Alfred Russel Wallace

John van Wyhe

Alfred Russel Wallace (1823–1913) was an English naturalist who famously conceived of the principle of evolution by natural selection independently of Charles Darwin in 1858 (Fig. 19.1). Wallace is often incorrectly referred to as working class. In fact, he was the son of a solicitor with inherited property sufficient to generate an income of £500 per annum (Wallace 1905,1:7). Thus, according to the conventions of the day, Wallace's father was a gentleman. The family's financial circumstances, however, declined so the Wallace family moved from London to a village near Usk, on the Welsh borders, where Wallace was born in Kensington Cottage on 8 January 1823. As far as Wallace could later remember, the family kept one servant. Wallace is also sometimes described as Welsh. This is also incorrect. His parents were English. As a small boy in Usk, Wallace could remember, because of his blonde hair, that "I was generally spoken of among the Welsh-speaking country people as the little Saxon" (1:29). Wallace also referred to himself as "English" or an "English naturalist" many times in his publications (C. S. Smith 1998).

When Wallace was six years old, the family moved to Hertford, north of London, where he lived until he was fourteen. Here Wallace attended Hertford Grammar School, where he followed a classical education, not unlike Darwin's at Shrewsbury School, including Latin grammar, classical geography, and "some Euclid and algebra" (Wallace 1905). During his last year in Hertford, the family's finances further declined so that Wallace was obliged to tutor other students to pay his fees. Wallace was deeply conscious of this fall in status before his peers. He later described the shame of this and other cost-saving measures imposed by his parents as a "cruel disgrace," "exceedingly distasteful," and perhaps "the severest punishment I ever endured" (1:58). Wallace left school in March 1837 aged fourteen, just as Darwin was becoming a transmutationist.

WORKING LIFE

Wallace left home to join his elder brother John, an apprentice builder in London. Here Wallace observed working-class men or artisans for the first time. He clearly saw them as a different type of person, as is clear from his careful recollections of

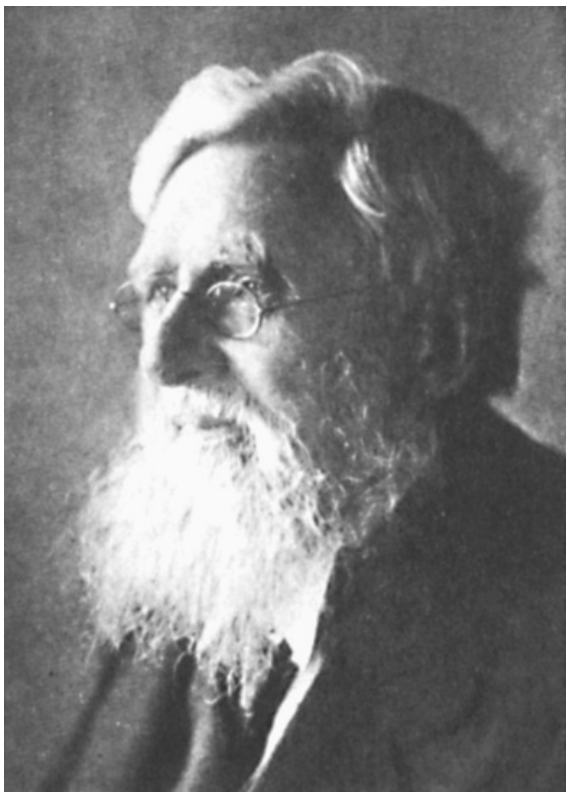


Figure 19.1. Alfred Russel Wallace in old age. From A. R. Wallace, *My Life* (London: Chapman and Hall, 1905)

their language, dress, and behavior in his autobiography (Wallace 1905). His long association with working-class people adds to the modern misconception that Wallace was working class. However the designation of Wallace as working class by some modern commentators is in ignorance of the meanings and definitions of social class in Victorian Britain. There is a vast scholarly literature on the subject that shows that class was by no means simply a product of financial wealth (see, e.g., Cannadine 1999).

Like other Victorians of his generation, Wallace described a society composed variously of "the higher classes," "the middle classes," "tradesmen and labourers," "peasantry," and the "lowest class of manufacturing operatives" (Wallace 1905). Caught between the usual groupings, Wallace seems to have gone through life with the impression of watching all "classes" from the outside, though he clearly felt the greatest affinity with middle-class peers. This, in addition to his formative experiences in a radical working-class context, left him with a sense that the social arrangement of his country was deeply flawed.

