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Jacob Darwin Hamblin

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Introduction by Jacob Darwin Hamblin, Oregon State University

What does it mean to describe a worldview as Humboldtian? Prussian aristocrat Alexander von Humboldt (1769-1859) traveled extensively, gathered specimens, produced drawings, formulated grand geophysical theories, and never shied from describing the earth's processes on a global scale. While his brother Wilhelm lent his name to "Humboldtian education," Alexander is associated with "Humboldtian science," expansive and ambitious. Most geographers see Humboldt as an intellectual forebear, and it is hard to find works on the rise of environmental consciousness that do not acknowledge him. His convictions that all phenomena were connected make him a sympathetic figure to modern scientists, environmentalists, and environmental historians alike.¹ Moreover, Humboldt exemplified the Romantic-era tradition that embraced the world of science and the world of letters as if they were part of the same whole. His five-volume opus, *Cosmos*, was an enormous attempt to demonstrate the unity of knowledge, written long after his traveling years were behind him.

In *The Passage to Cosmos*, literary scholar **Laura Dassow Walls** has shown us how Humboldt the explorer produced this unitary worldview. Throughout the book is a sense that the division between the humanistic and scientific traditions is itself an unfortunate historical development. Perhaps we can learn something from Humboldt. It seems appropriate that the book itself easily crosses over stiff academic boundaries, not just between science and the humanities, but also between literary criticism and history. The book already has won several awards, and the range is indicative of the book's appeal across such boundaries. The Organization of American Historians awarded it the Merle Curti Prize for intellectual history; the Modern Languages Association awarded it the James Russell Lowell Prize for literary studies; and the Society for Literature, Science, and the Arts awarded it the Michelle Kendrick Memorial Book Prize.

For this roundtable, I solicited comments from scholars of exploration, geography, and the history of science. **Felipe Fernández-Armesto** has written that history has two big stories: how human cultures diverged thousands of years ago, and how they found one another again. Since the 1970s, Fernández-Armesto has been writing about these encounters, beginning with the quintessential patrons of exploration, Ferdinand and Isabella, and later exploring the creation of colonial society in the Canaries, an area often perceived a template for later colonial expansion. Since then he has written books about Columbus, pre-Columbian exploration, the Spanish Armada, and other topics on a scale that has made him a leading scholar of world history.²

¹ A recent book that draws the connection to environmental thought explicitly is Aaron Sachs, *The Humboldt Current: Nineteenth-century Exploration and the Roots of American Environmentalism* (New York: Viking, 2006).

² Felipe Fernández-Armesto, *Ferdinand and Isabella* (New York: Taplinger, 1975); Felipe Fernández-Armesto, *The Canary Islands after the Conquest: The Making of a Colonial Society in the Early Sixteenth*

Michael F. Robinson also writes on the history of expeditions and uses it as a lens for understanding the meaning of exploration in American culture. For Robinson, the scientific content of the voyages often gave way to stories of masculinity and conquest, as ships traveled to more obscure and harsh environments in the latter half of the nineteenth century. For Robinson the stories do not stop with the voyages themselves, but rather they continue to the process of men coming home, defending claims, and trying to “cast themselves as men worthy of the nation’s full attention.”³ Robinson continues to probe these topics through his exploration history blog, “Time to Eat the Dogs.” See timetoeatthedogs.com.

Michael S. Reidy and Daniel Zizzamia have co-authored comments here that reflect Reidy’s existing expertise, while introducing us to Zizzamia’s insight as he works on his doctoral dissertation. Reidy’s past work has illuminated the rise of geophysical sciences in the nineteenth century, showing the relationship between natural philosophers and the Royal Navy that was so central to the success of voyages and expeditions. His work not only contextualizes the story of disciplinary growth, but also implicates men of science in the consolidation of empires. He has argued that natural philosophers adopted the spatial approach of Humboldt, with its influence on mapping and data collection over large areas, and in so doing complemented the expansion of British imperialism.⁴

Innes M. Keighren shares with Walls a fascination with the reception of geographic texts over time. He has written about the influence of German geography on the United States during a later era, particularly the westward movement of Friedrich Ratzel’s ideas through Ellen Churchill Semple, who studied with Ratzel in Leipzig at the close of the nineteenth century. Semple’s 1911 *Influences of Geographic Environment* is the classic of environmental determinism that shaped geographical thought in the English-speaking world (especially the United States) for a generation.⁵

Before turning to the first set of comments, I would like to pause here and thank all the roundtable participants for taking part. In addition, I would like to remind readers that as an open-access forum, *H-Environment Roundtable Reviews* is available to scholars and non-scholars alike, around the world, free of charge. Please circulate.

Century (New York: Oxford, 1982); Felipe Fernández-Armesto, *Before Columbus: Exploration and Colonization from the Mediterranean to the Atlantic, 1229-1492* (Philadelphia: University of Pennsylvania Press, 1987); Felipe Fernández-Armesto, *The Spanish Armada: The Experience of War in 1588* (New York: Oxford, 1988); Felipe Fernández-Armesto, *Columbus* (New York: Oxford, 1991); Felipe Fernández-Armesto, *Pathfinders: A Global History of Exploration* (New York: Norton, 2006).

³ Michael F. Robinson: *The Coldest Crucible: Arctic Exploration and American Culture* (Chicago: University of Chicago Press, 2006). Quote on p. 2.

⁴ Michael S. Reidy, *Tides of History: Ocean Science and Her Majesty’s Navy* (Chicago: University of Chicago Press, 2008).

⁵ Innes M. Keighren, *Bringing Geography to Book: Ellen Semple and the Reception of Geographical Knowledge* (London: I. B. Tauris, 2010).

Comments by Felipe Fernández-Armesto, University of Notre Dame

According to Laura Dassow Walls's surprising judgment, Humboldt has been "forgotten" in the United States (ix). The attention, adulation and influence he once attracted, inspired, and radiated are certainly remarkable by comparison with his current reputation and, it seems to me, his attainments. His life was a failure. His ambitions were frustrated. His magnum opus remained unfinished at his death. He was a compiler and synthesizer, rather than an innovator, in science. He made the "great career move" that elevates so much posthumous renown rather too late to garner most of the usual benefits: on the contrary his very longevity seems to have made him venerable. His death evoked widespread and heartfelt laments from fellow scientists and public figures all over Europe and the Americas. Emerson called him a "wonder of the world." Nevada was almost named after him. At his centenary in 1869, which Professor Walls describes in the most vivid pages of her book, rival ethnic and intellectual constituencies in the U.S. vied to celebrate him.

