

ALFRED RUSSEL WALLACE: SCIENTIST, PHILOSOPHER AND HUMANITARIAN.*

A BOOK-STUDY.

I. AN INFORMING AND INSPIRING LIFE-STORY.

THERE are few forms of literature so helpful to general readers, and especially to young men and women, as autobiographies of the few really great men of all ages, when the life-stories are marked by simplicity, directness and sincerity. They bring us into personal rapport with the aristocracy of brain and soul—the men who have enlightened and lifted the world. Doubly valuable are these works when the men in question have lived fine, true, simple and noble lives while in a large way pushing forward the frontiers of human knowledge, enriching all future ages by calling forth great truths that have hitherto slumbered in the womb of mystery.

In the recently published autobiography of Dr. Alfred Russel Wallace we have such a life-story. The author was not only the co-discoverer with Charles Darwin of the evolutionary theory and one of the greatest, if not indeed the greatest working naturalist of the nineteenth century, but he was and is a sane, enlightened and progressive reformer with a true statesman's vision, and a broad-minded philosopher whose noble humanita-

rianism has ever matched his passion for truth.

The present autobiography has, we think, a fault common to most large two-volume works of this character. It dwells in a somewhat too extended manner on unimportant personal details and facts relating to the family and friends of the author. All these things, while making the work especially precious to family and friends, hold no personal interest for the general reader and tend to take from the interest and value of the work. This fault, however, is insignificant in comparison with the general excellence of the life story, which merits the widest reading.

II. THE EARLY LIFE OF DR. WALLACE.

The careers of few men of the nineteenth century are so rich in lessons of worth for the thoughtful young men and women of our day as is that of Alfred Russel Wallace, while the story of his labors, discoveries and conclusions cannot fail to broaden and deepen the culture of those wise enough to follow the simple, earnest, truth-loving philosopher as from youth to a victorious and fruitful old age he has tirelessly striven to enlarge the borders of knowledge in the realm of science and philosophy and to better the condition of the millions of earth.

He was born in a humble home. His

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father was a man of education, but somewhat lacking in energetic perseverance, especially when engaged in labors along practical lines, and the finances of the family suffered as the years passed, so it was impossible to give the children who came into the home the liberal education that they craved. Alfred Russel, in common with his brothers, received only the ordinary grammar-school education of the time, though this was supplemented by home training and education which probably counted for quite as much as that which he received in school. The father belonged to a circulating library association which enabled him to obtain the latest and best books. These he read aloud to the family during the evenings, and in this way all the little group gained a love for literature and a breadth of culture in certain directions that many youths with far better scholastic advantages do not acquire. Later the father was librarian in an excellent library, and many afternoons after school was out, Alfred went to the library and devoured the contents of choice books until it grew too dark to read longer.

But the time came, and that when the youth was only fourteen years of age, when the father could no longer support the boy and it became necessary for him to leave the home-roof and earn his own livelihood. It was arranged that he should go in company with his elder brother William, a surveyor by profession, and as his aid earn a sufficient amount to maintain himself while learning land surveying. As the elder brother was not quite ready to start on his labors, Alfred spent a period of four or five months with his brother John who was apprenticed to a carpentering firm in London. This time was well spent in increasing his general education.

At that time Robert Owen's social philosophy was being presented to the English people and it had already attracted quite a large following in London. Headquarters had been opened under the somewhat pretentious name of "Hall of Science," and here lectures were given explaining Mr. Owen's theories and describing the wonderful work that he had achieved at New Lanark. There were also reading-rooms and rooms for physical exercise in the Hall of Science, and hither young Wallace and his brother John were wont to go of an evening. Thus a new world of thought opened before the youth during the impressionable and formative period of life. He read with great avidity many works of

social reform and liberal thought, while the social philosophy of Robert Owen made a life-long impression on his mind.

In the early summer of 1837 he set out as aid to his brother William in surveying, and for the next few years the two brothers were thus engaged. Very beautiful is the description of the simple and wholesome life they led as they journeyed through England and Wales wherever their work chanced to call them. Both brothers were great lovers of nature, but to Alfred the marvels of the Great Mother appealed with irresistible charm. The wonderful wild flora and the multitudinous plants of England and Wales were an unfailing source of pure delight. Yet he longed to know the names of the plants, their habits, and the great families to which they belonged. He had time to study during rainy days, on Sundays, and frequently in the evenings, and at length he obtained a small work on botany, published by the Society for the Diffusion of Knowledge. Later, by saving up his money, he was enabled to buy a large and authoritative work on the subject, while a friend loaned him an encyclopedia of the plant life of Great Britain. This in large part he copied, pasting the leaves in his botany. Thus equipped he began a systematic study of the plants with which he came in contact. Soon he had obtained a far better knowledge of botany than most youths who had gone through the books at school but who had not had the subjects illustrated and impressed on the brain by seeing and examining the plants of which they had read. During spare moments young Wallace, who possessed a wonderfully methodical mind, drew charts and tables for the classification of the plant life of England. Thus he pursued his study in the painstaking and eager manner of the specialist in love with his work and possessing a quenchless thirst for knowledge. Later he studied geology, ornithology and entomology in the same painstaking manner. When in London he visited the great museums to familiarize himself with the birds, butterflies, beetles and other animal life of the world described in the various textbooks he had set out to master, and which he did master more completely than most specialists in natural history of his age.

In 1844 Mr. Wallace came of age, having been born on the eighth of January, 1823. By this time his brother had filled all the engagements he had been able to secure for survey-

ing, and new work was so difficult to obtain that it became necessary for Alfred to seek other employment. He therefore secured, after a little waiting, a position as teacher in the Collegiate School at Leicester, kept by the Rev. Abraham Hill, a position which he retained a little over a year, or until the sudden death of his brother William, when it became necessary for him to devote his time to winding up his elder brother's business affairs.

