

# MORE THAN HUMAN RIGHTS

An Ecology of Law, Thought and  
Narrative for Earthly Flourishing

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# **“This great chain of causes and effects”—Alexander von Humboldt’s View of Nature**

Andrea Wulf

I’m not a lawyer, activist, or a scientist. I can’t answer questions about legal approaches to the rights of nature and I don’t know much about the moral or ethical implications that come with the rights of animals, plants, rivers, or other nonhuman entities. I’m not a biologist who can reveal discoveries that blur the boundaries between humans and nonhumans, nor do I know enough about the subject matter of nonhuman rights to point out its limitations. I’m a historian and what I can contribute to this debate is a window into the past. I write history books to try to understand why we are who we are. I look at the past to make sense of the present. Often the past can elucidate current issues or at least give us a different perspective.

I'm interested in the history of the relationship between human-kind and nature in order to understand why we've destroyed so much of our magnificent blue planet. This led me to write *The Invention of Nature: Alexander von Humboldt's New World*, a book about Alexander von Humboldt, a visionary scientist and explorer who shaped our concept of nature today.<sup>1</sup> Humboldt saw connections everywhere. Nothing, not even the tiniest organism, was looked at on its own. "In this great chain of causes and effects," Humboldt said, "no single fact can be considered in isolation."<sup>3</sup> He explained that the natural world was a living organism where everything was interconnected, from the smallest insect to the largest trees—an argument that is at the nexus of the discussion of the rights of nature.

Humboldt's revolutionary insights, I believe, can provide some of the philosophical and scientific underpinning to the discussions of this conference. In this essay, I want introduce Humboldt and his ideas to our debate. He might have not talked about any legal implications, nor was he an activist, but he popularized the concept of the web of life when he described nature as "a wonderful web of organic life."<sup>4</sup>

So, who was this man? Born into a wealthy aristocratic Prussian family in Berlin in 1769, Humboldt discarded a life of privilege and spent his substantial inheritance on a daring five-year exploration of Latin America in 1799–1804. This expedition took him from the tropical rainforest at the Orinoco to the icy peaks of the Andes, from the magnificent Inca ruins in Peru into the deepest shafts in Mexico's silver mines. He met scientists, plantation

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1 Andrea Wulf, *The Invention of Nature: Alexander von Humboldt's New World* (New York: Knopf, 2015).

3 Alexander von Humboldt, *Essay on Plant Geography*, ed. Stephen T. Jackson (Chicago: Chicago University Press, 2009), 79.

4 Alexander von Humboldt, *Kosmos. Entwurf einer physischen Weltbeschreibung* (Stuttgart: J. G. Cotta'schen Buchhandlungen, 1845), vol. 1, 21.

owners, and many Indigenous peoples across the South American continent. It was a voyage that shaped his life and his thinking, and made him legendary across the world. Ralph Waldo Emerson declared the “Age of Humboldt”<sup>5</sup> and thought the Prussian scientist to be “one of those wonders of the world.”<sup>6</sup> Thomas Jefferson called him “one of the greatest ornaments of the age”<sup>7</sup> and Henry David Thoreau filled his journal with remarks such as “Humboldt says” or “Humboldt has written.”<sup>8</sup> Humboldt was instrumental for John Muir’s ecological thinking and ideas of forest preservation and Charles Darwin said that the explorer was the reason why he boarded the *Beagle*.<sup>9</sup>

Humboldt is the forgotten father of environmentalism because he warned of the destruction caused by monoculture, deforestation, and irrigation. He was the first to define global climate and vegetation zones at a time when other scientists focused on classification. He understood the idea of a keystone species two hundred years before the concept was named and, more than a century before scientists began to discuss shifting tectonic plates, Humboldt talked about an ancient connection between Africa and South America.<sup>10</sup>

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5 *Boston Daily Advertiser*, May 19, 1859.

6 Ralph Waldo Emerson (1869) quoted in *The Journals and Miscellaneous Notebooks of Ralph Waldo Emerson*, ed. William H. Gilman et al. (Cambridge: Harvard University Press, 1960–92), 16:160.

7 Thomas Jefferson to Carlo de Vidua, August 6, 1825, in Ingo Schwarz, ed., *Alexander von Humboldt und die Vereinigten Staaten von Amerika. Briefwechsel* (Berlin: Akademie Verlag, 2004), 171.

