ALEXANDER VON HUMBOLDT and the United States
Alexander von Humboldt and the United States:
Art, Nature, and Culture
is organized by the Smithsonian American Art Museum
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This exhibition is supported by an indemnity from the Federal Council on the Arts and the Humanities.
Alexander von Humboldt (1769–1859) was one of the most celebrated explorers of all time. Ralph Waldo Emerson proclaimed him “one of those wonders of the world.” Humboldt was also a protean scholar whose seemingly boundless interests included astronomy, botany, chemistry, economics, geography, geology, physics, politics, and zoology. He and his elder brother, Wilhelm (1767–1835), a prominent philologist, educational reformer, and the driving force behind the establishment of the University of Berlin (which was renamed in the brothers’ honor in 1949), became leading intellectual figures in the nineteenth-century German states.

Although Alexander von Humboldt came from a Prussian aristocratic family, he had enlightened views on political and social issues and was a lifelong outspoken opponent of slavery. At an early age, he became deeply interested in nature and avidly read books about exploration. After studies at the University of Frankfurt an der Oder, the University of Göttingen, and the Mining Academy of Freiberg, Humboldt worked for five years as a Prussian mining official. This provided him with the opportunity to conduct a wide range of scientific experiments and undertake applied research, such as the development of a respirator and a safety lamp for miners.

Humboldt was eager to embark on a major journey to an unexplored region of the world. Early plans for trips to Egypt and to the West Indies never materialized due to war in Europe. Finally, authorized by King Carlos IV of Spain, he and the French naturalist Aimé Bonpland (1773–1858) set off in 1799 on a self-financed five-year voyage of exploration to the "equinoctial
HUMBOLDT AS MENTOR TO AMERICAN SCIENTISTS

Humboldt showed a remarkable talent for spotting and advancing the careers of promising young scientists. He had realized that he could not possibly write letters to the entire world, so he himself led his protégés to conduct such studies across the globe. In particular, Humboldt mentored two men who went on to become leading figures in nineteenth-century American science—Louis Agassiz and Arnold Guyot.

Louis Agassiz (1807–1873) was a Swiss-born naturalist who made many important contributions to the history and earth sciences. Early in his career, based in Neuchâtel, Agassiz was particularly interested in the diversity and interrelationships of extant and extinct fishes and echinoderms. Following up on earlier work by the German Swiss naturalist Jean de Charpentier and especially the German naturalist Karl Friedrich Schimper, he also investigated the morphology and distribution of non-photosynthetic cold-water current in the Pacific along the west coast of South America.

As the officer in charge of the United States Navy office (the precursor of today’s United States Naval Observatory) in Washington, D.C., Matthew Fontaine Maury (1806–1873) established the systematic gathering of information on sea conditions and weather by American shipmasters. Influenced by Humboldt, Maury used a vast trove of data to generate global characterizations of geographic systems, developing what Humboldt termed a “physical geography of the sea.” In 1847 Maury published the widely acclaimed Wind and Current Chart of the North Atlantic. He was also interested in global wind patterns and their impact on ocean currents. Rejecting the then-prevailing notion that winds were responsible for the major oceanic currents, Maury maintained that these currents were the result of temperature-related changes in the density of seawater, which generate systems of circulation between the cool and warm regions of the globe. Finally, he prepared the first bathymetric map of the Atlantic Ocean. While not very accurate, this map was important for the laying of the first transatlantic cable, a project that Humboldt had enthusiastically supported.

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an outspoken proponent of “scientific” racism, which was anathema to his mentor and cast a deep shadow on Humboldt’s scholarly legacy. He also wanted to use science to advance a national agenda, unlike Humboldt’s cosmopolitan concept of science.

During a visit to Philadelphia in 1846, Agassiz drew on Humboldt’s description of blacks, which, coupled with his obsession about the consequences of miscegenation, led him to argue that the different races of humans represented separate species. He was influenced by the polygenism of the physician Samuel George Morton (1799–1851) in Philadelphia. Morton had measured a large number of human skulls to determine their brain volume (without accounting for body size and sex) and, based on a highly biased analysis, asserted that whites had greater brain capacity than blacks and Native Americans.18 Agassiz first expounded his view in a highly biased analysis, asserted that whites had greater brain capacity than blacks and Native Americans.18 Agassiz first expounded his view in a highly biased analysis, asserted that whites had greater brain capacity than blacks and Native Americans.18 Agassiz first expounded his view in a highly biased analysis, asserted that whites had greater brain capacity than blacks and Native Americans.18 Agassiz first expounded his view in a highly biased analysis, asserted that whites had greater brain capacity than blacks and Native Americans.18 Agassiz first expounded his view in a highly biased analysis, asserted that whites had greater brain capacity than blacks and Native Americans.

However, as even his earliest scientific biographers pointed out, Humboldt never made a single groundbreaking scientific discovery nor did he formulate a major theory that posterity would come to firmly associate with his name. Working as a private scholar, he was not the founder of an academic school, but he served as mentor to many a young scientist. The sheer breadth of his interests led Humboldt to eschew in-depth pursuit of any particular line of scientific research. Instead he encouraged others to undertake the detailed examination of specific topics. A well-known example is Humboldt’s discovery that the intensity of Earth’s magnetic field decreases from the poles to the equator. He left it to his friend, the mathematician Carl Friedrich Gauss (1777–1855), to develop a method for determining the strength of Earth’s magnetic field.20 Thus, even his early scientific biographers considered Humboldt a hero-explorer, a tireless collector of data, and a gifted public communicator of science rather than an original creative mind.21 Indeed, Humboldt is most widely known for his holistic thinking about nature and for introducing nature and world cultures to diverse audiences. However, he also could look back on numerous scientific accomplishments. The impact of much of Humboldt’s research has yet to be critically reassessed by modern historians of science.

