





The resemblance between Adams's eccentric graph predicting "the absorption of nature's resources"<sup>2</sup> and end of civilization and Gore's atmospheric projections is striking—the hockey stick pattern, the vertical flights to infinity; the points of no return in sine waves riding Gore's x axis and Adams's northerly swerve at the eighteenth century; the logarithmic thrust driving the lines skyward; the certainty of doom coldly implied in the underlying calculations. Both Gore's and Adams's charts focus not only on the direction of changes in atmosphere or history, but the *rate of change*; its sudden acceleration, its speed and momentum, the feedback loop pushing the lines upward with no hope of reversal or rescision. The concept of historical momentum fascinated Adams. "As a Conservative Christian Anarchist," he wrote to Charles Milnes Gaskell in 1902, "I am deeply interested in the furious rapidity of change I find here. Another fifty years, at this rate, will fetch us to the end."<sup>3</sup>

<sup>1</sup>Davis Guggenheim, *An Inconvenient Truth* (United States: Paramount Vantage, 2006), 00:20:21.

<sup>2</sup>Henry Adams, "The Rule of Phase Applied to History," in *The Degradation of the Democratic Dogma*, comp. Brooks Adams (1919; repr. New York: Macmillan, 1920), 304.

<sup>3</sup>*Letters of Henry Adams: 1892–1918*, ed. Worthington Chauncey Ford (Boston: Houghton Mifflin Company, 1938), 369.

In the hindsight of decades of apathy and outright antagonism since NASA climatologist Dr. James Hansen testified before a 1988 Senate committee about the threat of greenhouse gases, we may also recognize darkly ironic but similar patterns in graphs whose lines power upward in the boundless optimism of infinite smart phone sales, GDP growth, or an S&P 500 sailing heavenward which imply—in another ironic inversion (or reversion)—the ways humanity has signed on to the global suicide pact now unfolding and which Adams's and Gore's charts project. Yet as dire as they are, such images seem almost whimsical, finally measuring data beyond measurement, for who will be there to record it? Both require an imaginative leap—in fact, depend upon the imagination of readers and viewers—in their respective ascents into the infinitude of doom. In the “Rule of Phase” Adams speculates that “[t]he ignorant student can merely guess what the skilled experimenter would do; he can only imagine an ideal case.”<sup>4</sup> To his brother Brooks, he wrote in 1902,

I apprehend for the next hundred years an ultimate, colossal, cosmic collapse; but not on any of our old lines. My belief is that science is to wreck us, and that we are like monkeys monkeying with a loaded shell; we don't in the least know or care where our practically infinite energies come from or will bring us to. . . . It is mathematically certain to me that another thirty years of energy-development at the rate of the last century, must reach an *impasse*.<sup>5</sup>

Both Adams and Gore are nonscientists who plunged deeply into science for nonscience reasons: Gore an altruist whose understanding—and fear—of the consequences of unchecked carbon emissions led him on a decades-long quest “to alert people to the dangers of global warming and help figure out how to stop it,”<sup>6</sup> while Adams absorbed science and the object of its study, nature, into the larger scope of an aesthetic

<sup>4</sup>H. Adams, “The Rule of Phase Applied to History,” 304.

<sup>5</sup>*The Letters of Henry Adams: 1899–1905*, ed. J.C. Levenson, et al., 6 vols. (Cambridge, MA: Harvard University Press, 1982–1989), 5:400. Italics are Adams's.

<sup>6</sup>Al Gore, *An Inconvenient Truth: The Crisis of Global Warming* (New York: Viking, 2007), 10.

paradigm that for him intuitively—and throughout his career—ranged well beyond the boundaries of traditional “literary” production in novels, poetry, and essays.<sup>7</sup>

The tropics of language and imagery in *An Inconvenient Truth*, as well as Gore’s many public statements, interviews, and writings, at times romantic, even religious, rely on emotional rhetoric and evocative imagery woven into a fabric of hard data, authoritative sourcing, and the occasional gimmick, as when he ascends on an elevated platform alongside his hockey-stick graph to dramatize the volume of greenhouse gases humanity is pouring into Earth’s fragile atmosphere. The opening scenes in both book and film are pastoral, portraying his personal connection to the *locus amoenus* of his family farm on the Caney River in Tennessee. His language is jargon-free. He is a politician who presciently recognized that the politics of the global climate crisis would matter as much as the science. His effort is both educational and promotional. He proselytizes not only for the survival of the human species but for planetary health—for the integrity and preservation of nature for its own sake, not just in service of human needs. At the core of his work is a fervent idealism based on the simple understanding that “our relationship to nature is not a relationship of ‘us’ and ‘it,’” but rather that “we are all part of the same ecosystem, that we are all in it together.”<sup>8</sup> A familiar concept for his willing listeners and readers—and hardly original—but a wisp of fairy dust before the roaring figurative (and literal) trains of agrarian and industrial economics and human ingenuity, consumption, and waste. As a seasoned and much-scarred politician, Gore is also a realist who understands what he is up against and self-aware enough to recognize his limitations and resources. In 2007, he won a Nobel Peace Prize and an Academy Award even as the juggernaut of civilization bulldozed through the critical waypoint of 350 parts-per-million of atmospheric carbon to

<sup>7</sup>On the theme of how environmental writing has enlarged the scope of traditional literature, see Lawrence Buell, *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture* (Cambridge, MA: Harvard UP, 1995), 85–91.

<sup>8</sup>Gore, *An Inconvenient Truth*, 11.

beyond 400 ppm. As of this writing in 2020, the temperature in Antarctica recently hit 70° Fahrenheit on the back end of the warmest decade for planet Earth in recorded history while another in the near daily parade of end-times climate reports reveals that glaciers in Greenland and Antarctica are receding six times faster than they were twenty years ago.<sup>9</sup>

Where Gore exposed “an inconvenient truth,” Adams declared, “convenience was truth.”<sup>10</sup> Gore took no pleasure in the fact that too few listened to his science-based plea for climate action, if anything the opposite, while Adams’s posture of failure in both public and private writings was flavored with self-satisfaction. “I never yet heard of ten men who had ever read my history and never one who had read Hay’s *Lincoln*,” he opined to Brooks of his nine-volume *History of the United States during the Administrations of Jefferson and Madison* (1889–91).<sup>11</sup> Privately, he delighted in the ruse of failure while the essays and books of his later years often portray, and often with more than a hint of *schadenfreude*, his despair at the course of history, politics, the American experiment, and “society,” an amorphous usage that Adams applied generally to civilization at large, albeit western European, and not infrequently laced with aristocratic undertones, and overtones.<sup>12</sup> “The world,” he wrote to Elizabeth Cameron in 1905, “cares

<sup>9</sup>Damian Carrington, “Polar ice caps melting six times faster than in 1990s,” *The Guardian*, March 11, 2020, [https://www.theguardian.com/environment/2020/mar/11/polar-ice-caps-melting-six-times-faster-than-in-1990s?CMP=Share\\_iOSApp\\_Other](https://www.theguardian.com/environment/2020/mar/11/polar-ice-caps-melting-six-times-faster-than-in-1990s?CMP=Share_iOSApp_Other) (accessed March 11, 2020).

<sup>10</sup>*The Education of Henry Adams*, ed. Ernest Samuels (Boston: Houghton Mifflin, 1973), 457.

<sup>11</sup>Levenson et al., eds., *Letters: 1899–1905*, 5:668.

<sup>12</sup>Adams’s private writings, as well as overt statements in several published works—notably the *Education* and *Mont Saint Michel and Chartres*—also reveal an ugly strain of anti-Semitism that simmered in later life, especially during the 1890s. The broadest overview of Adams’s anti-Semitism is by J.C. Levenson, who unflinchingly traces its arc through his later years: “The Etiology of Israel Adams: The Onset, Waning, and Relevance of Henry Adams’s Anti-Semitism,” *New Literary History* 25 (1994): 569–600. See also Levenson, *The Mind and Art of Henry Adams* (Stanford, CA: Stanford University Press, 1957), 224–26; Ernest Samuels, *Henry Adams: The Major Phase* (Cambridge, MA: Belknap, 1964), 167–170, 182–184, 243, 266, 356–59; David S. Brown, *The Last American Aristocrat: The Brilliant Life and Improbable Education of Henry Adams* (New York: Scribner, 2020): 6, 119, 260, 291–92, 301, 315–23.

not one straw whether we exist or not.”<sup>13</sup> Whether “the world” refers to “society” or readers who did not read his *History* or the universe at large is conjectural, but he makes clear in the *Education* that “No one is likely to suggest a theory that man’s convenience has been consulted by Nature at any time.”<sup>14</sup>

A year after Henry Adams’s death in 1918, his brother Brooks gathered Henry’s unpublished speculative writings, “The Tendency of History” (1895), “The Rule of Phase Applied to History” (1909), and “A Letter to American Teachers of History” (1910), into the volume entitled *The Degradation of the Democratic Dogma* (1919, with a second printing in 1920). Along with the later chapters of *The Education of Henry Adams* (1907), these writings develop what Henry describes in the *Education* as a “dynamic theory of history,” which “takes for granted that the forces of nature capture man.”<sup>15</sup> The fearful optimism of late nineteenth-century Euro-American science and its prospects for mastering nature through technology and industrialization was strained by a growing sense that humanity’s place in the hierarchy of nature had been diminished by the discoveries of science. Yet history and historiography remained insistently anthropocentric; the study of humankind’s doings—its politics, economics, wars, advancements (if that is what they were)—was a thing apart from nature, except as nature supplied resources for those activities. Adams’s speculative writings, based on wide reading in science and scientific philosophy, reject this myopic view of history and its implied theme of human progress. History, he found, was so threaded within nature that it created its own feedback loop, affecting itself and the world it inhabited. History and nature, in other words, were woven into the same fabric of historical motion. By the 1890s the study and methods of “scientific history,” which now seemed as fixed as canon law, appeared to Adams both arbitrary and limited by the dimensions of human perception—and

<sup>13</sup>Levenson et al., eds., *Letters: 1899–1905*, 5:660.

<sup>14</sup>*Education*, 493.

<sup>15</sup>*Education*, 474.

therefore vulnerable to the jeopardies of faulty thinking and false optimism.

