

# Nature

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[Thomas Cole, *Desolation*, oil on canvas, 1836.]

Nature may seem like an unlikely choice for a lexical project devoted to political concepts. This is because it is often defined in terms of the non-human, such as when John Stuart Mill described it as everything “that takes place without the agency... of man.”<sup>1</sup> For many, I suspect the word conjures a mental image of plants, animals, and perhaps even the wilderness. The concept thus invites spatial analysis, signifying something like a “zone of human exclusion,” to borrow Peter Galison’s evocative phrase.<sup>2</sup> Insofar as the political is an inherently human activity, an argument can therefore be made that nature ranks among the *least* political of all concepts.

Of course, to insist that nature is apolitical is already to indicate why it plays such a powerful role in political discourse. Nature’s claim to reside outside or perhaps even above politics endows it with enormous moral authority, which is exactly

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<sup>1</sup>John Stuart Mill, *Nature, The Utility of Religion, and Theism* (London: Longmans, Green, Reader, and Dyer, 1874), 8.

<sup>2</sup>See Peter Galison, “Wastelands and Wilderness,” *Building Crashing Thinking* (forthcoming); and Peter Galison and Robb Moss, “Containment” (2015), 81 minutes.

why it is so often invoked in the service of overtly political aims.<sup>3</sup> Often, appeals to the natural tend to align with a conservative agenda, in the broad sense of that word, tending to figure in explanations of the way things are rather than imaginative speculations about the way they could be. In recent debates about the legality of same-sex marriage, for example, nature has been used to defend traditional gender roles, family structures, and kinship relationships.<sup>4</sup> Similarly, Adam Smith's well-known dictum that nature has endowed mankind with the "propensity to truck, barter, and exchange" has been described as way of making specific regimes of economic production and social organization that elevate the marketplace to a central and privileged place in all human affairs seem inevitable.<sup>5</sup> For that reason, the concept is often viewed with suspicion by those who are weary of the way it appears to endorse the idea that everything is for the best as it is and, as such, things ought to remain as they are.

Despite these concerns, recent years have seen an upswell of interest in the concept of nature among scholars in the humanities and interpretive social sciences. At a time of considerable distress about the fate of our planet, a deeper and more sustained attention to the natural world seems more pressing now than it has in recent memory. Historians, for example, have largely embraced the idea that we cannot properly understand human history by cleaving it entirely from natural history.<sup>6</sup> Similarly, eco-criticism, animal studies, multi-species ethnography, and other approaches that seek to bring the critical and interpretive tools of the humanities into dialogue with the natural sciences are now thriving.<sup>7</sup> Indeed, even the anthropologist Bruno Latour has recently chosen to promote his "diplomatic" metaphysics by describing it as an "ecologizing" rather than "modernizing" project. Whereas the latter sought to impose a sharp separation between facts and values, humans

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<sup>3</sup>See Lorraine Daston and Fernando Vidal, eds., *The Moral Authority of Nature* (Chicago: University Of Chicago Press, 2003).

<sup>4</sup>For a critical discussion of this trope in particular, see Stefani Engelstein, "The Allure of Wholeness: The Eighteenth-Century Organism and the Same-Sex Marriage Debate," *Critical Inquiry* 39, no. 4 (2013): 754–76.

<sup>5</sup>Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (London: W. Strahan and T. Cadell, 1776), 16. For a critique, see, for example, Karl Polanyi, *The Great Transformation* (New York: Rinehart & Co., 1944).

<sup>6</sup>For an early and influential set of essays in environmental history, see William Cronon, ed., *Uncommon Ground: Toward Reinventing Nature* (New York: W.W. Norton & Co, 1995).

<sup>7</sup>The literature is far too vast to cite here, but for a selective introduction, see Lawrence Buell, *Writing for an Endangered World: Literature, Culture, and Environment in the U.S. and beyond* (Cambridge, Mass: Belknap Press of Harvard University Press, 2001); Eben Kirksey and Stefan Helmreich, "The Emergence of Multispecies Ethnography," *Cultural Anthropology* 25, no. 4 (2012): 545–76; Harriet Ritvo, *The Animal Estate: The English and Other Creatures in the Victorian Age* (Cambridge, Mass: Harvard University Press, 1987).

and non-humans, nature and society, the former, he hopes, might “make it possible to bring a larger number of values into cohabitation within a somewhat richer ecosystem.”<sup>8</sup>

For Latour as for so many others, the need to revisit, rethink, and reimagine our relationship to nature derives much of its urgency from the specter of climate change. As it is often said, we live at a time when our species has become so powerful it now qualifies as a genuine force of nature in its own right. By implication, our greatest challenge is no longer simply to understand the world we inhabit, but to shape it in ways that will allow us to flourish. Latour therefore concludes that if “geologists themselves . . . see humanity as a force of the same amplitude as volcanoes or even of plate tectonics, one thing is now certain: we have no hope whatsoever . . . of seeing a definitive distinction between Science and Politics.”<sup>9</sup> On this view, nature and culture are fundamentally of a piece with each other, even co-constituting each other. Insofar as both involve not only acts of representation, but also, and perhaps even more crucially, deliberate and powerful means of intervention, the desire to impose a clear boundary between ourselves and the rest of the world is at best a quixotic fool’s errand.<sup>10</sup>

What is interesting is that Latour is joined in this sentiment by many prominent members of the scientific community themselves. For example, the recent and much talked about proposal that we formally recognize a new geological epoch—the *Anthropocene*—is motivated by analogous concerns about our immense power over the earth as a whole. As Paul Crutzen and Eugene Stoermer argued in the *IGBP Newsletter* over a decade ago, the “expansion” of our species has been so “astounding” that “it seems to us more than appropriate to emphasize the central role of mankind in ecology and geology.”<sup>11</sup> More recently, Crutzen was joined by Will Steffen and John McNeill in making the connection even more explicit, stating that humans have evolved into “a global geophysical force.” Although these authors admit that our species has always left a mark on its local surroundings, they nonetheless insist that “preindustrial humans did not have the technological or organizational capacity to match or dominate the great forces of nature.” All of that has changed, however, necessitating a recognition that “the Earth has now left its natural geological epoch” and entered the *Anthropocene*.<sup>12</sup>

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<sup>8</sup>Bruno Latour, *An Inquiry into Modes of Existence: An Anthropology of the Moderns* (Cambridge, Mass: Harvard University Press, 2013), 11.

<sup>9</sup>Bruno Latour, *An Inquiry into Modes of Existence*, 9.

<sup>10</sup>For a different articulation of a related claim, see Ian Hacking, *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science* (Cambridge: Cambridge University Press, 1983).

<sup>11</sup>Paul Crutzen and Eugene Stoermer, “The ‘Anthropocene,’” *IGBP Newsletter* 41 (2000): 17–18.

