MR. A. R. WALLACE'S "ISLAND LIFE."*

The mutual relation of apparently far-removed branches of science is every day becoming more manifest, and has been developed ever since Mrs. Somerville wrote her admirable little book on that subject, in a way that is not only interesting, but wonderful. The labourer in narrow fields, the mere collector, even the French naturalist whom some traveller recently met with in Asia Minor, and whose ignorance of the ornithology and botany of the region astonished the other, until he explained that his life was entirely consecrated "à l'étude des Coléoptères," are all contributing to the larger sciences which deal with the history of our planet, and light is now being thrown by beetles and butterflies on the development of vast continents and oceans in far-back ages. Few investigators have done more to unite these opposite spheres of investigation than the distinguished author of the deeply interesting book now before us. Its modest title of Island Life will appear to many at first sight a misnomer, but it has been chosen in order

* Island Life; or, the Phenomena and Cause of Insular Faunas and Floras, including a Revision and Attempted Solution of the Problem of Geological Climax. By Alfred Russel Wallace. London: Macmillan and Co. 1880.
to express the fact that islands, by their flora and fauna, offer by far the best subjects for the study of the distribution of living things, and for the solution of the strange problems which it presents, with the assistance of geological and astronomical facts, and also of the physical laws of the Cosmos. Few things are more curious than the apparently capricious distribution of both species and genera, often irrespective, so far as can be seen, of climate, food, or other obvious external circumstances. This is perhaps most remarkable in the case of birds, whose powers of locomotion are so great. The raven, for example, is found in a range extending from the Arctic Regions to Texas, on the one hand, and to northern India on the other. It is probable that its place of origin was in the region of the beautiful little willow-wrens, so familiar in our gardens as a summer visitor, actually extends from Norway across Asia to Alaska, and southwards to Ceylon, China, and Borneo; while there is a lovely sunbird (Nectarina osea), as well as some other species, which is strictly limited to the warmer parts of the Valley of the Jordan. Of the Parnus palustris, or marsh tomtit, there are two varieties (classed by some geologists as distinct species), one of which is found over the whole of Europe, and the greater part of temperate Asia, as far as Japan; while the other, strange to say, is found only in Italy, Turkey, with a small region of Asia Minor, and reappears in identical form in a limited part of eastern China,—one of the most curious examples of discontinuous distribution.

Most people are aware of the very anomalous groups of animals peculiar to the Australian region, the almost total absence of quadrupeds, and the fact that the mammalia of the nearer southern Australia are in structure allied to the emu, whose development, but not its growth, has been arrested. Islands, viewed in the light of their origin, are either oceanic—that is to say, never connected with any portion of dry land, or continental, showing by their geological formation the limited depth of intervening sea, and by their flora and fauna that they at some period more or less distant formed a portion of the neighboring continent. The Azores and Bermuda are typical examples of the first class, and our own islands, Borneo, Java, and Moluccas, with a silky down, suggesting an enormous chicken whose development, but not its growth, has been arrested.

The change of snow-line on mountains has increased denudation, and caused much migration and consequent modification of species. We are now at a peculiarly stable period, when the changing of the weather has produced great changes of climate, this could only be where a region was partially snow-clad; whereas, whenever a large area became completely buried in snow and ice, as northern Europe seems to have been, the glacial condition would be continued even when the sun approached nearest to the earth in winter, so that our estimate of the astronomical facts, such as the amount of accumulation of frozen material, eccentricality, and the Alpine glaciation of the miocene period, is supposed to have been caused by the preceding one. These changes every 10,000 years have hastened both geological and biological changes. The change of snow-line on mountains has increased denudation, and caused much migration and consequent modification of species. We are now at a peculiarly stable period, eccentricity being very low, and this has encouraged the notion of the very slow rate of change generally adopted by geologists, and repudiates on grounds of their own by Sir W. Thomson and other physicists. Consequently, the period allowed by Mr. Wallace for geological time is much shorter than what is required according to the views of Sir C. Lyell and his followers.

It is written, as might be expected from one of the very earliest of the apostles of evolution, from what we may call the vantage-ground of that hypothesis, and in the face of the most unanswerable of all the objections (by which the mere changes of form within the limits of a genus, or even an order) are concerned, the facts and generalisations of Mr. Wallace have not only derived great strength and coherence from the hypothesis, but afford powerful arguments in favour of its truth. We must, however, confess that we do not discover anything in this volume which has much bearing on evolution in its widest sense, or in the universal, formation of the sea bottom.

There are a few specimens of the curious facts and ingenious reasoning which Mr. Wallace has added in the biological portion of his subject. To many, the most important part of his book will be that which deals with the glacial period, and the original home of the emu. He shows that they developed into slightly different forms, followed by a second elevation and reunion, so as to crowd the various species into one area, a conjecture to some extent supported by the actual condition of the sea bottom.

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to be found in it, although there are expressions which almost suggest that such is his opinion.

It is impossible in our limits to give more than a few brief and imperfect hints of the contents of a work so replete with curious details and with ingenious reasoning,—the scope of which is so large, and the data, though most important, often so minute. It will, doubtless, be eagerly read by every earnest student of science, and will also greatly interest even those who aspire to no higher aim than the mild intellectual luxury of scientific dilettantism. The illustrations are admirable, both in design and engraving.