



Alfred Russel Wallace (1823–1913), by Reginald Haines, c.1909

Wallace, Alfred Russel (1823–1913), naturalist, evolutionary theorist, and social critic, was born on 8 January 1823, at Kensington Cottage, Usk, Monmouthshire, the third of four sons and eighth of the nine children of Thomas Vere Wallace and Mary Anne Greenell. Early biographical treatments give the year of his birth as 1822 through an oversight on Wallace's own part. The spelling 'Russel' was perpetuated from a mistake made when the birth was recorded.

Early life, 1823–1848 Wallace's childhood was happy but not without hardship. His mother came from a respectable middle-class English family; his father, of Scottish descent, was to have taken up the law. Despite being

sworn in as an attorney in 1792, however, he apparently never practised, the income from inherited property allowing him to live a life of leisure for the next fifteen years. In 1807 he married and shortly thereafter entered into the first of a long series of largely unprofitable ventures, most notably the publication of a literary magazine. He was swindled out of his remaining property about 1835 and the family, already foundering financially, fell on hard times. Wallace was forced to withdraw from the grammar school at Hertford at the end of 1836 and was sent to London to board with his elder brother John. The ensuing stay of several months produced the first critical influence on his overall intellectual development: contact with supporters of the socialist Robert Owen. Indeed, at some point during this period Wallace actually heard Owen lecture in person; the effect was such that from that time onward he would characterize himself as a disciple.

By mid-1837 Wallace had joined the eldest brother, William, in Bedfordshire to learn the surveying trade. In January 1839 he was temporarily apprenticed to a watchmaker, but less than a year later was back with William, by then working in Hereford. In these and the following years he gained a good practical education in a number of technical trades (surveying, drafting and map-making, mechanics, building design and construction, agricultural chemistry, and so on), and began to develop an amateur's interest in natural history subjects, especially geology, astronomy, and botany. In 1841 he became associated with the newly formed Kington Mechanics' Institution and in that same year or the next, on moving to the Welsh

town of Neath, began attending lectures sponsored by the Neath area's scientific societies. Soon he was frequenting the local libraries and giving his own lectures on various popular science subjects at the Neath Mechanics' Institute. In the early 1840s he also began to write: one of his first efforts, on the disposition of mechanics' institutes, was composed about 1841 and reached print in a history of Kington published in 1845.

During a work slowdown in late 1843 William Wallace was forced to let his brother go, whereupon Alfred secured the position of master at the collegiate school in Leicester. Here he again had access to a good library, and encountered several works that would profoundly influence his future endeavours. Here, too, he was fortunate enough to make the acquaintance of Henry Walter Bates, a young entomologist whose enthusiasm for neighbourhood collecting excursions soon attracted Wallace's involvement. It was also during this period that he attended some lectures on mesmerism, and proceeded to become a skilled practitioner of the then little credited art. His early experiments in this realm were a revelation to him; as he later recalled, he had learned his

first great lesson in the inquiry into these obscure fields of knowledge, never to accept the disbelief of great men, or their accusations of imposture or of imbecility, as of any weight when opposed to the repeated observation of facts by other men admittedly sane and honest. ('Notes on the growth of opinion', *Religio-Philosophical Journal*, new ser., 4, 1893, 229)

The sudden death of William in February of 1845 drew Wallace back to surveying, where there was again plenty of work thanks to the railroad boom. He still enjoyed the outdoor labour, but the trials of managing the business, even with the assistance of his brother John, began to test his patience. He had meanwhile been keeping up his natural history collecting and lecturing activities on the side, and was even made a curator of the Neath Philosophical and Literary Institute's museum. Eventually, natural history won out: inspired by William H. Edwards's new book, *A Voyage up the River Amazon*, Wallace commenced plans for an extended collecting expedition. Bates was quickly enlisted, and on 25 April 1848 the two young naturalists left Liverpool for Pará (now Belém), at the mouth of the Amazon.

Collecting in the Amazon, 1848–1852, and the Malay archipelago, 1854–1862 Apart from meeting their immediate goal of earning a living through natural history collecting, Wallace and Bates had a broader purpose for travelling to the Amazon: solving the mystery of the causes of organic evolution. Though Wallace had unreservedly embraced the notion of social progress from his early teens and apparently leaned toward a uniformitarianism-based but progressive view of change in physical nature even before turning twenty, he had not been a convert to biological evolution until he read Robert Chambers's controversial, anonymously published *Vestiges of the Natural History of Creation* about 1845, the year it was published. That one might demonstrate the fact of evolution through a detailed tracing out of individual phylogenies over time and space was

apparent to him early on, and the Amazon was to afford a natural laboratory to this end. He would eventually stay in the area four years, gaining invaluable field experience and sending home a sizeable quantity of biological specimens, largely of birds and insects.