Adams's "dynamic theory of history" has been a nettled, yet compelling pathway in his intellectual evolution for readers and critics. What to make of it: flawed science? futurist history? symbol? metaphor? the product of Comtean-Darwinian scientific and social philosophy? He was as dismissive of his own theory in private correspondence as he was captivated by his wide readings in physics, mathematics, and scientific philosophy to develop it. To James Ford Rhodes, he wrote in 1908,

*My a priori* calculation as a law of history is not worth much, but as a curiosity I am amused by it, and would like to see the situation in 1930. Capitalism, Socialism, Anarchism, or restriction of birth-rate, all squint at the same end with the exhaustion of cheap steel. The world should be a curious study between 1930 and 1940—even more curious than in my own very curious time.<sup>16</sup>

With the reference to cheap steel, Adams is trolling James Ford Rhodes, who, like Adams, was an award-winning historian and served as president of the American Historical Association. Notably, as Adams knew, Rhodes was free to pursue history as an avocation after he made a fortune in his father's steel and coal company.

Adams's dynamic theory is hard to dismiss, as a century of informed criticism and commentary attests. His rule of phase chart, like Gore's hockey-stick graph, is a distillation of Adams's recognition that humanity—and therefore *history*—is subject to the workings, possibilities, and limitations of nature, and so too, the consequences of ravaging the planet in futile wars and recklessly squandering resources such as iron ("cheap steel"), coal, and lumber. With his dynamic theory Adams wanted to toss his own Molotov cocktail into traditional historiography—the *anarchist* part of declaring himself a "Conservative Christian Anarchist." But even historical anarchy—and the labored prose of the "Rule of Phase," with its sketchy chart and dubious methods—was governed by the discipline and imaginative

<sup>16</sup>Levenson, et al., eds., *Letters*, 6:126.

possibilities of an aesthetic ethos, and was itself an element of his art. Adams's book reviews in the *North American Review* in the 1870s, decades earlier, frequently reference the artistic nature of historical writing and imaginative preconditions for studying history. "The historian must be an artist," he said of William Stubbs's *Constitutional History of England*, even as he declared that "scientific training is as necessary to the historian as to the mathematician;" and of Francis Parkman's *The Old Régime in Canada*, "his work is that of an artist."<sup>17</sup> Critical to Adams's aesthetic ideal is "form," which more so than genre or discipline defined the varying shapes of his literary art. To Edith Morton Eustis, he wrote in February 1908, "Between artists, or people trying to be artists the sole interest is that of form. Whether one builds a house, or paints a picture, or tells a story, our point of vision regards only the form—not the matter. The two volumes [the *Education* and *Mont Saint Michel and Chartres*] have not been done in order to teach others, but to educate myself in the possibilities of literary form."<sup>18</sup> Adams's later speculative writings on science and history may similarly be regarded as part of the evolution of "the possibilities of literary form"—having evolved from Adams's surety about the methods of scientific history in the 1870s to his ironic, witty, and purposive dynamic theory of history at the turn of the century.

Although anachronistic, the parallel between Adams's historical projections and Al Gore's environmental calculations is more than coincidental, for Gore's measurements and charts, while scientifically sound (unlike Adams's), are ultimately historical projections (like Adams's), and suggest a unifying theme by which to consider the divergent threads of Adams's explorations in science, scholasticism, and social and political thought; that is, the ways in which history is determined by

<sup>17</sup>Henry Adams on *The Constitutional History of England in Its Origin and Development*, vol. 1, by William Stubbs, *North American Review* 119, no. 244 (July 1874): 235, [www.jstor.org/stable/25109851](http://www.jstor.org/stable/25109851) (accessed June 16, 2020). Henry Adams (unsigned) on *The Old Régime in Canada*, by Francis Parkman, *North American Review* 120, no. 246 (January 1875): 176, [www.jstor.org/stable/25109887](http://www.jstor.org/stable/25109887) (accessed September 3, 2020).

<sup>18</sup>Levenson et al., eds., *Letters*: 1906–1918, 6:122.



nature and natural forces. Adams, like his naturalist contemporaries such as John Muir, recognized the threat humanity posed to life on the planet as well as the historical momentum that would lead to crisis and colors the looming sense of catastrophe that permeates Adams's later private and public writings. His speculative writings on history address the failure of his own time to understand the ways in which it was tumbling into disaster. Embedded also within his dynamic theory of history is a critique of historical scholarship and teaching that followed either the archaic styles of eighteenth-century nationalist and romantic historical writing or succumbed to versions of "scientific history" that would necessarily lead at best to limited or at worst fatal conclusions.

Adams is the unlikelyest of environmentalists in any sense of today's usage and would seem a doubtful candidate for a critique shaded by ecocriticism. He was not engaged in promoting environmental conservation but rather in shifting the foundations of historical study to account for the ways in which science, that is, the study of nature—through Gibbs, Kelvin, Marie Curie, Haeckel, Darwin, and others—had altered fundamental assumptions about humanity's place in the universe and on the planet and, importantly, *how* to study them. One of the leading precursors to the scientist-writers of Adams's era was Alexander von Humboldt, who strongly influenced Charles Darwin and Ernst Haeckel and enjoyed international fame. The scientist-president Thomas Jefferson delayed Humboldt for a week in Washington on a tour of the US, sharing in long conversations about his holistic approach to science, which considered nature both "in the pure objectivity of external phenomena, and in their inner reflection in the mind."<sup>19</sup> Sierra Club founder John Muir (born 1838, Adams's birth year), John Burroughs (b. 1837), Haeckel (b. 1834), and others were also forging a new understanding of the interconnectedness of nature. Adams mentions Burroughs with admiration in a 1905 letter to John Hay, describing him as one of "two of our very

<sup>19</sup>Alexander von Humboldt, *Cosmos: A Sketch of a Physical Description of the Universe*, trans. E.C. Otte and B.H. Paul (New York: Harper, 1866), 4:iii.

small number of original writers.”<sup>20</sup> (Joel Chandler Harris was the other.) Francis Parkman had also portrayed the impact on Euro-American character of the wilderness and its disappearance, as had, a generation earlier, James Fenimore Cooper.<sup>21</sup>

In the *Education* Adams attributes to the German zoologist Ernst Haeckel a vital role in the intellectual and artistic development of his persona “Henry Adams,” from the seeming clarity of scientific history to his realization of “chaos and multiplicity.” Haeckel coined the word *ecology* (*oecology*) from the Greek word *oikos*, meaning house, his term for a holistic (“monistic,” he called it) discipline of science that would incorporate Humboldt’s concept of the planet’s undifferentiated organic and inorganic workings.<sup>22</sup> Adams describes Haeckel as “the easiest to approach, not only because of being the oldest and clearest and steadiest spokesman of nineteenth-century mechanical convictions but also because in 1902 he had published a vehement renewal of his faith.”<sup>23</sup> An early and persistent advocate for Darwin’s findings on evolution, Haeckel’s writings enjoyed a widespread readership similar to that of E.O. Wilson or Stephen Hawking today. An accomplished artist who grew up reading and absorbing Humboldt’s writings and artwork, Haeckel produced exquisitely detailed paintings of microscopic creatures and jellyfish based on his studies in zoology that influenced art, architecture, and science well into the twentieth century, thus fusing art and science in ways similar to Adams’s literary efforts.

Adams’s reference is to *Les Énigmes de l’Univers*, the French translation of Haeckel’s widely-read 1899 work, *Die Welträtsel: Gemeinverständliche Studien über Monistische Philosophie*, which traces the major scientific discoveries of his era and synthesizes his monistic concept in opposition to the institutional resistance of the church, as well as political and even scientific

<sup>20</sup>Levenson et al., eds., *Letters: 1899–1905*, 5:657.

<sup>21</sup>Roderick Frazier Nash, *Wilderness and the American Mind*, 5th ed. (New Haven: Yale University Press, 2014), 98–100.

<sup>22</sup>Andrea Wulf, *The Invention of Nature: Alexander von Humboldt’s New World* (New York: Knopf, 2015), 307.

<sup>23</sup>*Education*, 453.

conservatism. *Les Énigmes* is largely a rejection of the dualistic concept of a spiritual plane separate from nature and of the rigid traditions that attack or misuse science in the interest of protecting church dogma. “The hypothetical ‘spirit world,’” Haeckel writes, “is purely a product of poetic imagination.”<sup>24</sup> Yet Adams declares in the *Education*,

The volume contained only one paragraph that concerned a historian; it was that in which Haeckel sank his voice almost to a religious whisper in avowing with evident effort, that the ‘proper essence of substance appeared to him more and more marvellous [*sic*] and enigmatic as he penetrated further into the knowledge of its attributes—matter and energy—and as he learned to know their innumerable phenomena and their evolution.’<sup>25</sup>

The passage is a dramatic—even melodramatic—epiphany for “Adams,” either opening the door to a nonmaterial, first cause or faith-based interpretation of the universe or revealing at least the permission granted by one materialist scientist to consider that option. It is also a canard. Adams’s translation in the *Education* is not accurate, and in the context of the book’s argument, this brief quotation misleadingly suggests that Haeckel had now landed at the threshold of the unknowable, where he religiously whispers (“avowing with evident effort,” “sank his voice”) his confession of spiritual faith. Adams’s fluency in French would not have led him to alter Haeckel’s sentence from first-person plural to third-person singular, or more importantly the character of that passage, without purpose. Here are Haeckel’s original German and the French translation Adams read, followed by Adams’s original translation in his own handwriting from his reading notes on Haeckel:

Ja, wir müssen sogar eingestehen, daß uns dieses eigentliche Wesen der Substanz immer wunderbarer und rätselhafter wird, je tiefer wir in die Erkenntnis ihrer Attribute, der Materie und Energie,

<sup>24</sup>Ernst Haeckel, *The Riddle of the Universe at the Close of the Nineteenth Century*, trans. Joseph McCabe (New York: Harper, 1905), 90. <https://www.gutenberg.org/files/42968/42968-h/42968-h.htm> (accessed December 17, 2020).

