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## Rethinking Max Weber's Theory of Disenchantment

Who says we are disenchanting? Not the leaders of the National Rifle Association, who are currently rewriting fairy tales to include fantastical stories in which Little Red Riding Hood doesn't need a manly woodsman to come to her rescue because Granny had the foresight to arm herself with a shotgun. And isn't it a comfort to learn that Hansel and Gretel's parents did not abandon them in the woods to starve because both children had guns and brought home the necessary bacon to keep the family together?<sup>1</sup> But while the NRA may believe it can re-enchant the world with bigger and better guns, there has been a long tradition of scholarship in the West claiming that from the Reformation onwards people experienced the world as increasingly disenchanting. According to this narrative, science demystified the world, taking the magic and mystery out of nature. A sense of communal identification was lost to bureaucratic connections and the rise of isolated and alienated individuals. Finally, instrumental reason undermined the power of the imagination. This was, of course, the view set forth by Max Weber in his 1918 lecture "Science as a Vocation."<sup>2</sup>

In past decades a number of scholars have seriously challenged Weber's thesis, most recently Egil Asprem, who has problematized Weber's notion of disenchantment by presenting ample evidence that there was plenty of enchantment in the scientific and philosophical theories devised and discussed in the first half of the twentieth century.<sup>3</sup> It is the object of this essay to show that the same can be said of the eighteenth and nineteenth centuries. The idea that a materialist and mechanical philosophy achieved canonical status in the early modern period is quite simply wrong. As I will argue, eighteenth-century enlightenment sci-

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1 <https://www.nrafamily.org/articles/2016/1/13/little-red-riding-hood-has-a-gun/> (last accessed August 17, 2016).

2 "The fate of our times is characterized by rationalization and intellectualization and, above all, by the 'disenchantment of the world.'" Max Weber, "Science as a Vocation," *Essays in Sociology*, ed. and trans. Hans H. Gerth and C. Wright Mills (Oxford: Oxford University Press, 1946), 129–56; here 155. This essay was originally published as "Wissenschaft als Beruf." It was delivered at the University of Munich in 1918 and published by Dunker & Humblot (Munich, 1919).

3 Egil Asprem, *The Problem of Disenchantment: Scientific Naturalism and Esoteric Discourse, 1900–1939*. Studies in the History of Religions, 147 (Leiden and Boston: Brill, 2014).

ence and philosophy and its nineteenth-century counterparts enchanted the world by revealing the marvelous and magical possibilities of science and by emphasizing the sheer pleasures of the imagination. But it was not science alone that offered new kinds of enchantment; literature, art, and the new forms of entertainment that arose did as well. Reason, I contend, was not the enemy of magic and enchantment but one of its greatest allies.

In my *Religion, Magic, and Science in Early Modern Europe and America* I argued that the attempt to rationalize the early-modern world was a Sisyphean effort, much like the little Dutch boy trying to hold back the flood by putting his finger in the dyke. Labeling and classifying natural objects, writing catechisms to shore up religious dogmas, prescribing stricter rules of etiquette to civilize the *hoi poloi*, and devising schemes to make ordinary language less vulgar were all aspects of the larger attempt to impose rational order on nature and society in the wake of the collapse of the Aristotelian-Ptolemaic worldview and breakdown of late medieval society under the impact of the Reformation and emergence of proto-capitalism.<sup>4</sup> In actuality all these attempts to reestablish order were only partially successful, but their limited success appeared to provide evidence for Weber's contention that enlightenment rationality disenchanting the world.

However, in arguing this Weber essentially drank the kool aid provided by anti-Enlightenment and later Traditionalist thinkers from Edmund Burke (1729–1797) to Oswald Spengler (1880–1936), who excoriated the enlightenment ideals of rationality, equality, and democracy as they looked back longingly to a lost golden age suffused by religious faith and dedicated to communal rather than individual good.<sup>5</sup> This past perfect was, however, a form of nostalgia, a fiction, a utopia that, as the noun implies, existed nowhere but in the minds of enlightenment critics. I am not denying that from the end of the seventeenth century onwards the world was in many respects rationalized and disenchanting, although I follow Alexandra Walsham in preferring the term “desacralized.”<sup>6</sup>

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<sup>4</sup> Allison P. Coudert, *Religion, Magic, and Science in Europe and America*. Praeger Series on the Early Modern World (Santa Barbara, CA, Denver, CO, and Oxford: Praeger, 2011), ch. 5.

<sup>5</sup> *The Enlightenment and its Shadows*, ed. Peter Hulme and Ludmilla Jordanova (London and New York: Routledge: 1990); Zeev Sternhell, *The Anti-Enlightenment Tradition*, trans. David Maisel (New Haven, CT, and London: Yale University Press, 2010). Over the past decades God has returned to the Enlightenment with a vengeance, as scholars have taken issue with the Traditionalists' view of the Enlightenment as anti-religious and secular. See *God in the Enlightenment*, ed. William J. Bulman and Robert G. Ingram (Oxford and New York: Oxford University Press, 2016).

<sup>6</sup> Walsham prefers the terms desacralization to secularism because she is principally concerned “with the decline of belief in divine immanence rather than the rejection or marginalization of

I am arguing that throughout Western history there have been periods of disenchantment, but in every case new forms of enchantment arose to fill the gap. This is particularly true of the eighteenth and nineteenth centuries when enchantment escaped the confines of the church, entering the public realm of pleasure gardens, theaters, scientific societies, zoos, pubs, cabarets, circuses, freak shows, mountain trekking, bicycling, and out-door camping.<sup>7</sup> But even more importantly, enchantment moved from outside of individuals into the human imagination. Exotic travel literature, the novel, and science developed in tandem in the early modern period, allowing individuals unprecedented ways to imagine, to get under the skin of, spy on, or see inside of beings decidedly different from themselves, such as flies, cannibals, murderers, moon-people, monsters, mountebanks, quacks, even women.<sup>8</sup>

Henry Stubbe (1632–1676), the English physician, writer, and member of the England's prestigious Royal Society, went as far as to call natural philosophers “novellists”<sup>9</sup> and with good reason because, like novelists, they alerted the public to all the new and wondrous things that had been discovered about humans and the world around them: microscopes, telescopes, air pumps, the circulation of the blood, a human-powered submarine, pendulum clocks, the slide ruler, blood transfusions, adding and calculating machines, the pressure cooker, and Dom Perignon champagne.<sup>10</sup> These new wonders did not fit neatly within a Christian framework that viewed enchantment as coming from external supernatural forces. They were part of the natural world.<sup>11</sup>

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religion per se.” Alexandra Walsham, “The Reformation and the Disenchantment of the World Reassessed,” *American Historical Review* 51.2 (2006): 497–528; here 504. On this issue, see *Säkularisierung, Dechristianisierung, Rechristianisierung im neuzeitlichen Europa: Bilanz in Perspektiven der Forschung*, ed. Hartmut Lehmann. Veröffentlichungen des Max-Planck Instituts für Geschichte, 130 (Göttingen: Vandenhoeck & Ruprecht, 1997); and Anthony Giddens, *Consequences of Modernity* (Stanford, CA: Stanford University Press, 1990).

**7** For a magisterial examination of the many things that Londoners paid to look at from the seventeenth to the nineteenth centuries, see Richard D. Altick, *The Shows of London* (Cambridge, MA: The Belknap Press of Harvard University Press, 1978).

**8** I am indebted to Mary Baine Campbell for this observation, although I disagree with her contention that the world became disenchanting as a result of scientific advances in the early modern period. See her *Wonder & Science: Imagining Worlds in Early Modern Europe* (Ithaca, NY, and London: Cornell University Press, 2004), 17.

**9** Campbell, *Wonder & Science* (see note 8), 17.

**10** <http://theinventors.org/library/inventors/bl1600s.htm> (last accessed on August 17, 2016)

**11** This point is emphasized by Jane Bennett: “My quasi-pagan model of enchantment pushes against a powerful and versatile Western tradition (in the disciplines of history, philosophy, and literature) that make enchantment depend on a divine creator, Providence, or, at the very least, a physical world with some original connection to a divine will.” See her *The Enchantment of Mod-*

The paradox here is that one of the most vociferous early proponents of the disenchantment thesis was Edmund Burke (1729–1797) in his excoriation of the French Revolution; but this same Burke reintroduced eighteenth-century Europeans to Longinus’s concept of the sublime, and with that came a new and marvelous source of enchantment found not only in nature but in the sciences and the arts as well.<sup>12</sup> Burke’s Janus-faced approach to disenchantment points to something important, namely the idea that modernity is characterized by ambiguity, ambiguity expressed in the “fruitful tensions between seemingly irreconcilable forces and ideas,” to cite Michael Saler.<sup>13</sup>

I would go even further and argue that disenchantment occurs historically any time anyone envisions a previous age as being enchanted, unlike his or her own. If disenchantment were not an unavoidable fact of everyone’s life in every recorded age, why would religion have arisen in the first place? What other than real or possible disenchantment would motivate individuals to sacrifice things they love and value and perform complex, costly, and often painful rituals? Thanksgiving would be an obvious motive, but the obverse of thanksgiving is always and inevitably disappointment or disenchantment, with death being the greatest disenchanter of all. Following Durkheim, one might say that disenchantment comes to everyone who forsakes the community for purely private interests. Durkheim claimed that it was the nature and function of community festivals and communal feasts to restore communal enchantment and the “effervescence” lost to individuals estranged from the group.<sup>14</sup> This suggests that disenchantment cannot be a permanent feature of life in general. There is a moral dimension to this analysis that I will come back to at the end of this essay.

Before we get to Burke’s sublime and the awe and astonishment it produced in individuals, we need to go back a century and consider Robert Boyle’s reaction to a “luminous” leg of veal discovered by a terrified servant just as Boyle was retiring for the night. Boyle was so fascinated by the report of this luminous

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*ern Life: Attachments, Crossings, and Ethics* (Princeton, NJ, and Oxford: Princeton University Press, 2001), 12. Bennett rejects this teleological framework, arguing with Epicureans that matter is “wondrous, even without purpose” (13).

<sup>12</sup> Edmund Burke, *Reflections on the Revolution in France*. Oxford World Classics (1790; Oxford and New York: Oxford University Press, 2009); id., *A Philosophical Enquiry into the Origins of the Sublime and Beautiful*. Oxford World Classics (1756; Oxford and New York: Oxford University Press, 2015).

<sup>13</sup> Michael Saler, “Modernity and Enchantment: A Historiographical Review,” *American Historical Review* 111 (June 2006): 692–716; here 699.

<sup>14</sup> Émile Durkheim, *The Elementary Forms of Religious Life*, trans. Joseph Ward Swain (New York: Free Press, 1965). “Collective Effervescence” is mentioned six times in this work on pages 250, 258, 405, 441, 445, and 469.

leg that he ordered it to be placed in a dark corner of his bedroom, where, as he later wrote to a friend, “I plainly saw, both with wonder and delight, that the joint of meat did, in diverse places, shine like rotten wood or stinking fish; which was so uncommon a sight, that I had presently thoughts of inviting you to be a sharer in the pleasure of it.”<sup>15</sup> Despite the late hour and the cold he had previously caught trying out a new telescope, Boyle called for another shank “ennobled with this shining faculty” to be brought from the larder to his bedroom, and, intrigued by this “uncommon sight,” he stayed up until the early hours of the morning to investigate the phenomenon.