During the time which he spent as teacher in the Leicester Collegiate School he had access to a fine library and as a result he made great advance in his self-education through systematic study of standard works. Among the books mastered at this time which he states had a special influence on his life were Humboldt's *Personal Narrative of Travels in South America*, a work which awakened a desire to travel in the tropics, and Malthus' *Principles of Population*, a work without which, he says, "I should probably not have hit upon the theory of natural selection." A little later *Vestiges of the Natural History of Creation* produced a strong impression on his mind, as is shown by a letter to a scientific friend, while the works of Lyell afforded him the greatest enjoyment, opening new vistas of truth and increasing his love of natural history and physical science in general. Darwin's *Journals* served to further stimulate the desire to visit the tropics which Humboldt's *Travels* had awakened.

At this time occurred one of those seeming accidents that exercise a life-shaping influence. Mr. Wallace chanced to become acquainted with Henry Walter Bates, an enthusiastic entomologist who had made extensive collections of bugs, beetles and butterflies. In association with this scientific enthusiast, young Wallace became as deeply interested in entomology as he had been in botany, and forthwith began a most thorough system of self-culture on the subject, supplementing it with studies of other branches of natural science. He and Bates became intimate friends and together conceived the idea of setting forth for the tropics as collectors of butterflies, beetles and other forms of life. A work had recently appeared by Mr. W. H. Edwards entitled *A Voyage Up the Amazon*, which determined the young men to fare forth to the wilds of the South American forests, provided they could make arrangements for the disposal of their collections of butterflies and other insects, so as to pay expenses.

They were encouraged in their purpose by Mr. Edward Doubleday, who had charge of the department of butterflies in the British Museum. He stated that if they collected land shells, birds and mammals as well as insects, he felt sure they could easily pay all their expenses. Thus encouraged, and after making arrangements with a party to act as agent in London, the two young men took passage in a sailing vessel for Para in the spring of 1848.

III. FOUR YEARS ON THE AMAZON AND RIO NEGRO.

For four years Alfred Russel Wallace devoted himself tirelessly and with unflagging zeal to his labors. He explored the banks of the Amazon, Rio Negro and many of their tributaries and sent home enough specimens to pay his expenses, but he saved the greater number of his collections to take with him when he returned. He collected butterflies, beetles and other insects and many rare specimens of birds and other forms of life. He made a study of the wonderfully beautiful fish of the rivers he traversed. These he described with great minuteness and accompanied his descriptions with careful drawings. He also made geographical surveys, charting and mapping little-known rivers and correcting errors in the maps of the day in regard to certain streams in parts of their courses. Naturally, loving botany as he did, he also made a very careful study of the vegetable life of this wonderful region and thus contributed in a real way to the world's knowledge of these parts in regard to geography and plant and animal life.

It would seem from his narrative that Bates and Wallace were not much together during their wanderings. Doubtless they felt it wisest to take different sections for their search. They were in touch, however, from time to time, and ever after maintained the warm friendship that had grown up between them in England.

In summing up his recollections and impressions of his sojourn in South America Mr. Wallace thus refers to the three things that most impressed him during his wandering up the great rivers of central South America:

"Looking back over my four years' wandering in the Amazon valley, there seem to me to be three great features which especially impressed me, and which fully equaled or

even surpassed my expectations of them. The first was the virgin forest, everywhere grand, often beautiful and even sublime. Its wonderful variety with a more general uniformity never palled. Standing under one of its great buttressed trees—itsself a marvel of nature—and looking carefully around, noting the various columnar trunks rising like lofty pillars, one soon perceives that hardly two of these are alike. The shape of the trunks, their color and texture, the nature of their bark, their mode of branching and the character of the foliage far overhead, or of the fruits or flowers lying on the ground, have an individuality which shows that they are all distinct species differing from one another as our oak, elm, beech, ash, lime and sycamore differ. This extraordinary variety of the species is a general though not universal characteristic of tropical forests, but seems to be nowhere so marked a feature as in the great forest regions which encircle the globe for a few degrees on each side of the equator.

“The second feature, that I can never think of without delight, is the wonderful variety and exquisite beauty of the butterflies and birds, a variety and charm which grow upon one month after month and year after year, as ever new and beautiful, strange and even mysterious, forms are continually met with. Even now I can hardly recall them without a thrill of admiration and wonder.

“The third and most unexpected sensation of surprise and delight was my first meeting and living with a man in a state of nature—with absolute uncontaminated savages! This was on the Uaupés river, and the surprise of it was that I did not in the least expect to be so surprised. I had already been two years in the country always among Indians of many tribes; but these were all what are called tame Indians, they wore at least trousers and shirt; they had been (nominally) converted to Christianity, and were under the government of the nearest authorities; and all of them spoke either Portuguese or the common language, called ‘Lingoa-Geral.’

“But these true wild Indians of the Uaupés were at once seen to be something totally different. They had nothing that we call clothes; they had peculiar ornaments, tribal marks, etc.; they all carried weapons or tools of their own manufacture; they are living in a large house, many families together, quite unlike the hut of the tame Indians; but, more

than all, their whole aspect and manner were different—they were all going about their own work of pleasure which had nothing to do with the white men or their ways; they walked with the free step of the independent forest-dweller, and, except the few that were known to my companion, paid no attention whatever to us, mere strangers of an alien race. In every detail they were original and self-sustaining as are the wild animals of the forests, absolutely independent of civilization, and who could and did live their own lives in their own way, as they had done for countless generations before America was discovered. I could not have believed that there would be so much difference in the aspect of the same people in their native state and when living under European supervision. The true denizen of the Amazonian forests, like the forest itself, is unique and not to be forgotten.”

IV. A SEA-VOYAGE FRAUGHT WITH PERIL AND DISASTER.

At the end of four years Mr. Wallace determined to return home with his rich collection, a veritable argosy for the young man, representing the principal harvest of his hard years of toil. He embarked on July 12, 1852, on a sailing vessel named “The Helen,” loaded chiefly with rubber, cocoa, anatto and balsam-capivi. The voyage, which was as rich in thrilling experiences, disasters and narrow escapes as the most daring creation of the novelist’s brain, was described in the simple and unaffected manner peculiar to the writings of Mr. Wallace at the time of its occurrence in a letter written to a friend in South America as the young naturalist was nearing the coast of England, and so graphic is the description that we give the story largely in Mr. Wallace’s own words.

