

WHOSE ANTHROPOCENE?

Revisiting
Dipesh Chakrabarty's
"Four Theses"

Edited by
Robert Emmett
Thomas Lekan



Transformations in
Environment and Society

2016 / 2

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RCC Perspectives
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Foreword

The essays in this volume stem from a collaboration between the Rachel Carson Center and the University of South Carolina (USC). Readers of *RCC Perspectives* will notice a conversation that continues from issue 2013/3, “Anthropocene: Exploring the Future of the Age of Humans” (edited by Helmuth Trischler), and reflects the launch of the major exhibition “Welcome to the Anthropocene: The Earth in Our Hands” at the Deutsches Museum in December 2014. The Anthropocene, a term coined by American biologist Eugene Stoermer and Dutch geochemist Paul Crutzen, describes a new geological epoch dominated by human activities at all scales, particularly the transformation of the planet’s atmosphere due to fossil-fuel burning. The aforementioned collaborations on this theme led to a February 2015 workshop held at USC entitled “After Nature,” hosted by the USC History Center and affiliate departments and units in environmental studies, global studies, English, and geography, and co-sponsored by the Rachel Carson Center. The workshop served as the centerpiece of Professor Dipesh Chakrabarty’s week-long series of public lectures and seminars, sponsored by the Provost’s Visiting Scholars Institute. The goal of the workshop was to use Chakrabarty’s 2009 essay “The Climate of History: Four Theses” as a catalyst for multidisciplinary reflections that began with humanistic questions about ontology, freedom, and justice and moved outward to engage scholars from the social sciences, natural sciences, and applied professional fields. The great disciplinary diversity of the workshop’s participants and audience reflect the wide-reaching influence of Chakrabarty’s work, which has sparked debates in history, philosophy, cultural and postcolonial studies, and subsequently among bio- and geoscientists, about the Anthropocene.

We invited a mix of university faculty that included a core group of current and former Carson Fellows and visiting scholars working in environmental history, political philosophy, religious studies, and literary criticism; scholars from Duke University’s Nicholas School of the Environment, the University of North Carolina Kennan-Flagler Business School, and Sonoma State’s Department of Environmental Planning; and USC faculty from geography, law, biology, and geology. The participants were asked to reflect primarily upon the thesis most relevant for their work, a structure that, as is evident in the section headings and contributions below, did not fall along disciplinary lines. The

resulting essays suggest many ways in which Chakrabarty's arguments both reflect and further catalyze an ongoing transformation in intellectual culture and research on environment and society in the Anthropocene.

In "Breaching the Divide: Human and Natural Histories," historian Timothy J. LeCain joins law professor Josh Eagle and conservation biologist Carol Boggs to explore the collapse of the age-old distinction between human and natural histories (Thesis 1), while those exploring "Politics in/of the Anthropocene" (Thesis 2) include geochemist Lori Ziolkowski, cultural geographer Jessica Barnes, and political theorist John Meyer. Sustainable business professor Carol Hee joins international relations scholar Kathleen McAfee and Laura Watt, a scholar of environmental history and management, to explore the intersections of capitalism and species history (Thesis 3) in "Species Capital: Consumption in the Anthropocene." We round out the volume with a section that takes up the challenge of species-being (proposed in Thesis 4), "Probing our Limits: Narrative and the Geophysical Imagination," which includes essays by literature and film scholar Alexa Weik von Mossner, religious studies professor Lisa Sideris, and soil scientist Daniel deB. Richter. We end this volume with a response from Chakrabarty to the wide-ranging discussions—of the practices of history, of the politics of freedom, and of the limitations of capitalism—that his work has inspired.

Introduction

In his 2009 essay “The Climate of History: Four Theses,” the historian Dipesh Chakrabarty argued that anthropogenic climate change has signaled a fundamental shift in human history and human capacity. Once we have accepted the scientific evidence that human activities are re-shaping the Earth’s atmospheric patterns and geochemical cycles, he argues, we are compelled to recognize that human beings have, collectively, become a geophysical force capable of determining the course of climate for millions of years. A force of this magnitude is like the cyanobacteria that breathed oxygen into our atmosphere over 2.5 billion years ago, making life as we know it possible, or the asteroid that triggered the extinction of the dinosaurs 66 million years ago. On such a scale, the narrow channeling of climate anxiety onto the technoscientific dimensions of a transition from fossil fuel-based sources of energy to renewables appears quaint. Chakrabarty argues that emergent forms of geological agency have driven a wedge into the continuity of human experience over time that undergirds historical understanding. With these ties to the past severed, human beings often find themselves lacking a useful account of collective experience that can guide future action.

The “Four Theses” has become a primary text for understanding the problematic nature of the Anthropocene as a cultural category, one that describes a collective, if unintended, human project whose implications extend far beyond geological inquiries about stratigraphic dating. Even as geologists continue to debate whether the Earth has indeed departed the Holocene, and if so, when, Chakrabarty has articulated what is at stake for our perception of human agency as a species when the timescales of human history become entangled in geological epochs. Reflecting on his “Four Theses” involves re-casting if not radically transforming the meaning of history and the purpose of humanities research in the age of global warming.

Chakrabarty has proposed four theses to understand the “deep contradiction and confusion” that climate change has produced for historical understanding.¹ In this volume, Timothy J. LeCain compares the “Four Theses” to Martin Luther’s “Ninety-Five Theses” for their potential to disrupt both humanistic and natural-scientific knowledge. Chakrabarty does not merely challenge the way we go about doing historical research; he argues that because climate change collapses the distinction between natural history and human

1 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 198.

history, it calls us to abandon the dominant way in which we have conceptualized ourselves since the Enlightenment. The idea of the Anthropocene severely qualifies humanist histories of modernity and globalization, whether of the neoliberal, progressive, or Marxist variety. Its geological hypothesis requires us to put global histories of capital in conversation with the species history of humans, as colonial expansion and capitalist accumulation produced both historical inequalities and locked in future climate instability tied to humanity at the level of a *global* population. Considering species history and the history of capital together thus pushes us to the limits of historical understanding. Imagination and creativity take on renewed importance for navigating the currents of shared experience.

For historians interested in processes of globalization, decolonization, and environmental change, the “Four Theses” poses a concise challenge to phenomenological or hermeneutic understandings of the past, materialist analyses of capitalism, postcolonial understandings of the subaltern, and ecological histories that situate humans as biological agents. Throughout the nineteenth and twentieth centuries, Chakrabarty argues, historians of all stripes assumed that the story of human affairs unfolded through acts of conscious self-reflection beyond the analytics of naturalistic explanation. Indeed, such assumptions about humans’ capacity for individual and collective self-fashioning ensured that considerations of freedom, rights, and struggles for emancipation have remained at the center of our historical imagination for the past 250 years, even when circumscribed by Karl Marx’s famous dictum that “men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past.”²

To be sure, there is nothing new about historians’ recognition that impersonal and anonymous material forces—ranging from Marx’s dialectical materialism to Ferdinand Braudel’s climatic *longue durée*, to Alfred Crosby’s ecological imperialism—have delimited the exercise of human choice. And yet, according to Chakrabarty, in no discussion of freedom since the Enlightenment have historians—including environmental historians interested in humans as biological agents—recognized how much the “mansion of modern freedoms stands on an ever-expanding base of fossil fuel use.”³ In a subsequent 2012 essay entitled “Postcolonial Studies and the Challenge of Climate Change,” Chakrabarty went even further, arguing that the figures of the rights-bearing human

2 Karl Marx, *The Eighteenth Brumaire of Louis Bonaparte* (Moscow: Progress Publishers, 1934 [1852]), 10.

3 *Ibid.*, 208.

being found in anticolonialist literature and the “subject under erasure” in deconstructive, postcolonial criticism were inadequate for understanding the collective agency of humans in the Anthropocene—a provocative intellectual move for an author who is considered one of the founders of subaltern studies.⁴ With the sophisticated tools of Earth systems science at our disposal, we now recognize that the industrial revolution was not merely a watershed in global political economy, but also a rupture in the fabric of the planet’s geospatial time. We are living, in short, in an era both of our own making and one entirely outside the experience and memory of human history. This time out of mind calls for particular mindfulness as we proceed.

Not all of Chakrabarty’s former intellectual comrades have welcomed the Anthropocenic turn in his writing. For Slavoj Žižek, to cite one prominent example from the rich critical response to the “Four Theses,” it is only within a Hegelian dialectic of the universal (life on Earth) and the particular (capitalism) that the planetary climate crisis reveals itself.⁵ Žižek maintains that the survival of the human species paradoxically depends on “first resolving the particular deadlock of the capitalist mode of production.”⁶ Chakrabarty, on the other hand, does not conceive of the Anthropocene emerging dialectically from the contradictions of capitalism and nature. Instead, he insists, we must conceive of ourselves as a species that “stumbled” into it through growing population numbers and multifaceted industrial activities. In this “negative universal history,” the crisis of climate change precipitated by greenhouse gas emissions has revealed parameters for the continued existence of life that have no inherent connection to capitalism, socialism, nationalism or any other mode of production. His claim that “the whole crisis [of climate change] cannot be reduced to a story of capitalism”⁷ has certainly provoked a vital conversation across philosophy, history, human geography, cultural anthropology, and political theory about the significance of climate change, social inequality, and the logics of capital. Chakrabarty’s subsequent work on the conjoined histories of capitalism and climate, moreover, notes that anthropogenic climate change brings into view the collision of three incommensurable histories—of Earth systems, of life and evolution on Earth, and of the more recent industrial civilization—that defy our ability to transform the radical uncertainties of the Anthropocene into

4 Dipesh Chakrabarty, “Postcolonial Studies and Climate Change,” *New Literary History* 43, no. 1 (Winter 2012): 1–18. On subaltern approaches to history, see especially Chakrabarty, *Provincializing Europe: Postcolonial Thought and Historical Difference* (Princeton: Princeton University Press, 2000).

5 For Žižek’s discussion of Chakrabarty see *Living in the End Times* (London: Verso, 2010), 330–36.

6 Chakrabarty, “Four Theses,” 334.

7 *Ibid.*, 222.

calculable risks and force us to recalibrate our moral disposition toward the planet in ways that do not necessarily put humans first.⁸

In a more profound sense, the “Four Theses” pointed to a need to explore humans’ ontological status in the age of global warming along many paths and opened philosophical questions that otherwise might be subsumed in pragmatic or polemical discourses around climate. If, as Chakrabarty argues, an accidental geological agency is the price we pay for the pursuit of freedom, how should we conceive of the immediate predicament, which requires plans for climate change mitigation alongside an Enlightenment-inspired quest for climate justice? How has the “Great Ontological Collapse,” as LeCain defines it in this volume, changed the contours of scientific and humanistic knowledge? Does responding to climate change require that humanists abandon their ongoing explorations of disciplinary power and social difference—particularly those produced by the sharp inequalities of global capital—in favor of species history? Are we left *only* with a “negative universal history” in responding imaginatively to the crisis of climate change, or is there time still for dreaming new utopias, time for imagining other revolutionary transformations in environment and society?

We share many of the enthusiasms and concerns of contributors in this volume, which for the sake of structure we have grouped according to the “Four Theses.” Nonetheless, we wish to highlight in particular four cross-cutting themes that emerged from the discussions in South Carolina. First, several contributors worry that Anthropocene discourse—and in particular the strongly normative, prescriptive versions of a “Good Anthropocene”—amounts to a new deterministic, essentialist reading of the human. Chakrabarty’s warning that we attend to the disjunctions of scale and agency notwithstanding, contributors including Kathleen McAfee, Lisa Sideris, and Jessica Barnes flag concerns about how the Anthropocene tends to erase relevant differences in human experience that are expressed in, and through, environmental knowledge and power.

Second, several authors are troubled by an unproductive reduction of planetary systemic change to a subset of geophysical environmental changes—shortchanging the entanglement of humans and nonhumans across ecological (and geomorphological) scales. It is noteworthy that this concern appears in contributions from a geochem-

8 Dipesh Chakrabarty, “Climate and Capital: On Conjoined Histories,” *Critical Inquiry* 41, no. 1 (2014): 1–23.

ist (Lori Ziolkowski) and a biologist (Carol Boggs) as well as from researchers in the social sciences and humanities. Researchers occupied with different primary methods and objects of study perhaps inevitably produce different accounts of Anthropocenic change. These in turn construct humans as a species in different ways, although the resulting figures of the human are not all equally potent in decision-making arenas.

Third, contributors are quite divided over the claims to novelty and of rupture in the “Four Theses.” John Meyer and Josh Eagle point out earlier moments when natural history and human history have been apprehended as necessarily interdependent in political theory and legal practice. We would add from a cursory survey of “Anthropocene” publications the general observation that some disciplines more readily embrace and indeed pursue novelty, via aesthetic or scientific experiments. Literary theory and Earth systems science perhaps are leading a charge into the unknown astride this Anthropocene neologism. But does this new term also help us to frame new relationships of power?

Finally, many contributors highlight a need for a politics of mitigation and deployment of creativity in everyday life rather than starting at a planetary perspective of epochal change. Contributors as diverse in their approaches and disciplinary backgrounds as Carol Hee, Laura Watt, and Daniel deB. Richter might have us begin by narrating usable pasts rather than asking that we operate at the abstract level of species life. Film and literature critic Alexa Weik von Mossner examines fictions plotted on the inhuman timescale of climate change that dissatisfy because they fail to breathe life into human characters or produce sympathy. Understanding the near-future consequences of global warming depends on the artfulness with which we imagine and render the often quotidian experiences of climate change. A surprisingly powerful rainstorm wakens a child in the night, whose crying disturbs the neighboring dogs and livestock; an electrical fan trips the breaker and plunges a room into the dimness of interior space, interrupting a conversation at the seminar table. Imagining environment is as much a matter of niche, setting, and ambience as it is of projecting global Earth systems effects: this collection of essays responds to Chakrabarty’s salutary call for us to “rise above disciplinary prejudices” and use our powers of creative imagination as well as scientific analysis to make sense of climate change.

Breaching the Divide
Human and Natural Histories

“To call human beings geological agents is to scale up our imagination of the human. Humans are biological agents, both collectively and as individuals. They have always been so. There was no point in human history when humans were not biological agents. But we can become geological agents only historically and collectively, that is, when we have reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself. 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. We seem to be currently going through that kind of a period. The current “rate in the loss of species diversity,” specialists argue, “is similar in intensity to the event around 65 million years ago which wiped out the dinosaurs.” Our footprint was not always that large. Humans began to acquire this agency only since the Industrial Revolution, but the process really picked up in the second half of the twentieth century. Humans have become geological agents very recently in human history. In that sense, we can say that it is only very recently that the distinction between human and natural histories—much of which had been preserved even in environmental histories that saw the two entities in interaction—has begun to collapse. For it is no longer a question simply of man having an interactive relation with nature. This humans have always had, or at least that is how man has been imagined in a large part of what is generally called the Western tradition. Now it is being claimed that humans are a force of nature in the geological sense. A fundamental assumption of Western (and now universal) political thought has come undone in this crisis” (Chakrabarty, “Four Theses,” 206–7).

Timothy J. LeCain

Heralding a New Humanism: The Radical Implications of Chakrabarty's "Four Theses"

When Martin Luther nailed his "Ninety-Five Theses" to the door of Wittenberg's All Saints' Church, he sought to start a conversation about reform. Yet his ideas sparked something that eventually came to look rather more like a revolution. As far as I am aware, Dipesh Chakrabarty has not nailed his "Four Theses" to any doors at the University of Chicago, but perhaps he should. The satisfying "thunk" of nail in wood would provide an appropriate note of material solidity to Chakrabarty's provocative ideas that—at least to my reading—pose a powerful challenge to the modernist illusion that we humans are separate from the material world around us. Humanism may never be the same again.

I am not sure that Chakrabarty intended anything quite so bold as a reformation of the humanistic disciplines. Nonetheless, in the context of the recent efflorescence of neo-materialist and posthumanist thinking in a variety of scholarly fields, his "Four Theses" may prove more radical than even he intended, or perhaps desires. Indeed, his first thesis is by most academic measures already plenty radical. Chakrabarty proposes that the advent of anthropogenic climate change spells "the collapse of the age-old humanist distinction between natural history and human history."¹ From Vico to Collingwood to Carr, most historians have taken it as largely self-evident that whatever remained natural about human beings—mostly just their bodies—had no real history, while the rest of the nonhuman world was the province of an entirely distinct "natural history." Real history only commenced when humans began to do unnatural things: cultivate crops, make tools, build cities, and create societies and cultures. In this view, humans had a history that was in proportion to the extent to which they were unnatural and cultural.

Anthropogenic climate change, however, has breached this once seemingly impregnable wall of separation. The unnatural power of human society and technology has grown so great that it has, ironically, come full circle to become natural again: a force of nature comparable to the Earth's orbital permutations, plate tectonics, or the impact of a massive asteroid. Chakrabarty argues that, as humans become such a "geophysical force,"

1 Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35, no. 2 (2009): 201.

conventional humanistic distinctions between human culture and nature collapse. Neither “subject nor object,” such a force of nature is simply “the capacity to move things.” This is a consequence of human creativity and history, yet it possesses neither, and is instead akin to “some nonhuman, nonliving agency.” With anthropogenic climate change, humans must be understood both as unnatural self-created creatures and a natural force—what Chakrabarty terms “the human-human and the nonhuman-human.”²

In essence, Chakrabarty’s brilliance is to clearly identify here what we might term the Great Ontological Collapse. Many humans, particularly those under the seductive spell of Western Enlightenment thought, had for centuries insisted that they existed on a plane far above the base material world around them because their ontology was one of creation and self-creation. Humans were subjects, never objects. Indeed, as Chakrabarty notes, such anthropocentric hubris was often closely tied to the new religions that evolved in the wake of the Neolithic revolution and urban settlement.³ Attempting to explain their seeming divergence from other animals and the natural world, city dwellers often concluded that a supernatural god must have granted them some part of its own divine and immaterial essence. Centuries later, Enlightenment thinkers secularized the immaterial soul, replacing it with a sort of “Soul 2.0,” one inherent in an abstracted and disembodied concept of the human intellect and culture: we think, therefore we create.

