

Alfred Russel Wallace

Co-Founder, With Darwin, of the Modern Theory of Evolution

By Benjamin C. Gruenberg

THE remarkable fact that two men at opposite ends of the earth had worked out, unknown to each other, an identical solution to the problem of the genesis of species, has been so often told that it hardly needs to be repeated. Each of these two men, with a modesty that is rare even among scientists, constantly insisted that all honor for the great discovery was due to the other. For many years they lived in friendly communion—and nowhere is there the slightest indication of envy or jealousy. One of these men, Charles Darwin, died in April, 1882; the other, Alfred Russel Wallace, has just passed away.

Alfred Russel Wallace was born in Usk, Monmouthshire, England, on January 8th, 1823. He received an elementary education in a local grammar school, and from the time he was fifteen years old he got his education without any schooling. For six years he was occupied in engineering and surveying operations with his older brother. During these years, in which he spent a large part of the time out of doors, he felt growing upon him an interest in the plants and animals that he came across and took great delight in learning the names of new forms. He cultivated this interest so that out of it developed a large part of his life work.

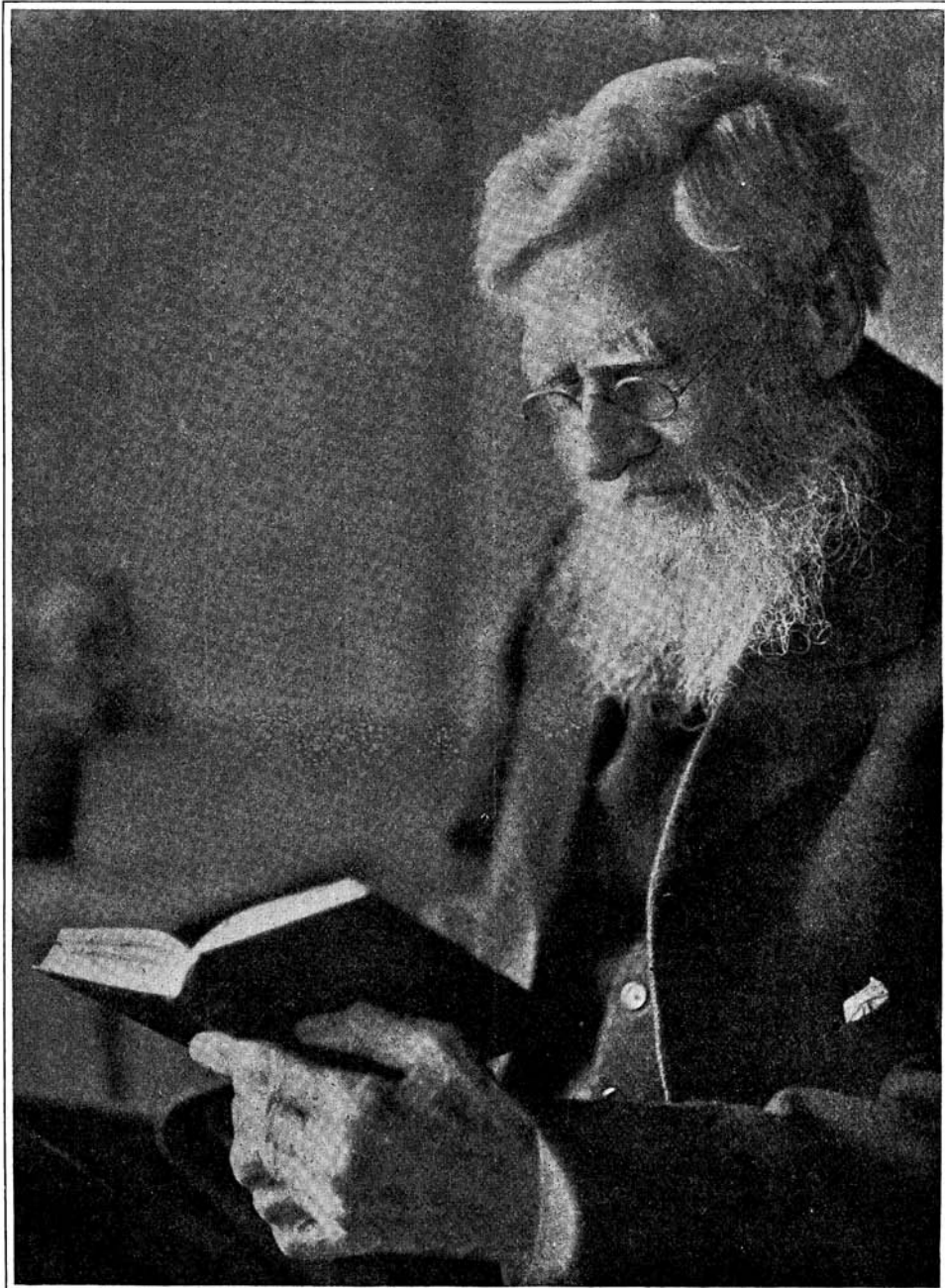
In 1844 he was a teacher of English at the Collegiate Institute at Leicester. This was an important year for him, as in it occurred a few trifling events that turned the whole course of his life. It was here that he became acquainted with Henry Walter Bates, a clerk in Allsopp's brewery; here that he read Humboldt's "Personal Narrative of Travels in South America," which aroused in him a strong desire to visit the tropics, a desire strengthened later by reading Darwin's account of the voyage of the "Beagle," and here that he read Malthus's "Essay on Population."