<sup>12</sup>Will Steffen, Paul Crutzen, and John McNeill, “The Anthropocene: Are Humans Now Over-

Similar notions were recently echoed by the postcolonial scholar, Dipesh Chakrabarty, as well. Writing in the pages of *Critical Inquiry*, Chakrabarty laments that “Humans now wield a geological force,” which rivals in power the massive asteroid whose impact led to the extinction of non-avian dinosaurs: “to call ourselves geological agents is to attribute to us a force on the same scale as that released at other times when there has been a mass extinction of species.”<sup>13</sup> Given this formulation, it is somewhat ironic that Chakrabarty goes on to urge his colleagues to abandon traditional modes of critical analysis that seek to understand human society through the language of difference and power. In the age of the *Anthropocene*, we are told, traditional Marxian politics have lost their critical edge because the consequences of global climate change impact all of us, regardless of race, class, or gender identity: “unlike the crises of capitalism, there are no lifeboats here for the rich and the privileged.”<sup>14</sup> Chakrabarty thus calls on us to engage in a form of “species-thinking” that will make it possible to re-imagine our history as that of a “human collectivity, an us.”<sup>15</sup>

Although they clearly differ on many important issues, it is noteworthy how much all of these authors agree that a defining feature of the *Anthropocene* is humanity’s almost limitless power. In particular, I find it striking, to say the least, that Cruzen and Chakrabarty, as well as Latour and so many others, appear to embrace a historiographical rubric patterned upon a continued expansion of humanity’s capacity to intervene in the world, until such a time that our species must finally face the possibility of its own collapse and annihilation. In contrast, I would like to ask if it does not make more sense, both in point of empirical fact as well as in hopes of forging a more sustainable politics, that we strive to accept precisely the opposite, namely, an acknowledgement of our species’ *lack* of power, emphasizing its ignorance, its fragility, and, above all else, its remarkable lack of control? After all, what does the specter of climate change represent if not a *failure* to exercise mastery over the world around us and, perhaps even more significantly, ourselves and each other? For, in the final analysis, is it not our own actions, or, more precisely, our collective *inaction*, that will ultimately be responsible for our undoing, much more so than some abstract geological force?

In what follows, I would therefore like to explore another conceptual avenue, one that might offer some additional resources for thinking about our species’ relationship to the rest of the world. In particular, I am interested in examining the

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whelming the Great Forces of Nature?,” *Ambio* 36, no. 8 (2007): 614.

<sup>13</sup>Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35 (Winter 2009): 206–7.

<sup>14</sup>Dipesh Chakrabarty, “The Climate of History: Four Theses,” 221.

<sup>15</sup>Dipesh Chakrabarty, “The Climate of History: Four Theses,” 222.

concept of nature's shifting, unstable, and complex history in hopes of articulating a different way forward than the one that so many recent discussions of the *Anthropocene* presuppose. However, I do not simply want to return to an equation of nature with the non-human. Rather, I would like to redirect Latour's suggestion that we collapse the distinction between nature and culture outright, but to do so by emphasizing an alternative, though not unrelated, historical register.<sup>16</sup> Instead of arguing that we should abandon the concept of nature because we have such immense power to intervene in the world, I would like to endorse a concept of nature that pushes our species to confront the *limits* of its power and influence, both over material circumstances as well as each other.

If Timothy Morton is right, as he certainly is, that the traditional concept of nature cannot survive a confrontation with what he calls "hyperobjects"—objects like global warming whose spatio-temporal extension is massively distributed—then I propose that instead of doing away with the concept outright, as Morton urges we should, we might rather re-conceptualize it along alternative lines, ones that are at once more mundane yet perhaps also more useful.<sup>17</sup> In that vein, we might return to Mill's classic 19<sup>th</sup> century formulation—nature is everything "that takes place without the agency . . . of man"—but stress the importance of the word *agency* over *man*. Doing so would mean attending to one's limited capacity to generate particular outcomes rather than dwelling on the question of where those capacities may reside. The concept of nature, I would thus like to suggest, may be understood as an encounter with events and circumstances beyond one's control. As we shall see, this means it is fundamentally indexical, tied to the personal experience of one's individual place in the world. However, it also means that an experience of nature involves grappling with our difficulty influencing each other, which has clear implications for the way that we live as part of a larger community. Hence, if the concept of the political is fundamentally about power, I propose that we understand nature to be about its exact opposite, a concept that invokes human frailty, weakness, and impotence.

#### *Unaccommodated Man*

The Oxford English Dictionary offers a useful place to begin rethinking the nature / culture divide, providing some fascinating clues about the history of both words.<sup>18</sup>

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<sup>16</sup>See Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge, Mass: Harvard University Press, 2004).

<sup>17</sup>See Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013). See also Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics* (Cambridge, Mass: Harvard University Press, 2007).

<sup>18</sup>For more on the enormously complex and fundamentally polysemous meaning of "nature," see Raymond Williams, *Keywords: A Vocabulary of Culture and Society* (New York: Oxford University

For example, we learn that “nature” derives from an Anglo-Norman word for the “active force that establishes and maintains the order of the universe.” We might say, then, that nature consists of that which shapes the material world within which we live. However, the picture is complicated somewhat because the Latin word *natura* referred not just to the “creative power governing the world,” but also, more specifically, to the generative capacities of our bodies: “birth, constitution, character,” and, especially, “the genitals.”<sup>19</sup> In contrast, “culture” derives from an Anglo-Norman word for the “action of cultivating land, plants, etc.,” as well as the practice of animal husbandry. Over time, it also came to be used as a way to talk about a person’s development, especially the cultivation of one’s linguistic and artistic faculties. In this, the English word again follows its Latin counterpart, *cultura*, which referred chiefly to farming practices such as tilling the soil or caring for plants and animals, as well as the “training or improvement of the faculties.”<sup>20</sup> Only much later did culture come to acquire what might be described as its “anthropological” meaning, as a system of signification that gives meaning and therefore makes sense of all human action.<sup>21</sup>

As this brief etymological excursion suggests, the nature / culture divide has never mapped neatly onto a human / nonhuman dichotomy. Our language recognizes both human nature and agriculture, and neither involve a distant or strained metaphor. Rather, both expressions seem to represent something very near the core meaning of each term. Whereas the word “culture” is primarily about cultivation, a rearing or shaping to meet some deliberate end, the word nature has historically been used to describe the “inherent or essential quality or constitution” of a thing, meaning those aspects we cannot change. When speaking about our own species, the OED tells us, the word nature therefore refers to one’s “innate character,” or, more fully, the “basic . . . disposition of mankind.” Often, it specifically signifies our moral and personal failings, as in the appeal to one’s worst or base nature. This helps to explain why the phrase “human nature” is so often invoked to excuse behaviors we find objectionable, implicitly claiming they are an inevitable if also

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Press, 1976). More recently, these complexities have led Noel Castree to argue that nature constitutes what W.B. Gallie described as an “essentially contested concept.” See Noel Castree, “Nature,” *Keywords for Environmental Studies*, eds. Joni Adamson, William Gleason, and David Pellow (New York: New York University Press, 2016), 151-155.