Humboldt and Bonpland’s Essai sur la géographie des plantes (1805) is generally considered the foundation of plant geography.22 Humboldt acknowledged earlier efforts, especially by his friends Georg Forster (1754–1794) and Karl Ludwig Willdenow (1765–1812), to document and interpret the geographic distribution of plants. Humboldt’s work explored the spatial relationships of plants to one another and to geographically variable physical and climatic parameters such as altitude, humidity, and temperature. He contrasted his undertaking with traditional botanical research, which primarily focused on classifying plants based on their structural attributes and which he considered a critical first step in interpreting patterns of plant distribution. Humboldt’s studies on the inter- actions of plants with one another and their relationships with their physical environment also established him as a pioneer in ecology,23 although his contributions to this biological discipline (which was not formally designated until 1866) are often not fully recognized.

Together with Carl Ritter (1779–1859), Humboldt is regarded as the founder of modern geography.24 Humboldt reflected his mentor’s comprehensive, pan-humanitarian naturalistic interests in a grand consideration of conditions relevant to human geography as well as economic and political systems. Through this research, his innovative representations of geography as “the study of the distribution of the Andrea volcano Chimborazo showing geog eezing zon tions at different altitudes,” and his exciting work as a cartographer, he contributed substantially to the development of geography as a science. Carl Ritter became interested in the relationships between humanity and nature early in his career.25 This interest deepened when he met with Humboldt in 1807. Later both scholars were active in Berlin. Ritter took a comparative approach to geography, aimed at establishing the interdependence of all phenomena in nature. He strove to demonstrate the individuality of continents, believing that their distinctive shapes and locations were based on a divine plan to facilitate the development of human civilization.26 Like Humboldt, Ritter wanted to accumulate, without preconceived notions, as many observations as possible on particular regions of the globe in order to discover laws underlying the relations between humans and the natural world. Unlike Humboldt, however, he was unashamedly Eurocentric in his views, regarding Europe as home to humanity’s greatest achievements.27 Ritter’s methodological innovations, especially social geography, influenced the historical development of this academic discipline.28 Humboldt made many empirical contributions across a wide range of sciences, including physics and geology. The extensive, well-documented collections of plants, many of them new to science, made by Bonpland and Humboldt in the temperate and tropical zones of Europe and South America laid the foundation for our understanding of neotropical plant diversity.29 Consistent with his egalitarian outlook, Humboldt tried to make his observations and thinking widely accessible.30 His public lectures in Berlin in 1827 and 1828 attracted many women, who at that time were still not admitted to universities yet constituted a major community of readers.31 In 1829 Humboldt wrote a letter to a young woman from a wide range of social backgrounds. The popular appeal of Humboldt’s presentations and the great success of his books in Europe and the United States testified to the efficacy of his communication efforts.

Humboldt and the University of Pennsylvania

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Following Humboldt’s passing on May 6, 1859, his influence in the United States rapidly waned. Critics across America still celebrated the centennial of his birth on September 14, 1869, with dedications of monuments, statues, and many speeches paying homage to his life and accomplishments. However, a major 1890 review of the beginnings of American science continued to contribute to some disciplines (e.g., botany) by gathering data in the field, but other disciplines became more focused on a technical style of writing that was aimed at fellow researchers rather than the reading public. Through his writings, however, Humboldt continued to explore the interactions in the natural world. Charles Darwin’s (1809–1882) book, *The Personal Narrative*, published in the United States during the second half of the nineteenth century, has been a major resurgence of interest in his life and accomplishments. However, a major 1890 review of the beginnings of American science continued to contribute to some disciplines (e.g., botany) by gathering data in the field, but other disciplines became more focused on a technical style of writing that was aimed at fellow researchers rather than the reading public. Through his writings, however, Humboldt continued to explore the interactions in the natural world. Charles Darwin’s (1809–1882) book, *The Personal Narrative*, published in 1839, was strongly influenced by this book and modeled his own *Journal of Researches* on it. Darwin considered Humboldt an inspiration, who “like another Sun illuminates everything I behold.”

In 1819, before his death, Darwin wrote to his friend Joseph Dalton Hooker:

> I believe that you are fully right in calling Humboldt the greatest scientific traveller who ever lived. You might truly call him the discoverer of a grand voyage of scientific travellers, who taken together have done more for science.

He had once met Humboldt in person but “remember[ed] nothing distinctly about [their] interview, except that Humboldt was very cheerful and talked much.”

In his writings, Humboldt repeatedly stressed the threat humans posed to nature. He first recognized the connection between deforestation and regional climate change and witnessed the adverse environmental impact of agricultural practices while traveling through Venezuela in 1860. Humboldt saw humans as part of nature, not outside it, and warned that they were capable of destroying it. He viewed nature as a single, unified whole, and all of life—including humans—as parts of a harmonious, interconnected, and interdependent whole. Thus, Humboldt has been considered a proto-environmentalist.

Humboldt’s holistic perspective of nature has become relevant again now that humanity faces a global environmental crisis. Most present-day environmentalists lack Humboldt’s holistic perspective of nature. Instead they tend to focus on specific ecological changes without considering the complex web of interactions between humans and the environment. Furthermore, the current environmental movement often focuses on the preservation of animals, plants, or places rather than the establishment of an integrative research program based on Humboldt’s vision. Humboldt’s thinking was also in conflict with the traditional view (informed by religious teaching) that nature had been created solely for humanity’s benefit, enjoyment, and exploitation. However, his vision found enthusiastic reception from nineteenth-century American naturalists, including George Perkins Marsh and the “father of American environmentalism,” John Muir (1838–1914). In his book *Man and Nature*, he wrote:

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5 Ibid., 5.