Wallace spent his London evenings in a "hall of science" or mechanics' institute. In this context he encountered the socialist ideas of Robert Owen (Fig. 19.2). Wallace was deeply impressed by Owen's utopian social ideals – with his stress on environment determining character and behavior. Hence, if the social environment were improved, so would the morals and well-being of the workers. The hall of science also introduced Wallace to the latest views of religious skeptics and secularists. Although Wallace's parents were perfectly orthodox members of the Church of England, Wallace became a skeptic. From 1837 he joined his brother William as an apprentice land surveyor, first in Bedfordshire. It was a very good time to be a surveyor. The year before the Tithe Commutation Act was passed. It replaced the ancient system of the payment of tithes in kind with monetary payments based on the average value of tithable produce and productivity of the land. The valuation process required accurate maps. Wallace liked the instruments of surveying and the mathematics involved. He began to read about mechanics and optics, his first introduction to science. His days in the open air of the countryside led him to an interest in natural history. From 1841 he took up an amateur pursuit of botany, although he had no one to guide or encourage his nascent scientific interests.

In 1843 his father died and with a decline in the demand for surveyors, his brother no longer had sufficient work to employ Wallace. After a brief period of unemployment in early 1844, Wallace, although barely qualified, worked for over a year as a teacher at the Collegiate School at Leicester.

In these years, Wallace read some very influential works for his future life. Alexander von Humboldt's *Personal Narrative* (1814–29) and Darwin's *Journal of Researches* (Darwin 1845; van Wyhe 2002–) introduced Wallace to the exciting prospect of scientific travel. Another major influence on Wallace's nascent scientific views was Charles Lyell's *Principles of Geology* (1830–33). Thomas Malthus's *Essay on the Principle of Population* (1826) would later contribute to Wallace's independent discovery of natural selection. Wallace also read the anonymous *Vestiges of the Natural History of Creation* in 1845 (Secord 2000). The argument in *Vestiges* for the progressive physical "development" of nature and species, Darwin's numerous remarks suggesting that species change (Darwin 1845), and Lyell's lengthy dismissal of Jean-Baptiste Lamarck's transmutation, despite a masterful exegesis of the paleontological evidence for "the gradual birth and death of species," all contributed to Wallace accepting, from about 1845, that species were not fixed but could change. However, it should be stressed that the there is and was no homogeneous idea of evolution. Instead there were very many different conceptions of biological change. The genealogical descent and branching pattern that Darwin had developed since 1837 does not appear in Wallace's private documents until the mid-1850s (Barrett et al. 1987).

Most of the naturalistic framework of *Vestiges* was in fact derived from a work Wallace had already read, the phrenologist George Combe's *Constitution of Man* (1828) (van Wyhe 2004). Both works portrayed the world as governed by universal and beneficent natural laws tending toward progress. Combe's phrenological laws of mind were described as the most recently discovered laws of nature. Combe elaborated a system of hierarchically arranged natural laws: physical, organic, and moral. These three classes mapped onto man's constitution as described by phrenology. By combining these with a "law of hereditary descent," Combe argued that the

Figure 19.2. Robert Owen (1771–1858) was an early socialist and a great influence on Wallace. Nineteenth-century lithograph

human race would ascend the scale of improvement in organic and mental spheres (van Wyhe 2003). Hence the progress of nature was just as applicable to the human mental faculties as organic ones. Therefore, a "doctrine of natural laws," rather than religion, would lead to future scientific and social progress. These themes appeared again and again in Wallace's later writings as these formative experiences led him to adopt much of the rationalist, skeptical, and naturalistic outlook of his Owenite working-class environment with an optimistic faith in physical and social progress through the unimpeded operation of beneficent natural laws (Durant 1979).

Another lifelong influence Wallace encountered in Leicester was mesmerism (Winter 1998). He experimented by mesmerizing some of his students, to cause rigidity of the limbs, a trance state, suggestion, as well as phrenomesmerism. In phrenomesmerism it was believed possible to excite the behavior of a particular phrenological organ by touching the specific spots on a mesmerized person's head. As Wallace (1905, 1:236) wrote in his autobiography,

> The importance of these experiments to me was that they convinced me, once for all, that the antecedently incredible may nevertheless be true; and, further, that the accusations of imposture by scientific men should have no weight whatever against the detailed observations and statements of other men, presumably as sane and sensible as their opponents, who had witnessed and tested the phenomena.

This was perhaps the earliest instance of Wallace's lifelong characteristic of convincing himself by a few coincidences that an explanation was true and then never again doubting it or losing his belief. The fact that his mesmerized subjects were familiar with the phrenological map of the head, for example, never entered his written consideration to explain the actions of his subjects.

