

Topical Selection and Mimicry.

WILL you permit me to make a few remarks on Dr. A. R. Wallace's review of my book ("On the Modification of Organisms") which appeared in your journal on April 9 last (vol. xliii. p. 529)? I cannot disguise from myself the fact that in attempting any reply I labour under great disadvantages: first, in having to combat the statements of such a high authority as Dr. Wallace; and secondly, in writing as I am from the Antipodes, my reply cannot reach your readers for at least three months after the publication of the review in question. Nevertheless there are two statements made by him which demand some notice from me.

The first is that I have misrepresented Darwin's views on the question of natural selection. My reply to this is distinct and emphatic. The references to Darwin in my book are absolutely correct: there is no misrepresentation; there is no misquotation. In every reference to Darwin's views I gave the page and the edition from which the quotation was taken. In writing my book I was perfectly aware how important it was to start with a clear understanding of what Darwin meant by the term natural selection, and I was at the utmost pains to quote his exact words in every reference I made to him. It is not my fault if Darwin did not give a clear or consistent definition of natural selection, or that he confounded cause with effect, as when at one time he defined natural selection as "the struggle for existence," and at another time as "the survival of the fittest." I can therefore with the utmost confidence refer your readers to the book itself in confirmation of what I here state.

Dr. Wallace has also been good enough to give, as a sample of my "teaching," a part of a sentence of mine on the subject of mimicry. He says your readers "may estimate the value of Mr. Syme's teaching by his explanation of mimicry, which is, that natural selection has nothing to do with it, but that insects choose environments to match their own colours. He tells us that these extraordinary resemblances only occur among insects that are sluggish, and that 'to account for the likeness to special objects, animate or inanimate, we have only to assume that these defenceless creatures have intelligence enough to perceive that their safety lies in escaping observation.'"

Now I did not state that these extraordinary resemblances occurred only among insects; what I said was that they occurred "chiefly" among insects. I am aware that, judging from Dr. Wallace's stand-point, I may have disposed of the subject of mimicry in a somewhat off-hand way, and for the simple reason that I regarded mimicry as a subordinate branch of the more important subject of protective coloration, which I had treated at some length; and in adopting this course I was taking as my guide Dr. Wallace himself, who has elsewhere stated that "the resemblance of one animal to another is of exactly the same essential nature as the resemblance to a leaf, or to bark, or to desert sand, and answers exactly the same purpose" ("Natural Selection," p. 124, 2nd edition). So far, then, I may presume that I am in good company. To understand what I said about mimicry, therefore, it is necessary to know my views on protective coloration. Protective coloration I regarded as, in certain cases, the result of heat and light acting on the pigment cells, and, in other cases, the result of what, for want of a better name, I may call topical selection—that is, the selection by the animal of its environment. Obviously, this environment would be a cover or background which would enable the animal to escape observation, as by that means many animals, especially such as are not possessed of great speed or great powers of flight, might elude their enemies, or, if Carnivora, might steal upon their prey unawares. No doubt there is something captivating in the idea of a universal cause to which every change in the organic world may be referred; but it is surely contrary to the rules of right reasoning to invoke the aid of a greater force than is necessary to account for a given result. This is what the Darwinist does, however, in order to explain the phenomena of protective coloration and mimicry. It is well known, however, and it has been pointed out by Dr. Wallace himself, that certain

varieties of protectively coloured insects are frequently confined to very limited areas. Some will only be found on a certain species of tree or plant; others only on rocks or a stone wall of some particular colour; others, again, only on small patches of soil or gravel; while a short distance from these there may be other objects differently marked, which may be frequented by insects altogether different in colour, although belonging to the same or to an allied species. Are we to suppose that every tree, plant, rock, every stone wall, and every distinctive patch of soil or gravel, has been the scene of natural selection? There is no other conclusion open to the Darwinist. But when it is considered that natural selection may take hundreds of thousands or even millions of years, to effect a given result, the strain upon our forbearance must be great when we are asked to believe that this process is the only one we have to reckon with. If the phenomena can be accounted for by a shorter or simpler process, why should the longer and more complex one be insisted on? Is it not more reasonable to suppose that animals have sufficient intelligence to fly to, and remain in, the place where experience has shown they are least exposed to observation? Can anyone doubt that animals possess such knowledge? How otherwise are we to explain the action of the butterfly, for instance, in darting at once when disturbed to some object which resembles itself, and then lying perfectly still, when one might in vain attempt to find it, although within a few inches of it?

This view also receives corroboration from the fact that many unprotected animals render themselves inconspicuous by covering themselves with materials which resemble their environment. Thus certain Lepidopterous larvæ form cases for themselves out of the fragments of the substance on which they feed, the cases of the larvæ of the Psychidæ, for instance, being made of leaves or of brown grass stems; those of the Essex emerald moth of fragments of leaves spun together with silk; certain species of sea-urchins and many Mollusca cover themselves with grains of sand, shell, and bits of stone, while, according to Poulton, certain species of crabs fasten species of seaweed to their bodies for the same purpose.

Topical selection will also explain the protective coloration of certain vertebrates, as rabbits, hares, and deer. Thus Mr. H. A. Brydon, who has an extensive acquaintance with the habits of deer in South Africa, writes ("Kloof and Karoo," p. 298) as follows:—

"In some localities where the 'zuur veldt' clothes the upper parts of the mountains, and the 'rooi' grass the lower portions, the vaal and the rooi rhebok may be found on the same mountain-side, but each adhering to its own peculiar pasturage. When the hunters come upon the ground to shoot, the rooi rhebok immediately fly from their lower slopes to the higher ground of their grey brethren, and the two species are seen galloping in close company over the mountain heights. If the hunter rests quietly after his shot and looks about him, he will presently see the two kinds of antelope, as soon as they think they may safely do so, separating, the rooi rhebok quitting the 'vaal' pastures, and betaking themselves again to their own feeding-grounds. To this habit they invariably adhere, and will not delay their departure an instant longer than their safety admits of. If the vaal rhebok in turn are driven out of their own ground, they pursue exactly the same tactics, and will on no account remain for long in their red brethren's territory."

The occurrence of so many trimorphic and polymorphic varieties of the same species have always been a puzzle to Darwinists, as the numerous varieties which the Darwinian theory postulates would all be killed off by natural selection, except the "fit"; but according to the theory which I have advanced, most variations would find their appropriate environments and live. If this theory of topical selection be correct, its application to the phenomena of mimicry is obvious. We have only to suppose that one animal may find safety in associating with another animal to which it has some resemblance, without invoking the aid of either mimicry or natural selection.

I shall not attempt to reply to the other remarks of your critic further than this, that no one who contents himself with reading Dr. Wallace's review will be able to form the slightest idea of the views put forth in my book. That it has taken a lifetime, as Dr. Wallace correctly enough says it has, to build up "the vast edifice" of Darwinism is surely no guarantee of the truth of that system, and certainly no reason why it should be above criticism, as my reviewer seems to think it should be.

Melbourne, 1891.

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