Packing his bags before his voyage on the Beagle in 1831, and knowing space was tight in his small cabin, Charles Darwin asked the captain if he could take Alexander von Humboldt’s “Personal Narrative,” the seven-volume account of Humboldt’s travels in Latin America 30 years before. Of course he could take his Humboldt, was the reply—for a naturalist and explorer it was almost like taking the Bible. This was the book, Darwin said, that inspired him to volunteer for the voyage, and Humboldt’s descriptions governed everything he saw. “I am at present fit only to read Humboldt,” he wrote from Brazil. “He like another Sun illumines everything I behold.”

As Andrea Wulf shows in her engrossing biography of Humboldt, Darwin was far from the only one whose eyes he opened. When Humboldt died in 1859, aged 89, he was famed across continents. In the coming era of empire and exploration his name spanned the globe, from Humboldt’s Current along the shores of Chile and Peru, to a glacier in Greenland and waterfalls in New Zealand. The state of Nevada, Ms. Wulf tells us, was almost called Humboldt when its name was debated in the 1860s. Nearly 300 species of plants and a hundred animals bear his name, from a South American penguin to a predatory squid. There is even a Mare Humboldtianum on the moon. Yet today, while Darwin’s name is recognized everywhere, most of us know little of Humboldt and his
The “Invention of Nature” traces his career and achievements, but is particularly concerned with Humboldt’s ideas and influence. His background was privileged: His father, a distinguished soldier, was royal chamberlain in the Prussian court, and his mother’s fortune helped to fund his expeditions and research. His older brother, Wilhelm, became a minister, ambassador and distinguished linguist. Yet after their father’s death, when Alexander was 9, their childhood was far from happy, and Alexander formed a protective shell of wit and ambition. Although he studied finance and science, mathematics and languages, largely to please his mother, his wanderlust grew. As a brilliant young mine inspector of 22, he traveled across Germany and Poland, fascinated not only by geology but also by the harsh conditions underground, which prompted his invention of a new breathing mask and safety lamp. From then on, his investigations made room for the people who worked in the lands he visited. He developed a lifelong hatred of servitude and slavery and an acute awareness of how human greed despoiled the natural world.

In an age before specialization, Humboldt’s interests ranged widely, from subterranean flora to “animal electricity” and Galvanism. As a young man in the intellectual circles of Weimar, he formed a close friendship with Goethe, who was amazed—as everyone was—by his rushing talk and fizzing ideas. Ms. Wulf sees much of Humboldt in Goethe’s Faust with his “feverish unrest,” and writes well about their mutual interests, including Kant’s ideas on the subjectivity of knowledge, and their rejection of mechanical theories nature in favor of a more Romantic, “organic” vision, “interpreting the natural world as a unified whole that is animated by interactive forces.”

With his mother’s death in 1796, Humboldt began collecting instruments and packing trunks. A confirmed Republican who had been inspired by the French Revolution, he had hoped to join Napoleon’s 1798 expedition to Egypt, but a lack of transport prevented him, and a voyage of circumnavigation was also postponed. But a year later a visit to Madrid allowed Humboldt and his companion, the naturalist Aimé Bonpland, to set sail for Latin America. His extraordinary four years there established Humboldt’s reputation, and Ms. Wulf gives them generous space, her prose enlivened by Humboldt’s vivid journals—as he gazes, for example, at the rapids of the Orinoco at sunset, which look as if a river of mist were “suspended over its bed”—and by her own travels in his footsteps from the Venezuelan rainforests to the high plains of Ecuador, with condors circling overhead.

Humboldt mapped routes and rivers, collected data on soil and sand, rocks and
minerals, and eventually brought back 6,000 species of plants, 2,000 of which were new to European botanists. Everywhere, he also noted the effects of human activity.