Now he is an object of intense scholarly interest. Aaron Sachs's *The Humboldt Current* – one of the best scholarly books of recent years – assigned him a primordial role in modern scientific tradition and in the making of U.S. identity, developing a suggestion Mary Pratt broached in 1992.⁶ Laura Walls has now added a cascade of examples that confirm and amplify Sachs's work. She shows that not just scientists, but, it seems, almost every significant nineteenth-century U.S. thinker and artist wanted to claim to be Humboldt's disciple or, in many cases, genuinely reflected his influence. The big question this scholarship begs is, "Why?"

The title of Professor Walls's book excites expectations of an investigative study of Humboldt's life in relation to *Cosmos*, the book that he hoped would crown his work and synthesize knowledge of the planet. Disappointingly, this turns out to be no part of her project, though I suspect that a study of the intellectual trajectory that led to *Cosmos* would help us understand why Humboldt's work resonated so much with the younger scientists of his day. In the 1820s, to judge from his letters, his interests gradually became re-focused. Previously he had wanted to be the world's most learned individual, but the mere expansion of the range of his knowledge no longer satisfied him. Now, when he had largely exhausted his fortune and could finance no more expeditions on his own account, he dreamed of making a virtue of the necessity of sedentarism to write comprehensive analysis of "all the matter in the universe" – what we would now call a theory of everything, unifying, ordering, and schematizing knowledge.

⁶ Aaron Sachs, *The Humboldt Current: Nineteenth-century Exploration and the Roots of American Environmentalism* (New York: Viking, 2006); Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992).

He had started his scientific career like an encyclopaedist of the Middle Ages, gathering the learning of the world. He became the last magus of the Renaissance, attempting the blasphemy of comprehending the cosmos. He ended life as the first of the great nineteenth-century synthesizers, whose ambition was not only to grasp the order of nature but also to make it clear to the world. His shift of focus was clear by 1827, when he had an opportunity to revisit one of the passions of his youth – studying the magnetism of the Earth on an expedition in Siberia; but he tackled the task in a lackluster fashion. He did establish a useful series of points for observation of magnetic variation, but his thoughts were now intent on larger ambitions. He began *Cosmos* towards the end of the 1820s. Lectures he gave in Berlin in 1828 were a sort of rough draft. Thirty years later, at the age of eighty-nine, he was still at work on his deathbed. In the age of Dr Lydgate and Mr Casaubon, the model of comprehensive scientific ambition was inspiring to the would-be synthesizers who followed him. Without appreciating the fact that Humboldt anticipated a major preoccupation of mid-nineteenth century science and scholarship, I am not sure that it is possible to understand his influence.

Cosmos, however, seems strangely marginal to Professor Walls's main interest, despite the title she gives her book. A poorly integrated chapter does discuss *Cosmos*. Professor Walls says it was "an important cultural work for America," but her account seems to suggest the reverse (215). Americans – deeply impressed with Humboldt's work on their own hemisphere – took a long time to start to appreciate *Cosmos*. Unspecified "high authority," says Professor Walls, appealing to the evidence of Felix Lieber, "invited later generations to assume that his turn to *Cosmos* [sic] was a retreat from the torturous and repressive politics he found himself helpless to influence" (215). Her reading of the text ascribes to it extraordinary originality and prescience. "Humboldt," she writes, "wanted science to open both eyes, to see itself seeing" (241). For her, this supposed insight is the key both to Humboldt's marginalization by the scientific establishment of the late nineteenth and early twentieth centuries, and to his popularity today, because he had "foregrounded the voice and subjectivity of the scientist" (315). I am not convinced that the text bears out this bold and interesting reading. As far as I can see, Humboldt's views on the relationship between perception and reality were standard Enlightenment stuff, anticipated by Hume and unthreatening to scientism.

In other chapters, Professor Walls makes a useful and impressive contribution to the record of Humboldt's influence in the U.S., and to the enumeration of what she calls "Humboldtian texts," including "*Pym, Moby-Dick, Walden, Leaves of Grass*," (169) and countless other American classics, whose authors collectively "transformed" Humboldt's language "into an American idiom of moral responsibility" (285) for the environment. The implied emphasis on Humboldt's place among pioneers of ecology is appropriate, I think. Along the way Professor Walls makes audacious judgments about her protagonist's scientific views. That he "took evolution for granted" (236) is surely simply wrong, unless it is to be understood as a mere truism: Humboldt shared the common early nineteenth-century narrative of how life-forms change over time, but had no over-arching explanation to offer and did not anticipate

Darwin's theory. Walls seems to me to romanticize Humboldt's ethnography, claiming that "framing irony" (62) dispels the plain and obvious meaning of texts in which Native barbarity and degeneracy are described in terms reminiscent of Darwin's reflections on the Fuegians. I see no more evidence of irony in Humboldt than of wishful thinking in Walls. In general, her dictum that Humboldt engaged in a "Counter-Enlightenment project" (170) seems overstated. Like most writers schooled in the Enlightenment but maturing in an era of romanticism, Humboldt is best understood as a transitional figure, for whom the politics and science of the Enlightenment provided unalterable principles. Nor can I see any grounds for attributing "magic realism" (71) to Humboldt.

Professor Walls devotes over sixty continuous pages to a digest of Humboldt's published *Narrative* of his journeys in Spanish America and resumes the narration at length, in patches, thereafter. This seems disproportionate, but perhaps justified on the grounds that it was probably his most widely read text in its day. Humboldt came to the task as a result of inheriting a fortune in 1797. He renounced his prodigious career in the Prussian government and decided to dedicate himself to scientific exploration. It was the fulfillment of a dream of his unhappy childhood, a vision from the pages of heroic travel literature, which he read as a boy in order to escape into solitude. I think of Amerigo Vespucci, inspired in boyhood by Dante's version of Ulysses, or of Walter Henley, whose readings of Humboldt, in his turn, thrilled him with thoughts of Chimborazo and Cotopaxi. Walls dismisses the suspicion, which many readers of Humboldt have shared, that part of his need of escape arose from his unresolved sexuality; she may be right to do so, but she seems to me in general to ignore the role of Humboldt's psychology in moulding his work.

