

A Critic at Large, Henry Walter Bates

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IF I were heading for the Amazon and had room in my tropical kit for just one book, my choice would unquestionably be Henry Walter Bates's "The Naturalist on the River Amazons." A hundred and twenty-five years after its first appearance, it remains the basic text, one of the monuments of scientific travel writing, and a celebration of the world's ultimate wilderness in its virgin splendor. I still have my copy-it was my inspiring companion a decade ago, when I spent eight months wandering in that "glorious forest," as Bates called it. There were times when I was way out there, hundreds of miles from anything approaching the modern world, with no familiar cultural referent to cling to except Bates. Shuddering with loneliness, I would recall that Bates spent eleven years in Amazonia, yet only once in his narrative is there a suggestion of the discomfort and homesickness that must at times have been unbearable. This uncharacteristically personal momentone of the memorable passages in exploration literature-comes after the first of four and a half years he eventually spent in the village of Ega, fourteen hundred miles up the river. There had been no parcels from England since his arrival at Ega, his clothing was worn to rags, he was barefoot ("a great inconvenience in tropical forests," he reports, "notwithstanding statements to the contrary that have been published by travelers"), he had been robbed, and his servant had run off. But the worst of it was that there was nothing left to read. He had read from beginning to end even the advertisements of his few precious copies of the Athenaeum. "I was obliged, at last," he writes, with marvelous understatement, "to come to the conclusion that the contemplation of Nature alone is not sufficient to fill the human heart and mind."

But most of the time Bates was lost in wonder, astonished by a diversity he had never imagined possible. While he was staying in Para (present-day Belem), he found seven hundred species of butterfly within an hour's walk of the town, "whilst the total number found in the British Islands does not exceed sixty-six," and at Ega, where "Nature writes, as on a tablet, the story of the modifications of species," he identified "upwards of seven thousand species of insects," including eighteen species of "true papilio"-swallowtail butterflies-"within ten minutes' walk of my house." Any amount of deprivation and difficulty, he reasoned, was worth putting up with for the privilege of making such discoveries.

The mid-nineteenth century was a remarkable time to be a naturalist. A uniform theory explaining how life on earth had evolved, in all its diversity, had not yet been worked out, and the world's richest and most complex terrestrial ecosystem, the tropical rain forest, had been entered by no more than a handful of people with a Western scientific perspective, its mysteries had not been unraveled (this is still to a great extent the case), its riotous biota was almost completely uncatalogued and unclassified. As often happens in remarkable times, individuals with remarkable qualities appeared with the stamina, the curiosity, and the powers of observation and extrapolation that were equal to the task. England produced four self-contained and largely self-educated geniuses who became pioneers of tropical biology: Charles Darwin, Alfred Russel Wallace, Henry Walter Bates, and Richard Spruce. They were very different types, but they all knew each other, and corresponded, and sent each other drafts of their scientific papers for comment, and all but Darwin cut their teeth on the Amazon. Darwin and Wallace were, of course, two of the great Victorian minds. Bates and Spruce were lesser figures, but their contributions to science were tremendously important. Darwin, having completed his five-year

circumnavigation of the globe on H.M.S. Beagle in 1836 and published his famous journal three years later, had a ten-year start on the others. He was their hero. He had a tremendous volume of data and a brilliant theoretical mind (and a bigger ego than the three others), and he had been working on the theory of natural selection for twenty years when Wallace precipitated the long-delayed publication of "On the Origin of Species" by sending him, in 1858, an outline of the theory which was in some ways clearer than his own version.

Wallace was a magnanimous soul, a truly open mind. He arrived at the theory independently—he always called it Darwinism, and wasn't at all concerned about getting his share of the credit—and yet he felt that there were many things it didn't account for, and (quite correctly, as recent work by Stephen Jay Gould and others has shown) that natural selection wasn't the only explanation for evolutionary change. He and Bates went to the Amazon together when they were in their mid-twenties. Both were ardent entomologists, and their fascination with the beauty and intricacy of insects gradually grew into awe of the entire creation. Wallace was interested in broad zoogeographical patterns; he wasn't afraid of taking speculative flights. Bates was suspicious of sweeping generalities; he was concerned with direct, detailed observation with what could be seen and verified. Spruce, a botanist, came out to the Amazon three years later, with Wallace's younger brother Herbert, who was quickly carried off by yellow fever. Spruce's task was particularly daunting. In some locales, almost every tree and shrub proved to be a new species. He spent the better part of fourteen years in the Amazon Valley—longer than any of the others. But his name is less known, except in botanical circles, because he never wrote a book, instead devoting the rest of his career to the study of liverworts. After he died, Wallace generously took time from his own work to edit Spruce's journals, which are a trove of botanical and ethnobotanical information. They were published in 1908 as "Notes of a Botanist on the Amazon and Andes."