The two men split up in March 1850 (or possibly earlier), Wallace choosing to concentrate on the central Amazon and Rio Negro regions. There he first came into contact with native peoples unaffected by European influence, an experience that left an indelible positive impression on him. A map he prepared of the Rio Negro proved reliable and became a standard reference for many years. Most of his time was spent studying the area's ornithology, entomology, physical geography, primatology, botany, and ichthyology, and he soon became fascinated by two problems in particular: first, how geography influenced species distribution boundaries, and second, the way the adaptive suites of many populations seemed more attuned to ecological station than to closeness of affinity with other forms.

By early 1852 the stresses of tropical exploration had undermined Wallace's health to the extent that he decided to leave the region. On returning to Pará he was told that his younger brother Herbert, who had joined the expedition in 1849, had succumbed to yellow fever some months earlier. Earlier he had discovered that through an unfortunate misunderstanding his collections from the year before had not been forwarded on to England. Passage for both himself and his treasures (including a number of living specimens) was arranged, but after several days at sea the brig on which he was sailing caught fire. Although everyone on board was safely evacuated to a pair of lifeboats all of Wallace's possessions, save a few drawings, notes, and odds and ends, perished. The party was finally rescued—after ten anxious days of paddling and bailing—by a passing cargo vessel making a return run to England. Their new carrier too, was old and decrepit, and barely managed to survive a series of storms encountered over the remainder of the voyage.

The Amazon experience left Wallace, now twenty-nine, with a solid reputation as a naturalist. But the sea disaster had robbed him of materials for further study, and—most significantly—the mechanism of organic change had eluded him. He was initially undecided as to what course to pursue next. While making up his mind he made good use of what was to be an eighteen-month stay in London; in addition to vacationing briefly in Paris and Switzerland and reading several papers at professional society meetings, he put together two reasonably well-received books: *Palm Trees of the Amazon* (1853), a short systematic ethnobotanical survey, and *A Narrative of Travels on the Amazon and Rio Negro* (1853). When finally he decided to soldier on with his collecting activities, this time in the Malay archipelago (the Indonesia region), passage to Singapore was secured through a grant from the Royal Geographical Society.

By the time he left the Malay archipelago, just less than eight years after his arrival in Malaya on 20 April 1854, Wallace had visited every important island in the group,

many on multiple occasions. His efforts, drawing on perhaps 70 separate expeditions (requiring some 14,000 miles of island-to-island sailing in native crafts), reaped the astonishing harvest of 126,500 natural history specimens, including more than 200 new species of birds and well over 1000 new insects. His many experiences are imperishably detailed in his splendidly successful book *The Malay archipelago* (1869), a work that remained in print in multiple editions more than a century later, and which continues to make for fascinating reading. In it are recorded, among other exploits, his efforts to capture specimens of the bird of paradise, his pursuit of the orangutan, his activities in New Guinea (where he was one of the first Europeans to set up a residence), his various dealings with the region's many native peoples, and numerous vignettes conveying the joys and vicissitudes of the field naturalist's work.

It was during the period from 1854 to 1862 that Wallace fully came into his own as a zoogeographer. The Malay archipelago provided the ideal geographical setting for species distribution studies, not only as an end in themselves, but as evidence critical to elucidation of the evolutionary process. His 1859 paper 'On the zoological geography of the Malay archipelago' (*Journal and Proceedings of the Linnean Society, Zoology*, 4, 1860, 172–84), a classic in that field, included his delineation of the abrupt zoogeographical discontinuity between the oriental and Australian faunal realms that now bears his name: Wallace's Line.

The discovery of natural selection While collecting in Sarawak in February 1855 Wallace wrote out his first important contribution to theoretical biology, 'On the law which has regulated the introduction of new species' (*Annals and Magazine of Natural History*, 16, 1855, 184–96). When it appeared in print it caught the attention of the celebrated geologist Sir Charles Lyell, who specially brought it to the notice of Charles Darwin, then labouring over his work, planned in several volumes, on 'the species problem'. As most of its ideas were not new to Darwin he was not particularly impressed, and indeed the essay, though a model of clarity, did no more than rather generally outline connections between the geological and geographical distribution of organisms that even Wallace himself had taken for granted for a good ten years at that point. But it was an indication of things to come, as were the several further studies based in the same evolutionary train of thought that he penned over the next three years.