On the morning of August 6th, when the young naturalist was busily engaged in his stateroom, the captain appeared saying: “I am afraid the ship is on fire.” Mr. Wallace immediately went with him on deck, when it was found that the smoke was rising from various parts of the vessel. The balsam-capivi, which is highly combustible and liable to ignite after a ship begins to rock, is usually transported in kegs packed in damp sand. The captain of the vessel, however, not knowing the danger, had packed a large portion of his cargo in rice-chaff, with the result that this highly inflammable gum had taken fire. After vainly endeavoring to check the flames

it soon became evident that the only hope for the sailors lay in the life-boats. Accordingly, to use Mr. Wallace's own language, "the crew were employed getting out the boats, the captain looked after his chronometer, sextant, books, charts, and compasses, and I got up a small tin box containing a few shirts, and put in it my drawings of fishes and palms, which were luckily at hand; also my watch and a purse with a few sovereigns. Most of my clothes were scattered about the cabin, and in the dense suffocating smoke it was impossible to look after them. There were two good boats, the long-boat and the captain's gig, and it took a good deal of time to get the merest necessaries collected and put into them, and to lower them into the water. Two casks of biscuit and a cask of water were got in, a lot of raw pork and some ham, a few tins of preserved meats and vegetables, and some wine. Then there were corks to stop the holes in the boats, oars, masts, sails, and rudders to be looked up, spare spars, cordage, twine, canvas, needles, carpenter's tools, nails, etc. The crew brought up their bags of clothes, and all were bundled indiscriminately into the boats, which, having been so long in the sun, were very leaky and soon became half full of water, so that two men in each of them had to be constantly bailing out the water with buckets.

"All hands were at once ordered into the boats, which were astern of the ship. It was now about twelve o'clock, only three hours from the time the smoke was first discovered. I had to let myself down into the boat by a rope, and being rather weak it slipped through my hands and took the skin off all my fingers, and finding the boat still half full of water I set to bailing, which made my hands smart very painfully. We lay near the ship all the afternoon, watching the progress of the flames, which soon covered the hinder part of the vessel and rushed up the shrouds and sails in a most magnificent conflagration. Soon afterwards, by the rolling of the ship, the masts broke off and fell overboard, the decks soon burnt away, the ironwork at the sides became red-hot, and last of all the bowsprit, being burnt at the base, fell also. No one had thought of being hungry till darkness came on, when we had a meal of biscuit and raw ham, and then disposed ourselves as well as we could for the night, which, you may be sure, was by no means a pleasant one. Our

boats continued very leaky, and we could not cease an instant from bailing; there was a considerable swell, though the day had been remarkably fine, and there were constantly floating around us pieces of the burnt wreck, masts, etc., which might have stove in our boats had we not kept a constant lookout to keep clear of them. We remained near the ship all night in order that we might have the benefit of its flames attracting any vessel that might pass within sight of it.

"I cannot attempt to describe my feelings and thoughts during these events. I was surprised to find myself very cool and collected. I hardly thought it possible we should escape, and I remember thinking it almost foolish to save my watch and the little money I had at hand. However, after being in the boats some days I began to have more hope, and regretted not having saved some new shoes, cloth coat and trousers, hat, etc., which I might have done with little trouble. My collections, however, were in the hold, and were irretrievably lost. And now I began to think that almost all the reward of my four years of privation and danger was lost. What I had hitherto sent home had little more than paid my expenses, and what I had with me in the "Helen" I estimated would have realized about £500. But even all this might have gone with little regret had not by far the richest part of my own private collection gone also. All my private collection of insects and birds since I left Para was with me, and comprised hundreds of new and beautiful species, which would have rendered (I had fondly hoped) my cabinet, as far as regards American species, one of the finest in Europe. . . . But besides this, I have lost a number of sketches, drawings, notes and observations on natural history, besides the three most interesting years of my journal, the whole of which, unlike any pecuniary loss, can never be replaced.

"Day after day we continued in the boats. The winds changed, blowing dead from the point to which we wanted to go. We were scorched by the sun, my hands, nose, and ears being completely skinned, and were drenched continually by the seas or spray. We were therefore almost constantly wet, and had no comfort and little sleep at night. Our meals consisted of raw pork and biscuit, with a little preserved meat or carrots once a day, which was a great luxury, and a short allow-

ance of water, which left us as thirsty as before directly after we had drunk it. Ten days and ten nights we spent in this manner. We were still two hundred miles from Bermuda, when in the afternoon a vessel was seen, and by eight in the evening we were on board her, much rejoiced to have escaped a death on the wide ocean, whence none would have come to tell the tale."

The vessel that rescued them was an unseaworthy old tub, but meagerly provisioned with food that was not fit for human beings to touch. Shortly after they were taken aboard a terrific storm arose which threatened to destroy the vessel, and it was followed a few days later by a still greater tempest. The ship was considerably damaged and it was necessary to keep the pumps going steadily to keep down the water. However, she weathered the storm and reached England by October first.

V. LONDON: THE NATURALIST BECOMES AN AUTHOR.

Here a pleasant surprise awaited Mr. Wallace, as, arriving in London, he found that through the foresight of his agent his collection had been insured for a thousand dollars. This supplied him with money for immediate needs and enabled him to spend several months in London,—time enough to get out his two first works, one on *The Palms of the Amazon and Rio Negro*, and the other *Travels on the Amazon and Rio Negro*, and to further prosecute his studies in natural science so as to fully equip him for his next expedition to the tropics; for though when on the ocean he had determined never again to brave the seas, he soon felt the goad of desire for more knowledge in regard to tropical life which would enable him to solve many problems that were haunting his brain, and he determined to make the Malay Archipelago the field of research, as here tropical life was particularly rich in those forms that were the most alluring to him.

