

time had become involved with a local mechanics institute. A slowdown in 1843 caused his brother to let him go, however, whereupon he secured a job teaching several basic skills at a school in Leicester. There he met the young entomologist Henry Walter Bates (later of 'Batesian mimicry' fame), who further interested him in natural history collecting. In early 1845 his brother William died suddenly, and Wallace left Leicester to take over his business, now prospering again. But this end of the work, involving the collection of fees and other equally unpleasant duties, did not appeal to him. In 1847 he conspired with Bates to turn professional as natural history collectors, and after choosing South America as their destination the two headed out in the spring of 1848.

During Wallace's period at Leicester he had come into contact with two works that would prove critical to his intellectual development: Charles LYELL's masterwork of uniformitarian earth science, *Principles of Geology* (1830–33), and Robert CHAMBERS's *Vestiges of the Natural History of Creation* (1844). The first work instilled in Wallace a sense that scientific explanation should be based on the identification of observable and ongoing efficient causes; the second, that organic evolution was a reality. One of the main goals of the South American expedition was to retrieve data that could be used to document and elucidate the evolutionary process. Wallace was there four years, but although highly successful in his collecting, he was unable to realize this goal. Further, on his way home to England in 1852 his ship caught fire and sank (he and his shipmates were narrowly rescued ten days later), and most of his collections from the preceding two years were lost.

Wallace decided to continue studying the question by embarking on an even more ambitious expedition to the Malay Archipelago in 1854. Over the next eight years he collected more than 125,000 specimens, made fundamental contributions to ethnology, zoology and biogeography, and last but not least

WALLACE, Alfred Russel (1823–1913)

Alfred Russel Wallace was born in the village of Usk, Monmouthshire (previously and currently Gwent) on 8 January 1823 and died in Broadstone, Dorset on 7 November 1913. He was the eighth of nine children in a middle-class but not very well-off English family; his childhood seems to have been rather ordinary. In late 1836, however, his father experienced financial ruin and he was forced to apprentice young Alfred to a builder in London. Shortly after arriving there Wallace was exposed through an older brother to the social utopian teachings of the Owenists, an influence which would inform his positions from that point onward.

In 1837 Wallace took up with his oldest brother William to learn the surveying trade. The outside work proved much to his liking. He started to take an interest in the geology, botany and astronomy of the areas where he was working, and by 1841 had begun some natural history collecting, and in his leisure

arrived at one of history's most influential deductions, the theory of natural selection. In early 1858, during a bout with malaria, Wallace connected the ideas of Thomas MALTHUS on population checks to his own years of study on the relations among fecundity, adaptation and variation to derive the 'survival of the fittest' process model for the theory of evolution: the notion that better adapted individuals should tend to survive longer and therefore differentially pass along their particular suites of adaptations to their progeny. He quickly wrote out an essay capturing the essence of the idea and sent it off to Charles DARWIN for comment. Darwin was dumbstruck on reading it, and, fearing a priority battle, sought the advice of his friends Charles Lyell and Joseph Hooker on how to deal with the matter. Lyell and Hooker arranged to have Wallace's draft and two unpublished writings on the same subject by Darwin read at the next meeting of the Linnean Society, and this took place (without getting Wallace's permission first) on 1 July 1858. Darwin now pressed on with his work in earnest, and *On the Origin of Species* was published some fifteen months later.

Wallace returned to England in 1862. Without formal education or friends in the right places, he was forced to embark on a career of writing, lecturing, and menial editing and exam-correcting activities that kept his head only barely above water financially for the rest of his life. Apart from one further lengthy adventure (a ten-month lecturing tour to the United States and Canada in 1886–7) he spent almost all of his remaining days in England, thinking, writing, and establishing himself as one of the most energetic and visible polymaths of the age. Wallace's published catalogue extends to nearly eight hundred items, including twenty-one books. Of the latter the best known are *Travels on the Amazon and Rio Negro* (1853), *The Malay Archipelago* (1869), *Contributions to the Theory of Natural Selection* (1870), *The Geographical Distribution of Animals* (1876), *Tropical*

Nature and Other Essays (1878), *Island Life* (1880), *Darwinism* (1889), his autobiography, *My Life* (1905) and *The World of Life* (1910).

In addition to his independent realization of the theory of natural selection, Wallace made an extraordinary number of contributions to subjects as diverse as land planning, statistical epidemiology, biogeography, glaciology, exobiology, anthropology, museum design, economics and social planning. He rightly has been recognized as the 'father of zoogeography' for his many labours in the interest of that science, and additionally rates both as history's most revered tropical regions naturalist and as the first significant model figure for the recent bio-diversity movement. During his lifetime he was considered the foremost authority on the Malay Archipelago region, and his book *The Malay Archipelago* ranks with the greatest classics of scientific travels writing.