Yet what happens when humans’ thinking and creating results not in their transcendence of nature, but their abrupt descent back into it? This is precisely the phenomenon occurring with anthropogenic global warming, Chakrabarty suggests. Humans have not “slipped the surly bonds of Earth,” but find themselves bonded ever more tightly to the most fundamental earthly phenomena.⁴ To be sure, some have already begun to take a certain pride in having achieved such a powerful effect, suggesting that it is perhaps now the destiny of humans to fully master and reengineer the planet. The Australian ethicist Clive Hamilton notes that the so-called “ecopragmatists,” such as Michael Shellenberger and Ted Nordhaus of the “neogreen” Breakthrough Institute, have begun to argue that humans can engineer a “Good Anthropocene.” Some advocates of this optimistic view—what Hamilton

2 Dipesh Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” *New Literary History* 43 (2012): 11, 13.

3 Dipesh Chakrabarty, “Climate and Capital: On Conjoined Histories,” *Critical Inquiry* 14 (Autumn 2014): 17.

4 The passage is from the aviator John Gillespie Magee’s famous 1941 paean to technological transcendence, “High Flight.” A few months after composing the poem, the surly bonds reasserted themselves. Magee plummeted to his death when his Spitfire collided with another aircraft while on maneuvers over eastern England.

aply calls the Promethean position—argue that humans can manage the effects of global warming through gigantic geoengineering projects.⁵ Yet Chakrabarty rightly cautions against such anthropocentric hubris, proposing that this new world-altering geophysical force is unthinking and unintended, a “beast” that humans have unleashed more than created, and clearly not one that they control. Far from escaping the bonds of a weak and passive Earth, humans are instead revealed to be the creations of a powerful and creative Earth. The distinction between human and natural ontologies is at an end.

This is a profoundly important insight, and I suspect that its implications may be more radical than even Chakrabarty suggests. Having recognized how climate change collapses the divide between human and natural history, it becomes reasonable to ask whether there was ever a divide in the first place. We begin to contemplate the heretical thought that perhaps humans never left nature, that we have always been a force or product of the natural material world, even if only recently a geophysical one. For this claim to make sense demands that we take on the even broader modernist distinction between culture and nature, and ask how human intelligence, creativity, and inventiveness are not above the material world but rather products of it. Until recently, most scholars have assumed that nonhuman organisms and things might at most simply influence a distinctly separate sphere of human culture through some ill-defined abstract process. Indeed, culture was frequently understood as standing in opposition to nature. To the degree that nonhuman things were understood as cultural—as implied, say, in the phrase “material culture”—it was solely because humans had put the culture there. In the conventional anthropocentric view, human culture was infinitely creative and mutable while everything else on the planet was often understood as largely passive and fixed—mere “natural resources” or “raw materials.” Given this interpretation, cultural phenomena like social power, intelligence, or creativity could never, in and of themselves, be understood as material things.

These old verities are now giving way, thanks in part to the new ways of thinking made possible by global climate change. Environmental historians, neo-materialists, and posthumanist thinkers in a variety of disciplines have begun to suggest the many ways in which human culture is inseparable from the material world. Chakrabarty

⁵ For a penetrating critique of the “Good Anthropocene,” see Clive Hamilton, *The Earthmasters: The Dawn of the Age of Climate Engineering* (New Haven: Yale University Press, 2014). I criticize the broader Anthropocene concept itself in Timothy J. LeCain, “Against the Anthropocene: A Neo-Materialist Perspective,” *International Journal for History, Culture and Modernity* 3, no. 1 (2015): 1–28.

cites Daniel Smail's important argument that cultural history can be analyzed at least somewhat as a product of the biological nature of the human brain.⁶ The environmental historian Edmund Russell demonstrates how the British Industrial Revolution—so central to anthropogenic climate change—was in significant part the product of the genetic creativity of a New World cotton plant.⁷ In my own work, I have argued that what is typically understood as solely human intelligence behind the open-range stock industry in the United States was also the product of the cattle's own highly social intelligence.⁸ At the same time, new materialist scholars have pushed us to consider how many other aspects of human sociocultural existence are materially grounded. In her argument for a "vital materialism," political theorist Jane Bennett argues that we need to rethink the power of humans: "not by denying humanity's awesome, awful powers, but by presenting these powers as evidence of our own constitutions as vital materiality."⁹ In his recent career-defining *magnum opus*, the French anthropologist Philippe Descola exhorts scholars to move "beyond nature and culture," perhaps in part by taking inspiration from the many non-Western peoples whose animistic world-views render such a dichotomy largely nonsensical.¹⁰ In sum, these new ideas suggest that we humans derive much of what we like to think of *our* power, intelligence, and creativity, from the material things around us. Indeed, in many ways these things are understood as constituting who we are.

Many of these neo-materialist insights resonate with Chakrabarty's thesis. However, they also posit a further question: How did humans become a geological force of nature in the first place? Intent on exploring the consequences, Chakrabarty says less about the causes, though he suggests that "we have stumbled into it" through the process of industrialization. Provocatively, he also refuses (I think rightly) to make any causal distinction "between the capitalist and socialist societies we have had so far, for there was never any principled difference in their use of fossil fuel."¹¹ In this I suspect Chakrabarty

6 Daniel Lord Smail, *Deep History and the Brain* (Berkeley: University of California Press, 2008).

7 Edmund Russell, *Evolutionary History: Uniting History and Biology to Understand Life on Earth* (Cambridge: Cambridge University Press, 2011).

8 Timothy J. LeCain, "Copper and Longhorns: Material and Human Power in Montana's Smelter Smoke War, 1860–1910," in *North American Mining and the Environment*, eds. John McNeill and George Vrtis (Berkeley: University of California Press, forthcoming).

9 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham: University of North Carolina Press, 2010), 10.

10 Philippe Descola, *Beyond Nature and Culture*, trans. Janet Lloyd (Chicago: University of Chicago Press, 2013).

11 Chakrabarty, "Four Theses," 217.

points to what neo-materialists might suggest was the first source of this human geographical power: not their social and cultural inventiveness, nor their various political economies, but rather their relations with the material power of the coal and oil that helped to create them all.

“The mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use,” Chakrabarty elegantly writes.¹² Yet are fossil fuels only the base of human freedom, or do they in some logical sense create and constitute that freedom? In collapsing human and natural ontologies, it becomes possible to understand coal and oil as creative ontological forces, to suggest that humans do not use fossil fuels so much as they become entangled with and created by them.¹³ Timothy Mitchell argues that the material nature of coal not only helped create modern democracy, but also in a deeper sense constitutes that democracy.¹⁴ Transforming coal into a useful commodity, Mitchell argues, involved “establishing connections and building alliances . . . that do not respect any divide between material and ideal” or even between the “human and nonhuman.”¹⁵

“Having recognized how climate change collapses the divide between human and natural history, it becomes reasonable to ask whether there was ever a divide in the first place.”

In sum, Chakrabarty’s “Four Theses” suggest that the material reality of global climate change is also helping us to create new ideas, behaviors, and cultures. His insights derive from the present crisis, yet I suspect they are equally essential to understanding the past. It is difficult to predict what the history of the “nonhuman human”—the human who is as much coal, oil, and other things as culture and ideas—might look like. But I think it is safe to say that phenomena like justice and freedom, as well as their opposites, will increasingly be understood not solely as human ideas or creations, but as

12 Ibid., 208.

13 Though it does not discuss coal and oil, the mechanisms of this process are well explained in Ian Hodder, *Entangled: An Archaeology of the Relationship between Humans and Things* (Malden, MA: Wiley-Blackwell, 2012).

14 Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011). Mitchell does, however, distinguish between coal and oil, arguing the latter fosters more centralized and less democratic societies.

15 Ibid., 7.

products of the powerful material things we partner with. In this, Chakrabarty's "Four Theses" may indeed herald an impending academic reformation: the emergence of a nonhuman humanism.

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Josh Eagle

Climate Change and the Confluence of Natural and Human History: A Lawyer's Perspective

In a 2000 article, Paul Crutzen and Eugene Stoermer argued that human activities, particularly the production of greenhouse gases, had so altered the Earth that we had, in the past few centuries, entered a new geological epoch: the Anthropocene.¹ As Crutzen and Christian Schwägerl described it, the period dating from the birth of the Industrial Revolution was unique in Earth's history due to the "human dominance of biological, chemical and geological processes."² "For millennia," according to Crutzen and Schwägerl, "humans have behaved as rebels against a superpower we call 'Nature' . . . Albeit clumsily, we are taking control of Nature's realm . . . A long-held religious and philosophical idea—humans as the masters of planet Earth—has turned into a stark reality."³

For Dipesh Chakrabarty, the collapse of the distinction between "[human] species history and the history of the earth systems" raises a host of moral and epistemological questions. On the smallest scale, the new paradigm requires a new vocabulary, one that takes into account our potential role as instigators of the "natural" events to which we must respond.⁴ At a meta-level, the fact of climate change calls into question prior assumptions about human power and concomitant responsibility. At the core of Chakrabarty's argument about history is a statement about the changing relationship between humans, Earth's geophysical history, and the other plant and animal species on the planet. Prior to the discovery of the Anthropocene, the majority of historians perceived humans and the natural world as two separate, if interacting, entities, but the birth of the Anthropocene melded the two pieces into one. Humans have become inseparable from natural forces—or, as Chakrabarty puts it, "the need arises to view the human simultaneously on contradictory registers: as a geophysical force and as a political agent, as a bearer of rights and as author of actions; subject to both the

1 Paul J. Crutzen and Eugene F. Stoermer, "The 'Anthropocene,'" *IGBP Newsletter* 41 (2000): 17–18.

2 Paul J. Crutzen and Christian Schwägerl, "Living in the Anthropocene: Toward a New Global Ethos," *Yale Environment* 360 (24 January 2011), http://e360.yale.edu/feature/living_in_the_anthropocene_toward_a_new_global_ethos/2363/.

3 *Ibid.*

4 Dipesh Chakrabarty, "Climate and Capital: On Conjoined Histories," *Critical Inquiry* 14 (Autumn 2014): 19.

stochastic forces of nature (being itself one such force collectively) and open to the contingency of individual human experience; belonging at once to differently-scaled histories of the planet, of life and species, and of human societies.”⁵

This essay explores the potential ramifications of the Anthropocene concept for environmental law and policy. Environmental lawyers would likely struggle with the proposition that what is novel about climate change, in comparison to other environmental threats, is that it has reordered the relationship between humans and the rest of the planet. From the beginning, environmental law has been premised on the idea that humans are a powerful force in reshaping our environment. Laws would not be necessary, or even logical, absent the assumption that people can harm the environment such that others are then harmed; remedies would be equally irrelevant if humans did not also have the power to at least partially prevent or remediate harm. Indeed, there is a substantial literature on the implications of climate change for environmental law. Most of that work focuses on how we might amend existing laws or adopt new laws to reduce greenhouse gas emissions (“mitigation”) or help people and government agencies respond to unpredictable climate change impacts (“adaptation”).⁶ The birth of climate change law can be attributed to lawyers’ perceptions of unprecedented environmental threats and the search for novel remedies to novel harms. Yet in legal thought, even on this planetary scale, it does not matter whether—if climate change is anthropogenic—people are part of or apart from the trajectory of the natural world—that is, whether we are insiders or outsiders in relation to nature. Lawyers care about harm and remedies for harm: what matters is whether a person is causing harm to another person and whether there is a remedy for that harm.

This is not to say that the question of naturalness does not inform the process of contemplating harm and remedy. Suppose the river that supplies A with water becomes unusable because of high concentrations of heavy metals. B has historically deposited heavy metals, byproducts of his business, into the river. Even in the absence of B’s actions, heavy metals

5 Dipesh Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” *New Literary History* 43, no. 1 (2012): 14.

6 Cinnamon Piñon Carlarne, *Climate Change Law and Policy: EU and US Approaches* (New York: Oxford University Press, 2010); Michael B. Gerrard, ed., *Global Climate Change and US Law* (Chicago: American Bar Association, 2007); Michael B. Gerrard and Katrina Fischer Kuh, eds., *The Law of Adaptation to Climate Change* (Chicago: American Bar Association, 2012); Reuven S. Avi-Yonah and David M. Uhlmann, “Combating Global Climate Change: Why a Carbon Tax Is a Better Response to Global Warming than Cap and Trade,” *Stanford Environmental Law Journal* 28, no. 3 (2009): 3–50.

would occur in the river from natural sources. If the current, dangerously high levels of contamination are part of a natural cycle, so that B's contributions did not prevent A from using the water, can we consider B's actions harmful? Obviously, answering this question would take some research and some thought, but it is easy to see why understanding the natural state of things would be important. Once it has been established that harm has occurred and that reducing B's contributions could make A whole again, however, it would not matter whether B existed within or outside of the natural world. Nevertheless, the inside-outside question can matter a great deal in coloring the politics that inevitably shape legal rules. The way in which it does this stems from rhetorical framing, rather than the ontological status of humans and nature.

The question of whether humans are insiders or outsiders vis-à-vis the natural world has long played a central role in political arguments for and against environmental regulation. Although the meaning of the two terms is subject to manipulation, the basic concepts are as follows. Humans, as insiders, are merely one species among many. While we may be cleverer than other animals, we are part of the natural order—that is, part of a system of interdependent species. We must care for other species because we are dependent upon their wellbeing. The outsider view, on the other hand, posits human exceptionalism: humans are, for religious reasons or because of the enormous difference between our mental capacities in comparison to other animals, qualitatively different from all other species. Interestingly, both environmentalists and those opposed to more stringent regulation have made use of both the insider and outsider frameworks, even within the same specific policy contexts.

The insider status of humans is a core tenet of modern environmentalism. In a work that would become central to environmental ideology, Aldo Leopold famously expressed the idea that all species, including humans, are interdependent parts of a shared system: “We abuse land because we see it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect.”⁷

Other famous environmentalists have made the same point: Anne and Paul Ehrlich, analogizing species to rivets on an airplane wing,⁸ and James Lovelock and Lynn Mar-

7 Aldo Leopold, *A Sand County Almanac* (New York: Random House, 1966).

8 Paul R. Ehrlich and Anne Ehrlich, *Extinction: The Causes and Consequences of the Disappearance of Species* (New York: Random House, 1981).

gulis, who introduced the “Gaia hypothesis” positing the complete interdependence of all living and non-living components of Earth.⁹ Some important modern US environmental laws, most notably the Endangered Species Act (ESA) of 1973, can be read as reflecting this insider view of interdependence. In the text of the ESA, Congress acknowledges that the loss of other species would likely have a suite of detrimental consequences for humans.¹⁰

But those in favor of greater protections for endangered species have also sometimes employed an outsider frame. Holmes Rolston III, a leading environmental philosopher, has argued that there is nothing harmful or unnatural about interspecies competition, but when that competition involves humans, it is no longer a fair one—it becomes unnatural.¹¹ Rolston also makes an ethical-outsider argument: as a more powerful species, one with competitive superpowers that other species do not possess, we owe less powerful species a duty to be circumspect about how we use our superpowers.¹²

Regulated parties also rely on both insider and outsider arguments. Opponents of endangered species law have sometimes taken the insider position, arguing that it is only natural for species, including humans, to compete for survival: “Humans have just as much right to use the land and prey on other animals as the wolf or the lion.”¹³ Human victories in evolutionary battles do not represent harm or require remedy, and they also have a moral component: Why should people feel bad, or be vilified, for using their property in ways that happen to decrease other species chances for long-term survival?¹⁴

It is possible to spin the story of the Anthropocene as either an insider or outsider tale. On the one hand, it portrays humans as having become the ultimate insider, literally a part of natural phenomena on every scale. On the other hand, the story vividly illustrates the powers that make humans distinct from other species: no other species has, or could ever, generate its own geological epoch. In the US context, if one goal of telling the story

9 James E. Lovelock and Lynn Margulis, “Atmospheric Homeostasis by and for the Biosphere: The Gaia Hypothesis,” *Tellus Series A* 26, no. 1–2 (1974): 2–10.

10 Endangered Species Act of 1973, 16 U.S.C 1531-1544, 87 Stat. 884, § 1531(a)(3).

11 Holmes Rolston III, “Property Rights and Endangered Species,” *University of Colorado Law Review* 61, no. 2 (1990): 283–306.

12 Holmes Rolston III, “Duties to Endangered Species,” *BioScience* 35, no. 11 (1985): 718–26.

13 Susan Warren, “In a New Spin on Conservation Debate, Fort Worth Zoo Gives Credit to Hunters,” *The Wall Street Journal*, 14 June 2001, accessed 1 December 2015, <http://www.wsj.com/articles/SB992464676750910480>.