<sup>25</sup>*Education*, 453.

eindringen, je gründlicher wir ihre unzähligen Erscheinungsformen und deren Entwicklung kennen lernen.<sup>26</sup>

Bien plus, nous devons même avouer que cette essence propre de la substance nous apparaît de plus en plus merveilleuse et énigmatique à mesure que nous pénétrons plus avant dans la connaissance de ses attributs, la matière et l'énergie, à mesure que nous apprenons à connaître ses innombrables phénomènes et leur évolution.<sup>27</sup>

Still more, we are obliged even to admit that this proper essence of substance appears to us more and more marvelous and enigmatic as we penetrate further into the knowledge of its attributes, matter and energy; and as we learn to know their innumerable phenomena and their evolution.<sup>28</sup>

The shift in person brings Haeckel's passage into line with Adams's third-person portrait of "Adams" in the *Education* and in turn aligns Haeckel's presumed religious intimations with the dramatic moment when "he found himself lying in the Gallery of Machines at the Great Exposition of 1900, his historical neck broken by the sudden irruption of forces totally new."<sup>29</sup> Yet all that Haeckel appears to allow in the conclusion of his book, from which this passage is taken, is that there is much that we do not know, and we do not know enough about it to know that we may not have the capacity to understand how even to study it, though Haeckel does maintain the conviction that when we do, his monistic theory of nature will be confirmed.

Adams's sense of nature was part of his family heritage, from his great-grandfather, the farmer and second president, John Adams, to his own childhood experiences in the fields of Quincy. For the Adamases, stewardship of the nation's

<sup>26</sup>Ernst Haeckel, *Die Welträtsel: Gemeinverständliche Studien über Monistische Philosophie* (1899; repr., Leipzig, Ger: Alfred Kröner Verlag, 1909), Section 239, <http://www.gutenberg.org/files/59547/59547-h/59547-h.htm> (accessed September 16, 2020). Dr. Karin Pagel-Meiners kindly provided an English translation of the German for comparison to the French edition used by Adams and his rendering in the *Education*.

<sup>27</sup>Ernest Haeckel, *Les Énigmes De L'univers*, Traduit De L'allemand Camille Bos (Paris: Librairie C. Reinwald, 1902), 433–34.

<sup>28</sup>Miscellaneous notes, writings, and graphic material, 1891–1909, Microfilm Edition of the Henry Adams Papers, 1843–1938 (Boston: Massachusetts Historical Society, 1984), Reel 32.

<sup>29</sup>*Education*, 382.

wilderness and public lands was integral to the democratic experiment. Henry's grandfather, the sixth president, John Quincy Adams, identified conservation with the health of the democratic republic itself and was responsible for the nation's first set-aside of public lands for forest management. None of which is to say that Henry Adams was an advocate for conservation and environmental integrity in the ways of his contemporary John Muir, or even his grandfather, John Quincy Adams.

In the *Education*, Henry Adams identifies the pastoral imagery of the family home at Quincy with his grandfather. His well-known descriptions of summertime and the outdoors are tinged with the sentimentality of distant childhood memories, yet the fact that such images were so pronounced for Adams in his late sixties, when he wrote the *Education*, suggests the immediacy of nature as a thematic foundation for his later-life explorations of science and historiography, as well as his nascent artistic instincts: "Light, line, and color as sensual pleasures, came later and were as crude as the rest"—but they would come. His impetus, whether in the crafted prose of his journalism and the *History of the United States*, the innovative forms and narrative structures of the *Chartres* and the *Education*, or the speculations of a double-helix of science and history, always gravitated toward art. The conflict between nature and human enterprise, he suggests, was already evident for him, even if by instinct and even as a boy. "Life was a double thing," Adams writes. "Winter and summer, then, were two hostile lives, and bred two separate natures. Winter was always the effort to live; summer was tropical license."<sup>30</sup>

Adams's descriptions of natural scenery elsewhere in his writings often evoke an aura of Wordsworthian sublimity that sometimes tends toward the sentimental.<sup>31</sup> In Scotland in 1862, for

<sup>30</sup>*Education*, 8, 9.

<sup>31</sup>For an overview of Adams's descriptions of natural scenery, see Florence M. Burns, "Henry Adams's Appreciation of Nature," *New England Quarterly* 26 (1953): 237–47. Adams's portrait of nature's influence on him as a child also reflects the Romantic literary convention of linking natural scenery with childhood. Marjorie Hope Nicholson, *Mountain Gloom and Mountain Glory: The Development of the Aesthetics of the Infinite* (1959; repr., Seattle: University of Washington Press, 1997), 13.

example, he could write, in a lengthy narrative letter to his brother Charles, of the “Grand mountain peaks covered with glittering snow, whose base descends towards Italian plains and is green with olive trees and vineyards; that is my ideal of the sublime and beautiful.”<sup>32</sup> From a hotel verandah in Honolulu, Adams described for Elizabeth Cameron how the

full moon rose behind us and threw a wonderful light as far as the ocean-horizon. On the terrace were twin palm trees, about fifty feet high, glistening in the moonlight, and their long leaves waving, and as Stoddard says, ‘beckoning’ and rustling in the strong gusts, with the human suggestion of distress which the palm alone among trees conveys to me.<sup>33</sup>

In passages like these, Adams adheres to Romanticist conventions of emotional identity with nature while still maintaining his distance—from the verandah, on the terrace, from hotels in Scotland or Hawai‘i, or in finding his way to Clarence King’s well-lighted cabin in the Rocky Mountains. In the *Education*, Adams describes getting lost as the sun set “on the flank of Long’s Peak” in Estes Park, Colorado after he’d set out on his own to fish: “[T]he park stretched its English beauties off to the base of its bordering mountains in natural landscape and archaic peace”—until after wandering for two hours and fearing that he might “tumble into some fifty-foot hole,” he finds his way to King and “fell into his arms.”<sup>34</sup> While Adams’s descriptive prose at times shares a sublimity also recurrent in the writings of Muir, Burroughs, and Humboldt, Adams’s sense of an idealized and romanticized nature in such passages is distinct from the ways nature informed his understanding of science and its relationship to history.

From Cairo in 1873, Adams wrote to his Harvard doctoral student, Henry Cabot Lodge, advising him “to master the scientific method.” The letter has a more professorial tone than much of Adams’s later personal correspondence, piling on

<sup>32</sup>Levenson, et al., eds., *Letters: 1858–1868*, 1:384.

<sup>33</sup>Levenson, et al., eds., *Letters: 1886–1892*, 3:270.

<sup>34</sup>*Education*, 310–11.

advice to read various German historians, *in German* “because I think the German method is so sound.” Adams’s idea of scientific history is grounded in German historical scholarship, in which he found “solid reasoning and thorough knowledge.”<sup>35</sup> His historian brother Brooks reached the same conclusion based on Henry’s advice. “I have pretty much made up my mind that you are right,” he wrote Henry in 1887, “that I must learn German, [*sic*] to do anything worth talking about.”<sup>36</sup>

The word *history* was only one of many to which the word *science* attached itself in the mid- to late-nineteenth century. As explosive developments across the sciences were subdividing into fields of specialization (much to Haeckel’s lament), the use of the word *science* began to seem almost fashionable. Lester Ward promoted himself as a *social scientist* advancing knowledge of “scientific lawmaking.” “So great was the prestige that the word ‘science’ carried in academic circles,” wrote W. Stull Holt, who even in 1940 still seemed horrified, “that such monstrosities [had been] developed as ‘library science’ and ‘domestic science.’ Even a new church based on ideas denying the validity of the fundamental principles upon which contemporary science rested took the name ‘Christian Science.’”<sup>37</sup>

When Adams began teaching history at Harvard in 1870, he assumed as part of his duties the editorship of the *North American Review* (NAR). His book reviews—“Critical Notices,” as the magazine’s book review section is headed—offer a refined view of his scholarly standards and understanding of what “scientific history” meant and what it would correct in traditional historical writing, a prime example of which was Edward A. Freeman’s nationalist and romanticist interpretation of history. To Lodge, Adams wrote, “Great as is Mr. Freeman’s parade of

<sup>35</sup>Levenson, et al., eds, *Letters: 1868–1885*, 2:154–56.

<sup>36</sup>Brooks Adams to Henry Adams, March 22, 1887, Microfilm Edition of the Henry Adams Papers, 1843–1938 (Boston: Massachusetts Historical Society, 1984), Reel 33.

<sup>37</sup>Richard Hofstadter, *Social Darwinism in American Thought*, rev. ed. (Boston: Beacon Press, 1967), 72; Holt, “The Idea of Scientific History in America,” *Journal of the History of Ideas* 1 (1940): 352, <http://www.jstor.org/stable/2707092> (accessed September 19, 2020).

knowledge, he has never written anything really solid.”<sup>38</sup> His critical notice for the *NAR* was even harsher: Freeman’s *The History of the Norman Conquest of England, Its Causes and Its Results* (1873) was tainted by the “rampant vivacity of his enthusiasm.” Further descriptors include “adulation,” “apologizer,” “eulogist,” and “curiously tortured.” Freeman was guilty of “tampering with the moral aspects of his tale.” He was, in the dagger-like understatement of Adams’s conclusion, an “advocate, and not a strong one.”<sup>39</sup> By contrast, Adams’s review of German historian Rudolf Sohm’s *La Procédure de la Lex Salica* (included on Lodge’s reading list) finds the work a model of restraint in avoiding excessive theorizing; for support he further cites the preface by Léon Charles Thévenin, who affirms the thoroughness of Sohm’s research and, notably, his efforts to establish the conditions for the progress of *all* science (“de toute science”).<sup>40</sup> Francis Parkman’s *The Old Régime in Canada* illustrates for Adams “an objective way of dealing with history” by relying on “the words of the original documents” and citing letters “in the original.”<sup>41</sup> Hermann Eduard von Holst’s history of Andrew Jackson’s administration, *Die Administration Andrew Jackson’s in ihrer Bedeutung für die Entwicklung der Demokratie in den Vereinigten Staaten von Amerika* (1874), interested Adams for the opportunity it presented to ask how well American history offered “material for scientific treatment” and whether it would stand “the test of careful scientific analysis” with “the same care and thoroughness that German scholars devote to every branch of knowledge.” The temptation to vent the intergenerational disdain of the Adamses for Jackson is acidly clear in Adams’s suggestion that Jackson would not fare

<sup>38</sup>Levenson, et al., eds., *Letters: 1868–1885*, 2:155.

<sup>39</sup>Henry Adams, “*The History of the Norman Conquest of England, Its Causes and Its Results*, by Edward A. Freeman,” *North American Review* 118, no. 242 (January 1874), 177–81, <https://www.jstor.org/stable/25109793> (accessed March 9, 2020).