<sup>19</sup>See “nature, n.”. OED Online. March 2015. Oxford University Press. <http://www.oed.com/view/Entry/125353?rskey=SFYMBn&result=1&isAdvanced=false> (accessed May 01, 2015).

<sup>20</sup>See “culture, n.”. OED Online. March 2015. Oxford University Press. <http://www.oed.com/view/Entry/45746?rskey=UslHv&result=1&isAdvanced=false> (accessed May 01, 2015).

<sup>21</sup>See, for example, Clifford Geertz, *The Interpretation of Cultures* (New York: Basic Books, 1973).

unenviable fact of life. It also helps to explain the idiomatic expression of “doing one’s nature” or heeding “nature’s call.”<sup>22</sup>

In this context, it is interesting to consider the garden. Going back to classical antiquity, and in sharp contrast to our own time, gardens were not places one went to experience or languish within nature. On the contrary, they were primarily seen as a place of escape from the dangers that lurk in the unfamiliar and the unknown. During the European Renaissance, they evolved into hugely ambitious, inordinately expensive, and elaborately designed spaces that were often fenced in by a forbidding enclosure. Moreover, they tended to be full of ornament, architecture, and other products of human artifice, especially sculptures, fountains, and statuary. Finally, it was often crucial that plants in a garden be carefully manicured in accordance with elaborate geometrical schemes. Taken together, these features were all carefully calibrated to appeal to our ocular and olfactory senses, whereas the wilderness that lay just beyond was seen as an unpredictable and dangerous place. This is perhaps most clearly expressed in the Judeo-Christian tradition of using the word “paradise”—which derives from the Persian word for an “enclosed park, orchard, or pleasure ground”—to refer to the biblical Garden of Eden.<sup>23</sup> Having eaten from the tree of knowledge, Adam and Eve were literally expelled from the garden and thrown into a world full of death, decay, pain and suffering.<sup>24</sup>

For much of European history, then, the concept of nature had a rather different normative valance than it often does now. In our own time, the adjective “natural” is frequently used to describe things that are healthy, wholesome, and otherwise good. In contrast, an earlier period tended to view the state of nature as something that had to be overcome. This is perhaps most clearly brought out in the work of early modern political philosophers such as Thomas Hobbes. Although *Leviathan* was primarily concerned with the relationships among human beings, Hobbes nonetheless had a great deal to say about life in a state of nature. Most noteworthy is that he did not primarily fear nature because it involved an exposure to the elements so much so as an exposure to ourselves and each other. At one point, for example, he warned that “Nature” has the power to “dissociate, and render men apt to invade, and destroy one another.” Absent a recognized sovereign strong enough to cultivate and enforce the laws of civil society, he reasoned that

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<sup>22</sup>See “nature, n.”. OED Online. March 2015. Oxford University Press. <http://www.oed.com/view/Entry/125353?rskey=SFYMBn&result=1&isAdvanced=false> (accessed May 01, 2015).

<sup>23</sup>See “paradise, n.”. OED Online. March 2015. Oxford University Press. <http://www.oed.com/view/Entry/137340?rskey=DbH8Cy&result=1> (accessed May 01, 2015).

<sup>24</sup>For a short but wonderfully informative history of European gardens, see Andrew Cunningham, “The Culture of Gardens,” *Cultures of Natural History*, ed. Nicholas Jardine, James A. Secord, and E. C. Spary (Cambridge: Cambridge University Press, 1996), 38–56.

humanity would be doomed to “that condition which is called Warre; and such a warre, as is of every man, against every man.” “In such a condition,” Hobbes went on to write, “there is no place for industry; because the fruit thereof is uncertain; and consequently no culture of the earth.” Hence, he famously concluded, life in a state of nature is “solitary, poore, nasty, brutish, and short.”<sup>25</sup>

Of course, not all early modern English philosophers had quite such a bleak view. John Locke, for example, wrote in a decidedly more ambivalent mien. As we might expect from one of the principle architects of modern liberalism, he often emphasized the freedom that characterized life in a state of nature, describing its inhabitants as “absolute Lord of his own Person and Possessions.” At the same time, Locke also hastened to add that a person’s “Enjoyment” of these liberties was “very uncertain, and constantly exposed to the invasion of others” who were all “Kings as much as he.” Locke therefore concluded the state of nature, although replete with personal liberty, was also “full of fears and continual dangers.”<sup>26</sup> Moreover, while he evinced a clear admiration for Native Americans, whom he judged more free and more natural than the English, Locke also pitied them for lacking a concept of personal property, without which there was not much incentive to cultivate or “improve” their condition.<sup>27</sup>

Whereas both Locke and Hobbes celebrated the creation of civil society, others explored a different trajectory. Besides the biblical narrative of Adam and Eve’s expulsion from paradise, William Shakespeare’s *King Lear* offers a particularly evocative depiction of man’s descent *into* a state of nature. First performed more than five decades before Hobbes penned *Leviathan*, the play is centrally concerned with political power, as Lear finds himself exposed to the elements soon after divesting himself of mastery over his kingdom. Having given up command of his subjects, Lear finds he can no longer even control the avarice of his own offspring, so much so that he is literally cast out into the cold and the rain. Wandering aimlessly through a stormy, chaotic, “tyrannous night,” Lear is overtaken by insanity and unreason, gradually shedding every accouterment of civil society in horror and in disgust.<sup>28</sup> When he encounters another whom he mistakes as undergoing a similar transformation, Lear objectifies his interlocutor, and by proxy also himself, as “the thing itself.” In the very same breath, and while he is stripping the clothes from his back, he shouts, “unaccomodated man is no more but such a poor, bare,

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<sup>25</sup>Thomas Hobbes, *Leviathan, Or, The Matter, Forme, and Power of a Common Wealth, Ecclesiasticall and Civil* (London: Printed for Andrew Crooke, 1651), 62.

<sup>26</sup>John Locke, *Two Treatises of Government* (London: Awnsham Churchill, 1690), 345.

<sup>27</sup>*Ibid.*, 259.