14 *Ibid.*

of the Anthropocene is to move climate change legislation forward, the outsider emphasis on “humans as masters of the planet” may have particular resonance with US Christian conservatives because it dovetails with interpretations of the Bible that stress “human exceptionalism.”¹⁵ One of the leading, recent champions of outsider framing of environmental policy is former Secretary of the Interior Manuel Lujan, Jr., who served under US President George H.W. Bush. On endangered species, Lujan stated: “I believe that man is at the top of the pecking order. I think that God gave us dominion over these creatures, not necessarily to serve us . . . I just look at an armadillo or a skunk or a squirrel or an owl or a chicken, whatever it is, and I consider the human being on a higher scale. Maybe that’s because a chicken doesn’t talk.”¹⁶

Similarly, most Americans who identify as opposed to government climate change action fit the profile of what Dan M. Kahan, Hank Jenkins-Smith, and Donald Braman call “hierarchical individualists.”¹⁷ Those whose views are consistent with this profile see people as individually powerful and are less likely to support community efforts: imagining human society as ordered and hierarchical seems more consistent with the outsider view of humans as “at the top of the pecking order.” Of course, it is always possible that the adoption of an outsider view of the climate change problem might lead in another direction. An approach to the problem that relies on geoengineering is entirely consistent with the view of humans as special: special enough to have created their own epoch, and special enough to rein in the threatening results with new technologies. Ultimately, delays in reducing emissions may render risky forays into geoengineering inevitable.

What do these historical uses of an inside-outside distinction mean for the environmental law of climate change? If anything is certain, it is that a paleontologist’s conclusion that human impacts will hereafter be detectable in the fossil record will not fundamentally alter

15 As the prosecutor in the famed Scopes Monkey Trial asked one of Scopes’ students:

Q – How did [Scopes] classify man with reference to other animals?

A – Well, the book and he both classified man along with cats and dogs, cows, horses, monkeys, lions, horses and all that.

Q – What did he say they were?

A – Mammals.

Q – Classified them along with dogs, cats, horses, monkeys and cows?

A – Yes, sir.

(See the transcript of the trial, reprinted as: *The World’s Most Famous Court Trial: Tennessee Evolution Case* [Clark, NJ: Lawbook Exchange, 1999], 126.)

16 Ted Gup, “The Stealth Secretary,” *Time Magazine*, 24 June 2001, <http://content.time.com/time/magazine/article/0,9171,159723,00.html>.

17 Dan M. Kahan, Hank Jenkins-Smith, and Donald Braman, “Cultural Cognition of Scientific Consensus,” *Journal of Risk Research* 14, no. 2 (2011): 147–74.

the insider-outsider debate. It is also highly unlikely that the policy world's acceptance of an inside or outside characterization of the problem will determine whether or not we properly mitigate or adapt to climate change, as both arguments will remain salient no matter what the stratigraphy commission decides in 2016.

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Carol Boggs

Human Niche Construction and the Anthropocene

Anthropocene. On the face of it, the word is a claim that a marker is forming in the geologic record, a change in the rock and fossil layers that reflects a change from the geological and biological conditions of the Holocene. Yet the word is, of course, more than that. It is a tool with which to focus attention on the current role of *Homo sapiens* in altering the Earth as a whole, and is a shorthand descriptor of that phenomenon. Its etymology embodies the problems of scale, from geologic epoch to human generation time, that face those grappling with changes associated with the Anthropocene. It also encompasses a lot more than just climate change, acknowledging humans as a *biogeophysical* force and not only—as postulated by Dipesh Chakrabarty—a geophysical one.¹ To fully understand the Anthropocene, the biological and biogeochemical alterations that follow from human activities must be considered. One component cannot be isolated from the other: they intertwine at all spatial and temporal scales. In turn, the diversity, breadth, and depth of the human footprint on the globe associated with the Anthropocene complicate consideration of values and justice and demand close attention from environmental humanists.

Individuals of many species alter their environments. Beavers build dams, affecting the hydrology of the surrounding areas. Some plants, such as the succulent ice plant, *Carpobrotus chilensis*, effectively poison the soil around them, making it difficult to impossible for other plant species to grow. Cattle and some species of African termites produce methane. Even simple acts like nest building by birds or den digging by coyotes alter the individual's environment, often in ways that increase survival or reproductive success. Such alteration of the local environment that persists over time and alters an organism's fitness is termed "niche construction."²

Humans excel at niche construction. Aided and abetted by our neural capabilities and opposable thumbs, we have donned clothing and built insulated housing, allowing us to retain our subtropical habitat affinity in locations far outside the subtropics. Aqueducts, irrigation systems, wells, and urban water supply pipes mimic streams and lakes that provide the water we need to survive. Agriculture, refrigeration, and transportation net-

1 Global Energy Initiative, accessed 14 September 2015, <http://globalenergyinitiative.org/insights/>.

2 John Odling-Smee et al., "Niche Construction Theory: A Practical Guide for Ecologists," *Quarterly Review of Biology* 88 (2013): 328.

works alter the temporal variability in our food supply. We have developed public health measures, antibiotics, and vaccines capable of reducing the number of disease organisms residing within us. The list of human niche construction activities goes on.

Human niche construction uses phenomenal amounts of energy. Current energy sources across the globe are primarily fossil fuels.³ As a result of using such fuels, humans are altering the global carbon cycle: the atmospheric build-up of CO₂ and other greenhouse gases has led directly to global, and in many cases local, climate change.⁴

The footprint of human niche construction also extends beyond greenhouse gases and climate. As a species, our activities are altering other nutrient cycles, including nitrogen and phosphorous.⁵ Fertilizers are widely used to support agriculture, which figures prominently in our constructed niche. Water runoff from agricultural land can result in enormous increases in nitrogen and phosphorous in rivers by the time they reach the ocean: fresh water floats on top of salt water, isolating it from oxygen contact. The extra nitrogen and phosphorous in the fresh water stimulates large algal blooms; when the algae die and sink, their decomposition strips the salt water below of oxygen. Without oxygen, fish and other life-forms either die or leave, resulting in the formation of dead zones. Such dead zones are now found extensively along the coasts of the Americas, Europe, and Asia.⁶

Cycling of various elements is only one fallout from our niche construction activities. Land-use change, pollutants, and intentional and unintentional transport of species to new areas play major roles in global alterations that might show up in the stratigraphic record. Changes in land cover and soils are driven by human land-use change, say from forest to parking lot, or desertification, as is happening in several parts of the world.⁷ Such changes are occurring on a local to continental scale. Land use is also involved in feedbacks with climate through changes in the Earth's albedo, or reflectiveness.

3 Milena Gonzalez and Matt Lucky, "Fossil Fuels Dominate Primary Energy Consumption," *Vital Signs Online*, WorldWatch Institute, last modified 24 October 2013, <http://worldwatch.org/fossil-fuels-dominate-primary-energy-consumption-0>.

4 Thomas F. Stocker et al., "Technical Summary," in *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Intergovernmental Panel on Climate Change (New York: Cambridge University Press, 2013), http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_TS_FINAL.pdf.

5 e.g., Benjamin W. Sullivan et al., "Spatially Robust Estimates of Biological Nitrogen (N) Fixation Imply Substantial Human Alteration of the Tropical N Cycle," *PNAS* 111 (2014): 8101–6.

6 Robert J. Diaz and Rutger Rosenberg, "Spreading Dead Zones and Consequences for Marine Ecosystems," *Science* 321 (2008): 926–29.

7 e.g., Zhongcheng Jiang, Yanqing Lian, and Xiaoqun Qin, "Rocky Desertification in Southwest China: Impacts, Causes, and Restoration," *Earth Science Reviews* 132 (2014): 1–12.

Through evaporation and plant respiration, land use affects the water cycle, including the location and amount of precipitation. Finally, land-use change is now the major driver of terrestrial species and population extinctions.⁸ One estimate puts species loss at around 1,000 times the natural background extinction rate.⁹ And the loss of populations due to land-use change in tropical areas alone was estimated at 1,800 populations each hour in the mid-1990s.¹⁰ Thus, while climate change will undoubtedly exacerbate the approaching global extinction crisis, that crisis has already been set in motion by human-driven land-use change as part of human niche construction. Whether the fossil record would have reflected a current extinction event due to land-use change in the absence of climate change is likely to remain unknown.

“While climate change will undoubtedly exacerbate the approaching global extinction crisis, that crisis has already been set in motion by human-driven land-use change as part of human niche construction.”

Transport of species from one area to another is also an extinction driver.¹¹ Movement may be intentional as with crops, garden plants, and pets, or unintentional as with hitchhikers on commercial vessels or travelers. The resulting extinction of local native, and often unique, species leading to the dominance of a common set of introduced species is worst on islands,¹² but occurs globally. For example, the golden California grasslands are actually made up of Eurasian annual grasses that are ill-suited in their timing of reproduction and death for a Mediterranean climate; the native forbs and grasses are almost completely outcompeted except on specialized poor soils. This phenomenon has led some conservation biologists to refer to the current epoch not as the Anthropocene, but as the *Homogenocene*.

8 Navjot S. Sodhi, Barry W. Brook, and Corey J. A. Bradshaw, “Causes and Consequences of Species Extinctions,” in *The Princeton Guide to Ecology*, ed. Simon A. Levin (Princeton: Princeton University Press, 2009), 514–20.

9 Stuart L. Pimm et al., “The Biodiversity of Species and Their Rates of Extinction, Distribution and Protection,” *Science* 344, no. 6187 (2014): 1246752.

10 Jennifer B. Hughes, Gretchen C. Daily, and Paul R. Ehrlich. “Population Diversity: Its Extent and Extinction,” *Science* 278 (1997): 689–92.

11 A topic that is highlighted in the “Mobility” section of the special exhibition “Welcome to the Anthropocene: The Earth in Our Hands” at the Deutsches Museum in Munich (2015–16).

12 Rick C. Torben et al., “Archaeology, Deep History, and the Human Transformation of Island Ecosystems,” *Anthropocene* 4 (2013): 33–45.

What draws attention, then, is the breathtaking diversity of the spatial and temporal scale of our activities. Niche construction occurs not just on a scale of an acre or two, but ranges upwards to a regional scale and beyond, where the resulting effects are becoming visible—and not only the geophysical climate change that results from energy use. Clearly, *Homo sapiens* is a niche constructor *par excellence*, but this means collateral consequences for climate, species diversity, and landscapes. What has caused the human footprint and our impacts to expand so dramatically in the recent past? The answer lies in the combination of population growth, technological advances, and affluence. These factors are distributed unevenly across the globe, so that in some areas population growth is more significant while in other areas affluence leads. As nations develop, that distinction will diminish.

Why is it important that environmental humanists speak to all of this? Firstly, Chakrabarty's theses reduce environmental justice to climate justice on a global scale. But human niche construction activities that lie at the root of current global-scale climate change are much broader than energy use, and impact our world in a variety of ways and on multiple scales. Beyond climate justice, analysis of the impacts of niche construction includes patterns of land use and resulting fairness in human quality of life. It also includes equity among species and the fate of nonhuman species. Niche construction therefore raises thorny issues of values, not just in terms of what our actions reflect but also what our policies and actions *should* reflect. Indeed, the breadth of our niche construction activities, which lie at the root of geochemical and other changes, demand that the scope of analysis be broadened.

Secondly, humans like to set goals in dealing with problems. What criteria do we use to create a target baseline for the diversity and climate of the planet? How does the array of temporal and spatial scales at work affect this? What can we learn from environmental history in this regard? There is a 100-year-old argument among land managers about whether we should seek the preservation of a landscape and its inhabitants, or conservation of that landscape—preservation entails maintenance of the current baseline conditions; conservation allows biota and other resources to be extracted on a sustainable basis. Has the scale of current change altered this argument? What are the equity, economic, and political implications of attempts at preservation versus conservation or versus some novel approach—such as neo-ecosystems—as we move forward in the Anthropocene, with a projected increase in climate variability and disassociation of plant and animal communities due to climate, land use, and invasive species?

Finally, humans born since 1976—those less than 39 years old at the time of writing—have never known a global weather year of temperatures that were normal in relation to the twentieth-century average. Does this mean that these and future generations will not “see” climate change and loss of biodiversity as bad if change—rather than a baseline—is what they are familiar with? What do studies of identification with place have to say on this matter? As humans become more isolated from the land and its associated biota through niche construction, will the ability of individuals to detect the effects of climate and biodiversity change become dulled, leaving only scientists and amateur naturalists to “see” the impacts? How will an intensifying spiral of change affect policy? Clearly, these are among the questions that are desperately begging for answers from humanists and social scientists.

Returning from these themes to the Anthropocene concept, the term itself argues that human agency has expanded to become a biogeophysical force. This human agency includes not only climate forcing, but also the various consequences of our activities as niche constructors. Whether niche construction becomes a maladaptive trap for our species requires attention to all parts of the puzzle.

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Politics in/of the Anthropocene

“In the era of the Anthropocene, we need the Enlightenment (that is, reason) even more than in the past. There is one consideration though that qualifies this optimism about the role of reason and that has to do with the most common shape that freedom takes in human societies: politics. Politics has never been based on reason alone. And politics in the age of the masses and in a world already complicated by sharp inequalities between and inside nations is something no one can control” (Chakrabarty, “Four Theses,” 211).

Lori A. Ziolkowski

The Geologic Challenge of the Anthropocene

Over the past century global temperatures have steadily increased. This current warming trend is disconcerting because humans, rather than geologic forces, are driving the changing climate through the combustion of fossil fuels—becoming, as Chakrabarty argues, geophysical agents in their own right. Many have termed this human-induced planetary warming a new geologic epoch, the Anthropocene.¹ Barring a global catastrophe, such as a meteorite impact, Crutzen has suggested that humans will remain the dominant environmental force for many millennia. The concept of the Anthropocene has provided a powerful tool for discussing our role in changing the Earth's climate with nonscientists. However, from a geologic perspective, Crutzen's focus on atmospheric carbon emissions misses the deeper stratigraphic deposits that may provide the strongest evidence of our time in the Earth's future geologic record: the non-climate-related activities that fuel our postindustrial civilization and its myriad electronic media.

Traditionally, epochs in geologic time are defined by large-scale changes in Earth's environment. These changes can be magnetic, biological, or chemical, and occur so abruptly that they disturb most of life on Earth. One such dramatic and abrupt change in the rock record occurred at the Cretaceous-Paleogene boundary, 66 million years ago. Many readers will recognize this time as the period when not only the dinosaurs went extinct, but also nearly three-quarters of the plant and animal species on Earth.² This event was first discovered when a father and son team studying rocks in Italy identified a thin layer of clay that contained 30 times the typical levels of the rare-earth element iridium. While iridium is rare in Earth's crust, it is abundant in meteorites and asteroids. They therefore hypothesized that there was a catastrophic impact with an object from outer space.³ Since then, this iridium-rich clay layer has been identified at more than 100 sites around the world, providing evidence that this was a worldwide event demarcating an abrupt shift between geologic epochs.

1 Paul J. Crutzen, "Geology of Mankind," *Nature* 415, no. 6867 (2002): 23.

2 David Jablonski and W. G. Chaloner, "Extinctions in the Fossil Record [and Discussion]," *Philosophical Transactions of the Royal Society B* 344, no. 1307 (1994): 11–17.

3 Luis W. Alvarez et al., "Extraterrestrial Cause for the Cretaceous-Tertiary Extinction," *Science* 208, no. 4448 (1980): 1095–108.

Further back in time, the boundary between the Permian and Triassic was one of Earth's most extensive known extinction events. This particular extinction, which occurred 250 million years ago, is thought to have resulted from a series of major events such as ocean anoxia,⁴ volcanism,⁵ and climate change of the order of 8°C.⁶ At this geologic boundary, fossils of many marine and freshwater species sharply decline, while there appears to be a more a gradual decline in land-based species, indicating that the ocean was likely affected before the land. It took nearly ten million years for the Earth to recover to the same level of biodiversity,⁷ which gives an indication of the severity of this event. This abrupt change in life on Earth was clearly demarcated by the number of fossils in the stratigraphic record indicating that there was a sharp and fundamental change in Earth's natural history.

While humans may think that they are disconnected from geologic epochs millions of years ago, this is far from the truth. When James Watt invented the steam engine in the 1700s, it was the beginning of the large-scale human impact on the planet. This invention allowed for ancient geologic carbon to be reintroduced into the contemporary carbon cycle through its conversion of coal to carbon dioxide. However, this technological progress came at an environmental cost. In the 800,000 years before the industrial revolution, atmospheric carbon dioxide concentrations typically ranged from 175 to 300 parts per million (ppm).⁸ The atmospheric carbon dioxide concentration today is over 400 ppm. The rise in the atmospheric carbon dioxide concentration today is attributed to human activity based on a number of scientific approaches. First, carbon isotope measurements of today's atmosphere can only be explained by the incorporation of ancient carbon introduced during the combustion of fossil fuels.⁹ Additionally, when sophisticated computer models that simulate the Earth system are used to reconstruct tempera-

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- 9 P. P. Tans, A. F. M. De Jong, and W. G. Mook, "Natural Atmospheric ¹⁴C Variation and the Suess Effect," *Nature* 280 (1979): 826–28.

tures over the twentieth century, they cannot predict the observed rising temperatures unless the rise in atmospheric carbon dioxide due to fossil-fuel burning is included in their model projections.¹⁰ Therefore, from a scientific perspective, the warming we are experiencing today is due to human activities.