<sup>40</sup>Henry Adams (unsigned), “*La Procédure de la Lex Salica*, by R. Sohm,” *North American Review* 118, no. 243 (April 1874), 416–25, <http://www.jstor.com/stable/25109822> (accessed March 9, 2020).

<sup>41</sup>Henry Adams (unsigned), “*The Old Régime in Canada*, by Francis Parkman,” *North American Review*, 120, no. 246 (January 1875), 175–77, <https://www.jstor.org/stable/25109887> (accessed March 9, 2020).



well under rigorous scrutiny, as the German-American scholar had already shown how Jackson, in Von Holst's words, "systematically undermined the public sense of law."<sup>42</sup> Adams further addressed the value of archival documents for historical scholarship in his review of George Bancroft's tenth volume of the *History of the United States from the Discovery of the American Continent*. In contrast Adams found that the English historian Henry Maine, in his *Lectures on the Early History of Institutions*, should have "employed a more rigid series of tests" for his theories: "a theory which, however probable in itself, ought by no means to be assumed as a foundation for reasoning without at least some attempt at demonstration."<sup>43</sup>

The recurring theme of "scientific history" in Adams's *NAR* reviews—several of which are quite lengthy and reveal his own depth in the subject matter—suggests how fully he had, in the 1870s and 80s, absorbed the scholarly methods of contemporary historiography, which he would fully use in his own crafted and carefully documented *History of the United States during the Administrations of Jefferson and Madison*. Many among the new wave of historians in that era also appropriated the philosophical underpinnings of optimism in human progress manifest in varying iterations of Social Darwinism that promised an evolution toward the perfectibility of humankind, in whatever, possibly unsavory, ways that might come about. In practice, the laboratory for scientific history for Adams's contemporary historians—including his correspondents Herbert Baxter Adams and John Franklin Jameson—was the classroom, where reliance on the texts of past historians was shunted aside in favor of the examination of documents and archives. One

<sup>42</sup>Henry Adams (unsigned), "Die Administration Andrew Jackson's in ihrer Bedeutung für die Entwicklung der Demokratie in den Vereinigten Staaten von Amerika, by H. v. Holst," *North American Review* 120, no. 246 (January 1875): 183, <https://www.jstor.org/stable/25109888> (accessed March 9, 2020).

<sup>43</sup>Henry Adams (unsigned), "History of the United States from the Discovery of the American Continent, Vol. 10, by George Bancroft," *North American Review* 120, no. 247 (April 1875): 424–32, <http://www.jstor.com/stable/25109909> (accessed June 17, 2020); "Lectures on the Early History of Institutions, by Henry Sumner Maine," *North American Review*, 120, no. 247 (April 1875): 433, 436, <https://www.jstor.org/stable/25109910> (accessed April 9, 2020).

reason for turning to this new teaching method was simply to maintain student interest. Adams frequently described the strain, familiar to anyone who has stood in front of a college classroom teaching indifferent students. "I hardly know how I am getting on with the students," he wrote to Charles Milnes Gaskell at the outset of his teaching career in 1870. "[A]s a rule they are supernaturally lazy and ignorant."<sup>44</sup>

As a student in Germany, Adams had gained firsthand experience with the new seminar methods being introduced at Johns Hopkins University by Herbert Baxter Adams. Germany was, as Deborah Haines has shown, the primary model for history professors in American universities.<sup>45</sup> Adams was among those historians introducing new pedagogical and research methods to American students and practicing them as a researcher. Even as he advised Lodge to learn German, Adams noted that he would need to learn Anglo-Saxon to engage firsthand the documents of medieval English history that would lead to the publication of *Essays in Anglo-Saxon Law*. But such publications were the exception for many leading proponents of scientific history for whom the concept was more directed toward the classroom than publication.

Science required observation, accurate data, and inductive methods, as opposed to the deductive reasoning of philosophers and religious authorities. For the study of history, scientific methods offered a model for Adams and his contemporary historians in seeking accurate information and striving for objectivity in recounting that information. In Adams's *History*, scientific history meant setting aside the biases of heritage as he examined documents in the US and abroad to develop a narrative of the early republic.<sup>46</sup> But what if the scientific model—and nature itself—were at odds with the "scientific" methods of historical writing and study? The

<sup>44</sup>Levenson, et al., *Letters: 1868–1885*, 2:84.

<sup>45</sup>"Scientific History as a Teaching Method: The Formative Years," *Journal of American History* 63 (1977): 892–912.

<sup>46</sup>Noble Cunningham Jr. refutes the idea that Adams's *History* was unbiased in *The United States in 1800: Henry Adams Revisited* (Charlottesville: University of Virginia Press, 1988).

findings of Haeckel and others consistently supported and even promoted the idea that humanity is part of nature, a product of nature, bound by its laws, limitations, and possibilities, and that studying the past and the prospects of humanity, to be faithful, must align itself not only with scientific methods, but nature itself. Historical writing, especially in the US, had consistently reinforced a dualistic view of nature and humanity in narratives of European and white civilization versus wilderness, from Jamestown and the Pilgrim landings through the so-called closing of the frontier, with Indigenous nations invariably falling on the wilderness—that is, nature, and therefore hostile—side of that equation.

Throughout Adams's essay "The Tendency of History," the relation of civilization and humankind to the workings of nature forms a thematic premise for his so-called *dynamic* theory of history based on the physical properties of motion and force. The *dynam* was a relatively new word in the nomenclature of science, describing the amount of force needed to move a given measure of weight. Even this term found its way into nonscientific usage. Lester Ward, for example, entitled one of his books *Dynamic Sociology* (1883), in which he disputed the idea "that Nature's ways should be man's ways" and argued in favor of "dynamic actions" and "dynamic opinion."<sup>47</sup> History, in other words, was for Adams both product and evidence of natural law while "man" was, in his words, "the most important of all its [science's] subjects."<sup>48</sup> Pursuing the impact of science on the social, political, and historical workings of the age in which he lived, Adams avowedly used these writings to poke fun at his fellow historians and the entire wave of *scientific you-name-its* for studying only the tip of the science iceberg while missing all that kept it afloat.<sup>49</sup>

<sup>47</sup>Quoted in Hofstadter, *Social Darwinism in American Thought*, 75–76.

<sup>48</sup>H. Adams, "The Tendency of History," 126.

<sup>49</sup>For the irony and humor in Adams's plunge into scientific theory in his late essays, see Howard M. Munford, "Henry Adams and the Tendency of History," *New England Quarterly* 32 (1959): 79–90, <https://www.jstor.org/stable/362213> (accessed August 12, 2020); and Keith R. Burich, "Henry Adams and the Rise and Fall of the

The quest to define the movement of history that culminates in the dynamic theory of history is a seminal theme of the *Education*. Adams's third-person narrative voice serves the purpose of dramatizing scientific objectivity and is only the most prominent of the ironic devices he deploys to distance himself from his portrayal of "Henry Adams," the Carlylean manikin who moves about on the stage of global political and societal events during a lifetime lived at or in close proximity to the centers of world powers. Throughout the *Education*, in ironical Homeric fashion, he often substitutes epithets for the name of his un-Homeric hero: "a mere passenger," "the voyager in strange seas of thought" (paraphrasing Wordsworth), "the navigator of ignorance," "the weary Titan of unity," "a historical tramp," "the seeker of history," "the Virgin's pilgrim," "a student of history," "a traveller [*sic*] in the highways of history," "a student of mechanics," and famously, a "conservative Christian anarchist."<sup>50</sup> The Adams of the *Education* is not seeking absolute truth—"convenience was truth"—but "only a spool on which to unwind the thread of history without breaking it" and to guide him toward a dynamic theory of history.<sup>51</sup> The narrative of the *Education* is an odyssey without a compass and a frayed scholastic argument—frayed, that is, by the nonlogic of the "supersensual chaos," which ultimately defines the nature of the universe—in which Adams becomes a latter-day Aquinas, building the intellectual and aesthetic foundation for an age of multiplicity. A child born in 1900, he declares, will find herself in a land "where order was an accidental relation obnoxious to nature." To understand history, the human mind must respond "as the forests did"; and as "a force of nature," even after "hundreds of thousands of years" of evolution, man now finds himself "waiting for Nature to tell him her secrets."<sup>52</sup> An idea, a thesis, ultimately a metaphor in the anti-epic of

---

Luminiferous Ether," Massachusetts Historical Society, *Proceedings*, 3rd ser., 107 (1995): 57–84. <http://www.jstor.org/stable/25081102> (accessed August 12, 2020).

<sup>50</sup>*Education*, 452, 453, 455, 468, 469, 471, 496, 499, 500, 472.

<sup>51</sup>*Education*, 472.

<sup>52</sup>*Education*, 452, 457, 475.

Adams-the-manikin's wanderings through history, the dynamic theory becomes the inevitable conclusion of his writings and experiences as an observer and offstage participant in the power politics and shifting tectonics of knowledge and history. The omniscient narrative voice and perspective of distance dramatize "Adams's" odyssey from "the safeguards of an old, established traffic"<sup>53</sup> to the epiphany of discovering that history's course has been dislocated from Enlightenment confidence in a knowable reality.

Brooks Adams contributed to the *Degradation* with a lengthy essay of his own on that "old, established traffic," entitled "The Heritage of Henry Adams," which takes up nearly half the volume. That heritage, according to Brooks, was defined by conflict between their grandfather, John Quincy Adams, and Andrew Jackson over slavery, civil service, and the preservation of public lands. "Jackson," Brooks writes, "was the materialization of evil" and "embodied the principle of public plunder." But while collectively the essays in the book and its theme of degradation may be read as an account of the consequences of Jackson's presidency, Brooks was also at pains to portray Henry's explorations in science and history as nonpartisan: "He has shown how scientific history can support no party and no interest." Rather, Henry's study of "pure science" and the writings collected in this volume suggested to Brooks an ideal beyond party; for Henry, he writes, "all the world had become a part of an organic whole."<sup>54</sup>

"The Tendency of History" is Henry Adams's presidential address to the 1894 meeting of the American Historical Association. As an artist whose "sole interest is that of form," Adams packaged what normally would have been a formal speech to a professional gathering into the less formal letter post-dated from Guadalajara, Mexico, to Herbert Baxter Adams, then secretary of the AHA. In the preamble, Adams jokes about being "an absent President," referencing also his earlier travels "in Tahiti or Fiji" when he was first honored with that

<sup>53</sup>*Education*, 3.

