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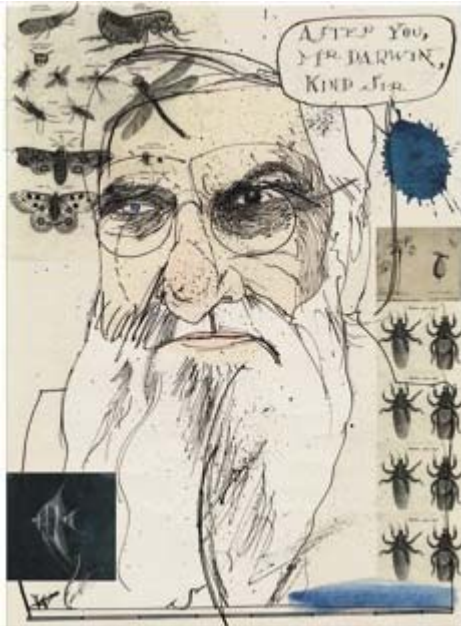
A CRITIC AT LARGE

## MISSING LINK

*Alfred Russel Wallace, Charles Darwin's neglected double.*

by Jonathan Rosen

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Wallace's turn toward spiritualism hastened an eclipse that had begun when Darwin published "On the Origin of Species."

When he was twenty-four years old, Alfred Russel Wallace, the greatest field biologist of the nineteenth century, had his head examined by a phrenologist who determined that, while his "organ of wonder" was very big, his "organ of veneration," representing respect for authority, was noticeably small. Wallace was so struck with the accuracy of this report that, sixty years later, he mentioned it in his autobiography. It was wonder that drew him to nature, and an instinctive disregard for authority that made it easy to challenge an entire civilization's religious convictions, as he did when, in 1858, he dashed off a paper proposing a theory of evolution by means of natural selection. Unlike Charles Darwin, who spent twenty years keeping a similar conclusion to himself in private dread, Wallace didn't give a damn what people thought. This utter independence from public opinion is one of several reasons that he has all but vanished from popular consciousness.

Another is simple bad luck. Wallace grew up poor and was always an outsider in the gentlemen's club that constituted the scientific world of his day. When, in his youth, he sailed to the Amazon to seek his scientific fortune, his ship caught fire and sank on the way home, taking with it thousands of specimens, a number of live monkeys, and his dream of an easy life. Wallace never found steady work and was instead forced to make a living by his pen—risky for a scientist with a restless imagination in a cautious age—supplementing his income by working as a lowly test

examiner. Most unluckily of all, Wallace, having completed his explosive paper on evolution, chose to send it to Darwin himself, who then kicked into high gear and brought out “On the Origin of Species” the following year.

Still another reason for Wallace’s obscurity has something to do with that phrenologist. Wallace cracked one of the greatest scientific mysteries of all time but continued to believe throughout his long life that a stranger had read the riddle of his character by feeling the bumps on his head. Phrenology was one of several commitments—like his campaign against vaccination and his credulous defense of spiritualist mediums—that did not endear him to the scientific establishment, or to posterity.

But there are signs that Wallace’s time has finally come. Since 2000, at least five biographies have been published: “The Forgotten Naturalist,” by John Wilson; “Alfred Russel Wallace: A Life,” by Peter Raby; “In Darwin’s Shadow,” by Michael Shermer; “The Heretic in Darwin’s Court,” by Ross A. Slotten; and “An Elusive Victorian,” by Martin Fichman. In addition, two recent anthologies of Wallace’s own writing—“Infinite Tropics: An Alfred Russel Wallace Anthology,” edited by Andrew Berry and introduced by Stephen Jay Gould; and “The Alfred Russel Wallace Reader,” edited by Jane R. Camerini and introduced by David Quammen—give a sample of his consummate writing style. Joseph Conrad kept Wallace’s classic “The Malay Archipelago” on his night table, drawing on it in several of his own books, most notably “Lord Jim.”