In keeping with geologic tradition, for the Anthropocene to be classified as a new period in geologic time the changes we are currently imposing on the planet need to be preserved in the rock record a million years from now. Yet the primary pieces of evidence for the source of the warming today, such as the isotopic composition of atmospheric carbon dioxide, will not be preserved in the rock record. The isotope that clearly identifies the million-year-old carbon as the culprit for today's warming, radiocarbon or ¹⁴C, decays over time and consequently is only present in material younger than 50,000 years old, much shorter than geologic time. Carbon that originates from million-year-old fossil fuel does not contain any radiocarbon and thus "dilutes" today's radiocarbon signal. Therefore, a million years from now, the rock record will not record how we have changed the carbon cycle through the use of fossil fuels. To meet the stratigraphic test for a new geologic epoch, advocates of the Anthropocene must be able identify a more enduring signature in the Earth's crust—one that scientists a million years from now can identify as a definitive marker of our presence.

Even though climate scientists agree that humans had an impact on the climate long before the industrial revolution,¹¹ geologists have yet to agree on when the Anthropocene began in the geologic record. Recently, a group of scientists have identified the Trinity Test of July 1945, which ushered in the era of nuclear weapons testing in the 1950s and 1960s, as the most compelling start date for the Anthropocene.¹² Just as iridium traces helped to identify the Cretaceous-Paleogene boundary 66 million years ago, these scientists have proposed that the rare isotopes formed in nuclear weapon detonations, such as plutonium 239, dispersed over large parts of the globe and demarcated the beginning of the Anthropocene. While these rare isotopes have been incorporated into

10 Gerald A. Meehl et al., "Combinations of Natural and Anthropogenic Forcings in Twentieth-Century Climate," *Journal of Climate* 17, no. 19 (2004): 3721–27.

11 William F. Ruddiman, "The Anthropogenic Greenhouse Era Began Thousands of Years Ago," *Climatic Change* 61, no 3 (2003): 261–93.

12 Colin N. Waters et al., "Can Nuclear Weapons Fallout Mark the Beginning of the Anthropocene Epoch?" *Bulletin of Atomic Scientists* 71, no. 3 (2015): 46–57; Jan Zalasiewicz et al., "When Did the Anthropocene Begin? A Mid-Twentieth Century Boundary Level Is Stratigraphically Optimal," *Quaternary International* (2015): in press.

soil and sediments that will eventually become part of the rock record, these chemical compounds are unlikely to be detected millions of years from now. All of the isotopes formed during nuclear weapons testing are unstable isotopes and decay in abundance over time. The longest-lived isotope is plutonium 239, which has a half-life of 24,110 years. This means that after 24,000 years half of the plutonium-239 has decayed into its daughter product. Therefore, after 100,000 years, or five half-lives, only a very small fraction of this isotope level survives in the rock record. While 100,000 years may seem like an infinite amount of time on a human timescale, from the geologic perspective 100,000 years is akin to one second over the course of one day. The chemical signal of nuclear weapons testing will fade over geologic time, and consequently will not leave an abrupt record in the rocks demarcating the birth of the Anthropocene. This means that another marker of human civilization, which *will* survive geologic time, is needed to pass the stratigraphic test for a new geologic epoch.

While much of the debate on the Anthropocene surrounds how human civilization has impacted the climate through fossil fuel combustion, it is likely that the rock will record a different marker of our existence: the seemingly inexhaustible search for natural and mineral resources across the globe over the past 50 years. In the oceans, overfishing has put such pressure on natural fish populations that some predict that many marine fish species will be extinct by 2050. Due to the increasing human footprint, many terrestrial species are also facing extinction, as Carol Boggs reminds us in her contribution to this volume. As a warming climate is shifting, more extinctions are expected. These changes in animal and plant diversity are likely going to be recorded in the geologic record. However, it is likely that the recent technological boom associated with telecommunications and the internet will be the most distinctive marker of our time. Through the advent of new mobile technologies, we are mining the Earth for rare elements that allow our handheld devices to be sensitive to touch and our computer chips to process data faster, and replacing these devices with new models each year—producing what Jared Farmer has characterized as “future fossils.”¹³ The exponential production of computers of all shapes and sizes requires rare minerals that we have mined from previous geologic times. Is it not ironic that our conveniences of modern life, such as smartphones, will probably be what leave a permanent record in geologic time, rather than the inconvenient truth of climate change?

13 Jared Farmer, “Future Fossils” (paper presented at “Anthropocene Objects and Environmental Futures” workshop, Rachel Carson Center, Munich, Germany, 5–7 July 2015). See also a more recent reference to “technofossils” by Colin Waters et al., “The Anthropocene is Functionally and Stratigraphically Distinct from the Holocene,” *Science* 351, 6269 (2016): 207–310.

“While much of the debate on the Anthropocene surrounds how human civilization has impacted the climate through fossil fuel combustion, it is likely that the rock will record a different marker of our existence.”

In a few million years, the rock record of Earth will indeed record changes stemming from postindustrial human civilization. What remains unknown is how this record will play out. Will there be evidence of mass extinction and compositional changes of the Earth, or a recovery of life on Earth as civilization adapted to a less resource-driven economy? Only (geological) time will tell.

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Jessica Barnes

Rifts or Bridges? Ruptures and Continuities in Human-Environment Interactions

In a brightly lit office on the sixth floor of the Ministry of Water in Cairo, I sit in front of a bank of computers. It is June 2014 and the cool air conditioning provides welcome respite from the 43°C (110°F) temperatures outside. I am meeting with a group of engineers from the ministry whose job is to forecast the flow of the Nile in the coming days, weeks, and months. Recently, they have been expanding their time horizons. Responding to the interest of a group of government officials and international donors as to how climate change will affect the river that provides 96 percent of Egypt's water, they have been looking at Nile flows on decadal timescales. One of the IT specialists clicks through a series of screens, showing me the regional climate model they have been working with to project future climate in the Nile Basin. He types a command line and a window comes up with a shaded map showing what precipitation might look like over the basin in the year 2050. The map's swirls of reddish-pink (rainfall decline) and greenish-blue (rainfall increase) are the key to projecting Nile flows.¹ For those sitting in this room, climate change is a familiar object—something they talk about, give presentations on, write reports about, and discuss in journal articles. They, like a number of international and Egyptian water specialists, are concerned about how climate change will affect this resource, which provides almost all of the country's drinking water and feeds Egyptian fields.

Six years previously I sat in another meeting room, this one in an agricultural cooperative in the rural province of Fayoum, several hours from Cairo. In the absence of air conditioning a fan whirred overhead, circulating the warmth. A group of farmers was meeting with an engineer from the Ministry of Water. They, too, were concerned about Nile water, or rather about the lack of Nile water flowing through their irrigation canal. "The main problem," began one farmer "is stealing. There are 60 (unauthorized) pumps on the canal and the *bahhar* (the lowest-level irrigation official) is just standing there!" Another farmer spoke about an upstream canal—if it did not take so much water, they would have enough. "Now we're in June," he said. "In July and August it will only get worse, what with the

1 Despite the clear outlines of this image of future rainfall patterns, the way in which climate change will affect Nile flows is in fact highly uncertain. For more on this uncertainty and how it is interpreted and negotiated by differently positioned scientists, see Jessica Barnes "Uncertainty in the Signal: Modeling Egypt's Water Futures," *Journal of the Royal Anthropological Institute* 22 (Supp) (2016): 38–58.

cultivation of rice.” An old man with less than an acre of land chimed in. “It’s all the large farmers’ fault,” he said. He’s gone to complain many times, he told the group, “but nobody listens to me.” The situation’s unfair, they concluded: we are wronged (*mazloom*).

In these vignettes we see two groups that share the same concern—the volume of Nile flow. Yet they perceive that water in different ways. The scientists in the modeling unit of the water ministry look at the Nile in terms of the climatic event that generates that flow—precipitation over the East African Highlands where the river begins. The Egyptian farmers who use 90 percent of this water, on the other hand, see fluctuations in flow in terms of other farmers buying illegal pumps and growing rice, local *bahhars* not enforcing the rules, engineers allocating more water to another canal, and their complaints falling on deaf ears. They recognize the political and technical decisions that act as intermediaries between the water falling from the sky as rain and them receiving it.² While climate change is common currency to the first group, in 16 months of fieldwork in rural Egypt, I have never heard a farmer talk about changing rainfall patterns.³

I start with these two vignettes to get at the central question I want to raise here. What exactly do we gain from a statement of novelty, be that about the human condition (humans as geophysical agents), current condition (“after nature”), geological epoch (the Anthropocene), or contemporary challenge (the end of sustainability)? Is there anything that we lose in a claim to the unprecedented or in defining a rupture with the past? By focusing on the rifts, do we lose sight of the bridges?

I read the four fascinating papers by Dipesh Chakrabarty with great interest. As someone from an interdisciplinary environmental background, climate change is something that I think about quite often. I have no doubt that humans are changing global climate in an unprecedented fashion. Yet I am also aware that this way of seeing the world comes from my particular educational training and the cultural context in which I live. Among the Egyptian farmers with whom I have been working since 2007, climate change is not something that they are thinking about. Although they are directly reliant on a climate-derived resource—water—they see that resource not as a function of a climatic process

2 Jessica Barnes, *Cultivating the Nile: The Everyday Politics of Water in Egypt* (Durham: Duke University Press, 2014).

3 See also Jessica Barnes, “Scale and Agency: Climate Change and the Future of Egypt’s Water,” in *Climate Cultures: Anthropological Perspectives on Climate Change*, eds. Jessica Barnes and Michael Dove (New Haven: Yale University Press, 2015), 127–45.

but of politically mediated decision-making. I am therefore cautious about interpreting Anthropocenic climate change as signaling a new form of humanness, or a shift to a new epoch. I see this theoretical move as attributing a certain dominance to climate change that eclipses other dimensions of human-environment and societal interaction, which may be far from novel. I wonder: Does the notion of the Anthropocene make it harder to think about people whose worldview is not climate-focused? If the Anthropocene is predicated on a notion of rupture with the past, how might it impact our assessment of other knowledges that do not conform to the same temporal boundaries and spatial scales?

Chakrabarty's argument is highly nuanced. In setting out three images of the human—the universalist-enlightenment view, the postcolonial-postmodern view, and the Anthropocenic view—he notes that these views “do not supersede one another. One cannot put them along a continuum of progress. No one view is rendered invalid by the presence of others. They are simply disjunctive.”⁴ Yet as Chakrabarty's argument and the broader notion of the Anthropocene are taken up in diverse arenas of debate, I fear we lose some of this subtlety. In place of the nuance, I see a trending towards what Mike Hulme terms “climate reductionism”—a way of viewing the world as a place in which the future of societies and environments is seen in terms of climate alone.⁵

“Does the notion of the Anthropocene make it harder to think about people whose worldview is not climate-focused? If the Anthropocene is predicated on a notion of rupture with the past, how might it impact our assessment of other knowledges that do not conform to the same temporal boundaries and spatial scales?”

Such reductionism, Hulme argues, has become a sign of our times as increasing concern about anthropogenic climate change has led to disproportionate attention being placed on climate over other factors that shape societies and their interactions with the physical world. The scholarly act of defining a new era (based on the emission of greenhouse gases) and a new form of humanity (based on humans' ability to alter global climates) to me seems to contribute to this narrowing of the vision.

4 Dipesh Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” *New Literary History* 43, no. 1 (2012): 2.

5 Mike Hulme, “Reducing the Future to Climate: A Story of Climate Determinism and Reductionism,” *Osiris* 26 (2011): 245–66.

The Anthropocene has become something of a trendy term among anthropologists, geographers, and scholars in a number of related disciplines. Indeed at the 2014 annual anthropology meeting, there were ten panels on the Anthropocene. But beyond sparking some animated discussion at the bars of the conference hotel over exactly how the word should be pronounced (ANTHropocene versus anTHROpocene?), I still wonder what exactly the term can offer us. One of the key shortcomings of the Anthropocene as a new universality, it seems to me, is its claim to the novelty of the current human condition. Chakrabarty writes that in the case of climate change—as the fundamental crisis of the Anthropocene—unlike in the crises of capitalism, “there are no lifeboats here for the rich and the privileged.”⁶ He gives as an example “recent fires in the wealthy neighborhoods of California.” I am not fully convinced by this argument. As a large body of scholarship within environmental justice and political ecology has demonstrated, the burden of environmental risks, whether climate change-related or not, falls unevenly on different social groups, mediated by class, race, gender, and ethnicity.⁷ Fires in a wealthy neighborhood may be devastating, but are probably less devastating to households that have home insurance, have invested in fire safety measures, or own cars to flee in response to warnings.⁸

In the Egyptian case—however much or little water enters Egypt as climate change alters precipitation patterns in the river’s East African source regions—access to water will always be a question of political control, with winners and losers. Whatever the nation’s water supply, the richer, more influential farmers are likely to be able to obtain the share of that supply that they need to cultivate their crops of choice. The ability to access this livelihood-supporting resource is ultimately more about questions of power and inequality than rainfall. These questions are not fundamentally new. The terrain of influence may shift over time and space, from British colonial officers exerting their control over the irrigation system in the late nineteenth century⁹ to large

6 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 221.

7 See, for example, Julian Agyeman, Robert Bullard, and Bob Evans (eds.), *Just Sustainabilities: Development in an Unequal World* (Cambridge, MA: MIT Press, 2003); Robert Bullard, *Dumping in Dixie: Race, Class, and Environmental Quality* (Boulder: Westview, 2000); Melissa Checker, *Polluted Promises: Environmental Racism and the Search for Justice in a Southern Town* (New York: New York University Press, 2005).

8 See, for instance, Timothy Collins, “Households, Forests, and Fire Hazard Vulnerability in the American West: A Case Study of a California Community,” *Global Environmental Change Part B: Environmental Hazards* 6, no. 1 (2005): 23–37. For a broader discussion of the relationship between fire, human agency, and the Anthropocene, see Andreas Malm and Alf Hornborg, “The Geology of Mankind? A Critique of the Anthropocene Narrative,” *The Anthropocene Review* 1, no. 1 (2014): 62–69.

9 Claire Cookson-Hills, “The Aswan Dam and Egyptian Water Control Policy 1882–1902,” *Radical History Review* 116 (2013): 59–85.

agribusinesses appropriating land and water resources today,¹⁰ but the significance of these sociopolitical relations in shaping human-environment interactions prevails. To me, therefore, the defining of an Anthropocenic era, with its implications of rupture with the past and narrowing to a climate-focused vision, remains more stifling than productive.

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John M. Meyer

Politics *in*—but not *of*—the Anthropocene

“The planet,” to speak with Spivak again, “is in the species of alterity, belonging to another system.” And “yet,” as she puts it, “we inhabit it.” *If there is to be a comprehensive politics of climate change, it has to begin from this perspective.* The realization that humans—all humans, rich or poor—come late in the planet’s life and dwell more in the position of passing guests than possessive hosts has to be an integral part of the perspective from which we pursue our all-too-human but legitimate quest for justice . . . — Dipesh Chakrabarty¹

We need what Chakrabarty describes here as a “comprehensive politics of climate change.” And his claim—echoing critical theorist Gayatri Spivak—that this politics must begin by recognizing that Earth is simultaneously the familiar place we inhabit *and* alterity (possessing an alien quality or otherness) is apt. That we are home, but can never be fully “at home,” captures a central insight of contemporary talk of the Anthropocene. Yet what are the consequences of beginning a consideration of *politics* here? What are the possibilities and pitfalls of doing so? In this essay, I consider three ambiguities that are important in addressing these questions. The first regards the “newness” of the idea of humanity as exhibiting geophysical agency. The second concerns the relationship between this idea of the Anthropocene and particular prescriptions for political or policy change. The third considers the public resonance of the Anthropocene idea. In drawing out these three ambiguities, I aim to take the idea of the Anthropocene seriously, yet push against any attempt to derive a political prescription from it as being dangerously at odds with the need to “pursue our all-too-human but legitimate quest for justice.”

1) What is new about the Anthropocene?

Chakrabarty draws a valuable distinction between conceptions of the “global” and the “planetary.” The former are human processes, including globalization, capitalism, and industrialization. Yet climate change—anthropogenic though it clearly is—is not

¹ Dipesh Chakrabarty, “Climate and Capital: On Conjoined Histories,” *Critical Inquiry* 41, no. 1 (2014): 23, emphasis added.

a human process in this sense, but a planetary one, because “long-term Earth-system processes [are] coactors.”² An understanding of the Anthropocene, then, requires the simultaneous recognition of human power to transform the nonhuman world *and the limits of intentional human action*, given our inescapable embeddedness in planetary processes that are beyond human control.