<sup>54</sup>Brooks Adams, "The Heritage of Henry Adams," in *Degradation*, 77, 97, 102, 111.

position, though Herbert Baxter Adams found Henry's witticisms less than humorous. Absence and distance, as well as informality, doubtless fueled the letter's provocative substance and stiff warning to his fellow history professors, who, Henry suggests, have not fully understood the implications of teaching history according to a scientific model. "A science cannot be played with," Adams warns. The better part of two generations after the publication of Henry Thomas Buckle's *History of Civilization in England* (1857) and Charles Darwin's *Origin of Species* (1859), Adams questions whether, "[l]ike other branches of science, history is now encumbered and hampered by its own mass." What had been an original and substantive response to romantic historical writing such as Freeman's in the 1870s, when Adams was a Harvard professor, now threatened to become its own self-authoritative, and even biased, version of history. Without accounting for "the violent impulse which Darwin gave to the study of natural laws," historians swayed by the spirit of Social Darwinism might find themselves chasing the holy grail "of a great generalization that would reduce all history under a law as clear as the laws which govern the material world." If the social and intellectual impulses Darwin unintentionally ignited only reinforced through science the Enlightenment ideal of a perfectible humanity, how would historians account for the backlash of a scientific history that, in the wake of discoveries such as radium, might lead to unpredictable outcomes and pit itself against the "foundation of some prodigious interest," such as the church or state or capitalists or workers?<sup>55</sup> Would it leave scientific historians as isolated and threatened as Galileo before the Inquisition? Nature itself, as science had shown, from Marie Curie's "metaphysical bomb . . . called radium" to Clarence King's geological confirmation of cataclysmic events affecting climate and evolution, modeled the errancy and danger of complacent confidence.<sup>56</sup>

<sup>55</sup>H. Adams, "The Tendency of History," 125, 131, 126, 127, 128.

<sup>56</sup>*Education*, 452; Keith R. Burich, "'Something Newer and Nobler Is Called into Being': Clarence King, Catastrophism, and California," *California History* 72 (1993): 234-49.

In Brooks Adams's *The Law of Civilization and Decay*, Henry had seen precisely how an iconoclastic, unitary theory of history might be rendered, and at what personal and professional cost. "I have been going through a long period of severe depression regarding my book," Brooks wrote to Henry in 1895, fearful of how the book would be received, though he could not resist adding a melodramatic note: "I am one lonely man against whom all society is banded."<sup>57</sup> Two years earlier, as the financial markets collapsed, Brooks asked Henry to critique an early draft of the book. Brooks's thesis is that monetary centralization and the accumulation of wealth compelled imperial expansion because empires mismanaged and misused natural and human resources in conquered regions, which in turn necessitated further conquest. Humanity is acting against its own interests, Brooks suggests, in its abuse of nature through the removal of resources and wasteful consumption, the consequence of which was political, economic, and moral decay in societies from ancient Rome to the nineteenth-century British empire.<sup>58</sup> Through successive drafts and correspondence, Brooks's work proved a stimulant for Henry to rethink the premises of historical study and its relationship to nature, especially as human thought, manifested in various ideologies, religious beliefs, and economic models, generated motion and energy. When Henry described to Brooks "another thirty years of energy-development at the rate of the last century," it was this "energy-development," driving historical momentum, to which he referred.<sup>59</sup> Brooks's introduction to the *Law of Civilization and*

<sup>57</sup>Brooks Adams to Henry Adams, June 24, 1895, Microfilm Edition of the Henry Adams Papers, 1843–1938 (Boston: Massachusetts Historical Society, 1984), Reel 33.

<sup>58</sup>In his account of the "ravages committed by man" in ancient civilizations, George Perkins Marsh anticipated Brooks's thesis by a generation: *Man and Nature or, Physical Geography as Modified by Human Action* (New York: Charles Scribner, 1867), 43, 1–56. Marsh served in Congress with John Quincy Adams and worked with him on conservation issues, as well as the founding of the Smithsonian Institute. See Robin Kundis Craig, "George Perkins Marsh: Anticipating the Anthropocene," *Utah Law Faculty Scholarship*, 197 (2020), <https://dc.law.utah.edu/scholarship/197> (accessed January 27, 2021).

<sup>59</sup>Levenson et al., eds., *Letters: 1900–1906*, 5:400.

*Decay* proposes a “scientific” precursor to Henry’s dynamic theory,

based upon the accepted scientific principle that the law of force and energy is of universal application in nature, and that animal life is one of the outlets through which solar energy is dissipated.

...

Starting from this fundamental proposition, the first deduction is, that, as human societies are forms of animal life, these societies must differ among themselves in energy, in proportion as nature has endowed them, more or less abundantly, with energetic material.

Thought is one of the manifestations of human energy, and among the earlier and simpler phases of thought, two stand conspicuous. . . Fear, which, by stimulating the imagination, creates a belief in an invisible world, and ultimately develops a priesthood; and Greed, which dissipates energy in war and trade.

Probably the velocity of the social movement of any community is proportionate to its energy and mass, and its centralization is proportionate to its velocity; therefore, as human movement is accelerated, societies centralize.<sup>60</sup>

Henry foresaw the consequences of his brother’s blunt approach to the political third rail of monetary policy. “The gold bugs will never forgive you,” he warned Brooks.<sup>61</sup> But he found common ground in Brooks’s themes of energy, motion, velocity, and the “universal application in nature” to humankind’s affairs. Henry reviewed multiple drafts of Brooks’s manifesto, from line-edits and theory to independent research, and finally to assisting in getting the book published in London, where Henry thought it might have a softer landing.

Henry followed the leads prompted by Brooks’s thesis, from the frontiers of science and how far physics, chemistry, and mathematics would carry him in the new discoveries of his age to the Middle Ages, where he found both personal and intellectual refuge in the writings of Aquinas and Gothic shrines to the Virgin Mary. Brooks regarded Henry’s *Mont Saint Michel and*

<sup>60</sup>Brooks Adams, *The Law of Civilization and Decay: An Essay on History* (New York: Macmillan, 1897), Preface, ix.

<sup>61</sup>B. Adams, “The Heritage of Henry Adams,” 91.



*Chartres* as “by far the greatest attempt at a historical generalization that exists in any language.”<sup>62</sup> Henry’s dynamic theory of history, like Brooks’s “law,” also posits humankind as an element of nature: “Man is a force; so is the sun; so is a mathematical point, though without dimensions or known existence”; “the forces of nature capture man”; “the feeble atom or molecule called man.” The phrase itself, *a dynamic theory of history*, as a vehicle to measure human “progress,” cues up the images of the *dynamo* at the Chicago World’s Fair of 1893 and the Great Hall of *Dynamos* at the Paris World Fair of 1900 that embodied the shifting phases of history in a post-Darwinian, post-radium, post-second law of thermodynamics age. As Adams’s speculative writings imply and the *Education* recounts, history, like science—the simile matters—must be in the business of discovering its governing principles. “A Dynamic Theory of History (1904),” Adams’s chapter in the *Education*, sustains from the outset the idea that such a theory “begins by begging the question”—whether such measurements can be taken and how valid the results would be—effectively casting doubt on the phase rule chart he so carefully calculated.<sup>63</sup>

Here the manikin “Adams” becomes representative—the history professor in extremis—a teacher in search of a unitary thesis: “Every professor,” Adams writes in the “Tendency,” “who has tried to teach the doubtful facts which we now call history must have felt that sooner or later he or another would put order in the chaos and bright light into darkness. . . . The law was certainly there, and as certainly, was in places actually visible, to be touched and handled, *as though* it were a law of chemistry or physics” (my emphasis). The application of the scientific method is less the point—that is, it also begs the question—than the analogy: if science can discover the laws of thermodynamics, then a *comparable* method and set of laws might be available to historians. What Adams observed in Darwin’s work was not only his scientific discoveries but a tectonic shift in *how* nature was to be studied, and as his brother experienced more

<sup>62</sup>B. Adams, “The Heritage of Henry Adams,” 102.

<sup>63</sup>*Education*, 474.

directly than he, if on lesser scale than Darwin, the ensuing shock it brought not only to science but beyond: “We cannot help asking ourselves what would happen if some new Darwin were to demonstrate the laws of historical evolution.”<sup>64</sup> There is more at stake, Adams suggests, than the professors understand. They have become too comfortable in their notions of “scientific history” to venture where science might take them. The study of human affairs, past and present (and future?), must do more than mimic scientific methods; it must treat humanity as part of the natural world, like other living species, which Darwin had shown to have evolved as products of the energy and environments that make their existence possible. But that may be a step too far, Adams suggests, for his contemporaries.

The object of scientific study, the natural world including humankind, was more than biology for Adams and more than an object for conservation whether for its own sake or for its resources. Adams was no naturalist like Burroughs and Muir, nor a conservationist like his grandfather. The natural world manifested itself for him in gravity and force and energy; in thermodynamics and electricity; in chemistry, physics, and mathematics and their historical manifestations in politics, economics, and diplomacy. Decades earlier, in his 1868 review of the tenth edition of Charles Lyell’s *Principles of Geology* for the *NAR*, Adams had noted not only how Lyell had altered an understanding of earth’s history through the geologist’s “coldly scientific spirit” of investigation but of the “earth’s economy” and the necessity of “the exercise of imagination” to understand geological and climate changes on the scale of deep time.<sup>65</sup> Adams brought to that review—a bold effort in which he showed an understanding of the subject that should have been far beyond his depth—the perspective of his explorations with Charles Milnes Gaskell of the geology of Wenlock Edge in Shropshire, England, which even today holds interest

<sup>64</sup>H. Adams, “The Tendency of History,” 127, 128.

