

#### WALLACE'S ISLAND LIFE.\*

MR. WALLACE'S present work is a proper supplement to his *Geographical Distribution of Animals*, noted above, while at the same time it is so far complete in itself as to bring before the ordinarily intelligent reader the whole wide field of this most interesting branch of natural history.

The island world is a world almost by itself. Australia, Great Britain and Ireland, Japan, Borneo, New Guinea, New Zealand, are its continents, so to speak; and the phenomena of its life, both animal and vegetable, are in many ways striking and singular. The Englishman going to Japan, for example, separates himself from his home by the whole width of Europe and northern Asia, yet finds himself surrounded by so many familiar objects of nature that he can almost fancy himself still in his native island. But let an Australian sail thirteen hundred miles south to New Zealand, and he is in a strange scene. In the Malay Archipelago are two islands, Bali and Lombok, each about as large as Corsica, and divided by a strait only fifteen miles wide; yet these islands differ from each other in their birds and quadrupeds more than England and Japan. The American who crosses from Florida to the Bahamas, scarcely fifty miles distant, is greeted by a similar diversity—a diversity greater than that between the natural productions of Florida and Canada. These likenesses and diversities are subject to variations in themselves very curious. Thus, the quadrupeds, birds, and insects of Borneo closely resemble those of

the nearest continent, Asia; but those of Madagascar are extremely unlike those of Africa, although the distance between island and continent is much less in the latter case than in the former. Sumatra and Borneo, which are perhaps three hundred miles apart, are almost identical in their *fauna* and *flora*; while Borneo and Celebes, which are not more than one hundred miles apart, are very unlike.

Such is the region of facts which Mr. Wallace has been so long and so diligently exploring, and into which he takes the reader in the present volume. For the original investigator the path is, of course, a slow and patient one. There must first be a detailed knowledge of island forms of life and the forms of adjacent continents; then an intelligent and accurate classification of them, so that their affinities and antipathies may be established; extinct forms must next be hunted up; geology must be carefully studied, and finally the ocean bed uncovered in search of its contour and depth. Most islands are but fragments of continents, with continental connections, in history or in fact; and thus the whole past and present of the physical geography of the globe becomes the source of material for studying the great migrations of island forms.

It would be beyond our power in the present notice to follow Mr. Wallace's argument step by step, or to give more than a mere hint of the interesting facts which he presents to view. Of the two Parts into which the work is divided, the First, in a series of ten chapters, spreads before the reader the whole mass of phenomena of the dispersion of island organisms, indicating, as we have done above, the remarkable contrasts to be noted, accenting the importance of locality as an essential character of species, pointing out that the geographical divisions of the globe do not correspond to the zoölogical divisions, and discussing continental climatic changes and glacial epochs in their bearing upon the subject. Mr. Wallace's high though discriminating sense of the truth and importance of evolution as the key to the distribution of plants and animals is expressed in Chapter IV, and in Chapter X we have in full his cautious opinion of the earth's age, and of the rate of development of plants and animals, founded upon the denudation and deposition of strata as a measure of time, and upon the estimated thickness of sedimentary rocks. Here he does not assent to the extreme views advanced in some quarters, and notably by Mr. Croll.

In the fourteen chapters of Part II, the author advances to a more particular study and classification of the facts supplied by the great islands and island groups of the globe: first, the Oceanic Islands, such as the Azores and the Gallapagos; secondly, the Continental Islands, of which Great Britain, formerly an integral part of Europe, is a

\* *Island Life*. By Alfred Russell Wallace. Harper & Brothers. \$4.00.

[Alfred Russell Wallace, an eminent English naturalist, was born at Usk, in Monmouthshire, in 1822. Began life as an architect, became interested in natural history, made his first scientific expedition in 1848 to Brazil, spent four years in exploring the forests of South America, and made very valuable collections, the greater part of which were afterward lost at sea. In 1853 he published *Travels on the Amazon*, etc. In 1854 he went to the East Indies, and spent eight years in exploring the islands of the Malay Archipelago. While thus engaged, and without any knowledge of Mr. Darwin's speculations, he fixed upon Natural Selection as a theory to account for the Origin of Species. He brought back to England from the East Indies upwards of 100,000 entomological specimens, and more than 8,000 birds. Since 1869 he has published *The Malay Archipelago*, *Miracles and Modern Spiritualism*, *Contributions to the Theory of Natural Selection*, and *On the Geographical Distribution of Animals* (2 vols.), which latter work has appeared in English, French and German.]

leading example; and finally the anomalous islands, such as Celebes and New Zealand. In this part of the volume, the reader sees the naturalist at work, his collections before him, his theories in his mind, examining, comparing, applying, testing, and building up conclusions out of atoms, as the coral insect raises islands from the bottom of the sea. As an instance of the curious and fascinating nature of such researches as these, we quote the following paragraph on birds as seed-carriers:

Of the twenty-two land birds found in the Azores, half are more or less fruit-eaters, and these may have been the means of introducing some plants into the islands. Birds, also, frequently have small portions of earth on their feet; and Mr. Darwin has shown by actual experiment that almost all earth contains seeds. Thus, in nine grains of earth on the leg of a woodcock, a seed of the toad-rush was found which germinated; while a wounded red-legged partridge had a ball of earth weighing six and a half ounces adhering to its leg, and from this earth Mr. Darwin raised no less than eighty-two separate plants, of about five distinct species. Still more remarkable was the experiment with six and three-quarter ounces of mud from the edge of a little pond, which, carefully treated under glass, produced five hundred and thirty-seven distinct plants; this is equal to a seed for every six grains of mud; and when we consider how many birds frequent the edges of ponds in search of food, or come there to drink, it is evident that great numbers of seeds may be dispersed by this means.

Mr. Wallace's book may be summed up by saying that in general two classes of causes, the biological and the physical, have to do with the phenomena of distribution. Under the first head are put the natural tendency of all organic forms to increase and spread by various powers of dispersion and migration, and also those laws of evolution and extinction which favor some organisms and baffle others. The physical causes have already been hinted at. His conclusions we will let him state in his own words:

Not only does the marvelous structure of each organized being involve the whole past history of the earth, but such apparently unimportant facts as the presence of certain types of plants or animals in one island rather than in another are now shown to be dependent on the long series of past geological changes; on those marvelous astronomical revolutions which cause a periodic variation of terrestrial climates; on the apparently fortuitous action of storms and currents in the conveyance of germs; and on the endlessly varied actions and reactions of organized beings on each other. And although these various causes are far too complex in their combined action to enable us to follow them out in the case of any one species, yet their broad results are clearly recognizable; and we are thus encouraged to study more completely every detail and every anomaly in the distribution of living things, in the firm conviction that by so doing we shall obtain a fuller and clearer insight into the course of nature, and with increased confidence that the "mighty maze" of Being we see everywhere around us is "not without a plan."

Special excellences of the work are its frank introduction, setting forth what it proposes to do, and its clear recapitulation, at the close, of what it has done; its true scientific modesty, and its temperate tone—neither scientifically frigid nor rhetorically tropical; its minute Table of Contents and Index, which map out the entire field to the eye

with great distinctness; its altogether admirable typography; and last, but not least, its series of twenty-six maps and illustrations, some of them touched with color. Specially curious and interesting among these are the three showing respectively the zoölogical regions of the globe, and the distribution therein of the true jays and the marsh tit (*parus palustris*).