

From The Saturday Review.

WALLACE ON NATURAL SELECTION.*

IN his modest contributions to the theory of natural selection Mr. Wallace has brought to the aid of Mr. Darwin's important theory no mean amount of confirmation and support. His high repute as a naturalist of logical and observant mind, coupled with the width and variety of scale on which his studies of nature have been carried on, must give to his conclusions a scientific weight wholly beyond that of the ablest criticism from a less special or authoritative stand-point. From a moral point of view the higher interest attaches to the subsidiary alliance, so to say, which he has thus, unsolicited, sought with the cause of natural selection, in that he might himself, in no mean degree, have put forth a claim as an independent originator of the theory. Nothing can indeed be handsomer or in better taste than the way in which Mr. Wallace disclaims on his own behalf what, to many a scientific discoverer, might appear very fair pretensions to an equality, if not a priority, of place in the promulgation of the great modern idea of the evolution of life. It is only as having "a certain historical value" that he puts forward anew the pair of Essays in which he laid down, fifteen years ago, the outlines of a scheme identical all but in name with that of Natural Selection, announced with startling effect by Mr. Darwin. He has wisely reprinted them without alteration as the most emphatic evidence of his own stage of scientific progress at that date. He had then, he assures us, not the slightest notion of the scope and nature of Mr. Darwin's labours. The first of these Essays was published in the *Annals and Magazine of Natural History*, the second in the *Journal of the Proceedings of the Linnæan Society*. Not being likely to attract the attention of any but working naturalists, it is hardly surprising that few had the opportunity of ascertaining how much or how little they contained. Thus it happened that while some writers gave him more credit than he deserved, others very naturally classed him with Dr. Wells and Mr. Patrick Matthew, whom Mr. Darwin shows to have certainly propounded the fundamental principle of natural selection before himself, but to have made no further use of that principle, and to have failed to see its wide and immensely important applications. The second of Mr. Wallace's Essays in particu-

lar, "On the Tendency of Varieties to depart indefinitely from the Original Type," tentative and vague as it must appear in the light of the intervening years of progress, presents to us something like the faint and nebulous image which we see through a telescope of lower power compared with the well-defined and lustrous spiral of Lord Rosse's magnificent reflector. It is full of interest as showing how thoroughly the author discerned at the time the value and scope of the law which he had discovered, and which he has since been able to verify and apply in many a field of original investigation. We have here another emphatic instance of that concurrent or dual law of discovery with which the precedents of Newton and Leibnitz, Adams and Leverrier have made us familiar. So far, however, from the idea of rivalry, we find Mr. Wallace expressing the most sincere satisfaction that Mr. Darwin had long been previously at work, and that it was not left for himself to undertake the *Origin of Species*. Having measured his own strength, he confesses himself less equal to the task than others who have learnt to value his abilities might be disposed to think. Even if not suited, as he modestly pleads, to those more scientific and elaborate processes of induction and correlation which in Mr. Darwin's hands have laid the foundation of a new school in Europe and America, and marked out for our age the lines of advance for all naturalistic and biological science, his independent research has resulted, he may justly boast, in his seizing upon many a group of unappropriated facts, and tracing out the generalization which may bring them under the reign of admitted law. A further reason which has led him to the publication of the present volume is that there are not a few important points on which he differs from Mr. Darwin. He has sought in consequence to put his own opinions on record in an easily accessible form before the publication of the new and crowning instalment of his great work which Mr. Darwin has already announced. His independence of view is most conspicuously traceable in the last but one of the Essays making up the present series, "On the Development of Human Races under the law of Natural Selection." This paper has been reprinted from the *Anthropological Review*, with a few alterations and additions of some importance. Certain more extensive modifications contemplated by their writer have, he tells us, been withheld by him for fear lest he should weaken the effect without adding much to the argument. It will be interesting to trace how far he has anticipated Mr. Darwin

* *Contributions to the Theory of Natural Selection. A series of Essays.* By Alfred Russel Wallace, Author of the "Malay Archipelago," &c. &c., London: Macmillan & Co. 1870.

in the application of his theory to the vexed problem of the origin and development of man. We shall doubtless gain from the master of the theory himself an amount of learning and a fulness of illustration infinitely beyond the slight and sketchy outline which we get from Mr. Wallace. In width of research and wealth of material, the original philosopher of natural selection stands, it is not disputed, at the head of all the naturalists of the day. It is this quality of richness in the accumulation of facts which gives to every production of his pen a value and an authority of its own altogether apart from the special hypothesis which his facts are intended to uphold. We can hardly conceive, however, that his line of argument is likely to deviate widely from that which we find laid down in Mr. Wallace's short and preparatory Essay.