It is hardly surprising that, as a young man interested in natural science reading works on the most intriguing scientific questions of the day at the Leicester town library, Wallace there met another budding young naturalist, an enthusiastic entomologist named Henry Walter Bates. Bates introduced Wallace to his next scientific pursuit: the collecting of insects, particularly beetles.

Wallace's brother William died in March 1845, causing Wallace to leave the school to attend to William's surveying firm in Neath, together with his brother John. The business did not succeed. Wallace next worked as a surveyor for a proposed rail line for a few months. Then he and John attempted to establish an architectural firm, which produced a few successful projects, such as the building for the Mechanics' Institute of Neath. The director of the Mechanics' Institute invited Wallace to give lectures there on science and engineering. In late 1846 Wallace and his brother John bought a cottage near Neath where they lived with their mother and sister Fanny.

AMAZON, 1848–1852

In April 1848 Wallace and Bates sailed for Brazil to earn a living as natural history specimen collectors. They initially stayed in Para (now Belém). After collecting Amazonian specimens together for nine months, Wallace and Bates continued separately. Wallace focused particularly on collecting in and exploring the Upper Rio Negro. The principal scientific result of his time on the Amazon was an appreciation of the biogeographical boundaries, particularly broad rivers, that separated different species. Thus, Wallace employed a similar mode of regional demarcation to his earlier surveying work (J. R. Moore 1997).

In 1852 Wallace was returning home when disaster struck. His ship caught fire and sank destroying almost the entirety of his notes and personal collection. Fortunately the collection had been insured by Wallace's agent Samuel Stevens for £200. If Wallace collected any notes or material for his interest in the origin of species, none has survived, and he never referred to any in his later writings.

Wallace's subsequent publications therefore suffered from the dearth of data he was able to bring home. His first book *Palm Trees of the Amazon and Their Uses* (1853) described the distribution and uses of the palms he had observed and was illustrated from his own sketches. The book was criticized by some contemporaries because of its scanty detail, inaccuracies in some of the drawings, and sometimes amateurish descriptions, all resulting from his lack of training as a botanist. His other book fared better. *A Narrative of Travels on the Amazon and Rio Negro* (1853), although also criticized for its dearth of particular data, was better received and sold better. Wallace

also read papers before scientific societies and made important connections in the London scientific community.

SOUTHEAST ASIA, 1854–1862

After only eighteen months in England, Wallace again set off for the tropics to work as a specimen collector. As Bates remained in the Amazon basin, Wallace headed instead for Southeast Asia. He had been advised that British cabinets were particularly lacking in specimens from those regions and hence it would be a profitable collecting ground. Wallace was also keen to observe one of the world's few species of great apes, the orangutan, and the different human races in the region. The scientific connections made during his time in London allowed him to appeal for financial assistance to the Royal Geographical Society which in turn secured government funding to pay for a first-class passage to Singapore and a second-class ticket for a young assistant named Charles Allen. Wallace arrived in Singapore on 18 April 1854.

Over the next eight years Wallace made dozens of expeditions procuring 125,000 specimens, including insects, birds, shells, and mammals. In 1855, while living in Sarawak on the island of Borneo, Wallace wrote his first theoretical paper on species: "On the Law Which Has Regulated the Introduction of New Species" (Wallace 1855). In this essay Wallace argued, "Every species has come into existence coincident both in time and space with a pre-existing closely allied species." Although a clear and lucid exegesis of the paleontological and biogeographical data of the time, the paper did not explicitly state that species transmuted one into another. It instead made the case of geological succession. Wallace used intentionally vague language that new species were somehow created according to the model of preceding species. He was testing the waters. Therefore, it was possible for some readers, such as Darwin, to conclude that Wallace referred to a series of supernatural creations in particular times and places. Hence, only much later in *Origin of Species*, Darwin (1859, 355) wrote, "I now know from correspondence, that this coincidence [Wallace] attributes to generation with modification." Others, less accustomed to accepting the evidence for transmutation, such as Lyell, found the implications of the Sarawak paper more novel and suggestive. Lyell opened his own species notebooks (L. G. Wilson 1970). Lyell also urged Darwin to publish his views in outline first rather than continuing to complete his studies and publish on a large scale (van Wyhe 2007). Hence, Darwin began on 14 May 1856 "by Lyells advice" a more condensed version of his original plan (van Wyhe 2006). This condensed version is still known as the "big book" and would have extended to three volumes (R. C. Stauffer 1975, 11). By the spring of 1858, Darwin had completed more than ten chapters, covering two-thirds of the topics later discussed in *Origin of Species*.

