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‘Wallace’s “Geographical Distribution of Animals.”’<sup>1</sup>

The naturalist who has ever applied minute analysis to the animals and plants of a limited district is well capable of extending his observations and generalizations to the forms of life which are found over the earth’s surface. Mr. Alfred Russel Wallace is so well known as the successful investigator of the Malay Archipelago and of New Guinea, that any opinion on his part relating to the general distribution of animal life must be received with the respect which zoologists must feel towards one who has successfully explored previously unknown regions both in Brazil and in the far East. Mr. Wallace prefaces his bulky volumes with some remarks of genuine modesty and sincerity. For the standard of excellence at which he has aimed is that his book should bear a similar relation to the eleventh and twelfth chapters of the “Origin of Species” as Mr. Darwin’s “Animals and Plants under Domestication” does to the first chapter of that work. His object has been to show the important bearing of researches upon the natural history of every part of the world upon the study of its past history. An accurate knowledge of any groups of birds or insects, and of their geographical distribution, may enable us to map out the islands and continents of a former epoch, the amount of difference that exists between the animals of adjacent districts being closely related to preceding geological changes. By the collection of such minute facts alone can we hope to fill up a great gap in the past history of the earth as revealed by geology, and obtain some indications of the existence of those ancient lands which now lie buried beneath the ocean, and have left us nothing but these living records of their former existence.

The detailed study of such peculiar facts as those which, *e.g.* are found in adjacent small islands of the Malay Archipelago, brought prominently before the author some of the curious problems of geographical distribution; and although discouraged at first by the great dearth of materials in many groups, the absence of general systematic works, and the excessive confusion that pervaded the classification, the present enormous work was prepared after a continuous labour of about six years. Mr. Andrew Murray’s “Geographical Distribution of Mammals” had been first in the field, in which the distribution of various groups of animals was illustrated by many coloured maps; but as these maps were not confined to groups of any fixed rank, but are devoted to a selection of groups of various grades, it was impossible to arrive at any accurate generalizations from a system which neglected uniformity of treatment, and left its author open to the unjust imputation that he had only produced a partial selection of facts, which may be made to prove anything.

Though readers might not have expected it of Mr. Wallace, man is altogether omitted from the series of the animal kingdom as here given, for the reason that if the genus *Homo* had been here treated like all other genera nothing more than the bare statement “universally distributed” could have been given. If Mr. Wallace has given an outline of the distribution of the varieties or races of man, the plan of his work would have been departed from. Mr. Wallace justifies himself by considering anthropology as a science by itself, and by saying that it seemed better to omit it altogether from a zoological work than to treat it in a necessarily superficial manner. On the judgment which induced Mr. Wallace to take this step we pass no opinion that merely saying that he has left a convenient opening for another anthropologist to attempt to occupy the blank.

To those persons who are more interested in facts than in theories this work will serve as a kind of dictionary of the geography and affinities of animals, as by means of the index the native country, the

systematic position, and the numerical extent of every important and well-established genus of land animal may be at once discovered. As this information was previously scattered through hundreds of volumes, the present work has the advantage of conciseness and the greatest convenience of reference. Many reviewers habitually look for errors of detail, and we may frankly confess that we have done so. But we have been unable to find any such; and we can only contrast the present work, not only with those modern English works on comparative anatomy which require a special grammar to expound them, but with J. G. Fischer's "Synopsis Mammalium" (published in 1829), the "addenda, emendanda, et corrigenda" to which (published in 1830) were nearly as voluminous as the first inaccurate volume. The general results at which Mr. Wallace has arrived with regard to the past changes and mutual relations of the great regions into which the land surface of the globe has been divided, are of especial value. All the palæontological, no less than the geological and physical evidence, at present available points to the great land masses of the northern hemisphere as being of immense antiquity, and as the area in which the higher