While staying in the Moluccas in February 1858, during a bout of malaria, Wallace arrived at the notion of natural selection. His discovery was an independent one: Darwin's commitment to the same idea, privately reached twenty years earlier, was still only known to a handful of confidants. The ideas of Thomas Malthus figured prominently in this revolutionary concept: given the limited resources of earth, the ability of populations to reproduce in numbers testing those limits, and the inherent variability of expression of traits in such populations, it was logical to suppose that only the better-adapted individuals would tend to win out in the continuing competition for survival and pass their particular characteristics on to

their progeny. On recovering from his illness Wallace jotted down his ideas in essay form and sent the work—'On the tendency of varieties to depart indefinitely from the original type'—off to Darwin, with whom he had recently begun a correspondence, for 'possible forwarding' to Lyell. Darwin recognized in its message the very essence of his last twenty years of labour, and was quite understandably taken aback. The exact chain of events that followed is still not known, but it appears that Darwin decided to place the matter—an issue of priority—in the hands of two of his most trusted scientific friends, Lyell and the botanist Joseph Hooker. It was their altogether reasonable solution to present Wallace's paper, along with two extracts from Darwin's unpublished writings on natural selection, at the next meeting of the Linnean Society on 1 July 1858. This compromise has been viewed by most observers as having satisfied all involved, both then and later, yet it must be pointed out that as the initiating work Wallace's paper rightfully should have been read first, but instead was presented third; and that his permission to have it read and then published was not obtained prior to the act. The second matter, especially, is of great historical interest: it had not been Wallace's intention to have his communication published immediately, and it is now difficult to judge just how far—and in what directions—his thoughts had actually progressed at that point.

While the essential similarity between the Darwin and Wallace versions of natural selection as of 1858 is apparent enough, a number of observers have noted that Wallace tended to address competition in population level terms, whereas Darwin dwelled on the relative superiorities of individual organisms. This may be one result of Wallace's early exposure to socialist views. However, it is still not clear what Wallace's views on evolution in general were at that time. Among the remarkable features of 'On the tendency ...' is the absence of any reference to the concepts earlier set out in 'On the law ...'; further, 'On the tendency ...' contains no discussions of the possible relation of natural selection to the emergence of mankind. Yet there is conclusive evidence that the question of man's origins had been on Wallace's mind for ten years or more by 1858. Wallace, like Darwin, believed that the struggle for existence was a conservative force incapable of shaping unnecessary adaptational refinements, but this position, added to his Owenist views on societal perfectibility and his acquaintance with the moral and intellectual capabilities of native tropical peoples, may well have led him to a pre-1858 evolutionary perspective differing considerably from Darwin's.

Later life, 1862–1913 Although Wallace later referred to his Malay adventure as 'the central and controlling incident of my life' (*My Life*, 1.336), his work had really just begun when he returned to England in the spring of 1862. Over fifty-one years of fruitful attention to a formidable array of subjects lay ahead, with the ultimate result that by the end of his life he had become one of the best-known scientists in the world—'the Grand Old Man of Science', as he

was often referred to. He appears to have retained his travelling habit even after 'settling' in England, residing at at least ten separate addresses between 1862 and 1903. In the spring of 1866 he married Annie (1845/6–1914), the twenty-year-old daughter of his friend the botanist William Mitten. Their marriage was a long and happy one; Annie Wallace shared her husband's consuming love of nature (and, especially, gardening), and assisted him from time to time with his literary work. Two children, Violet and William, survived to adulthood (a third died in infancy).

For a couple of years Wallace busied himself primarily with study of his vast personal collection of specimens, but it was not long before he realized that he did not want to spend the rest of his life immersed in species-level systematics. At first living in London, he was able to take part in the meetings of several scientific institutions, notably the Entomological (of which he was president in 1870–71), Ethnological, Linnean, Zoological, and Anthropological societies. To the last of these bodies in March 1864 he delivered the important paper, 'The origin of human races and the antiquity of man deduced from the theory of "natural selection"', in which he theorized that physical evolution in our species had probably largely ceased once the action of natural selection had begun to focus itself on the human mind.