<sup>28</sup>William Shakespeare, *King Lear*, ed. Stanley Wells (Oxford: Oxford University Press, 2000), 194 (Scene 11, line 136).

forked / animal as thou art.”<sup>29</sup>

It is striking how often Lear invokes non-human animals in search of a language that is appropriate to his own suffering. Just as often, however, he also speaks admiringly—in turns even lovingly—of their condition. The passages cited above, for example, dwell at some length on the nobility of the non-human, emphasizing our dependence upon animals by pointing out that we provide “the worm no silk, the beast no hide, the sheep no wool” and “the cat no perfume.”<sup>30</sup> And several scenes later, as he is sent off to prison, Lear attempts to comfort his only faithful daughter, Cordelia, with the thought that “We two alone will sing like birds i’th’ cage,” promising her they would “tell old tales, and laugh / At gilded butterflies.”<sup>31</sup>

Eloquent though at times he could be, Lear increasingly loses control of his own mind, and with it, his language, as he embraces his animality. At one point, for example, Lear is seen wearing a crown of weeds and flowers, prompting the Earl of Gloucester to describe his erstwhile sovereign as a “ruined piece of nature.”<sup>32</sup> But Lear’s slow decline into a state of complete disarticulation is perhaps brought out best at the very end of the play. Holding the corpse of the loving Cordelia, he lets out an animal cry—“Howl, howl, howl, howl!”—before lamenting, enraged, “Why should a dog, a horse, a rat have life, / And thou no breath at all?”<sup>33</sup> Immediately thereafter, Lear disrobes once more as he wails in desperation: “O, O, O, O!”<sup>34</sup> By the end of the tragedy, then, Lear has regressed so far that he stands before us naked and barely able to master his own speech, howling at a world over which he has lost all control in pathetic screams, yelps, and barks that express no thought but only rage, grief, and misery.

If the bounds of the natural co-extend with the domain over which we have no control, the line between nature and culture must be always in flux. And indeed, if we turn our attention from *King Lear* to *The Tempest*, we find that, in truth, Shakespeare was a far more subtle and sophisticated philosopher than my discussion so far would suggest. On a first, superficial reading, the two plays appear to share a great deal in common. As in the case of Lear, so too are we here dealing with a character—Prospero—who has lost, or, depending upon one’s reading, abdicated

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<sup>29</sup>William Shakespeare, *King Lear*, 191 (Scene 11, lines 96-98).

<sup>30</sup>William Shakespeare, *King Lear*, 191 (Scene 11, lines 93-94).

<sup>31</sup>William Shakespeare, *King Lear*, 257 (Scene 24, lines 8-13). Note the convergence with an earlier play dealing in similar topics, *Richard II*. Here too a deposed King must face the limitations of his own power, which leads him to emphasize the earthiness of human experience. Reduced to contemplating his own death, Richard says, “Let’s talk of graves, of worms, and epitaphs,” and, a few lines later, “For God’s sake, let us sit upon the ground / And tell sad stories of the death of kings.”

<sup>32</sup>William Shakespeare, *King Lear*, 237 (Scene 20, line 129).

<sup>33</sup>William Shakespeare, *King Lear*, 270, 273-4 (Scene 24, lines 253 and 301-302).

<sup>34</sup>William Shakespeare, *King Lear*, 274 (Scene 24, line 304).

political rule. And, again, the result is an expulsion into the state of nature, only this time it is a remote island located somewhere in either the Mediterranean or the Atlantic.

In most other respects, however, the two plays could hardly be any more different, because Prospero's ability to exercise power does not wane over time. Indeed, Prospero may be more in control of his island than he ever was of his dukedom in Italy. The reason that Prospero's brother Antonio was able to usurp his rule of Milan in the first place is that he had neglected the day-to-day task of governance, preferring to spend his time engaged in a study of natural magic and other occult arts instead. As Stephen Orgel has written, Prospero's magic may be likened to the new science that was taking shape at the time, an "empirical study of nature leading to the understanding and control of all its forces."<sup>35</sup> When Prospero and his daughter Miranda drift ashore on their new home, the skilled magi therefore quickly gains mastery over it, turning the island's endemic inhabitants into political subjects. This includes what is arguably the play's most dense, rich, and complex character, namely Caliban, who offers an especially instructive challenge to Prospero's authority. Having been taught to speak Prospero's language—"how / to name the bigger light and how the less"—Caliban insists that the primary "profit" of his new skill is that now "I know how to curse."<sup>36</sup> In striking contrast, however, he also demonstrates the ability to discourse knowingly, at times even beautifully, about the island's hidden secrets, offering to show a shipwrecked sailor "where crabs grow, / And I with my long nails will dig thee pig-nuts, / Show thee a jay's nest, and instruct thee how / To snare the nimble marmoset."<sup>37</sup>

Perhaps it is no surprise that an early modern playwright would delight in the extensive, though not unlimited, mastery over nature the new science made possible. But the theme only grew in significance as natural philosophy continued to become increasingly celebrated within European culture. Mary Shelley's anonymous *Frankenstein* is a particularly well wrought, if also well trodden, example. Composed just as the practice of physiology began to make the inner workings of biological organisms an object of reliable knowledge, Shelley's narrative has often been read as a warning of what can go wrong when we seek to control aspects of nature as basic and fundamental as life itself. But what has been less often acknowledged is that Frankenstein's monster is not inherently, nor constitutionally violent. As Bruno Latour points out, the death and destruction that abounds in

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<sup>35</sup>Stephen Orgel, "Introduction," William Shakespeare, *The Tempest*, ed. Stephen Orgel (Oxford: Oxford University Press, 1987), 20.

<sup>36</sup>William Shakespeare, *The Tempest*, ed. Stephen Orgel (Oxford: Oxford University Press, 1987), 121 (Act 1, Scene 2, lines 362-364).

<sup>37</sup>William Shakespeare, *The Tempest*, 150-151 (Act 2, Scene 2, lines 161-164).

Shelley's narrative actually results from Frankenstein's refusal to accept the monster as one of his own.<sup>38</sup> Thus, whereas Prospero's mistake may have consisted in trying to make Caliban into his slave, Victor Frankenstein represents precisely the opposite failure: a refusal to control and, in so doing, properly cultivate his creation.

### *Owning Nature*

As science and technology have continued to grow, increasingly large parts of the world have been brought under human control. Interestingly, the same period has also witnessed a concomitant increase in the scope of what we can own. With certain restrictions, it is now possible to assert legal possession over entire regions of the human genome as well as whole organisms themselves, including all of their progeny. These twin developments are not a historical accident. Rather, they reveal something important about the profound link between science and capitalism. Not only did both cultural institutions emerge at roughly the same time and place—17<sup>th</sup> century Europe—but they also rely on each other for epistemic, technological, legal, and other resources with which to exercise power.<sup>39</sup>

In the context of late modern capitalism, the decisional authority bestowed upon us by personal property rights constitutes one of the most ubiquitous and far-reaching expressions of power. To own something is not just to control it, but to enlist the state in the task of protecting and defending that claim against others. Ironically, something of the reverse holds true as well, for, as we shall see, the modern state only recognizes our ability own those parts of the world that have been effectively brought under our power. Thus, whereas literary, dramatic, and philosophical texts provide a particularly revealing glimpse of early modern ideas about nature, regimes of private property—particularly intellectual property—offer especially salient insights into more recent debates.

The relevance of intellectual property law to our discussion about the concept of nature is especially clear in the United States, which, since the time of its founding, has viewed the creation of new knowledge as a particularly efficient and desirable way to increase social and economic prosperity. Thomas Jefferson himself insisted that a clause be inserted into the U.S. Constitution granting Congress the power to “promote the progress of science and useful arts, by securing for limited times to

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<sup>38</sup>Bruno Latour, “Love Your Monsters,” *Breakthrough Journal*, no. 2 (2011): 21-28.

