

The following paper was then read :—

II.—*Some OBJECTIONS to the THEORY of NATURAL SELECTION, as explained by Mr. A. R. WALLACE.* By HENRY MUIRHEAD, Esq., M.D.

I HAVE been much pleased and edified by the perusal of Mr. A. R. Wallace's *Contributions to the Theory of Natural Selection*, but I have not been altogether satisfied with some of the conclusions. I have therefore noted down some of my objections, with other observations, chiefly with a design to learn whether some of my views are new or true, and what may be said against them.

At page 315 Mr. Wallace says, "Man, by the mere capacity of clothing himself and making weapons and tools, has taken away from Nature the power of slowly but permanently changing the external form and structure in accordance with the external world, and which she exercises over all other animals." Man by his intellect has been enabled more than any other animal actively to modify surrounding agencies, instead of somewhat passively permitting these to modify him. If a man could modify all his surroundings to his will, he could live for ever. Still each individual plant or animal must possess this power to some extent, else it ceases to live. Again, at page 348 he says, "Two characters can hardly be wider apart than the size and development of man's brain, and distribution of hair on the surface of his body, yet they both lead to the same conclusion, that some other power than natural selection has been engaged in his production." Why there should have been more interference with these than with the size and hairiness of a mouse's tail I cannot conceive. If we cannot imagine the Universe without a Deity, we cannot logically conceive any part thereof without Him. He must interpenetrate every atom if He be omnipresent, and be aware of every atom's every movement if He be omniscient.

Mr. Wallace, at page 343, says, "Comparing the savage with the civilised man above him, and the brutes below him, we are alike

driven to the conclusion that in his large and well-developed brain he possesses an organ quite disproportionate to his actual requirements, and in advance, only to be fully utilised as he progresses in civilisation." "The brain of pre-historic and savage man seems to prove the existence of some power distinct from what has guided the development of the lower animals through their ever-varying forms of being."

The notion that millions of big brains have been provided, perhaps for hundreds of thousands of years for beings to whom the large size was useless, nay, detrimental, by reason of weight and magnitude, that said size might in after ages become useful to a remote descendant and his progeny, seems to me ascribing to nature and to nature's God a want of resource and a waste of power which, if displayed by a human architect or engineer, we should certainly call bungling, and would surely be anything but the "survival of the fittest."

Talking of "survival of the fittest," it strikes me that "survival of the fortunate" would have been a more fortunate choice of phrase. In the example which Mr. Wallace furnishes of "an oak dropping millions of acorns", or the innumerable seeds of plants on which small birds feed, or the ova of many fishes, the chances are hundreds to one, I should think, that the fittest will not survive, but only the fortunate. In fact, in the case of seeds and ova, as their devourers must deem the seemingly best the fittest for food, there appears much probability of the survival of the unfittest being the predominant law in these regions of the animal and vegetal kingdoms.

If every individual that comes into being grew up to maturity, and then the struggle for existence commenced, "the survival of the fittest" would have been the appropriate phrase; but we all know that such is not the case. I call those individuals fortunate which, in addition to being endowed with attributes more than ordinarily conducive to safety, manage to escape "the ills that flesh is heir to," and so grow up and leave progeny. But those attributes which conduce to safety are not the causes of variation, but the consequences. In fact, an attribute which turns out of pre-eminent utility to a race tends to depress and extirpate other attributes (variations) that may crop up. This Mr. Wallace has ably shown to be the case with regard to man's intellectual abilities—these interfering with the spread of many other variations in man and other organised beings.

What, then, is the origin of the variations of individuals? From what causes do varieties spring? Simply from dissimilar incidences or combinations of surrounding agencies. No two individuals have identical relationship with the surroundings: more especially in the order or sequence of incidence. And unlike causes are followed by unlike effects. The surroundings or agencies are divisible into two classes, viz., 1st., ancestral or conservative; 2ndly, personal or reforming. The ancestral descending from the progenitors tend to conserve their own endowments in their own family, so that child resembles parent. The personal (or non-ancestral) agencies tend to alter the ancestral endowments, and insert marks of their own influence on the individual. Thus every unit of a race is subjected to the influences inherited from a long line of ancestors, and also the personal influences

of a multitude of surroundings. But mark, no sooner does any personal variation get established, than it too becomes conservative, and strives to perpetuate its like in those proceeding from its possessor. Doubtless myriads of variations cease with the respective individuals personally exhibiting them, in consequence of these individuals dying without issue. And besides this, the influence of many of the personal variations only very slightly affects the progeny, and unless the latter are for several generations subjected to surroundings similar to those causing the mark in the progenitor, the said mark or variation will very likely fade out of view. Again, where the surroundings scarcely alter in a long series of generations, we may expect but little change in the race there abiding, as in some of the lime-forming animals of the slow-changing depths of the ocean.