<sup>65</sup>Henry Adams, “*Principles of Geology; Or the Modern Changes of the Earth and Its Inhabitants, Considered as Illustrative of Geology*, by Charles Lyell,” *North American Review* 107, no. 221 (October 1868): 465–67, [www.jstor.com/stable/25109408](http://www.jstor.com/stable/25109408) (accessed August 20, 2020).

for the fossilized creatures in a reef that was formed 425 million years ago. It was one thing for Lyell to shake the scientific world, but the shock waves of his original 1830 first edition of the book also hit the church, rolled over accepted notions of humankind's primacy in the scheme of things, and consequentially threw doubt on fundamental ideas of authority and tradition. History, by contrast, Adams writes in the "Tendency," had until now been "tolerated by governments and society as an amusing or instructive and, at any rate, a safe and harmless branch of inquiry." But historians who dared to realign their thinking in similar ways to Darwin and Lyell would face severe opposition from the monoliths of state and church that depended on pre-Darwinian science for their own preservation. The church, Adams warns, "will not and cannot accept any science of history, because science, by its definition, must exclude the idea of a personal and active providence," while "the hostility of the state would be assured toward any system or science that might not strengthen its arm."<sup>66</sup> But political and social tensions, Adams recognizes, would infect a science of history, and perhaps already had, even as they were also by their nature objects of historical study: church v. science, capitalism v. socialism, labor v. plutocrats. A "science of history" had become for Adams more analogy than method. His usage is subtle but consistent: "Any science assumes a necessary sequence of cause and effect, a force resulting in motion which can not [*sic*] be other than what it is. Any science of history must be absolute, like other sciences, and must fix with mathematical certainty the path which human society has got to follow": *any science, like other sciences, with mathematical certainty*, and above, *as though it were a law of chemistry*—what such a science of history would look like, and what it would discover, are speculations that Adams offers by way of simile and analogy. The point is not to assume what such a science would be, but rather to reveal what it is not and to suggest its possibilities by way of comparison. And would such a science, Adams ponders, were it to "announce that the present evils of the world—its huge

<sup>66</sup>H. Adams, "The Tendency of History," 128, 129.

armaments, its vast accumulations of capital, its advancing materialism, and declining arts”—simply find that society had “shut its eyes and ears” to such findings?<sup>67</sup> Masking himself behind the informality of his letter to Herbert Baxter Adams, Henry closes with a wry—and thin—claim to write “in the paradoxical spirit of private conversation,”<sup>68</sup> but hardly private, as it then fell on H.B. Adams to read Henry’s “letter” to the assemblage of some of the most preeminent historians of his day.

Henry Adams expands the metaphor of scientific methodology in the first sentence of “The Grammar of Science (1903),” chapter 31 in the *Education*, as he sets the stage for “Adams’s” fictional odyssey into the wilderness of scientific history: “Of all the travels made by man since the voyages of Dante, this new exploration along the shores of Multiplicity and Complexity promised to be the longest.” This chapter opens the final section of the book, interweaving “Henry Adams’s” studies in science and philosophy with global events, in particular the Russian-Japanese War. Karl Pearson’s *The Grammar of Science* (1892) ignites the intellectual spark for “Adams” and gives the chapter its title, though both author and manikin deftly avoid the particulars of Pearson’s mathematics in favor of how useful the book’s ideas might be: “Not so much the actual tool was needed, as the right to judge the product of the tool.”<sup>69</sup>

Pearson’s *Grammar* examines how scientific thought is changing and in what direction it is headed, or at least where Pearson believes it should head. Despite his objections that Pearson’s book mostly restated ideas Adams had previously encountered in Johann Bernhard Stallo’s 1882 book, *The Concepts and Theories of Modern Physics*, he still found Pearson provocative for suggesting how historians might think about their subject in comparably imaginative ways to scientists: “A student of history had no need to understand these scientific ideas of very great men; he sought only the relations with the ideas of their grandfathers, and their common direction

<sup>67</sup>H. Adams, “The Tendency of History,” 130.

<sup>68</sup>H. Adams, “The Tendency of History,” 133.

<sup>69</sup>*Education*, 449.

towards the ideas of their grandsons.” The historian “Henry Adams” of the *Education* “had no interest in the universal truth of Pearson’s or Kelvin’s or Newton’s laws; he sought only their relative drift or direction.”<sup>70</sup> But Pearson proved both provincial and objectionable. In sharply worded marginalia in his copy of the book, Adams took exception to Pearson’s insistence that scientific knowledge could not penetrate beyond the limits of sensory perception and his philistine dismissal of poetry and aesthetics.<sup>71</sup> Adams further cites in the *Education* Pearson’s rebuke of nineteenth-century thinkers who settled matters for which they had no answers by resorting to speculations beyond their “sense-impressions,” where “we cannot infer necessity, order or routine, for these are concepts formed by the mind of man.”<sup>72</sup> Still, Pearson served as a touchstone for a full-throated revision of the nature of scientific study, which paralleled Adams’s iconoclastic thesis in the “Tendency,” and for his shared inclination for the erasure of oxymorons and crossover of disciplines as expressed in the terms *a grammar of science* and *scientific history*.

The problem for historians, the manikin Adams dramatically discovers, is that in their myopic ordering of history they have not fully accounted for natural law and its unruliness. “In plain words,” Adams writes in the *Education*, “Chaos was the law of nature; Order was the dream of man.”<sup>73</sup> The dynamic theory of history, then, is based on the understanding that humankind does not exist separately from nature’s chaos while historical study, in light of the discoveries of science, not only must account for this understanding but also recognize the potential flaws, and even dangers, in attempting to project history’s course and direction. “A dynamic theory,” Adams writes, “takes for granted that the forces of nature capture man.” In a metaphor drawn from nature, he depicts humankind still

<sup>70</sup>*Education*, 453, 451.

<sup>71</sup>Ernest Samuels, *Henry Adams: The Major Phase* (Cambridge, MA.: Harvard University Press, 1964), 291; Henry Wasser, *The Scientific Thought of Henry Adams* (Thessaloniki, Greece: n.p., 1956), 120–121.

<sup>72</sup>Quoted in *Education*, 451.

<sup>73</sup>*Education*, 451.

desperate to preserve its stature—culturally, autonomously, just a few rungs below the apex of the Great Chain of Being—even as it sought understanding of the universe, grasping at what little understanding it can snag in the vast universe it inhabits: “the theory may liken man to a spider in its web, watching for chance prey”—which is the “[f]orces of nature” dancing “like flies before the net.” Again, primeval man can only respond to the stimulation that surrounds him “as the forests did,” shaping his mind in self-reflective ways that require explanations, understanding, unity. In turn humanity becomes itself “a force of nature,” assimilating “other forces as he assimilated food.” As Adams walks history through its phases, from fetish to religious to scientific, channeling Comtean social theory into his dynamic theory and ultimately leading to his—by all accounts among his contemporary critics and those who followed—shaky application of the physicist Josiah Willard Gibbs’s phase rule to history, he returns to nature as both metaphor and context: “The experience of three thousand years had educated society to feel the vastness of Nature”; in the church phase, the cross “represented the sum of nature”; the “Pyramids and Cross” were “two new natural forces”; further developments, like the invention of the compass, gunpowder, and the printing press “widened immensely the range of contact between nature and thought”; and in the evolution of philosophy, “thought did not evolve nature but nature evolved thought.”<sup>74</sup>

Adams plots the course of that evolution in his 1909 essay, “The Rule of Phase Applied to History.” He took pains, largely without success, to have drafts reviewed by scientists who would understand the physics and mathematics of Gibbs’s phase rule, if not Adams’s to all appearances bizarre application of it to history. That effort has been treated variously by literary scholars, some of whom, as Howard Munford first suggested, have found “grim humor” and “elaborate irony” in the attempt “to convert history into a science.”<sup>75</sup> Adams himself

<sup>74</sup>*Education*, 474, 475, 477, 479, 482, 485.

<sup>75</sup>Munford, “Adams and the Tendency of History,” 80; J.C. Levenson, *Mind and Art*, 363; Joseph Mindel, “The Uses of Metaphor: Henry Adams and the Symbols of

described the “Rule” to Brooks as “a mere intellectual plaything, like a puzzle . . . not meant to be taken too seriously.”<sup>76</sup> Keith Burich has suggested that Adams’s reading of Gibbs may have been limited to a short section of Gibbs’s treatise entitled “On the Coexistence Phases of Matter,” which outlines the thesis of the phase rule in a “deceptively simple but exceedingly powerful formula.”<sup>77</sup> Yet Burich also acknowledges Adams’s exhaustive reading in the overall subject matter, including numerous textbooks and papers by some of the most influential scientists of his era. Gibbs had published his findings on the phase rule more than two decades earlier than Adams’s “Rule,” in an 1876 paper entitled “On the Equilibrium of Heterogeneous Substances,” which met with immediate recognition by the leading scientists of his day. By the time Adams came across it, Gibbs’s work was foundational to late nineteenth-century physics and mathematics.

“The Rule of Phase Applied to History” remained unpublished in Adams’s lifetime until Brooks’s inclusion in the *Degradation*. Henry’s re-engineering of the phase rule in the service of history is problematic and flawed, and, absent the literary strategies that enliven most of his writings, as William Decker notes, it is not easy reading.<sup>78</sup> Social movements and historical “motion” cannot be calculated in the same way one calculates the variables that change ice into water and water into vapor in a closed system. The indeterminacy among many readers about whether to regard Adams’s historical chart in the “Rule” literally or as a symbol, or his argument as metaphoric,

---

Science,” *Journal of the History of Ideas* 26 (1965): 89–102. Examining the draft of Adams’s “Rule,” Keith R. Burch finds “a more explicit statement of Adams’s belief that the fate of mankind is governed by unpredictable . . . ‘catastrophes.’” “Our Power Is Always Running ahead of Our Mind”: Henry Adams’s Phases of History,” *NEQ* 62 (1989): 164. Burch further discredits the perspective on Adams’s phase rule. William H. Jordy, *Henry Adams: Scientific Historian* (New Haven: Yale University Press, 1952), and “Henry Adams and the Rise and Fall of the Luminiferous Ether,” *MHS Proceedings* 107, 3rd. ser. (1995): 57–84. See also William Merrill Decker, *The Literary Vocation of Henry Adams* (Chapel Hill: North Carolina University Press, 1990): 76–91.

<sup>76</sup>Levenson et al., eds., *Letters: 1906–1918*, 6:219.

<sup>77</sup>Burich, “Our Power Is Always Running ahead of Our Mind,” 167.