<sup>39</sup>The literature on the historical connection between science and capitalism is vast, but see, for example, J. D Bernal, *Science and Industry in the Nineteenth Century* (London: Routledge & Paul, 1953); Harold John Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven: Yale University Press, 2007); Kaushik Sunder Rajan, *Biocapital: The Constitution of Postgenomic Life* (Durham: Duke University Press, 2006).

authors and inventors the exclusive right to their respective writings and discoveries.”<sup>40</sup> Historians and legal scholars often emphasize the utilitarian assumptions that are implicit in this formulation, arguing that it evinces a new vision of intellectual property as a kind of grand bargain between the state and its citizens, one in which the desire to incentivize the disclosure of new innovations is balanced against an aversion to even temporary monopolies.<sup>41</sup> That being said, the US patent code clearly errs on the side of disclosure, invoking extremely broad and remarkably vague language to delimit what constitutes patentable subject matter, stating simply that “Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor.”<sup>42</sup>

Although the United States formally recognizes “any new and useful . . . composition of matter” as patentable subject matter, so-called “products of nature” constitute a major exception to the rule. Since the late 19<sup>th</sup> century, the US Patent Office has held that entrepreneurs cannot secure intellectual property rights over entire swaths of the world simply by discovering their commercial potential. The reason, first spelled out in an internal decision from 1889, is that the latter do not qualify as a genuine “invention” and, as such, are not “something new or different from what it is in its natural state.”<sup>43</sup> This distinction was reinforced during the mid 20<sup>th</sup> century when the Supreme Court of the United States ruled that a mixture of symbiotic organisms could not be privatized by the law. At issue in this case was the validity of a patent that had previously been granted to the Kalo Inoculant Company. The patent in question covered a carefully calibrated mixture of different species of Rhizobial bacteria that, together, allowed a wide range of plants to fix nitrogen from the air. When another seed company began selling packages of the same mixture to growers, the Kalo Inoculant Co. brought suit for intellectual property infringement. In its decision, however, the Court dismissed Kalo’s suit, arguing the patent was rendered invalid by the fact that the “qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals . . . are manifestations of laws of nature, free to all men and reserved exclusively to none.” Hence, the court ruled, the act of mixing existing bacteria represents “no more than the discovery of some of the handiwork of nature.”<sup>44</sup>

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<sup>40</sup>US Constitution, Article 1, Section 8, Clause 8.

<sup>41</sup>Mario Biagioli, “Patent Specifications and Political Representation: How Patents Became Rights,” *Making and Unmaking Intellectual Property: Creative Production in Legal and Cultural Perspective*, eds. Mario Biagioli, Peter Jaszi, and Martha Woodmansee (Chicago: University of Chicago Press, 2011), 25–40.

<sup>42</sup>U.S. Code, Title 35, Part II, Chapter 10, 101.

<sup>43</sup>Decisions of the Commissioner of Patents, *Ex Parte Latimer*, 12 March 1889, 123-127.

<sup>44</sup>*Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948).

The 1948 Supreme Court decision in *Funk Brothers Seed Co. v. Kalo Inoculant Co.* explicitly barred the privatization of nature under intellectual property law. However, the thorny question of how to distinguish the bounds of the natural was not therefore settled. Less than a half century later, in 1980, the U.S. Supreme Court issued another landmark ruling that again turned on the very same question. In *Diamond v. Chakrabarty*, it was decided, for the first time in history, that biological organisms could be removed from the state of nature and rendered as patentable subject matter simply by manipulating their genomes. This case revolved around a new kind of *Pseudomonas* bacterium that had been engineered by Ananda Chakrabarty for the General Electric Company. What distinguished Chakrabarty's creation from a regularly occurring bacterial cell is that he had induced it to incorporate four different plasmids—small, circular pieces of DNA that bacteria routinely take up and shed during their normal life cycle—which, in combination, gave it the ability to break down crude oil. Chakrabarty filed for a patent on GE's behalf, but his claim was initially denied by the Patent Office on the grounds that being a product of nature, living things could not be patented.

General Electric appealed the decision, and the Chakrabarty case wound its way through the courts for nearly a decade before the Supreme Court finally decided in GE's favor. Writing for the majority, Chief Justice Warren E. Burger drew a sharp contrast between what Chakrabarty had succeeded in doing and what the Kalo Inoculant Company had done several decades before. Because the latter had discovered "only some of the handiwork of nature," Burger explained, it did not qualify for a patent: "Each species" of Rhizobial bacteria "has the same effect it always had" in that they all continued to "perform in their natural way." In stark contrast, Burger concluded, Chakrabarty had produced "a new bacterium with markedly different characteristics from any found in nature." For that reason, "His discovery is not nature's handiwork, but his own," making it eligible for protection under intellectual property law.<sup>45</sup>

The court's reasoning bears closer scrutiny because it reinforces a core claim of this essay; namely, that our conception of the bounds of the natural change as science and technology bring new parts of the world under human control. Having found a way to intervene in the genetic makeup of a single-celled organism, the court ruled that Chakrabarty had changed the bacterium enough that it no longer qualified as a product of nature. However, and this is the second conclusion we may draw from the case, the court's ruling failed to explicitly clarify what constitutes a sufficiently thoroughgoing intervention required to lift something out of the state of nature and bring it under human control. After all, the Kalo Inoculant Co. clearly devised a

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<sup>45</sup>Sidney A. Diamond, *Commissioner of Patents and Trademarks, v. Ananda M. Chakrabarty, et al.*, 447 U.S. 303 (1980).

non-trivial, not to mention profitable, way to exercise control over several species of single-celled organisms. But why should a mixture of different bacteria living in combination—a so-called “microbial culture”—be so different from a mixture of plasmids within a single bacterium? In effect, the court simply relied on a shared intuition that an organism’s genetic makeup is so basic to its identity that Chakrabarty’s modified bacteria could not possibly constitute a product of nature.

The recent history of U.S. patent law demonstrates that as new things—including the genomes of biological organisms—come under our control, the court has incrementally recognized our ownership rights over them. What is more, this legal history suggests there is no fact of the matter about what is required to remove something from the state of nature. The decision that something is a product of nature rather than a cultural artifact is itself cultural. More tendentiously, we might even say modern patent law reveals our ideas about the bounds of the natural primarily to be a measure of our culture’s optimism about its ability to intervene in the world.