In 1858 Wallace was living on the island of Ternate in the Moluccas, the fabled spice islands, west of New Guinea, and then part of the Dutch East Indies. It was here that Wallace conceived of an explanation for the origin of new species that was strikingly similar to Darwin's. According to his own much later recollections, he was suffering from a recurrent bout of fever when the idea came to him. Years before, he had read Malthus's observations that the inevitable geometrical population human growth was prevented only by severe checks. Hence, remembering the argument of Malthus, Wallace conceived of "a general principle in nature" that permitted only a "superior" minority to survive "a struggle for existence" (Darwin and Wallace 1858).

Wallace elaborated this theory in his so-called Ternate essay "On the Tendency of Varieties to Depart Indefinitely from the Original Type." As he wrote in the essay itself,

> The numbers that die annually must be immense; and as the individual existence of each animal depends upon itself, those that die must be the weakest – the very young, the aged, and the diseased, – while those that prolong their existence can only be the most perfect in health and vigour – those who are best able to obtain food regularly, and avoid their numerous enemies. It is, as we commenced by remarking, "a struggle for existence," in which the weakest and least perfectly organized must always succumb. (Darwin and Wallace 1858, 56–57)

Many species have one or more daughter varieties. How these were formed is not stated in the essay. However, as the environment slowly changed as Lyell had argued, a species might become unsuited to its environment and die out. One of its daughter species might, however, be well suited to the new environment and prosper. It could never return to the original parent form as this was now inferior in that environment. This process, reiterated over vast geological time, would account for the origin of new species and the fact that some species had common ancestors.

What happened next has been surrounded by confusion and conspiracy theories for decades. However, there is no evidence for any of the accusations against Darwin. Wallace sent his essay to Darwin, whom he knew to be preparing a large work on evolution, in case it might interest him, with the request that it be forwarded on to Lyell if sufficiently interesting. The essay was largely written against Lyell, but using his own style of reasoning. Wallace hoped to convince Lyell that evolution was the inevitable outcome of the gradual laws of nature.

The single greatest mystery in this story is the date that Wallace sent the essay to Darwin. The Ternate essay is dated February 1858. The original manuscript and its covering letter do not survive. If the essay was sent to Darwin on the next monthly mail steamer after February, as Wallace recollected over a decade later, this would have been 9 March 1858. A letter to Frederick Bates sent on this steamer still survives and bears postmarks showing that it arrived in London on 3 June 1858 (see McKinney 1972). Davies (2008) has shown that all the intermediate mail steamer connections fit for these dates. Darwin's letter to Lyell, which claimed receipt of Wallace's letter and essay on the same day, has been dated to 18 June 1858 (Darwin 1985–, 7:107).

Hence, several writers have asked, if both the Bates and Darwin letters left Ternate on the same ship, how could Darwin receive his on 18 June (as he claimed) and not 3 June? This apparent discrepancy has been the source of great confusion. The reason these two weeks are of consequence is that some commentators believe that Darwin delayed forwarding Wallace's essay to Lyell in order to appropriate, unacknowledged, ideas from Wallace's manuscript into his own (Brackman 1980; J. L. Brooks 1984; Davies 2008).

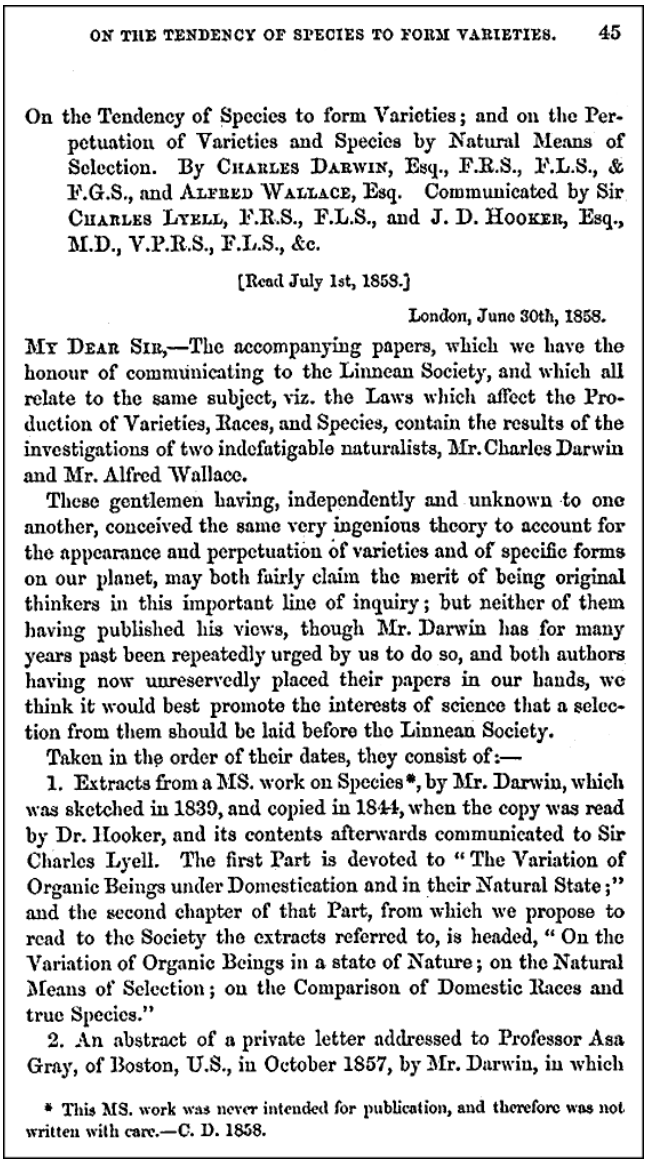
However, the conspiracy theorists have failed to realize that Wallace wrote his lost letter in reply to a letter from Darwin received on that very same 9 March steamer. There is no evidence from his surviving correspondence that Wallace could reply by the same steamer while in the Moluccas. Furthermore, the date of receipt of Wallace's letter and essay by Darwin on 18 June 1858 is exactly the right day for the mail steamer that left Ternate in early April and, through an unbroken series of mail steamer connections, arrived in London on 17 June (van Wyhe and Rookmaaker 2012).