As odd, even repugnant, as we might find this incident, Boyle clearly believed his correspondent would experience the same wonder and urge to investigate that he had, and, indeed, seventeenth-century natural philosophers did consider wonder a prime motivation behind their investigations. René Descartes (1596–1650) claimed that his researches were often preceded by “a sudden surprise of the soul which makes it tend to consider attentively those objects which seem to it rare and extraordinary”<sup>16</sup> Francis Mercurius van Helmont (1614–1698), whose biography I wrote, claimed that “the beauty of this Living Earth when seen with a microscope will make a man in Love with it.”<sup>17</sup>

Van Helmont's good friend Gottfried Wilhelm Leibniz (1646–1716) was propelled by the same love and wonder in his scientific investigations: “. . . the more one understands nature and the solid truth of real sciences, which are so many rays of divine perfection, the more one is able to truly love God.”<sup>18</sup> Fran-

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15 Lorraine Daston and Katherine Park, *Wonders and the Order of Nature, 1150–1750* (New York: Zone Books, 1998), 13.

16 Daston and Park, *Wonders and the Order of Nature* (see note 15), 13. Descartes described wonder as the first passion of the soul: “When the first encounter with some object surprises us ... this makes us wonder and be astonished. . . . And since this can happen before we know in the least whether this object is suitable to us or not, it seems to me that Wonder is the first of all the passions. It has no opposite, because if the object presented has nothing in it that surprises us, we are not in the least moved by it and regard it without passion.” René Descartes, *The Passions of the Soul*, trans. Stephen Voss (Indianapolis, IN: Hackett Publishing Co, 1989), pt. 2, arts. 70 and 53; 56–57 and 52.

17 “Some Observations of Francis Mer: Van Helmont . . .,” British Library, Sloane MSS 5630, 9<sup>th</sup> observation.

18 This passage appears in a review Leibniz wrote in 1695 of *An account of W. Penns travails in Holland and Germany, anno MDCLXXVII for the service of the Gospel of Christ . . .* (London: T. Sowle, 1694). *G.W. Leibniz: Textes inédits*, ed. Gaston Grua, 2 vols. (Paris: Presses Universitaires de France, 1948), I: 91. Leibniz's comments, along with the previous ones, were a standard trope of the period concerning the “Book of Nature” as a second “Scripture” revealing the wonders and majesty of God. See *The Book of Nature in Early Modern History*, ed. Klaas van Berkel

cis Bacon (1561–1626) had been similarly intrigued by the marvels and wonders of nature and included a history of them in his program to reform natural philosophy. He had called for natural histories of monsters, prodigious births, and anything new or rare. London’s Royal Society took Bacon at his word and published in its journal *The Philosophical Transactions* many cases of strange phenomena or what were colloquially referred to as “wonders.” These included cases of monstrous births – one account describes the birth of a twenty-three pound monster without any bones or head. Other “wonders” included people claiming to fast for lengthy periods or who appeared to survive without eating; “old agers,” whose lives were exceedingly long; and people with unusual anatomies – for example a woman in France with four breasts, a “pretty young hermaphrodite,” as well as a woman pregnant for eighteen years.<sup>19</sup> It is clear from accounts like these that reports of seemingly supernatural or miraculous events sparked the curiosity of natural philosophers and stimulated their urge to investigate.

What became increasingly valued in the early modern period was what was new and original and, because of this, wonderful. The connection was constantly made between the New World and the new discoveries made possible by the New Science. Nicholas Monardes (1493–1588), for example, gave an enthusiastic endorsement of the “newe thyges and secrets” discovered in the Americas in his *Joyfull Newes out of the Newe Fonde World* (1577). He was especially taken by “the rare and singular vertues of diuerse and sundrie hearbes, trees, oyles, plantes, and stones, with their applications as well for phisic as chirurgerie . . . .”<sup>20</sup> One of the reasons why cabinets of curiosities were so popular in the seventeenth and eighteenth centuries was to highlight just how far the modern world had come from classical antiquity. Contrasting antique artifacts with modern instruments – telescopes, globes, lenses, microscopes – and specimens of flora and fauna from the new world demonstrated how the once dominant culture of the past was receding before new forms of modernity.<sup>21</sup> Jonathan Israel draws

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and Arjo Vanderjagt. Groningen Series in Cultural Change, 17. 2 vols. (Leuven and Dudley, MA: Peeters Publishers, 2006).

**19** Theodore K. Hoppen, “The Nature of the Early Royal Society, pt. 1,” *The British Journal for the History of Science* 9 (1976): 1–24; Peter Dear, “Miracles, Experiments and the Ordinary Course of Nature,” *Isis* 81 (1990): 663–83.

**20** Nicolás Monardes, *Joyfull newes out of the Newe Founde Worlde, wherein is declared the rare and singular vertues of diuerse and sundrie hearbes, trees, oyles, plantes, and stones, with their applications, as well for phisicke as chirurgerie. . . .* Translated from the 1565 Spanish edition by John Frampton (London: In Poules Church-yard by Willyam Norton, 1577).

**21** *The Origins of Museums: The Cabinets of Curiosity in Sixteenth- and Seventeenth-Century Europe*, ed. Oliver Impey and Arthur McGregor (Oxford: Clarendon Press, 1987); Stephen Green-

attention to the essential role of journals in spreading an awareness of new ideas and turning people away from old authorities.<sup>22</sup>

Many scholars have seen Francis Bacon (1561–1626) as a key player in the process of disenchantment.<sup>23</sup> But if we look at his writing, we are struck by his complete and utter conviction that marvels both incite scientific investigation and create new and equally marvelous things. Bacon was a major figure in promoting the “modern” agenda of advancement and progress.<sup>24</sup> His writings were immensely important in this regard with his admonition that, unlike their medieval predecessors, natural philosophers had the duty to produce practical “fruit” from their scientific researches as well as intellectual “light.” Bacon practiced what he preached, becoming a martyr to the cause of science. Checking on the carcass of a chicken he had buried in a bank of snow to see if cold could arrest its decay, he caught the chill that killed him.<sup>25</sup>

Bacon's *History of Life and Death* did much to legitimize the idea that restoring health and prolonging life were legitimate and worthy human goals. In his *New Atlantis* he lists many wondrous things that human could and should expect from the work of natural philosophers, among which were “the prolongation of life,” “the restitution of youth,” and “the retardation of age.” He describes the scientists employed in “Salomon's House,” the scientific institution he describes in his imaginary “New Atlantis,” who produce a “water of Paradise,”

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blatt, *Marvelous Possessions: The Wonder of the New World* (Chicago: Chicago University Press, 1991); Eilean Hooper-Greenhill, *Museums and the Shaping of Knowledge* (London: Routledge, 1992); Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley, CA: University of California Press, 1994); Anthony Alan Shelton, “Cabinets of Transgression: Renaissance Collections and the Incorporation of the New World,” *The Culture of Collecting*, ed. John Elsner and Roger Cardinal (Cambridge, MA: Harvard University Press, 1994), 177–203.

**22** Jonathan I. Israel, *Radical Enlightenment: Philosophy and the Making of Modernity, 1650–1750* (Oxford and New York: Oxford University Press, 2002), 142–51.

**23** See, for example, Carolyn Merchant, *The Death of Nature* (San Francisco, CA: Harper & Row, 1980).

**24** Paolo Rossi, *Francis Bacon: From Magic to Science*, trans. Sacha Rabinovitch (Chicago: Chicago University Press, 1968); Stephen Gaukroger, *Francis Bacon and the Transformation of Early-Modern Philosophy* (Cambridge and New York: Cambridge University Press, 2001); Deborah E. Harkness, *The Jewel House: Elizabethan London and the Scientific Revolution* (New Haven, CT: Yale University Press, 2007).

**25** Lisa Jardine and Alan Stewart argue that the chicken really stood for the opiate that killed Bacon, but most historians accept that the chicken was indeed a chicken. See Lisa Jardine and Alan Stewart, *Hostage to Fortune: The Troubled Life of Francis Bacon* (New York: Hill and Wang, 1999).

that is “very sovereign for health, and the prolongation of life.”<sup>26</sup> There were also special caves on the island with air that helped heal and prolong life and a bath that restored “the very juice and substance” of the human body.<sup>27</sup> Salomon’s House contained laboratories for the dissection of animals and birds “that thereby we may take light what may be wrought upon the body of man.” The fact that headless birds “leape and flutter” suggested to Bacon that it might be possible to resuscitate the dead, an idea that is still very much with us. He even proposed that organs could be transplanted.

In their own wonderful book *Wonders and the Order of Nature* Lorraine Daston and Katharine Park agree with many other scholars that by the early eighteenth century “the star of the marvelous had indeed waned, if not completely vanished.”<sup>28</sup> The wonder and excitement inspiring seventeenth-century natural philosophers like Boyle, Descartes, and Bacon had gone out of fashion, becoming a sign of ignorance, childishness, and vulgarity.<sup>29</sup> But I would argue this sim-

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**26** Francis Bacon, *The Collected Works of Francis Bacon*, ed. James Spedding, Robert L. Ellis, and Douglas D. Heath, 14 vols. (London: Longmans, 1868–1901), 5: 400.

**27** Bacon, *The Collected Works* (see note 26), 5: 401.

**28** Daston and Park, *Wonders and the Order of Nature* (see note 15), 312.

**29** Daston and Park, *Wonders and the Order of Nature* (see note 15), 304, see also 329, 333. Daston’s and Park’s work is important in showing that up to the mid-eighteenth century elites took differing approaches to wonders; there was hence no linear move away from wonder and enchantment. Princes and courtiers collected marvelous items to promote their worldly ambitions. For similar reasons, physicians and naturalists collected and catalogued wonders. But natural philosophers, they argue, were more ambivalent inasmuch as wonders interfered with the idea of a comprehensible universe based on discoverable natural laws (703). By the seventeenth century, however, natural philosophers were more enthusiastic about investigating wonderful objects as a result of the move toward empiricism. This helps to explain, for example, why Robert Boyle may have funded an investigation of occult phenomena in Scotland. On this possibility, see *The Occult Laboratory: Magic, Science and Second Sight in Late 17th-Century Scotland: A New Edition of Robert Kirk’s The Secret Commonwealth and other texts, with an introductory essay*, ed. Michael Hunter (Woodbridge: The Boydell Press, 2001). It may also explain why Henry More and Joseph Glanvill collaborated on an investigation of witchcraft in *Saducismus triumphatus, Or, full and plain Evidence concerning Withcraft and Apparitions* (London: Printed for A. L., 1681). Unlike most other historians, Daston and Park argue that disenchantment occurred not because of intellectual reasons – the rise of science, the spread of instrumental reason, and the growth of secularism – but for social and political reasons. As a result of the proliferation of sects after the Reformation, the masses were using marvels and wonders for their own purposes. Elites responded to the threat of anarchy by regularizing nature and marginalizing wonders. In Daston’s and Park’s view, a new dichotomy emerged between the rational elites and the irrational *hoi poloi*, the enlightened and the vulgar (704). One could be “curious,” but wonder was unacceptable (704). This is what Randall Styers means when he says to be modern is to reject magic. See his *Making Magic: Religion, Magic, & Science in the Modern World* (Oxford and New York: Oxford



ply is not the case. Wonder did not cease in the eighteenth century. While the Enlightenment rejected traditional Christian sources of enchantment, it created new forms by fostering an optimistic view of human nature and agency that encouraged all kinds of utopian as well as practical schemes to improve life in thoroughly wonderful ways. Enlightenment thinkers revealed, even revealed in, the marvelous possibilities of science and technology and in doing so piqued the delight and imaginations of their readers.