Bates writes that he spent "eleven of the best years of my life" in the Amazon. They were certainly the most exciting. He was born in Leicester in 1825, the eldest son of hosiery manufacturer, himself the son of a hosiery dyer, and thus he was not, as Darwin was, a child of privilege. His formal education ended at the age of thirteen, whereupon he was apprenticed to a colleague of his father's, for whom he worked thirteen hours a day. He continued to study at night and became, among other things, fluent in Greek. Throughout his life, he was fond of reading Homer in the original, but, unlike many of his contemporaries (Thoreau included), he felt no need to spout the Iliad in his book. He also played the guitar. But his main interest was bugs. On holidays with his younger brother he would comb the nearby Charnwood Forest for specimens. At the age of eighteen, he produced his first contribution to science—a short paper on beetles entitled "On Coleopterous Insects Frequenting Damp Places."

A year or two later, he made the acquaintance of Wallace, a young English master at the Collegiate School in Leicester, who shared his entomological interests. On their outings, they would talk about going abroad to a place that had never been collected would fantasize about following in the footsteps of Humboldt and Bonpland, who had spent years wandering in South America at the turn of the century—and they would talk about the subversive implications of Darwin's recently published journal and of the writings of the geologist Charles Lyell, whose theory of uniformitarianism challenged the prevailing view that each organism had been made by God in a special, separate act of creation.

But it was the publication, in 1847, of W. H. Edwards' "Voyage up the River Amazon, Including a Residence at Para," with its descriptions of "the beauty and the grandeur of the vegetation" and the "kindness and hospitality of the people," as Wallace recalled years later in his autobiography, that fired them with a longing to visit the Amazon. A lawyer from New York who also owned railroads and coal mines, Edwards was the grandfather of American lepidopterology. He described more North American butterflies than anyone had before or has since. A meeting with the great man as he was passing through London and a visit to the British Museum, where the two young naturalists saw some exquisite butterflies just collected in Para, made Bates's mind up: he would chuck his boring job (by now he was an office clerk in Burton-on-Trent) and accept an invitation from Wallace to go with him to the Amazon to collect specimens—the sale of which would pay for the trip—and data "toward solving the problem of the origin of species."

Embarking from Liverpool in a small trading vessel, they reached Para, at the mouth of the Amazon, in thirty-two days, on May 28, 1848—a quick trip. After eighteen months there, they ascended the Tocantins, the first big right-bank tributary of the Amazon, and then went up the main river to Santarem, where Bates would be headquartered for the next three years. On March 26, 1850, he and Wallace parted company. Whether temperamental or philosophical differences arose between them—any differences are quickly magnified in claustrophobic jungle settings—or whether they had merely begun to get on each other's nerves, we will never know; Bates speaks simply of "finding it more convenient to explore separate districts and collect independently."

Wallace went up the Rio Negro, the Amazon's largest tributary (with a discharge four times that of the Mississippi), and its tributary the Uaupes. There he glimpsed the fabulous cock of the rock—an umbrella bird with a crest stretching from the tip of the bill to the top of the head—and met some interesting Indians. In 1852, racked with fever and ague, he set sail for England, with a huge collection of specimens, dead and live. The ship caught fire and sank off the Guianas, and he lost everything. A lesser man would have been broken by the disaster, but Wallace wrote a beautiful poem about it, a brilliant book on the palms of the Amazon (almost entirely from memory), and a popular work, "A Narrative of Travels on the Amazon and Rio Negro," which occupies almost as highly respected a place in the literature of the Amazon as Bates's book. (Darwin, though, sniped in a letter to Bates, "I was a little disappointed in Wallace's book on the Amazon; hardly facts enough.") Then he took off for the Malay Archipelago, where he spent eight years, collecting a hundred and twenty-seven thousand specimens, formulating the theory of natural selection, making fundamental discoveries in biology, geology, geography, and ethnography. His "The Malay Archipelago" (1869) was a great success, and stands with Bates's book as a nineteenth-century classic. The rest of Wallace's life was devoted to an extraordinary range of interests and causes: vaccination, socialism, land nationalization, women's rights. After his years in the Orient, where he found that ancestors continued to play a dominant role in the world of the living, he became fascinated with the idea of communication with the dead. Spiritualism was enjoying a vogue in Victorian England; a group that included Arthur Conan Doyle went regularly to séances. Darwin and Julian Huxley were shocked, but Wallace had no patience with narrow-minded scientists who dismissed avenues of possibility without even examining the evidence. After a long and wonderfully full life, he died in 1913.