G. K. Chesterton once remarked that Wallace was one of the world’s great men because he led a revolution and then a counter-revolution. Having done as much as anyone to overturn traditional religious assumptions, Wallace proceeded to horrify his fellow-evolutionists by concluding that natural selection could not in itself explain the uniqueness of man. He never renounced his evolutionary theory, but instead made it the cornerstone of a theistic explanation of the universe. No wonder a later scientific generation, newly professionalized, ignored him in favor of his more austere and single-minded colleagues. But the twin impulses in Wallace’s work make him compelling and oddly contemporary. He combines both halves of the debate over the meaning of evolution, coolly articulating the materialist mechanisms by which the simplest organisms morphed into human beings while arguing that our existence offers evidence of divine agency. If his name is relatively unknown, his spirit is still making itself felt nearly a hundred and fifty years after his seminal discovery.

**A**lfred Russel Wallace was born in Usk, Wales, in 1823, to a once prosperous family that had fallen on hard times. His father was a lawyer who never practiced, and who dabbled in doomed literary ventures and made a series of increasingly disastrous investments. Rural Wales remained an important touchstone for Wallace, who encountered there both natural beauty and the poverty of struggling farmers. His education was spotty, but his father read Shakespeare aloud, along with the Bible, Defoe’s “A Journal of the Plague Year,” and the travel writings of Mungo Park; by his early teens, Wallace had himself read “Paradise Lost,” Dante’s “Inferno,” and, perhaps prophetically, “Don Quixote.”

This reading was his primary patrimony. By the time Wallace was thirteen, the family fortunes had sunk so low that his parents could no longer afford to educate him. He was sent to London to board with a brother who was an apprentice carpenter. At the London Mechanics’ Institute, one of several centers of higher learning for the working class, he heard lectures on Robert Owen, the Welsh social reformer, which turned him against the British class system, just as the pamphlets of Thomas Paine, and his brother’s radical views, began turning him against the Church. He was soon packed off again, this time to live with another brother in the countryside north of London, working as an apprentice surveyor, but he took his radical notions with him.

Surveying allowed Wallace to spend his days outdoors, and a new phase of his life began. He discovered geology and botany, purchasing, in 1841, a pamphlet on the structure of plants published by the Society for the Diffusion of Useful Knowledge. Soon, his interest spread to beetles. There are three hundred and fifty thousand described species of *coleoptera* in the world, more than any other order in the animal kingdom; when a later British biologist, J. B. S. Haldane, was pressed by a clergyman on the nature of God, he reportedly said, “He has an inordinate fondness for beetles.” British naturalists were certainly fond of them, since they could be found all over England. In a public library, Wallace met a young man named Henry Walter Bates, later to become one of the great Victorian entomologists, who was as passionate about natural history as he was. Before long, the young men were planning a tropical adventure in the manner of Alexander von Humboldt and Darwin, whose “Voyage of the Beagle” had been published in 1839, and had fired a generation of restless young naturalists.

Wallace gave himself a crash course in flora and fauna, making local collecting trips and haunting the British

Museum. He also read everything on natural history that he could find, including Robert Chambers's hugely influential book "Vestiges of the Natural History of Creation." This notorious work, published anonymously in 1844, blended science and creationism and argued passionately for "transmutation"—the notion that present life had evolved from previous forms. This was not a new argument—Darwin's grandfather Erasmus had suggested as much two generations earlier; the missing key, which both Darwin and Wallace would supply, was the way that evolution worked. But "Vestiges" helped lay the foundation both for popular acceptance of the concept of evolution and for its ultimate scientific articulation. Though rife with unsubstantiated speculation that put off many established men of science (including Darwin, who also took note of how much calumny could be heaped on a man who ventured unpopular, and unproven, scientific opinions), the book excited Wallace and gave his first trip to the Tropics a purpose beyond the chance to flee a dead-end job and follow in the glamorous footsteps of other scientist-adventurers. Although to the outside world Wallace would remain, for some time, a bug collector for hire, without proper affiliations, his theoretical ambitions were present from the outset. He wrote to Bates, "I should like to take some one family to study thoroughly, principally with a view to the theory of the origin of species."

