WALLACE'S ISLAND LIFE.

In his recently published Island Life Mr. Wallace has given us a valuable supplement to his Geographical Distribution of Animals. Four years' additional thought and research upon the lines laid down in that suggestive work have brought to a completion the general scheme of inquiry which he from the first proposed to himself, and he now proposes, as a clear and definite theory, the results of investigations which might at first appear fragmentary and disconnected. Mr. Wallace has entitled himself to be called the father of the new science of zoological geography, showing that we have in the present distribution of living things over the earth's surface a key to the problem of the most ancient relations of land and water. The aggregation of existing faunas and floras in definite assemblages within certain areas is proved to be the direct result of a complex set of causes which may be grouped or classified as partly physical, partly biological. Starting from the general law of evolution, regarding all the main types of animals and plants as having diverged from certain common centres, the author proceeds to trace the changes and modifications which they exhibit to the operation of the same causes through long ranges of time, and he points to these changes as in themselves an index to the primary laws which make up the constitution of nature. There may be laid down upon the globe, he remarks, certain well-defined zoological regions or provinces which indicate far more truly than the old geographical divisions the range and the history of animal existence upon the earth. The main divisions of land and water which constitute the great continental masses have undergone no essential change. The continents and oceans as they now exist have had throughout all geological time much the same general outline. There have been local changes here and there; elevations and depressions have taken place, altering coast lines, isolating portions of land, and drying up areas of water; but the general contour of the continents has remained the same. Great changes of climate have occurred in various regions, not due to any shifting of the earth's axis, or to extra-telluric influences of any kind, but, as Sir O. Lyell and all sober geologists have maintained, to local derangements of the surface, especially to the sun. He is able to correct Mr. Croll's calculations of the range of temperatures prevailing towards the Pole. Our author discusses anew, with the aid of the latest evidence, the causes of glacial epochs, illustrating his arguments by the analogy of the planet Mars as most akin to our globe in relation to the sun. He is able to correct Mr. Croll's calculations of the effects of high excentricity, showing how far more influential have been geographical changes of the earth's surface. The last glacial epoch was the climax of a great process of continental development which had been going on throughout long geological ages. It was the direct consequence of the North Temperate and Polar land having attained a great extension and a considerable altitude just at a time when a phase of very high excentricity was coming on. Taking this period to coincide with the change from the Miocene to the Pliocene period, Mr. Wallace assigns to it a date of about 200,000 years before our era, the next preceding cycle of high excentricity and consequent ice-age, still falling within the Miocene, going back to 600,000 years. The present condition of the earth, beginning with the Pliocene, he looks upon as one of exceptional stability, and within it have been brought about those changes in the earth's flora and fauna which it is the object of the present work to bring under review. Enormous ranges of time, as well as vast and stupendous cataclysms or terrestrial convulsions, may be banished from the consideration of science.

With the physical proofs of the general permanence of continents and oceans Mr. Wallace combines the interesting evidence supplied by the distribution of living forms. He is able to map out six primary zoological provinces or divisions of the earth, which correspond in the main with the received continental boundaries, though exhibiting modifications in detail owing to

local geographical changes. The animal forms of Southern Africa, for instance, differ so widely from those of the Northern extremity at no distant geological period the place of the Sahara; Southern Africa thus forming a great separate island or geographical province, whilst those of the North approximate to those of the Southern hemisphere. The animal forms of the Northern extremity of the continent are to be traced out, Mr. Wallace considers, by comparison with those of the Southern, as the inhabited part of the Southern hemisphere is the part least changed, and by tracing the changes, taking into account the ascertained laws of the living forms inhabiting them. 1. The Palaeartic, equivalent to Europe, with North Temperate Africa and Asia. 2. The Tropical, the Sertmarian, which forms the Great Desert of Africa. 3. The Oriental--i.e. tropical Asia to the Philippines and Java. 4. The Australian, including the Pacific Islands, Moluccas, &c., New Zealand and the islands lying to the north of them. 5. The Neotropical, Southern America to northern Mexico, Central America, and the West Indies. 6. The Galapagos, 7. South America, with tropical North America and the West Indies. A map on Mr. Wallace's projection makes clear at a glance these geographical divisions, and the manner in which his facts and deductions were obtained. There are of course overlapping areas in which the forms and faunas have a partial community of character, and others which are distinctly bounded off and separated. He proceeds to trace this separation by the slow passage by swimming, or by the aid of drift-wood. The Sandwich Islands, separated from the great continents by more than two thousand miles, and by ocean depths of three thousand fathoms, are connected in a measure with the other Pacific Islands by countless coral reefs and atolls. Volcanic mountains rise to a height of 14,000 feet. Indigenous mammals are here altogether unknown. The birds, which are fairly numerous and highly peculiar, exhibit on the whole the same affinities with the Australian and Pacific types. Their marked speciality is suggestive of extreme antiquity, or of connexion with some very ancient land now submerged.

Coming to the British Isles, Mr. Wallace dwells upon the features which characterize continental as distinct from oceanic islands. Among the islands of the British station he distinguishes the very several families inhabiting the Azores once a part of the submerged continent, the Flores, and the Canaries, which are the most akin to the North American continent. These appear to be the earliest separated from the remaining mass of the continent by the barrier of the ocean. The Galapagos Islands, volcanic islands, are the most frequently visited. Their peculiarities of form are very remarkable, and they are very strikingly shown by birds and insects. The migratory flies, for instance, which flock in vast numbers, upwards of 180 species having been recorded. The Galapagos Islands, volcanic islands, have peculiarities of form which are preserved among the land tortoises which are wonderful swimmers and quite competent to have made their way from the mainland of South America. The island of Madagascar is the next in geographical latitude, separated from the continent of Africa by wide oceanic latitudes. It has received its deathblow from the chapter on oceanic islands in the Origin of Species, it may be thought that the lost continent of Atlantis was probably the original habitat of our anthropoid ancestors. The Atlantean has received its deathblow from the chapter on oceanic islands in the Origin of Species, it may be thought that the lost continent of Atlantis was probably the original habitat of our anthropoid ancestors. The Atlantean has received its deathblow from the chapter on oceanic islands in the Origin of Species, it may be thought that the lost continent of Atlantis was probably the original habitat of our anthropoid ancestors.
life correspond strikingly with the immense antiquity of its sepa-
ration from the continental masses of the southern half of the
globe. Nor in the case of New Zealand is there a less strongly
marked correspondence between the zoological character of its
fauna and the physical features of that isolated group. Mr.
Wallace’s survey of the widely separated island systems of the
globe sets upon a solid basis his views of the wonderful powers
of dispersion and modification existing in the organic world. In
his theory of local geographical changes modifying the general
stability of continents, we have perhaps a key to the most difficult
and complex problems involved in the phenomena of the variation
and distribution of living forms.

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