Pondering the decline in water levels at Lake Valencia in northern Venezuela, he developed, as Ms. Wulf puts it, “his idea of human-induced climate change,” describing how deforestation led inevitably to erosion: The impact for future generations could, he said, be incalculable. On the great plains of the Llanos, he remarked on the crucial role of the occasional Mauritia palms—later recognized as a typical “keystone species,” a single plant essential to an ecosystem. After crossing the Andes he became increasingly interested in volcanoes, rejecting the Neptunists, who believed that sedimentation was the main force in creating the earth’s crust, in favor of the Vulcanist notion of cataclysmic eruptions. He also suggested that the chains of volcanoes hinted at underlying rifts, and pondered the original joining of land-masses bordering the Atlantic—a step toward the theory of tectonic plates. He noticed how the earth’s magnetic field decreased as one approached the equator, and he looked at the sky as well as the earth: Some years later, in 1817, his drawing of “isothermal lines”—which meteorologists still use today—allowed the first clear comparison of climatic conditions in different regions.

Gradually, Humboldt developed his own philosophy of nature, at once scientific and poetic. The climactic moment was his ascent of the ice-capped volcano of Chimborazo in Ecuador in 1802. Gasping the thin air, hands numb and feet bleeding, he and his companions reached over 19,000 feet, a record at the time. As they climbed, Humboldt began to construct his Naturgemalde—a sketch that would represent nature as a unified, living whole, an interconnected web. A cross-section of the mountain, this showed plants according to their altitudes, related in accompanying tables to gravity, humidity, pressure, temperature and animal species, enabling comparison with other climate zones. Instead of adopting the taxonomic categories of the Enlightenment, as Ms. Wulf says, “he saw vegetation through the lens of climate and location: a radically new idea that still shapes our understanding of ecosystems today.”

In 1803, Humboldt spent a year in Mexico, plunging through the colonial archives, a period that crystallized his view that the Spanish had demolished ancient civilizations, native tribes and rich forests in their greed for gold and timber. His next stop was Washington. He was excited to meet Jefferson, now president and one of his heroes. The delight was mutual, as Jefferson not only shared his scientific and botanical interests, but could pump him for information on Latin America. The one subject they avoided was slavery.

In Paris, London and Berlin, Humboldt was feted in society salons and scholarly academies. The Romantic poets as well as geologists and naturalists devoured his ideas, concurring with his belief that nature was, as Ms. Wulf writes, “in a mysterious
communication with our ‘inner feelings.’ ” He had a charisma that made women swoon, although he showed no interest in them: all his intense relationships were with men. But his most intense passion was for his work as he wrote and published his best-selling books, building up an astonishing network of correspondents and admirers. Among them was Simón Bolívar, whose bloody struggles to liberate the different regions of South America Humboldt would follow and support over the decades.

Humboldt never lost his restlessness, his maladie centrifuge, as a friend called it. He tried repeatedly to gain permission from the East India Company to visit the Himalayas but was refused—perhaps, Ms. Wulf suggests, because of his frequent comparison of the rapacious Spanish empire to British rule in India. Instead, in his 60s, in 1829 he set off on a headlong journey into Russia, sponsored by Czar Nicholas I, who wanted information about mining in the Urals. This Humboldt dutifully provided before, typically, breaking with instructions and charging off for the Altai Mountains on the Mongolian border, then making a wild detour to the shores of the Caspian Sea.

Andrea Wulf magnificently recreates Humboldt’s dazzling, complex personality and the scope of his writing, particularly in his late, five-volume work “Cosmos.” She shows, too, how he influenced later thinkers, including the conservationist George Perkins Marsh, the biologist and philosopher Ernst Haeckel, and the environmentalist John Muir, whose campaign to preserving the wilderness led to the creation of Yosemite National Park. Her book fulfills her aim to restore Humboldt to his place “in the pantheon of nature and science,” revealing his approach as a key source for our modern understanding of the natural world.

—Ms. Uglow is the author, most recently, of “In These Times: Living in Britain Through Napoleon’s Wars, 1793-1815.”