For Darwin, and for other famous naturalists of the day, like Thomas Huxley and Joseph Hooker, the road to the Tropics generally ran through the finest universities and a post on one of Her Majesty's ships. For Bates and Wallace, who sailed for the Amazon in 1848, the jungle was their Oxford and Cambridge, as well as a source of income. Burgeoning interest in natural history was creating a lively market in reports and samples from the field. Wallace and Bates signed on with an agent, Samuel Stevens, who taught them taxidermy and species preservation, planned their itinerary to accord with the needs of collectors, sent them bottles and cash when they ran out, and advertised their findings in specialized journals, selling their specimens to institutions like the British Museum and Kew Gardens, as well as to wealthy amateurs.

The Amazon was a great apprenticeship for Wallace. He absorbed everything—the fact that certain species that could fly would nonetheless remain on their respective riverbanks, the distribution of plant species separated by hundreds or even thousands of miles. He observed the customs of indigenous inhabitants: how totally naked women could still exhibit modesty; how Indians hunted birds (with curare-tipped darts fired from ten-foot-long blowpipes, a technique that he tried but failed to master). He learned the proper way to eat a live ant, the best defense against vampire bats, and the importance of travelling with fishhooks and mirrors and axes for trade. He developed an intimate acquaintance with malaria, dysentery, torrential rains, and, above all, with the staggering diversity of the rain forest.

But the final lesson came on the way home. Wallace's ship caught fire and sank, and he found himself, after four years in the Amazon, floating in an open boat in the Sargasso Sea, seven hundred miles from shore. He was without friends, having quarrelled with Bates halfway through the expedition. The boat that rescued Wallace almost sank, too, and at some point on the return trip, weak from multiple bouts of fever and contemplating his losses—he had grabbed only a few notebooks, while his entire private collection, including several hundred species new to science, had gone down with the ship—Wallace decided never to travel again.

His resolution was short-lived. After less than two years in England, he was ready to depart again. He was better known this time, and had proved himself both as a collector and as a surveyor. (His map of the Uaupés River remained in use for more than fifty years.) This earned him the backing of the Royal Geographical Society for a trip to the Malay Archipelago, the vast chain of islands that make up present-day Indonesia.

He arrived in Singapore in 1854; he was thirty-one years old and was to remain in the Far East for another eight years, amassing, according to Shermer's biography, an "almost unimaginable 125,660 specimens, including 310 mammals, 100 reptiles, 8,050 birds, 7,500 shells, 13,100 butterflies, 83,200 beetles, and 13,400 other insects, over a thousand of which were new species." The book that Wallace later wrote about this period, "The Malay Archipelago," is rich with the thrill and wonder of the hunt, as when he caught his first specimen of the butterfly *Ornithoptera poseidon*:

I trembled with excitement as I saw it coming majestically toward me, and could hardly believe I had really succeeded in my stroke till I had taken it out of the net and was gazing, lost in admiration, at the velvet black and brilliant green of its wings, seven inches across, its golden body, and crimson breast. It is true I had seen similar insects in cabinets, at home, but it is quite another thing to capture such one's self—to feel it struggling between one's fingers, and to gaze upon its fresh and living beauty.

But Wallace, unsurpassed as a collector, was also becoming a great conceptualizer. Only a year into his trip, while living under the protection of the "white Rajah of Sarawak"—an eccentric Englishman who ruled a little fiefdom on the

northern coast of Borneo and who, Slotten claims, furnished the model for Rudyard Kipling's "The Man Who Would Be King"—Wallace formulated what became known as "the Sarawak Law." His idea, which he published in 1855, approached a full-blown theory of evolution, concluding that "every species has come into existence coincident both in space and time with a preexisting closely-allied species." Wallace still didn't know how it happened, but he was getting close. The article didn't generate the stir that he had anticipated, but it caught the attention of Charles Lyell, the great geologist whose work was indispensable to both Darwin and Wallace. Lyell was a friend of Darwin's, and after reading Wallace's paper he not only began keeping his own species notebook but urged Darwin to publish something. He recognized that Wallace was closing in.

In early 1858, Wallace, while based on the island of Ternate, where he had gone in search of the elusive birds of paradise, was gripped by a fit of malarial fever. As he recalled in his autobiography, "At the time in question I was suffering from a sharp attack of intermittent fever, and every day during the cold and succeeding hot fits had to lie down for several hours, during which time I had nothing to do but to think over any subjects then particularly interesting me." In Wallace's case, this meant the origin of species.