In any event, wars closed Asia and Africa to the would-be explorer. The Spanish monarchy, however, welcomed him to the New World. His explorations revealed nothing previously unknown (though his ascent of Chimborazo took him to literally unscaled heights), but he saw, experienced, collected, and wrote so much that he ensured the world knew more than ever about its western moiety. Without his efforts, the botanical studies of José Celestino Mutis and the monumental scientific investigations directed by Alessandro Malaspina would have been largely unknown. Humboldt published so much that no one could read it all. But his study of Mexican politics established him as a respected voice of liberalism. The engravings that illustrated his *Vues des cordillères*, as Walls reminds us, informed romantic imaginations. But his *Narrative*, above all, fascinated an entire generation of young scientists. Darwin said it was the work that most influenced him. It made Louis Agassiz impose himself on the author. Humboldt's willingness to accept mentorship points towards another reason for the breadth of the circles of admiration that surrounded him. When not exploring, he was a selfless patron of young scholars, and self-sacrificially tireless as a correspondent.

Why did the adulation he drew in his lifetime and in the generation after his death not endure? The simplest explanations lie in the limitations of his work, the failure of his great project, and the passage of time, which affects all reputations. Walls,

however, argues that scientific positivism and anti-German sentiment combined to eclipse his work, until Franz Boas “brought Humboldt’s ideas back to the United States” (211). There are obvious problems with this thesis. The chronology seems imperfect, as Boas’s work preceded the main phases of anti-German feeling, and the dip in Humboldt’s renown occurred in Europe as well as in the United States.

Still, Professor Walls’s argument is suggestive and worthy of further contemplation and investigation. She is a painstaking scholar, who makes few errors of fact (though her understanding of Spanish seems imperfect; she misconstrues completely the meaning of the term “creole” in the usage of historians of Latin America (65); and the United States was not “the world’s lone functioning republic” (99) in the spring of 1804). Her readings of texts, though sometimes questionable, are always sensitive and stimulating. The fact that I disagree with many of her judgments does not make me impervious to the merits of the book as a work of scholarship, or to its usefulness, which I am sure will endure, as a quarry of Humboldtian influences and references in U.S. literature and art.

Comments by Michael F. Robinson, University of Hartford

Alexander von Humboldt had the air of the mystic about him. He was a man who wandered mountains, gathered disciples, and looked for hidden meanings. In the age of specialization, he still thought it reasonable to write a book about The Universe. Yet as mystics go, Humboldt was a strange one. His visions did not appear to him in moments of solitude, while sitting in a temple or perched on a mountaintop. Rather, they came to him in the midst of the typhoon, trying to apprehend the deluge of phenomena that swirled about him. While Siddhartha and St Thomas abandoned their possessions, Humboldt hoarded his. Barometers, dip compasses, pressed flowers, dead birds: they fill the Baron's world. These objects pack the corners of almost every portrait ever made of him (replaced in later years by shelves overflowing with books). If Humboldt was a mystic, he was one who suffered from obsessive-compulsive disorder.

Yet it wasn't that Humboldt couldn't let go. It was that little things mattered. In ephemeral objects and bits of data, he saw hidden patterns of the world, the connective tissue of the universe. These deeper motives were often invisible to his readers, especially for the first decades of the nineteenth century. In the early years, North Americans and Europeans tended to look upon Humboldt, fondly, as both expert and walking cabinet-of-curiosities. Only in the late 1840s, with the publication of the magisterial *Cosmos*, did they gain full measure of Humboldt's interest in the big picture. Even then, however, Humboldt struggled to explain himself, to tell the story of big ideas through the scrupulous account of small phenomena, a project that required greater literary skills than he possessed.

For this reason, Humboldt would have thrilled to read *Passage to Cosmos*, not because Laura Walls had written about *him*, but because she had done what he had always hoped to do: bring a fine-grain reading of the subject elegantly to bear on questions of greater scale. Like her subject, Walls fully commands the details of her story. *Passage* offers a close reading of Humboldt's early life, his expedition to South America, his return to Europe, and his efforts to articulate a vision of Cosmos. Yet *Passage* roosts in the trees of Humboldt's life only so long before soaring off for different views of the woods: Humboldt's roots in German philosophy, his experiences in the Post-Enlightenment cultures of France and the United States, and his attempts to walk the ridgeline between the emerging "two cultures" of science and literature. Humboldt's flights from the particular to the general sometimes give the reader vertigo. This is not true of *Passage*. Walls shows exceptional skill in bringing us from microcosm to macrocosm and back again, never losing sight of the narrative arc of her story.

There is, of course, no perfect view of the woods, the Universe, or Prussian explorers. As Humboldt understood, the human subject was not, and nor could be, mere witness to Nature. It was its co-creator, the imaginative agent that put disparate phenomena together into a whole. This is true of biographies too. *Passage*

reflects Walls' deep understanding of American literary and scientific circles in the 19th century, the educated "Culture of Truth" that embraced Humboldt's work and adapted its ideas for use in natural history, philosophy, and literature.

Yet there were other channels of the Humboldt Current that remain uncharted in *Passage*. While Walls gives an incisive account of Humboldt's impact upon Transcendentalists and natural philosophers, she is silent on his earliest adopters: educators and textbook writers who understood Humboldt's holistic visions long before he had become the hero of *Cosmos*. When Humboldt's primitive maps bearing "isothermal lines" (the ancestor of modern weather maps) first appeared, they were scarcely noticed in scholarly circles. Before they percolated up to the salon and the café, they would become well known in the classroom to thousands of American pupils who worked through the geography primers of William Woodbridge and Emma Willard in the 1820s. Woodbridge, Willard, and the textbook writers who copied them, were quick to see the genius in Humboldt's holistic displays of information, extending, coloring, and annotating his isothermal maps. By the 1830s, geography primers had abandoned rote lists of names and places to emphasize "the relations among things" including climatic and ecological zones, economic production, and maps displaying the world's population by their "degree of civilization." Here is the irony that *Passage* misses: while elites continued to see Humboldt as a living encyclopedia well into the 1830s, the "rougher classes" had already come to understand his work in more modern, post-*Cosmos*, ways.

If *Passage* doesn't chart *all* the ways Humboldt shaped America, it remains a work of broad scope and great beauty. Walls navigates adeptly through the many perils that confront the Humboldtian biographer. She finds drama in the corners of Humboldt's life that others have missed. She succeeds in being comprehensive without being exhaustive. She has managed, in the words Humboldt's brother Wilhelm, to "clothe the skeleton with flesh." The result is a biography that soars. Of the many excellent works on Humboldt that have emerged in the last decade, this one is the best.