Wallace quickly developed a warm personal and professional relationship with Darwin. In 1863 he wrote his first reply to a criticism of Darwinian tenets; dozens more followed. However, in 1869 he showed the first definite sign of parting with Darwin's logic when he opined that the higher intellectual and moral faculties of humankind could be explained only on supposition of the influence of preternatural causal agencies. At about the same time he began seriously to question Darwin's model of sexual selection—the notion that female choice of mates could account for the gaudy coloration and other secondary sexual characteristics of the males of many species of birds and other animals.

Meanwhile, scores of articles, reviews, and letters to the editor on various other matters ranging from geodesy and animal instinct to museum organization and the power of the vote had been appearing in various newspapers and reviews under his name. Over a period of nine years (1862–70) Wallace presented ten papers at the annual meetings of the British Association for the Advancement of Science. He met nearly every British naturalist of note and counted many as intimates, including Darwin, Lyell, Hooker, Thomas Huxley, St George Mivart, Philip Sclater, Edward Poulton, Herbert Spencer, William Crookes, Francis Galton, John Lubbock, William Barrett, and Edward Tylor.

After *The Malay archipelago* appeared in 1869 and the essay collection *Contributions to the Theory of Natural Selection* a year later, Wallace turned his attention to an in-depth study of the geographical distribution of animals. In 1876 he produced the two-volume classic *The Geographical Distribution of Animals*; this was followed by *Tropical Nature and other Essays* in 1878, and in 1880 by another definitive work, *Island Life*. By now he had tired of city living and embarked on a series of removals to more rural

settings. The first relocation out of London was to Grays, Essex, in 1872; this was followed by moves to Dorking (1876), Croydon (1878), Godalming (1881), Parkstone (1889), and, finally, Broadstone, near Wimborne, Dorset (1902).

Though Wallace and his family managed to live reasonably comfortably right through to the end, they were never able to achieve financial security. Bad and carelessly speculative investments led to his losing most of the considerable profits accrued from the sale of his Malay archipelago collections; meanwhile, none of his applications for permanent income-yielding positions proved successful. As a result he was forced to take on a variety of short-term employments (notably, editing other naturalists' writings, working part-time as an assistant examiner in physical geography, and engaging in various lecturing and creative literary activities). In 1870 he attempted to take an easy profit by answering a £500 challenge posed by a flat-earthier; this proved to be a mistake, for although Wallace won the wager he was unable to collect and the man harassed him and his family for years. By 1881 his financial situation had so deteriorated that a mutual friend intervened and, largely through Darwin's influence, was able to secure him a civil-list pension.

Wallace's professional attention in the post-Malay period was by no means exhausted, or perhaps even dominated, by natural science subjects. In 1866, to the wonder of many of his colleagues, he publicly embraced spiritualism. Earlier he had been a self-proclaimed agnostic; his conversion was precipitated by several factors, including long-held opinions on the nature of belief as related to the evidence of the senses, an attraction to spiritualism's moral teachings, an interest in its apparent connection to natural processes, an extensive personal investigation of séance phenomena, and perhaps (though this has never been conclusively demonstrated, and he denied it himself) a general dissatisfaction with the materialist limitations of Darwinian natural selection. As soon as he was convinced of the reality of the phenomena, he began writing on spiritualism as well. His first three major treatments of the subject were later brought out as the collection *On Miracles and Modern Spiritualism* in 1875. He quickly gained recognition as one of the movement's leading voices. Three of his essays on spiritualism, 'A defence of modern spiritualism' (1874), 'Modern spiritualism—are its phenomena in harmony with science?' (1885), and 'If a man die, shall he live again?' (1887), were in his own time his most reprinted works.

It will be recalled that Wallace had committed himself to Owenist ideals as far back as 1837; further important early influences on the development of his social science included his involvement as a surveyor with the enclosure movement c.1840–1841, his reading in 1853 of Herbert Spencer's *Social Statics* and adoption of its 'social justice' message, and his admiration for the innate qualities of 'uncivilized' peoples. When by 1880 he had completed the major part of his studies on geographical distribution, Wallace began devoting much of his time to social issues. That same year his essay 'How to nationalize the

land' (*Contemporary Review*, 38, 1880, 716–36) attracted such attention that a new organization called the Land Nationalisation Society, dedicated to retrieving control of the land from large holders, was created and he was made its first president. He held the office to his death in 1913, working persistently for the organization's success until about 1896, at which point he effectively retired to the role of figurehead. Another of what he ironically termed his 'heresies' was an active involvement in the anti-vaccination movement, especially from 1883 to 1898. His conclusions on this matter appeared in a series of three pamphlets and the final report of a royal commission that took up the matter. The most visible of these efforts was *Vaccination a Delusion* in 1898; it was issued simultaneously as a pamphlet and as part of the book *The Wonderful Century*.