Wallace recalled waiting for the chills and the fever to subside, his mind throbbing with all the reading he had done, including Malthus's "Essay on the Principle of Population," that dark assessment of the way in which disease and famine keep human populations in check, and Lyell's "Principles of Geology," which emphasized the vast age of the earth and the possibility of tiny incremental changes becoming amplified over aeons.

Swirling around with these theories was Wallace's own experience as a collector, which had given him ample opportunity to note that within each species there were often minute variations, which—in the spans of time that Lyell wrote about, and exposed to the struggles that Malthus described—might become new species if circumstances were favorable. When the fever and shaking subsided, Wallace had it. The fittest variations would survive, the least fit would perish, and new species would thus come into being. During the next two days, he wrote "On the Tendency of Varieties to Depart Indefinitely from the Original Type." He then mailed the paper off to the man most likely to appreciate it.

**D**arwin had not been especially impressed with Wallace's Sarawak paper; despite Lyell's excitement, Darwin had written "nothing new" in the margin. That was not his reaction when, on June 18, 1858, he received a package from Ternate containing Wallace's new paper. That very day, he wrote to Lyell expressing his shock: "I never saw a more striking coincidence... Even his terms now stand as heads of my chapters." He added despairingly, "So all my originality, whatever it may amount to, will be smashed."

What followed has been called the "Delicate Arrangement." The term, drawn from a phrase used by Huxley's grandson, provides the title of a 1980 book by Arnold C. Brackman arguing that Darwin received Wallace's paper earlier than he acknowledged, incorporated aspects of it into his own work, and then sent it on to Lyell pretending that it had just arrived. Much poring over postmarks and manuscripts is involved in this argument, but the recent biographies all make it pretty clear that, at its root, this was primarily an instance—perhaps the greatest—of great minds thinking alike. But there's no question that Hooker and Lyell—Darwin's friends, both of whom were powerful and wellborn members of the Royal Society—took action to protect Darwin's "priority." And although Darwin wrote to Lyell that "I would far rather burn my whole book, than that he or any other man should think that I had behaved in a paltry spirit," he turned the matter over to Lyell and Hooker with enough hints to help them resolve things favorably for him. Lyell and Hooker arranged a reading, at a meeting of the Linnean Society, on July 1, 1858, of three items: the first was an unpublished sketch by Darwin written in 1844; the second was a letter he had written to a Harvard biologist in 1857 describing aspects of his theory; the final, making a sort of coda to Darwin, was Wallace's paper.

Wallace, still in the Tropics, did not even know about the meeting—nobody told him until it was all over. When he found out, he expressed the humble satisfaction of a servant invited to eat at the master's table, writing to his mother, "I sent Mr. Darwin an essay on a subject on which he is now writing a great work. He showed it to Dr. Hooker and Sir C. Lyell, who thought so highly of it that they immediately read it before the Linnean Society. This assures me the acquaintance and assistance of these eminent men on my return home." One wonders what he might have written had he known the reason for such speedy publication. But later, when he had divined more of the circumstances, he retained his generosity, adding only that he wished he had been given a chance to proof his article.

Solving the origin of species was all well and good, but Wallace still needed to make a living. He spent four more years in the Malay Archipelago, in part because he could not afford to leave and in part because he did not want to. This was the age when naturalists, armed with only pins and jars and magnifying glasses, were on the cutting edge of

the scientific world. However much their findings gave rise to materialism in others, there remained an almost mystical aspect to their love of what we would today call biodiversity—the overwhelming plenitude they found in the rain forest and even in their private gardens when they retired to the English countryside. Throughout his life, Wallace would return to collecting like Antaeus touching the earth; days before his death, at the age of ninety, he was still being wheeled through his garden to look at favorite flowers. Wallace was the kind of man who bottle-fed a baby orangutan for three months after he'd rescued it from a swamp, unconcernedly noting its resemblance to a human infant. He never lost his sense that the natural world contained more than the answers derived from it.