During the long eighteenth century (1650–1800) there was an increasing resistance to the idea of human beings as innately sinful and an emerging consensus that humans are social creatures, whose essential goodness and natural sympathy for their fellow humans can be enhanced or destroyed by the treatment they receive from family and society at large. Hans Erich Bödeker has justly described this radical reevaluation of human nature as an “anthropological revolution,” which was no less important than the Copernican or Newtonian Revolutions, both of which contributed to this positive view of human potential.<sup>30</sup> The idea that humans were bound to improve under proper instruction became axiomatic for many Enlightenment thinkers intoxicated by the Promethean vision that, indeed, man does make himself.<sup>31</sup>

As Isaac Kramnick has pointed out, the Enlightenment “began the Western love affair with science and technology.”<sup>32</sup> In his *Second discours, sur les progrès successifs de l'esprit humain* (1750), Anne-Robert-Jacques Turgot (1727–1781) sketched out the history of human progress. In a similar vein, the Scottish enlightenment philosophers, Adam Smith (1723–1790), Adam Ferguson (1723–1816), John Millar (1735–1801), and Lord Kames (1696–1778) delineated the four stages of human progress from hunting to herding, agriculture, and commerce. The Marquis of Condorcet (1743–1794) remained committed to his belief in progress and the inevitable improvement of the human race even after he had been imprisoned during the French Terror, eventually committing suicide to avoid the guillotine. In his *Essai sur la manière de perfectionner l'espèce humaine* (1756) the French physician Charles Augustin Vandermonde (1727–1762) outlined the simple

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University Press, 2004). While there is some truth to all these ideas, I argue in this essay that curiosity and wonder often went hand in hand in the early-modern period and even until today.

**30** Hans Erich Bödeker, “Menschheit, Humanität, Humanismus,” *Geschichtliche Grundbegriffe: Historisches Lexikon zur politisch-sozialen Sprache in Deutschland*, ed. Otto Brunner, Werner Conze, and Reinhart Koselleck. 8 vols. (Stuttgart: E. Klett-Cotta, 1972–1997), 3: 1063–128.

**31** This observation is made by Roy Porter, *Flesh in the Age of Reason: The Modern Foundation of Body and Soul* (New York and London: W.W. Norton & Company, 2003), 386–87.

**32** *The Portable Enlightenment Reader*, ed. Isaac Kramnick (New York: Penguin Books, 1995), xii–xiii.

rules and natural principles that would make health, beauty, and strength hereditary, while simultaneously instructing parents how to train their children's minds. The French originator of positivism and sociology Auguste Comte (1798–1857) saw improvement as inevitable. According to “The Law of the Three Stages,” which he announced, human civilization had advanced from an early “theological” stage to a “metaphysical” stage, and from there it had finally moved into the final “scientific” stage.

The English Romantic poet Percy Bysshe Shelley (1792–1822) also believed that man could be “perfectionized.” He belonged to a circle of enthusiasts for vegetarianism, teetotalism, and nudism, which was instituted by his friend John Frank Newton (ca. 1770–1827), the author of *The Return to Nature, or a Defense of the Vegetable Regime* (London, 1811). Newton tried to get his family to return to the prelapsarian state when humans and animals were herbivores and lived in peace and harmony. According to Shelley he had succeeded admirably with his children, who, in Shelley's words, “are the most beautiful and healthy creatures it is possible to conceive; the girls are perfect models for a sculptor; their dispositions are also the most gentle and conciliating.”<sup>33</sup> Shelley, like so many others, secularized the Judeo-Christian millennium, presenting it as a future golden age.<sup>34</sup> As he explained to a friend, “my golden age . . . will be the millennium of the Xians.”<sup>35</sup> Shelley accepted Locke's conviction that human nature could be changed. Like Locke and his father-in-law William Godwin, Shelley believed that nature was good and evil artificial and unnecessary. Everything that was not good was therefore “unnatural” by definition. As Mary Shelley wrote of her husband: “The prominent feature of Shelley's theory of the destiny of the human species was that evil is not inherent in the system of the creation, but an accident that might be expelled . . . That man could be so perfectionized as to be able to expel evil from his own nature, and from the greater part of the creation, was the cardinal point of his system.”<sup>36</sup> According to Tristram Stuart, Shelley accepted the Zoroastrian belief that good and bad were in an epic struggle, with good eventually gaining the upper hand.

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33 Tristram Stuart, *The Bloodless Revolution: A Cultural History of Vegetarianism from 1600 to Modern Times* (New York and London: W.W. Norton & Company, 2007), 372.

34 Carl L. Becker, *The Heavenly City of Eighteenth Century Philosophers*. Yale Note Bene Series. 2nd rev. ed. (1932; New Haven, CT: Yale University Press, 2003). For an evaluation of Becker's work, see *Carl Becker's Heavenly City Revisited*, ed. Raymond O. Rockwood (Ithaca, NY: Cornell University Press, 1958).

35 Stuart, *The Bloodless Revolution* (see note 33), 385.

36 Stuart, *The Bloodless Revolution* (see note 33), 385–86.

The idea that both the world and the human race could be perfected appears in Germany as well in the work of Gottfried Wilhelm Leibniz (1646–1716) and the many German philosophers influenced by him. As I have argued in several books, if, as most commentators contend, Leibniz actually believed what Voltaire claimed, namely that this was “the best of all possible worlds,” and if his concept of “pre-established harmony” inevitably led him to an inescapable form of determinism, how can we possibly explain his life-long commitment to ecumenism, education, and science? The fact is that by the end of his life Leibniz came to think that this was indeed the best of all possible worlds because, and only because, it has the capacity to become better and better.<sup>37</sup> As he wrote in his short treatise *On the Radical Origination of Things* (1697),

Many substances have already attained great perfection. However, because of the infinite divisibility of the continuum, there are always parts asleep in the abyss of things, yet to be roused and yet to be advance to greater and better things, advance, in a word, to greater cultivation. Thus, progress never comes to an end.<sup>38</sup>

The word “cultivation” in this quotation is a translation of the German word *Bildung*.

The notion of *Bildung* and idea of perfectibility was taken even further in the nineteenth century by the German research scientist and professor at the University of Berlin, Emil du Bois-Reymond (1818–1896). In his lecture, “Über die Übung” (Concerning Practice). Du Bois-Reymond took the word *Bildung* to mean “to perfect oneself through practice.” He claimed that self-perfection is a quality of higher organisms, particularly of human beings, but that it also applied to animals. One achieved *Bildung* only through frequent repetition of a complex bodily activity with the assistance of the mind. Like a gymnast on the bars, Du Bois-Reymond claimed that through practice an experimenter, like himself, could step by step convert himself from an ugly, uneducated mass into an ideal, fully educated Apollo. Du Bois-Reymond included an illustration of this astonishing transformation – with the “uneducated mass” symbolized by a frog – in his treatise. His claim may seem bizarre, but it expressed the incredible optimism that many people felt as a result of scientific developments

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<sup>37</sup> Allison P. Coudert, *Leibniz and the Kabbalah* (Dordrecht and Boston, MA: Kluwer, 1995). The argument in this book is summed up in ch. 13 of my book, *The Impact of the Kabbalah in the Seventeenth Century: The Life and Thought of Francis Mercury van Helmont, 1614–1698*. Brill's Series in Jewish Studies, 9 (Leiden and Boston, MA: Brill, 1999).

<sup>38</sup> G. W. Leibniz, *Discourse on Metaphysics and Other Essays*, ed. Roger Ariew and Daniel Garber, trans. Roger Ariew (Boston, MA: Hackett Publishing Company, 1992), 48.

and discoveries made from the seventeenth century onwards.<sup>39</sup> The idea that humans could physically reshape themselves through exercise laid the foundation for the fitness industry that is such a powerful force in today's economy. It must be noted that Du Bois-Raymond was himself a model gymnast.<sup>40</sup>

Francis Bacon's insistence that science must produce "fruit" as well as "light" encouraged the idea that science was the perfect tool to ameliorate every aspect of human existence. By the end of the eighteenth century many individuals, not only in England but across the continent, agreed with Erasmus Darwin (1731–1802) that "All nature exists in a state of perpetual improvement," and this included human beings. This conviction was enshrined in the great many treatises that appeared in the eighteenth and nineteenth centuries delineating the kind of progress humans had made in the past and would continue to make.<sup>41</sup> In a letter to Joseph Priestley, Benjamin Franklin summed up the sort of marvelous advances he and his contemporaries expected from science:

I always rejoice to hear of your being still employed in experimental researches into nature, and of the Success you meet with. The rapid Progress *true* Science now makes, occasions my regretting sometimes that I was born so soon. It is impossible to imagine the height to which may be carried, in a thousand years, the power of man over matter. We may perhaps learn to deprive large masses of their gravity, and give them absolute levity, for the sake of easy transport. Agriculture may diminish its labor and double its produce; all diseases may by sure means be prevented or cured, not excepting even that of old age, and our lives lengthened at pleasure even beyond the antediluvian standard.<sup>42</sup>

Scientific as well as practical discoveries lay behind this tremendous spurt of optimism about the malleability of nature and the possibility of perfecting the human mind and body. John McManners documents the more positive attitude toward illness and old age that began to emerge among those he describes as

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<sup>39</sup> Gabriel Finkenstein, *Emil Du Bois-Reymond: Neuroscience, Self, and Society in Nineteenth-Century Germany* (Boston: MIT Press, 2013).

<sup>40</sup> The classical ideal of male beauty championed by the art historian and archeologist Johann Joachim Winckelmann (1717–1768) included the characteristics of manly vigor, restraint, and physical fitness. Winckelmann wrote about the Greek gymnasium and helped to foster the rise of gymnastics. See George L. Mosse, *The Image of Man: The Creation of Modern Masculinity* (London and New York: Oxford University Press, 1996), ch. 3; Jacques Ulmann, *De la gymnastique aux sports moderne: histoire des doctrines de l'éducation physique* (Paris: Vrin, 1965).

<sup>41</sup> See Michel Baridon, "Les concepts de nature humaine et de perfectibilité dans l'historiographie des Lumières de Fontenelle à Condorcet," *L'Histoire au dix-huitième siècle*, ed. Henri Coulet. Actes du Colloque d'Aix-en-Provence (Aix-en-Provence: Edisud, 1980).

<sup>42</sup> Benjamin Franklin to Joseph Priestley, February 8, 1780. Cited in *The Portable Enlightenment Reader*, ed. Kramnick (see note 32), 73–74.

“the affluent minority” in eighteenth-century England: “[T]hey were wanting to live longer, and they were discovering the logic to insist on enjoying life and being useful at a greater age.”<sup>43</sup> In her highly informative book about medical practice in eighteenth-century Braunschweig-Wolfenbüttel, Mary Lindemann demonstrates that it was not only the affluent who actively sought medical help. In this community of predominantly small farmers, there was a great desire for health on the part of everyone. People were not fatalistic, and even though high infant mortality rates were the norm, pediatric ailments were not accepted as routine.<sup>44</sup> As Lindemann says, “the inhabitants of Braunschweig-Wolfenbüttel approximated us more than their two centuries’ removal in times might suggest.”<sup>45</sup>

The growing faith in medical progress was fostered by nothing so much as the success of small pox inoculation. Inoculation was one of the great medical success stories of the eighteenth century and did much to encourage the belief in medical progress. Abbé Roman chose this as the subject of his celebratory poem, ‘L’Inoculation, Poème en quatre chants.’ A new hairstyle for women was devised to commemorate the discovery, “coiffure à l’inoculation,” which consisted of an ornament depicting an olive tree with a serpent entwined about its trunk – symbols of wisdom and Asclepius, the hero and god of medicine in ancient Greek mythology and religion – with the sun, signifying enlightenment, rising in the background. This ornamental pin was inserted into the hair, which had been artificially piled up into “une grande pouf.”<sup>46</sup>

The conviction that medicine was improving and doctors becoming more competent was illustrated by the enhanced status of the medical profession. Surgery was the most upwardly mobile occupation of the eighteenth century. For the first time it was recognized as a liberal profession, and professorships in surgery

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43 John McManners, *Death and the Enlightenment: Changing Attitudes to Death Among Christians and Unbelievers in Eighteenth-Century France* (Oxford: Clarendon Press, 1981), 84.