For all his successes, Wallace's star dimmed rapidly after his death in 1913. Never one to draw attention to his own prominence, he deferred fully and often to Darwin's lead on natural selection, a move which has relegated him to 'other man' status in the history books. Further, over the final fifty years of his long career he immersed himself in a variety of fringe social causes – especially land nationalization, spiritualism, anti-vaccination and socialism – and was viewed by many of his contemporaries as something of a crank. But it is also true that his grand vision of the process of evolution extended well beyond that entertained by Darwin, and it is by no means clear even today how he came to that vision, how well it actually fits together or to what extent it may or may not prove to be an accurate picture of reality.

One model of Wallace's development as a thinker portrays him as an agnostic purveyor of naturalism and materialism until about the year 1865, when he began seriously to investigate spiritualism. His witnessing of spiritualist 'manifestations' at seances, this theory suggests, caused him to: (1) rethink the uni-

versality of application of natural selection; (2) ultimately reject its application to the development and refinement of human consciousness; and then (3) adopt an ever-more teleological and/or theistic point of view on all matters over the remainder of his days. Another model dwells on his humanistic and socialistic orientations, beginning with his early exposure to Owenist ideals. In this understanding, Wallace is viewed as a sympathetic supporter of the human struggle for self-realization, a position which in the end conflicted with the rather brutal reality of natural selection as a winnowing agent, and that in turn forced him to come to recognize limits on its range of operation. These models (and their variants) have come to be known as the 'change of mind' hypotheses.

More recently it has been seriously questioned as to whether Wallace underwent any such 'change of mind'. In the newer view Wallace is understood as having very early in life adopted a teleological leaning grounded in the notion of progress and a unique brand of Bauplan-like, final causes based thinking. There are indications Wallace at first believed that large-scale forces were influencing the direction of physical and biological change, but that the immediate circumstances under which such changes took place were inconceivable, and ungeneralizable. But in 1858 he saw that a form of selection resulting in adaptive structures could arise that indeed was generalizable. Such 'natural selection' could account for the somewhat haphazard accumulation (to use his term) of traits that had survival value; still, he had no explanation for those adaptations – particularly the creative elements of conscious awareness – that appeared not to. When he adopted spiritualistic beliefs about 1866 it likely was because he felt he had by then seen enough evidence to suggest that humankind's mental evolution was being influenced by forces which, though 'natural' in the sense that they observed natural law just as physical reality does, were non-physical. By supplementing natural selection with spiritualism in

this scientific fashion Wallace probably felt he had solved the problem of efficient causation in evolution at both the biological and mental levels – and in a manner still compatible with the notion that a progressive final cause was operating. Perhaps so and perhaps not, but at the least Wallace deserves more credit than he has received for suggesting how feedback processes (though this was before such terminology was used) might operate within a natural hierarchy of physical, biological and consciously aware forces.

Whatever framework one adopts to understand Wallace's efforts, it is clear that by the end of his life he was one of Britain's best-known figures. Significantly, he was an excellent, lucid writer. His various communications, appearing at the rate of over a dozen a year in scientific journals, literary reviews, newspapers, books and other venues, were no doubt consumed by a very large number of readers. Both his natural science and his social science commentaries, contrary though they often were to prevailing opinion, were characterized by a very high standard of logical argumentation and marshalling of evidence. This, in addition to his noted fairness in the representation of opposing viewpoints, garnered him a healthy level of respect, even from most of his foes. Despite the occasional misdirected foray (for example, into phrenology), as a body, his work has stood up well to the present day, and attracts more than just historical interest. His insistence on argument from fact led him to scientific revelations regarding, among other things: the nature of biogeographic regions and dynamics; the nature of human racial differentiation; protective coloration, mimetic resemblance and polymorphism in animals and plants; the process of speciation; glacial motion and the causes of the Ice Age; the measurement of the age of the earth; the permanence of the continental masses; the mouth-gesture theory of the origin of language; and the constraints on the existence of life on other planets in the solar system. In the social arena, he coupled a heartfelt concern for the basic rights

of all individuals with a vision of the necessity for cooperative social organization to fashion a variety of startling suggestions on land reform, international trade, practical ethics, legislative reform, the future role of women in society, urban and rural planning, museum design, the use of statistics in epidemiology, the use of a paper money standard, labour issues and the standardization of consumer-oriented product information. In 1901 the American philosopher Charles Peirce described Wallace thus:

Not quite a typical man of science is Wallace; not a man who observes and studies only because he is eager to learn, because he is conscious that his actual conceptions and theories are inadequate, and he feels a need of being set right; nor yet one of those men who are so dominated by a sense of the tremendous importance of a truth in their possession that they are borne on to propagate it by all means that God and nature have put into their hands – no matter what, so long as it be effective. He is rather a man conscious of superior powers of sound and solid reasoning, which enable him to find paths to great truths that other men could not, and also to put the truth before his fellows with a demonstrative evidence that another man could not bring out; and along with this there is a moral sense, childlike in its candor, manly in its vigor, which will not allow him to approve anything illogical or wrong, though it be upon his own side of a question which stirs the depths of his moral nature.

(Peirce, 1901, p. 36)

In 1904 G.K. Chesterton went so far as to name him '[one of the two] most important and significant figure[s] of the nineteenth century ... For he has been the leader of a revolution and the leader of a counter revolution' (i.e. materialistic evolution studies, and humanistic social and spiritualistic studies; Chesterton, 1904, p. 420).