AFTER Wallace went home, Bates, though his own health was steadily deteriorating, stuck it out in Amazonia for seven more years. He went up the Tapajós River, which enters the main stream at Santarem, then up to Ega, from which he made forays into Upper Amazonia. Finally, in

June of 1859, he, too, racked with the "ague of the country"-almost certainly malaria-bailed out and returned to England. But, unlike Wallace, he made it back with his booty: 14,712 species, no fewer than eight thousand of which were new to science. The precise breakdown was:

- 52 mammals
- 360 birds
- 140 reptiles
- 120 fish
- 14,000 insects
- 35 mollusks
- 5 zoophytes

In 1855, while Bates was still in Amazonia, Wallace sent him from Malaya a draft of a paper he had written, entitled "On the Law Which Has Regulated the Introduction of New Species." In it Wallace argued that every species has arisen "coincident both in space and time with a preexisting closely allied species"-that the diversity of life on earth had not come about as the result of numerous special creations by God. The habitually cautious Bates was somewhat taken aback. He wrote Wallace that while the two of them had often discussed the theory of natural selection (as it would be called), "the theory I quite assent to, and, you know, was conceived by me also, but I profess that I could not have propounded it with so much force and completeness." Wallace, attempting to mollify him, wrote back that the "paper is, of course, only the announcement of the theory, not its development," and that it would actually appear clearer to him than "to persons who have not thought much on the subject." The full development of the theory had to wait four years, until Darwin finally brought out "On the Origin of Species." The book was published in November, and, unlike Wallace's paper, it caused an immediate furor. Bates had returned that summer. He read the book and was an instant convert. At last, he thought as he fell to work sorting out his Amazonian specimens, there was a unifying framework.

One of the most common forms of butterfly in Amazonia is a lazily flapping, elongate, two-tone (usually brown-and-yellow or red-and-blue) type, of which Bates had caught many examples. As he examined them, he noticed that some were heliconians, a foul-smelling and unpalatable group, avoided by birds because of the chemicals they absorb as caterpillars from their food plant-the passionflower vine. But others were Dismorphia-a completely different family. They were perfectly palatable, but in flight were indistinguishable from the heliconians and therefore were also left alone by birds. This was just one of many mimetic complexes that Bates discovered not only among the insects of the Amazon but also among the birds and reptiles. The sole satisfactory mechanism he could come up with to explain these convergences was natural selection" the selective agents being insectivorous animals which gradually destroy those sports [as mutations were then called] or varieties which are not sufficiently like [the protected species] to deceive them," as he wrote in a now famous paper entitled "Contributions to an Insect Fauna of the Amazons Valley. Lepidoptera: Heliconiidae," which was published in 1862.

The paper contained some of the first sophisticated insights into tropical biology and provided some of the first indications of the complexity of the rain forest. Darwin was delighted by it, because the paper was, as Bates himself had remarked, "a most beautiful proof of natural selection," and he hailed it as "one of the most remarkable and admirable papers I ever read in my life." He wrote Bates, "I am rejoiced that I passed over the whole subject [of mimicry] in the 'Origin,' for I should have

made a precious mess of it." This type of mimicry—a palatable species mimicking an unpalatable one—became known as Batesian mimicry. Many other types have since been identified. In Mullerian mimicry, for example, some unpalatable species converge on the same color pattern, producing the same aposematic, or warning, coloration. In Mertensian mimicry, a palatable and a highly toxic species both come to resemble a moderately toxic model. Many butterflies are "automimics": one may have false eyespots on its wings, say, to fool birds into snapping at a part of its body that it can better afford to lose than its head. Camouflage and crypsis—keeping a low profile—are favorite survival strategies in the rain forest: moths simulate leaves, and snakes look like vines. It is as if the rain forest were a dangerous, riotous carnival, and everyone who would dance in it must wear a costume.

Darwin urged Bates to write a memoir of his years in the Amazon and introduced him to the publisher John Murray, and in 1863 Murray brought out Bates's "The Naturalist on the River Amazons." (Bates preferred a literal translation of the river's Portuguese name, Rio Amazonas. The Amazons were a legendary female tribe said to have attacked the first Europeans to navigate the river.) The book was a tremendous success. It went through many editions and was translated into several languages. Darwin wrote Bates, "It is the best work of Natural History Travels ever published in England. Your style seems to me admirable. Nothing can be better than the discussion on the struggle for existence, and nothing better than the description of the Forest scenery. It is a grand book, and whether or not it sells quickly, it will last." John Gould, the American ornithologist and bird painter, who had been yearning to go to the Amazon, wrote, "Bates, I have read your book—I've seen the Amazons." Bates, typically, deprecated the achievement. He said he would rather spend another eleven years in the jungle than have to go through the ordeal of writing another book. That year, he married Sara Ann Mason, of Leicester. They had three sons, two of whom were to become farmers in New Zealand.