44 Mary Lindemann, *Health & Healing in Eighteenth-Century Germany* (Baltimore, MD: Johns Hopkins University Press, 1996), 349: “. . . parents did not face the deaths and illnesses of their children with stoic fortitude. They took great pains to alleviate the miseries of their offspring and consulted healers even for very young children, often those just day old.”

45 Lindemann, *Health & Healing* (see note 44), 373.

46 Marie Antoinette inaugurated these extravagant hairstyles or “poufs,” which could be up to a yard high and illustrated sentimental or political themes. They were formed from a wire padded with wool, cloth, horsehair, and gauze, interwoven with the woman’s own hair. The elaborate construction was stiffened with pomade and dusted with powder, which attracted vermin, requiring fashionable ladies to carry long handled head-scratchers. Marie Antoinette wore a “pouf à l’inoculation” to publicize the fact that she had persuaded the King to be inoculated against smallpox.

opened up at universities. In 1731 the Académie Royale de Chirurgie was founded, and its members dared to claim equality with physicians. The reputation of French surgeons was the highest in Europe. Paris became the surgery capital of Europe, and students flocked to the city for instruction.<sup>47</sup> Julien Offray de La Mettrie (1709–1751), who was both a *philosophe* and a physician, claimed that “Doctors are the only philosophers who are useful to the Republic. . . . The others are idlers and drones.”<sup>48</sup> Throughout the eighteenth and nineteenth centuries French surgeons continued to pioneer new surgical techniques such as removing cataracts, performing cesarean sections, and extracting bladder stones with many patients surviving these last two ordeals. While these operations were obviously life-saving when successful, French surgeons continued to innovate by engaging in another form of radical surgery that did not so much save as transform the lives of people dubbed “monsters,” a category that included those born with hair lips and cleft palates, those who developed hideously disfiguring tumors, and burn victims with scar tissue that left them permanently disfigured. In her thoroughly arresting biography of the American-born Dr. Thomas Dent Mütter (1811–1859), Cristin O’Keefe Aptowicz describes Mütter’s sojourn in Paris in 1831, where he was introduced to the new surgical techniques involved in *les opérations plastiques* or what is now known as plastic surgery. One has to remember that this was before the age of anesthesia, which began slowly and met with considerable resistance in the 1840s. Without anesthesia surgeons had to be not only immensely skilled but also very fast. As Aptowicz points out, it was not uncommon for patients entering the operating theater for plastic surgery to be prepared to die rather than continue their miserable lives as freaks and monsters, who “saw how children howled at the sight of them” and adults flinched and turned away. When successful, these surgeries were “nothing short of miraculous”:

With a careful hand, a steady knife, and a piece of bone, a surgeon could reconstruct a man’s nose with a twisted portion of his own forehead. A burned woman’s eye could close for the first time in ten years, thanks to a surgeon’s knife cutting the binding scar tissue and replacing it with skin from her own cheek. Cleft palates were fused back together – trickier than it might seem, for the sensitivities when working on the roof of the mouth

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<sup>47</sup> Laurence W.B. Brockliss and Colin Jones, *The Medical World of Early Modern France* (Oxford: Clarendon Press, 1997), 554; Cristin O’Keefe Aptowicz, *Dr. Mütter’s Marvels: A True Tale of Intrigue and Innovation at the Dawn of Modern Medicine* (New York: Gotham Books, 2014).

<sup>48</sup> *La politique du médecin de Machiavel ou le chemin de la fortune ouvert aux médecins* (Amsterdam: Freres Bernard, 1746), xx. La Mettrie wrote this under the pseudonym Dr. Fum-Ho-Ham. Cited in John McManners, *Death and the Enlightenment* (see note 43), 50.

meant the patient was in constant threat of vomiting, which would tear open delicate sutures and ensure infection.<sup>49</sup>

It is understandable why the physician and early historian of the American Revolution, David Ramsay (1749–1815) referred to the physician's "god-like work of alleviating human misery."<sup>50</sup>

One way physicians asserted their new celebrity and the power that accompanied it was by commissioning portraits. A romantic image of physicians emerged to celebrate those who worked long hours and displayed great bravery and tenaciousness as they sacrificed their own health in the service of others. One can see this not only in this new genre of portraits but in the emergence of medical biographies as well.<sup>51</sup> Describing the psychological effects of these advances in medicine and the growing prestige of medical men, McManners concludes that "Among educated people there was an increased concern with problems of health, a growing reluctance to accept illness fatalistically, and an intensified shrinking in the face of pain."<sup>52</sup> Medical developments may not have been instrumental "so much in prolonging life, as in making longer life worth while."<sup>53</sup> Clear evidence of this interest in living longer can be found in the belief that the boundary between life and death was reversible and the concomitant fear of being buried alive, a fear that inspired new models of coffins that had bells, whistles, and air pipes just in case the corpse revived.<sup>54</sup>

Bacon and Descartes had been key advocates of the idea that in addition to improving human nature and human health, physical nature itself might be manipulated and controlled for the benefits of humans. This became a guiding prin-

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49 Aptowicz, *Dr. Mütter's Marvels* (see note 47), 20–21.

50 David Ramsay, *A Review of the Improvements, Progress and State of Medicine in the XVIIIth Century* (Charleston, SC: W. P. Young, 1801), 15.

51 Ludmilla Jordanova, *Nature Displayed: Gender, Science and Medicine, 1760–1820* (London and New York: Longman, 1999), 79–81; *Romanticism and the Sciences*, ed. Andrew Cunningham and Nicolas Jardine (Cambridge: Cambridge University Press, 1990); *British Medicine in the Age of Reform*, ed. Roger French and Andrew Wear (London: Routledge, 1991).

52 McManners, *Death and the Enlightenment* (see note 43), 47.

53 McManners, *Death and the Enlightenment* (see note 43), 42.

54 Peter H. Reill, "Death, Dying and Resurrection in Late Enlightenment Science and Culture," *Wissenschaft als kulturelle Praxis, 1750–1900*, ed. Hans Erich Bödeker, Peter Hanns Reill, and Jürgen Schlumbohm. Veröffentlichungen des Max-Planck-Instituts für Geschichte, 154 (Göttingen: Vandenhoeck & Ruprecht, 1999), 255–74; id., *Vitalizing Nature in the Enlightenment* (Berkeley, CA, Los Angeles, CA, and London: University of California Press, 2005), 171–82; Russell C. Maulitz, *Morbid Appearances: The Anatomy of Pathology in the Early Nineteenth Century* (Cambridge: Cambridge University Press, 1987); Ruth Richardson, *Death, Dissection and the Destitute* (London: Routledge and Kegan Paul, 1988).

ciple of the Scientific Revolution and Enlightenment. Bacon's and Descartes's optimism flew in the face of the skeptical conditioning that was part and parcel of the classical education and Christian upbringing of European male elites, both of which emphasized the precarious nature of life and the helplessness of individuals in the face of suffering and pain unless they possessed philosophical resignation or a religious cast of mind. But this mentality, along with the myth of a lost Golden Age and the idea that the Ancients were vastly superior to the Moderns, came under increasing attack in the early-modern era as trade, travel, developing commerce, and the ingenuity of artisans, craftsmen, and natural philosophers opened up vistas of previously unimagined possibilities and brought new and unprecedented things such as rhinoceri and ant eaters to the attention of Europeans, not to mention potatoes and tobacco.<sup>55</sup>

Microscopes and telescopes may have blown the minds of natural philosophers, allowing them to see things they never knew existed, but air and water pumps, carriages with better springs for faster and more comfortable travel, newly designed houses with smaller, heated rooms, and more sophisticated, healthful, and appetizing food served on pewter plates convinced many ordinary people that, indeed, life was worth living and science a potent force for good. Given these improvements, it is understandable that "utility" and "fitness" became key concepts in the Enlightenment, joining together notions of pleasure, enjoyment, morality, aesthetics, as well as economic efficiency, all of which were aspects of the new kind of enchantment characterizing the early modern period.<sup>56</sup>

The disenchantment thesis was and still is based largely on the idea that the so-called mechanical philosophy triumphed in the seventeenth century, turning the dynamic and vibrant universe – in which everything was holistically connected in a "Great Chain of Being" – into a mass of inert atoms.<sup>57</sup> As Max Horkheimer put it, "Nature lost every vestige of vital independent existence, all value of its

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55 The classic account of the conflict between the so-called "Ancients" and "Moderns" is Richard F. Jones' *Ancients and Moderns: A Study of the Background of The Battle of the Books* (St. Louis, MO: Washington University Studies, 1936). For more modern evaluations, see Joseph M. Levine, *The Battle of the Books: History and Literature in the Augustan Age* (Ithaca, NY: Cornell University Press, 1994) and Richard Nate, *Wissenschaft und Literatur im England der frühen Neuzeit*. Figuren, 9 (Munich: Wilhelm Fink, 2001).

56 Lorraine Daston, "Attention and the Values of Nature in the Enlightenment," *The Moral Authority of Nature*, ed. Lorraine Daston and Fernando Vidal (Chicago and London: The University of Chicago Press, 2004), 100–26.

57 Arthur O. Lovejoy, *The Great Chain of Being: The History of an Idea* (1936; New York: Harper & Row, 2005).



own. It became dead matter – a heap of things.”<sup>58</sup> Peter Reill has challenged this idea in his revisionist history of the Enlightenment. He claims that while there is a general agreement among historians that from the late 1680s to the 1740s the mechanical philosophy became dominant with the widespread acceptance of Newtonian science and an “overriding impulse” to translate knowledge into mathematical terms, this changed by mid-century when nature was revitalized and the Cartesian distinction between mind and matter was largely dissolved.<sup>59</sup>

I would go even farther and argue that the mechanical philosophy did not become dominant at any time during the seventeenth, eighteenth, or nineteenth centuries. Vitalism never disappeared, even in the work of those like Robert Boyle and Isaac Newton, who are considered exponents of the mechanical philosophy. Vitalism was a legacy of medieval and Renaissance alchemy and Hermeticism. The claim that Boyle embraced the mechanical philosophy when he moved to Oxford in 1655 has been effectively refuted by Antonio Clericuzio. Clericuzio argues that it was only in the eighteenth century that Boyle was taken to symbolize the mechanical philosophy. This view of Boyle ignores the fact that he believed there were non-mechanical forces in the natural world such as spirits, seminal principles, and ferments, all of which had the power to fashion matter.<sup>60</sup> In the General Scholium added to the second edition of the *Principia* of 1713, Newton postulated the existence of a subtle spirit pervading matter: “And now we might add something concerning a certain most subtle spirit which pervades and lies hid in all gross bodies.” A similar idea appears in the Queries appended to Newton’s *Opticks*.<sup>61</sup> Perhaps even more surprisingly, Sarah Ellen-zweig

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58 Max Horkheimer, “Reason against itself,” *What is Enlightenment? Eighteenth-Century Answers and Twentieth-Century Questions*, ed. James Schmidt (Berkeley, Los Angeles, CA, and London: University of California Press, 1996), 361

59 Peter Hanns Reill, *Vitalizing Nature in the Enlightenment* (see note 54), 6. For other historians who also take 1740 as a turning point, see Robert E. Schonfield, *Mechanism and Materialism: British Natural Philosophy in an Age of Reason* (Princeton, NJ: Princeton University Press, 1970); Thomas L. Hankins, *Science and the Enlightenment* (Cambridge and New York: Cambridge University Press, 1985); Stephen Gaukroger, *The Collapse of Mechanism and the Rise of Sensibility: Science and the Shaping of Modernity, 1680–1760* (Oxford and New York: Oxford University Press, 2010).