The recurring accusations that Darwin did or could have borrowed ideas, such as the principle of divergence, from Wallace's writings were conclusively refuted in an important essay by David Kohn (1981). Kohn showed that what many writers mistakenly call an idea of "divergence" between Darwin and Wallace is two different things, which Kohn called "taxonomic divergence" and "a principle of divergence." Taxonomic divergence is the observation that "taxa can be arranged in a branched-hence diverging-scheme" (Kohn 1981, 1105). Darwin made this observation as early as 1837, and this is reflected in his famous Notebook B family tree sketch, which depicts daughter species diverging off a central ancestral trunk. Taxonomic divergence was also mentioned in one line of Wallace's Sarawak paper (1855), but no explanatory principle was given.

A "principle of divergence," according to Kohn, explains "how divergence occurs." Darwin developed this by the mid-1850s and clearly described it in a letter to Asa Gray in September 1857. The same treatment of divergence appeared in Darwin's draft chapters for *Natural Selection* (R. C. Stauffer 1975). After these documents were written, Darwin received Wallace's Ternate essay. The essay contained only one statement on how divergence occurs: "But this new, improved, and populous race might itself, in course of time, give rise to new varieties, exhibiting several diverging modifications.... Here, then, we have progression and continued divergence." As Kohn demonstrated, there were fundamental differences between Wallace's 1858 continued divergence and Darwin's much longer 1857 principle of divergence. Wallace "offered an explanation that is ecologically static, where a new species forms only by the extinction of its parent. There is none of the creation of new evolutionary opportunities by the subdivision of the environment that characterized Darwin's principle of divergence" (Kohn 1981, 1106).

Darwin was greatly surprised to receive Wallace's essay with its stress on a struggle for selection that sounded so similar to his own explanations. He forwarded Wallace's essay the same day to Lyell and asked for advice. Concerned that their friend would lose his priority in the idea of natural selection of twenty years, Lyell and J. D. Hooker had extracts from Darwin's manuscripts from 1844 and 1857 and Wallace's draft essay read before the Linnean Society of London on 1 July 1858. These documents were published together in the society's proceedings in August 1858 (Fig. 19.3). Both events, despite their retrospective importance, were largely overlooked by contemporaries and were certainly too brief to engender any scientific revolution (Moody 1971; England 1997). Even Lyell and Hooker themselves were not yet fully convinced of Darwin's views, and hence neither could have had the slightest idea that he was unveiling the greatest theory in biology, as modern commentators now see the event.

Had Darwin not forwarded Wallace's essay for publication, Wallace would probably never have been credited as co-discoverer of natural selection at all because Wallace did not plan to publish on the subject until his return to England,



ON THE TENDENCY OF SPECIES TO FORM VARIETIES. 45

On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection. By Charles Darwin, Esq., F.R.S., F.L.S., & F.G.S., and Alfred Wallace, Esq. Communicated by Sir Charles Lyell, F.R.S., F.L.S., and J. D. Hooker, Esq., M.D., V.P.R.S., F.L.S., &c.

[Read July 1st, 1858.]

London, June 30th, 1858.