The following year, just when everything was going so well, Bates suffered a blow. He applied for a post in the Zoological Department of the British Museum, for which he was superbly qualified, but the position went to a poet who knew absolutely nothing about zoology but was a friend of someone on the museum's board of directors. Two years later, with the strong backing of Murray, he was appointed assistant secretary of the Royal Geographical Society. Though he would have preferred the scientific job, he stayed at the society for twenty-eight years, editing its transactions, and supervising its daily operations and the publication of several important books, including Peter E. Warburton's "Journey Across the Western Interior of Australia." His latter years were filled with honor. The Emperor of Brazil, for example, awarded him the Brazilian Order of the Rose, which was only rarely bestowed on foreigners. He was plagued by dyspepsia, as were both Darwin and Huxley, and he died, of bronchitis, on February 16, 1892. He left many of his butterflies to the British Museum, and his magnificent beetle collection was bought by a Frenchman, Charles Oberthür, one of the big names in turn-of-the-century entomology.

That is all I have been able to learn about this intensely private, self-effacing Englishman. Questions that pique the modern curiosity, such as whether he remained a detached observer, in the British manner—"a solitary stranger on a strange errand," as he described himself—all those eleven years, without succumbing to the charms of the women of Amazonia, are unanswerable. He certainly had an eye for feminine beauty. He writes of buxom mulata women and "frank and smiling" Indian girls with "nearly perfect figures," and a passage near the beginning of his book betrays more of a literary than a scientific sensibility: "Amongst them [groups of people cooling

themselves outside their doors] were several handsome women, dressed in a slovenly manner, barefoot or shod in loose slippers; but wearing richly decorated ear-rings, and around their necks strings of very large gold beads. They had dark expressive eyes, and remarkably rich heads of hair. It was a mere fancy, but I thought the mingled squalor, luxuriance and beauty of these women were pointedly in harmony with the rest of the scene; so striking, in the view, was the mixture of natural riches and human poverty." The recent appearance of the octogenarian Eskimo sons of the polar explorers Robert Peary and Matthew Henson suggests that Victorians in the field were not as celibate as has generally been supposed.

THE charm-and the genius-of Bates's book is that he does not restrict himself to cataloguing the natural history; he observes and is interested in everything. The subtitle gives an idea of the work's breadth: "A Record of Adventures, Habits of Animals, Sketches of Brazilian and Indian Life, and Aspects of Nature Under the Equator, During Eleven Years of Travel." Today is the era of the specialized scientist, who is reluctant to think about things that are not in his discipline, but in Bates's day the boundaries of the disciplines had not yet been drawn. Omnivorous curiosity was expected of the explorer. Humboldt's mind, for instance, was a vessel and a computer of monumental capacity; his "Voyage to the Equinoctial Regions of the New Continent" runs to twenty-three volumes. Like Humboldt, Bates responded to and gave equal time to the people. (It is very hard not to respond to the Amazonians, who are among "the friendliest people on earth.") His view of nature included man and his works; it was more Shakespearean than Thoreauvian. This breadth of interest separated him, as Darwin pointed out, from "the mob of naturalists without souls."

As a result, not only do we meet in his pages the most varied assemblage of life on earth-including hyacinthine macaws, hairstreak butterflies, fin cheating spiders, curl-crested toucans (the engraving of the bespectacled Bates mobbed by these birds is one of the famous nineteenth-century images of the jungle), trogons, jacamars, sloths, troupials, fire ants, army ants, anacondas, piranhas ("As soon as any offal fell from the canoe, the water was blackened with the shoals that rushed instantaneously to the spot"), manatees, scarlet-faced ouakaris, and leonine marmosets-but we also meet the various racial and cultural mixtures of Amazonia: mulattoes; mamelucos (white and Indian); cafuzos (Indian and African); tapuyos, or detribalized Indians; and the mesti"o river people, who are now known as caboclos, and many of whom still live as Bates found them, except that they have shotguns, radios, outboard motors, and a few other modern goods. There are fascinating passages on the use of the fish stupefying timbo vine, on how the Tikuna Indians buried their chiefs ("the knees doubled up, in large jars under the floor of their huts"), on geophagy (the curious practice of eating dirt), on cannibalism, on the use of the zarabatana, or blowgun, on bow hunting for river turtles, on headshrinking among the Mundurucu (a practice they have since given up). We hear about a bogeyman called the Curupira-the Amazonian Bigfoot who lives deep in the forest, has backward-pointing feet to throw off trackers, and is held responsible for such inexplicable sounds in the night as sudden crashes, piercing cries, sounds "like the clang of an iron bar against a hard, hollow tree." We learn of a monstrous serpent called the Mai d' Agua-the Amazonian Nessie-and are told of the Amazonians' fear of the boto, or freshwater dolphin, which persists to this day. Bates's informants told him that the boto assumed the shape of a beautiful woman, "with hair hanging loose to her heels," who enticed young men close to the water, never to be seen again. (Mine claimed that it becomes a man who steals ashore at night, and accounts for embarrassing pregnancies and venereal diseases, and babies with birth defects.)