8 Henry David Thoreau, April 1, 1850, May 12, 1850, October 27, 1853, in *The Writings of Henry D. Thoreau: Journal*, ed. Robert Sattelmeyer et al. (Princeton, NJ: Princeton University Press, 1981–2002), 3:52, 3:67–68, 7:119.

9 Charles Darwin to D.T. Gardner, August 1874, published in *New York Times*, September 15, 1874; Darwin’s annotated Humboldt books are held today at Cambridge University Library.

10 Humboldt, *Essay on Plant Geography*, 67.

But, most importantly, Humboldt returned from his expedition with a new concept of nature that still colors our ideas today. Nature was interconnected and alive, Humboldt explained, “animated by one breath—from pole to pole, one life is poured on rocks, plants, animals, and even into the swelling breast of man.”<sup>11</sup> The emphasis here is on “one life.” This was not a divinely ordained universe with humans as the masters of nature. Humboldt turned away from the human-centered perspective that had ruled humankind’s approach to nature for millennia: from Aristotle, who had written that “nature has made all things specifically for the sake of man”<sup>12</sup> to botanist Carl Linnaeus who had still echoed the same sentiment more than two thousand years later, in 1749, when he insisted that “all things are made for the sake of man.”<sup>13</sup>

One of the most important moments in the shaping of this new concept of nature was Humboldt’s ascent of Chimborazo, a volcano some one hundred miles south of Quito, in 1802.<sup>14</sup> At almost twenty-one thousand feet, Chimborazo was then believed to be the highest mountain in the world; it was a difficult climb. Dizzy, half-frozen and struggling to breathe in the thin air, Humboldt and his small team had to crawl on their hands and knees along steep ridges and razor-sharp rocks. A huge crevasse stopped them at 19,413 feet, just one thousand feet below the peak.<sup>15</sup> And, though

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11 Alexander von Humboldt to Caroline von Wolzogen, May 14, 1806, in *Goethe’s Briefwechsel mit den Gebrüdern von Humboldt*, ed. F. Th. Bra-tranek (Leipzig: Brockhaus, 1876), 407.

12 Aristotle, *Politics*, 1.8.

13 Carl Linnaeus quoted in Donald Worster, *Nature’s Economy: The Roots of Ecology* (San Francisco: Sierra Club Books, 1977), 37.

14 Wulf, *The Invention of Nature*, 85–88; Alexander von Humboldt, diary, June 23, 1802, in Alexander von Humboldt, *Reise auf dem Río Magdalena, durch die Anden und Mexico*, ed. Margot Faak (Berlin: Akademie Verlag, 2003), 2:100–109.

15 Alexander von Humboldt, diary, June 23, 1802, in Humboldt, *Reise auf*

they couldn't make it to the summit, it still felt like being on top of the world. No one had ever come this high—not even the early balloonists in Europe.

As Humboldt looked down upon the mountain ranges beneath him, he began to see the world differently. Everything that he had seen in the previous years came together. His brother Wilhelm had long believed that Alexander's mind was made "to connect ideas, to detect chains of things."<sup>16</sup> For Humboldt, the days they had spent traveling from Quito and then climbing up Chimborazo had been like a botanical journey from the equator toward the poles—with the whole plant world seemingly stacked on top of each other as the vegetation zones ascended the mountain—from tropical species in the valleys to the last bit of lichens just below the snow line. He also realized that many of the plants were similar to those he had seen elsewhere—in the Alps, the Pyrenees, and on the mountain slopes in Tenerife. He was struck, he said, by this "resemblance which we trace in climates most distant from each other."<sup>16</sup> No one had looked at plants like this before. Where other scientists saw categories of classification, Humboldt viewed nature as a global force with corresponding climate and vegetation zones across continents. He was, a colleague later said, the first to understand that everything was interwoven as with "a thousand threads."<sup>17</sup>

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*dem Río Magdalena*, 2:106.