The collections which he had sent home from time to time during his stay in Brazil had made his name well known to the authorities of the Zoological and Entomological Societies, and on reaching London he received a ticket giving him free admission to the Zoological Gardens while he remained in England. He was a welcome visitor at the scientific meetings of both societies. In 1850 he had sent a paper on the Umbrella Bird,

then almost unknown to British ornithologists, to the British Zoological Society, which was printed in the Society's Proceedings for that year; and on his return to England the Royal Geographical Society induced him to contribute a paper on the little-known region traversed by the Rio Negro and Uaupés rivers.

During his stay in England and while preparing his two first books, he attended the meetings of various scientific societies, especially those concerned with physical science. Here he met a number of England's foremost scientists and made many life-long acquaintances.

VI. EIGHT YEARS' WANDERING IN THE TROPICAL ISLES OF THE FAR EAST.

In the early spring of 1854 Mr. Wallace set out for the Malay Archipelago and in due time arrived at Singapore, from whence he began his eight years' of wandering throughout the Malay Archipelago, which, to use his own language, "constituted the central and controlling incident" of his life. Here for eight years he journeyed from island to island, often visiting the seldom-frequented regions where savage tribes of head-hunters had dwelt for generations, and at times camping for weeks or months on the edge of swamps and in jungles; and during the greater part of his wanderings he had no white companion, but was served by a bright little Malay boy who proved very faithful both as servant, cook and assistant in his work. For the rest he had to depend largely on strangers of alien races whom he was able to pick up from time to time to serve as boatmen, guides, burden-bearers and land servants.

We cannot, of course, follow the naturalist during these years of wandering in the wild and untrodden islands of the eastern seas, but from the following extract taken from a letter written home shortly after he began his research in the Malay Archipelago we gain an idea of the life he was compelled to lead during a great portion of the time, and some of the dangers he was constantly confronting. He is describing his work in the jungle near Malacca where he spent some time:

"At Malacca I had a strong touch of fever, with the old 'Rio Negro' symptoms. . . . Insects are not very abundant there, still, by perseverance, I got a good number, and many rare ones. Of birds, too, I made a good collection. I went to the celebrated Mount

Ophir, and ascended to the top, sleeping under a rock. The walk there was hard work, thirty miles through the jungle in a succession of mud-holes, and swarming with leeches, which crawled all over us, and sucked when and where they pleased. . . . I got some fine new butterflies there, and hundreds of other new or rare insects. Huge centipedes and scorpions, some nearly a foot long, were common, but we none of us got stung or bitten. We only had rice, and a little fish and tea, but came home quite well. The mountain is over four thousand feet high. Near the top are beautiful ferns and pitcher-plants, of which I made a small collection. Elephants and rhinoceroses, as well as tigers, are abundant there."

That he was more than once in deadly peril we can easily imagine. On one occasion his little boat was driven on rocks and almost wrecked on a savage coast. At other times he was for weeks and months in constant peril from poisonous reptiles, insects and the denizens of the virgin forests and swamps, to say nothing of the savage peoples. Frequently he was the victim of the fevers of the tropics, and one of the most interesting parts of this narrative of peculiar fascination is the scientist's description of how the key to one of the great riddles of the evolutionary theory flashed upon him when he was in the grip of a hard chill incident to a malarial fever. So important is the truth that came to the naturalist at this time, and because it is related to one of the most interesting incidents in the history of the development of the evolutionary theory, we quote somewhat at length:

"It was while waiting at Ternate in order to get ready for my next journey, and to decide where I should go, that the idea already referred to occurred to me. It has been shown how, for the preceding eight or nine years, the great problem of the origin of species had been continually pondered over, and how my varied observations and study had been made use of to lay the foundation for its full discussion and elucidation. My paper written at Sarawak rendered it certain to my mind that the change had taken place by natural succession and descent—one species becoming changed either slowly or rapidly into another. But the exact process of the change and the causes which led to it were absolutely unknown and appeared almost inconceivable. The great difficulty was to understand how,

if one species was gradually changed into another, there continued to be so many quite distinct species, so many which differed from their nearest allies by slight yet perfectly definite and constant characters. One would expect that if it was a law of nature that species were continually changing so as to become in time new and distinct species, the world would be full of an inextricable mixture of various slightly different forms, so that the well-defined and constant species we see would not exist. Again, not only are species, as a rule, separated from each other by distinct external characters, but they almost always differ also to some degree in their food, in the places they frequent, in their habits and instincts, and all these characters are quite as definite and constant as are the external characters. The problem then was, not only how and why do species change, but how and why do they change into new and well-defined species, distinguished from each other in so many ways; why and how do they become so exactly adapted to distinct modes of life; and why do all the intermediate grades die out (as geology shows they have died out) and leave only clearly-defined and well-marked species, genera, and higher groups of animals."

Mr. Wallace next observes how this new idea or principle which occurred to him at this time "answers all these questions and solves all these difficulties, and it is because it does so, and also because it is in itself self-evident and absolutely certain, that it has been accepted by the whole scientific world as affording a true solution of the great problem of the origin of species."

And now follows the interesting narrative of how the new truth was suddenly revealed to him and the result:

"At the time in question I was suffering from a sharp attack of intermittent fever, and every day during the cold and succeeding hot fits had to lie down for several hours, during which time I had nothing to do but think over any subjects then particularly interesting me. One day something brought to my recollection Malthus's *Principles of Population*, which I had read about twelve years before. I thought of his clear exposition of 'the positive checks to increase'—disease, accidents, war, and famine—which keep down the population of savage races to so much lower an average than that of more civilized peoples. It then occurred to me that these causes or their equiv-

alents are continually acting in the case of animals also; and as animals usually breed much more rapidly than does mankind, the destruction every year from these causes must be enormous in order to keep down the numbers of each species, since they evidently do not increase regularly from year to year, as otherwise the world would long ago have been densely crowded with those that breed most quickly. Vaguely thinking over the enormous and constant destruction which this implied, it occurred to me to ask the question, Why do some die and some live? And the answer was clearly, that on the whole the best fitted live. From the effects of disease the most healthy escaped; from enemies, the strongest, the swiftest, or the most cunning; from famine, the best hunters or those with the best digestion; and so on. Then it suddenly flashed upon me that this self-acting process would necessarily *improve the race*, because in every generation the inferior would inevitably be killed off and the superior would remain—that is, *the fittest would survive*. Then at once I seemed to see the whole effect of this, that when changes of land and sea, or of climate, or of food-supply, or of enemies occurred—and we know that such changes have always been taking place—and considering the amount of individual variation that my experience as a collector had shown me to exist, then it followed that all the changes necessary for the adaptation of the species to the changing conditions would be brought about; and as great changes in the environment are always slow, there would be ample time for the change to be effected by the survival of the best fitted in every generation. In this way every part of an animal's organization could be modified exactly as required, and in the very process of this modification the unmodified would die out, and thus the *definite* characters and the clear *isolation* of each new species would be explained. The more I thought over it the more I became convinced that I had at length found the long-sought-for law of nature that solved the problem of the origin of species. For the next hour I thought over the deficiencies in the theories of Lamarck and of the author of the *Vestiges*, and I saw that my new theory supplemented these views and obviated every important difficulty. I waited anxiously for the termination of my fit so that I might at once make notes for a paper on the subject. The same evening I did this pretty fully, and

on the two succeeding evenings wrote it out carefully in order to send it to Darwin by the next post, which would leave in a day or two.

"I wrote a letter to him in which I said that I hoped the idea would be as new to him as it was to me, and that it would supply the missing factor to explain the origin of species. I asked him if he thought it sufficiently important to show to Sir Charles Lyell, who had thought so highly of my former paper."

Mr. Wallace does not enter into the details of what followed the receipt of his paper by Mr. Darwin, as the latter had dwelt on that in his autobiographical sketch published years earlier. Briefly, it may be observed that Charles Darwin had years before come to conclusions similar to those expressed by Mr. Wallace and had imparted his views confidentially to a few intimate friends, including Sir Charles Lyell, Dr. Hooker and Professor Asa Gray of Harvard University, Cambridge, Massachusetts. On receipt of Mr. Wallace's paper and letter, Mr. Darwin found himself in a quandary. He did not desire to appear to appropriate any one's else discovery, yet his conclusions, though carefully guarded save as he had imparted them to his intimate friends, had been entertained for fifteen years and he had already prepared half of his great work elucidating them. In his dilemma he sought advice from Sir Charles Lyell, who counseled him to make an abstract of his great work and accompany it with explanations and a letter which he had written to Professor Gray a year previous, showing that he had long ere this fully arrived at the same conclusions as those advanced by Mr. Wallace, and that both these papers should be given in the forthcoming meeting of the Linnean Society. In the *Life and Letters of Charles Darwin* the great author of the *Origin of Species* gives this interesting account of the publication of the two papers:

"Early in 1856 Lyell advised me to write out my views pretty fully, and I began at once to do so on a scale three or four times as extensive as that which was afterwards followed in my *Origin of Species*; yet it was only an abstract of the materials which I had collected, and I got through about half the work on this scale. But my plans were overthrown, for early in the summer of 1858 Mr. Wallace, who was then in the Malay Archipelago, sent me an essay 'On the Tendency of Varieties to depart indefinitely from the Original Type';

and this essay contained exactly the same theory as mine. Mr. Wallace expressed the wish that if I thought well of his essay, I should send it to Lyell for perusal.

"The circumstances under which I consented at the request of Lyell and Hooker to allow of an abstract from my MS., together with a letter to Asa Gray, dated September 5, 1857, to be published at the same time with Wallace's Essay, are given in the *Journal of the Proceedings of the Linnean Society*, 1858, p. 45. I was at first very unwilling to consent, as I thought Mr. Wallace might consider my doing so unjustifiable, for I did not then know how generous and noble was his disposition. The extract from my MS. and the letter to Asa Gray had neither been intended for publication, and were badly written. Mr. Wallace's essay, on the other hand, was admirably expressed and quite clear."

During his evenings and on rainy days when he was not otherwise engaged with his collections, Mr. Wallace wrote letters and papers of deep interest, containing not only vivid descriptions of his life and discoveries, but pregnant with the rich fruitage of his reasoning from facts and observations at hand. One of these papers, as we have just seen, was "On the Tendency of Varieties to depart indefinitely from the Original Type," and dwelt on the great truth of the survival of the fittest. Another paper written much earlier was entitled "On the Law which has regulated the Introduction of New Species." It was published in *The Annals and Magazine of Natural History* in 1858. He also spent every spare moment he felt he could take from other work in reading a few great books that afforded additional food for his imagination and reasoning faculties. But his time when not ill with fevers was for the most part devoted to collecting, classifying and properly mounting birds, butterflies, beetles and other insects. In a letter to his friend Bates, written from Ternate in 1858, he gives a list of the different distinct species he had collected up to date during his Malay wanderings. These numbered 8,540. In 1861 he writes of "cleaning, arranging, comparing and packing for safe transmission to the other side of the world about sixteen thousand specimens of insects, birds and shells."

From such facts we see how indefatigable he had been in his arduous labor. On his return to England in 1862, in addition to his

immense and valuable collection of specimens he brought two extremely beautiful and rare birds of paradise, such as had never before been seen alive in Europe. They were for some time a leading attraction in the Zoological Gardens of London.

VII. AT HOME AGAIN: HIS CHIEF SCIENTIFIC WORKS.

On reaching London Mr. Wallace found that his printed papers and his valuable work for natural history had won for him the admiration and friendship of most of England's foremost physical scientists. Everywhere the worth of his views on subjects relating to physical science in general and natural history in particular was highly respected and his great ability as a logical reasoner was fittingly recognized. Among those who were especially warm in their friendship and appreciation were Sir Charles Lyell, the Nestor of physical science of the day, and Charles Darwin, the master-spirit among the evolutionary leaders. Herbert Spencer, T. H. Huxley, and indeed all the more eminent of the progressive school of physical scientists were numbered among his personal friends. He also found his services in demand by the great societies which were carrying forward the various branches of investigation in natural science and history.