Assuming, then, that dissimilar incidences and combinations of surrounding agencies are the causes and origin of all variations, then the question comes to be, "What is the origin of the groups named varieties, species, genera, etc.?" Simply that certain families or groups, through contingent circumstances cease to intercross with other families or groups, and that these isolated, *i.e.*, non-intercrossing, groups being acted on generation after generation, each only by its own assemblage of personal and ancestral agencies, diverge from each other more and more in the course of ages; forming first varieties, then still down the stream of time, as the divergence of the groups widens, the dissimilarities of the groups become great enough to form what naturalists term specific differences, and each group is named a species. In after ages we get to genera, orders, etc. Each species is the exponent-product of all the influences of all the individuals that have contributed to it ancestrally, *plus* the product of those non-ancestral agencies which have affected the individuals existing. The same remarks are of course applicable to varieties, and likewise to individuals.

These comments on the origin of species bring me to the subject of human uniformity, that is, the little difference which exists between the various races of mankind compared with the wider diversities exhibited by the species of the classes below him. Mr. Wallace has ably shown that any variation in man's non-mental endowments would have been less conducive to his safety than those resources which his intellect enables him to provide from the inexhaustible store-house of nature around him. So that ability's arbitrament, whose sway is greatest among men, would give the victory (survivorship) to him who, providing against hunger and cold, could best sling a stone or handle a revolver—not to the giant six cubits high, or with a dozen fingers and as many toes. This intellectual ability Mr. Wallace thinks has operated to retain "man's body generically the same for long periods, while other animals have been undergoing modifications in their whole structure to such an amount as to constitute genera and species" (page 328). Now I think there exists one other cause which has operated very powerfully on man, antagonistically to the formation and conservation of species and genera. It is, that man, more than any other animal, intercrosses with all varieties of his kind, recombining divarications. What is human history but a record of races

invading races, and if they do not extirpate the vanquished, intercrossing with them, especially with their females? No other animal does so to the same extent as man. A very little variation among wild animals will serve to keep them apart, and favour divarication. The dog, indeed, is the companion of Man in his wanderings, but he is not permitted by his master to annihilate the varieties of his race; while the rat, which also, unasked, travels with man, but less under his control, is, like man himself, given to extirpate the weaker varieties of his kind.

In conclusion, I beg to recapitulate the two most important points advanced: 1st, Natural selection, if it mean survival of the fittest, is not the predominant law of organic nature. 2ndly, Variations arise from the ever-varying incidences of surrounding agencies; and species, genera, etc., are formed and fostered by groups being isolated—so isolated that the peculiarities from individual variations are prevented from commingling in one common group by intercrossing. This isolation will be mainly geographical as long as the variations formed are only races, but after the differences have become so great as to form species, then biotic considerations will keep the groups from intercrossing, although they may not be kept geographically apart.

DISCUSSION.

Mr. CHARLESWORTH said that his great difficulty was how to reconcile the theory of evolution or natural selection with the permanence of species. As an example, he instanced the warm-blooded water-animals (*Cetacea*), and the fishes, which differed so much in the structure of the vertebral column—and yet both cetaceans and fishes live under the same conditions.

Mr. WAKE did not see much difficulty in the point raised by Mr. Charlesworth. The existence of animals so different as the cetacea and the fishes under similar conditions, showed only that the mammalian type of the former had become fixed before the cetacea took to their abnormal habitat. Their external form may, however, be supposed to have been affected by the action of "natural selection," assimilating them so far to the fishes. The influence of external conditions does not, however, appear to be sufficient of itself to account universally for the changes of animal structure which that hypothesis is intended to explain.

Dr. CARTER BLAKE thought that the reason might be that the fishes passed through lower grades of development than the cetacea, and that the greater amount of ossification of the plano-concave vertebræ in cetacea than in fishes, related to a transference of phosphate of lime in place of the primitive cartilaginous notochord of the earlier vertebrata. But the fossil crocodile called *Streptospondylus*, from the Wealden, exhibited vertebræ, in which the ball was in front and the cup behind. In ordinary crocodiles the cup was in front and the ball behind, thus differing from the type in the exceptional genus above mentioned. Now, *Streptospondylus* and the other crocodiles had pro-same habitat and mode of life, and on the theory of natural selection Carter Blake could not see a *vera causa* for the existence of the variant form.