- 16 Wilhelm von Humboldt to Karl Gustav von Brinkmann, March 18, 1793, quoted in Ulrich von Heinz, "Die Brüder Wilhelm und Alexander von Humboldt," in *Alexander von Humboldt in Berlin. Sein Einfluß auf die Entwicklung der Wissenschaften*, ed. Jürgen Hamel, Eberhard Knobloch, and Herbert Pieper (Augsburg: Erwin Rauner Verlag, 2003), 19.
- 16 Alexander von Humboldt, *Personal Narrative of Travels to the Equinoctial Regions of the New Continent during the Years 1799–1804*, trans. Helen Maria Williams (London: Longman, Hurst, Rees, Orme, Brown and John Murray, 1814–29), 3:160.
- 17 Georg Gerland, 1869, quoted in Ilse Jahn, "Vater einer großen

As he traveled through Latin America, Humboldt's ideas of nature clarified. At Lake Valencia in today's Venezuela in 1800, for example, he saw the devastating environmental effects of colonial plantations.<sup>18</sup> As the plantation owners had wrested fields from the wilderness, they had destroyed large swathes of ancient forests. The land had become barren, the water levels of the lakes were falling, and, with the disappearance of brushwood, torrential rains had washed away the soils on the surrounding mountain slopes. Seeing this destruction, Humboldt was the first to explain the fundamental function of the forest for the ecosystem. He wrote about the forest's ability to enrich the atmosphere with moisture and its cooling effect, as well as its importance for water retention and protection against soil erosion. It's worth quoting him at length:

When forests are destroyed, as they are everywhere in America by the European planters with an imprudent precipitation, the springs are entirely dried up, or become less abundant. The beds of the rivers, remaining dry during a part of the year, are converted into torrents, whenever great rains fall on the heights. The sward and moss disappearing with the brush-wood from the sides of the mountains, the waters falling in rain are no longer impeded in their course: and instead of slowly augmenting the level of the rivers by progressive filtrations, they furrow during heavy showers the sides of the hills, bear down the loosened soil, and form those sudden inundations, that devastate the country.<sup>19</sup>

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Nachkommenschaft von Forschungsreisenden . . . : Ehrungen Alexander von Humboldts im Jahre 1869," *HiN* 8 (2004): 19.

18 Humboldt, *Personal Narrative of Travels*, 4:140–49.

19 Humboldt, *Personal Narrative of Travels*, 4:143–44.



It was here, at Lake Valencia, that Humboldt developed his idea of human-induced climate change. The action of humankind across the globe, he warned, could affect “future generations.”<sup>20</sup> Humboldt would see again and again how humankind unsettled the balance of nature. When nature is perceived as a web, its vulnerability also becomes obvious. Everything hangs together. If one thread is pulled, the whole tapestry may unravel. “Everything is interaction and reciprocal,”<sup>21</sup> Humboldt noted in his diary in 1803. He later warned that “the restless activity of large communities of men gradually despoil the face of the earth.”<sup>22</sup>

Wherever he went, Humboldt remarked on this destruction. At the Venezuelan coast he noted how unchecked pearl fishing had completely depleted the oyster stocks; in the forests of Loja in today’s Ecuador he saw how the Spanish had destroyed huge areas of cinchona forest by stripping the trees’ bark for quinine (which was used to treat malaria).<sup>23</sup> In Mexico he said that humankind was “raping nature”<sup>24</sup> and later in his life he prophetically warned about deleterious gas emissions at industrial centers.<sup>25</sup>

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20 Humboldt, *Personal Narrative of Travels*, 4:143.

21 Alexander von Humboldt, diary, August 2–5, 1803, in Humboldt, *Reise auf dem Río Magdalena*, 2:258.

22 Alexander von Humboldt, *Aspects of Nature, in Different Lands and Different Climates, with Scientific Elucidations*, trans. Elizabeth J. L. Sabine (London: Longman, Brown, Green and John Murray, 1849), 2:11.

23 Humboldt, *Personal Narrative of Travels*, 2:147; Humboldt, *Aspects of Nature*, 2:268; Alexander von Humboldt, diary, July 23–28, 1802, in Humboldt, *Reise auf dem Río Magdalena*, 2:126–30.

24 Alexander von Humboldt, diary, April 12, 1803–January 20, 1804, in Humboldt, *Reise auf dem Río Magdalena*, 2:219.

25 Alexander von Humboldt, *Untersuchungen über die Gebirgsketten und die vergleichende Klimatologie* (Berlin: Carl J. Klemann, 1844), 2:214.