The brewery clerk and the school teacher both appear to have had souls, and a common interest in the world of living things. In 1848 Bates and Wallace went to Para, and for two years they explored together along the Amazon, making valuable collections and notes. They then parted company, Bates continuing his exploration to the south for seven years longer, and Wallace to the north for two years. A fire on board the rubber ship destroyed his collections and most of his notes, but he courageously set to work to write up his travels from some notes that were saved and from his recollections. His first book, "Travels on the Amazon and the Rio Negro," was published in 1853.

The following year Wallace started on his voyage to the Malay Archipelago, which occupied him until 1862. The observations and studies made during this period furnished the material for a large number of special monographs, and four rather large books of a more general character. These were "The Malay Archipelago," published in 1869, "The Geographical Distribution of Animals," published in 1876, "Tropical Nature," published in 1878, and "Island Life," published in 1880. Early in his Malay travels (1855) he wrote a short essay "On the Law Which Has Regulated the Introduction of New Species," in which he pointed out that new species had always made their appearance in regions occupied by similar species, and that the introduction had always been gradual. This was a vague approach to a general idea of evolution, but at this time there was nothing in Wallace's mind to correspond to the idea of "Natural Selection." But two years later, while incapacitated from work by an attack of intermittent fever, fragments of reflections that had passed through his head in years of solitude began to shape themselves about the Malthusian doctrine of the pressure of population upon subsistence. In a moment of inspiration he applied to the world of changing forms that he had been studying this conception of struggle for existence—and within two weeks his essay "On the Tendency of Varieties to Depart Indefinitely from the Original Type" was on its way to Darwin, with the request that the latter forward it to Sir Charles Lyell, the famous geologist. Now Charles Darwin had been at work on this very problem, and for nearly twenty years had been gathering materials to establish his theory, and we may well believe that he was somewhat discomposed on receiving from Wallace this summary of his own ideas. Darwin consulted Lyell and Joseph Hooker, the botanist, who had seen a sketch of his theory some thirteen years previ-

ously. On the advice of these two men he prepared an abstract of his theory, and this abstract was combined with Wallace's paper. Under the title "On the Tendency of Species to Form Varieties, and on the Perpetuation of Varieties and Species by Natural Means of Selection," this joint paper was presented to the Linnean Society of London on the first of July, 1858, by Lyell and Hooker. On this occasion neither Darwin nor Wallace was present, the one being away from England and the other being kept at home by illness. Lyell and Hooker, on introducing the paper—which was read by the secretary—pointed out the importance of the questions raised and the significance of the solution offered; but such was the novelty of the ideas presented that there was absolutely no discussion.