Comments by Michael S. Reidy and Daniel Zizzamia, Montana State University

Alexander von Humboldt is a deeply paradoxical figure. Broadly trained in natural philosophy, he made his name by traveling throughout South America, documenting its mineral wealth and mapping its contours. He then published thirty volumes in as many years for eager European elites who were salivating over the continent's untapped wealth. Yet, he was also a staunch defender of social justice, influenced by the republican values of the French Revolution. To his dying day, he scorned those who participated in the imperial project. Out of his extraordinary life, a paradox surfaces: Humboldt was an outspoken anti-imperialist who traveled through imperial networks and helped usher in America's "manifest destiny," galvanizing an entire generation of traveling naturalists who viewed the world through imperial eyes.

Humboldt was also an enlightened man of letters, a broad thinker who combined an overwhelming empiricism with a sentimental appreciation of the aesthetic beauty of nature. Careful quantitative measurements were useful only as a foundation for an emotional appreciation of the natural world. He was, above all, a devout secular humanist who argued adamantly against the specialization of disciplines. Yet, those whom historians have labeled "Humboldtians" ushered in the age of specialization and championed a reductionist worldview. Another paradox arises: Humboldt was a Romantic generalist whose expansive influence helped bring about the split between science and the humanities.

Laura Dassow Walls's text is an attempt to make sense of these paradoxes and reveal the historical impact and contemporary relevance of Humboldt's multi-faceted life and work. It is a welcome addition to the growing literature regarding Humboldt's significance and legacy. Walls's scholarship is grounded in both primary and secondary material, relying on a close reading of Humboldt's own writings and the best of previous scholarship, including Rupke's *Alexander von Humboldt: A Metabiography* and Sach's more recent *The Humboldt Current*. The text is also representative of the canon of environmental justice literature, which includes scholars such as David Harvey, Robert Gottlieb, and Beverly Wright.

Building on this previous work, Walls's aim is not only to "reclaim Humboldt" (xi), but also to explain why reclamation is both necessary and timely. She approaches this topic through today's two-culture divide. Humboldt, Walls argues, defied these divisions, and she uses the "Introduction," the "Interchapter," and the "Conclusion" to bring the reader back to both the importance of Humboldt's syncretic vision and to our own need to reorient our outmoded and divisive approach to knowledge creation. While Walls contends that Humboldt's writings were a call to intellectual arms, so too is *The Passage to Cosmos*. Her text is above all a cultural critique, in line with Humboldt's own "humanistic worldview" (235). As Walls makes clear, we need

to return to that worldview; we need to reinvent the “age of Humboldt” and see the universe as a *Cosmos*.

While the overarching thesis of the text concerns the two-culture divide, the thematic chapters contribute significantly to previous scholarship on Humboldt. First, Walls reminds us of the powerful influence he had in advancing science. His unceasing attempts to uncover the interconnectedness of the forces of nature led to the founding of modern physical geography, systematic meteorology, and the field of biogeography. He popularized the graphical method of data analysis and helped incorporate South America into European geography. For Walls, however, much more important than his specific findings or the introduction of new fields was the manner in which he attempted to study those fields. The significance of Humboldt is not in the objects he studied but rather in the syncretic methodology he employed to study them; he outlined not only what to see in nature but also how to see and feel its permeations.

While Humboldt’s impact was far-reaching, Walls sometimes overstates Humboldt’s significance. Her stance, for example, that he “virtually invented modern international science” (8) is misleading. The year of Humboldt’s birth, 1769, was also the year when more than 150 astronomers were dispersed to seventy-seven different locations throughout the globe to observe the Transit of Venus. Linnaeus’s “apostles” were likewise scattered across the continents, and the international quest to determine longitude at sea was at its apex. In this respect, international science could be said to have invented Humboldt. In Walls’s analysis, moreover, Humboldt skillfully synthesized the intellectual work of others such as Goethe, Herder, Willdenow, and Kant to create his own brand of science. Those who in turn attempted to synthesize Humboldt’s approach, however, were either obedient followers enriching modern society or recalcitrant apprentices involved in “obscene perversion” (145).

Second, Walls highlights Humboldt’s influence in establishing our modern “ecological” vision. As Walls puts it, Humboldt invented the discourse, “a way of speaking, about nature that we now call ‘environmental’: namely, a planetary interactive causal network operating across multiple scale levels, temporal and spatial, individual to social to natural, scientific to aesthetic to spiritual” (11). Though the phrases “ecological” and “environmental” are anachronistic, Humboldt wrote about the devastation wrought by humans in surprisingly modern terms. His passages concerning the felling of trees and manipulation of water through irrigation placed humans at the center of the relationship between the physical and biological realms. Indeed, the main difference between Humboldt’s ecological vision and our own is that Humboldt had fully integrated humans into the confluence of forces at work. This confluence, moreover, was for Humboldt a question of social justice, a link we are just beginning to reinvent in the fields of environmental justice and environmental history.

Humboldt's "way of speaking" was indeed an environmental discourse ahead of its time. Historians of science often place the founding of the science of ecology on Darwin's discussion of the "entangled bank" in the closing paragraph of the *Origin*. Darwin, however, had learned much of his approach to studying nature, the process involved in viewing the entangled bank, from Humboldt and others more than fifty years earlier. Yet, Darwin excised Humboldt's focus on the human dimension. There are no humans on Darwin's entangled bank; there are no humans anywhere in the *Origin*. We are just now in the process of resurrecting this dimension in our modern approach to ecology. Walls reminds us that it had been there all along in the prescient writings of Humboldt.

Third, Walls outlines the legacy of Humboldt in shaping the thoughts and actions of America's foundational intellectual figures. The fact that many modern Americans have forgotten Humboldt's pervasive influence, even though his name and ideas mark America's physical and intellectual landscape, is for Walls "exactly equivalent to analyzing Romanticism without Goethe, naturalism without Darwin, modernism in ignorance of Einstein, or postmodernism without Heisenberg" (x). Much of the earlier scholarship on Humboldt, from Cannon's seminal work on "Humboldtian Science," to Malcolm Nicholson's work on Humboldt's plant geography, to Reidy's work on the rise of geophysics has focused on Humboldt's influence in Europe, particularly Britain. Along with the work of Goetzmann, Walls's text is important for bringing Humboldt across the Atlantic and reintroducing him to scholars of U.S. history.