The fact that decisions about what constitutes a product of nature are largely conventional is further brought out by recent controversies about whether unaltered DNA sequences are patentable subject matter. In a unanimous decision that was filed in the summer of 2013, the U.S. Supreme Court ruled that “naturally occurring” DNA sequences, which had long been protected as genuine intellectual property, should be re-classified as a product of nature. The court’s reasoning in this case is highly instructive because it hinged on precisely the question of just how thoroughgoing an intervention was required to remove something from “the state that nature hath provided,” to borrow the language John Locke used to justify the existence of private property rights in his *Second Treatise of Government*.<sup>46</sup>

During the 1990s, a medical diagnostics company named Myriad Genetics, Inc., was awarded a patent on two parts of the human genome, known as BRCA1 and BRCA2, respectively. The medical and economic value of these patents derived from the discovery that women with these alleles exhibited an increased risk for developing breast and ovarian cancer. Then, in 2010, a group of medical care providers challenged Myriad’s monopoly on the use of these sequences to inform patients about their susceptibility to cancer, arguing that not only did Myriad’s vigorous defense of its intellectual property drive up the price of what should be a routine diagnostic test, and thus result in significant and preventable loss of life, but that its patents should never have been granted in the first place. Writing on behalf of the supreme court, Clarence Thomas agreed, explaining that the discovery of a particular sequence of DNA “by itself” might be a significant medical break-

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<sup>46</sup>Locke, *Two Treatises of Government*, 245.

through, but that does not render those sequences “‘new compositions of matter’ that are patent eligible.”<sup>47</sup>

Of course, Myriad’s lawyers disagreed. And so did a majority of the judges on the Federal Circuit Court of Appeals, who had earlier ruled in the company’s favor. The reason, Myriad argued, is that its patents did not cover the same DNA molecules as those one would ordinarily find in the human body. Rather, Myriad had first isolated and purified naturally occurring DNA, severing a number of covalent chemical bonds to cleave the relevant regions from the surrounding material that made up a human chromosome. Insofar as Myriad had created a new chemical molecule in the act of sequencing the BRCA1/2 alleles, the company argued, its patents did not run afoul of the product of nature doctrine. In his opinion for the Supreme Court, however, Justice Thomas rejected the relevance of this distinction, arguing that breaking a few covalent bonds to isolate and purify portions of a naturally occurring molecule does not a genuine intervention, and therefore invention, make.

In the *Myriad Genetics* case, the court once again faced a situation in which the bounds of the natural were directly under dispute. However, unlike in previous cases, *Myriad Genetics* reveals that the boundary can move backwards as well as forwards. That is, the case shows how things which once counted as a significant intervention—and thus a significant measure of our control—no longer do so at some later time. As science and technology continue to develop, what once seemed a powerful expression of our ability to intervene in the world comes to appear mundane. Ironically, as this happens, things which had previously been classed as a human invention may be inserted *back* into the state of nature.<sup>48</sup>

Recent debates that animate American intellectual property law may strike some as arcane and at times exceedingly technical. But they are nonetheless worthy of careful inspection, because they reveal much about our fascination with and confusions about the concept of nature. On the one hand, the patent law reflects a longstanding tradition that renders all of human history as so many chapters in a progressive narrative about the upward march of civilization. This is epitomized by nothing so much as our faith that science and technology will continue to enlarge our dominion over the rest of the world. At the same time, however, we have also encountered hints of a countervailing tendency, one which highlights the precariousness of our position by emphasizing that even the most advanced achievements

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<sup>47</sup> Assoc. for Mol. Pathology et al. v. Myriad Genetics, etc., 13.

<sup>48</sup>For more on the history of the product of nature doctrine, see Daniel J. Kevles, “Inventions, Yes; Nature, No: The Products-of-Nature Doctrine From the American Colonies to the U.S. Courts,” *Perspectives on Science* 23, no. 1 (June 30, 2014): 13–34.

of our culture can be placed back into the state of nature by mere legal fiat. In other words, the question of where nature ends and culture begins is not only cultural, it is highly fraught, vexed, and contested.

Of course, the constant interplay between our culture's techno-utopian optimism and the more pessimistic outlook that never seems to lie far behind is not unique to the patent law.<sup>49</sup> Rather, this spirit of equivocation arguably goes right to the heart of western modernity, which has long tempered its exuberant faith in progressive development with a near total obsession with degeneration and with decline.<sup>50</sup> Take for example, Thomas Cole's painting, *Desolation*, pictured above. Among the most celebrated members of the 19<sup>th</sup> century Hudson River School, Cole is perhaps best known for melodramatic scenes that pit human beings and their physical surroundings against one another, often executed on a grand scale. Cole clearly drew inspiration from German predecessors like Caspar David Friedrich, many of whose most famous paintings—especially the 1818 canvas, *Wanderer Above the Sea of Fog*—featured a human figure with its back turned to the viewer, surveying an incomprehensibly vast landscape stretched out before him. Insofar as they show nature as something which simultaneously dwarfs yet is nonetheless dependent upon us, the observer, these paintings illustrate a dialectic that stands at the heart of the argument offered here: nature may be a zone of human exclusion, Friedrich's wanderer seems to be telling us, but it is one that only emerges as such when we turn our backs to it, which is, in itself, an act of bounding that we have initiated ourselves.

But it is another feature shared by the work of these two artists I particularly want to emphasize here. In strikingly similar ways, both Cole and Friedrich seem to delight in showing up our insignificance when compared to the sublime power of nature. For example, Friedrich's well-known canvas, *The Sea of Ice*, depicts a harrowing scene in which huge shoals of ice, each the size of a mountain, overpower a comparatively tiny British naval ship that froze in search of the northwest passage. Similarly, Cole's *Desolation* forms the last of a five-part series, entitled *The Course of Empire*, that serves as a visual meditation on our species' hubristic confidence in its own long-term significance. While the first two canvases in this series—*The Savage State* and *The Arcadian or Pastoral State*—show human beings embedded within, dependent upon, and thus subject to their surroundings, later ones—*The Consummation of Empire* and *Destruction*—depict an impressive ability to control the world through technological and architectural means. However, much like Gib-

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<sup>49</sup>See, for example, J. Edward Chamberlin and Sander L. Gilman, eds., *Degeneration: The Dark Side of Progress* (New York: Columbia University Press, 1985).

<sup>50</sup>See J. Edward Chamberlin and Sander L. Gilman, eds., *Degeneration: The Dark Side of Progress* (New York: Columbia University Press, 1985).

bon's late 18<sup>th</sup> century *Decline and Fall of the Roman Empire*, Cole also suggests that any advanced civilization harbors within it the seeds of its own destruction. On this reading, the ease and leisure that characterize life in civil society inevitably cause its members to descend into a level of decadence that will, eventually, see them succumb to the wilderness once again. While the ruins dotting the vast landscape pictured in Cole's *Desolation* thus serve as evidence of a once-great empire, they also stand as a towering monument to the awesome power of nature, and with it, our impotence and insignificance.

