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‘Mr. Wallace’s Geographical Distribution of Animals.’

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.

It may be safely asserted of this splendid work, that while it could not possibly have been compiled at any earlier period of scientific development, it could scarcely have been produced by any other man than the author. The last twenty years have revolutionised the study of biology. Within that period the researches of Mr. Darwin, and those who have followed in his steps, have given new ideas to every department of natural science, and opened out innumerable hitherto unthought-of lines of inquiry. To Mr. Wallace we are largely indebted for the momentous changes that have been brought about in our knowledge of animals and plants. From his youth he has been an industrious observer, a diligent student of Nature, and an original explorer in regions seldom visited by naturalists; and while general readers have to thank him for some of the most charmingly written books of travel that we possess, by scientific men he is respected as the joint originator, with Mr. Darwin, of the theory of “Natural Selection,” and as one of the foremost, and most original of modern zoologists. It would not, therefore, be easy to estimate too highly the importance and value of a work like the present, in which Mr. Wallace has given us the results of his long experience in research and observation, and in which he has used this superabundance of materials to lay the foundations of the various new departments of knowledge, to which a more enlightened study of zoology and geography is rapidly leading us.

The idea of considering the question of animal distribution from a geographical point of view is due to the most advanced school of biological inquiry. Till recently naturalists were content to accept special characteristics of climate, with their corresponding diversities of vegetation, as adequate causes alike for the absence of definite animals from certain localities, and for their predominance within circumscribed limits. This popular view seems at first sight to be supported by various incontrovertible facts, as, for example, that individual parts of the earth’s surface, as mountains, marshes, plains, and rock-defiles, have their special faunas; and that well defined regions have animal occupants peculiar to themselves. Thus, while in the arctic zone we find white bears, white ptarmigans, walruses, ermines, and reindeer; in the tropics we meet with apes, elephants, parrots and birds of paradise; on the desert we have camels and ostriches; on the prairies bisons; and in forests, whether belonging to tropical or temperate zones, the jaguar and deer.

Facts, such as these, appear at first sight conclusive in regard to the influence of climatic and vegetal influences. But as soon as we examine these same regions a little more closely, we discover a formidable array of opposing facts, which as clearly demonstrate that climate and vegetation can only have been very subordinate agents in the process of animal distribution. In the equatorial parts of Africa and America, for example, where very similar conditions of climate exist, and the soil in both regions bears luxuriant forests; elephants, apes, leopards and guinea-fowls are found in the former, while in the latter their places are occupied by tapirs, prehensile-tailed monkeys, jaguars and toucans. Again, while in reference to climate and soil a striking similarity exists between parts of South Africa and Australia, the one has lions, antelopes, zebras, and giraffes, the other kangaroos, wombats, phalangiers, and mice. Certain districts of North America closely resemble many parts of Europe in soil, climate, and vegetation, yet the former have their racoons, opossum, and humming-birds, the latter their moles, hedgehogs, and true fly-catchers.

Similar anomalies meet us when we pass on to the consideration of the distribution of individual groups of animals, and even of families and species. Indeed, here the question begins to assume the character of an aggregation of complex problems, for the solution of which we must wait until zoological geography, which is now in its early infancy, has attained the force and stability of a well-matured and exact science. Perhaps we may also then receive satisfactory replies to that innumerable

host of questions which suggest themselves to the most superficial students of the history of animal distribution, as, for example: Why are there no crows in South America, while those birds are found in every other part of the world? Why are antelopes limited to Africa and Asia; true lemurs to Madagascar; birds of paradise to New Guinea; and sloths to South America?

Questions of a similar character might be brought forward in endless numbers, but for the present these and many analogous speculative inquiries must remain unanswered, and continue, as they long have been, to rank as puzzling curiosities in the history of animal distribution. It is possible that a more careful study of the influence exerted by man on the permanence, or extinction of animal groups in definite localities, may throw some light on the subject. This is a line of inquiry which Mr. Wallace has followed with special care and industry; and some of the most original and interesting parts of his great work are those which he devotes to the consideration of the complex series of changes brought about in the physical conditions and character of a country by apparently unimportant interferences.