Is this recognition of our mutual constitution with processes beyond our control—though not beyond our influence—*new*? On the one hand, recognition of humans as inescapably embedded in ecosystem processes, and therefore also recognition of the unintended consequences of human action, has been a staple of environmental thinking and scholarship over the past generation. Its lineage stretches back far longer, a point that Chakrabarty seems to acknowledge in referencing George Perkins Marsh’s 150-year-old classic *Man and Nature* as an example.³

On the other hand, Chakrabarty asserts a discontinuity between even this understanding of ecological embeddedness and contemporary planetary notions. His point is echoed in Clive Hamilton and Jacques Grinevald’s recent argument that the Anthropocene is not a product of “ecological thinking” but could only result from new “Earth-system thinking” and therefore “the Anthropocene is a new anthropogenic rift in the natural history of planet Earth rather than the further development of an anthropogenic biosphere.”⁴

In our workshop, Chakrabarty concluded that rather than resolving whether Anthropocene-thinking was *new*, it is more appropriate to ask whether it is *fresh*: Does it do useful work, does it energize our thinking? With Chakrabarty, I think the answer is that an Earth-system perspective might provide this freshness. Yet for it to do so, we ought not imagine—as Chakrabarty also has—a pre-Anthropocene world in which humans were living autonomously and human history was not integrally tied to natural history.⁵

2 Ibid., 21.

3 Dipesh Chakrabarty, “The Geophysical Agency of Humans and Climate Change,” *Global Energy Affairs* 2, no. 3 (2014): 16–17.

4 Clive Hamilton and Jacques Grinevald, “Was the Anthropocene Anticipated?,” *The Anthropocene Review* 2, no. 1 (2015): 67.

5 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 201–7. Dipesh Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” *New Literary History* 43 (2012): 10.

This notion of a (recent) past in which human history proceeded autonomously has always been a fiction. Certainly, many academics and others have thought, written, and acted as though this notion of human autonomy was real, and it has been particularly influential in many theories of modernity and modern freedom. Yet what has often been true in theory belies the always already embedded character of practice. Bruno Latour captures the fallacy of the idea of modernity as an age in which humans have achieved autonomy from nature succinctly, asserting ironically that “we have never been modern.”⁶

2) How does the Anthropocene relate to prescriptions for political change?

To pose this question, we must first reject a common assumption that a politics of the Anthropocene—that is, a singular, rational prescription—can be *derived* from the concept itself. This assumption echoes a long-influential view that normative political theory could, and should, be derived from a proper understanding of nature and/or human nature. In that case, the key task was to get nature “right,” since determinate guidance for political order would follow. Evidence of this assumption is widespread, and can be found among many environmental thinkers and activists.⁷

The claim to derive political prescriptions from the idea of the Anthropocene worries many critics. Donna Haraway, for instance, has challenged the focus on humanity as such (*anthropos*), suggesting that it would be more accurate to speak of the “Capitalocene.”⁸ While these criticisms may elide distinctive planetary dimensions that Chakrabarty highlights, they are driven by the justified concern that Anthropocene talk might lead to the flattening of human differences and the forced imposition of top-down solutions upon society. Critics rightly worry that problematic political prescriptions—reflecting unexamined assumptions about power, privilege, justice, and injustice—will follow from its widespread embrace. To do so would neglect what Chakrabarty refers to as the “quest for justice.”

6 Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

7 I explore this “derivative” approach in John M. Meyer, *Political Nature: Environmentalism and the Interpretation of Western Thought* (Cambridge: MIT Press, 2001).

8 Donna Haraway, “Anthropocene, Capitalocene, Chthulucene: Staying with the Trouble,” paper presented at the conference “Anthropocene: Arts of Living on a Damaged Planet,” University of California, Santa Cruz, 8 May 2014, <http://vimeo.com/97663518>.

If we distance ourselves from the derivative relationship, however, we might then hold onto both recognition of the geophysical agency of humanity *and* of the deeply unequal distribution of this agency—and the widespread injustice of its effects. Rather than a politics *of* the Anthropocene, here we would recognize that politics *in* the Anthropocene will—as always—be refracted through diverse human experiences, positions, affects, cultures, and views of justice and injustice.

While the desire to use rationality to transcend this refractive process has deep roots in the Enlightenment and can be traced back to Plato, it has always been in tension with actual politics and human freedom. This point is essential. For while it is important to notice—with Chakrabarty and Timothy Mitchell—that modern notions of freedom grew along with a fossil-fuel economy,⁹ it is false and dangerous to conclude that the restriction of this freedom will allow societies to better address the challenges of living in the Anthropocene. This, it seems to me, is what is required by Chakrabarty's call for us to think “disjunctively” about the human condition.¹⁰ His own deep grounding in histories of postcolonialism and the subaltern allow him to navigate this terrain more judiciously, and hopefully convey this message more persuasively, than many others.

3) How does the idea of the Anthropocene promise to resonate—or not—with the publics that academics and activists might hope to reach?

If we are to think disjunctively and yet acknowledge that the mutual constitution of the human and nonhuman is not something wholly new, then we must evaluate Anthropocene talk in terms of its potential for public resonance. Here, the Anthropocene moves most clearly from being a geophysical hypothesis to a normative argument.

Hamilton and Grinevald, noted above, clearly believe that a recognition of the ways in which the Earth system itself has been altered by human actions can prompt a greater sense of urgency. By contrast, Giovanna Di Chiro has recently argued that for those involved in movements and organizations for environmental and climate justice, the notion of the Anthropocene has not gained political traction, nor does it seem to make

9 Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2013).

10 Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” 2.

historical or political sense.¹¹ I suspect that this is for reasons that go beyond the concerns with derivative politics outlined earlier. These activists are already intimately familiar with the mutual constitution of human and nonhuman systems. As such, Anthropocene talk can appear to reframe already pressing concerns in more abstract or universalizing language. In this context, a rhetorical appeal to the Anthropocene seems more likely to appear patronizing than enlightening or mobilizing.

More broadly we must ask whether, and in what contexts, stories about the Anthropocene (or the geophysical agency of humanity on a planet we cannot control) are likely to facilitate awareness, understanding, or action not already prompted by more established discourses about climate change. If we are to seriously pursue a politics *in* the Anthropocene, this question will remain one of the most important to ask, precisely because the answer is not at all clear.

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¹¹ Giovanna Di Chiro, "Environmental Justice and the Anthropocene Meme," in *The Oxford Handbook of Environmental Political Theory*, eds. Teena Gabrielson, Cheryl Hall, John M. Meyer, and David Schlosberg (Oxford: Oxford University Press, 2016), 362–81.

Species Capital
Consumption in the Anthropocene

“The industrial way of life has acted much like the rabbit hole in Alice’s story; we have slid into a state of things that forces on us a recognition of some of the parametric (that is, boundary) conditions for the existence of institutions central to our idea of modernity and the meanings we derive from them . . . [W]hatever our socioeconomic and technological choices, whatever the rights we wish to celebrate as our freedom, we cannot afford to destabilize conditions (such as the temperature zone in which the planet exists) that work like boundary parameters of human existence. These parameters are independent of capitalism or socialism. They have been stable for much longer than the histories of these institutions and have allowed human beings to become the dominant species on earth. Unfortunately, we have now ourselves become a geological agent disturbing these parametric conditions needed for our own existence . . . To speak of species thinking is not to resist the politics of ‘common but differentiated responsibility’ that China, India, and other developing countries seem keen to pursue when it comes to reducing greenhouse gas emissions.” (Chakrabarty, “Four Theses,” 217–18).

Carol Hee

Beyond Corporate Sustainability in the Anthropocene

The Brundtland Commission defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”¹ Industrialization has enabled wealthy societies to act with a geological agency that has diminished the ability of poor societies and future generations to meet their needs. Consequently, in this new era of the Anthropocene, the challenges we face encompass much more than sustainable development. Instead we must focus on health, restoration, innovation, capacity building, well-being, resiliency, and flourishing. Who will lead this transformation? Can the same drivers that forged our present be harnessed to create an alternative future in which human well-being increases across socioeconomic groups without a decrease in Earth’s capacity to sustain life? Since over half of the world’s largest economic entities are corporations, Stuart Hart’s answer could be humanity’s best hope: “Business—more than either government or civil society—is uniquely equipped at this point in history to lead us toward a sustainable world in the years ahead . . . [Corporations] are the only entities in the world today with the technology, resources, capacity, and global reach required. Properly focused, the profit motive can *accelerate*, rather than inhibit, global sustainability.”²

Since this proposition in 1999, the notion that corporations can help create a more sustainable world has gained significant traction. Yet the track record of corporations has been spotty. Few would argue with the assertion that the pursuit of short-term profit played a significant role in the global financial collapse in 2008. The frequent use of misleading advertising claims about products’ green credentials also undermine the claim that corporations are likely to be part of the solution rather than the problem. Nevertheless, five ongoing changes point the way forward along a path where socially and environmentally responsible businesses employ economic and intellectual capital to innovate solutions that not only conform to the Brundtland Commission’s definition of sustainable development, but also restore the ability of ecosystems to regenerate and build the capacity of communities and nations to improve their citizens’ well-being. These harbingers of hope are,

- 1 World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987).
- 2 Stuart Hart, *Capitalism at the Crossroads: Next Generation Business Strategies for a Post-Crisis World* (Upper Saddle River, NJ: Financial Times Press, 2010).

in ascending order of radicalness and potential: (1) the types of data that businesses are now measuring and reporting; (2) improvements in the eco-efficiency of manufacturing processes, especially decarbonization; (3) how society's expectations of businesses are evolving; (4) "net-positive" building and manufacturing; and (5) the divergence of consumption from societal aspirations.

Business Metrics for the Anthropocene

Although US government regulations³ require that only the largest corporations in three sectors (energy, chemical, and automobile manufacturing) report greenhouse gas (GHG) emissions, financial investors understand that their interests in sustained, profitable financial returns cannot be uncoupled from the risks of climate change. Consequently, starting in 2000, a growing pool of investors has worked to persuade 70 percent of Fortune 500 companies to *voluntarily* report their GHG emissions as part of the Carbon Disclosure Project (CDP).⁴ These financial investors include banking giants HSBC, JPMorgan Chase, Bank of America-Merrill Lynch, and Goldman Sachs and represent over a third of the world's total financial capital. Furthermore, 93 percent of the world's largest 250 companies publish sustainability reports conveying data on companies' environmental and social impacts.⁵ These include information on companies' material and water use, energy consumption, effluent and waste production, labor practices and working conditions, human rights, anti-corruption policies, and customer health and safety, as well as goals for improvement.⁶ Reflecting on the increase in sustainability reporting, Global Reporting Initiative's chief executive, Ernst Ligteringen, has stated that "disclosing information on sustainability performance and impacts is now the expected norm for large companies around the world—something simply unimaginable only a decade ago."⁷ That the majority of large companies now voluntarily report environmental metrics portends a promising

3 74 FR 56260. US Environmental Protection Agency, *Protection of the Environment*, Title 40, Chapter I, Subchapter C, Part 98, Subpart A, §98.2.

4 "Catalyzing Business and Government Action," Carbon Disclosure Project, accessed 22 July 2015, <https://www.cdp.net/en-US/Pages/About-Us.aspx>.

5 "GRI Is the Global Standard as Sustainability Reporting Goes Mainstream, Says KPMG Survey," Global Reporting Initiative, last modified 9 December 2013, accessed 15 December 2015, <https://www.global-reporting.org/information/news-and-press-center/Pages/GRI-is-the-global-standard-as-sustainability-reporting-goes-mainstream-says-KPMG-survey.aspx>.

6 "The KPMG Survey of Corporate Responsibility Reporting 2013," KPMG International, last modified December 2013, accessed 13 October 2015, <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/corporate-responsibility/Documents/kpmg-survey-of-corporate-responsibility-reporting-2013.pdf>; "Sustainability Reports Move from Pioneers to Standard Practice," *SustainableBusiness.com*, 15 December 2011, accessed 25 November 2015, <http://www.sustainablebusiness.com/index.cfm/go/news.display/id/23243>.

7 "GRI Is the Global Standard."

change because, as modern management guru Peter Drucker noted, “what gets measured gets managed.”⁸ By measuring and reporting on social and environmental impacts, corporations can begin to manage differently such that their geological agency can be made less destructive.

The Decarbonization of Production Processes

Over the last decade, companies have demonstrated the potential to decouple profitmaking and environmental harm: the 187 companies that in 2014 merited an “A” grade from CDP for their efforts to measure, report, and reduce GHG emissions outperformed the Bloomberg World Index by nearly 10 percent.⁹ According to CDP, “the climate performance leaders have reduced their total (absolute) emissions by 33 million metric tons in the past reporting year, equivalent to turning London’s car owners into cyclists for two and a half years.” The world’s third-largest consumer products company, Unilever, earned an A from CDP in 2014 and reduced GHG emissions from its manufacturing sites by 37 percent between 2008 and 2013¹⁰ while growing its revenues 23 percent.¹¹ Decoupling the production of material goods from the emission of GHGs makes it possible to envision a future where increases in social development indices (human development index, life expectancy at birth, etc.) and increases in wealth as measured by GDP will not be inexorably linked to increases in emissions. Data demonstrating an economically viable decoupling of production from emissions indicate that innovative corporate agents can maximize the benefits of industrialization while mitigating harmful externalities.

The Rise of the Green Consumer

Increased corporate sustainability reporting empowers customers to alter their spending behavior to support more socially and environmentally responsible corporations. An October 2012 survey of 6,224 consumers in Brazil, China, India, Germany, the United Kingdom, and the United States found that two-thirds agreed that “as a society,

8 Larry Prusak, “What Can’t Be Measured,” *Harvard Business Review*, last modified 7 October 2010, <https://hbr.org/2010/10/what-cant-be-measured>.

9 “Revealed: The Companies Doing the Most to Combat Climate Change,” Carbon Disclosure Project, 15 October 2014, accessed 5 December 2015, <https://www.cdp.net/en-US/News/CDP%20News%20Article%20Pages/Revealed-companies-doing-most-to-combat-climate-change.aspx>.

10 “Greenhouse Gases,” Unilever Corporation, accessed 22 July 2015, <http://www.unilever.com/sustainable-living-2014/reducing-environmental-impact/greenhouse-gases/our-greenhouse-gas-strategy/>.

11 “Revenue of the Unilever Group Worldwide from 2007 to 2014 (in Million Euros),” Statista, accessed 5 December 2015, <http://www.statista.com/statistics/269190/global-revenue-of-the-unilever-group-since-2007/>.

we need to consume a lot less to improve the environment for future generations” (66 percent) and that they felt “a sense of responsibility to purchase products that are good for the environment and society” (65 percent).¹² Research by Cone Communications and Echo Research in 2013 showed that 90 percent of shoppers worldwide switch to brands that support a good cause given a similar price and quality.¹³ Furthermore, the 2014 Nielsen Global Survey on Corporate Social Responsibility, which included more than 29,000 respondents in 58 countries, found that 55 percent of those surveyed were willing to pay more for products from socially and environmentally responsible companies, up from 38 percent in 2011.¹⁴ A similar 2014 study focusing on American consumers by Lab42 Market Research found that 84 percent of survey respondents were willing to pay more for goods and services from companies demonstrating social responsibility, and customers no longer purchase certain brands because of their social (44 percent) or political (61 percent) views.¹⁵

Savvy businesses realize the revenue-generating potential of catering to the demands of conscientious consumers. Two well-known examples are Clorox’ Green Works All-Purpose Cleaner (endorsed by the Sierra Club), which captured 40 percent of the “green” cleaning category and generated over US\$40 million in revenue in its first year,¹⁶ and Patagonia, which experienced 40 percent revenue growth after an advertising campaign with the admonition “Don’t buy this jacket.”¹⁷ These trends notwithstanding, the enormity of the environmental changes that define the Anthropocene compels us to question whether tender-hearted consumers purchasing less environmentally toxic products from enlightened corporations can significantly change the trajectory of our presently unsustainable lifestyles for the planet.

12 “Re:Thinking Consumption—Customers and the Future of Sustainability,” Globescan, 27 November 2012, accessed 25 November 2015, <http://www.globescan.com/news-and-analysis/press-releases/press-releases-2012/248-regeneration-consumer-study-finds-consumers-buying-less-and-buying-better.html>.

13 “2013 Cone Communications/Echo Global CSR Study,” Cone Communications and Echo, 22 May 2013, accessed 25 November 2015, <http://www.conecomm.com/2013-global-csr-study-release>.

14 “Doing Well by Doing Good,” Nielsen, 17 June 2014, accessed 8 December 2015, <http://www.nielsen.com/us/en/insights/reports/2014/doing-well-by-doing-good.html>.

15 “Consumer Perception of Corporate Social Responsibility Topline Report,” Lab 24, 15 September 2014, accessed 25 November 2015, <http://lab42.com/consumer-perception-of-corporate-social-responsibility>.

16 Ilana DeBare, “Clorox Cleaners Take Big Share of Green Market,” *San Francisco Chronicle*, 12 October 2008, accessed 25 November 2015, <http://www.sfgate.com/business/article/Clorox-cleaners-take-big-share-of-green-market-3265692.php>.

17 Kyle Stock, “Patagonia’s Confusing and Effective Campaign to Grudgingly Sell Stuff,” *Bloomberg Businessweek*, 25 November 2013, accessed 20 November 2015, <http://www.bloomberg.com/bw/articles/2013-11-25/patagonias-confusing-and-effective-campaign-to-grudgingly-sell-stuff>.