Meanwhile, Wallace's natural science studies had been given a boost by an invitation to deliver a series of lectures on evolutionary theory at the Lowell Institute in Boston in late 1886. On completing this obligation he took the series (plus talks on at least three non-science subjects) across the United States over a period of ten months, along the way meeting countless dignitaries of science, politics, and letters, up to and including President Cleveland. While in California in the summer of 1887 he was reunited with his expatriate brother John, whom he had not seen in nearly forty years. In San Francisco he gave the spectacularly successful public lecture 'If a man die, shall he live again?' The California visit was also marked by strong impressions produced by visits to redwood groves (in the company of John Muir), the Yosemite valley, and the future site of Stanford University (with Leland Stanford, whom he had befriended in Washington, DC, earlier that year).

On returning to England, Wallace used his American lectures as the point of departure for a new book, *Darwinism* (1889), which achieved considerable popularity and ranks among his best-known works. Encouraged by this success, he spent most of the 1890s writing on a mixture of social and natural science topics. In 1889, after reading Edward Bellamy's best-selling novel *Looking Backward*, he finally declared himself a socialist (until that point he had remained unconvinced that the change-over to a socialistic state was feasible). In 1898, expanding on some lectures on scientific progress he had delivered two years earlier in Switzerland, he fashioned an idiosyncratic rendering of the nineteenth century's successes and failures under the title *The Wonderful Century*. In 1900 he brought out the two-volume collection of his essays *Studies Scientific and Social*, and three years later the study *Man's Place in the Universe*, in which he created a stir by arguing for the soleness of advanced life on earth and its centrality of location in the universe (then thought to extend no further than our own galaxy). Some of the arguments used in the latter work were applied in 1907 to the more special case of Mars in an attempt (*Is Mars Habitable?*) to debunk Percival Lowell's theory that the red planet was inhabited. In these two works Wallace fully anticipated the anthropic principle and all but founded another study for which he has been given but little credit: exobiology.

In 1905 Wallace's well-received two-volume autobiography *My Life* came out. In 1908 his name appeared—this time as editor—at the head of yet another two-volume work: the botanical papers and diaries of his friend and co-Amazonian explorer Richard Spruce, who had died in 1894. His last public appearance took place in 1909, when he gave a lecture to the Royal Institution that evolved into the teleological popular science study *The World of Life* (1910). Two short works of social criticism, *Social Environment and Moral Progress* and *The Revolt of Democracy* (both published in 1913) were his final monographic productions, at the age of ninety. The full list of Wallace's books is rounded out by the inclusion of *Australasia* (1879), a commissioned volume for a travel series, *Land Nationalisation* (1882), *Bad Times* (1886), an essay on the depression of trade, and *Natural Selection and Tropical Nature* (1891), another collection of previously published works.

Appearance, character, and historical significance Physically, Wallace was tall (6 feet 1 inch in his youth) and lean but robust with sparkling, bespectacled blue eyes. He was bearded from the time of his Malay travels; his hair turned prematurely snow white in his fifties, and in old age he came to walk with a considerable stoop. Apart from a moderate number of passing but occasionally troubling ills, his health was generally good throughout his life.

Wallace was especially celebrated for his forthright honesty. Decent to a fault (he refused to blame others for their blemishes of character and on occasion was duped accordingly), he was held in the highest respect even by most of his adversaries. Though shy and self-effacing by nature, he was good company when at ease and was much in demand as a lecturer. Further, he was sought out as a reviewer and popular expositor for his easy, lucid writing style. Among colleagues of equal standing his professional reputation was excellent, and those who knew best considered him to be among the greatest scientific reasoners of the era.

Numerous important honours came Wallace's way during his long and productive life—there might have been even more, but after receiving honorary doctorates from Dublin in 1882 and Oxford in 1889 he politely let it be known he desired no further academic honoraria. He received medals from the Royal Society in 1868, 1890, and 1908, the Société de Géographie in 1870, and the Linnean Society in 1892 and 1908, as well as the Order of Merit in 1908. A mark of his dissenting status within the scientific élite was that he was only elected FRS as late as 1893. His main professional affiliations were with the Royal Geographical Society, Linnean Society, Royal Entomological Society, and Zoological Society. He also belonged to the Ethnological Society, British Association for the Advancement of Science, Batavian Society of Arts and Sciences, British National Association of Spiritualists, Anti-Vaccination League, and a few lesser institutions.