<sup>78</sup>Decker, *Literary Vocation*, 79.

results largely from the essay's tone, which, notwithstanding Henry's remarks to Brooks, lacks the ironic lightness that characterizes much of his work in the *History* and "Tendency" and "Letter." It reads more like a highly technical academic paper, or the appearance of one, though the potential, and unlikely, irony of appearing even to mock academic styling is dulled by the weight of the effort. Still, the "Rule" reinforces through a compelling thought-experiment the fusion of history—that is, humanity's exploits and intellectual development—and nature, and thereby challenges Adams's contemporaries to enlarge their understanding of history itself. By shifting the foundations of historical study to account for the ways in which science, from Copernicus through Marie Curie, altered fundamental assumptions about humanity's place in the universe and on the planet, Adams questions in his final major essay, "A Letter to American Teachers of History" (1910), the validity of "scientific history" as it was taught, presuming now to instruct history teachers "how not to teach!"<sup>79</sup>

In private correspondence, Adams described the "Letter" as "a little volume to make fun of my fellow historians," written "not for the improvement of humanity, but only to prod up my historical flock."<sup>80</sup> Again Adams postures behind epistolary informality, where, in the heritage of a globally influential dynasty, private—or better, individual—correspondence framed documents ultimately intended for posterity. The "Letter" is not only more successful than the "Rule," it further raises the question of the limitations of a planet regarded by humanity as existing only to serve its own demands and, by more than inference, the morality of those demands and what they may suggest about the ethos and future of the human species. The "Letter" combines the scientific tenets of Adams's dynamic theory of history—the conservation of energy, its degradation through entropy, and evolution—to reveal both humanity's inability to escape from the forces of nature and its impact on nature. Despite Adams's various objections to Pearson, imagining nature

<sup>79</sup>Levenson et al., eds., *Letters: 1906–1918*, 6:337.

<sup>80</sup>Levenson et al., eds., *Letters: 1906–1918*, 6:301, 316.



and history so broadly was in keeping with the ways in which *The Grammar of Science* had emphasized imagination as fundamental to a scientific vision and attitude, a viewpoint shared by Humboldt, Haeckel, Darwin, Marsh, Muir, and others. Pearson further differentiated between the practical application of scientific findings (the “mechanical”) and the scientific mind, which “converts *all* facts whatsoever into science.”<sup>81</sup> His goal was “the complete interpretation of the universe,”<sup>82</sup> for which he insisted that the scientific method has applications in other fields, including sociology, psychology, and even folklore. His was less an effort to use the formulas of math and physics to solve non-math and non-physics problems than to encourage exploring traditionally non-science subjects with the imagination of a scientist, an approach that paralleled Adams’s rethinking of how history should be studied and taught.

Adams confronted the paradigm shift marked by the abuses of Darwin’s theory to rationalize runaway capitalism and even eugenics, for which Pearson later became a leading advocate. But for Adams the paradigm itself was upside down. In entropy Adams found both proof and purpose for critiquing the limits of “scientific history” by illustrating its implied alignment with the progressive ideologies of the day. While the First Law of Thermodynamics declared that the quantity of energy in the universe remained constant, the Second Law revealed that its expenditure and use always degraded and altered it. Here Adams found cause to suggest that as a species humankind was itself both a product of energy and a cause of its depletion, especially through the expenditure of what was then universally considered the most unique ability of humans, to think. Thought—whether in religious ideologies or eighteenth-century rationalism or post-Darwinian social engineering—expended energy, and the fact of entropy meant that humankind was not evolving toward perfection but rather thinking its way into degradation with the dissipation of its own energy and through the plunder of nature in thought-driven

<sup>81</sup>Karl Pearson, *The Grammar of Science* (London: Dent, 1949), 16.

<sup>82</sup>Pearson, *The Grammar of Science*, 18.

pursuit of wasteful wars and needless consumption. If historians wished truly to become scientific, then the Second Law of Thermodynamics required them to understand that humankind was “no longer at the top but at the bottom of the ladder, in the face of accelerated extinction.” Quite simply, humanity was destroying itself and taking everything with it. In Émile Durkheim’s *Le Suicide* (1897) and its dismal portrait of decadence, alcoholism, and increasing suicides throughout Europe, Adams found confirmation of humanity’s “social decrepitude.”<sup>83</sup>

The scientific foundation of Adams’s “Letter” reflects, as do his other speculative essays on historiography, the inescapability of humanity’s existence from the governance of nature and natural law. Contemporary historians, he believed, had neither recognized nor confronted this reality and its implications for humanity and the study of history. Thought itself, a product of evolution, was evidence of humankind’s degradation, and while thinking made humanity unique, that uniqueness also meant that humanity was exclusive among species not only in contributing nothing to nature’s economy but in degrading nature by its very existence. “From the physicist’s point of view, Man, as a conscious and constant single, natural force, seems to have no function except that of dissipating or degrading energy,” and Adams faults humankind for its vanity in believing otherwise:

He yearns for flattery, and he needs it. The contradiction between science and instinct is so radical that, though science should prove it twenty times over, by every method of demonstrations known to it, that man is a thermodynamic mechanism, instinct would reject the proof, and whenever it should be convinced, it would have to die.<sup>84</sup>

Adams found support in a number of sources for the notion that not only historians but even some scientists were deceiving themselves—historians for their focus on humankind’s preeminence and scientists for a mechanistic approach to science in

<sup>83</sup>Henry Adams, “A Letter to American Teachers of History,” in *Degradation*, 166, 186.

<sup>84</sup>H. Adams, “Letter to American Teachers,” 216, 230–31.

service of humanity's practical needs. In the *Education*, Adams links the trio of Hermann von Helmholtz, Ernst Mach, and Arthur Balfour as authorities for the contrary idea that a "supersensual chaos" characterized the universe and eluded science.<sup>85</sup> All three believed that science had yet to account for the limitations of human perception and sensory experience in the study of nature. Helmholtz, whose writings enthusiastically promoted the new Second Law of Thermodynamics, was well known among nineteenth-century scientists for breaking ground in physics and geometry, as well as his writings on scientific philosophy. Much of his research focused on the workings of human senses, for example, sight and touch: If an individual's two eyes are seeing two separate images of the same object or different fingers are simultaneously touching one object, is the resulting conclusion (the distance of a tree or the shape of a pen) accurate or is it created from some experiential, and therefore mysteriously interpretive, concept of the size of trees or shape of pens, and if so, how to account for this non-sensory response? William Jordy suggests that Adams would have read Helmholtz's *Popular Lectures on Scientific Subjects*.<sup>86</sup> Like Karl Pearson, Helmholtz wrote about the epistemology of science, enlarging the idea of what constituted science to include areas like grammar, history, and law, as they were being studied in the enlightened scientific advances of his era. Of interest to Adams especially were Helmholtz's theories about the search for first causes. "It is not enough," Helmholtz wrote, "to be acquainted with the facts; scientific knowledge begins only when their laws and their causes are unveiled."<sup>87</sup> Separately, in physicist Ernst Mach's *Science of Mechanics* Adams would have read that "[t]he highest philosophy of the scientific investigator is precisely this toleration of an incomplete conception of the world." Ernest Samuels suggests that Adams should have heeded Mach's warning against pursuing his own holy grail of

<sup>85</sup>*Education*, 460.

<sup>86</sup>Jordy, *H. Adams, Scientific Historian*, 231n17.

<sup>87</sup>Hermann von Helmholtz, *Popular Lectures on Scientific Studies*, trans. E Atkinson (New York: Appleton, 1885), 13.

a unifying “dynamic theory” of history, but if the “Letter” and “Tendency of History” and “Rule of Phase” are read in the spirit of prodding historical flocks, as Adams indicated, then it is rather historians and even scientists who should take heed of chasing the grails of mechanistic thinking.<sup>88</sup>

Among this group of three advocates for the “supersensual chaos” in which the “Henry Adams” of the *Education* finds himself floundering, Arthur James Balfour is unlike the others. While Helmholtz and Mach were accomplished researchers who influenced generations of scientists, Balfour was a prominent conservative British politician and prime minister from 1902 to 1905 whom Adams personally knew. He was also president of the British Association for the Advancement of Science, and it is in this capacity that Adams name-checks him in the *Education*, ponderously (or ironically) writing that “in 1904, Arthur Balfour announced on the part of British science that the human race without exception had lived and died in a world of illusion until the last year of the century. The date was convenient, and convenience was truth.”<sup>89</sup>

That convenience gave Adams license to stamp 1904—or as he later indicated, the turn of the century—as the landmark year in which even the limits of science would give way to the prospects of “supersensual chaos.” The decade immediately preceding had been marked by three notable events: “1893,” for which stand-alone mention of the year serves as a metonym for the financial collapse that rocked the US and beyond; Wilhelm Roentgen’s discovery of X-rays in 1895; and the Curies’ discovery of radium in 1898.<sup>90</sup> Economics and nature are part and parcel of the same whole, and that relationship, Adams presumes to suggest, has been underestimated by those who presumed to understand it.

Arthur Balfour’s portentous declaration, as Adams framed it, was delivered in his 1904 presidential speech, “Reflections Suggested by the New Theory of Matter.” Adams placed enough

<sup>88</sup>Quoted in Samuels, *H. Adams: The Major Phase*, 387.

<sup>89</sup>*Education*, 457.

<sup>90</sup>*Education*, 457.

stock in it to write to Gaskell: “The next crop of nonsenses will be singularly complicated. Between science and socialism we shall find much new foolishness. By the way, Arthur Balfour foreshadows it, in his Address last week. He is, in my opinion, quite right.”<sup>91</sup> Yet Henry also described Balfour to Brooks as “fatuous,” likely with reference to Balfour’s self-righteous brand of religious and monetary conservatism, and even by the standards of the aristocratic Adams, his archly aristocratic and often oppressive politics.<sup>92</sup> A nonscientist philosopher and promoter of science, Balfour’s interest in science, as L.S. Jacyna has shown, was as motivated by social and political concerns as it was by science. Natural science, he feared, threatened both the state and politically powerful church by leading the way toward a new nonreligious social order. In the First Law of Thermodynamics, the conservation of energy, Balfour inferred that a self-contained universe would presume the absence of an outside agency, while by contrast the possibility of what Adams referred to as “supersensual chaos” validated institutional religion, of which Balfour was a vigorous defender. Even as he promoted science, Balfour insisted that science could not account for the agency of God, or, where Adams found sympathy, the limits of sensory experience:

We claim to found all our scientific opinions on experience; and the experience on which we found our theories of the physical universe is our *sense perception* of that universe. That *is* experience; and in this region of belief there is no other. Yet the conclusions which thus profess to be entirely founded upon experience are to all appearance fundamentally opposed to it; our knowledge of reality is based upon illusion; and the very conceptions we use in describing it to others, or in thinking of it ourselves, are abstracted from anthropomorphic fancies, which science forbids us to believe and nature compels us to employ.<sup>93</sup>

<sup>91</sup>Levenson et al., eds., *Letters: 1899–1905*, 5:605.