My Dear Sir,—The accompanying papers, which we have the honour of communicating to the Linnean Society, and which all relate to the same subject, viz. the Laws which affect the Production of Varieties, Races, and Species, contain the results of the investigations of two indefatigable naturalists, Mr. Charles Darwin and Mr. Alfred Wallace.

These gentlemen having, independently and unknown to one another, conceived the same very ingenious theory to account for the appearance and perpetuation of varieties and of specific forms on our planet, may both fairly claim the merit of being original thinkers in this important line of inquiry; but neither of them having published his views, though Mr. Darwin has for many years past been repeatedly urged by us to do so, and both authors having now unreservedly placed their papers in our hands, we think it would best promote the interests of science that a selection from them should be laid before the Linnean Society.

Taken in the order of their dates, they consist of:—

1. Extracts from a MS. work on Species*, by Mr. Darwin, which was sketched in 1839, and copied in 1844, when the copy was read by Dr. Hooker, and its contents afterwards communicated to Sir Charles Lyell. The first Part is devoted to "The Variation of Organic Beings under Domestication and in their Natural State;" and the second chapter of that Part, from which we propose to read to the Society the extracts referred to, is headed, "On the Variation of Organic Beings in a state of Nature; on the Natural Means of Selection; on the Comparison of Domestic Races and true Species."

2. An abstract of a private letter addressed to Professor Asa Gray, of Boston, U.S., in October 1857, by Mr. Darwin, in which

* This MS. work was never intended for publication, and therefore was not written with care.—C. D. 1858.

Figure 19.3. The opening page of the Darwin-Wallace announcement of evolution through natural selection. Permission: Wellcome

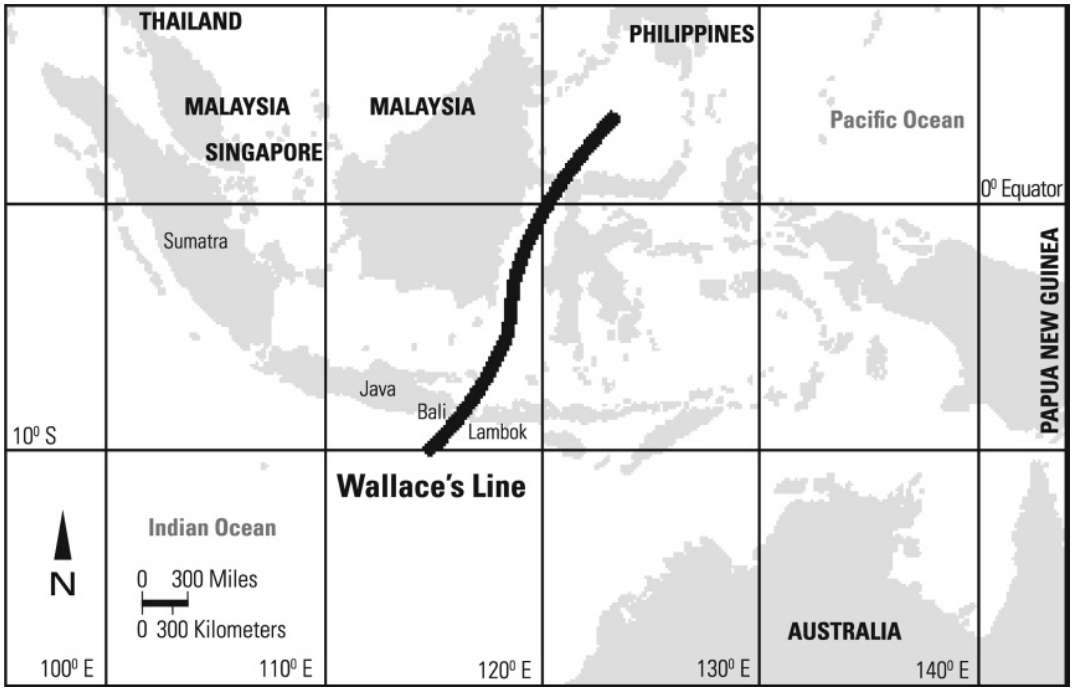


Figure 19.4. The sharp dividing line between the Asian and Australian fauna of the eastern and western sides of the Malay Archipelago proposed by Wallace

as he wrote to the ornithologist Alfred Newton in 1887: "I *had* the idea of working it out, so far as I was able, when I returned home" (F. Darwin 1892, 190). In 1857 letters to Darwin and H. W. Bates, Wallace also indicated his intention to prepare a work on species after returning, when he would have access to essential English libraries and collections (Darwin 1985–, 6:457). Wallace returned home only in 1862, an estimated two years after Darwin would have completed and published his big book on species (van Wyhe 2007).

