

public a collection of essays having a bearing on this question, written and published at various times, not with the intention of detracting from the credit due his distinguished fellow-worker, but rather to limit his own very modest claims. He says: "I have felt all my life, and I still feel, the most sincere satisfaction that Mr. Darwin had been at work long before me, and that it was not left for me to attempt to write the 'Origin of Species.' I have long since measured my own strength, and know well that it would be quite unequal to that task."

The first two of these essays, "On the Law which has Regulated the Introduction of New Species," and "On the Tendency of Varieties to Depart Indefinitely from the Original Type," were written before the publication of Mr. Darwin's book, and are therefore quite independent productions. The remainder of the essays show throughout the interaction of the original thought of the author and the work of the other students in the same field. They show very beautifully how rapidly a theory expands when it ceases to be the personal property of a single intellect and becomes the common working-ground of many students. The third, fourth, and fifth chapters are devoted to the discussion of a part of the subject which, although first suggested by the Amazonian traveller Bates, is, to a great extent, the intellectual property of the author, namely, the mimicry or protective resemblances among animals. The wonderful phenomena of imitation among insects, which give us, in the butterflies and other insects, the most perfect imitations of the leaves of plants or the coloring of the bark of a tree, or even the dung of a bird, receive here an elaborate discussion. There can be no question that these chapters give the strongest arguments for the theory of natural selection which have yet been presented. The fact, which seems pretty well made out, that those groups of insects which are protected from their natural enemies by some unpleasant secretion, or in any other way, are generally the most varied in appearance, the most abundant, and the most frequently imitated in form by the other groups of insects, is probably the weightiest contribution yet made to the evidence in favor of natural selection. The author, with a discretion which many of the advocates of Darwinism would do well to imitate, does not weaken his argument by asserting that all variations which bring about imitations are to be ascribed to the principle of protective resemblance. The chapters "On Instinct in Man and Animals," "The Philosophy of Birds' Nests," and "A Theory of Birds' Nests," are devoted to a laudable effort to overthrow the common idea involved in that most question-begging of terms, *instinct*. The author endeavors to show that men build as much by instinct as animals do, imitation being the basis of the work in both cases. In the few classes of facts cited, the author makes a tolerably clear case for his view. Birds do indeed have a chance in their youth to see how a nest is built, and it is quite conceivable that they build in part from recollection of the nest where they were born. But there are other and more numerous cases, such as the nests of the solitary wasps, where the phenomena are much more complicated, and where imitation is out of the question. Besides, there are the cuckoos, which lay their eggs in the nests of other birds, a feat which it would be difficult for the birds to learn by imitation. Although the author has done good work in these chapters, by endeavoring to persuade the public to look upon the feats of animals in a common-sense way, and not to make unjustifiable suppositions concerning the nature of the mental operations therein involved, we cannot believe that he has cleared up the main difficulties of the question. We may ask our theorizers on animal psychology why the more marvellous performances of the so-called *brute creation* may not be classed with the mental operations of our *lightning calculators*, who certainly perform their work by no blind instinct, inconceivable as the means may be to the general run of men.

In the eighth chapter, our author answers the arguments against the Darwinian development hypothesis which the Duke of Argyll has brought forward in the "Reign of Law." With a small expenditure of force, he pretty effectually demolishes the theory of the "continual interference" of the Creator in the operations of nature—a theory, by the way, which, by the fitness of things, should have been originated by the supporters of the miracle of the winking Madonna rather than by the interpreters of the great forces of nature. At the close of this chapter the author tabulates, in a form more ingenious than logical, the arguments for the Darwinian hypothesis, under the title of "A Demonstration of the Origin of Species by Natural Selection." It will have for the general reader the great value given by a clear synoptic form to a train of argument so long that few but the special students of the subject have been able to grasp it in its expanded form.

#### WALLACE ON NATURAL SELECTION.\*

NOTHING shows more clearly the pure spirit which characterizes the general intercourse of scientific men than this work of Mr. Wallace. Having been, by one of those frequent accidents of discovery, the joint-worker with Mr. Darwin for years before either knew that the other was occupied with the question of natural selection, he now puts before the

\* "Contributions to the Theory of Natural Selection: A Series of Essays by Alfred Russel Wallace, author of 'The Malay Archipelago,' etc., etc. New York: Macmillan & Co. 1870.

The chapter on the action of natural selection on man, in which Mr. Wallace, with great ingenuity, shows how man is, by his intellect, sheltered from the action of natural selection, at least so far as that operates through physical peculiarities, is probably the most important contribution which has recently been made to the theory of races.

In the tenth and concluding chapter of the book, the author takes up the question of the limits of natural selection as applied to man. It marks a new era in the history of the last phase of the development hypothesis, for it shows that one of the originators of the present form of that theory has passed the first enthusiasm of discovery, and can look with calmness upon its defects. We must congratulate the scientific world that the ablest advocate of Darwinism has had the philosophical acumen to perceive, and the courage to declare, that there are features in the physical and mental structure of man which cannot have been produced by natural selection. Our author's considerations on this point are too extended, and too closely connected, to enable us to illustrate by extracts. We can heartily commend the whole chapter to all who are interested in this vast question. That the reader may not be frightened from this profitable task by the fear that they may be too recondite for any but the specialist, we venture to give some of the headings of the sections of this chapter, which are: "The Brain of the Savage shown to be Larger than he needs it to be," "Man's Naked Skin could not have been produced by Natural Selection," "Feet and Hands of Man considered as Difficulties in the Theory of Natural Selection," "Origin of Man's Mental Faculties, by the Preservation of Useful Variations, not Possible." This chapter is throughout penetrated by a religious spirit, which in no way, however, prejudices the argument. In recapitulating, the author says: "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." There will be a large amount of short-sighted criticism expended to show the contradiction between this assertion and some of the sentences of his criticism on the "Reign of Law." We leave the satisfaction which this may give to those who admire the *tu quoque* line of argument. The author closes his work by an admirable refutation of the assertion of Huxley, that our "thoughts are the expression of molecular changes in that matter of life which is the source of our other vital phenomena." The argument on this point is as clear as it is courteous—in the latter regard well suited to be a model for the gentleman whose assertion it overthrows.

It is not a little singular that, within a year, two of the greatest thinkers of the day, who have gone furthest on the road which is generally believed to lead inevitably to atheism, have, in all earnestness and in the true scientific spirit, declared that their studies have given them the abiding conviction that there is, beyond this range of physical events, an intellectual guiding force. Our author believes that all force is "will force," the will of a Supreme Intelligence; and Julius Robert Mayer, who has carried the idea of the correlation of forces to that point where the short-sighted believed he had left nothing but machinery in the universe, has declared that beyond all these phenomena must lie the Infinite Mind, and that his work, so far from sapping, has only strengthened the foundations of religion.

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