Chesterton's evaluation of Wallace's position in nineteenth-century thought would be viewed today by most observers as overstatement, but a final verdict is not yet possible. There has been a rise in interest in Wallace studies in recent years, with the basic logic of both his scientific and social studies efforts coming under renewed scrutiny. Among the topics being considered are his contribution to the development of the liberal agenda in the twentieth century; his influence on the thoughts of William James and Charles Peirce; the early examples he set in his studies on biodiversity and exobiology; the degree to which evolution might be viewed as consistent with a spiritualistic interpretation of nature; and his practical role and influence as a 'heretic' intellectual personality.

BIBLIOGRAPHY

Narrative of Travels on the Amazon and Rio Negro (1853; 2nd edn, 1889).

'On the Law which has Regulated the Introduction of New Species', *Annals and Magazine of Natural History*, vol. 16, 2nd ser. (1855), pp. 184–96.

'On the Tendency of Varieties to Depart Indefinitely from the Original Type', *Journal of Proceedings of the Linnean Society, Zoology*, vol. 3 (1858), pp. 53–62.

'The Origin of Human Races and the Antiquity of Man Deduced from the Theory of "Natural Selection"', *Journal of the Anthropological Society of London*, vol. 2 (1864), pp. clviii–clxx.

'On the Phenomena of Variation and Geographical Distribution as Illustrated by the Papilionidae of the Malayan Region', *Transactions of the Linnean Society of London*, vol. 25 (1865), pp. 1–71.

The Malay Archipelago, 2 vols (1869; 10th edn, 1890).

Contributions to the Theory of Natural Selection (1870).

The Geographical Distribution of Animals, 2 vols (1876).

- Tropical Nature and other Essays* (1878).
Island Life (1880; 3rd edn, 1902).
Darwinism (1889; 3rd edn, 1901).
 'Human Selection', *Fortnightly Review*, vol. 48 ns (1890), pp. 325–37.
My Life, 2 vols (1905; condensed edn 1908).
The World of Life (1910).
- Other Relevant Works*
 'On the Zoological Geography of the Malay Archipelago', *Journal of Proceedings of the Linnean Society, Zoology*, vol. 4 (1860), pp. 172–84.
 'A Defence of Modern Spiritualism', *Fortnightly Review*, vol. 15 ns (1874), pp. 630–57, 785–807.
On Miracles and Modern Spiritualism (1875; rev. edn, 1896).
Land Nationalisation (1882; new edn, 1892).
 'The "Why" and the "How" of Land Nationalisation', *Macmillan's Magazine*, vol. 48 (1883), pp. 357–68, 485–93.
Vaccination a Delusion; Its Penal Enforcement a Crime (1898).
The Wonderful Century (1898).
 'Evolution', in *The Progress of the Century* (1901), pp. 3–29).
Man's Place in the Universe (1903).
 'The World of Life: As Visualised and Interpreted by Darwinism', *Fortnightly Review*, vol. 85 ns (1909), pp. 411–34.
- Further Reading*
 Beddall, Barbara G., 'Darwin and Divergence: The Wallace Connection', *Journal of the History of Biology*, vol. 21 (1988), pp. 1–68.
 Brooks, John Langdon, *Just Before the Origin: Alfred Russel Wallace's Theory of Evolution* (New York, 1984).
 Chesterton, G.K., 'Alfred Russel Wallace', *English Illustrated Magazine*, vol. 30 ns (January 1904), pp. 420–22.
 George, Wilma, *Biologist Philosopher: A Study of the Life and Writings of Alfred Russel Wallace* (1964).
 Kottler, Malcolm Jay, 'Charles Darwin and Alfred Russel Wallace: Two Decades of Debate over Natural Selection', in David Kohn (ed.), *The Darwinian Heritage* (Princeton, 1985), pp. 367–432.
 Lightman, Bernard (ed.), *Victorian Science in Context* (Chicago, 1997).
 McKinney, H. Lewis, *Wallace and Natural Selection* (New Haven, Connecticut, 1972).
 Marchant, James (ed.), *Alfred Russel Wallace: Letters and Reminiscences*, 2 vols (1916).
 Peirce, Charles, Review of *Studies Scientific and Social, Nation*, vol. 72 (10 January 1901), pp. 36–7.
 Quammen, David, *The Song of the Dodo: Island Biogeography in an Age of Extinctions* (New York, 1996).
 Raby, Peter, *Alfred Russel Wallace, a Life* (2001).
 Smith, Charles H. (ed.), *Alfred Russel Wallace: An Anthology of His Shorter Writings* (Oxford, 1991).
 ———, *The Alfred Russel Wallace Page*, <http://www.wku.edu/~smithch/index1.htm>, 13 November 2001.
 Smith, Roger, 'Alfred Russel Wallace: Philosophy of Nature and Man', *British Journal for the History of Science*, vol. 6 (1972), pp. 177–99.

CHS