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[p. 6a]

‘Wallace’s *Tropical Nature*.’

*Tropical Nature, and Other Essays*. By Alfred R. Wallace, author of *The Malay Archipelago*, &c. London: Macmillan & Co. 1878.

It is not often that work of this kind is undertaken by a man who has been largely instrumental in accumulating the facts on which his theories are based. Mr. Wallace sets out to explain the peculiar characteristics of the tropics, the climate, meteorology, the physical character, the phenomena of animal, insect, and vegetable life. He has had 12 years’ experience in the tropics of both hemispheres. He is the author of *The Malay Archipelago*, of *The Geographical Distribution of Animals*, and of *Contributions to the Theory of Natural Selection*. Work of the kind he has undertaken in these essays is usually reserved for some laborious German, a closet-naturalist, who, by patient study of all the travels and books on natural history which libraries contain, arrives at generalizations which are sometimes fruitless, but are also frequently of great value in sifting out the truth. That Mr. Wallace generalizes with the comprehensiveness of such a compiler is not to be inferred, but at any rate his knowledge of the tropics at first hand stands him in good stead, he puts many curious questions in a new and most instructive light, and if he does not compare favorably with such an investigator as the one named, it is more because he is not so voluminous than that he is not so valuable. When he first appeared Mr. Wallace was working a vein very similar to that of Darwin in his “epoch-making” book, the *Origin of Species*, and has continued since then to cross Darwin’s path, now receiving help from that wise old Briton, and again supplying him with corrections of theories based upon insufficient data. In this book he elaborates more clearly a very important variation, if it be not more, from Darwin’s theory of the sexual selection practiced by female beasts and birds in the choice of their partners.

The climate and physical aspects of the equatorial zone form the subject of the first essay. It is popularly supposed that the uniform high temperature of the tropics is sufficiently explained by the greater altitude, and therefore greater heating power, of the midday sun; but a little consideration will show that this alone by no means accounts for the phenomenon. The Island of Java is situated in from  $6\frac{1}{2}^{\circ}$  to  $8\frac{1}{2}^{\circ}$  south latitude, and in the month of June the sun’s altitude at noon will not be more than from  $58^{\circ}$  to  $60^{\circ}$ . In the same month, at London, which is  $52\frac{1}{2}^{\circ}$  of north latitude, the sun’s noonday altitude is  $62^{\circ}$ . But besides this difference of altitude in favor of London, there is a still more important difference, for in Java the day is only about  $11\frac{1}{2}$  hours long in the month of June, while at London it is 16 hours long, so that the total amount of sun-heat received by the earth must be then very much greater at London than at Batavia. Yet at the former place the mean temperature of the day and night is under  $60^{\circ}$  Fahrenheit, while in the latter place it is  $80^{\circ}$  Fahrenheit. In England the noonday sun in June rarely inconveniences people, but in the tropics exposure for a few minutes will scorch a European so that the skin turns red, becomes painful, and often blisters off. These different effects are probably due to a combination of causes, some of which are: The constant high temperature of the soil and surface-waters of the ocean, the great amount of aqueous vapor in the atmosphere, the great extent of the intertropical

regions, which cause the winds that reach the equatorial zone to be always warm, and the latent heat given out during the formation of rain and dew.