Beyond “Less Bad” and towards “Net Positive”

Championed by architect and *Cradle-to-Cradle* co-author William McDonough, the concept of “net positive” has garnered the attention of sustainable business proponents. Simply stated, a net positive company “gives back more than it takes from society and the environment.”¹⁸ In order to be net positive, companies “must enhance the potential and resilience of all life’s natural systems—instead of just repairing our planet’s natural systems, they must make them healthier and stronger.”¹⁹ Net positive requires companies to aspire to something greater than doing less harm and instead have a positive goal: not creating a world where people suffer less, but where people enjoy “equity, justice, health, and well-being.”²⁰ McDonough envisions “a delightfully diverse, safe, healthy and just world, with clean air, clean water, soil and power, economically, equitably, ecologically and elegantly enjoyed” and challenges designers and manufacturers to make things “in a way that loves all of the children, of all species, for all time.”²¹

While it may be difficult to find a company that is authentically net positive in all aspects, the Living Building Challenge certifies buildings as net positive if they generate more energy over the course of a year than they consume.²² In addition to environmental benefits, research shows that “green” buildings, such as those certified by the US Green Building Council, increase worker productivity and wellness.²³ Indian conglomerate ITC achieves net positive environmental goals as a result of three major initiatives: (1) forestry projects that sequester twice the amount of carbon emitted; (2) rainwater harvesting that collects three times more water than used, and (3) waste reduction initiatives including efforts to minimize waste, to recycle by-products, and to create products with the waste paper purchased from other companies.²⁴

18 Oliver Balch, “Can a Business Really be Net Positive and, If So, How Do We Judge Success?” *The Guardian*, 19 June 2013, accessed 25 November 2015, <http://www.theguardian.com/sustainable-business/business-net-positive-how-measure>.

19 Jeffrey Hollender, “Net Positive: The Future of Sustainable Business,” *Stanford Social Innovation Review*, 29 April 2015, accessed 1 December 2015, http://www.ssireview.org/blog/entry/net_positive_the_future_of_sustainable_business.

20 Ibid.

21 William McDonough and Michael Braungart, *The Upcycle: Beyond Sustainability—Designing for Abundance* (New York: North Point Press, 2013).

22 “Living Building Challenge Certification Options,” International Living Future Institute, accessed 1 August 2015, <http://living-future.org/living-building-challenge/certification/certification-options>.

23 Amanjeet Singh et al., “Effects of Green Buildings on Employee Health and Productivity,” *American Journal of Public Health* 100 (2010): 1665–68.

24 “Sustainability Report 2014,” ITC, accessed 1 August 2015, <http://itcportal.mobi/sustainability/sustainability-report-2014/index.aspx>.

Under its Net-Works program, modular carpet producer Interface aims to have a net positive effect by paying unemployed fishermen in economically distressed communities in the Philippines to collect discarded nylon fishing nets that damage coral reefs, recycling it into raw carpet material.²⁵ Interface is thus bolstering the fishing community's resilience to fluctuations in the fishing industry's profitability by providing an alternative revenue stream, restoring the ability of a marine ecosystem to function properly by removing dead-ly abandoned nets, and decoupling Interface's growth from dependence on nonrenewable, GHG-producing petroleum processing and products.

While increases in countries' GDPs have historically been linked to an increase in ecological footprint,²⁶ these examples indicate that development and economic growth need not necessarily cause environmental degradation or sacrifice the well-being of one community for another's. Instead, they provide a model for redirecting the powerful agency of human endeavors towards a positive, restorative future as opposed to the paradigm that gave rise to the Anthropocene.

The Quest for Happiness and the Dawn of Post-consumerism

Examples such as Interface's Net-Works notwithstanding, an even broader cultural shift from that of today's consumerism, including away from green consumption, is necessary to reverse the epoch-scale changes that our modern lifestyles are inflicting on the planet. In an article for the *Wall Street Journal*, David Owen caused controversy and consternation among green consumers and green businesses when he coined the term "the Prius Fallacy," which is "a belief that switching to an ostensibly more benign form of consumption turns consumption itself into a boon for the environment."²⁷ Remedying environmental damage on a planetary geophysical scale requires altering the entire consumerist culture: not only tweaking how things are made, but instead changing people's relationship to things. A reevaluation of what constitutes the good life offers the best hope.

While the sharing economy (e.g., ZipCar), peer-to-peer lending (e.g., AirBnB), traditional and IT-platform-enabled secondhand markets, upcycling, and remanufacturing may extend products' lives, the accompanying decrease in overall consumption

25 "Net-WorksTM," Interface, accessed 22 July 2015, <http://www.interfaceglobal.com/Products/Net-Works.aspx>.

26 Richard McLelalan et al., eds. *Living Planet Report 2014: Species and Spaces, People and Places* (Gland: World Wildlife Fund, 2014), www.footprintnetwork.org/lpr14.

27 David Owen, "It's Too Easy Being Green," *The Wall Street Journal*, 2 February 2012, accessed 1 December 2015 <http://www.wsj.com/articles/SB10001424052970203889904577198922867850002>.

is outpaced by the growth of consumption in developing countries. Shifting the focus from the customer to producers as the agents primarily responsible for consumerist culture, American economist Frank Hyneman Knight famously wrote: “The values of life are not, in the main, reducible to satisfactions obtained from the consumption of exchangeable goods and services. Such desires as people have for goods and services are not their own in any original sense, but are the product of social influence . . . largely manufactured by the competitive system itself.”²⁸ The more significant questions are whether companies are changing their perception of people as “consumers” and thus modifying their marketing efforts to persuade people to consume less. Are there examples of companies that, instead of manufacturing needs for larger, newer, and more abundant material goods, understand and promote that which actually increases human well-being and promotes environmental restoration?

A large growing body of research demonstrates that materialism is strongly inversely correlated with well-being,²⁹ although an understanding that people’s purchase decisions are often non-functional has enabled companies to sell goods by appealing to people’s aspirations, dreams, and associations. Work by Ryan Howell and others demonstrates that people achieve greater lasting satisfaction from spending money on experiences rather than on physical things.³⁰ Furthermore, research finds that, beyond having fulfilled basic requirements for health and safety, well-being is derived from close relationships, a focus beyond one’s self, meaningful work, achievable non-materialistic goals, openness to new experiences, and gratitude.³¹ A short animated film produced by Google, released for Valentine’s Day 2012, captures the insights of well-being researchers. In it, a boy attempts to “find the perfect gift [for that special someone] but in the end the gift that counts the most is the one he can’t buy . . . spending quality time with her, doing what she loves to do.”³² Ironically, the company promoting this message is the same company that derives

28 Frank Hyneman Knight, “Some Fallacies in the Interpretation of Social Cost,” *The Quarterly Journal of Economics* 38 (1924): 582–606.

29 Ryan T. Howell, Paulina Pchelin, and Ravi Iyer, “The Preference for Experiences over Possessions: Measurement and Construct Validation of the Experiential Buying Tendency Scale,” *The Journal of Positive Psychology* 7 (2012): 57–71.

30 Ryan Howell and Graham Hill, “The Mediators of Experiential Purchases: Determining the Impact of Psychological Needs Satisfaction and Social Comparison,” *The Journal of Positive Psychology* 4 (2009): 511–22.

31 Patrick Hofstetter, Michael Madjar, and Toshiyuki Ozawa, “Happiness and Sustainable Consumption: Psychological and Physical Rebound Effects at Work in a Tool for Sustainable Design,” *International Journal of Life Cycle Assessment* S1 (2006): 105–15.

32 “Valentine’s Day 2012,” Google, accessed 22 July 2015, <http://www.google.com/doodles/valentines-day-2012>.

financial rewards by selling information about people to companies to enable more effective marketing and sales.

Can the Profit Motive Accelerate the Transformation Needed in the Anthropocene?

A chasm remains between the changes that have occurred and those needed to move our world beyond sustaining the status quo. Yet as Chakrabarty writes, “A critique of capital is not sufficient for addressing questions relating to human history once the crisis of climate change has been acknowledged and the Anthropocene has begun to loom on the horizon of our present. The geologic now of the Anthropocene has become entangled with the now of human history.”³³ This statement raises the question of what the role of industry and of capitalism should be in an era of growing awareness that these deliverers of prosperity (and a certain type of freedom to a minority) have been the instrument through which humans have collapsed the distinction between human and natural history. As humans become aware of their existence as a species that wields the power of geologic force, they must recognize that the corporations they have created also exist within planetary boundaries. Like a species, corporations exist within ecosystems and, on a sufficient scale, can alter ecosystems towards their own demise.

Consequently, to counter the forces that have enacted epoch-changing transformations on the Earth, businesses not only need to change what they do but need to change what they are and how they exist in relation to the inhabitants of Earth and to its natural systems. Instead of viewing people as consumers, business executives need to recognize themselves and their customers as biological species with the agency to simultaneously alter their history and the natural history of the planet. Instead of using the tools of marketing to stimulate demand for material consumption, the technology, resources, capacity, and global reach of corporations should be employed to equitably satisfy basic human needs and facilitate well-being within planetary biophysical constraints. The result of the conversation between what Chakrabarty refers to as “global histories of capital” and “the species history of humans”³⁴ must be a set of guidelines directing us beyond sustaining our industrialist, consumerist mode as species on Earth.

33 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 197–222.

34 *Ibid.*, 212.

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Kathleen McAfee

The Politics of Nature in the Anthropocene

Over the past four decades, Nature has entered global politics. In contentious treaty negotiations on climate change and biodiversity, governments are pressed to take action in response to planetary ecological crisis. In conservationist discourse more broadly, this upper-cased construct is represented as a singular nature under siege by society. Nature, we are told, is damaged and becoming dangerously scarce: witness overflowing carbon sinks and imminent climate catastrophe, disappearing species and vanishing ecosystems, and insufficient land, water, and food for a burgeoning humanity. But for whom, and why, has this nature become scarce?

The politics of nature cannot be neutral. Like all politics, ecopolitics is ultimately about who is entitled to what, who owes what to whom, how such rights and entitlements are to be enforced, and who gets to decide. In a world of great geographic variety and vast social difference, decisions and actions by states and others, or inactions opting for the status quo inevitably have consequences that affect some people and places very differently than others. How the natural world, and humans' role in it, are conceptualized helps to determine the menu of choices deemed preferable, possible, or beyond the pale. The notion of scarcity itself is a political concoction that masks immense waste, obscene concentrations of wealth, and the self-defeating pursuit of endless economic growth.

In the past decade or so, scholars trying to come to terms with global warming and the supposed scarcity of "ecological space" have embraced the idea of the Anthropocene age to acknowledge the scale and unprecedented rapidity of anthropogenic global change. Some accounts link the Anthropocene concept to a posthumanist turn in social and cultural studies and reject dualist distinctions between society and nonhuman nature.¹ But the representations of nature and the nature-society nexus in many narratives of the Anthropocene too easily lend support to one particular set of options and interests while obscuring others.

1 See for example the classic and more recent work of scholars such as Donna Haraway and Sabine Wilke, e.g., Donna Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature* (London: Free Association Books, 1991); Sabine Wilke, "Anthropocenic Poetics: Ethics and Aesthetics in a New Geological Age," in "Anthropocene: Exploring the Future of the Age of Humans," edited by Helmuth Trischler, *RCC Perspectives* 2013, no. 3, 67–74.

In Dipesh Chakrabarty's "Four Theses," the Anthropocene signals that "humans" are now a "geological force." Embrace of the Anthropocene becomes the basis of a renewed universalism in which "reason," linked to a 250-year quest for "freedom," is seen as key to global collective action. The new status of humans is said to abolish the separate categories of nature and society—old news for most critical social theorists—but at the same time it seems to trump postcolonialism's questioning of universals. But is species-level human action possible?² Even if "we can become geological agents only historically and collectively,"³ this is inevitably a social and political process, where agency is wielded through collective actions by particular groups of people.

Chakrabarty defers to prominent natural scientists as nature's interlocutors: the only qualified witnesses and guides to the likely, although uncertain, trajectory of global change. Invoking the power of Enlightenment reason, he cites E. O. Wilson, Harvard entomologist and biographer of another recent construct, biodiversity: "We know more about the problem now. . . . We know what to do."⁴ Chakrabarty also quotes chemist and Nobel laureate Paul Crutzen and biologist Eugene Stoermer, the pair generally credited with introducing the Anthropocene concept: "An exciting, but also difficult and daunting task lies ahead of the *global research and engineering community to guide mankind* towards global, sustainable, environmental management."⁵

Crutzen, Stoermer, Wilson, and similarly engaged natural scientists are not the first spokespeople for nature. As a student of postcolonialism, Chakrabarty is surely aware of how the nature ideal has been deployed over the past five hundred or more years by the global research and engineering communities of their days as a justification for conquest and dispossession. Claims of superior, scientific knowledge, often flying in the face of deep local knowledge and experience, have supported major projects for reordering landscapes, frequently with disastrous consequences and nearly always with inequitable results. A brief sampling might note the ill-fated hydrological reengineering of Tenochtitlán, the replacement of community forests by scientifically managed imperial woodlots, the substitution of Cartesian-grid, monocrop planting for na-

2 Michael J. Watts offers an incisive account of the misuse of natural-science metaphors in environmentalist discourse and the related revival of biopolitics as a neoliberal project in "Now and Then: the Origins of Political Ecology and the Rebirth of Adaptation as a Form of Thought," in *The Routledge Handbook of Political Ecology*, eds Tom Perreault, Gavin Bridge, and James McCarthy (London: Routledge, 2015), 19–50.

3 Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35, no. 2 (2009): 206.

4 Chakrabarty, "Four Theses," 211.

5 *Ibid.*, (my emphasis).

tive polycultures adapted to local soils and rains, the violent suppression of women's practical healing knowledge by an all-male medical elite, the new enclosures of landscapes and forests by today's agro-efficiency engineers and would-be "global" conservation organizations acting in the name of nature and the best interests of "humanity."

One need not deny the power of Enlightenment reason, or dismiss the achievements of scientific method in engineering and medicine, to be justifiably leery of agendas to "guide mankind" with knowledge—and, as strongly implied, superior values—possessed by an unspecified "we." Clearly Wilson's "we" is not the same "humanity" that he has described as the "planetary killer," but rather is one small subset, to which he belongs, of the human species. I suspect that Chakrabarty would agree with much of the above. But perhaps in adopting a new planetary discourse of the Anthropocene he has turned his critical gaze away from the power-laden deployments of nature and claims to unique expertise that have framed "global" conservationism and policy-making on climate change. The notion of a unique, Western appreciation of nature that legitimized mass displacements for game parks is marshalled today in support of new enclosures for biosphere reserves, carbon banks, "climate smart" industrial farms, and other forms of what critics call "green grabbing."

The most widely influential idea in contemporary conservation discourse is still the "tragedy of the commons," the vision of Garrett Hardin, credentialed microbiologist, self-proclaimed ecologist, crusader for population control, and dabbler in scientific racism. While Hardin's metaphor of the selfish pastoralists who destroy their own livelihood has been amply debunked by ecologists and scholars of local collective action, his notion that nature will take its revenge on humanity, or at least on the undeserving majority of us, lives on as a subtext in neo-Malthusian imaginaries of autonomous nature such as James Lovelock's Gaia hypothesis.

If Hardin's and Lovelock's visions can be disregarded as pseudoscientific outliers, the idea that nature itself has set measurable limits on human activity, limits to which formal science alone is privy, has taken on new life in the context of deepening concerns about climate change and shrinking "resources." For several decades, the 1970s theories of "limits to growth" were pushed to the background by the technological optimism and fixation on competitive growth of the neoliberal 1980s, 1990s, and 2000s. The limits thesis was then revived, and linked to the Anthropocene concept, notably

with the 2009 publication by Johan Rockström, Will Steffen, and colleagues of “Planetary Boundaries: Exploring the Safe Operating Space for Humanity,” which postulates nine biophysical tipping points beyond which “irreversible and abrupt environmental change is almost certain to occur.”⁶

Subsequent debates about the parameters of such limits have involved geoscientists primarily, alongside economists—presumably the most scientific of social scientists—and other environmental policy advocates. Among the latter are post-environmentalists who contend that we enlightened humans must now acknowledge our role as co-creators, for better or worse, of the more-than-human world and resolve to make the best of what we have wrought. Tenets of this new conservationism are that natural limits are not static or absolute, and that the goal is not the survival of all species and populations but rather the maintenance of ecological “resiliency” and promotion of adaptive capacity, including by means of geoengineering.⁷ Sustainability therefore requires decisions, informed by science, about which species in which places must be preserved, and which may be redundant and might *reasonably* be traded off. But for what ends, exactly, and by whom?

The 2015 “Ecomodernist Manifesto,” an iteration of this approach by the Breakthrough Institute, contends that “climate mitigation is fundamentally a technological challenge.”⁸ It celebrates worldwide urbanization, the food-producing power of high-tech, intensified agriculture, the potential of carbon-capture technologies, and the efficiency of globalized resource extraction as evidence of a trend toward the decoupling of economic growth from ecological degradation. This putative decoupling, they say, can be further propelled by nuclear fission and fusion, “next-generation solar,” and technology to decarbonize the atmosphere, enabling humans to “leave more room for nature” and bring about “a good Anthropocene.” Public sector regulations and subsidies have a role, but mainly in helping private-sector entrepreneurs to bring technological innovations “to market.”⁹

6 Johan Rockström et al., “Planetary Boundaries: Exploring the Safe Operating Space for Humanity,” *Ecology and Society* 14, no. 2 (2009): 32, <http://www.ecologyandsociety.org/vol14/iss2/art32/>.

7 Here I draw on the work of Jessica Dempsey, most recently in *Environment and Planning A* (forthcoming 2016). See also Noel Castree, “The Anthropocene and the Environmental Humanities,” *Environmental Humanities* 5 (2014): 233–60.

8 John Asafu-Adjaye et al., “An Ecomodernist Manifesto,” 21. Last modified April 2015, <http://www.ecomodernism.org/manifesto-english/>.