<sup>92</sup>Levenson et al., eds., *Letters: 1899–1905*, 5:89.

<sup>93</sup>Arthur James Balfour, “Reflections Suggested by The New Theory Of Matter,” *Popular Science Monthly* 65 (Oct. 1904): 503–4. [https://en.wikisource.org/wiki/Popular\\_Science\\_Monthly/Volume\\_65/October\\_1904/Reflections\\_Suggested\\_by\\_the\\_New\\_Theory\\_of\\_Matter](https://en.wikisource.org/wiki/Popular_Science_Monthly/Volume_65/October_1904/Reflections_Suggested_by_the_New_Theory_of_Matter) (accessed October 6, 2020)

Balfour's wide-ranging speech on the extra-sensory prospects of first causes to a gathering of scientists as preeminent as Adams's "historical flock" suggested to the nonreligious Adams a unitary epistemology similar to Haeckel's monism. Balfour's speech makes no mention of religious necessity but rather focuses on the limits of "anthropomorphic fancies." In not so many words, Adams also entertained doubts about such fancies based on his eclectic readings in science and in the architecture and scholasticism of the French Middle Ages. If anything, Adams found in Balfour a sympathetic rendering of his own nonreligious theorizing, as well as, if not as bluntly as Balfour, a defense of state and institutional religion to which Adams personally adhered despite wayward speculations that led him at times to swing capriciously between socialism and capitalism.

As the spider web image in the *Education* illustrates, humanity's anthropocentric myopia had created a shadows-on-the-wall kind of delusion about its supposed preeminence in nature and self-anointed ascent toward perfection. The corruption of Darwin's research and publications into a winner-take-all struggle for economic, political, and social dominance had, Adams recognized, come at great cost. Humanity's failure to recognize its own place within the natural world was itself evidence not only of how wrong-headed the presumptions of Social Darwinism were but of entropy itself at work in the "social energy" being dissipated in waging pointless battles for a nonexistent prize. In the "Letter," Adams dramatizes an awkward but effective fictional Socratic dialogue between what he calls an "evolutionist," that is, a Social Darwinist, and "physicists," who defend the evidence for studying the applications of entropy to history. In doing so, he catalogues instances of humanity's misuse of planetary energy sources and the consequences of that misuse. Leaning heavily on Andrew Gray's *Lord Kelvin: An Account of His Scientific Life and Work* (1908) in the following passage, Adams starkly warns history teachers of the stakes in interpreting history through a materialist and anthropocentric lens:

"Already,"—one may hear the physicists aver—"man dissipates every year all the heat stored in a thousand million tons of coal which nature

herself cannot now replace, and he does this only in order to convert some ten or fifteen percent of it into mechanical energy immediately wasted on his transient and commonly purposeless objects. He draws great reservoirs of coal-oil and gas out of the earth, which he consumes like the coal. He is digging out even the peat-bogs in order to consume them as heat. He has largely deforested the planet, and hastened its desiccation. He seizes all the zinc and whatever other minerals he can burn, or which he can convert into other forms of energy, and dissipate into space.”<sup>94</sup>

Adams further quotes Kelvin directly from Silvanus P. Thompson’s *The Life of William Thomson, Baron Kelvin of Largs* (1910) in warning of the threat to Earth’s atmosphere from unchecked fuel consumption: “If we burn up our fuel supplies so fast, the oxygen of the air may become exhausted, and that exhaustion might come about in four or five centuries.”<sup>95</sup>

Adams recognized not only the future threat to planetary integrity but the damage already in progress. Much of humanity’s wastefulness occurs as a result of “armies and armaments which are made avowedly for no other purpose than to dissipate or degrade energy, or annihilate it as in the destruction of life”; or for momentary pleasures, “as in drinking alcohol, or burning fireworks, or firing cannon, or illuminating cities, or deafening them by senseless noises.” Adams notes, too, humanity’s systematic destruction of “all the larger forms of animal life in which nature stored her last creative efforts,” and he presciently faults humanity—in “this enormous mass of nature’s economies which man dissipates every year in rapid progression”—for degrading and wasting energy captured “from the sun, directly or indirectly, as heat-rays, or water-power, or wind-power.” “The sun,” he notes, “can keep up its expenditure indefinitely . . . while man is a bottomless sink of waste unparalleled in the cosmos, and can already see the end of the immense economies which his mother Nature stored for his support.”<sup>96</sup>

<sup>94</sup>H. Adams, “Letter to American Teachers,” 216; on Adams’s use of Gray, see Samuels, *H. Adams: The Major Phase*, 463–65.

<sup>95</sup>Quoted in *Degradation*, 216–17; Silvanus P. Thompson, *The Life of William Thomson, Baron Kelvin Of Largs*, (London: Macmillan, 1910), 2:1002.

<sup>96</sup>*Degradation*, 217–18.

Grim assessments like this have led some critics to find Adams cynical and despairing. Van Wyck Brooks wryly asks, “But why did he rejoice in the downfall of worlds?”<sup>97</sup> As industrialism and capitalism mushroomed, altering the economies, politics, and cultures of Europe and the US in the nineteenth century, Adams found the darkened atmosphere of his era too dark even for his own taste. Upon completion of the “Letter” in 1910, he wrote to Gaskell of the “growing stream of pessimism which comes in a continuous current from Malthus and Karl Marx and Schopenhauer . . . which is openly preached on all sides now.”<sup>98</sup> Accusations of cynicism or pessimism are commonly leveled against those who see the world realistically and have been in no short supply in recent decades among skeptics and science deniers with regard to the global climate crisis. But it is worth noting that the above-cited passages from the “Letter” fall in the second half of this two-part essay, subtitled “The Solutions.” The act of formalizing the “Letter” is itself an exercise in seeking solutions that contrasts to the sometimes dire musings Henry shared, often off-handedly, with Brooks and others in personal writings. The “mechanistic model” of nature, as Carolyn Merchant has shown, “reinforced and accelerated the exploitation of nature and human beings,”<sup>99</sup> and it was this model that Henry Adams found not only faulty but past its expiration date even as industrial runaway capitalism continued building on it. He also recognized, as his upward-swerving graph in “The Rule of Phase Applied to History” illustrates, that western civilization showed no signs of slowing as it hurtled itself toward the “ultimate, colossal, cosmic collapse” that building on a cracked foundation would bring about.

If Adams’s late writings suggest cynicism or pessimism, it is an attitude born of idealism and nurtured in the intellectually stimulating atmosphere of science and its now fully untethered

<sup>97</sup>Van Wyck Brooks, *New England: Indian Summer, 1865–1915* (New York: Dutton, 1940) 485.

<sup>98</sup>Levenson et al., eds., *Letters: 1906–1918*, 6:316.

<sup>99</sup>Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (1980: rpt. New York: HarperCollins, 1989), 43.



exploration of nature and the universe. The irony and detached tone of amusement that characterizes the to-all-appearances serious efforts of these late writings—and thus confirm and are confirmed by numerous personal remarks in Adams's letters—form a veneer over what can only be regarded as grave concern for the ways in which humanity is exploiting nature and damaging the planet. The arc of Adams's late work is marked by a dramatic recognition that everything—technology, knowledge, social relations, and the understanding of the natural world—had changed during the course of his life. The Enlightenment child of unity—of Quincy's natural world—had discovered the multiplicity of nature and the universe and so the reduced status of humankind in the scheme of things. His point being, of course, that there was no scheme of things, only motion, energy, and force. In the world in which he matured, war, consumption, waste, ignorance, and political chaos—from the land grabbing of the Jackson era to the Civil War, Grant's incompetence, McKinley's assassination, and the Great War—seemed evidence of the jeopardy to which science had led and importantly, the misunderstanding and misuse of its discoveries. When Adams proclaims to Brooks “that science is to wreck us,” he is not faulting science for its curiosity and explorations so much as how its findings are being interpreted and applied.

Even Adams's earliest writings suggest that an eclectic intellectual curiosity was the keystone of aesthetic values for which “form” was the framework. His concept of literary art stretched across genres and subject matter as he reshaped forms to suit varying and otherwise diverse interests. In numerous comments throughout his letters, he references the importance of narrative forms and dramatic artfulness. His later writings rely on dramatic strategies from his role as “uncle” and “pilgrim” in the *Chartres* to the character of “Henry Adams” in the *Education* to the wit and irony and conversational tone of the epistolary “Tendency” and “Letter.” The scientific and philosophical deep-dive of the late chapters of the *Education* challenges readers in much the same way as the cetology chapters of *Moby-Dick*, the historical essays woven into *War and Peace*, and the extemporaneous essays in *Vanity Fair*. The northward

curve of the graph in “The Rule of Phase Applied to History” points to the same ending and the same likely outcome as Al Gore’s charts, and while it has no value to the disciplines of science or history, as symbol and image it augurs the dissolution of civilization and along with it the democratic *experiment* (the most fundamental method of inductive reasoning in science).

Brooks Adams has been criticized for the grim title he hung on the posthumous volume of his brother’s essays, effectively making the Second Law of Thermodynamics, *degradation*, the theme of the book. In the shadows of an unfolding climate crisis, and indeed today’s correlating crisis of American democracy, Adams was remarkably prescient. The old paradigm of historical study—and of the nature of knowledge itself—that in his terms, he was unspooling, has found new life in climate-change denialism and the explosion of unfettered capitalism. The new paradigm of knowledge science was constructing in his era offered the means to reconstruct the epistemology of history in ways that distinguish Adams from naturalist counterparts like Muir, Burroughs, and Humboldt and yet suggests a vital and unique place for him in their company in the development of natural philosophy.

Robert F. Sommer *is an author and independent scholar. His essay collection, LOSING FRANCIS: ESSAYS ON THE WAR AT HOME, won the 2019 Thorpe Menn Award for Literary Excellence. He is the author of two novels and has written for commercial, literary, and scholarly publication. His recent non-fiction work, ZOMBIE POWER PLANT, traces the fifteen-year battle by Kansas environmentalists to prevent construction of one of the largest coal-burning power plants in the US. Sommer can be found online at Uncommon Hours.*