On the general question of man's great antiquity most intelligent persons may be taken now as approximately agreed. The first point on which thoughtful men are divided relates to the unity or plurality of mankind at the remote period of their origin. Have the various forms under which man now exists been distinct from the beginning, or have all been derived from some single pre-existing form? In other words, is man of one or many species? In favour of the unity of mankind, it is urged that there are no races without transitions to others, that every race exhibits within itself variations of colour, of hair, of feature, and of form to such a degree as to bridge over, to a large extent, the gap that separates it from other races. Given due length of time for these differences to develop themselves under the influence of climate, food, and other physical causes, we can readily account for all the variations of type which at present meet the eye. On the other hand there are the proofs of stability of type in monuments as ancient as those of Egypt, China, and Mexico. Portuguese and Spanish settlers in South America, the Dutch at the Cape and the Moluccas, the Jews dispersed widely as the human race, retain their characteristic lineaments unchanged for centuries. The mound builders of the Mississippi valley and the dwellers on Brazilian mountains had, even in the infancy of the human race, definite traces of the peculiar type of cranial formation which characterizes them still. It is Mr. Wallace's aim to show how, by the light of natural selection, these opposing views of anthropologists can be reconciled. This may be effected, he argues, if we consider that a condition of immobility for a long period, say the last four or five thousand years,

need not preclude an advance at an earlier period, or if we can show that there are causes in nature which would check any further physical changes when certain conditions were fulfilled. Supposing it now to have been substantially made good that the changes in the organic world have run parallel with, or have been in part dependent upon, changes in the inorganic, so that animal forms have developed in harmony with the external conditions of nature, and by virtue of peculiarities inherited in the organism, enhanced by the "survival of the fittest," and modifying the whole being by the principle of the correlation of growth, is there anything in the nature of man which takes him out of the category of those existences over whose successive mutations this law had such a powerful sway? In other words, can or cannot the theory of natural selection be applied to the question of the origin of man in the same way as to the origin of animals of lower type?

Now the reason, Mr. Wallace argues, why this principle acts so powerfully upon brutes depends chiefly upon their self-dependence and individual isolation. The mere animal, if sick or weak, falls an early prey or is left to die. The struggle for life is pitiless and intense. There is no capacity for acting in concert, no division of labour, no foresight for contingent needs. Again, when gradual changes of physical geography or climate compel corresponding changes on the part of the animal, this is only possible to the beast in the way of a change of bodily structure and internal organization. Has a larger or more powerful foe to be encountered? Has a carnivorous animal, by reason of the decreasing numbers of the antelopes on which he has hitherto preyed, got to attack buffaloes? it is only those with most powerful claws and most formidable teeth that can struggle with and overcome such an animal. Together with a new kind of food, again, natural selection will come in to act upon the stomach and intestines, adapting them to new conditions of diet, failing which, in the weaker specimens, the animal species will decrease in number and die out. But man has in his intellect a preservative against the ills of mere animal existence. He does not require longer nails or sharper teeth. He makes himself sharper spears or a stronger bow, or constructs a more cunning pitfall, or hunts his prey in larger company. Instead of putting forth thicker fur or longer wool, he takes to himself clothing, a house, and a fire. He plants seeds, and diversifies his diet. He has thus in lapse of time taken away from nature that power of slowly, but permanently, chang-

ing the external form and structure which she exercises over the mere animal. Whatever might have been the process of raising organic forms in general from an originally common type, so long as simply natural forces suffered no check or interference of an artificial kind, the law of organic change went on in harmony with the changing universe. During that period took place, it is contended, those great modifications of structure and external form which resulted in the development of man out of some lower type of animal. Before his intellect had raised him above the level of the brutes, at a period when he was gregarious but scarcely social, man was subject to the influence of that natural selection to which were due the primary divisions of race which have since remained stamped upon his kind. But as he became truly man, with reflection, speech, intellectual and moral instincts, he was able thenceforth to keep himself, with little change, in harmony with the changing universe around him:—

There is one point, however, in which nature will still act upon him as it does upon animals, and, to some extent, modify his external characters. Mr. Darwin has shown that the colour of the skin is correlated with constitutional peculiarities both in vegetables and animals, so that liability to certain diseases or freedom from them is often accompanied by marked external characters. Now, there is every reason to believe that this has acted, and to some extent, may still to continue to act, on man. In localities where certain diseases are prevalent, those individuals or savage races which were subject to them would rapidly die off; while those who were constitutionally free from the disease would survive and form the progenitors of a new race. These favoured individuals would probably be distinguished by peculiarities of colour, with which again peculiarities in the texture or the abundance of hair seems to be correlated, and thus may have been brought about those racial differences of colour which seem to have no relation to mere temperature or other obvious peculiarities of climate.