60 Antonio Clericuzio, “A Redefinition of Boyle’s Chemistry and Corpuscular Philosophy,” *Annals of Science* 47 (1990): 561–89; here 563; id., “From van Helmont to Boyle: A Study of the Transmission of Helmontian Chemical and Medical Theories in Seventeenth-Century England,” *British Journal for the History of Science* 26 (1993): 303–43; here 318.

61 On Newton’s theory of matter, see P. M. Heimann, “Nature is a Perpetual Worker”: Newton’s Aether and Eighteenth-Century Natural Philosophy,” *Ambix* 20 (1973): 1–25; P. M. Heimann and J.E. McGuire, “Newtonian Forces and Lockean Powers: Concepts of Matter in Eighteenth Century Thought,” *Journal of the History of Ideas* 39 (1978): 271–83; Alan Gabbey, “Newton, Active Pow-

demonstrates that Spinoza's monistic materialism, summed up in his notion of *deus sive natura*, drew on the vitalistic theories characteristic of Renaissance Hermeticism. She is one of the increasing number of scholars who reject the idea that the mechanical philosophy triumphed during the seventeenth and early eighteenth centuries.<sup>62</sup> The fact that Boyle, Newton, and Locke all practiced alchemy provides more evidence that the mechanical philosophy was not triumphant.<sup>63</sup> The same, I believe, can be said of Leibniz, who was also interested in alchemy and the vitalistic philosophy of the Kabbalah.<sup>64</sup>

In his pioneering work on Mesmerism, Robert Darnton demonstrates that vitalistic theories like that of Anton Mesmer (1734–1815) were eagerly embraced in France at the end of the eighteenth century, and the predilection for spiritualist cosmologies on the part of elite and popular culture alike prepared the way for Romanticism. Mesmer's theory of animal magnetism had a great deal in common with the theories about electricity, magnetism, gravity, light, and fire proposed by supposedly "respectable" authors. Mechanical explanations failed to give an adequate or even plausible account of the wondrous effects of these invisible forces, which were reported assiduously in the popular press. Things may not have worked out so well for Dr. Frankenstein's monster in terms of electricity, but electrical belts and electrical corsets were advertised as cures for weak backs, and it was claimed that electrical hair brushes not only increased the luster and abundance of one's hair but actually prolonged life. Electrical charges

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ers, and the Mechanical Philosophy," *The Cambridge Companion to Newton*, ed. I. Bernard Cohen and George E. Smith (Cambridge and New York: Cambridge University Press, 2002), 329–57.

<sup>62</sup> Sarah Ellen Zweig, "Richard Bentley's *Paradise Lost* and the Ghost of Spinoza," *God in the Enlightenment*, ed., William J. Bulman and Robert G. Ingram (Oxford and New York: Oxford University Press, 2016), 257–77. See Catherine Packham, *Eighteenth-Century Vitalism: Bodies, Culture, Politics* (New York and London: Palgrave Macmillan, 2012); Ann Thomson, *Bodies of Thought: Science, Religion, and the Soul in Early Enlightenment* (Oxford and New York: Oxford University Press, 2008). For a re-evaluation of the Scientific Revolution, see Margaret J. Osler, *Rethinking the Scientific Revolution* (Cambridge and New York: Cambridge University Press, 2000).

<sup>63</sup> Lawrence M. Principe, *The Aspiring Adept: Robert Boyle and his Alchemical Quest* (Princeton, NJ: Princeton University Press, 1998); William R. Newman and Lawrence M. Principe, *Alchemy Tried by the Fire: Starkey, Boyle, and the Fate of Helmontian Chymistry* (Chicago and London: Chicago University Press, 2002). On Newton's interest in alchemy, see William R. Newman, *Promethean Ambitions: Alchemy and the Quest to Perfect Nature* (Chicago and London: The University of Chicago Press, 2004); "The Unknown Newton," *The New Atlantis. A Journal of Technology and Society* (Winter, 2015): <http://www.thenewatlantis.com/publications/the-problem-of-alchemy> (last accessed August 17, 2016).

<sup>64</sup> Allison P. Coudert, *Leibniz and the Kabbalah* (see note 37).

were reputed to make plants grow and cure gout. A report was published about a young boy who had regained the full use of his limbs after being thrown daily into a tub with a large electric eel – a cure we might well attribute to “natural” causes now.<sup>65</sup> The fact that scientific and pseudo-scientific explanations of the same phenomena were often so similar made it all the more difficult for ordinary people to distinguish fact from fiction, and the fuzzy line between the two was itself a source of wonder and speculation. We should remember that Goethe's *Faust* was a product of the eighteenth century, not the Middle Ages, and he appealed to an eighteenth-century audience.

In her wonderfully entertaining account of electricity during the eighteenth century, Patricia Fara describes the awe, astonishment, as well as dread aroused by public demonstrations involving electrical experiments inspired by the work of Thomas Willis (1621–1675).<sup>66</sup> Luigi Galvani (1737–1798) and his nephew Giovanni Aldini (1762–1834) both entered the field of what became known as “medical electricity,” offering public experiments to show how dead animals and humans seemed to come alive once electrical currents passed through their limbs. Galvani's specialty was electrifying dead frog's legs. Aldini's experiments involved drowning innumerable dogs and cats and then electrifying them. Timing was everything because if submerged too long, no amount of electricity could revive these poor creatures.

Others took Aldini's experiments even further, electrifying the bodies of executed criminals. *The Newgate Calendar* (a record of executions at that famous, or infamous, London prison) describes the application of electricity to the body of the criminal George Foster: “On the first application of the process to the face, the jaws of the deceased criminal began to quiver, and the adjoining muscles were horribly contorted, and one eye was actually opened. In the subsequent part of the process the right hand was raised and clenched, and the legs and thighs were set in motion.”<sup>67</sup> An even more ghoulish spectacle involved electrical experiments performed on the body of the executed thief and murderer Matthew Clydesdale in 1818 by the Scottish physician and chemist Andrew Ure (1778–

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<sup>65</sup> Robert Darnton, *Mesmerism and the End of the Enlightenment in France* (New York: Schocken Books, 1968), 14.

<sup>66</sup> Patricia Fara, *An Entertainment for Angels: Electricity in the Enlightenment*. *Revolutions in Science* (London: Icon Books, 2003). Thomas Willis was an English physician and neuroanatomist considered by many to be the founder of neuroscience and an important figure in the history of psychiatry.

<sup>67</sup> *The Newgate Calendar*, January 18, 1803 <http://www.exclassics.com/newgate/ng464.htm> (last access August 17, 2016)

1857). Ure described the experiment as well as the reactions of the crowd that had come to witness the spectacle:

The success of it was truly wonderful. Full, nay, laborious breathing, instantly commenced. The chest heaved and fell; the belly was protruded and again collapsed with the relaxing and retiring diaphragm . . . . On moving the second rod from the hip to the heel, the knee being previously bent, the leg was thrown out with such violence as nearly to overturn one of the assistants, who in vain attempted to prevent the extension. . . .<sup>68</sup>

When electricity was applied to both Clydesdale's supra-orbital nerve and heel

[e]very muscle in his countenance was simultaneously thrown into fearful action; rage, horror, despair, anguish, and ghastly smiles united their hideous expression in the murderer's face, surpassing far the wildest representations of a Fuseli<sup>69</sup> or a Kean.<sup>70</sup> At this period several of the spectators were forced to leave the apartment from terror or sickness, and one gentleman fainted.<sup>71</sup>

When the electrical current was applied to the ulnar nerve at the elbow, "the fingers now moved nimbly, like those of a violin performer." Then "he seemed to point to the different spectators, some of whom thought he had come to life."<sup>72</sup> One witness claimed that Clydesdale had opened his eyes and stood up. At this point, "Dr. Jeffrey pulled out his unerring lancet and plunged it into the jugular vein of the culprit, who instantly fell down upon the floor like a slaughtered ox on the blow of a butcher."<sup>73</sup> Of course, Clydesdale could not possibly have stood up, but such was the excitement produced by these experiments that hyperbole came naturally.

Electricity became all the rage. One of the most unusual uses of it occurred in the Temple of Health constructed by James Graham (1745–1794) in London's

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**68** *The Literary Gazette and Journal of Belles Lettres, Arts, Politics, etc.*, no. 104 (Saturday, January 16, 1819), Pt. 1.

[https://books.google.com/books?id=MGpEAQAAMAAJ&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](https://books.google.com/books?id=MGpEAQAAMAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false) (last accessed on August 17, 2016).

**69** Henry Fuseli (1741–1825) was a Swiss artist and writer, who spent most of his life in Britain. Many of his paintings, such as "The Nightmare," dealt with the demonic aspects of the supernatural.

**70** Edmund Kean (1787–1833) was a British actor celebrated for his dramatic roles, especially Shakespearean characters.

**71** *The Literary Gazette* (see note 68).

**72** *The Literary Gazette* (see note 68)

**73** Roseanne Montillo, *The Lady and Her Monsters: A Tale of Dissections, Real-Life Dr. Frankenstein's and the Creation of Mary Shelley's Masterpiece* (New York: William Morrow Paperbacks, 2013), 216.

Adelphi. Known as “The Doctor of Love,” Graham opened what may have been the first electrical therapy spa to enhance the pleasures of sex and cure infertility. The pièce de resistance in Graham’s opulent establishment was the famous “Celestial Bed.” Mounted on glass legs to insulate it from the ground, the bed was connected to wires in an adjoining room through which electrical currents were passed. The bed was surrounded by mirrors, and Graham suggestively claimed that the mattress was filled with hair from the tails of English stallions. When opened to the public, over 11,000 visitors flocked to see the Palace in the first three months. Graham believed that decadent lifestyles were diminishing human sexual capacity. He was convinced that a diet of raw, rather than cooked, dead food, combined with plenty of fresh air, hard beds, early hours, and a daily routine of washing the body, particularly the genitalia, in one of his mud baths would reinvigorate his effete contemporaries.<sup>74</sup> Graham was eventually charged with indecency, fell into debt, and died of a brain hemorrhage at the age of forty-nine after a bout of religious mania.<sup>75</sup> But the promise he, Mesmer, and many others held out for the wonderful effects of electricity were sufficiently alluring to convince people that science had the ability to cure all kinds of ailments while greatly enhancing the pleasures of life. Graham was convinced that the human race could be regenerated and that a “New Jerusalem” of perfection could be instituted on earth. As Stuart comments, “This revival of millenarianism was typical of extremists at the end of the eighteenth century, who fused their hopes of democratic reform with the expectation of a utopian future.”<sup>76</sup>

The conviction that health could be improved along with actual advances in medical care was an aspect of what Peter Gay has described as the “medicalization” of the Enlightenment by those authors who discussed the shortcomings of society and social institutions – for example, religious fanaticism, political injustice, poverty, disease, the prevalence of ignorance and superstition – as “pathologies” that could be “cured.”<sup>77</sup> The most effective way to cure these conditions was by improving human reason and perfecting human nature.

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<sup>74</sup> Stuart, *The Bloodless Revolution* (see note 33), 332.

<sup>75</sup> The English romantic poet Robert Southey (1774–1843) gives the following description of Graham: “This man lived upon vegetables, and delighted in declaiming against the sin of being carnivorous, and the dreadful effects of making the stomach a grave and charnel-house for slaughtered bodies. Latterly he became wholly an enthusiast, would madden himself with ether, run out into the streets, and strip himself to clothe the first beggar whom he met.” Cited in Stuart, *The Bloodless Revolution* (see note 33), 336.

<sup>76</sup> Stuart, *The Bloodless Revolution* (see note 33), 332.