Formerly he had dreamed of devoting his life to the personal investigation of the multitudinous lower forms of life in the vegetable and animal world, which had lured him to the tropics of the Old and the New World and had held such almost irresistible charm for him during more than twelve years. But now, when he was recognized as one of the foremost, if not as the very greatest working naturalist of the age, he found the horizon of thought so greatly broadened that other and vaster themes lured him with compelling power. His philosophical research and his personal investigations carried forward in a rationalistic attempt to solve in so far as possible the riddle of the ages, the story of the ascent of life, dwarfed his former ambitions, and there were also other themes that called to him, not the least of which was the bettering of social conditions for all the children of man.

Sir Charles Lyell conceived a high regard for the intellectual ability of Mr. Wallace and the soundness of his reasoning, and after the naturalist returned from the Far East a warm and lasting friendship sprang up between the

two. Charles Darwin also cherished for him the highest regard. The entire absence of any feeling of jealousy between the two great scientists and co-discoverers of a revolutionary theory was as beautiful as exceptional. On one occasion Mr. Darwin in a personal letter to Mr. Wallace wrote as follows:

"I hope it is a satisfaction to you to reflect and very few things in my life have been more satisfactory to me—that we have never felt any jealousy towards each other, though in some sense rivals. I believe I can say this of myself with truth, and I am absolutely sure that it is true of you."

Darwin ever entertained a very high regard for Mr. Wallace's reasoning power and his ability to make dry subjects perfectly plain and interesting. He also frequently appealed to him for light on different questions, though the two scientists often differed radically in their views and conclusions. In one of his letters Mr. Darwin thus refers to one of our author's contributions to *Nature*:

"I must ease myself by writing a few words to say how much I and all in this house admire your article in *Nature*. You are certainly an unparalleled master in lucidly stating a case and in arguing. Nothing ever was better done than your argument about the term *Origin of Species*, and about much being gained if we know nothing about the precise cause of each variation."

It was during the thirty years following his return to England from the Far East that Mr. Wallace wrote his greatest scientific works, among the most important of which were *The Malay Archipelago*, *Geographical Distribution of Animals*, *Natural Selection and Tropical Nature*, and *Island Life*. He also published a great number of smaller treatises and wrote frequently for the leading magazines, as well as preparing several papers for the Ninth Edition of the *Encyclopædia Britannica*.

Nor was his work confined to physical science. He wrote on a number of subjects entirely foreign to his special fields of research. Among his principal later scientific works were *Darwinism*, the best popular exposition of the evolutionary philosophy that has been written, and *Studies Scientific and Social*, embracing many of his shorter essays, both relating to physical science and social advance. Of his last three works, written in recent years

at a time of life when few men are able to clearly marshal and present their thought, and which in themselves would be enough to give a man a high place among the writers of his time, we shall speak presently.

His scientific works, fortified as they are by the immense acquisition of knowledge personally gained during his twelve years of wandering, are among the most important contributions to the literature of physical science and evolutionary thought that we have, complementing, elucidating and fortifying the master-works of Darwin and Spencer; and because of the author's wide knowledge of natural history they are in many respects more helpful and authoritative than the magnificent popular contribution of the fourth brilliant scholar in the great English evolutionary group, T. H. Huxley.

In 1882 Dublin University conferred on Mr. Wallace the degree of LL.D., and in 1889 he received the degree of D.C.L. from Oxford University.

VIII. DR. WALLACE'S VISIT TO AMERICA.

In the autumn of 1886 Dr. Wallace was engaged by the management of the Lowell Lecture Course of Boston to deliver a series of lectures that were given in November and December of that year, the subjects being:

1. The Darwinian Theory: what it is and how it has been demonstrated.
2. The Origin and Uses of the Colors of Animals.
3. Mimicry, and other exceptional modes of Animal Coloration.
4. The Origin and Uses of the Colors of Plants.
5. The Permanence of Oceans, and the relations of Islands and Continents.
6. Oceanic Islands and their Biological History.
7. Continental Islands: their Past History and Biological Relations.
8. The Physical and Biological Relations of New Zealand and Australia.

This course of lectures formed the groundwork of his popular book, published later, entitled *Darwinism*. After completing his lectures he went to Washington where he remained for some time, and from thence by easy stages he visited California, making scientific investigations at various points. The rocks, the Indian relics of the Mound Builders, the flowers of the different regions, the great

trees of the Yosemite, and such natural scenes as the Garden of the Gods in Colorado and Niagara Falls especially received his attention.

On his return to England he suffered greatly from asthma and came to the conclusion that his days of active labor were well-nigh over. He was, however, induced to go to Switzerland and deliver a lecture on the great achievements of the nineteenth century, which was so well received that friends urged him to prepare a volume on the subject. This he did not at first contemplate doing on account of his precarious health, but by a happy chance, if there be such a thing as chance, he was shown a way to health about this time, and with renewed life set to work on his splendid and thought-inspiring work, *The Wonderful Century*, one of the best if indeed it is not the most graphic and informing survey of the marvelous advances and also of the shortcomings of the nineteenth century. This volume was followed by his work, *Man's Place in the Universe*, and still later by the present volume, *My Life: A Record of Events and Opinions*, which, though completed last September, was not printed until the present year. As it contains nine hundred large pages of well-digested matter, its preparation would naturally be considered an important work for a man in the prime of life. It has, however, been written since Dr. Wallace passed his eightieth milestone. This rejuvenation of the great scientist, that has already enabled him to prepare three notable works after his health had completely broken down, is so remarkable that we give his account of his cure through a radical change of diet:

"When in 1896 I was invited by Dr. Lunn to give a lecture to his friends at Davos, I firmly believed that my scientific and literary work was concluded. I had been for some years in weak health, and had no expectation of living much longer. Shortly after returning from America I had another very severe attack of asthma in 1890, and a year or two after it recurred and became chronic, together with violent palpitations on the least sudden exertion, and frequent colds almost invariably followed by bronchitis. Any attempt at continuous work was therefore very far from my thoughts, though at times I was able to a fair amount of writing. My friend and neighbor, Professor Allman, had suffered from the same affection during a large part of his life, and only found very partial relief

from it by the usual fumigations and cigarettes, with occasional changes of air, and it was often quite painful to witness his sufferings, which continued till his death in 1898. As he was himself a medical man, and had had the best advice attainable, I had little hope of anything but a continuance and probably an increase of the disease.