Darwin was induced to hurry his work and to prepare



Photograph by Hoppe

ALFRED RUSSEL WALLACE

a "brief abstract" of his theory. This brief abstract was published in November of 1859 as a "small book" of about 500 pages—"The Origin of Species." Since then the doctrine of "Natural Selection" has gone under the name of Darwinism. In a letter to Joseph Hooker written in 1858 Huxley writes:

"Wallace's impetus seems to have set Darwin going in earnest, and I am rejoiced to hear we shall learn his views at last. I look forward to a great revolution being effected." The communication from Wallace did certainly serve to accelerate Darwin's work; but it would be a serious mistake to suppose that the service of Wallace was confined to stimulating Darwin. There can be no doubt that if Darwin had not given to the world the theory of natural selection, Wallace would have done so. Among biologists Wallace has right along shared fully with Darwin the credit for discovering the law of the natural elimination of the unadapted.

After his return to England, Wallace spent much of his time in advancing the new ideas by means of addresses, reviews and special articles, before the general public as well as before the scientific societies. In all this struggle, so insistent was Wallace in giving Darwin all the honor for discovering the theory, that Darwin frequently declared himself ashamed to accept the credit. On the other hand, Darwin never lost an opportunity to explain Wallace's share in the theory. In 1870 Wallace

published a collection of his essays, with some changes and additions, under the title "Contributions to the Theory of Natural Selection." The choice of this title is interesting as showing Wallace's devotion to Darwin and to the "cause," for some four years previously he had written to Darwin on the great amount of misunderstanding that had arisen from the use of the expression "natural selection," and suggesting the advantages of Herbert Spencer's phrase "survival of the fittest," which does not over-personify "nature."

Although Wallace was for over half a century the most persistent Darwinist among prominent men of science, he did not accept all of Darwin's views. In his book "Darwinism," published in 1889, he gave a clear exposition of the theory of natural selection and a summary of the evidence in its favor. In this book he also

rejects some of Darwin's subsidiary theories. In place of Darwin's theory of sexual selection, he pointed out the protective value of dull plumage in female birds while sitting on the nests, and accounted for the differences between male and female birds, as regards plumage, solely as the result of natural selection. In this book he also reaffirmed his conviction that natural selection could account for the development of species in general, but he did not think the theory adequate when it came to man's higher faculties. At this point Darwin stood firm in his faith; Wallace considered a special act of creation necessary. Wallace differed from Darwin also on the latter's theory of Pangenesis, although when he first read of it he admired it very much, and found it a source of "positive comfort," as he wrote in one of his letters. And Darwin wrote that "Wallace sticks up for the great god Pan like a man."

Among the other special contributions that Wallace made to the general idea may be mentioned his development of the theory of "Mimicry" (which was independently enunciated by Bates), the theory of warning colors, the theory of recognition marks and his correlation of the facts of geographical distribution of animals with the theory of evolution.

A thorough naturalist in the older sense of that term, Wallace was a comparatively ignorant man in those branches of biological science that have made such great strides in more recent times. He never studied anatomy, embryology or morphology, or even taxonomy in a thorough manner. His great interest was in the relations among organisms as they can be observed in the field or the forest. Of modern physiology he knew practically nothing. This special character of his interest in nature may account for the fact that in the later years of his life he found himself quite out of the current of evolutionary thought.