After Wallace's return to Britain in 1862, he was, for the first time in his life, financially secure. Stevens had invested his money well. However, over the next several years, Wallace lost his savings through the demands of a needy family and a series of bad investments. (Raby 2001) He tried unsuccessfully to secure full-time employment. Instead, he earned money by writing, giving occasional lectures, and correcting exam papers, the only regular paid job of his later life.

In late 1864, Wallace was devastated when his fiancée suddenly broke off their engagement. "I have never in my life experienced such intensely painful emotion" (Wallace 1905, 1:410). A few months later, in 1865, he began attending spiritualist séances. Like mesmerism and phrenology before, Wallace claimed he approached the subject with initial skepticism but soon became entirely convinced that the "phenomena" produced by mediums such as table rappings, spirit writings, and apparitions in dark rooms must be genuine and never again doubted the correctness of his conclusion, despite numerous cases of mediums publicly exposed as frauds. The following year he published "The Scientific Aspect of the Supernatural" (1866) and suggested that spiritualism merited scientific investigation. Spiritualism opened a new avenue for Wallace's belief in the possibility of human progress. It also gave him an explanation for what he believed were human abilities not needed for survival in a savage state and therefore not capable of explanation by natural selection.

In 1866 Wallace married Annie Mitten, the daughter of his botanist friend William Mitten. They had three children, two of whom survived to adulthood. In 1869 Wallace published his most famous book *The Malay Archipelago* recounting his travels in Southeast Asia. It was his most successful work both financially and critically. It is still in print and continues to enthrall readers with its tales of adventure and a deep appreciation for tropical natural history. In it he popularized his famous generalization of a sharp line between the fauna of Australia and Asia, now known as the Wallace Line, as he described it: "We have here a clue to the most radical contrast in the Archipelago, and by following it out in detail I have arrived at the conclusion that we can draw a line among the islands, which shall so divide them that one-half shall truly belong to Asia, while the other shall no less certainly be allied to Australia" (Wallace 1869a,1:13). It is important to remember that it was already common knowledge that Asian fauna inhabited the western side of the archipelago and Australian forms the eastern. Wallace attributed his line to two great sunken continents, one Asian, the other greater Australian. The islands of the archipelago were the scattered fragments that remained. But these preserved evidence of two former ancestral homes for the two faunas.

The book was also heavily anthropological, focusing on the races, languages, and other cultural details he observed (Fig. 19.4). He divided the peoples also into to two main

types, the Malayan and Papuan races. These too were roughly segregated east and west.

Also in 1869–70 Wallace published new proposals about the origins of human beings, which marked one of his greatest differences with Darwin (Wallace 1869b; 1870a: 332–71). His account was in fact based on the argument from ignorance. He could not see how natural selection could bring about several attributes of human beings, such as a moral sense and high intelligence, as he assumed these were not needed in a savage state of existence in early human prehistory as he did not believe they were needed by the "savage" peoples he had visited in Brazil and Southeast Asia. Therefore, he reasoned, natural selection could not have done so. Building on this assumption, Wallace asserted that this was evidence that a "Higher Intelligence" had intervened in the course of human evolution. These views were not well received by the new Darwinian community.

In the 1870s Wallace returned to his earlier surveyor's perspective with further publications on biogeography. In 1876 he published one of his most important books: *The Geographical Distribution of Animals*. Following Sclater (1857), Wallace divided the world into six main regions. Wallace discussed all of the known factors that determined the dispersal of living and extinct terrestrial animals including elevation, vegetation, land bridges, ocean depth, and glaciation.

Tropical Nature, and Other Essays (1878) was mostly reprinted material. It included Wallace's response to Darwin's theory of sexual selection to explain the origin of some animal coloration. Wallace argued that endless reiterations of female choice could not bring about male colorations and other features such as Darwin had argued for the feathers of the Argus pheasant. Instead, Wallace (1878, 365) imagined the "greater vigour and activity and the higher vitality of the male" led to more vivid coloration.

In 1870 Wallace took up the published wager of a flat-earth advocate. Although Wallace demonstrated, using his old surveying equipment, that a six-mile stretch of the old Bedford canal was indeed slightly convex, his opponent refused to accept the results and spent the rest of his life libeling and persecuting Wallace. It was, Wallace (1905, 2:364) recalled, "the most regrettable incident in my life" and "cost me fifteen years of continued worry, litigation, and persecution, with the final loss of several hundred pounds."