He and his traveling companion, French botanist Aimé Bonpland, also traveled along Orinoco and its surrounding river network. For seventy-five grueling days and almost 1,500 miles, Humboldt and Bonpland paddled along the rivers. As they ventured deep into the rainforest, a new world unfolded. Humboldt was captivated by the jungle. The forest teemed with life. There are “many voices proclaiming to us that all nature breathes,”<sup>26</sup> Humboldt wrote. This was the most magnificent web of life on earth, a world of “organic activity and life,”<sup>27</sup> as he later described it. Enthralled, he pursued every thread. One night, when he was yet again woken by a piercing orchestra of animal screams, he unpeeled the chain of reaction. Jaguars were hunting in the night, chasing tapirs who escaped noisily through the dense undergrowth, which in turn scared the monkeys sleeping in the treetops above. As the monkeys then began to cry out, their clamor woke the birds and thus the whole animal world. Life stirred in every bush, in the cracked bark of trees and in the soil. The whole commotion, Humboldt said, was the result of “a long-extended and ever-amplifying battle of the animals.”<sup>28</sup> This was a web of life in a relentless and bloody battle—a description that Darwin would later underline in his copies of Humboldt’s books and that would become an elemental part of his concept of natural selection. “What hourly carnage in the magnificent calm picture of Tropical forests,” Darwin scribbled in the margins of Humboldt’s book *Personal Narrative*, and “to show how animals prey on each other—what a ‘positive’ check.”<sup>29</sup>

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26 Humboldt, *Personal Narrative of Travels*, 4:505.

27 Humboldt, *Aspects of Nature*, 1:272.

28 Humboldt, *Aspects of Nature*, 1:270. I used the translation in Alexander von Humboldt, *Views of Nature*, ed. Stephen T. Jackson and Laura Dassow Walls, trans. Mark W. Person (Chicago: Chicago University Press, 2014), 146. See also Humboldt, *Personal Narrative of Travels*, 2:15 and 4:437.

29 Darwin’s copy of Humboldt’s *Personal Narrative of Travels*, 5:590; see also

Humboldt's concept of nature as a living organism was radically different from what scientists had believed until then. For centuries the Western world had been dominated by the idea that nature functioned like a complex apparatus—a “great and complicated Machine of the Universe,”<sup>30</sup> as one scientist had said. If humans could make intricate clocks and automata, then what great things could God create? According to seventeenth-century French philosopher René Descartes and his followers, God had given this mechanical world its initial push, while Isaac Newton regarded the universe more like a divine clockwork, with God as the maker continuing to intervene. It was against this mechanistic model of the world that we have to understand Humboldt's revolutionary ideas.

Humboldt had developed his ideas during his five-year expedition through South America, but a philosophical explanation can also be found in Friedrich Schelling's so-called *Naturphilosophie* (philosophy of nature). Schelling was a young philosopher who began teaching in 1798 at the University of Jena, a small town in Germany some 150 miles southwest of Berlin.<sup>31</sup> At twenty-three he was the youngest professor at the university but had already written three important philosophy books, which had made him famous and secured him the position in Jena. He was a popular teacher and his students described his lectures as an almost religious experience or epiphany.<sup>32</sup> He electrified his students and contemporaries with his philosophy of unity.

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4:437, Scientific Manuscripts Collections, Department of Manuscripts & University Archives, Cambridge University Library, Cambridge.

30 George Cheyne, in Donald Worster, *Nature's Economy: The Roots of Ecology* (San Francisco: Sierra Club Books, 1977), 40.

31 Just before Schelling arrived in Jena, Humboldt had also spent several months in Jena.

32 Henrik Steffens, *Was ich erlebte: Aus der Erinnerung niedergeschrieben* (Breslau: Verlag Josef Mar & Komp., 1841), 4:76.

There is a “secret bond connecting our mind with nature,”<sup>33</sup> Schelling told his students. Instead of dividing the world into mind and matter, as philosophers had for centuries—most famously Descartes—Schelling insisted that everything was one. He believed that the self and nature were identical. The living and nonliving worlds, he said, were ruled by the same underlying principles. Everything—from lizards to trees, stones to plants, mountains to humans—he said, was “linked together, forming one universal organism.”<sup>34</sup> Like Humboldt, Schelling questioned the mechanical models of nature and, as one of the students recalled, his new world was filled with a “new, warm, glowing life.”<sup>35</sup> This was the opposite of Newton’s automata-like universe that was ruled by natural laws. “Philosophy applied to nature,”<sup>36</sup> Schelling stated, “has to raise it up out of the dead mechanistic world it appears to be caught in.” The natural world was no longer God’s well-ordered clockwork or a piece of divine artistry—it was alive.