<sup>77</sup> Peter Gay, “The Enlightenment as Medicine and as Cure,” *The Age of Enlightenment: Studies Presented to Theodore Besterman*, ed. William H. Barbour (Edinburgh: St. Andrews University Publications, 1967), 375–86.

Alice Winter does for the nineteenth what Darnton did for the eighteenth century when she demonstrates that Mesmerism was not a fringe or pseudo-science in nineteenth-century Britain but a central one that raised all kinds of interesting, even marvelous and terrifying, speculations about the hidden powers of the human mind. Even after Mesmerism had been marginalized as medicine and became more professionalized, it did not disappear; it was absorbed into other practices, particularly psychical research, physiology, and psychoanalysis.<sup>78</sup> Winter offers a thoroughly enchanted view of many aspects of Victorian life:

Far from exhibiting the stifling conformity long associated with the period, Victorian England is now recognized as having been populated by phrenologists, plebian spiritualists, mediums, and psychic researchers. They lived in a broth more exotic than the so-called Monster soup of the Thames: a potent concoction of magnetic fluids, vital powers, and swarming spirits.<sup>79</sup>

George Eliot (1819–1880) shaved her head for a phrenological reading. Herbert Spencer (1820–1903) wrote articles for a mesmeric journal, and Michael Faraday (1791–1867) built an apparatus for table-turning. Spiritualism made the mathematician and logician Augustus De Morgan (1806–1871) question the nature of scientific proof, and female mediums cast doubt on the ideology of “The Angel in the House,” helping women expand their mental and physical horizons.<sup>80</sup>

In a letter to her father written after viewing the Great Exhibition of 1851, Charlotte Brontë describes the “magic” of the things she had seen:

. . . none but super-human hands could have arranged it thus, with such a blaze and contrast of colours and marvelous power of effect. The multitude filling the great aisles seems ruled and subdued by some invisible influence. Amongst the thirty thousand souls that peopled it the day I was there not one loud noise was to be heard, not one irregular movement seen; the living tide rolls on quietly, with a deep hum like the sea heard from the distance.<sup>81</sup>

From Brontë’s description, it seems that wonder was the order of the day and not just at the Great Exhibition. New inventions greatly enlarged the boundaries of what was possible, even plausible, and increasingly obscured the dividing line

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**78** Alison Winter, *Mesmerized: Powers of Mind in Victorian Britain* (Chicago and London: University of Chicago Press, 1998), 5–8.

**79** Winter, *Mesmerized* (see note 78), 9.

**80** Winter, *Mesmerized* (see note 78), 10.

**81** Winter, *Mesmerized* (see note 78), 27.

between the material and the spiritual as mechanical innovations produced signs of life and spirit. Charles Babbage's (1791–1871) salon is a case in point. Among the items on exhibitions were dancing automata that seemed to exhibit “grace” and “imagination” and an engine that did arithmetic.<sup>82</sup> Babbage claimed that even he did not know all the powers possessed by his machines, whose actions seemed “incomprehensible without the exercise of volition and thought.”<sup>83</sup> In his 1832 book *Natural Magic*, David Brewster (1781–1868) describes talking machines, hallucinations, and pictures that simulated animation.<sup>84</sup> According to Brewster western history passed through three stages: from the religious delusion characteristic of the medieval and early modern periods, to amusement in the Enlightenment, and finally to the wonders of modern industrial production.<sup>85</sup> Natural magic seized the imagination not only because the phenomena it produced were mysterious, at least initially, but because the human minds that created these marvelous products were themselves marvelous.

The magic and wonder of science was clear to see in the automata produced by eighteenth-century clock and furniture makers. Automata like Pierre Droz' and Henri-Louis Droz's harpsichord player, La Musicienne, and Wolfgang von Kempelen's Chess Man – even though it was eventually discovered to be a fake – encouraged spectators to try to figure out how they worked. In *Man a Machine* (1748) La Mettrie mentions Jacques de Vaucanson's defecating duck and his flutist, describing their maker as a “new Prometheus.”<sup>86</sup> Because Cartesian mechanistic philosophy left so many questions about the relationship between matter, force, and motion unresolved, the intriguing question arose in the minds of many of those who viewed these marvelous mechanical objects as to whether matter in and of itself could generate motion. The complexity and delicacy required to construct automata that could move in human or animal-like ways as a result of mechanical devices small enough to fit entirely inside the figures made them all the more awesome. Between 1750 and 1820 many writers

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**82** Babbage was a mathematician, inventor, philosopher, and mechanical engineer, who, along with Ada Lovelace (1815–1852), Byron's daughter, is credited with the concept of a programmable computer.

**83** Winter, *Mesmerized* (see note 78), 38.

**84** Brewster was a Scottish scientist interested in physics, mathematics, and astronomy and the inventor of the kaleidoscope.

**85** David Brewster, *Letters on Natural Magic Addressed to Sir Water Scott, Bart.* (1832; London: William Tegg & Co., 7th ed. 1856).

**86** Adelheid Voskuhl, *Androids in the Enlightenment: Mechanics, Artisans, and Cultures of the Self* (Chicago and London: University of Chicago Press, 2015), 25.

used android automata, either actual or imagined, to explore the boundaries between machines and humans.<sup>87</sup>

While several historians claim that automata contributed to disenchantment because they presaged the perils of the industrial age, Adelheid Voskuhl contends that such disenchantment was not characteristic of the eighteenth but only of later centuries.<sup>88</sup> Julie de Lespinasse (1732–1776), who presided over one of the most prominent salons in Paris in the 1750s and 60s, informed a correspondent that before dinner, she would go and see the automata on display in a nearby hall precisely because they are “astonishing, as they say.”<sup>89</sup> Shortly after citing this remark, however, Voskuhl claims surprisingly that individuals who saw automata and left descriptions of them did “not display any particular excitement . . . about the androids or their metaphysical implications.”<sup>90</sup> If this were indeed the case, one wonders why kings and princes spent so lavishly on these devices. This apparent nonchalance is contradicted by another report cited by Voskuhl that described the streets leading up to a display of automata as occupied every day by coaches and wagons. Even rain did not discourage people from attending the showing, which ran from six in the morning to seven or eight at night.<sup>91</sup>

As historians have pointed out, although the Enlightenment is generally characterized as an age of increasing liberty, fraternity, and equality, court culture remained very powerful in the last decades of the ancient regime and militated against these very ideals. Court culture demanded rigid etiquette and ostentatious displays of power, which included luxury commodities such as automata and an audience to appreciate them. In the words of Voskuhl,

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**87** Voskuhl, *Androids in the Enlightenment* (see note 86), 170.

**88** See Gaby Wood, *Living Dolls: A Magical History of the Quest for Mechanical Life* (London: Faber & Faber, 2003), xiv; Frank Wittig, *Maschinenmenschen: Zur Geschichte eines literarischen Motivs im Kontext von Philosophie, Naturwissenschaft und Technik*. Epistemata: Würzburger wissenschaftliche Schriften, 212 (Würzburg: Königshausen & Neumann, 1997), 25. Voskuhl, *Androids* (see note 86), disagrees with those like Jessica Riskin, who argue that eighteenth-century automata were built for scientific purposes: “I understand the women automata. . . to be not epistemically relevant simulations of live bodies, but rather mechanical replications of cultural and political body practices and ambitions” (21). See Jessica Riskin, *The Restless Clock: A History of the Centuries-Long Argument about What Makes Things Tick* (Chicago and London: University of Chicago Press, 2016).

**89** Cited in Voskuhl, *Androids in the Enlightenment* (see note 86), 67.

**90** Voskuhl, *Androids in the Enlightenment* (see note 86), 65.

**91** Voskuhl, *Androids in the Enlightenment* (see note 86), 65.



In this public and international court culture, automata and related artifacts were suitable items of wonder and spectacle; they provided incentive for mechanical innovation, and they were also suitable items for gift exchange among parties of political power. Technical ornamentation of place parks and gardens were part of the same culture that inspired automaton-making.<sup>92</sup>

There was a political dimension to court culture's fascination with automata and mechanical devices because they appeared to provide evidence of a mechanized universe set in motion by God, a universe that God's regents on earth liked to think of as a model for their own courtly universes.

The aesthetics of eighteenth-century European court culture were decidedly neoclassical and centered on Burke's notion of the beautiful rather than the sublime. Balance, proportion, and self-contained smallness were the essence of the beautiful as one can see from the gardens at Versailles and the Palladian architecture that Neoclassicists favored. Although Burke excoriated French revolutionaries for destroying the court culture he identified with, his own writing on the sublime contributed to revolutionary, and especially early romantic revolutionary, thought. Romantics adopted Burke's reverence for the sublime, which he defined as vast to the point of infinity, obscure, awe-inspiring, powerful, and uncanny. Burke's goal was to explain how terror could cause delight. His answer was that the pleasure an individual receives from the sublime involves the sensation that accompanies the removal of danger. In essence, coming to terms with the sublime necessitated a certain amount of *Schadenfreude*, but one that did not preclude but encouraged empathy.

One of the most important and characteristic aspects of modernity involved breaking down the barriers between God, humans, and nature, barriers that, as Norbert Elias has shown, took centuries of concerted human effort to erect.<sup>93</sup> Burke's essay on the sublime played a hand in this destruction. Far from disenchanting the world, this elimination of borders enchanted the world in profoundly new and exciting ways. Those who accepted this blurring of boundaries and saw themselves as part of nature rather than apart from it opened themselves up to a sympathetic appreciation of the world in holistic terms, where each part connected, reflected, and inflected every other. They realized that humans are thoroughly embedded in this cosmos; they are not aliens brought unwillingly

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<sup>92</sup> Voskuhl, *Androids in the Enlightenment* (see note 86), 27.

<sup>93</sup> Norbert Elias, *The Civilizing Process*, vol. 1, *The History of Manners*, trans. Edmund Jephcott (1939; New York: Urizen Books, 1978). In this regard it is interesting to note that in the seventeenth century some Puritan parents were reluctant to let their children crawl like animals suggesting that they rejected any thought of human kinship with the animal world.

from some heavenly gnostic or platonic sphere, to which they long to return. This is the message Samuel Taylor Coleridge (1772–1834) presents in his poem “The Eolian Harp” (II: 26–29):

O! the one Life within us and abroad,  
Which meets all motion and becomes its soul,  
A light in sound, a sound-like power in light,  
Rhythm in all thought, and joyance every where.

*Hen kai pan*, or “all in one,” became something of a clarion call for early Romantics and reflected the tremendous influence Spinoza’s philosophy with its identification of God with Nature (*Deus sive natura*) had on Romantics across Europe and especially in Germany. Although no one willingly admitted Spinoza’s influence because he was excoriated as an atheist, Romantics embraced his contention that God was in all things since this made the commonplace and ordinary marvelous, even divine. According to Friedrich Heinrich Jacobi (1743–1819), under his prodding Lessing confessed he had lost faith in orthodox Christianity and was a Spinozist: “The orthodox conceptions of the divine are no longer for me; I cannot stand them. *Hen kai pan!* I know nothing else.” But it was actually Jacobi who put the words in Lessing’s mouth when he queried, “Then you would indeed be more or less in agreement with Spinoza,” to which Lessing replied: “If I am to call myself by anybody’s name, then I know none better.”<sup>94</sup> Lessing added, “That is also the tendency in Goethe’s writings.” And, indeed, there was.