In an assessment of Wallace's long-term significance, his contributions to natural science occupy the primary position. The vast range of his attention to natural science, however, precludes more than a brief summary of his main contributions. Above all, of course, he is recognized as the independent realizer of the theory (actually,

and revealingly, he usually referred to it as the 'law' of natural selection; and his action was also the main spur for Darwin's decision to publish. But his work in this sphere went far beyond the setting of the general principle. He also established the role of protective coloration and other aspects of coloration in the evolutionary process, originated the concepts of polymorphism and recognition marks, explored the influences of geography on the processes of evolution, contributed significantly to the development of Batesian and Müllerian mimicry theory, and produced important arguments on the forces at work in human evolution, instinct, adaptation, the evolution of island biotas, and the relation of hybrid sterility to species divergence, among other subjects.

The Geographical Distribution of Animals (1876) has long been viewed as a cornerstone work in the history of the science of zoogeography, the study of the causes of the distribution of animal species and faunas. As its effective 'father' Wallace argued for the field's recognition as a subject worthy of enquiry, established principles of faunal regionalization, and introduced methods of analysis. Further, he linked the characteristics of distribution to other sciences such as geology, climatology, and anthropology. Among his outstanding contributions to zoogeography were his defence of ornithologist Philip L. Sclater's faunal regionalization scheme, the corridor model of dispersal along mountain chains into tropical regions, the theory of air- and water-borne dispersal of colonizing propagules to oceanic islands, his conservative stance regarding posed connective land bridges between now separated land masses, his recognition of the scope of worldwide latitudinal diversity gradients, his model of the causes of discontinuous (disjunct) distribution patterns, and his attention to the problems of tropical nature in general.

Wallace the physical geographer and geologist is perhaps most celebrated for his theory of continental glaciation, in which he was the first to propose a modern synthetic model drawing on both geographical-climatological and astronomical lines of reasoning. He also developed a coherent theory of ice movement, marshalling an array of evidence demonstrating the validity of the glacial excavation model of alpine lake basin evolution. He is also remembered for his support of the theory of the permanence of ocean basins and continental masses; further contributions were made to the study of land surface erosion rates, the classification of islands, the age of the earth, and the record of pre-Cenozoic and southern hemisphere glaciation episodes. His work on astronomical subjects was entirely derivative, yet it too was significant in that he was one of the first investigators to apply logically climatological and physical geography principles to the study of planetary environments.

In physical anthropology Wallace is most frequently cited for his early applications of natural selection to human evolution and racial differentiation, his field observations on the orang-utan and on primates in general, and his conclusions regarding the racial affinities of the native inhabitants of Australia, New Guinea, and Polynesia. He is also known for his early championing of

what he termed the 'mouth-gesture' theory of the origin of language.

Wallace's contributions as a social critic should also not be ignored. Many of his schemes for social progress were quite ingeniously argued, and some have actually come to pass, if sometimes in variant form or under a different name. Indeed, his individuality as a social critic has often been overlooked altogether (he is usually viewed as a 'follower' of the social theories of the American social critic Henry George, for example, but most of Wallace's ideas on related subjects had actually already been worked out by the time he came into contact with George's writings). The foundation of his land nationalization plan was a novel thinking out of the concept of rent which took into account both the locational value of a parcel of land and value added to it over time. In *Land Nationalisation* (1882) Wallace proposed planning strategies such as green belts and the legislated protection of rural lands and historic monuments; in this work he also developed elaborate plans for the divestiture of large land holdings (including a compensation programme for landlords) and the subsequent monitoring of state-owned properties. His concern with the ownership and distribution of land, and with social geography, drew in part on his experiences in early life, when he worked as a surveyor.

An interesting side-contribution of Wallace's involvement in the anti-vaccination campaign was his groundbreaking use of comparative statistics-based argumentation in epidemiology. There was much resistance to the non-anecdotal approach at first, especially by members of the medical profession, but most of Wallace's figures were apparently never seriously challenged. Among Wallace's other interventions were suggestions for reforming the House of Lords and the Church of England, a plea that strikers redirect their efforts toward concentrating on employee-based buy-outs, analyses of the depopulation of the Scottish highlands and the Irish land problem, and protests against colonial imperialism and 'might makes right' arguments. His explorations into currency stabilization theory presaged the 'Chicago school' of thought of the 1930s and were insightful enough to impress the American economist Irving Fisher, who dedicated his book *Stabilizing the Dollar* to him in 1920.