9 *Ibid.*, 30.

According to the “Ecomodernist Manifesto,”

“Ecosystems around the world are threatened today because people over-rely on them: people who depend on firewood and charcoal for fuel cut down and degrade forests; people who eat bush meat for food hunt mammal species to local extirpation. Whether it’s a local indigenous community or a foreign corporation that benefits, it is the continued dependence of humans on natural environments that is the problem for the conservation of nature.”¹⁰

Apart from the doubly dualist implication that humans can free themselves from the “natural environment,” what concerns me is the statement’s self-centered homogenizing of the human species. Whether forests are damaged by swidden cultivation, fuelwood collection, and subsistence hunting, or by copper mines and palm oil plantations, it is “people” who are said to be the problem.

Not exactly, other advocates of the Anthropocene might respond. It is the harnessing of coal, followed by steam, steel, and petroleum, that has brought about our fall from grace, beginning in the mid-eighteenth century. But under what circumstances, and at whose hands, did fossil-fuel technologies acquire their epoch-creating power? Andreas Malm and Alf Hornborg, critics of the Anthropocene notion, have reminded us that it was “capitalists in a small corner of the Western world”—not any electorate, much less our species—who “invested in steam, laying the foundation stone for the fossil economy.”¹¹ This “clique of white British men” was empowered to do that by their position in a particular ecosocial order. The profitability and transformative power of their technologies rested on “highly inequitable global processes”: depopulation of the Americas, slavery, exploitation of British miners and factory workers, and global demand for cheap cloth.¹² Further, Malm and Hornborg contend “the asymmetric exchange of biophysical resources on which industrialization rests” remains the “condition for *the very existence* of modern, fossil fuel technology.”¹³

10 Ibid., 17.

11 Andreas Malm and Alf Hornborg, “The Geology of Mankind? A Critique of the Anthropocene Narrative,” *The Anthropocene Review* 1, no. 1 (2014): 62–69.

12 Jason Moore, writing the tradition of Braudel, Arrighi, and world-system theory, presents a compelling case for the “Capitalocene” as a more accurate characterization of the past 500+ years. Moore, “The Capitalocene, Part I: On the Nature & Origins of Our Ecological Crisis,” unpublished paper, 2014, http://www.jasonmoore.com/uploads/The_Capitalocene_Part_I_June_2014.pdf.

13 Malm and Hornborg, “The Geology of Mankind?,” 64, original emphasis.

These points are germane to contemporary environmental politics, not only because they highlight the *sociogenic* origins of the globalized fossil-fuel economy, but because the same protagonists, as a class, are the greatest beneficiaries and promoters of today's fossil-fuel-based world economy.¹⁴ Greenhouse gas emissions have continued to rise, the dire warnings of scientists notwithstanding, because many thousands of times daily, members of this class take decisions to drill and frack, mine and dump, fell and burn, purchase politicians and advance corporate loans, fund friendly academics and found new institutes, fill the media with falsehoods about "clean" fossil fuel, block environmental regulation, and opt *not* to adopt less polluting methods, much less the cutting edge technologies in which the ecomodernists vest their hopes.

Whether these decisions are governed by carelessness or greed or, most typically, are compelled by competition for economic survival, is irrelevant to the outcome. Of course, some comfortable capitalists make different choices or have no direct interest in the fossil fuel and transport industries or the military-corporate complex at the heart of the global carbon economy. A few petroleum moguls, hedging their bets, make room for renewables, but they are an even-smaller minority. And yes, many millions of people derive material comforts and conveniences from fossil-fuel capitalism and many more desire the same, having no other model.

However, it is decisions made by people in positions of power (and their deputies) who benefit from the current system of wasteful production and overconsumption, far more than the cumulative actions of swidden cultivators, fuelwood collectors, or even people who drive cars, that have made the human species into a "geological force." The power of this segment of our species derives from their position in a particular social order, a socioeconomic arrangement that produces scarcity and distributes surplus, creating obesity alongside hunger, gated "communities" surrounded by homelessness, and carbon footprints thousands of times greater in materially rich regions than in poor ones.

Even if "humanity" could somehow elect to endure the ecological, social, and psychological costs of extending a Global North "lifestyle" to nine or ten billion, it is biophysically impossible—as the social and life sciences, as well as physics, demonstrate. To the extent that the actions and policies of the powerful persist as if this goal were not an illusion,

14 With the past of the Soviet bloc and the present of China in mind we can include "state capitalists" in this class.

the gulf will deepen between the climate-protected and the far greater number of people whose already-precarious lives are threatened by the consequences of climate change (contrary to Chakrabarty, the rich may face the same storms but they do have lifeboats).

Chakrabarty tells us that “humans . . . have become a natural condition.”¹⁵ Does this notion not renaturalize the nature-society binary, presenting us with Humanity as a whole, a blind antagonist who has “stumbled” into the Anthropocene, unwittingly accomplishing epochal, Earth-changing action “through our own decisions,” but who, being blind and witless, is unable to alter the consequences and thus is absolved of the obligation of doing so?

The main opening for critique in the “Four Theses” comes when Chakrabarty writes that “the very science of global warming produces of necessity political imperatives,” although he says little about what politics, or *whose* politics, are required.¹⁶ He is pessimistic about the possibility that global society will act collectively, guided by reason, to change course. But humanity as a whole does not, and indeed cannot, act politically. The current conjuncture is simultaneously an ecological turning point and a crisis of subsistence for billions of people, albeit to different degrees and in different ways. Today’s reality calls for a politics that identifies and forges links between the multiple fractions of humanity who comprise the *majority* of us and who are impoverished, materially and otherwise, by the effects of global warming and other, ongoing consequences of capitalism and colonialism.

We might well take a cue from Mexico, where a political movement has arisen among the “environmentally affected”—people threatened not only by rising seas and worsening storms and droughts but also people exploited and displaced by fraudulent, high-tech “sustainability” schemes such as agrofuel plantations, huge hydropower dams and wind farms, evictions for carbon-offset projects and high-end eco-resorts for wealthy tourists seeking reconnection with nature.

If climate change is indeed epoch-changing and humans are a geological force, is this not the worst time to abandon the lessons of history, the insights of the humanities, and the tools of social science that can help to identify the commonalities within diversity upon which politics for radical social transformation can be built? Now that geoscience has

15 Chakrabarty, “Four Theses,” 214.

16 *Ibid.*, 211.

educated us as to what is a stake in the politics of nature, it behooves us to remember, as the social scientist quipped, that “God gave physics the easy problems.”¹⁷

“If climate change is indeed epoch-changing and humans are a geological force, is this not the worst time to abandon the lessons of history, the insights of the humanities, and the tools of social science?”

Is not the urgent political task first that of communication—and the creation of languages and modes of interacting that enable diverse communities to see and hear each other without becoming subordinate to or even like each other—and so the forging of ties, networks, practices, movements, and institutions through which the world’s environmentally affected might wrest control of our “environments” from those who gain from their destruction? That can help us prefigure and continue building equitable and, yes, sustainable worlds?

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Laura A. Watt

Politics of Anthropocene Consumption: Dipesh Chakrabarty and Three College Courses

When I teach my US Environmental History course, we spend two weeks analyzing and discussing the history of changing consumption patterns, including a marvelous *New Yorker* piece by Elizabeth Kolbert comparing Henry David Thoreau's 1845 retreat to Walden Pond to a score of modern-day books by those attempting to step back from twenty-first century consumerism; for example, a couple in British Columbia who for a year ate only products from within a 160-kilometer radius, and a Manhattanite and his family attempting to live for a year with zero environmental impact.¹ Kolbert wisely draws parallels between this "No Impact Man," for instance—who still relied on waste heat in his apartment building to stay warm and free Wi-Fi at the local Starbucks for his blog postings—and Thoreau, who built his cabin on land owned by Ralph Waldo Emerson and often dined at the Emerson home. Both wrote books about their experiences before diving right back into the capitalist, consumerist world from which they had withdrawn.

Recently, my students got all fired up about conducting a similar experiment in giving up some form of consumption; the instigator suggested they do so as a class, for a week, and then discuss their experiences. I agreed, but asked: What are you going to do without? The first suggestion was feeble: "Eat only locally grown foods"—here in Sonoma County, producer of everything from organic vegetables to artisanal cheese to world-class wines, this is almost a license to gluttony rather than a restriction. The next offering could be seen as a major sacrifice only by college students: "Cook all meals at home." I suggested they try something a bit more ambitious. They disliked my idea of no shoes, and we decided that "no petroleum products" or "no products made in China" would be almost impossible to implement. When I suggested no credit cards, someone immediately qualified, "but debit cards are okay, right?" Hmm.

Recognizing one of the true hallmarks of civilization to be readily-available hot water—something I learned from a two-week sailing trip from Hawaii to San Francisco one summer—I suggested giving that up. The class was intrigued. I clarified that they could *make*

1 Elizabeth Kolbert, "Green Like Me," *The New Yorker*, 31 August 2009, accessed 20 November 2015, <http://www.newyorker.com/magazine/2009/08/31/green-like-me>

all the hot water they wanted, on the stove or in the microwave; they just couldn't use the hot water tap. Heads nodded—but then some students started to think about their weekend plans. One complained: “I don't know, I have a soccer game Saturday, and it's forecast to rain; how can I *not* have a hot shower afterwards?” More dubious looks. Finally, they agreed on their experiment: in the five days between class on Wednesday and the following on Monday, each student would give up hot water from the tap for two of those five days, and they could choose which days individually.

When we reconvened, roughly half the students sheepishly admitted that they hadn't even tried. Those who braved the experiment offered observations: “It's much harder to get dishes clean without hot water”; “People would save a lot of water without hot water, since you take way shorter showers!” My comment to them, and my reason for telling this story here, was that the lesson was less in the experience of doing without than in the elaborate negotiation over what was an acceptable sacrifice, even for such a short time. And this was a class full of junior and senior-level college students, almost all of whom were majoring in Environmental Studies, brimming with passion and commitment to saving the planet. Yet even a temporary step back from one of the joys of modern plumbing, made at their own convenience, was more than many of them could muster.

It is this lesson from teaching—my students' unwillingness to even try reducing their consumption levels for a brief time—that remains foremost in my mind whenever I consider the prospect of politically addressing climate change. In “Climate and Capital,” Dipesh Chakrabarty discusses how much of modern life is ruled by probabilistic thinking, and how poorly economists and policymakers confront the uncertainties associated with climate change, which he accurately describes as “inherently unknowable.”² He also observes that the greatest lurch forward into climate change, the “Great Acceleration” starting in 1945 and continuing today—a period of truly exponential growth of numerous measures of human domination of the planet—has also been a period of expanding social justice around the globe. I would add that the same period has been one of a spread of (at least somewhat) democratic government systems, which are *not* particularly well suited to solving uncertain and temporally long-range problems.

2 Dipesh Chakrabarty, “Climate and Capital: On Conjoined Histories,” *Critical Inquiry* 41 (2014): 6.

Chakrabarty notes that, although we seem to need reason more than ever in the Anthropocene, this is qualified by “the most common shape that freedom takes in human societies: politics. Politics has never been based on reason alone. And politics in the age of the masses and in a world already complicated by sharp inequalities between and inside nations is something no one can control.”³ In this sense politics reflects climate change itself, tending to extend beyond much deliberate control into the realm of the “inherently unknowable.” This is why my thoughts returned to my students’ reluctance to give up hot water: taking climate change seriously at economic and policy levels will necessarily require a huge change in consumption patterns from developed societies—changes that, while eminently reasonable, the voters in those societies (even those studying environmental issues!) seem hesitant or disinclined to change.

The combination of capitalism plus democracy seems almost guaranteed to lock in this dynamic. For instance, there have recently been mentions in the US of a gas tax—yet even with gas prices currently at a ten-year low (except for a brief dip in 2008), this has almost zero chance of becoming law. In our electoral system, almost any representative who might champion such a policy would risk being voted out of office; too many voters’ daily lives are dependent on cheap gas to make this a winning proposition. The 2008 economic crash represented a possible chance to fundamentally shift something about our system—but it only paused, briefly, then roared on. When asked to make a choice between the comfort and convenience of modern consumption patterns and the specter of uncertain yet potentially irreversible climate change that could threaten our existence as a species, I fear that most people end up choosing the former.

The freedom that comes with democracy to participate directly in politics has expanded globally at the same time that our reliance on fossil fuels has become ever more absolute, or as Chakrabarty puts in his “Four Theses”: “The mansion of modern freedoms stands on an ever-expanding base of fossil-fuel use.”⁴ The question of whether this relationship can be decoupled troubles my students in a second course, Environmental Policy; they always seem to conclude, after a semester of studying political processes at both the national and international level, that what is needed, at least temporarily, is an environmental dictator—someone or something to *compel* actions (or, perhaps more specifically, limits) rather than give us all free rein. Chakrabarty

3 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 211.

4 *Ibid.*, 208.

cites several authors who appear to agree: Tim Flannery suggests a “carbon dictatorship,” and Mark Maslin concludes that “it is unlikely global politics will solve global warming.”⁵ This raises an interesting, if somewhat depressing, thought: Might our political evolution toward greater participation and transparency in governance be our environmental Achilles’ heel?

Furthermore, there is a striking contrast between today’s environmental politics and those of the 1970s, which were wildly ambitious and optimistic about our ability to clean up anything, *tomorrow*; all we needed was the political will. Back then, there was a deeper faith in the rational nature of the discussion. This is ultimately the premise of Earth Day, originally conceived of as a nationwide teach-in: people just needed to be educated about environmental harms, and they would get in line and support environmental change.⁶ By comparison, Anthropocene politics seem pessimistic but also more realistic—perhaps with a bit more humility, acknowledging that there are some things we cannot fix or turn around, and perhaps a bit less faith in the existence of rationality.

A major difference between then and now can be found in the changing science of ecology. As far back as George Perkins Marsh (1864) and Frederic Clements (1916), much ecological science involved a presumption that the natural world is somehow self-regulating and tends toward equilibrium. Ecological restoration practitioners now recognize the role of chaos in shaping the natural world: in my home region of the San Francisco Bay Area, efforts to restore salt marsh habitat around the bay are taking place on former salt ponds, located not in some far-off wilderness but in the heart of a major metropolis, on tidelands utilized for industrial-scale salt production for more than a century.⁷ Among other goals, the project aims to bolster local populations of endangered snowy plovers, despite being outside of their historic range, because they have lost so much of their habitat elsewhere. Yet the plovers are increasingly crowded out by California gulls competing for space and raiding their nests for eggs.⁸ The gulls in turn only began nesting in the Bay Area after Los Angeles’ diversion of water from Mono Lake in the Eastern Sierra opened up their island breeding ground to predators. Sea-level rise over the next century could put this entire

5 Ibid., 211.

6 Adam Rome, *The Genius of Earth Day: How a 1970 Teach-In Unexpectedly Made the First Green Generation* (New York: Hill and Wang, 2014).

7 Laura A. Watt and Ellen Joslin Johnck, “The Bay Area’s Solar Salt Industry: An Unintended Conservationist,” *California History* 91, no. 2 (2014): 40–57.

8 Nick Neely, “The Salt Pond Puzzle: Restoring South San Francisco Bay,” *High Country News* 44, no. 13 (2012): 10–16.

restored landscape back under water. Layers of ecological change mean these birds and their habitats cannot simply “go back” to some prior state of perfect balance.

This brings me to a third observation from the intersection of my classes and Chakrabarty’s work, stemming from his discussion of human versus planetary survival, following Feng Han and James Lovelock.⁹ When I teach my Restoration class, one of the first readings I assign is chapter 10 of Darwin’s *Origin of Species*, which focuses on extinction.¹⁰ As a context for modern-day restoration efforts, my students need to understand that all of nature is constantly changing and evolving, and that many species and habitats disappear in the process. As climate change shifts things in new and unpredictable ways, I have no doubt that planet Earth will survive, and that various aspects of the biological world will adapt and evolve accordingly. Change will happen, as it always does, and those changes are not necessarily “good” or “bad” in a nonhuman sense; is it better or worse to have a predominance of mammals versus dinosaurs? Neither—these are just different outcomes. What gives climate change its most terrifying charge is the very real possibility that we will not survive it—although again, better or worse to have people around? From our perspective, better, but otherwise it’s just another possible outcome on an ever-shifting planet.

This all sounds rather bleak. There are two bright spots for me, however. First, ecological evidence seems increasingly to suggest that many (although not all) species are far more adaptive than initially understood. Chakrabarty laments that many of the species threatened by climate change might not be able to migrate to more hospitable habitats because “we’re standing in their way.”¹¹ Yet in an excellent essay entitled “What Darwin Got Wrong,” Jonathan Losos chronicles the unexpectedly brisk pace at which natural selection can operate.¹² Though these rapid changes often have negative consequences, there are also positive adaptations. I am reminded of a colleague’s comment at a recent conference, of automatic cameras at intersections in Chicago—intended to catch red-light runners—revealing urban coyotes waiting for the light to change, as they have learned that it is easier to cross on the green. While I am not so naïve as to think that all species will be able to adapt to new conditions, I also have no doubts that the natural

9 Chakrabarty, “Four Theses,” 19.

10 Charles Darwin, “On the Geological Succession of Organic Beings,” chap. 10 in *On the Origin of Species* (Cambridge, MA: Harvard University Press, 1964).