Historians of science will find some of the earlier chapters more summative than innovative, though previous scholarship is always placed in a fresh context. The material, for instance, concerning Humboldt's intellectual influences, including the Forsters, Herder, Willdenow, and particularly Kant, underscores the larger cultural forces at work sustaining Humboldt's approach to nature. With innovative insight, Walls also includes Jefferson as one of Humboldt's influences, and gives a tantalizing reference to "Creole scientist from South America and Mexico" (126). Likewise, Walls elaborates on the relationship between Humboldt and Kant. Humboldt's *Cosmos*, she explains, was part of a larger program of placing Kant's concept of "physical geography" on a firm empirical foundation with the goal of making it a science.

The "Interchapter," aptly entitled "Finally Shall Come the Poet," accomplishes two tasks. First, it sets up the transition to Humboldt's influence on the literary culture in America. Second, it reorients the reader to Walls's major theme: the unfortunate division between the sciences and humanities arising from the perversion of Humboldt's work. The subsequent chapters include material that may be new to historians of science, as the link to the literary is often missing from past scholarship on Humboldt in our field. It serves as a call to arms for literary historians as well. As Walls states, "Literary historians who work in the vacuum created by the divorce of the two cultures have yet to read American literature thought he distinctive kinds of

activist knowledge that shaped their author's natural, political and intellectual worlds" (171).

In highly engaging chapters, Walls links these two goals in the second half of her text, emphasizing that Humboldt's influence in America should be synonymous with his role as a champion of social justice. As Humboldt's influence grew in North America, however, he "proved too big to swallow whole" (22) and his holistic approach was "co-opted" (7). A perversion of Humboldt ensued, setting the stage for the modern split between the humanities and sciences. This is the main thesis of the text: As his successors spliced and categorized his vision, Humboldt's holism was lost. The subsequent methods of acquiring knowledge "militarized science into an arm of the state, and the flood of knowledge generated forced science to reorganize into a highly specialized and disciplined profession. Literary artists were left to carry on the work of social critique" (171). This distinction, according to Walls, was "crisp and well-marked" (166) by the time of Humboldt's death.

There is much to be gained from such an analysis. By extending Humboldt's worldview – "Explore, Collect, Measure, Connect" – beyond the sciences to the poets and early environmentalists, dusty and worn figures acquire new and fresh readings. The poets Emerson, Poe, and Thoreau turn out to be prone to scientific thinking; all at one point in their lives "trembled on the verge of science." Likewise, the environmentalists Cooper, Muir, and Marsh appear more holistic than previous scholarship suggests. Humboldt's *Cosmos* also acquires a new flavor. Humboldt's aim in writing his final text was to demonstrate how science and humanism could be profitably combined. In this reading, Humboldt offered both his followers and modern-day researchers guidelines toward a more unified, harmonious worldview.

The text is chock-full of this type of close analysis of texts, new readings of old figures, and engaging and surprising links weaving Humboldt through the American intellectual and cultural landscape. To spark discussion, however, we will move beyond the text's strengths and focus on what we perceive to be two weaknesses. In order to substantiate her claim of the "crisp and well-marked" split between the two cultures, Walls relies heavily on two related and problematic narratives: the first is the professionalization of the sciences, the second is Humboldt as an anti-imperial crusader.

In her previous article-length publications, Walls situated Humboldt at the crossroads of the historical division between the subjective and objective in an emerging "modern" science.⁷ She extends this theme in *The Passage to Cosmos*. In

⁷ Laura Dassow Walls, "The Birth of the Two Cultures," in *Alexander von Humboldt: From the Americas to the Cosmos*, ed. Raymond Erickson et al. New York: Bildner Center, City University of New York online publication. <http://web.gc.cuny.edu/bildnercenter/publications/humboldt.pdf>. p. 251, accessed June 2011.; Laura Dassow Walls, "Textbooks and Texts from the Brooks: Inventing Scientific Authority in America," *American Quarterly*, Vol. 49, No. 1 (Mar., 1997), pp. 1-25.; Laura Dassow Walls, "Textbooks and Texts from the Brooks: Inventing Scientific Authority in America," *American Quarterly*, Vol. 49, No. 1 (Mar., 1997), p. 21.

Humboldt's day, she contends, science "was not yet a big enclosed tent gathering insiders together, but more like a series of stalls in the great open-air agora of ideas, and that 'Literature' then included writing of all sorts, science no less than poetry and fiction" (viii). Walls wishes to make clear that the postmodern condition that seeks to deconstruct disciplinary boundaries between science and the humanities is not without historical precedent. Consequently, what resonates from the pages of *The Passage to Cosmos* is a clarion call to acknowledge that the "division that built the modern world no longer makes any sense." (316) Central to the construction of "the modern world" was the specialization and militarization of science as it became more tightly linked to the state. Walls consistently uses the rubric of "professionalization" (127-129) to express the rift that removed subjectivity and the humanities from science and created its bellicose bonds.

Walls's construction of subjectivity vs. objectivity that is intrinsic to the two-culture split rests on her insistence that Humboldt was a non-imperial agent, and a resulting thin analysis of the economics of science. Literature and the humanities were not the only elements of subjectivity and interestedness present in the development of science during the mid-to-late-nineteenth century. The effects of pecuniary interests were an important element of the discussions of "professionalizing" science. Without this lens added to Walls's analysis, she places the "professionalization" of science too early in the nineteenth century.

There is no doubt that something was happening that warrants explanation as the term "scientist" began to replace "natural philosopher" in mid to late-nineteenth century America. Yet, recent scholarship situates the rise of the "professional" scientist much later. Paul Lucier, for instance, has recently proposed that professional scientists did not exist in nineteenth-century America at all. Rather, a "professional scientist" would have been a contradiction in terms since "professionals" and "scientists" were entirely different and opposed categories. "Professionals" were "men of science who were engaged in or supportive of commercial relations with private interests," and "scientists" were "self-consciously disengaged from such commercial or money-making enterprises."⁸ Moreover, even if scientists bedded with industry or the government, that by no means makes the two-culture shift axiomatic. Perhaps "specialization," a term that Walls occasionally uses to represent this shift, is a more fruitful category of analysis that better represents the special subdivided categories formed out of the two-culture shift (8). And perhaps including Humboldt into the wider militarized economic structure of empire would add flesh to the lineage joining science to the state, and extend the many currents that fed the two-culture split.

