the nature of man, when he neither possessed human speech nor those sympathetic and moral feelings which in a greater or less degree everywhere now distinguish the race. Just in proportion as these truly human faculties became developed in him, would his physical features become fixed and permanent, because the latter would be of less importance to his well-being; he would be kept in harmony with the slowly-changing universe around him by an advance in mind rather than by a change in body. If, therefore, we are of opinion that he was not really man till these higher faculties were fully developed, we may fairly assert that there were many originally distinct races of men; while, if we think that a being closely resembling us in form and structure, but with mental faculties scarcely raised above the brute, must still be considered to have been human, we are fully entitled to maintain the common origin of all mankind.” As to the antiquity of man, the author sees no reason why the remains of man or his works may not yet be found in the tertiary deposits.

The ideas, of which we have endeavored above to present a condensation, are startling enough to those who have not kept pace with the recent progress of science, and it cannot be denied that they give pain to many excellent people who consider them antagonistic to religion. Nevertheless it is clear that they involve more elevated conceptions of the wisdom and providence of the Creator than the doctrine that the world was made in six literal days.

There is no reason to anticipate that the establishment of the theory of the immense antiquity of man and his development by natural selection, or by any other process out of inferior types—should it be established—shall be any more injurious to the interests of religion than was the demonstration that the earth moves round the sun instead of the sun moving round the earth. It is a mistake to suppose that the law of the struggle for existence and the survival of the fittest is atheistical in its tendency; on the contrary, the establishment of such a law indicates the action and purposes of a higher power. The very fact of a law presupposes a lawgiver, and the fact of evolution indicates the far-seeing action of intelligence. The progress which science shows to have taken place in the organic as in the inorganic world has not been achieved by chance, but by the unceasing action of a superintending Providence. He in whom we ourselves live, and move, and have our being, has directed the movement in accordance with His own wise plans, and toward a definite end. Such, it is gratifying to find, is the view of Mr. Wallace himself, who, in his final chapter on the limits of natural selection as applied to man, points out the insufficiency of his own theory to account for the development of man. He shows, for example—

“that the brain of the lowest savages, and, as far as we yet know, of the prehistoric races, is little inferior in size to that of the highest types of man, and immensely superior to that of the higher animals; while it is universally admitted that quantity of brain is one of the most important, and probably the most essential, of the elements which determine mental power. Yet the mental requirements of savages, and the faculties actually exercised by them, are very little above those of the animals. The higher feelings of pure morality and refined emotion, and the power of abstract reasoning and ideal conception, are useless to them, are rarely if ever manifested, and have no important relations to their habits, wants, desires, or well-being. They possess a mental organ beyond their needs. Natural selection could only have endowed savage man with a brain a little superior to that of an ape, whereas he actually possesses one very little inferior to that of a philosopher. The soft, naked, sensitive skin of man, entirely free from that hairy covering which is so universal among other mammalia, cannot be explained on the theory of natural selection. The habits of savages show that they feel the want of this covering, which is most completely absent in man exactly where it is thickest in other animals. We have no reason whatever to believe that it could have been hurtful or even useless to primitive man, and, under these circumstances, its complete abolition, shown by its most reverting in mixed breeds, is a demonstration of the agency of some other power than the law of the survival of the fittest in the development of man from the lower animals.

“Other characters show difficulties of a similar kind, though not perhaps in an equal degree. The structure of the human foot and hand seem unnecessarily perfect for the needs of savage man, in whom they are as completely and as humanly developed as in the highest races. The structure of the human larynx, giving the power of speech and of producing musical sounds, and especially its extreme development in the female sex, are shown to be beyond the needs of savages, and, from their known habits, impossible to have been acquired either by sexual selection or by the survival of the fittest.

“The mind of man offers arguments in the same direction hardly less strong than those derived from his bodily structure. A number of his mental faculties have no relation to his fellow-men, or to his material progress. The power of conceiving eternity and infinity, and all those purely abstract notions of form, number, and harmony, which play so large a part in the life of civilized races, are entirely outside of the world of thought of the savage, and have no influence on his individual existence or on that of his tribe. They could not, therefore, have been developed by any preservation of useful forms of thought; yet we find occasional traces of them amid a low civilization, and at a time when they could have had no practical effect on the success of the individual, the family, or the race; and the development of a moral sense, or conscience, by similar means is equally inconceivable.

“But, on the other hand, we find that every one of these characteristics is necessary for the full development of human nature. The rapid progress of civilization under favorable conditions would not be possible were not the organ of the mind of man prepared in advance, fully developed as regards size, structure, and proportions, and only needing a few generations of use and habit to coordinate its complex functions. The naked and sensitive skin, by necessitating clothing and houses, would lead to the more rapid development of man's inventive and constructive faculties; and, by leading to a more refined feeling of personal modesty, may have influenced, to a considerable extent, his moral nature. The erect form of man, by freeing the hands from all locomotive uses, has been necessary for his intellectual advancement; and the extreme perfection of his hands has alone rendered possible that excellence in all the arts of civilization which raises him so far above the savage, and is perhaps the forerunner of a higher intellectual and moral advancement. The perfection of his vocal organs has first led to the formation of articulate speech, and then to the development of those exquisitely-toned sounds which are only appreciated by the higher races, and which are probably destined for more elevated uses and more refined enjoyment in a higher condition than we have yet attained to. So, those faculties which enable us to transcend time and space, and to realize the wonderful conceptions of mathematics and philosophy, or which give us an intense yearning for abstract truth (all of which were occasionally manifested at such an early period of human history as to be far in advance of any of the few practical applications which have since grown out of them), are evidently essential to the perfect development of man as a spiritual being, but are utterly inconceivable as having been produced through the action of a law which looks only, and can look only, to the immediate material welfare of the individual or the race.

“The inference I would draw from this class of phenomena is that a superior intelligence has guided the development of man in a definite direction and for a special purpose, just as man guides the development of many animal and vegetable forms. The laws of evolution alone would, perhaps, never have produced a grain so well adapted to man's use as wheat and maize; such fruits as the seedless banana and bread-fruit; or such animals as the Guernsey milch-cow or the London dray-horse. Yet these so closely resemble the unaided productions of Nature that we may well imagine a being who had mastered the laws of development of organic forms through past ages, refusing to believe that any new power has been concerned in their production, and scornfully rejecting the theory (as my theory will be rejected by many who agree with me on other points) that in these few cases a controlling intelligence had directed the action of the laws of variation, multiplication, and survival, for his own purposes. We know, however, that this has been done; and we must, therefore, admit the possibility that, if we are not the highest intelligences in the universe, some higher intelligence may have directed the process by which the human race was developed by means of more subtle agencies than we are acquainted with.”

This suggestive and closely-reasoned passage, which it was impossible to abridge, will give some idea of the value of the present work as an original contribution to science. Mr. Wallace has succeeded in making a difficult subject attractive by the clearness and precision of his style, and the novelty of his illustrations. Anybody can understand his essays and enjoy them, and therefore the present volume may safely be recommended to those who wish to know something authoritative upon the most important scientific question of the day.