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forms of life were developed. In going back through the long series of the Tertiary formations in Europe, Asia, and North America, we find a continuous succession of vertebrate forms, including all the highest types now existing or that have existed on the earth. These extinct animals comprise ancestors or forerunners of all the chief forms now living in the northern hemisphere; and as we go back farther and farther into the past we meet with ancestral forms of those types also, which are now either confined to or specially characteristic of the land masses of the southern hemisphere. Not only do we find that elephants and rhinoceroses and hippopotami were once far more abundant in Europe than they now are in the tropics, but we also find that the apes of West Africa and Malaya, the lemurs of Madagascar, the edentata of Africa and South America, and the marsupials of America and Australia were all represented in Europe (and probably also in North America) during the earlier part of the Tertiary epoch. These facts, taken in their entirety, lead us to conclude that during the whole of the Tertiary, and perhaps during much of the Secondary periods, the great land masses of the earth were, as now, situated in the northern hemisphere, and that here alone were developed the successive types of vertebrata form from the lowest to the highest. In the southern hemisphere there appear to have been three considerable and very ancient land masses, varying in extent from time to time, but always keeping distinct from each other, and represented, more or less completely, by Australia, South Africa, and South America of our time. Into these flowed successive waves of life, as they each in turn became temporarily united with some part of the northern land. Australia appears to have had but one such union—perhaps during the middle or later part of the Secondary epoch, when it received the ancestors of its monotremata and marsupials, which it has since developed into a great variety of forms. The South African and South American lands, on the other hand, appear each to have had several successive unions and separations, allowing first of the influx of low forms only (edentata, insectivores, and lemurs); subsequently of rodents, and small carnivores; and, latest of all, of the higher types of primates, carnivora, and ungulata. During the whole of the Tertiary period, at least, the northern hemisphere, appears to have been divided, as now, into an eastern and a western continent, always approximating and sometimes united towards the north, and then admitting of much interchange of their respective faunas; but on the whole keeping distinct, and each developing its own special family and generic types of equally high grade and generally belonging to the same orders. We may suppose the climates of Europe and North America to have been widely different in these early times; but they may perhaps be harmonized, on the supposition of a more uniform and somewhat milder climate then prevailing over the whole northern hemisphere; the contrast in the vegetation of those countries being due to a radical difference of type, and therefore not indicative of climate. The general phenomena of the distribution of living animals, combined with the evidence of extinct forms, leads us to

conclude that the Palæarctic region of early Tertiary times was, for the most part, situated beyond the tropics, although it probably had a greater southward extension than at the present time. It certainly included North Africa, and much of what is now the Sahara, and perhaps reached as far as the Abyssinian highlands, where some truly Palæarctic forms are still found. A little further east, at Perim Island, the characteristic Miocene fauna of South Europe and Northern India once prevailed. Mr. Wallace well points out that the details as to the changes which have taken place in the faunas of the several regions are to a great extent speculative, and that they must remain so until we obtain as much knowledge of the extinct faunas and past geological history of the southern lands as we have of those of Europe and North America. But the broad conclusions to which Mr. Wallace has arrived appear (to us, at least) to rest on a sufficiently extensive basis of facts; and they lead us to a clearer conception of the mutual relations and comparative importance of the several regions than could be obtained at an earlier stage of our inquiries. We see that each of the six regions into which Mr. Wallace has divided the earth has had a history of its own, the main outlines of which may be traced with tolerable accuracy. Each of them is now, as in past time, characterized by well-marked zoological features, and all are connected and related by multifarious and complex modes.

Mr. Wallace's book, abounding as it does with minute details, is such that we can only roughly indicate some of his principal conclusions. These are truly worthy of one who, with Darwin, shares the honour of the discovery of some of the laws which regulate the origin of species; and who has always preferred the patient acquisition of certain and ascertained facts to the reception of the adulation which is sure to be given to the venturesome promulgator of some plausible and "telling" theory.

<sup>1</sup>"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 Russel Wallace. (London: Macmillan and Co. 1876.) [on p. 11]

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*The Alfred Russel Wallace Page*, Charles H. Smith, 2015.