In regard to the vegetation of the tropics Mr. Wallace finds that although the primeval forests of the equatorial zone are grand and overwhelming by their vastness, and by the display of a force of development rarely or never witnessed in temperate climates, yet the comparative scarcity of flowers will prove surprising, and the absence of animal life for great distances will also impress the traveler with astonishment. Hardly does the traveler see the same tree repeated in close neighborhood; he goes toward one like the tree he is seeking, but it proves on examination to be distinct. But if flowers and animals are few and far between, insects are not; butterflies especially are brilliant features in the tropical landscape. The largest and showiest are those which move in the most leisurely manner; they owe both the preservation of their colors and the slowness of their flight to immunity from the attack of birds and beasts. These will not eat them. Other kinds that are not distasteful mimic exactly the coloring of the uneatable butterflies, and thus protect themselves. Wasps, ants, and bees furnish an extraordinary variety both as to appearance and habits; leaf insects and stick insects copy leaves and twigs so exactly that they deceive birds. The brilliant colors of the birds are only recognized after long search for them among the apparently deserted woods, the most noticeable and most abundant belonging to the parrot, pigeon, and woodpecker families. Next to birds, and perhaps, to the less observant eye, even before them, the abundance and variety of reptiles form the chief characteristic of tropical nature. Lizards are by far the most abundant in individuals, and the most conspicuous; they constitute one of the first attractions to the visitor from colder lands. They literally swarm everywhere. Snakes are much less prevalent. Speaking of monkeys, Mr. Wallace asserts that the prehensile tails of the American varieties are used as a fifth hand, "and is constantly used to pick up small objects from the ground." He also confirms the old stories about vampire bats. Several species are blood-suckers, and abound in most parts of tropical America, being especially plentiful in the Amazon Valley. Their carnivorous propensities were once discredited, but are too well authenticated. Horses and cattle are often bitten and are found in the morning covered with blood; repeated attacks weaken and ultimately destroy them. Some persons are especially subject to the attacks of these bats, and as native huts are never sufficiently closed to keep them out, these unfortunate individuals are obliged to sleep muffled up in order to avoid being made seriously ill, or even losing their lives. The exact manner in which the attack is made is not positively known, as the sufferer never feels the wound. Mr. Wallace states that he himself was once bitten on the toe, which was found bleeding in the morning from a small round hole, from which the flow of blood was not easily stopped. On another occasion, when his feet were carefully covered up, he was bitten on the tip of the nose, only awaking to find his face streaming with blood. The motion of the wings fans the sleeper into a deeper slumber, and renders him insensible to the gentle abrasion of the skin, either by teeth or tongue. This ultimately forms a minute hole, the blood flowing from which is sucked or lapped by the hovering vampire. The largest South American bats, having wings from two to two and a half feet in expanse, are fruit-eaters, the true blood-suckers being small, or of medium size, and varying in color in different localities. They belong to the genus *Phyllostoma*, and have a tongue with horny papillæ at the end; it is probably by means of this that they abrade the skin and produce a small round wound. This is the account given by Buffon and Azara, and there seems now little doubt that it is correct.

Wallace quotes largely from Bates, the author of *The Naturalist on the Amazons* and the discoverer of "mimicry" as alluded to above in speaking of the protection certain edible butterflies gained by becoming similar in outward appearance to certain nauseous inedible butterflies. Sir Charles Dilke furnishes him

with a new example of protective resemblance in a pink-colored *Mantis* from Java. The mantis is a carnivorous insect which lies in wait for its prey. This one exactly resembles a pink orchis-flower, and the insects it feeds on would be actually attracted to it. The pink mantis is said to feed especially on butterflies, so that it is really a living trap and forms its own bait.

In his chapter on the coloration of animals and sexual selection, Mr. Wallace combats the views of Darwin both as to the diversity of color in sexes and the power of sexual selection, in accounting for the brilliant colors of male animals. Mr. Wallace argues that the primary cause of sexual diversity of color was the need of protection, repressing in the female those bright colors which are normally produced in both sexes by general laws. His "Theory of Birds' nests" is explained in *Contributions to the Theory of Natural Selection*. As to Darwin's argument for natural selection, he combats that by pointing out the greater probability that the frequent superiority of the male bird or insect in brightness or intensity of color, even when the general coloration is the same in both sexes, is primarily due to the greater vigor and activity and the higher vitality of the male not to the preference shown by the female. The colors of an animal usually fade during disease or weakness, while robust health and vigor add to their intensity. Even in the vegetable kingdom the same thing is seen, for the tints of foliage are deepest, and the colors of flowers and fruits the richest, on those plants which are in the most healthy and vigorous condition. The display of various ornamental appendages of the male animal during courtship may be attractive, but these appendages, with their bright colors or shaded patterns, are due probably to general laws of growth, and to that superabundant vitality which we have seen to be a cause of color. But there are many things which seem to show that the possession of these ornaments in the male is not an important character functionally, and that it has not been produced by the action of conscious sexual selection. Amid the facts collected by Mr. Darwin there is a total absence of evidence that the females admire or even notice this display. The hen, the turkey, and the peafowl go on feeding while the male is displaying his finery, and there is reason to believe that it is his persistency and energy rather than his beauty which wins the day. As an example, Mr. Wallace takes the humming-birds, in which abundant and diversified family the boldest and most pugnacious species are also the most brilliantly colored. He considers that surplus vital energy and a long course of unchecked development accounts for their coloring. Of course, this is only a hint of Mr. Wallace's argument; readers curious in such matters must look at the book for themselves.

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