

THE GEOGRAPHICAL DISTRIBUTION OF ANIMALS, with a Study of the Relations of Living and Extinct Faunas as elucidating the Past Changes of the Earth's Surface. By ALFRED RUSSELL WALLACE. Two vols. With Maps and Illustrations. New York: Harper & Brothers. Pp. 1110. Price, \$10.

THIS work has grown out of the recent progress of biological science, and could neither have been produced earlier than it has been, nor probably by any other living author. To those who regard the evolution hypothesis as a piece of mere useless speculation, it may be replied that it is the most powerful stimulus to investigation in the higher science of living things that has yet been known, of which the noble work before us is incontestable proof. The problem of animal distribution is here so conceived and presented as to give it very much the character of a new subject.

Up to this time, a naturalist has only needed to try to learn about the fauna of any country to be made aware of our lack of knowledge in this field. Much has been learned, of course, but the records were fragmentary and scattered, and it was only on the shelves of the best zoological libraries that anything approaching completeness

was to be found, so that practically such information has been inaccessible. But with the growing interest in Darwinism there came an appreciation of the value of the study of distribution, and a demand arose which made itself felt. As is always the case, the demand only needed to become urgent to insure a supply. And it was to meet this want, growing daily more pressing, that Mr. Wallace put forth this work—and the task could not have fallen into better hands. His life has been one of preparation for it. As early as 1848 he embarked with Mr. H. W. Bates for the Amazons, and in that region—the richest in animal life—and later in the Malay Archipelago, the best years of his life were given to the study of zoölogy. Few of our readers need to be reminded that in those far-away lands he independently worked out the theory of “natural selection.” The more difficult work of establishing the validity of the “doctrine of descent” fell into other and, as Mr. Wallace modestly and gracefully says, abler hands; but he has not ceased to work in that field, and has given great aid in searching out relevant facts and showing their bearings. This work is certainly one of the most valuable of these contributions. From the scattered sources he has, with infinite pains, collected the details of that which was known, and, arranging them with a skill and method which leave little to be desired, has put them within the reach of all.

The book sets out with an introductory chapter, showing the inadequacy of the popular notion that the manner in which animals are dispersed over the globe is due to diversities of climate and vegetation. Much as there undoubtedly is to give rise to this belief, a little examination shows that no such off-hand treatment will do. That South Africa has lions and giraffes, and Australia kangaroos and other marsupials, finds no explanation in differences of soil and climate, because no marked differences exist. So, too, the theory fails when we find Europe destitute of raccoons, opossums, and humming-birds, and North America without hedgehogs or true fly-catchers, although the conditions of life are in all essentials similar in the two regions.

Assuming the view that each species

has had one birthplace, and only one, the second and third chapters discuss the means by which dispersal has been effected, and what bearing the surface-changes of the earth have had on distribution. They are of great interest, and admirable examples of the efficiency of scientific induction when applied by able hands to the solution of perplexing problems.

The principles upon which zoölogical regions should be formed are next considered, and the reasons given which led the author to adopt, with little change, the divisions proposed by Mr. P. L. Sclater in 1857, which maps the globe into six great primary regions, the Palæarctic, Ethiopian, Oriental, Australian, Neotropical, and Ne-arctic.

Zoölogical classification receives, as of course it should, due consideration. Mr. Wallace attempts no reconciliation of the disputed points of classification, but selects and tabulates for his uses a few of the best-known classes. As the title-page indicates, the relation and distribution of extinct faunas have an important place. The recent lectures of Prof. Huxley are too fresh in the minds of our readers for it to be necessary to emphasize the value of the study of fossil forms in connection with the general doctrine of evolution. In the hands of Mr. Wallace its application to the question of distribution is full of suggestion and interest. We may add that, in this connection, due acknowledgment is made of the successful and important labors of American paleontologists.

In Parts IV. and V. are treated, first, the forms of life as seen in the different zoölogical regions, their differences and resemblances being pointed out; with, lastly, a systematic, tabular arrangement of the families of the animals considered, and sketches of their geographical distribution. The value and interest of these volumes are enhanced by a series of twenty plates showing the physical aspect and special zoölogical character of the different sub-regions, and by a set of excellent maps on which are shown the outlines of the regions and sub-regions, the belts of altitude, the forests, pastures, deserts, and snow-lines, together with the contours of the beds of the great oceans as determined by the most recent soundings.