⁸ Paul Lucier, "The Professional and the Scientist in Nineteenth-Century America," *Isis*, Vol. 100 (2009), p. 705.; See also Paul Lucier, *Scientists & Swindlers: Consulting on Coal and Oil in America* (Baltimore, MD: The Johns Hopkins University Press, 2008). For a similar stance on professionalization in Britain, see Jim Endersby, *Imperial Nature: Joseph Hooker and the Practices of Victorian Science* (Chicago: University of Chicago Press, 2008).

This then brings us back to the paradox of Humboldt caught between enlightened crusader for social justice and the epitome of the imperial traveler. Since the work of Mary Louise Pratt, most of us view Humboldt as the latter, and one of the aims of Walls's text is to return balance to Humboldt scholarship.⁹ In the process, she canonizes and memorializes Humboldt, ridding him of culpability. Humboldt, however, had received practical training as a mining inspector and accepted a position in the Prussian Department of Mines. His talents endeared him to Charles IV of Spain, who then offered Humboldt open run in Spain's American colonies along with guaranteed assistance from Spanish and Creole officials. Whether directly financed by the Crown or not, Humboldt was directly linked to European expansionism and colonization. Spain had long tried to assert control over its far-flung colonies, and Humboldt's acts of exploring, collecting, measuring, and connecting were powerful parts of that process. He reported on everything he saw, particularly the extractable natural resources, and offered his maps freely to influential statesmen. Our understanding of this process – of the political underpinnings of exploration and the power of maps and mapping – is far too advanced to accept Walls's rewriting of Humboldt. Pratt was correct.

Walls reinforces Humboldt's complexity by reminding us that we can still view Humboldt as having a vision untainted by the imperial lens. The problem with her use of both "professionalization" and her insistence on Humboldt's non-culpability is how she uses those arguments to support her overarching thesis. She uses professionalization to help explain science's militaristic turn, and Humboldt's focus on social justice to heighten the position of the poet. It is fitting that Walls ends her text with the concept of "consilience." She notes that William Whewell's version in the mid-nineteenth century was essentially Humboldtian, while E. O. Wilson's version in the late-twentieth century was overtly reductionist. Whereas Whewell, living prior to the specialization of the sciences, sought to combine all knowledge, Wilson, living in a fractured, specialized world, insisted on the heightened value of science and the specialized knowledge of the scientist. His book enraged most humanists who read it.¹⁰ Our fear is that Walls's text will likewise anger most scientists, leading to a further "gulf of mutual incomprehensibility" between the two cultures.

In narrating the beginnings of the two-culture divide, Walls makes an ontological claim that places blame on the scientist. The narrative is infused with a moral, with stark distinctions between good Humboldtians (humanists) and bad Humboldtians (scientists). As science became increasingly linked to the state and withdrew from poetry, a "positivist ideology of scientific objectivity" resulted. The only worthy scholarship that remained was sung by the poets. In the end, Walls has forsaken science, relegating it to a malformed child of an enlightened humanistic tradition.

⁹ Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992).

¹⁰ Edward O. Wilson, *Consilience: The Unity of Knowledge* (New York: Knopf, 1998).

Perhaps this is exactly what Walls wishes us to take from her text. Again, one of its strengths is the manner in which Walls practices what she preaches. It is an intellectual call to arms, a novel defense of humanism in an age that sorely needs it, and a practical guide for further scholarship. Every one of us should place issues of social justice central to our scholarship. Walls reminds us that Humboldt certainly did. *Passage to Cosmos* is important because it furthers our understanding of Humboldt, how he focused on issues of social justice, and how we can use his example as our guide. Despite his paradoxical nature, we will get closer to understanding him once we are able to use his approach to better the human condition. This is our charge. As Walls aptly concludes, the end of the story is ours to write.

Comments by Innes M. Keighren, University of London

To scholars in certain disciplines (not least geography)—operating in certain regional contexts (not least European)—the claim that Alexander von Humboldt has been forgotten seems peculiar, even improbable. Yet, as Walls demonstrates in her vibrant and insightful examination of Humboldt’s life, work, and intellectual contribution, this hard-to-imagine fact holds true in the contemporary United States. In that country, Humboldt has—among both popular and professional audiences—largely faded from view. That Humboldt has been forgotten (a result, as Walls notes, of political realignments in the post-Civil-War period and the fact that Humboldt had, in an institutional sense, no pupils to perpetuate his influence) in a country where his work met with sustained enthusiasm in the first half of the nineteenth century is remarkable, and tells us a great deal about the processes by which knowledge and ideas circulate and about how intellectual influence is both gained and lost. Part of the purpose of *The Passage to Cosmos* is thus to bring Humboldt to the attention of the community in whose memory he has faded, and to do so by showing quite how central his ideas were to the intellectual making of the United States in the nineteenth century.

The Passage to Cosmos is a brilliant book; its prose sparkles and its detailed synthesis illuminates. Its project is, in some respects, one of asking “What would the history of the Americas look like—in terms of race, politics, and literature—if we were to start with Humboldt?”. This ambition is much more, however, than simply an iteration of that trend within popular history writing which favours books whose titles derived from a familiar formula: *How* [insert proper noun] *Made the Modern World*. Humboldt’s intellectual legacy—in the United States, as elsewhere—was, as Walls shows, both messy and varied. Accepted by some, he was repudiated by others. His work was read not in isolation, but in contrast and comparison; his ideas influenced, but they did not determine; he was one source of intellectual inspiration among very many others. That said, Walls’s book amply demonstrates that the lineaments of American intellectual, literary, political, environmental, scientific, and aesthetic life in the nineteenth century cannot sensibly be set apart from Humboldt’s influence; Ralph Waldo Emerson, Edgar Allan Poe, and Henry David Thoreau—among many others—were “Humboldt’s American children” (267). To properly understand nineteenth-century America means understanding its relationship with Humboldt.

The tragic loss of much of Humboldt’s correspondence and papers—through fire, looting, and at Humboldt’s own hands—necessarily means that Walls’s book is largely a synthesis of secondary texts: the output of the “thriving industry” that is Humboldtian scholarship (her bibliography cites more than 160 works directly on or by Humboldt) counterpointed by her own detailed reading of Humboldt’s published work (ix). The scholarly value of Walls’s book lies, then, in its careful sifting and sorting of this material and the connections and elucidations that emerge

only through such detailed and rigorous synthesis. In that respect, particularly, *The Passage to Cosmos* is an important book and is valuable as much to those who know (or think they know) about Humboldt as it will surely be for the audience whom Walls wishes to reach and to persuade.

