

*Island Life*; or, the Phenomena and Causes of Insular Floras and Faunas, including a Revision and an Attempted Solution of the Problem of Geological Climates. By Alfred Russel Wallace. (London: Macmillan & Co.; New York: Harper & Brothers. 1880. 8vo, pp. xvii.-526, with maps and illustrations.)—Some of the most interesting biological problems are treated by Wallace in this volume. He presents in a popular form the more recent discussions upon the causes of climatic changes, adopting as a starting-point the theory of the great antiquity of the existing continents and oceanic basins. He treats of their bearing upon the causes which have led to the origin of the faunas and floras of to-day on oceanic and on continental islands. The climatic changes which must have taken place on this planet since the time of the chalk, have excited the greatest interest since the discovery within the Arctic circle of the remains of Tertiary plants which at the present day only flourish in climates as warm as those of the temperate zones. Some geologists have attempted to explain this warmer climate by a change in the earth's axis of rotation; but this theory has not found favor with physicists, nor with those geologists who have accounted for the ancient warmer climates of the Arctic region by the action of currents similar to that of the Gulf Stream at the present day. Now that we are beginning to understand the effects of oceanic currents, and know how slight a modification in existing currents would completely alter the climatic conditions of our earth, the solution of the problem does not seem to require great cosmic changes. The reconstruction of the continental masses at any special geological period is practicable within moderate limits of error, and, indeed, the effect of the ancient continents upon oceanic currents has been traced with a very probable degree of accuracy. Following this train of reasoning, the attempt is made in this volume to combine with the gradual terrestrial development the effect of the glacial period upon the distribution of the animals and plants now living upon the earth, regarding them as the direct descendants of those of a preceding geological period having a milder climate than that of the present epoch.

The first part of 'Island Life' is given to an exposition and discussion of the current theories and facts of the distribution of animals and plants, as affected by their former distribution in geological time during the Secondary and Tertiary periods; this part of the book is, in fact, a résumé of Wallace's former work on geographical distribution. The author finds in the theory of evolution, combined with the preceding theories, the key to a rational explanation of the existing condition of things, and contrasts this with the theory of special creations, which can only state the fact that things as they are have always been so. He goes on to show by some special cases that the changes which have affected animals and plants have little by little restricted their former range, so as either to limit them to single areas far less extensive than those they once occupied, or to restrict them to a number of areas now disconnected, but which can readily be shown to have been connected in previous geological periods. The longer these areas have been separated from the continental masses, the greater is the dissimilarity of their fauna and flora from those of the present continents. He also attempts to prove that the physicists are right in assigning a minimum period of one hundred millions of years as that within which all geological changes may have taken place. He uses the old argument of those who have opposed uniformitarianism that the agencies at work in earlier geological periods could not be measured by their intensity at the present day, so that we do not require the almost countless millions of years usually drawn upon by biologists to bring about from the earliest times the changes which have finally resulted in the actual order of things.

The second part of the volume is devoted to the special discussion of the faunas and floras of oceanic and continental islands; in the former are included such islands as the Bermudas, Azores, St. Helena, Ascension, the Galapagos, Sandwich Islands, and the like; in the latter, the British Islands, Java, Sumatra, Borneo, the West India Islands, Madagascar, and the like. Finally, one of the most interesting chapters in the book is the discussion of the origin of the fauna and flora of such anomalous islands as New Zealand.

An examination of the maps scattered through the volume shows, at a glance, the argument adopted by Wallace to explain the physical status quo in such continental islands as the British Islands, Japan, Java, Borneo, Australia, etc., etc. By the soundings of the surrounding seas we trace the former connection of such islands with continents where still flourish the same or similar characteristic animals and plants. Such, for instance, is the connection of Great Britain with Europe by the 100-fathom line; of Sumatra, Java, and Borneo with the Siamese peninsula; of Japan with the eastern part of China, and of the Mascarene Islands and Madagascar with Africa. The West India Islands Wallace does not include in this volume, having already given an account of their relationship to South America in his 'Geographical Distribution.' Yet they are, perhaps, the most interesting of all the continental islands, not only on account of their biological conditions, but also on account of their potential influence in determining the present course of the great Atlantic equatorial current, and modifying it to form the Gulf Stream of to-day. In his explanation of the causes which have mainly contributed to bring about the existing faunas and floras of oceanic islands, Wallace shows for the Azores, the Bermudas, the Galapagos, the Sandwich Islands, and others how all-important is the effect of winds and of oceanic currents in establishing little by little, upon an apparently isolated island, a portion of the fauna and flora of countries the shores of which are washed by currents in the path of which the oceanic islands lie.

While we have nothing but praise for his mode of presentation of the subject, we cannot but feel that Wallace has given either a most ungenerous or a most defective exposition of the origin of the theories which he has so freely used in this volume. Had it been written by an author out of reach of great libraries, entirely dependent upon magazine articles, and unfamiliar with the history of these theories except as presented in popular English periodicals and addresses, the utter disregard of any except British authorities could not have been greater. To mention only a few of the authorities ignored in this volume, as not having been properly introduced to the British public, neither Heer, nor De Candolle, nor Martius, nor Agassiz, nor Sartorius von Waltershausen, nor Peschel, nor Mühry, nor Ludwig is even named in connection with his own theories and investigations. We should not have considered it worth while to mention this deficiency in a popular exposition of theories many of which have become common property, were it not that our author constantly goes out of his way to quote the second-hand presentation of these views by English authorities; to such a degree is this carried by Wallace that some of his sentences, with their English want of appreciation of all non-British men of science, would form exquisite bits for an appendix to Lowell's essay "On a Certain Condescension in Foreigners."