#### *A Concept of Nature for the Age of the Anthropocene*

Although characteristically 19<sup>th</sup> century fears that a so-called "civilizing process" leads to a decadent culture that inevitably enters a period of decline may seem like the distant prejudice of a bygone age, I would nonetheless like to draw a parallel between these outmoded anxieties and our modern obsession with global climate change, biodiversity loss, and other expressions of environmental degradation. All are declension narratives that center on our excessive confidence in the ability to control our destiny. And, as such, they reveal that our relationship to nature is no less fraught today than it was for Romantics, even if that is true for different reasons. Whereas Romantics both dreaded yet also welcomed a day when nature would finally re-conquer the globe and lay waste to civil society, we fear that our species may have so fully mastered the world that it can no longer sustain us.

The dominant narrative of the *Anthropocene* is written in the style of a tragedy. It treats *Homo sapiens* as a protagonist whose power and hubris has grown to such an extent that we stand on the brink of rendering the whole Earth uninhabitable. Would not another narrative—composed in a more ironic register—be more useful? Rather than seeing ourselves as having overpowered nature to the point where it totally disappears, I would like to urge a view of the *Anthropocene* as a time in which our species has run up against the limits of its own power. Such a perspective not only rightly points out that the problems we currently face are primarily political (with disastrous ecological consequences). It also suggests that we would be foolish to try and strong-arm our way out of our predicament. What is most needed now is not for our species to exert even greater control, including ambitious proposals for large-scale geo-engineering schemes designed to reshape the earth as a whole. Instead, it would be better to develop an understanding of our place in the world built on humility; one that is premised on the desire to reconcile ourselves with the limits of our power as a starting point for thinking through potential solutions to global climate change.

In fact, ours is hardly the first generation to wonder whether our species has entered a new geological epoch, one wherein mankind reigns supreme. Indeed, the

idea is as old as the science of geology itself. When a French savant named Georges Cuvier undertook a study of the fossil record with the same meticulous attention to detail being lavished on the ruins of ancient civilizations at the close of the 18<sup>th</sup> century, he was struck by the radical breaks dividing the earth's history into a series of distinct stages, each of which appeared to have been ruled by different organisms. Whereas the oldest rocks he examined primarily yielded an abundance of fossil fishes, the next several layers were dominated by fearsome reptiles, only to give way to more recent formations in which mammalian creatures proliferated. Describing himself as a "new species of antiquarian" who dreamed of being able to "burst the limits of time" and "recover the history of this world," Cuvier used the word "revolutions" to distinguish between each of these geological epochs, drawing an implicit parallel with the dramatic regime change he had recently witnessed in his own country.<sup>51</sup>

Subsequent geologists infused Cuvier's vision with a sweeping evolutionary trajectory. Armed with the notion that life has an innate tendency to increase in complexity, late 19<sup>th</sup> century naturalists transformed a catastrophist model in which history periodically grinds to a halt into a grand narrative of evolutionary progress. The periodic mass extinction events that Cuvier identified were thereby re-fashioned into moments of rebirth and rejuvenation, a kind of ground clearing that made room for the proliferation of more complex and advanced organisms. According to the American paleontologist Edward Drinker Cope, for example, the history of life on earth "tends to upward progress in the organic sense; that is, toward the increasing control of the environment by the organism, and toward the progressive development of consciousness and mind."<sup>52</sup> Similarly, writing for a more popular audience some three decades later, another paleontologist likened the extinction of dinosaurs to the "Renaissance," in that it made possible the "birth of intelligence."<sup>53</sup> By the turn of the 20<sup>th</sup> century, it had therefore become conventional to insist on the continuity between human history and natural history, subdividing the Phanerozoic eon into an "Age of Fishes," "Reptiles," and "Mammals" that ultimately culminated in the "Age of Man." Moreover, what made each of these stages distinctive was not only that a new group of organisms rose to a position of dominance, but that

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<sup>51</sup>See Georges Cuvier, "Discours préliminaire," *Recherches Sur Les Ossements Fossiles de Quadrupèdes*, Tome Premier, (Paris: Deterville, 1812). See also Martin J. Rudwick, *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution* (Chicago: University of Chicago Press, 2005).

<sup>52</sup>Edward Drinker Cope, *The Primary Factors of Organic Evolution* (Chicago: The Open court publishing company, 1896), 475.

<sup>53</sup>Richard Swann Lull, *The Ways of Life* (New York: Harper & Brothers, 1925), 176. For a more scholarly treatise that touts a similar line, see Richard Swann Lull, *Organic Evolution: A Text Book* (The Macmillan Company, 1917).

each represented an advance over what came before, steadily building up to the evolution of a species—ourselves—whose power over the rest of creation was so immense that it could take over the reigns of evolution and control its own geological destiny.<sup>54</sup>

My concern is that current debates about the age of the *Anthropocene* simply turn an older, triumphalist narrative onto its head. Rather than celebrate our species' rise to power by emphasizing its ability to intervene in the world, we have come to dread those very capacities. What has largely remained unchanged, however, is the abiding faith that we are properly to be understood as the main protagonists in recent geological history. In other words, without discounting the tremendous ecological impact our species has had, I am deeply concerned that a pervasive anthropocentrism continues to inform much of our thinking about the *Anthropocene*. And, for that reason, I would like to see us imagine a more radical alternative, one that does not turn on a well-worn obsession with humanity's inexorable rise to power and prominence.

There is an obvious danger that lurks just under the surface of my proposal. By indexing nature to the limits of human control, we run the very real danger of simply naturalizing what those with political power would rather leave be. However, just because some things are difficult to change does not mean we ought not to make the attempt. Much of what is worth doing does not come to us easily, but that hardly means there is no value in trying. In other words, I emphatically do not advocate an essentialist definition of nature, nor that we take the normative leap and argue we *ought* not to alter those things we find hard to control. If the shifting and unstable history that I've presented here teaches us anything, it is precisely the opposite, showing just how dramatically our understanding of humanity's place in the world has changed over time. There is no reason the future should be any different, and I merely ask that we proceed in a way that is careful, deliberate, and, above all, cognizant of our weaknesses and shortcomings.

A deeper, and more instructive, objection points out that a great many things we would not usually classify as "natural" are in fact difficult if not practically impossible to control. The value of our money, the location of our political borders, and the many other examples of what Durkheim famously termed "social facts," all these are largely beyond our power. This is true even though social facts are human institutions, a product of our actions, beliefs, and practices. There is no fact of the matter that determines the value of a dollar bill beyond what we all, as

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<sup>54</sup>See, for example, Henry Fairfield Osborn, *The Origin and Evolution of Life* (New York: C. Scribner's Sons, 1917); Henry Fairfield Osborn, *Man Rises to Parnassus; Critical Epochs in the Prehistory of Man* (Princeton: Princeton University Press, 1927).

a collective, believe it to be, but I am not therefore in a position to influence it in any quantitatively meaningful sense. This is why social facts are often described as solid, durable, and resilient, and indeed why it makes sense to use the word “fact” in this context at all. Something similar holds true for a great many more mundane features of everyday life, although perhaps in an attenuated sense. Whether somebody loves me, what careers are open to me, and where I can choose to live, all of these are at least to some extent beyond my control, despite being about as far removed from our everyday notion of nature as one can imagine.