There are certain choices which Walls has made in the writing of her book—both thematic and organizational—which invite attention and encourage reflection. The first is the choice (or tendency) to perpetuate the idea of what we might call Humboldtian Exceptionalism—the view the Humboldt, in thought and practice, was sufficiently distinctive from his contemporaries that he stands apart as unique. Whilst it is not my claim that Humboldt was unexceptional (by any standards, and in the view of his contemporaries, clearly he was exceptional), but rather to suggest that to position Humboldt unproblematically in such a way risks obscuring the contribution that certain others made to his thought and science and to elide the role of luck and chance in shaping Humboldt's career. This first problem is most evident in the way in which Humboldt's relationship with his travelling companion, Aimé Bonpland, is dealt with. Walls tends to reinforce an understanding of Bonpland which positions him as peripheral to Humboldt's work at best, and "dithering" at worst (p. 108). As Stephen Bell has recently demonstrated in his book *A Life in Shadow: Aimé Bonpland in Southern South America, 1817–1858*, the relationship between Humboldt and Bonpland was both deep and complicated—not one simply of preceptor and pupil, but rather of lively exchange and debate.¹¹ In much the same way that Humboldt is figured by Walls to be indispensable in any critical understanding of the history of the Americas in the nineteenth century, surely Humboldt cannot properly be understood in isolation from Bonpland and others. Whilst Walls outlines in considerable detail the intellectual traditions and authorities from which Humboldt drew—Immanuel Kant, among others—more attention could perhaps have been paid to the intellectual influence of Humboldt's contemporaries and those with whom he worked most closely. Exceptionalism is, of course, a problem which is not specific to Walls's book, nor even to Humboldt—it is a necessary risk whenever we take up our pens to say "This person is interesting and important; let me tell you why."

The organizational trajectory of Walls's book reflects another choice and raises a second problem. Humboldt's activities—both practical and intellectual—are necessarily read by Walls as they relate to what they are assumed ultimately to have given rise: Humboldt's five-volume *Kosmos* (1845–1862). Given that Humboldt himself saw this multi-volume work as the culmination of a lifetime's intellectual experience, effort, and reflection, Walls's decision to look back at Humboldt's life through a lens shaped by his *Kosmos* is entirely valid, but it is also a decision which carries with it certain associated problems. One of these problems is the almost-inescapable tendency only to reflect upon Humboldt's life experiences as far as they relate to, or foreshadow, his final intellectual product—to see each and every event

¹¹ Stephen Bell, *A Life in Shadow: Aimé Bonpland in Southern South America, 1817–1858* (Palo Alto: Stanford University Press, 2010).

as necessarily constitutive of, or contributory to, *Kosmos*. Whilst it is clearly impossible to separate out causation, I think there was opportunity missed for a greater reflection on Humboldt's false starts and wrong turns, as well as those choices and experiences which led in clearly-defined ways to his magnum opus. Perspicacious as Humboldt certainly was, his life and work was also governed by chance, luck, opportunity, and frustration in ways which show *Kosmos* to be not inevitable (and arguably the more important as a result). In the same way, of course, that it is difficult to read Charles Darwin's account of his voyage aboard the *Beagle* in isolation from the knowledge of what that experience would ultimately generate, there is perhaps an inescapable problem of reading Humboldt apart from *Kosmos*. My call is not one of counterfactualism—to ask “What if Humboldt never wrote *Kosmos*?”—but rather to ask “How might we read what Humboldt did if we see it not always as an incremental progression towards a defined end?”.

In its detailed scholarship, and through its affecting prose, *The Passage to Cosmos* makes a significant and valuable contribution to the literature on Humboldt. It is to be hoped—and I see no reason to doubt—that it will reach and influence its intended audience and show how the making of America was, among myriad other influences, inescapably and always a question of Alexander von Humboldt.

Author's Response by Laura Dassow Walls, University of Notre Dame

Nothing teaches one intellectual humility so much as writing a book in an interdisciplinary field, covering a figure whose work is not only polymathic, but published originally in languages other than one's own. I was led to Humboldt nevertheless, when I started reading the scientific writings read by such American literary figures as Emerson, Thoreau, Hawthorne, Melville, Poe, and Whitman. They were the ones who told me that Humboldt—whose name I knew only from placenames, penguins, and southerly Pacific currents—was not just important, but essential. This was alarming, if exciting, news, for it meant that I would never understand the interrelations of literature and science unless I understood something of Humboldt. And the waters of the Humboldt Current turned out to be deep indeed. After I published my first book, on Thoreau and science,¹² I discovered that arguing for Humboldt's importance to Thoreau made little sense to a wider academic world. To most people, an interest in such a minor and marginal figure as Alexander von Humboldt looked entirely eccentric. Thus *Passage to Cosmos* was born out of frustration: yes, strange as it may seem to some of my colleagues, Humboldt has—or may we hope, *had?*—been forgotten in the United States. Even bare recognition of his name, among otherwise well-informed colleagues, proved elusive. This struck me as even more remarkable when I realized that in other national traditions, Humboldt scholarship was thriving. So if my first question was, Who was Alexander von Humboldt, and why are all my American literary authors reading him?, my second became, Why is there such a steep differential, in this *particular* respect, between national traditions? Why did I find such widespread ignorance of Humboldt in the contemporary U.S., when he seemed to have survived as a living intellectual figure in so much of the rest of the world?

Humboldt came to my attention first through his two most popular works, *Cosmos* and *Views (or Aspects) of Nature*, which were published in English, in multiple translations, in a tight span of years around 1850; his *Personal Narrative* was reissued in an inexpensive popular edition in 1853, and finally his *Political Essay on the Island of Cuba* got tangled in the U.S. pro/anti/slavery politics of the 1850s, in a vexed story I tell at length in Chapter 4. As I worked, I realized the importance of Humboldt's earlier, more political books to Americans in the early republic, namely the *Political Essay on the Kingdom of New Spain* and the exquisite volume *Vues des cordillères*. Thus there were at least two Humboldts in the U.S.: one known to educated elites in the earlier part of the 19th century; and one who captured popular imagination in the 1850s, by which time print technology and other innovations had made books and magazines much more widely available. The U.S. American craze for Humboldt seemed to outlive his death in 1859, but not by long—that fact set the parameters of my study.

¹² Laura Dassow Walls, *Seeing New Worlds: Henry David Thoreau and Nineteenth-Century Natural Science* (Madison: University of Wisconsin Press, 1995).