In his autobiography *Dichtung und Wahrheit* (1811), Johann Wolfgang Goethe (1749–1832) admits he read Spinoza:

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**94** *The Spinoza Conversations between Lessing and Jacobi: Texts with Excerpts from the Ensuing Controversy*. Introduced by Gérard Vallée, trans. G. Vallée, J. B. Lawson, and C. G. Chapple (Lanham, MD: University of America Press, 1988), 9–10. The conversations took place a few months before Lessing’s death in 1781. They were published by Jacobi as *Über die Lehre des Spinoza, in Briefen an den Herrn Moses Mendelssohn* (Breslau: G. Lowe, 1785). Lessing’s contemporaries as well as modern scholars have widely divergent views as to Lessing’s alleged Spinozism, which range from a definitive yes to a total denial. See Johannes Schneider, *Lessings Stellung zu Theologie vor der Herausgabe der Wolfenbüttler Fragmente* (‘s-Gravenger: Uiotgeverij Excelsior, 1953), 7–15. Vallée concludes, quite rightly in my opinion, that Lessing was not a confirmed Spinozist but a pantheist who rejected what he saw as the orthodox idea of God as a transcendent anthropomorphic autocrat for a theology of immanence (24).

I hastened back to the works [of Spinoza], to which I owe so much, and the same breath of peace wafted towards me. I became absorbed in reading and thought, as I looked within myself, that I had never seen the world so clearly.<sup>95</sup>

The world Goethe saw with such clarity was a holistic one: “All effects . . . that we observe in the world of experience are interrelated in the most constant manner . . . .”<sup>96</sup> In this holistic universe revelation came from Nature, with a capital “N,” not God or scripture, but from the natural world as it impinged on our senses. Since Nature had to be felt through our senses, it was experienced emotionally and not just through reason:

Let the eyes be closed, let the sense of hearing be excited, and from the simplest sound to the highest harmony, from the most vehement and impassioned cry to the gentlest word of reason, still it is but Nature that speaks and manifests her presence, her power, her pervading life, and the vastness of her relations, so that a blind man, to whom the infinitely visible world is denied, can still comprehend an infinite vitality by means of another organ.<sup>97</sup>

Goethe was very much influenced by his younger contemporary, the intrepid explorer and most famous scientist of his age Alexander von Humboldt (1769–1859), who also viewed the world in holistic terms. When climbing the volcano Chimborazo (now in Ecuador), Humboldt experienced an epiphany: when the fog lifted, from his precarious perch at 19,413 feet Humboldt saw the top of the volcano barely 1,000 feet above him and mountain range after mountain range stretched out majestically before him. It was then that he realized the earth was one great living organism, where everything was connected.<sup>98</sup> Nothing, not even the tiniest organism, could exist on its own: “In this great chain of causes and effects no single fact can be considered in isolation.”<sup>99</sup> Humboldt invented the idea of the web of life. Having seen at first hand the devastation caused by the colonial plantation at Lake Valencia in Venezuela in 1800, he was the first to

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**95** Goethe is cited in Alexander Rausch, “Neoclassicism and the Romantic Movement: Painting in Europe between Two Revolutions 1789–1848,” *Neoclassicism and Romanticism: Architecture, Sculpture, Painting, Drawings; 1750 – 1848*, ed. Rolf Toman (Cologne: Tandem, 2006), 318–479; here 327–28.

**96** Cited in Roger H. Stephenson, “Binary Synthesis: Goethe’s Aesthetic Intuition in Literature and Science,” *Science in Context* 18.4 (2005): 553–81; here 556.

**97** *Goethe’s Theory of Colours*, trans. with notes by Charles Lock Eastlake (London: John Murray, 1840), xviii.

**98** Andrea Wulf, *The Invention of Nature: Alexander Humboldt’s New World* (New York: Alfred A. Knopf, 2015), 2.

**99** Wulf, *The Invention of Nature* (see note 98), 5.

explain the importance of forests to retain water and protect against soil erosion.<sup>100</sup>

Both Goethe and Alexander von Humboldt rejected the Cartesian view of animals as machines, investigating instead the vital forces that shaped organisms. Wulf claims that Goethe's *Faust* has something of Humboldt in him and vice versa. Like Humboldt, *Faust* was trying to discover "all Nature's hidden powers." *Faust's* ambition "That I may detect the utmost force / Which binds the world, and guides its course" was Humboldt's as well.<sup>101</sup> Like Goethe and so many Romantics, Humboldt was driven by a sense of wonder. Yes, nature had to be measured and analyzed – Humboldt was, after all, a child of the Enlightenment – but it must be viewed through the senses and emotions as well: "Nature must be experienced through feeling," not numbers or abstract mathematics.<sup>102</sup> Goethe and Humboldt both read Erasmus Darwin's poem "Love of Plants," which took Linnaean sexual classification systems of plants to an extreme, making them love-sick, jealous, blushing, etc. While Goethe thought the poetry rambling and pedantic, Humboldt admired it for advocating a sympathetic and imaginative approach to nature.

The Romantics' concern with bringing the human and the natural world into a harmonious whole reflected the incompleteness, fragmentation, and ruin they observed around them. Long before Max Weber, they reacted against what they perceived to be the disenchantment of the world as a result of the alienation and anomie that came with industrialization, urbanization, utilitarianism, and the emphasis on individual rights characteristic of the Enlightenment. It was the Romantics, in fact, from whom Weber took many of his ideas about disenchantment.<sup>103</sup> They lamented the decline of a sense of community and the breakdown of the family with the rise of the competitive marketplace and

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**100** Wulf, *The Invention of Nature* (see note 98), 5–6. As Wulf points out, in addition to Goethe, Humboldt influenced Jefferson, Darwin, Wordsworth, Coleridge, Thoreau, and Simon Bolivar, among others. His centenary was celebrated across the world but nowhere more so than in the US. The state of Nevada was almost called Humboldt when its name was debated in 1860. While that didn't happen, in the United States there are 4 counties, 13 towns, parks, mountains, bays, lakes, and a river named after him, as well as the Humboldt Redwoods State Park in California and Humboldt Parks in Chicago and Buffalo. Almost 300 plants and more than 100 animals are named after Humboldt. Wulf claims that "[m]ore places are named after Humboldt than anyone else" (7). Jefferson called him "one of the greatest ornaments of the age" (5).

**101** Wulf, *The Invention of Nature* (see note 98), 37.

**102** Wulf, *The Invention of Nature* (see note 98), 36.

**103** Rüdiger Safranski, *Romanticism: A German Affair*, trans. Robert E. Goodwin (2007; Evanston, IL: Northwestern University Press, 2014), 126.

the eclipse of guilds. Even more importantly, they deplored the division between man and nature created by the growth of modern technology, which they believed turned nature into a machine, taking away the beauty, mystery, and magic it once possessed.

Anticipating Horkheimer, Novalis (Georg Philipp Friedrich Freiherr von Hardenberg, 1772–1801) complained that nature had been “demoted to the level of dull machinery.” Modernity had converted “the infinite, creative music of the universe into the uniform clattering of a monstrous mill.”<sup>104</sup> These observations would seem to put Romantics squarely in the disenchantment camp, but the opposite was actually the case. Instead of reacting with despair and turning to religion, the state, or heroic individuals for the solution – as many later Romantics and anti-Enlightenment Traditionalists did – the early Romantics set out to re-enchant the world.

Although a standard interpretation of the early German Romantics is that they were apolitical and their central aim was to create a new romantic literature and criticism opposed to Neoclassicism and the Enlightenment, they were intensely political.<sup>105</sup> In *Athenäumsfragment* 222 Friedrich Schlegel makes this clear: “The starting point of modern culture is the revolutionary wish to realize the Kingdom of God on earth.”<sup>106</sup> While critical of what they saw as the hedonism, materialism, and utilitarianism of some Enlightenment thinkers, early German Romantics accepted key Enlightenment ideas, such as the right and duty to think critically for oneself; the right to self-determination; the right to self-development free of external authority; the importance and value of education; and the need to overcome prejudice, superstition, and ignorance. These concepts became the basis for their project of re-enchantment through a holistic approach to nature and man’s place in it. Frederick Beiser argues that Romantic holism “was one of the most remarkable events in natural science since the onset of the scientific revolution.” He claims that it is not exaggeration to regard it as “a paradigm shift,” involving completely new criteria for explaining natural events. While mechanical physics understood a phenomenon by placing it within a series of efficient causes following one after the other, the organic theory explained

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**104** Safranski, *Romanticism* (see note 103), 127.

**105** “. . . we must abandon, once and for all, one of the most common myths about romanticism: that it was essentially apolitical, an attempt to flee from social and political reality into the world of the literary imagination. Rather than escaping moral and political issues for the sake of literature and criticism, the romantics subordinated their literature and criticism to their ethical and political ideals.” Frederick C. Beiser, *The Romantic Imperative: The Concept of Early German Romanticism* (Cambridge, MA: Harvard University Press, 2006), 24.

**106** Cited in Beiser, *The Romantic Imperative* (see note 105), 180–81.

a phenomenon in holistic terms as a product of multiple mutually interacting forces:

. . . the romantics' organic concept of nature implies that everything is reciprocally both means and ends. Depending on our standpoint, we can see each part of an organism as an instrument for the development of the whole, and the whole as an instrument for the development of each part. This means that it is possible to say both that man develops for the sake of nature as well as nature develops for the sake of man.<sup>107</sup>

Not only concerned with man's estrangement from nature, Romantics like Novalis also sought to overcome the alienation that divided an individual from himself with the split between mind and body and the realization that there are divisive forces and hidden drives in humans that required integration. Their solution once again was holism: the conscious, subconscious, reason, desire, and emotion had to be united in a single personality. In *Über Anmut und Würde* (On Grace and Dignity, 1793) Friedrich Schiller described this personality as "a beautiful soul," which exhibited a harmony of reason and sensibility.<sup>108</sup> Just as each of the drives within every individual had to be integrated, individuals must be integrated into a holistic community and organic state. Finally, nature must be seen as organic since everything from stones to humans are intrinsically connected. The utilitarian, disenchanted world "must be romanticized," according to Novalis, and this could only be done, as he says, "When I give the commonplace a higher meaning, the customary a mysterious appearance, the known the dignity of the unknown, the finite the illusion of the infinite." By doing this, "I romanticize it."<sup>109</sup> According to Coleridge this was precisely the task Wordsworth set for himself in their joint venture, the *Lyrical Ballads*. While Coleridge was to make the unreal real, Wordsworth was "to give the charm of novelty to things of every day, and to excite a feeling analogous to

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**107** Beiser, *The Romantic Imperative* (see note 105), 83, 146.

**108** Friedrich Schiller, "It is in a beautiful soul that sensuousness and reason, duty and inclination are in harmony, and grace is their expression as appearance." *Schiller's "On Grace and Dignity" in Its Cultural Context: Essays and a New Translation*, ed. Jane V. Curran and Christophe Fricker. Studies in German Literature, Linguistics, and Culture (Rochester, NY: Camden House, 2005), 153. For a copy of the original text, see <http://gutenberg.spiegel.de/buch/-3320/1> (last accessed on August 17, 2016).