One response would be to distinguish between our ability to intervene in the world as individuals versus our capacity to act as a collective, a population, or even a species. Acting in concert, it is possible to accomplish tasks that are beyond the power of individuals. In broad strokes, this is a core part of the argument Dipesh Chakrabarty makes in “The Climate of History,” where he calls on his readers to engage in a kind of “species thinking.”<sup>55</sup> In practice, of course, convincing others to act as we’d like them to is much easier said than done, which is precisely why global climate change poses such a difficult challenge. If nature represents that which is beyond our control as individuals, then large-scale attempts to intervene in it must be always political, involving others as well as ourselves. But the beliefs, values, and actions of our fellows are equally beyond our individual control. Hence, it will always be hard to reshape the world after our image, including those parts of it that we usually describe as our culture and society.

In the final analysis, then, it is true that the reading I endorse here does not succeed in imposing an absolute distinction between nature and culture, humans and the rest of the world. On the contrary, it does precisely the opposite. But that is far from a drawback, and it may even be one of the main features to recommend it. After all, as I have been at pains to stress, the bounds of the natural are not set in stone. They are constantly shifting. Moreover, it does not strike me as far-fetched to suggest that our experience in the face of particularly durable social realities differs so much from, say, that of confronting an imposing physical phenomenon. Is it really so much more difficult to level a mountain, irrigate a desert, or take to the air than it would be to effect meaningful change in a particularly entrenched and resilient institution like global capitalism? To the extent that we cannot easily influence the behavior of those around us, that is just in the nature of things. Similarly, we might ask: what is the nature of love if not the fact that we cannot control another’s subjective experience? Of course, all such experiences are highly variable and context dependent. Thus, for example, my own experience of attempting to change the value of a dollar bill would almost certainly differ from

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<sup>55</sup>Chakrabarty, “The Climate of History: Four Theses.”

those of a high-ranking official at the US Federal Reserve. But again, this variability and context-dependence strikes me as entirely appropriate, for, as we have seen, it also characterizes our encounters with more canonical and recognizable aspects of nature. Much like our experience of size is indexed to the space that our bodies occupy, so too, then, is our experience of nature dependent on very particular means of interacting with, and intervening in, the rest of the world. As a result, the concept of nature that I propose is anything but absolute. Rather, it is intended as a reflection of, and meditation on, the deeply personal experience of interacting with everything and everyone else in the world.

The variable and deeply contextualized sense in which I urge that we understand nature leads to a final point on which I would like to end: just as other organisms lead rich social lives, so too is it true that we are far from the only creatures that have altered their physical surroundings in deep, lasting, and far-reaching ways. To take just a single example, geochemists agree that for most of its history the earth's atmosphere was reducing and thus oxygen-poor. It was only during the Proterozoic eon that a group of photosynthesizing prokaryotes called cyanobacteria began to change the composition of the earth's atmosphere to a state that resembles our own. This was a monumental event, setting the stage for a rapid radiation of life forms known as the Cambrian explosion, during which most extant animal phyla first appeared (including the chordates, to which our species belongs). But in an ironic twist of fate, the photosynthetic activities of cyanobacteria not only created the geo-chemical conditions that first allowed complex animals to evolve, they also contributed to the Precambrian era's most violent mass extinction event, as the vast majority of obligate anaerobic organisms found themselves unable to adapt to the new atmospheric conditions.<sup>56</sup>

Evolutionary biologists and ecologists would describe these events as an example of niche construction, that is, of organisms changing their surroundings in ways that profoundly alter the selection pressures shaping their evolutionary trajectories. Other examples include the production of copious leaf litter by angiosperms

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<sup>56</sup>The literature on this complex topic is vast, but for an excellent introductory overview, see David C. Catling and Mark W. Claire, "How Earth's Atmosphere Evolved to an Oxic State: A Status Report," *Earth and Planetary Science Letters* 237, no. 1–2 (2005): 1–20. See also Lars Olof Björn, "The Evolution of Photosynthesis and Chloroplasts," *Current Science* 96, no. 11 (2009): 1466–74; D.E. Canfield, "The Early History of Atmospheric Oxygen," *Ann. Rev. Earth Planet. Sci.* 33 (2005): 1–36; Heinrich D. Holland, "The Oxygenation of the Atmosphere and Oceans," *Phil. Trans. Royal Society B* 361 (2006): 903–15; Bulusu Sreenivas and Takashi Murakami, "Emerging Views on the Evolution of Atmospheric Oxygen during the Precambrian," *Journal of Mineralogical and Petrological Sciences* 100, no. 5 (2005): 184–201; Lawrence M. Och and Graham A. Shields-Zhou, "The Neoproterozoic Oxygenation Event: Environmental Perturbations and Biogeochemical Cycling," *Earth-Science Reviews* 110, no. 1–4 (2012): 26–57.

and the construction of complex mounds by termites, as well as anthropogenic climate change.<sup>57</sup> For our purposes, we need not adopt the same terminology, but it is nonetheless worth pausing to consider what the biologists who introduced this concept into the technical literature meant when they claimed that their aim was nothing less than a “relativization of evolutionary biology.” Citing the critical insight that biology’s ubiquitous “‘metaphor of adaptation’ should be replaced with a ‘metaphor of construction’” by the well-known population geneticist Richard Lewontin, they argued that “Niche construction changes the dynamic of the evolutionary process in fundamental ways because it precludes a description of evolutionary change relative only to autonomous environments.”<sup>58</sup> That is, it implies nothing less than a new kind of ontology, one that is dynamic and integrated rather than static and disconnected.

Much as the biological notion of niche construction relativizes our understanding of the organism’s relationship to its environment, I have tried to suggest that a political reading of nature might relativize the way we understand our place in the world. However, in some ways it has exactly the opposite consequences. Whereas the orthodox view of evolutionary biology tends to overestimate the extent to which organisms are embedded within their environment, thereby discounting their power to actively shape and intervene in their ecological context, I have tried to suggest that our orthodox view of the *Anthropocene* tends to overstate our ability to exercise power. It is for this reason that I want to resist the temptation of elevating our species to the level of a geological force. Rather, we would do better to acknowledge our limits, moral, cognitive, and otherwise, as one kind of organism among so many others.

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<sup>57</sup>F. John Odling-Smee, Kevin N. Laland, and Marcus W. Feldman, *Niche Construction: The Neglected Process in Evolution* (Princeton, NJ: Princeton University Press, 2003).

<sup>58</sup>F. John Odling-Smee, Kevin N. Laland, and Marcus W. Feldman, “Niche Construction,” *The American Naturalist* 147, no. 4 (1996): 641–48. See also Richard C. Lewontin, *The Triple Helix: Gene, Organism, and Environment* (Cambridge, Mass: Harvard University Press, 2000).