Naturphilosophie was a philosophical system that was based on the idea of oneness, and Schelling called for “the necessity to grasp nature in her unity.”<sup>37</sup> He was mainly concerned with the unity between the internal and external worlds, between humans and nature, but he moved in a similar direction as Humboldt. Both men believed that the concept of an “organism” was the founding principle or essence of nature. Instead of regarding nature as a mechanical system, it should

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33 Friedrich W. J. Schelling, “Ideen zu einer Philosophie der Natur” (1797), in Friedrich W. J. Schelling, *Sämmtliche Werke*, ed. K. F. A. Schelling (Stuttgart: J. G. Cotta’sche Buchhandlung, 1856–61), 2:55.

34 Friedrich W. J. Schelling, “Von der Weltseele,” 1798, in Schelling, *Sämmtliche Werke*, 2:569. See also Robert J. Richards, *The Romantic Conception of Life: Science and Philosophy in the Age of Goethe* (Chicago: University of Chicago Press, 2002), 129ff.

35 Steffens, *Was ich erlebte*, 4:128.

36 Friedrich W. J. Schelling, “Erster Entwurf eines Systems der Naturphilosophie” (1799), in Schelling, *Sämmtliche Werke*, 3:13.

37 Henrik Steffens (1798), quoted in Richards, *The Romantic Conception of Life*, 151.

be seen as a living organism. The difference was like that between a clock and an animal. Whereas a clock consisted of parts that could be dismantled and then reassembled, an animal couldn't—nature was a unified whole, an organism in which the parts only worked in relation to each other. In a letter to Schelling after his return from South America, Humboldt wrote that he believed that Naturphilosophie was nothing less than a “revolution” in the sciences, a rejection of the “dry compilation of facts” and “crude empiricism.”<sup>38</sup>

For the rest of his life, Humboldt tried to synthesize where others divided. In 1845 he published the first volume of his bestselling *Cosmos*—a book that made him famous across the world. In *Cosmos* Humboldt took his readers on a journey from Earth to distant nebulae, from botany and geography to poetry and landscape painting. He discussed comets and the solar system as well as terrestrial magnetism, volcanoes and the snow line of mountains. He wrote about the migration of the human species, about the northern lights and the microscopic organisms that live in stagnant water or on the weathered surface of rocks. But *Cosmos* was more than just a collection of facts and knowledge; Humboldt was interested in connections. Take his discussion of climate, for example: other scientists focused only on meteorological data, such as temperature and weather, but Humboldt was the first to understand climate as a system of complex correlations between the atmosphere, oceans, and landmasses. In *Cosmos* he wrote of the “perpetual interrelationship”<sup>39</sup> between air, winds, ocean currents, elevation, and the density of plant cover on land.

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38 Alexander von Humboldt to Friedrich W. J. Schelling, February 1, 1805, in *Aus Schellings Leben: In Briefen*, ed. Gustav L. Plitt (Leipzig: R. Hirzel, 1869–70), 2:49; Alexander von Humboldt to C. C. J. Bunsen, March 22, 1835, in *Briefe von Alexander von Humboldt und Christian Carl Josias Bunsen*, ed. Ingo Schwarz (Berlin: Rohrwald Verlag, 2006), 29.

39 Humboldt, *Kosmos*, 1:304.

At a time when other scientists crawled into the ever-narrowing disciplines, Humboldt wrote a book that did exactly the opposite. As science moved away from nature into laboratories and universities, separating itself off into distinct disciplines, Humboldt created a work that brought together all that professional science was trying to keep apart. The most important part of *Cosmos* was the long introduction of almost one hundred pages. Here Humboldt spelled out his vision of a world that pulsed with life. Everything was part of this “never-ending activity of the animated forces,”<sup>40</sup> Humboldt wrote. Nature was a “living whole”<sup>41</sup> where organisms were bound together in a “net-like intricate fabric.”<sup>42</sup>

Humboldt’s *Cosmos* was translated in a dozen languages and shaped two generations of scientists, artists, writers, and poets in the United States. “The wonderful Humboldt,” Emerson jotted in his journal, “with his extended centre & expanded wings, marches like an army, gathering all things as he goes.”<sup>43</sup> Thoreau read Humboldt’s books and was deeply influenced by this new concept of nature as an interconnected whole. “Am I not partly leaves and vegetable mould myself?”<sup>44</sup> Thoreau asked in *Walden*.

The Earth was “living poetry,”<sup>45</sup> he wrote after reading Humboldt’s books *Cosmos* and *Aspects of Nature*, “not a fossil earth—but a living specimen.” Similarly, John Muir, the father of the

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40 Humboldt, *Kosmos*, 1:21.