A striking illustration of the force of human disturbance is presented in the case of St. Helena, where the introduction of goats has been followed by the total destruction of an entire flora of forest trees, and with them have disappeared all the insects, molluscs and birds, which had been either directly or indirectly dependent upon them. Again, while in the island of Mauritius the introduction of pigs, which now run wild there, has been followed by the extirpation of the dodo, in Australia the importation of the hive bee is rapidly exterminating the native stingless bee, much as the brown rat, which was originally brought to Europe from Asia, but which has now been carried by commerce all over the world, will soon extirpate every other species. The extent to which a slight change, effected in one link, may be perpetuated along a whole chain of organisms, is well shown in Mr. Darwin's often quoted and most notable case of "cats and clover." Here we begin the serial apologue with humble-bees, which are the sole recognised fertilisers of red clover. Humble-bees are kept down by field-mice, which destroy their combs and nests. Field-mice are kept down by cats. On cats, therefore, depends the abundance or scarcity of red clover; for as in accordance with the old adage, that mice can best play when cats are away, so, in the absence of the latter animals, the field-mice have leisure to follow their inclinations in catching and devouring humble-bees, on whose existence the fertilisation of red clover is dependent.

But great as man's influence is in rehabilitating the surface of the earth, he only shares with the rest of the organic world in effecting the vast changes to which our planet is being unceasingly subjected. Everywhere insects may be found whose presence is sufficient to exclude that of some of the most enduring of the mammalia. Thus in Paraguay, the abundance of a certain species of fly, which attacks new-born cattle and horses, has prevented those animals from running wild in the country, although they abound north and south of it. The presence of this pernicious insect has, therefore, induced conditions which have so completely altered the vegetation, and, through the latter, also the entire fauna of the district, that Paraguay has acquired a wholly different aspect from that presented by contiguous lands, which are free from the ravages of this fly. In South Africa, the Tsetse fly has set even a more fatal mark on certain well-defined districts where it abounds;

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for within those limits no horses, dogs, or cattle can exist, although asses, zebras, and antelopes are unaffected by it. As long, therefore, as the Tsetse fly endures, there will remain a barrier against the entrance of certain animals, more effectual than any raised by mountains, streams, or arms of the sea.

Mr. Wallace's method of treating the question of distribution, which is at once original and comprehensive, is based upon a comparison of the extinct and living faunas of definite localities, with special reference to the causes which have operated to destroy the former, and to give to the latter their present characters and habitats. He has thus had to pass in review all that we know of the changes that the earth's surface has undergone in geological periods, and to sum up the entire mass of results yielded by palæontological inquiry up to the present time. The work before us is divided into four great sections, and of these Part II. is devoted to the consideration of this large and interesting accumulation of facts and observation, while the earlier chapter gives the principles and general

phenomena of distribution. Part III., under the title of “Zoological Geography,” treats of the great regions of the earth’s surface and their subdivisions; and Part IV., under that of “Geographical Zoology,” completes the scheme of the work, by supplying its readers with a systematised compendium of all the vertebrate classes, and of many of the more important groups of insects, molluscs, and other animals lower in the scale.

To naturalists Mr. Wallace’s book needs no recommendation. To the general reader it may, and ought to be commended for its intrinsic value, and for the enormous mass of interesting information which it gives; and which can nowhere else be obtained, in regard to the distribution of animals and plants, not only in remote regions, but in those parts of the earth’s surface with which we believe ourselves to be the most familiarly acquainted.

In the definition of the several regions of the earth’s surface, with reference to which the subject of distribution should be considered, Mr. Wallace has, with characteristic modesty, resisted the temptation of creating new systems, and coining new names, and has followed the division, suggested by Mr. Sclater as early as 1857, which consists of six primary zoological provinces. These Mr. Wallace considers separately, under their respective subdivisions into four domains, and here he follows Mr. Sclater so closely, with only one verbal exception, that his work may be said to constitute, in some of its parts, an exhaustive elucidation of this scheme of geographical division.

These zoological provinces are illustrated by coloured maps, which give sea and land contours, indicating differences of height by means of variations of shades from white to black; but in this respect they are not to be commended, since these differences of tone are not marked enough to be appreciable in individual cases. Too much praise cannot, however, be awarded to the general technical finish and excellence of these volumes, which, like so many other scientific works, issued by the same firm, deserve the title of a veritable *édition de luxe*. Nothing can be better of their kind than the numerous plates, which represent in the most spirited manner groups of animals characteristic of special regions. To the naturalist these pictures will be invaluable, from the correctness of the drawing of the animals, and the fidelity with which individual characters of the surrounding scenery and local vegetation have been given. To the sportsman they will hardly be less attractive. But what hunter was ever fortunate enough to see grouped together such a varied company of bisons, antelopes, and rodents, as Mr. Wallace has delineated in life-like forms on the American prairies? or who, but the author himself, perhaps, ever saw, within reach of his gun or his pencil, such a gorgeous wealth of plumage and foliage, as we here find displayed in a Malayan forest, radiant with birds, insects, blossoms, and leaves of every hue?

The Alfred Russel Wallace Page, Charles H. Smith, 2021.