Passage to Cosmos thus threads the needle among Humboldt's own travels to the American continents, concluding with his visit to Jefferson and Company in 1804; the first wave of Humboldt books, on New Spain, South America, and Cuba; and, after a pause, a second wave of more explicitly scientific books—all of them entering intellectual and public discourse at different speeds, and responding to a rapidly changing social, scientific, economic, and political landscape. To unify this large story, I leaned hard on Humboldt's term "Cosmos," both as his summative book (as it was taken to be in the United States, at least) and as a normative concept that can be traced to his earliest writings and that pervades his work throughout. Professor Keighren protests that *Passage* is too *Cosmos*-centric, while Professor Fernández-Armesto protests that it loses sight of *Cosmos*: I think both responses are due to "Cosmos" being both a particular work of Humboldt's (of which I actually say rather little), and a unifying concept, often metaphorical, which, indeed, dominates my interpretation. That I have succeeded to any degree in threading the needle among so many multiple volumes and fields is a great relief; that I did not succeed in rendering equal justice to all avenues of Humboldt worthy of study only affirms my leading point, that there is an immense field here, rich with potential for new questions and insights, and far larger than any single person can command.

I greet, then, with particular pleasure the kind of corrective offered by Professor Robinson, who points to Humboldt's "earliest adopters: educators and textbook writers" who took up his physical geography long before the publication of *Cosmos*. I gave some hint of this with the glancing reference to Sidney Morse (119), and recently I learned that Humboldt was used to teach geography in the more innovative schools of the 1830s, but I'm delighted to hear there is so much more of this story to be told. Similarly, as Professors Reidy and Zizzamia protest, there are tricky issues at stake in the contentious question of the "professionalization" of science. My interpretation is inflected by the appointment of Louis Agassiz to Harvard's Lawrence Scientific School in 1846, which made him, for some time, America's leading science professor; this, together with the founding of the AAAS shortly afterward, indicated an elevating and intensifying of science as a field of study, even a profession, in a way quite different than one sees in, say, Ralph Waldo Emerson's ruminations on science in the 1830s. Resolving the larger question of when and how science was "professionalized" entails settling a number of controversies which are still actively being debated, and I happily and gratefully must leave this to specialists in the history of science, although I watch with great interest their handling of such border cases as Emerson, Poe, and Thoreau, as well as the pre-professional field of "natural history." Similarly, taken out of context, my phrase from the Preface asserting that Humboldt "virtually invented modern international science" (intended to intrigue skeptical readers) does indeed seem unbalanced; I hope the more nuanced treatment that follows suggests to what extent this might be correct, particularly given my emphasis (and here, my specialty as a literary scholar does show) on "modern science" as marked by the regular convening of scientific societies and the dense and ramifying networks of texts this entails, from letters, papers, and articles, to monographs, reports, and books, all of which generate a certain consensual, if contentious, collective that crosses national

and continental boundaries, and is unified, more or less, under that rich word “science.” In this movement Humboldt, who was, as Professor Fernández-Armesto says, so largely “a compiler and synthesizer,” seems to be ubiquitous as a catalyst. The thought that it was not Humboldt who invented modern science but rather that, as Professors Reidy and Zizzamia suggest, “international science could be said to have invented Humboldt,” delights me.

That this scientific network was so extensive as to take on a life—many lives!—of its own quite independent of Humboldt is, again, part of my point; so, for instance, when Professor Keighren raises the role of Bonpland, I can only agree: that he, as well as a flotilla of coordinate figures, is overlooked in *Passage* still troubles me, as it accedes to Humboldt’s own reticence in calling attention to his travelling companions, even as he weighs down his narratives with endless allusions and footnotes acknowledging various persons for some small but essential piece of information. My excuse is the demands of the form I adopted, which forced me to abandon so many of his collaborators to the mercy of the footnote or, worse, altogether to the cutting room floor. This became a problem of scale and focus, and although I hope my inclusion of so many additional figures diffuses the impression of “Humboldtian exceptionalism” that worries Professor Keighren, I do recognize the danger, and agree that a book centering on Humboldt decenters too many others.

Another aspect of this problem is raised by the hard question asked by Reidy and Zizzamia, namely, To what extent is Humboldt culpable for acts committed in his name, or with his science, if not by himself? Readers of *Passage* will find that this question haunts me throughout, but my judgment is recorded early on: “to deny [Humboldt] the agency to recognize, protest, and on occasion even subvert” the networks of colonial power in which he moved “is to deny the moral reach of his arguments—worse, of anyone’s arguments. . . . unlike Pratt, I do wish to grant active moral agency to Humboldt, and by extension to anyone who, like him, becomes aware they are struggling within, and penetrated by, structures of power” (20). The fact is that Humboldt did not, as Bonpland seems to have done, remove himself from those structures, which limited, compromised, and also enabled him, and to that extent he is culpable; but I hold that he did protest when he could, and furthermore, if we blame him for his silences—while priding ourselves on our hindsight—I then worry about how future generations will judge our own complicity with today’s versions of those same structures of power.

I want to close by contesting the claim that troubles me most greatly, in this set of responses which do me such honor in taking up my book with probing seriousness and insightful critiques. I have made myself tiresome in so many places and contexts by defending science that I’m deeply sorry to hear that any of my readers believe I have, as Reidy and Zizzamia have written, “forsaken science, relegating it to a malformed child of an enlightened humanistic tradition.” I took up the relationship between literature and science not to forsake science but to show, to my scientist friends, how richly poetic their enterprise is (although as it turns out, the scientists,

at least the many I know, knew this all along); and to show to my literary friends (some of whom still find this difficult to credit) that science is as truly part of the humanistic tradition as poetry. I believe that not to read science and literature *together*, tracing the myriad ways they dance, separate, and return to challenge and celebrate each other, is, quite simply, tragic. To my colleagues in U.S. American literature I wrote that losing sight of Humboldt cost us a deeper understanding of our own history, scientific, literary, artistic, economic, political, and cultural. And worse, as I ventured to say more speculatively to all my readers, losing sight of *science*—rigorous, empirical, international, modern science, particularly the earth system science that is directly descended from Humboldt—is now costing us the Cosmos itself. Science in all its forms, from the Higgs boson to the human genome to the causes of melting polar icecaps, is the sole means we in 21st century globalism have of creating a deep conversation with the natural, nonhuman world. If we remain deaf to that conversation, we lose the planet and with it, every human future we can possibly imagine. My work succeeds only to the extent to which my readers understand that the stakes are exactly that high.

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