The writings on evolution during the earlier part of the Darwinian period were characterized by a speculative attitude of mind. The theories were of course supported by facts, but they were altogether facts of observation. During the latter part of this period the rigid method of the experiment was extended to the world of living things, and many observations and interpretations of the field naturalist, many reflections of the study were subjected to a more searching analysis. As a result, many of the theories that did valuable service in the third quarter of the last century were more or less completely replaced by others. This change is of course of the kind that must always take place in the progress of a science; and it is no discredit to a theory or to its originators that it must give way to another. The theory of natural selection must have permanent value in the thought of mankind, notwithstanding its failure to meet the expectations of its most partial advocates. That this theory does not adequately explain all the facts that Wallace attempted to explain with it does not discredit Wallace. His work consisted in helping to make the idea familiar to the following generation. In this he succeeded. He was unable to accept many of the newer ideas, partly because he had not the training in the more subtle branches of biology, partly because he was unable to reconcile these ideas with what he considered fundamental—natural selection.

Thus Wallace objected to the mutation theory because he could not harmonize it with the idea of natural selection; but also because he could not understand the significance of the evidence upon which the mutation theory

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rested. In the same way he failed to appreciate the importance of the laws of heredity discovered by Gregor Mendel and later rediscovered independently by the Dutchman DeVries, the German Correns and the Austrian Tschermak, because he did not differentiate these laws from what had been known to Darwin, and because he could not see their application to the problem of evolution of organic forms. He also failed to appreciate the distinction between different classes of "variations" that have been forced upon us in part through mathematical studies and in part through breeding experiments. In all these cases, and some others, Wallace stood by the old as opposed to the new ideas.

Whoever accepts the principle of evolution must recognize that it applies to human ideas as well as to institutions

and to battleships. The thorough evolutionist will be prepared to have his ideas give way to new ones. Many of us are evolutionists, but not many are as thorough as that. The times change, but we do *not* all or always change with them. Wallace had stopped changing some years before his death.

Through the efforts of a number of friends, led by Charles Darwin, a civil pension was obtained for Wallace in 1881, in recognition of his services to science. With this and the income from his writings he was able to live quietly without engaging in the struggle for a livelihood, for unlike Darwin he had no independent income. He resided in various parts of England for over thirty years. In 1886 he visited this country to deliver the Lowell lectures.

Far from being a narrow pedant, wedded to his specialty to the exclusion of other matters, Wallace was a man of broad interests and deep sympathies. As an indication of the wide range of his intellectual activities, it may be worth while to note that he devoted a great deal of time to the study of the so-called "psychic phenomena," and wrote a book on the subject called "Miracles and Modern Spiritualism" (1875). He believed the subject to be of vital importance and tried to induce Huxley, Tyndall and other scientists to undertake a serious study of the matter. He succeeded only in convincing them that the frauds which they discovered were an integral part of the whole business. He was interested in many social problems, but here, too, showed his inability to make a sound analysis of the phenomena, for he was at one and the same time a "Single-taxer" and a "Socialist." For a number of years he was president of the Land Nationalization Society, and in 1882 published a book on the land question called "Land Nationalization; Its Necessity and Its Aims." His failure to understand the physiology of modern medical discoveries is shown by his espousal of the anti-vaccination cause, for which he also wrote a great deal.

Among his later publications are "The Wonderful Century; Its Successes and Its Failures" (1899), "Studies, Scientific and Social" (1900), "Man's Place in the Universe" (1903), in which he tried to show that the earth was the only inhabited celestial body, was in the center of the universe, and that man was the aim and end of the whole cosmic process, and an autobiography in two volumes called "My Life" (1905).

On the fiftieth anniversary of the reading of the Darwin-Wallace paper before the Linnæan Society, this body held a special meeting and conferred upon Wallace a gold Darwin-Wallace medal. Copies of this in silver were presented to Sir Joseph Hooker, the only man who was present at both of these memorable meetings, and to Francis Galton, Ray Lankester, August Weismann, Ernst Haeckel, and Edouard Strasburger. Never connected with any university, either as student or as instructor, Wallace was honored by special degrees from a number of institutions.

An able man and a hard worker, he leaves his writings as a monument to his industry and to his devotion to the advancement of truth. An intensely human man, he had a host of friends, among those who agreed with him, and also among those who did not.