Wallace came home in 1862, escorting two live birds of paradise. (He'd disembarked for two weeks in Malta to collect live cockroaches for them.) Compared with his return from the Amazon, this was a triumphant homecoming. Wallace was now a scientist of stature, and he had earned Darwin's gratitude and respect even before his return. After "On the Origin of Species" came out, Darwin wrote to him, "Most persons would in your position have felt bitter envy and jealousy. How nobly free you seem to be of this common failing of mankind." He added that he had no doubt that Wallace would have written his own definitive book on the subject just as well or better "if you had had my leisure." Wallace made the most of his brief stability, marrying the daughter of a respected botanist, and enjoying his welcome at various scientific societies. But he was never one to settle into an easy pattern. Replicating his early wanderings, he tended to move every few years, constantly seeking new gardens and better views. And, even as he was championing what he self-effacingly took to calling "Mr. Darwin's principle," he was being drawn toward a radically different world.

Wallace's sister Fanny had become a spiritualist while he was in the Tropics, and, partly through her interest, Wallace began attending séances in 1865. Though he was skeptical, looking behind doors and under tables in advance of the proceedings, he quickly fell under the spell of these events, enthusiastically recording what he saw. Fresh flowers materialized on a table. (Wallace duly noted each species.) A spirit hand reached down to touch the keys of an accordion. The name of a deceased brother turned up on a piece of paper that Wallace had hidden.

In 1866, Wallace, never one to keep his opinions to himself, produced a pamphlet, "The Scientific Aspect of the Supernatural," which he sent to his eminent colleagues. In 1869, he published a review of a new edition of Lyell's "Principles." In it, Wallace explained the mechanism of evolution and defended the laws of natural selection that accounted for it, but he also expressed the opinion that "there yet seems to be evidence of a Power which has guided the action of those laws in definite directions and for special ends." This was one of the first public expressions of a mystical turn that Wallace called his "little heresy." Darwin, warned in advance, had written anxiously to Wallace, "I hope you have not murdered too completely your own and my child." Wallace never did abandon natural selection, but later generations came to find him an unfit parent. He did not conform to the pattern of the modern scientist, who, on seeing the evolutionary light, was supposed to shed any illusion about the supernatural. Wallace attempted to reconcile the two, and his reputation suffered accordingly.

It wasn't only spiritualism. In the eighteen-eighties, he campaigned against vaccination, arguing that doctors, as interested parties, should not be the ones to decide the question. On a speaking tour of America, in 1887, alongside talks on "Darwinism," he delivered lectures with such titles as "If a Man Dies, Shall He Live Again?" His answer was an unequivocal yes. When Wallace announced, "We are all of us, in every act and thought, helping to build up a mental and spiritual nature which will be far more complete after the death of the body than it is now," he sounded less like a scientist than like Keats, articulating his belief that the world is a school for the education of souls.

Yet through all this he continued to make serious contributions to science. In the eighteen-sixties, Wallace and Darwin carried on a heated debate about the role of sexual selection, and Wallace has often since been proved correct. In 1876, he published "The Geographical Distribution of Animals," which became a pioneering text in the important field of biogeography. Yet, the same year, he relocated his family because a dead brother had urged it via automatic writing. No wonder posterity was confused.

The generous sweep of the recent batch of biographies makes Wallace's detours far more comprehensible. Wallace's interest in unseen forces was long-standing; he had conducted mesmeric experiments on his students in Leicester and on natives in the Amazon. He attended séances in the name of science as he understood it, a discipline that, in his time, was rapidly becoming more specialized and professionalized. The notion that the spirits of the dead might communicate with the living was, for men like Wallace, something worth looking into—as it was for William James, who sometimes turned up at the same séances.

For nineteenth-century naturalists, the idea of nature still carried divine associations. The minds that conceived of the possibility of evolutionary change were still informed by the religious assumptions that their new science was challenging. This helps account for the fluidity of opinion at the time. Charles Lyell realized that wind and rain might over aeons erode mountains, inspiring Darwin and Wallace to recognize that a single-celled organism might in time become a human being, but whether one saw such transformations as an explanation or as a subtler form of magic remained a matter of opinion; time, more than anything else, is the difference between “On the Origin of Species” and Ovid’s “Metamorphoses.” Lyell, so important to Wallace and Darwin, could not initially bring himself to accept the evolutionary ideas he had inspired.