**109** Frederick C. Beiser, *The Early Political Writings of the German Romantics*. Cambridge Texts in the History of Political Thought (Cambridge and New York: Cambridge University Press, 1996), 85. Andrea Nightingale describes the same kind of wonder that Thoreau experienced at Walden Pond in her article "Broken Knowledge," *The Re-enchantment of the World: Secular Magic in a Rational Age*, ed. Joshua Landy and Michael Saler (Stanford, CA: Stanford University Press, 2009), 15–37.

the supernatural, by awakening the mind's attention from the lethargy of custom and directing it to the loveliness and the wonders of the world before us."<sup>110</sup>

To the Romantic artist, nothing was beneath contempt; everything called for understanding and sympathy. This comes out clearly in the Neo-Romantic Hugo von Hofmannsthal's "The Letter of Lord Chandos" (1902). As Lord Chandos writes to his unidentified patron and mentor, anything, even the simplest, most rustic, and plebian object can reveal the mystery and wonder of the world:

A pitcher, a harrow abandoned in a field, a dog in the sun, a neglected cemetery, a cripple, a peasant's hut—all these can become the vessel of my revelation. Each of these objects and a thousand others similar, over which the eye usually glides with a natural indifference, can suddenly, at any moment (which I am utterly powerless to evoke), assume for me a character so exalted and moving that words seem too poor to describe it.<sup>111</sup>

On another occasion "it was a nut-tree and a half-filled pitcher which a gardener boy had left there" with "a beetle swimming on the surface from shore to shore" that occasioned an ecstatic response: ". . . this combination of trifles sent through me such a shudder at the presence of the Infinite, a shudder running from the roots of my hair to the marrow of my heels." Lord Chandos feels an intimate connection with the natural world and all the creatures inhabiting it, even the rats he had ordered exterminated, with whom he belatedly experiences the deepest empathy:

Recently, for instance, I had given the order for a copious supply of rat-poison to be scattered in the milk cellars of one of my dairy-farms. Towards evening I had gone off for a ride and, as you can imagine, thought no more about it. As I was trotting along over the freshly-ploughed land, nothing more alarming in sight than a scared covey of quail and, in the distance, the great sun sinking over the undulating fields, there suddenly loomed up before me the vision of that cellar, resounding with the death-struggle of a mob of rats. I felt everything within me: the cool, musty air of the cellar filled with the sweet and pungent reek of poison, and the yelling of the death cries breaking against the mouldering walls; the vain convulsions of those convoluted bodies as they tear about in confusion and despair; their frenzied search for escape, and the grimace of icy rage when a couple collide with one another at a blocked-up crevice.

Lord Chandos's ability to imagine himself in the place of others, even such lowly creatures as rats, appears again in his reaction to Livy's description of the hours

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**110** Samuel Taylor Coleridge, *Biographia Literaria*, ed. James Engell and Walter Jackson Bate. *The Collected Works of Samuel Taylor Coleridge*, 7 vols., gen. ed. Kathleen Coburn and Bart Winer. Bollingen Series, 75 (Princeton, NJ: Princeton University Press, 1983), 7: 6–7.

**111** Hofmannsthal, "Letter of Lord Chandos" [http://depts.washington.edu/vienna/documents/Hofmannsthal/Hofmannsthal\\_Chandos.htm](http://depts.washington.edu/vienna/documents/Hofmannsthal/Hofmannsthal_Chandos.htm) (last accessed August 17, 2016).

before the destruction of Alba Longa. This vision inspired him with a sublime terror that was both divine and bestial, providing him with a gaze into the abyss of the infinite that only confirmed his own nothingness. How different his reaction was from Pascal's. Pascal's terror of the infinite was absolute; there was nothing sublime about it. But here we see the frisson of excitement and the marvelous melancholy evoked by the romantic sublime:

You remember, my friend, the wonderful description in Livy of the hours preceding the destruction of Alba Longa: when the crowds stray aimlessly through the streets which they are to see no more . . . when they bid farewell to the stones beneath their feet. I assure you, my friend, I carried this vision within me, and the vision of burning Carthage, too; but there was more, something more divine, more bestial; and it was the Present, the fullest, most exalted Present. There was a mother, surrounded by her young in their agony of death; but her gaze was cast neither toward the dying nor upon the merciless walls of stone, but into the void, or through the void into Infinity, accompanying this gaze with a gnashing of teeth! A slave struck with helpless terror standing near the petrifying Niobe must have experienced what I experienced when, within me, the soul of this animal bared its teeth to its monstrous fate.

Lord Chandos claims that it was not pity he felt for these people about to be wiped off the face of the earth but an "immense sympathy" or "a flowing over into these creatures, or a feeling that an aura of life and death, of dream and wakefulness, had flowed for a moment into them." The boundary between one thing and another, between one person and another, is obliterated here in what would later be described as an oceanic feeling of "cosmic consciousness"<sup>112</sup>:

In these moments an insignificant creature – a dog, a rat, a beetle, a crippled apple tree, a lane winding over the hill, a moss-covered stone, mean more to me than the most beautiful, abandoned mistress of the happiest night. These mute and, on occasion, inanimate creatures rise toward me with such an abundance, such a presence of love, that my enchanted eye can find nothing in sight void of life. Everything that exists, everything I can remember, everything touched upon by my confused thoughts, has a meaning. Even my own heavi-

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**112** Richard M. Bucke, *Cosmic Consciousness: A Study of the Evolution of the Human Mind* (1901; New York: Dover Books, 2009). The desire to obliterate the barriers between people and see all humankind as one shows us at our best, "touched . . . by the better angels of our nature," to cite the last sentence of Abraham Lincoln's *First Inaugural Address* (March 4, 1861). But throughout history these better angels have been impeded by the inescapable fact that to know anything, humans must distinguish one thing from another. Unfortunately, this applies to creating one's identity as well, and this has fueled the xenophobia at the root of so much human conflict and suffering. For a wonderfully concise discussion of this issue, see Albrecht Classen, "Other, The, European Views of," *New Dictionary of the History of Ideas*, ed. Maryanne Cline Horowitz, 6 vols. (New York and San Francisco: Charles Scribner's Sons, 2005), 4: 1691–98.



ness, the general torpor of my brain, seems to acquire a meaning; I experience in and around me a blissful, never-ending interplay, and among the objects playing against one another there is not one into which I cannot flow. To me, then, it is as though my body consists of nought but ciphers which give me the key to everything; or as if we could enter into a new and hopeful relationship with the whole of existence if only we begin to think with the heart.

These rapturous moments that allow individuals to overcome the limitations of their separate existence and dissolve into the cosmic one – an experience Nietzsche would later describe as “Dionysian wisdom” – are, Lord Chandos admits, unfortunately few and far between, which leaves him deflated, even nauseated, by ordinary life and filled with longing for the simple life and simple joys experienced, he imagines, by the peasants who farm his estate:

my eye . . . seeks among all the poor and clumsy objects of a peasant's life for the one whose insignificant form, whose unnoticed being, whose mute existence, can become the source of that mysterious, wordless, and boundless ecstasy. For my unnamed blissful feeling is sooner brought about by a distant lonely shepherd's fire than by the vision of a starry sky, sooner by the chirping of the last dying cricket when the autumn wind chases wintry clouds across the deserted fields than by the majestic booming of an organ.

Lord Chandos describes these moments of ecstatic insight as being “like a splinter round which everything festers, throbs, and boils.” While exquisitely painful, they are what make the terrible boredom of ordinary life bearable:

It is then that I feel as though I myself were about to ferment, to effervesce, to foam and to sparkle. And the whole thing is a kind of feverish thinking, but thinking in a medium more immediate, more liquid, more glowing than words. It, too, forms whirlpools, but of a sort that do not seem to lead, as the whirlpools of language, into the abyss, but into myself and into the deepest womb of peace.

The experience Lord Chandos had of “a flowing over into these creatures” was predicated on the romantic idea that not only was all life endued with sensitivity but that all life was interconnected.

Unlike Neoclassicists, ugliness fascinated Romantics, opening them up to an appreciation of aspects of the world Neoclassicists ignored as outside, even antagonistic, to the realm of art. Friedrich Schlegel claimed: “Der romantische Imperativ fordert die Mischung aller Dichtarten. All Natur und Wissenschaft soll Kunst werden – Kunst soll Natur werden und Wissenschaft” (“The Romantic imperative stimulates the mixing of all sorts of poetry. All nature and knowledge

should be art – art should be nature and knowledge”).<sup>113</sup> Romantic artists and intellectuals broke down the borders between the various arts (literature, drama, painting, music), venturing into the realm of folklore (the Brothers Grimm), theology (Schleiermacher), and even law (Savigny) in an attempt to create a “universal poetry.” Facets of the natural and human world that Neoclassicists considered beneath contempt intrigued Romantics, invoking their compassion and sympathy. While neoclassical aesthetics marginalized and excluded entire groups of human beings on the basis of their alleged ugliness and low social status, Romantic aesthetics with its penchant for the strange and bizarre effectively expanded the boundaries of human sympathy to include those previously marginalized – the old, sick, poor, deformed, and insane – as well as the animal kingdom and entire realm of nature. In their different ways, all of these provided enchantment.

An important feature of many modern kinds of enchantment from the Romantics until today is that whether they delight or horrify, they do not set out to delude. In *The Arts of Deception* James W. Cook takes P. T. Barnum and modern magicians as examples of the way a rational and skeptical public can be enchanted without succumbing to delusions. Showmen used mass media to stimulate debates about the authenticity of their illusions and exhibitions, promoting endless curiosity that was never completely satisfied. The showman’s illusions helped to wean Victorian culture away from the pursuit of truth and sincerity into a postmodern awareness of contingency and perspectivism.<sup>114</sup> Illusions and hoaxes encouraged people to figure things out. So did the detective stories, which arose as a genre during the nineteenth century and delighted readers then as much then as they do today. Consumers, not all of them to be sure, but many, were aware of the ways they were being manipulated and took great pleasure in it.

Simon During carries forward Cook’s argument. When confronted with magical illusions, he claims that audiences honed their cognitive skills to detect the trickery behind them at the same time they experienced a sense of wonder and enchantment inspired by the technical skill of the magician. During emphasizes the way the imagination became a central source of enchantment for early Romantics, with the “willing suspension of disbelief” proposed by Coleridge.

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**113** From Schlegel’s Notebooks, 1797–1798. Cited in Beiser, *The Romantic Imperative* (see note 107), xiv.

**114** Michael Saler, “Modernity and Enchantment (see note 12),” 711; id., *As If: Modern Enchantment and the Literary Pre-History of Virtual Reality* (Oxford and New York: Oxford University Press, 2012).

While people could distinguish fact from fiction, they took pleasure in the blurred of the boundary between the two.<sup>115</sup>

As I mentioned at the beginning of this essay, there is a moral dimension to modern enchantment that should not be overlooked, although it is very different from the moral dimensions of traditional forms of religious, especially Christian, enchantment. As Jane Bennett points out in her philosophical meditation on modern enchantment, “To be enchanted is to be struck and shaken by the extraordinary that lives amid the familiar and the everyday. . . .”<sup>116</sup> This is what Novalis, Hofmannsthal, and so many other Romantics had striven to discover a century or two earlier. Enchantment assumes joyful attachment to the point of love and reverence. If we do not have these, Bennett asks, if we really live in a disenchanted world, what can we joyfully attach ourselves to? What is there to love about an alienated existence on a dead planet? Without love for something in this world, how can one care about anything, including oneself? With Bennett’s questions in mind, let me end this essay with a quotation from Carolyn Bynum’s 1997 Presidential Address to the American Historical Association. Here she declares that it is the job of every scholar and every teacher to excite wonder and enchantment in their readers and students:

. . . surely our job as teachers is to puzzle, confuse, and amaze. We must rear a new generation of students who will gaze in wonder at texts and artifacts, quick to puzzle over a translation, slow to project or to appropriate, quick to assume there is a significance, slow to generalize about it. Not only as scholars, then, but also as teachers, we must astonish and be astonished. For the flat, generalizing, presentist view of the past encapsulates it and makes it boring, whereas amazement yearns toward an understanding, a significance, that is always just a little beyond both our theories and our fears.<sup>117</sup>

This may be a difficult injunction to follow, or is it?

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**115** Simon During, *Modern Enchantments: The Cultural Power of Secular Magic* (Cambridge, MA: Harvard University Press, 2004).

**116** Bennett, *The Enchantment of Modern Life* (see note 11), 4.

**117** Carolyn Walker Bynum, “Wonder,” *American Historical Review* 102.1 (February, 1997): 1–26; here 26.

# **Magic and Magicians in the Middle Ages and the Early Modern Time**



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