41 Humboldt, *Kosmos*, 1:39.

42 Humboldt, *Kosmos*, 1:33.

43 Ralph Waldo Emerson, 1845, in *The Journals and Miscellaneous Notebooks of Ralph Waldo Emerson*, ed. William H. Gilman et al. (Cambridge: Harvard University Press, 1960–92), 9:270.

44 Henry David Thoreau, *Walden* (New York: Thomas Y. Crowell & Co., 1910), 182.

45 Henry David Thoreau, February 5, 1854, in *The Writings of Henry D. Thoreau*, 7:268; and Thoreau, *Walden*, 408.

National Parks in the US, studied Humboldt's books intensely—with pen in hand, underlining and scribbling into the margins as he went along. He highlighted most of the sections where Humboldt mentioned deforestation and the destructive force of agriculture. He also marked lines such as the “unity of all the vital forces of nature” and Humboldt's remark that “nature is indeed a reflex of the whole.”<sup>46</sup>

Muir saw nature with Humboldt's eyes. Muir's famous sentence—“When we try to pick out anything by itself, we find it hitched to everything else in the universe”<sup>47</sup>—owes a great deal to Humboldt. Muir often returned to this idea. As he wrote of “a thousand invisible cords” and “innumerable unbreakable cords,” he mulled over a concept of nature where everything was connected.<sup>48</sup> Every tree, flower, insect, bird, stream, or lake seemed to invite him “to learn something of its history and relationship.”<sup>49</sup> His greatest achievements of his first summer in Yosemite, Muir said, were “lessons of unity and inter-relation.”<sup>50</sup> Like Humboldt, Muir began to see nature as a web of life. “The cosmos,” Muir said, using Humboldt's term, would be incomplete without humans but equally without “the smallest transmicroscopic creature.”<sup>51</sup>

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46 Muir's copy of Humboldt's *Views of Nature* (1896), xi, 346, and Humboldt's *Cosmos* (1878), 2:438, Holt-Atherton Special Collections, University of the Pacific Library, Stockton, California.

47 John Muir, *My First Summer in the Sierra* (Boston: Houghton Mifflin Company, 1911), 211.

48 John Muir, Journal “Sierra,” summer 1869 (1887), Holt-Atherton Special Collections, University of the Pacific Library, Stockton, California.

49 Muir, *My First Summer in the Sierra*, 322.

50 Muir, *My First Summer in the Sierra*, 321.

51 John Muir, *A Thousand-Mile Walk to the Gulf*, ed. William Frederic Badé (Boston: Houghton Mifflin Company, 1916), 139.

More than a century after Muir arrived in the Yosemite in the late 1860s, ecologists, environmentalists, and nature writers continued to rely on Humboldt's vision, although most did so unknowingly. Rachel Carson's *Silent Spring* (1962) is based on Humboldt's concept of interconnectedness, and scientist James Lovelock's visionary Gaia theory of the earth as a living organism bears remarkable similarities. When Humboldt described the Earth as "a natural whole animated and moved by inward forces,"<sup>52</sup> he predated Lovelock's ideas by more than 150 years. Amazingly, Humboldt had initially considered the title "Gää" for his book *Cosmos*.<sup>53</sup>

Humboldt was undoubtedly one of the most important thinkers in the Western world and his ideas shaped our thinking about nature. I hope that this glimpse back into the past illustrates how long thinkers, writers, and scientists have believed in nature as an interconnected living organism rather than a binary construct with humans on one side and the rest of nature on the other side. Humboldt, and those who followed him, made it very clear that we're part of nature and that nature is alive. This was not a hierarchical model with the human species wearing a crown but an entangled web of life. Nature had not been "created" by God for the enjoyment and profit of humankind. We're not the "lords and possessors of nature,"<sup>54</sup> as Descartes had written in the seventeenth century; we're just one part of the natural world.

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52 Alexander von Humboldt, *Cosmos: Sketch of a Physical Description of the Universe*, trans. Elizabeth J. L. Sabine (London: Longman, Brown, Green and Longmans, and John Murray, 1845), 1:45.

53 Alexander von Humboldt to K. A. Varnhagen, October 24, 1834, in *Letters of Alexander von Humboldt to Varnhagen von Ense*, ed. Ludmilla Assing (London: Trübner & Co., 1860), 18.

54 René Descartes quoted in Keith Thomas, *Man and the Natural World: Changing Attitudes in England 1500–1800* (London: Penguin Books, 1984), 33.