"But the very next year I obtained relief (and up to the present time an almost complete cure) in an altogether accidental way, if there are any 'accidents' in our lives. Mr. A. Bruce-Joy, the well-known sculptor (a perfect stranger to me), had called on me to complete the modeling of a medallion which he had begun from photographs, and I apologized for not looking well, as I was then suffering from one of my frequent spells of asthma, which often prevented me from getting any sleep at night. He thereupon told me that if I would follow his directions I could soon cure myself. Of course, I was altogether incredulous; but when he told me that he had himself been cured of a complication of allied diseases—gout, rheumatism, and bronchitis—of many years' standing, which no English doctors were able even to alleviate, by an American physician, Dr. Salisbury; that it was effected solely by a change of diet, and that it was no theory or empirical treatment, but the result of thirty years' experiment on the effects of various articles of diet upon men and animals, by the only scientific method of studying each food separately and exclusively, I determined to try it. The result was, that in a week I felt much better, in a month I felt quite well, and during the six years that have elapsed no attack of asthma or of severe palpitation has recurred, and I have been able to do my literary work as well as before I became subject to the malady.

"I may say that I have long been, and am still, *in principle*, a vegetarian, and believe that, for many reasons, it will certainly be the diet of the future. But for want of adequate knowledge, and even more from the deficiencies of ordinary vegetable cookery, it often produced bad effects. Dr. Salisbury proved by experiment that it was the consumption of too much starch foods that produces the set of diseases which he especially cures; and when these diseases have become chronic, the only cure is almost complete abstinence from starchy substances, especially potatoes, bread, and most watery vegetables, and, in place of them, to substitute the most

easily digestible well-cooked meat, with fruits and nuts in moderation, and eggs, milk, etc., whenever they can be digested. Great sufferers find immediate relief from an exclusive diet of the lean of beef. I myself live upon well-cooked beef with a fair proportion of fat (which I can digest easily), a very small proportion of bread or vegetables, fruit, eggs, and light milk-puddings. The curious thing is that most English doctors declare that a meat diet is to be avoided in all these diseases, and many order complete abstinence from meat, but, so far as I can learn, on no really scientific grounds. Dr. Salisbury, however, has experimentally proved that this class of ailments are all due to malnutrition, and that this malnutrition is most frequently caused by the consumption of too much of starch foods at all meals, which overload the stomach and prevent proper digestion and assimilation. My case and that of Mr. Bruce-Joy certainly show that Dr. Salisbury has found, for the first time in the history of medicine, a *cure*—not merely an *alleviation*—for these painful and distressing maladies. This personal detail as to my health is, I think, of general interest in view of the large number of sufferers who are pronounced incurable by English doctors."

IX. SOCIAL VIEWS.

Our author's interest in social problems dates from his brief residence in London when he was but fourteen years of age. At that time, as we have already seen, he became deeply interested in the work of Robert Owen at New Lanark, and the social views of that great philanthropist and reformer exerted a marked influence on his mind. He was ever a passionate lover of justice, and he was too fundamental a thinker to fail to see the essential iniquity of present-day unjust social conditions. But it was not until the publication of Herbert Spencer's *Social Statics* that he clearly saw the iniquity of private-ownership in land and how it was a prime cause of social inequality and a leading factor in producing poverty, misery and the crime incident to these.

In 1881, after the publication of a luminous paper on how to nationalize the land, a Land Nationalization Society was formed and the great naturalist was elected its first president. At that time he wrote Herbert Spencer asking him if he would join the society. The latter declined in a letter from which we take the

following extract in order to show how, even so late as that date, Herbert Spencer had not become the reactionary he showed himself to be ten years later, when he published *Justice*:

"As you may suppose, I fully sympathize in the general aims of your proposed Land Nationalization Society; but for sundry reasons I hesitate to commit myself, at the present stage of the question, to a programme as definite as that which you send me. It seems to me that before formulating the idea in a specific shape, it is needful to generate a body of public opinion on the general issue, and that it must be some time before there can be produced such recognition of the general principle involved as is needful before definite plans can be set forth in any purpose.

"It seems to me that the thing to be done at present is to arouse public attention to (1) the abstract iniquity of the present condition of things; (2) to show that even now there is in our law a tacit denial of absolute private ownership, since the State reserves the power of resuming possession of land on making compensation; (3) that this tacitly admitted ownership ought to be overtly asserted; (4) and that having been overtly asserted, the landowner should be distinctly placed in the position of a tenant of the State on something like the terms proposed in your scheme: namely, that while the land itself should be regarded as public property, such value as has been given to it should vest in the existing so-called owner."

In commenting on the above Dr. Wallace says:

"On this I may remark that, during the twenty-five years that has elapsed, the Land Nationalization Society has been continuously at work, doing the very things that our critic seemed to think ought to be done *before* we formed the society. We have now 'generated a body of public opinion' in our favor, which could hardly have been effected without the work of a society, and we have long since satisfied most thinking men that the special difficulty as to the valuation of the owners' improvements is a purely imaginary one, since it is continually done."