Island Life (1880) was one of Wallace's most successful books. It surveyed the problems of the dispersal and speciation of plants and animals on islands that he categorized, following Darwin, as oceanic or continental. The latter type Wallace subdivided into "continental islands of recent origin," like Great Britain, and ancient continental islands, such as Madagascar. Unlike Darwin's theories of erratic spread to account for the discontinuous distribution of types, Wallace favored theories of continuous spread followed by selective extinctions, thus creating the appearance of gaps.

After 1880 Wallace's attention was increasingly spread across ever wider interests including a land nationalization campaign, anti-vaccination campaign, urban poverty, socialism, private insane asylums, militarism, and life on other planets. At the end of the 1880s, Wallace dropped his adherence to the individualism of Herbert Spencer and returned to the Owenite socialist fold (G. Jones 2002). This huge spread of interests in social and other matters depleted his scientific output.

From 1886 to 1887, Wallace traveled on a lecture tour across the United States. His lectures outlined the theory of evolution by natural selection and the evidence that supported it. These lectures formed the basis of one of his most important books, *Darwinism* (1889). The book was perhaps the clearest and most convincing overview of the evidence for evolution produced in the nineteenth century, second only to *Origin of Species*, and remains an outstanding overview even today. Wallace was more strictly selectionist than Darwin, who had allowed a role for other causes of change. However, the supernatural speculations regarding mankind's origins in the final chapter were either ignored or lambasted by contemporary reviewers. Some of the harshest words ever published about Wallace, in fact, were in reference to these views. The Darwinian acolyte G. J. Romanes (1890) wrote: "It is in the concluding chapter of his book, much more than in any of the others, that we encounter the Wallace of spiritualism and astrology, the Wallace of vaccination and the land question, the Wallace of incapacity and absurdity." The accusation of belief in astrology was incorrect.

The Wonderful Century (1898) discussed the achievements of the nineteenth century and, at even greater length, its problems. *Land Nationalisation* (1882) was a handbook on land reform aimed at telling the "landless classes" how to recognize their rights regarding landownership: "to teach them what are their rights and how to gain these rights" (Wallace 1882, vii).

Man's Place in the Universe (1903) argued against the existence of human beings on any other planet in the solar system (particularly given recent speculation about Mars) or indeed anywhere else in the universe but Earth. In 1905 he published his autobiography *My Life*; it remains the principal biographical source on Wallace. *The World of Life* (1910) was his final word on spiritualism and his view that humanity was placed on Earth for a reason. His last two books were on social issues and the land question. *Social Environment and Moral Progress* and *The Revolt of Democracy* appeared in 1913. The two base causes of poverty and starvation in a land of superfluous wealth were "land monopoly and the competitive system of industry" (Wallace 1913b, 1). Here again was Wallace's belief in removing social obstacles so that natural progress could ensue.

CONCLUSION

Wallace will no doubt remain an endearing, colorful, confusing, and controversial figure in the history of science. He is now often described, especially by commentators

outside professional history of science, as overlooked, forgotten, and overshadowed by Darwin. Some recent Wallace admirers even describe him as among the most famous Victorian scientists during his lifetime or at his death. This is certainly incorrect if we refer to the views of contemporary Victorians. While Wallace achieved considerable fame and reputation for his independent discovery of natural selection and his scientific works, especially *The Malay Archipelago*, he never approached anything like the level of fame or respect attributed to Lyell, Richard Owen, William Whewell, Louis Agassiz, T. H. Huxley, Hooker, or Darwin. The oft-repeated view that Wallace was somehow the victim of a Victorian class-based glass ceiling is equally false. Several of his contemporary men of science such as Huxley, born over a butcher's shop, were from humbler origins than Wallace (Desmond 1997).

Wallace's many heresies, as they were seen by more orthodox men of science at the time, clearly contributed to his mixed reputation. The unusually broad range of his literary output remains hard to appreciate. Michael Shermer (2002, 16–17) categorized the topics addressed by Wallace's publications as follows:

Book Topics	*Article Topics*
Evolution, 27%	Biogeography and natural history, 29%
Social commentary, 27%	Evolution and origins of life, 27%
Biogeography, 14%	Social commentary, 25%
Botany, 9%	Anthropology, 12%
Natural history, 9%	Spiritualism and phrenology, 7%
Origins of life, 9%	
Spiritualism, 5%	

There need not necessarily be some hidden consistency underlying his many interests. But if there is, it is likely to be Wallace's deeply held belief that the overall leitmotif of nature is progressive change. Where this is inhibited, such as in the social and political arrangements of his time, artificial impediments should be removed so that natural progress could follow. Wallace did enjoy a rise in fame in the last years of his life, but this was by outliving his contemporaries and becoming the only remaining prominent man of science from the Victorian age.