Wallace was greatly admired by leaders of the women's movement, both for his vocal support of suffrage and for his position that women's release from economic indenture was the prerequisite for a form of mate selection that would tend to raise the moral standards of humanity. Here, as elsewhere in his social criticism writings, the underlying theory was one linking the morality of spiritualist philosophy to Benjamin Kidd's notion of social 'equality of opportunity'. This idiosyncratic blend of concepts allowed him to envision a social direction governed by both societal and personal concerns, thereby avoiding the ethical crudities of much of the contemporary Darwinist and eugenicist formulations.

Wallace also made a significant, albeit indirect, mark as an educator. He devoted several studies to the proper design of museums and display of collections, inventing

the concept of the 'faunal diorama' (since extended to the 'biome exhibit' of zoological parks). His collections and travel and tropical nature works, moreover, proved an inspiration to the next generation of travelling naturalist-explorers and novelists alike (*Malay archipelago*, for example, was a major influence on the writings of Joseph Conrad).

The general assessment of Wallace's role in the history of evolutionary theory has not been without controversy. Historians have sometimes implied that, by virtue of his deferral of priority to Darwin, he got something of a raw deal. This assessment, however, neglects his rather special character and talents. The logician Charles Peirce once described Wallace as 'a man conscious of superior powers of sound and solid reasoning, ... [but] with ... a moral sense ... which will not allow him to approve anything illogical or wrong, though it be upon his own side of a question' (Peirce, 36). Thus, he played a significant role in drawing attention to the moral and ethical problems involved in applying natural selection to man; his example served to counter the influence of the more rigorous evolutionary philosophers, such as Herbert Spencer. While continuing, unlike other critics of Darwin, to insist on the centrality of natural selection, and indeed to extend and refine the concept in many ways, he sought nevertheless to accomplish this within a broader concept of evolution, one that admitted of a place for more than just the amorality of gross competition. It should be noted, for example, that it is Wallace's then little accepted view of the intellectual and moral comparability of primitive peoples with their 'civilized' counterparts that has been the one adopted by the best twentieth-century anthropologists.

Although, in the later twentieth century, Wallace's name became less well known to the general public than that of Huxley or Darwin, his position in the history of science remains secure: the essay on natural selection (of February 1858) alone identifies him with the front rank of scientific discoverers. On the several major subjects on which he disagreed with Darwin—the origin of humankind's higher moral and intellectual faculties, the manner of operation of sexual selection, the possibility of inheritance of acquired characters, the importance of the production of sterile hybrids to the evolutionary process, and the mode of dispersal of organic propagules along glacial corridors and across oceanic expanses—his positions have on the whole not fared badly. However, progress in understanding and contextualizing his world-view has been slow. About the exact relation between his spiritualism and social criticism, and his zoology, for example, little can be stated confidently at this time. Perhaps the most significant result of recent Wallace studies has been a growing appreciation that his involvement in social issues was part and parcel of his overall cosmology and not, as many earlier thought, the faddist hobbies of a crank.

Nevertheless, the trajectory of Wallace's career remains a remarkable one. From a young radical of impoverished background working as a surveyor, to a successful traveler, collector, and ethnographer; a leading evolutionary

theorist and pioneering scientific geographer; a partial dissenter within the ranks of the Darwinists; and a prominent social critic he was, much more than Darwin, the founder of a true 'social Darwinism'. His life highlights some of the lesser-known aspects of nineteenth-century English society. Though some have drawn attention to a deep-seated idiosyncrasy in his opinions, it remains a proof of the quality of his vision that many of the issues to which he drew attention continue to be viable concerns a century later.

After a general weakening of his health in his last few weeks, Wallace died peacefully in his sleep at Broadstone on 7 November 1913. He had apparently not been ready to call it quits until the very end as only a short time earlier he had been contracted to write yet another two books. His remains were buried three days later in Broadstone, where there is a small memorial stone made from fossilized wood. On 1 November 1915 a medallion bearing his name was placed in Westminster Abbey.