From the time, therefore, when the social and sympathetic feelings came into active operation, and the intellectual and moral faculties became fairly developed, man would cease to be influenced by "natural selection" in his physical form and structure. As an animal he would remain almost stationary, the changes of the surrounding universe ceasing to produce in him that powerful modifying effect which they exercise over other parts of the organic world. But from the moment that the form of his body became stationary, his mind would become subject to those very influences from which his body had escaped; every slight variation in his mental and moral nature which should enable him

better to guard against adverse circumstances, and combine for mutual comfort and protection, would be preserved and accumulated; the better and higher specimens of our race would therefore increase and spread, the lower and more brutal would give way and successively die out, and that rapid advancement of mental organization would occur, which has raised the very lowest races of man so far above the brutes (although differing so little from some of them in physical structure), and, in conjunction with scarcely perceptible modifications of form, has developed the wonderful intellect of the European races.

That Mr. Wallace is no blind devotee to the principle to which he assigns the primary distinctions of race and organism is shown by his concluding Essay on the "Limits of Natural Selection as applied to Man." There are, he considers, certain characteristics in man which could not possibly have been produced by the working of that principle; some which would have been useless, nay positively injurious to him, when first engendered, and consequently opposed to a law which, by Mr. Darwin's own challenge, can work only to the end of good. The brain of the savage, for example, appears to be larger than he needs it to be, implying the possession of faculties which in his undeveloped state he never had occasion to use. But the essence of the laws of evolution is that they lead to a degree of organization exactly proportionate to the wants of each species, never beyond those wants. No preparations can be made by them for the future development of the race, nor did any part of the body ever increase in size or complexity except in strict co-ordination to the pressing wants of the whole. "The brain of prehistoric and savage man seems to me to prove the existence of some power, distinct from that which has guided the development of the lower animals through their ever-varying forms of being." The absence of hair, again, from so much of man's body, from the back especially, which the savage seeks to supplement by coverings applied in the first instance to that as the most sensitive region of the organisms, could not have been otherwise than harmful. The loss of the prehensile foot is a further evidence of some other agency than the beneficent power of the selection of the fittest having been here at work. How could the voice of man with its wonderful power, range, sweetness, and flexibility, have been developed out of the rude habits of savages, who give no indication of its possession or its use? Here, too, the organ has been prepared in anticipation of the future progress and higher capabilities of man. Nor is

the origin of those higher faculties of his, the ideal conceptions of space and time, of eternity and infinity, the capacity for science and art, to be explained by the mere preservation of useful variations in the savage; while in the moral sense, nay in consciousness itself, we have instances of results equally transcending the power of evolutions by material law. Here, however, our author appears to be losing himself. He is either relaxing his hold of the theory which has carried him through so vast a range of the kingdom of life, or is straining it by an extension into regions of thought and speculation beyond its legitimate scope. We have never understood Mr. Darwin to put forward his hypothesis as a universal solvent for all the mysteries of organized being, as defining the stages of man's intellectual and moral progress no less than the primary changes of the unconscious organism. On the other hand, Mr. Wallace's reasoning seems to point to some occult or spiritual agency or force in nature and man, prior and superior to all law, and exterior to the unity of cosinical order. At this point he parts company with science, and we have no power to follow him. Suffice it to say that our faith in the universality of natural law receives no shock even should it be shown to fall short of explaining all mysteries and all knowledge. On whatever hypothesis we may attempt to rear the combined structure of material and mental philosophy, there are certain ultimate facts in each absolutely incommensurable to our minds. Mr. Wallace himself quotes with approval the words of Professor Tyndall, that on any hypothesis "the passage from the physics of the brain to the corresponding facts of consciousness is unthinkable." Why then lose confidence in a theory of organic development because it seems to halt on the threshold of the great mystery of immaterial and conscious forces? We may safely leave it to Mr. Darwin to clear away many of the objections which are here taken against his system. As regards others, we might refer the objector to not a few of his own arguments in this volume on "Creation by Law," in reply to the Duke of Argyll. If in the harmonious modifications and adaptations of living types we are enabled to see a law of relative perfection, why should not the same law be conceived to extend to those stages of growth which are as yet in embryo? May not the apparently purposeless functions or capacities of the organism be themselves manifestations, dimly seen or appreciated by us, of the same vital power which is not the product but the source of all organic development? In pursuance of

this argument for unity in nature and life we would fain draw attention to the short but admirable paper on "Instinct in Man and Animals," in which the writer deprecates the calling in of any new and mysterious power to account for what is perfectly in accordance with recognized laws and conditions of life. The same train of thought will be found carried on with much acuteness and observation in "The Philosophy of Birds' Nests." In two Essays upon this subject, as well as in one on "Mimicry and other Protective Resemblances," both in birds and in the insect kingdom more particularly, where the writer is lord beyond most living naturalists, he has combined an abundance of fresh and original facts with a liveliness and sagacity of reasoning which are not often displayed so effectively on so small a scale. It is not every writer who out of so limited a province of natural history could bring to light so many interesting and unexpected harmonies among the phenomena of life presented by the whole range of organized beings.