We sail with Bates in various types of now extinct sailing craft-the montaria, the cuberta, the igarite. We feel the excruciatingly itchy bite of the pium, a small gnat that is one of the scourges of Amazonia: "In places where it is abundant, it accompanies canoes in such dense swarms as to resemble thin clouds of smoke." We nearly die of yellow fever with him: "I was seized with shivering and vomit at nine o'clock in the morning. ...I took a good draught of a decoction of elder blossoms as a sudorific and soon after fell insensible into my hammock."

The best natural descriptions have a dreamlike quality, which can hardly have been intended yet faithfully mirrors the shadowy world beneath the jungle canopy. Here is Bates running into a boa constrictor: "On seeing me the reptile suddenly turned, and glided at an accelerated rate down the path. ...The rapidly moving and shining body looked like a stream of brown liquid flowing over the thick bed of fallen leaves." The natural histories of various organisms which are the core of the book are still fundamentally sound, though many of the Latin names have changed. Bates thought that the leaf-cutter ants carry back shreds of leaf to their mounds to thatch the mounds' roofs and keep their young broods dry. It has since been learned that the leaves are used as mulch to grow subterranean gardens of fungi, on which the ants subsist. More serious flaws are the occasional remarks, perfectly acceptable-indeed, almost mandatory-in those days, on the intellectual inferiority of Indians and people of mixed race; and pronouncements on the fertility of the soil, like "The country [of Para] is covered with forests, and the soil fertile in the extreme, even for a tropical country." Actually, the soils of Amazonia, and tropical soils in general, tend to be thin and poor. The lushness that Bates assumed to be a product of the soil results from a delicate balancing act: the rain forest exists mainly on water and air and the frenetic recycling of nutrients from leaf litter and decaying wood on the forest floor back up into the trees.

Reading Bates is an emotional experience for someone who has traveled in Amazonia, because much of what he describes so poignantly is no longer there. In his day, the village of Alter do Chao was a few sleepy huts on the right bank of the Tapajas River, lined in the dry season with miles of beautiful white sand beach, and it was still that way when I spent a memorable afternoon there in the fall of 1977, swimming and drinking cashew liqueur. I filed the place away in my mind. It became my secret, my ace in the hole, the first place I would head for when I finally gave up trying to fit into the modern world. In the summer of 1984, I happened to be back in the vicinity, and I took a bus out to Alter do Chao to see how it was doing. The place was unrecognizable. There were new streets with white villas, and on the beach were thousands of teen-age Amazonians, drinking Coke, water-skiing, bombing around in open jeeps with roll bars, moonwalking to Michael Jackson tapes. With the completion of the Transamazon Highway and the discovery of gold in that part of the Amazon, progress had come overnight, and no one was looking back.

I felt then the same kind of anguish that Bates felt when, after an absence of seven and a half years upriver, he returned to Para and found his favorite forests cleared. "The noble forest trees had been cut down, and their naked half-burnt stems remained in the midst of ashes, muddy puddles, and heaps of broken branches," he wrote. Steamboats had begun to ply the river in his absence, foreign merchants had arrived, and the city was four times as expensive. Bates couldn't afford it anymore. The citizens were pathetically imitating Portuguese and French dress and customs, and abandoning their wonderful folk traditions and religious festivals. Bates felt deep misgivings about returning to civilization. In his famous closing passage he wrote, "Pictures of

startling clearness rose up of ...factory chimneys and crowds of grimy operatives, rung to work in early morning by factory bells; of union workhouses, confined rooms, artificial cares, and slavish conventionalities. ...It was natural to feel a little dismayed at the prospect of so great a change."

-ALEX SHOUMATOFF