CHARLES H. SMITH

Sources A. R. Wallace, *My life: a record of events and opinions*, 2 vols. (1905) • J. L. Brooks, *Just before the origin: Alfred Russel Wallace's theory of evolution* (1984) • *Alfred Russel Wallace: an anthology of his shorter writings*, ed. C. H. Smith (1991) • H. L. McKinney, *Wallace and natural selection* (1972) • J. Marchant, ed., *Alfred Russel Wallace: letters and reminiscences*, repr. of 1916 edn (1975) • W. George, *Biologist philosopher: a study of the life and writings of Alfred Russel Wallace* (1964) • M. J. Kottler, 'Alfred Russel Wallace, the origin of man, and spiritualism', *Isis*, 65 (1974), 144–92 • M. J. Kottler, 'Charles Darwin and Alfred Russel Wallace: two decades of debate over natural selection', *The Darwinian heritage*, ed. D. Kohn (1985), 367–432 • B. G. Beddall, 'Wallace, Darwin, and the theory of natural selection: a study in the development of ideas and attitudes', *Journal of the History of Biology*, 1 (1968), 261–323 • B. G. Beddall, 'Darwin and divergence: the Wallace connection', *Journal of the History of Biology*, 21 (1988), 1–68 • R. Smith, 'Alfred Russel Wallace: philosophy of nature and man', *British Journal for the History of Science*, 6 (1972–3), 177–99 • A. Brackman, *A delicate arrangement: the strange case of Charles Darwin and Alfred Russel Wallace* (1980) • H. Clements, *Alfred Russel Wallace: biologist and social reformer* (1983) • M. J. Kottler, 'Darwin, Wallace, and the origin of sexual dimorphism', *Proceedings of the American Philosophical Society*, 124 (1980), 203–26 • R. E. Hughes, 'Alfred Russel Wallace: some notes on the Welsh connection', *British Journal for the History of Science*, 22 (1989), 401–18 • H. L. McKinney, 'Alfred Russel Wallace and the discovery of natural selection', *Journal of the History of Medicine and Allied Sciences*, 21 (1966), 333–57 • G. Scarpelli, "'Nothing in nature that is not useful": the anti-vaccination crusade and the idea of *harmonia naturae* in Alfred Russel Wallace', *Nuncius*, 7 (1992), 109–30 • M. Fichman, 'Wallace: zoogeography and the problem of land bridges', *Journal of the History of Biology*, 10 (1977), 45–63 • J. S. Schwartz, 'Darwin, Wallace, and the descent of man', *Journal of the History of Biology*, 17 (1984), 271–89 • C. S. Peirce, review, *The Nation*, 72 (1901), 36–7 [*Studies scientific and social*] • election certificate, RS • M. Shermer, *In Darwin's shadow: the life and science of Alfred Russel Wallace* (2002) • P. Raby, *Alfred Russel Wallace: a life* (2001) • G. Jones, 'Alfred Russel Wallace, Robert Owen and the theory of natural selection', *British Journal for the History of Science*, 35 (2002), 73–96 • D. Quammen, *The song of the dodo: island biogeography in an age of extinctions* (1996) • M. Fichman, 'Science in theistic contexts: a case study of Alfred Russel Wallace on human evolution', *Osiris*, 2nd ser., 16 (2001), 227–50

Archives BL, corresp. and papers, Add. MSS 3794, 46414–46442 • Linn. Soc., corresp. and papers • NHM, drawings and notebooks • Oxf. U. Mus. NH, Hope Library, corresp. and papers relating to spiritualism • Zoological Society of London, MSS of published communications | BL, corresp. with Macmillans, Add. MS 55221 •

John Innes Centre, Norwich, letters to Sir W. H. Flower · Man. CL, Manchester Archives and Local Studies, letters to Matthew Slater · NHM, letters to Samuel Stevens [copies] · NHM, letters to Lord Walden and to G. A. Boulenger and C. O. Waterhouse · Oxf. U. Mus. NH, letters to Robert McLachlan; letters to Raphael Meldola; letters to F. D. Morice; corresp. with Sir E. B. Poulton; letters to J. O. Westwood · RGS, corresp. with Royal Geographical Society · UCL, letters to Sir Francis Galton | FILM BFI NFTVA, 'Wild islands', 4 Aug 1997

Likenesses W. Strang, drawing, 1908, Royal College · R. Haines, photograph, c.1909, NPG [see *illus.*] · A. B. Joy, sculpture, Linn. Soc. · W. Rothenstein, lithograph, NPG · photographic plate (age 66), repro. in A. R. Wallace, *Darwinism*, frontispiece · photographic plates (at ages of 25, 30, 46, 55 and 79), repro. in A. R. Wallace, *My life: a record of events and opinions*, 2 vols. (1905) · portrait (painted over a photograph by T. Sims, 1869), NPG

Wealth at death £5823 os. 6d.: probate, 24 Dec 1913, CGPLA Eng. & Wales