Dr. Wallace hailed the appearance of Henry George's *Progress and Poverty* as the message of a true prophet of civilization, and hastened to call Mr. Spencer's attention to the work, but the spell of reaction and conventionalism

had begun to creep over the once splendidly progressive and courageous mind of the great philosopher. He had already ceased to be a social leader, but few of his friends and admirers were prepared for the reactionary views he advanced in *Justice*. There was a marked difference in the moral and mental make-up of these two great thinkers. Herbert Spencer in early life was quite as much or more than Alfred Russel Wallace dominated by the spirit of liberalism and of justice. He was a leader of civilization and a way-shower for the battalions of right and progress; but as age crept over him, he, like so many other one-time leaders, became a camp-follower along certain lines. He grew timid, conservative and reactionary. Not so with Dr. Wallace. His mind and soul have continued to expand, broaden and develop as the years have silvered his beard and crowned his octogenarian head with snow. His superb moral courage has kept pace with his intellectual vigor, while his passion for justice for all the people has burned brighter and brighter and his moral idealism and faith in a nobler to-morrow have shone forth in his later works with a splendor greater even than in his earlier writings.

He has written much in favor of land nationalization and various other social and economic progressive measures. At our request he prepared several papers for *THE ARENA*, the most notable being, perhaps, the two contributions entitled *The Social Quagmire and the Way Out for the Farmer and Wage-Earner*, which appeared in *THE ARENA* in the spring of 1893. Another important paper which he prepared for us was entitled *Human Progress, Past and Future*, which appeared in the *ARENA* for January, 1892. Two contributions on objective apparitions also awakened widespread interest and elicited much comment on both sides of the Atlantic.

Dr. Wallace, though a firm believer in the Single-Tax idea, is socialistic rather than individualistic in his economic views. He may be called a Fabian or an opportunist Socialist—a Socialist something after the order of Jean Jaurès, the eminent French statesman. In defining Socialism as he understands it, Dr. Wallace says:

"I may here state for the benefit of those ignorant writers who believe that socialism *must* be compulsory, and speak of it as a 'form of slavery,' that my own definition of socialism

is 'the voluntary organization of labor for the good of all.' All the best and most thoughtful writers on socialism agree in this; and for my own part I cannot conceive it coming about in any other way. Compulsory socialism is, to me, a contradiction in terms—as much so as would be compulsory friendship."

As to the practicability of socialism he says:

"I have ever since been absolutely convinced, not only that socialism is thoroughly practicable, but that it is the only form of society worthy of civilized beings, and that it alone can secure for mankind continuous mental and moral advancement, together with that true happiness which arises from the full exercise of all their facilities for the purpose of satisfying all their rational needs, desires, and aspirations"

He is, however, nothing if not a democrat, not believing in any form of government that does not conform to the wishes of the majority. "To my mind," he observes, "the question of good or bad, fit or not fit for self-government, is not to the point. It is a question of fundamental justice, and the just is always the expedient, as well as the right. It is a crime against humanity for one nation to govern another *against its will*. The master always says his slaves are not *fit* for freedom; the tyrant, that subjects are not *fit* to govern themselves. The fitness for self-government is inherent in human nature. Many savage tribes, many barbarian peoples are really better governed to-day than the majority of the self-styled civilized nations."

X. RELIGIOUS VIEWS.

Our author was born into a Church of England family and was reared in that faith, but his investigations led him, as they led most of the great physical scientists of the nineteenth century, into agnosticism. Later, however, his attention was called to modern spiritualism. He investigated, as he investigated other subjects, carefully, patiently, rigidly, keeping his mind open to the truth, but with what prejudice he had against rather than in favor of the spiritualistic claims. At last, however, like Sir William Crookes, F. W. H. Myers, Dr. Richard Hodgson, Sir Oliver Lodge, Camille Flammarion and many other of the profound scientific thinkers of the past century, he became convinced of the central claim of modern spiritualism, and de-

spite the advice and remonstrances of his scientific friends, he boldly championed what he conceived to be demonstrated truth, his volume of *Miracles and Modern Spiritualism* being one of the ablest expositions of the spiritualistic philosophy that has appeared. Since the publication of this work the investigations of the English Society for Psychical Research have led many of Europe's greatest scientists, both physicists and psychologists, to acceptance of a belief not very different from that entertained by Dr. Wallace, though for many years his religious convictions made against him both with his scientific fellow-workers and the leaders of the religious world, who were, however, wont to seize upon his arguments in favor of immortality with great avidity when arguing on evolution with scientists.

XI. HOME LIFE.

His home life has been as beautiful as his public career has been worthy and illustrious. He married some time after his return from the Malay Archipelago and has proved a faithful, high-minded husband and father. No spot has been so dear to him as his home. He naturally loves nature and has always striven to live in the country or where he could have ample land for flowers, shrubs and garden, and a fine view. "My gardening," he says, "has always been to me pure enjoyment. I have never made any experiments with my plants, never attempted to study their minute structure or to write about them; the mere seeing them grow, noting the infinite diversities of their forms and habits,

their likes and dislikes, all made the more interesting by the researches of Darwin, Kerner, H. Müller, Grant Allen, Lubbock and others, on the uses of each infinitely varied detail of stem and leaf, of bract and flower—all this was to me a delight in itself, and gave me that general knowledge of the outward forms and inward peculiarities of plants, and of the exquisite beauty and almost infinite variety of the vegetable kingdom, which enabled me better to appreciate the marvel and mystery of plant life, whether in itself or in its complex relations to the higher attributes of man."

No one can read this delightful life-story without finding his intellectual horizon broadened and his moral and spiritual sensibilities stimulated, while the life itself cannot fail to prove an inspiration to all serious-minded youths, one of the most marked characteristics being his splendid moral courage. He is an uncompromising foe of militarism—as much so as are the Quakers, in this respect his life stands out in splendid relief from those small-souled but loud-mouthed mortals who delight in taking the lives of unoffending animals, who glory in the "big stick," and who take pride in war and great armaments, but who are strangely lacking in the supreme test of true bravery—moral courage that cannot be swerved from what one believes to be right. Alfred Russel Wallace's moral courage is only equaled by his hatred of war, the useless taking of life and the inflicting of pain on others. He loves peace, he believes in human brotherhood, he worships towards the dawn, and the keynote of his life has ever been a passionate love for truth and justice.