It is possible to conceive of the debate over evolution as a literary one. Does the universe have an author? Is natural history a story with a plot, or just a random accumulation of anecdotes? Do things reverberate with a secondary, higher meaning, or are they merely what they are? Even Darwin could not free himself from the entanglements of metaphor. “Natural selection” implies agency, a “selector” that Darwin did not really believe in, which is why Wallace chided him for using the phrase.

Darwin, in his autobiography, noted that, as he grew older, he completely lost the ability to read poetry. He wondered if this was a symptom of mental decline, but it seems symbolic of a change in the fabric of his intellectual life and the larger movement of science away from the confusions of a phrase like “natural selection.” The age of metaphor—when science, religion, and poetic imagination were braided together—was passing away. Wallace, meanwhile, read poetry more and more, sprinkling poetic epigraphs through his books. In his autobiography, Wallace, thinking of all the ways in which his setbacks, his poverty, and the loss of his early collections had ultimately led him to his present life, quotes Hamlet: “There’s a divinity that shapes our ends, rough-hew them how we will.”

In 1889, Wallace read Edward Bellamy’s “Looking Backward” and became a socialist. He had long been a vocal critic of England’s stratified society; his opposition to compulsory vaccination had grown out of a conviction that the poor could not pay the fines for noncompliance and would wind up in jail, while the rich could shrug them off. (“Liberty,” he said, “is in my mind a far greater and more important thing than science.”) He became president of the Land Nationalisation Society and wrote that natural selection could never have the beneficial effect on human beings that it might as long as vast social inequalities existed. The “social Darwinism” that was already taking shape was, he felt, just a defense of class privilege.

His political passions, like aspects of his spiritualism, brought him full circle—back to the natives he had encountered in the Amazon and in the Malay Archipelago. Darwin, as Sloten observes, had been appalled by the gap between the “savages” he came across and Western man, whereas Wallace had often been struck by the similarities, and felt an instinctive kinship. Many of his passions—land nationalization, radical equality, even the belief in a spirit world—were built into the native societies he had encountered on his travels. Wallace was capable of suggesting without irony that the head-hunting Dayaks, among whom he had lived in Borneo, were morally superior to his British compatriots.

The generations that came after Wallace, extending into our own, have never known quite what to make of him. He remains today too theistic for the Darwinians and too Darwinian for advocates of intelligent design, with whom it is hard to imagine him having much patience. But his holistic impulses can still be seen in the work of naturalists like E. O. Wilson, who incorporated human nature into his theory of sociobiology (to wide scientific outrage) and who continues to dream of what he calls “consilience.” Though Wilson is not a theist, forty per cent of American scientists, when polled, acknowledge a belief in some sort of divine power. And there are scientists, like Francis Collins, the head of the Human Genome Project, who have declared unabashedly that the genetic code is the language of God. Collins seems to intend that statement as more than a metaphor but to be disinclined, unlike Wallace, to attempt a scientific argument proving that it is.

Shermer’s book, “In Darwin’s Shadow,” observes that, when Wallace started out, “the study of nature and theology were two sides of the same coin,” and the term “science” had yet to acquire its specialized sense of systematic observation in the natural sciences. Wallace, whose theory played such a crucial part in severing the relationship between science and religion, then devoted himself to the attempt to link them again. In the century since his death, in 1913, the gulf between science and religion has only widened, and later generations of scientists, reaching for useful models, have overlooked him.

Nonetheless, by the end of his long life Wallace had, almost in spite of himself, become enormously famous.

Despite trying to turn down an honorary degree from Oxford, membership in the Royal Society, and the Order of Merit (it required a visit to Buckingham Palace and an expensive new suit of clothes that Wallace did not wish to buy), Wallace wound up with just about every honor a great scientist could receive. At his death, he could have been buried in Westminster Abbey, next to Darwin, but his family, knowing his wishes, declined. Instead, they buried him in the local graveyard, which had a better view. ♦

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