11 Chakrabarty, “Four Theses,” 13.

12 Jonathan Losos, “What Darwin Got Wrong,” *Chronicle of Higher Education*, 20 January 2014, <http://chronicle.com/article/What-Darwin-Got-Wrong/144021/>.

world will respond to climatic shifts in new and innovative ways, and many species will find ways to either carry on or to change accordingly. We are not destroying the planet; we are simply destroying the planet *as we know it*.

The second bright spot is that even though, as Chakrabarty quotes from Feng Han, “human values will always be from a human (or anthropocentric) point of view,”¹³ an undeniable characteristic of human values is that they change over time. And as Charles Mann has written in his excellent essay “State of the Species,”¹⁴ Western societies have managed to make some “staggeringly implausible” changes in values over the past two hundred years or so, including turning away from the institution of slavery, granting voting rights to women, and increasing recognition of essential civil rights shared throughout society. Chakrabarty echoes this observation in his discussion of the increase in social justice through the “Great Acceleration.” None of these changes made economic sense at the time, yet they made moral sense, and often occurred over a surprisingly short time frame. Human values *can* evolve, which suggests that societies might increasingly recognize the trade-offs needed to address climate change, and respond accordingly.

Indeed, there are *some* signs that this might be happening in certain sectors of the global economy; for instance, in their business forecasts for decades into the future, energy companies often presume a far higher price for carbon than it currently commands—they seem to be anticipating tighter controls on carbon emissions than those that our political systems have produced thus far. It seems ironic that long-range planning for profitability might be more responsive to scientific models and projections than short-range politics. Yet the goal of these corporate responses is to continue to grow, to expand, and to sell more products—in other words, they require that consumption patterns continue apace. In contrast, consumptive habits and preferences *must* change if societies are ever to come close to living within the limits of global resources. The increasing popularity of the “tiny house” movement, extolling the virtues of living with less “stuff,” is perhaps a more hopeful sign.

My Environmental History students therefore represent an important barometer, indicating a discontinuity on the broader political stage. They are mostly from fairly left-

13 Chakrabarty, “Climate and Capital,” 19.

14 Charles Mann, “State of the Species,” *Orion Magazine*, 29 October 2012, accessed 2 December 2015, <https://orionmagazine.org/article/state-of-the-species/>.

leaning communities, attending college in liberal Northern California, studying environmental issues—they are impassioned by the idea of improving the world around them, and full of indignity when reading about the late-nineteenth-century destruction of the bison or the passenger pigeon—so they *ought* to be prime candidates for making committed changes to their lifestyles. Yet they were somewhere between reluctant and unwilling to try going without hot water from the tap for a weekend (and don't even suggest doing without one's cell phone! Unthinkable!). What will it take to convince them that scaling back their consumption patterns is not just a dubious exercise over a weekend, but a badly needed lifelong commitment? The challenge of giving up a measure of comfort and privilege may be the greatest hurdle for any political movement addressing climate change to overcome.

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Probing Our Limits
Narrative and the Geophysical Imagination

“The discipline of history exists on the assumption that our past, present, and future are connected by a certain continuity of human experience. We normally envisage the future with the help of the same faculty that allows us to picture the past. Weisman’s thought experiment illustrates the historicist paradox that inhabits contemporary moods of anxiety and concern about the finitude of humanity. To go along with Weisman’s experiment, we have to insert ourselves into a future “without us” in order to be able to visualize it. Thus, our usual historical practices for visualizing times, past and future, times inaccessible to us personally—the exercise of historical understanding—are thrown into a deep contradiction and confusion” (Chakrabarty, “Four Theses,” 198–99).

Alexa Weik von Mossner

Imagining Geological Agency: Storytelling in the Anthropocene

The Anthropocene, we learn from Dipesh Chakrabarty's writings, poses a challenge to historians, postcolonial critics, and scholars in many other disciplines because it forces us to radically rethink the scope of human agency. For the same reason it also poses a challenge to storytelling and to the ways in which we engage with narratives that try to give us a sense of what it *means* when biological agents become geological agents. "We can become geological agents only historically and collectively," claims Chakrabarty, "when we have reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself."¹ It is an issue of scale, then, and the difficulties involved in considering the human on that level are in part due to what the literary scholar Lawrence Buell has called a "crisis of the imagination."² Biocultural critics like Brian Boyd have argued that storytelling serves evolutionary purposes, and given that over thousands of years humans have transformed their experiences, hopes, and fears into stories, it seems worthwhile to look closely at some of the ways in which we currently tell each other stories about global environmental change and human agency in the Anthropocene.³

As a literary and film scholar, I am particularly interested in *how* we tell each other these stories and what kind of narratives and imaginative limitations are posed by the spatial and temporal scale of some of the processes that mark the Anthropocene. I am also interested in what effects such storytelling can have on those who receive it. Chakrabarty has argued that "we cannot ever experience ourselves as a geophysical force,"⁴ and has also suggested that grasping this new level of agency would necessitate "[scaling] up our imagination of the human."⁵ Such scaling up has always been the business of speculative modes of literature and film, be they fiction or nonfiction. In recent years,

1 Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35, no. 2 (2009): 206.

2 Lawrence Buell, *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture* (Cambridge, MA: Harvard University Press, 1995), 2. On this point, see also the conclusion of Ursula Heise's *Sense of Place and Sense of Planet: The Environmental Imagination of the Global* (New York: Oxford University Press, 2008).

3 Brian Boyd, *On the Origin of Stories: Evolution, Cognition, and Fiction* (Cambridge, MA: Belknap Press, 2009).

4 Dipesh Chakrabarty, "Postcolonial Studies and the Challenge of Climate Change," *New Literary History* 43, no. 1 (2012): 12.

5 Chakrabarty, "Four Theses," 206.

an emerging genre of climate change narratives⁶ has dramatized that fateful moment when anthropogenic forcing reaches “a tipping point at which this slow and apparently timeless backdrop for human actions transforms itself with a speed that can only spell disaster for human beings.”⁷ It is the moment when risk—defined by the late German sociologist Ulrich Beck as “the anticipation of catastrophe”⁸—mutates into actual hazard and catastrophe, often imagined as an apocalypse of some sort. Chakrabarty acknowledges that art and fiction might allow us to “extend our understanding to those who in future may suffer the impact of the geophysical force that is the human.”⁹ I want to suggest that storytelling—in fiction and nonfiction—can do not only that, but can also achieve something even more important: it can help us to *imaginatively experience* the impact of that geophysical force that is the human.

Storytelling does this through psychological activities that narratologists and psychologists of fiction call *transportation* and *performance*. “A narrative,” explains psychologist Richard Gerrig, “serves to transport an experiencer away from the here and now.”¹⁰ While it cannot force us to experience its imaginary world, it does extend what we might call an invitation. If we accept that invitation, we begin to shift our attention in a way that leads to the illusion of transportation: our actual surroundings seem to disappear (because we no longer pay much attention to them) as we begin to imagine the alternative world created for us by the literary or audiovisual text. Gerrig insists that there is nothing passive about this process, because experiencers, and especially readers, “must use their own experiences of the world to bridge gaps in texts. They must bring both facts and emotions to bear on the construction of the world of the text” and “give substance to the psychological lives of characters.”¹¹ We cannot help but fall back on what we already know from our real worlds when we engage with the alternative world of a story, and this is true even for speculative modes of narrative that imagine potential future worlds. There exist countless gaps that we continuously

6 For overviews and critical discussions of some of the recent climate change novels (sometimes dubbed “cli-fi”), see Adam Trexler and Adeline Johns-Putra, “Climate Change in Literature and Literary Criticism,” *Wiley Interdisciplinary Reviews: Climate Change* 2, no. 2 (2011): 185–200, and Sylvia Mayer, “Explorations of the Controversially Real: Risk, the Climate Change Novel, and the Narrative of Anticipation,” in *The Anticipation of Catastrophe: Environmental Risk in North American Literature and Culture*, ed. Sylvia Mayer and Alexa Weik von Mossner (Heidelberg: Universitätsverlag Winter, 2014), 21–38.

7 Chakrabarty, “Four Theses,” 205.

8 Ulrich Beck, *World at Risk* (Cambridge: Polity Press, 2007), 7.

9 Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” 12.

10 Richard J. Gerrig, *Experiencing Narrative Worlds: On the Psychological Activities of Reading* (Boulder, CO: Westview Press, 1998), 3.

11 *Ibid.*, 17.

fill during reading and watching, and our active “performance” of storyworlds—the act of imagining—is crucial for our understanding. It is something of a negotiation between the experienter’s real world and the alternative world presented by a writer or filmmaker. Gerrig insists that all this holds true for both fiction and nonfiction, and so *all* stories about the Anthropocene keep pushing against the boundaries of what is currently imaginable.

It is indeed quite interesting to see how often texts and films that attempt to imagine the risks of the Anthropocene mix and fuse fictional and nonfictional modes of narration. Not only do some writers of eco-science fiction, such as Kim Stanley Robinson and Dale Pendell, insist that their speculative narratives are based on scientific projections (Roland Emmerich’s blockbuster disaster film *The Day after Tomorrow* is another, more notorious, example).¹² At the other end of the spectrum we find a climate-change documentary like Franny Armstrong’s *The Age of Stupid*, which uses a dystopian frame narrative to give additional meaning to the documentary portion of the film and engage viewers emotionally in a story about human hubris and resulting disaster.¹³ Even more surprising, perhaps, is the fact that a renowned climatologist like James Hansen includes a science-fiction story set in the year 2525 in his popular-science book *Storms of My Grandchildren*. While that story “may read like far-fetched science fiction,” insists Hansen, “its central hypothesis is a tragic certainty—continued unfettered burning of all fossil fuels will cause the climate system to pass tipping points, such that we hand our children and grandchildren a dynamic situation that is out of control.”¹⁴ He thus tries to do exactly what Chakrabarty suggests fiction might be able to do, namely “extend our understanding to those who in future may suffer the impact of the geophysical force that is the human.”¹⁵ Unfortunately, however, Hansen’s science-fiction story ends up being so far-fetched and its protagonists so bloodless that it seems unlikely that it will engage readers’ imaginations and emotions in the intended way.

12 See, in particular, Kim Stanley Robinson’s *Science in the Capital* trilogy: *Forty Signs of Rain* (New York: Spectra, 2004), *Fifty Degrees Below* (New York: Spectra, 2005), and *Sixty Days and Counting* (New York: Spectra, 2007); Dale Pendell, *The Great Bay: Chronicles of the Collapse* (Berkeley: North Atlantic Books, 2010); and *The Day after Tomorrow*, directed by Roland Emmerich (Twentieth Century Fox, 2004).

13 *The Age of Stupid*, directed by Franny Armstrong (Spanner Films, 2009).

14 James Hansen, *Storms of My Grandchildren: The Truth about the Coming Climate Catastrophe and Our Last Chance to Save Humanity* (London: Bloomsbury, 2009), 251.

15 Chakrabarty, “Postcolonial Studies and the Challenge of Climate Change,” 12.

Hansen is ready to admit that “science fiction isn’t my area of expertise,”¹⁶ and so we might forgive him that, as a climatologist, he cannot create characters or storyworlds that excite our minds and engage our emotions. His fictional narrative fails to transport readers into an alternative world, so that they can perform and imaginatively experience the potential future effects of humanity’s collective geological agency. That is, however, what more experienced and talented writers and filmmakers can achieve. “Literature,” writes ecocritic Richard Kerridge, “can provide an all-out apocalyptic vision of catastrophe, to shock and scare us deeply.”¹⁷ It can also make us aware of the gross environmental inequalities that mark the Anthropocene and the almost invisible relationship between perpetrators and victims that postcolonial studies scholar Rob Nixon has aptly called “slow violence.”¹⁸ Reading transforms the mind through processes of transportation, cognitive estrangement, strategic empathizing, and other narrative techniques. Speculative fiction works particularly well because, in the words of science-fiction scholar Tom Moylan, “imaginatively and cognitively engaging with such works can bring willing readers back to their own worlds with new or clearer perceptions, possibly helping them to raise their consciousness.”¹⁹

Empirical research has demonstrated the crucial role of transportation in the persuasiveness of narrative texts,²⁰ but for scholars outside literary and film studies it is often easier to accept the influence of nonfiction narratives on societal processes. However, we should not underestimate the importance of fictional narratives in changing attitudes, understanding, and ultimately behavior. As social scientists David Lewis, Dennis Rodgers, and Michael Woolcock have argued with respect to “the fiction of development,” fictitious narratives can communicate knowledge in ways that are different from nonfiction discourse but just as valuable and often much more approachable and engaging.²¹ Psychological

16 Hansen, *Storms of My Grandchildren*, 251.

17 Richard Kerridge, “Ecological Approaches to Literary Form and Genre: Urgency, Depth, Provisionality, Temporality,” in *The Oxford Handbook of Ecocriticism*, ed. Greg Garrard (Oxford and New York: Oxford University Press, 2014), 372.

18 Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011).

19 Tom Moylan, *Scraps of the Untainted Sky: Science Fiction, Utopia, Dystopia* (Boulder, CO: Westview Press, 2000).

20 See, for example, Melanie Green and Timothy Brock, “The Role of Transportation in the Persuasiveness of Public Narratives,” *Journal of Personality and Social Psychology* 79, no. 5 (2000): 701–21.

21 Lewis, Rodgers, and Woolcock write that “not only are certain works of fiction ‘better’ than academic or policy research in representing central issues relating to development, but they also frequently reach a wider audience and are therefore more influential.” David Lewis, Dennis Rodgers, and Michael Woolcock, “The Fiction of Development: Literary Representation as a Source of Authoritative Knowledge,” *Journal of Development Studies* 44, no. 2 (2008): 198.

studies have shown that fiction is indeed better than nonfiction in raising readers' capability for empathy and social concern,²² and there is evidence that even an in many ways problematic feature film, such as *The Day after Tomorrow*, can have remarkable effects on the climate risk perceptions of its viewers.²³ That same film, however, is also a grave reminder of the fact that popular narratives are often firmly circumscribed by genre conventions, and, on a more fundamental level, by the fact that human storytelling traditions tend to focus on the individual agency of human protagonists and feature plotlines that are limited to these protagonists' life spans.²⁴

A novel like Pendell's *The Great Bay*, which spans 14,000 years (from the moment of "collapse" of human civilization in 2021), tries to get around this narrative problem and succeeds in evoking the long-term repercussions of human geophysical agency while at the same time diminishing individual human lives to a collage-like assemblage of brief snapshots. In a way, the book is therefore a response to Heise's complaint, in *Sense of Place and Sense of Planet*, that most climate change novels are too "conventional in their narrative strategies,"²⁵ frequently falling back "on apocalyptic narrative" and simplistic story lines that concentrate on the lives of generic science-fiction protagonists.²⁶ Heise calls for stylistic and formal innovation while also suggesting that the modernist tradition of narrative collage offers possibilities for capturing the vast dimensions of global ecological transformations.²⁷ Pendell's *The Great Bay* certainly attempts such an innovative mode of narration as it tells its story about the year of the collapse and the 14 millennia that follow it. At the same time, however, the narrative's fragmentary structure also creates problems and ultimately fails in its attempt to create an engaging story because its human protagonists are no more than brief and unimportant occurrences that

22 See, for example, Raymond Mar et al., "Exploring the Link between Reading Fiction and Empathy: Ruling out Individual Differences and Examining Outcomes," *Communications* 34 (2009): 407–28, and Dan R. Johnson, "Transportation into Literary Fiction Reduces Prejudice against and Increases Empathy for Arab-Muslims," *Scientific Study of Literature* 3, no. 1 (2013): 77–92.

23 For a discussion of the film's narrative strategies in conjunction with several reception studies see Alexa Weik von Mossner, "Facing *The Day after Tomorrow*: Filmed Disaster, Emotional Engagement, and Climate Risk Perception," in *American Environments: Climate, Cultures, Catastrophe*, ed. Christof Mauch and Sylvia Mayer (Heidelberg: Universitätsverlag Winter, 2012), 97–115.

24 This holds true for much of nonfiction narratives, and even more so for the most pervasive fictional story prototypes. According to literary scholar Patrick Colm Hogan, such narrative prototypes are "structured and animated" by universal human emotions and can therefore be found across cultures and epochs; see *The Mind and Its Stories: Narrative Universals and Human Emotion* (Cambridge: Cambridge University Press, 2003), 5.

25 Heise, *Sense of Place and Sense of Planet*, 207.

26 *Ibid.*, 206.

27 *Ibid.*, 76–77.

leave readers cold, and for the most part disinterested in their fates.²⁸ Geological time is not human time, and narrative events are only truly meaningful to us when they are experienced by someone—ideally someone we know well enough to care about.

Storytelling in and about the Anthropocene is thus, in very literal ways, affected by the imaginary and conceptual challenges that Chakrabarty has laid out in his writings. And yet the very idea of the Anthropocene—regardless of whether it will become an official geological epoch or not—continues to be immensely productive for storytelling, inspiring artists to look for innovative and more adequate modes and media for conveying what it means—and what it can mean—when humans wield a geological force. Over time, the creative energy involved in the production and mental performance of such stories might bring us at least a little closer to scaling up our imagination of the human.

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28 For a more detailed analysis of Pendell’s novel, see Alexa Weik von Mossner, “Science Fiction and the Risks of the Anthropocene: Anticipated Transformations in Dale Pendell’s *The Great Bay*,” *Environmental Humanities* 5 (2014): 203–16.

Lisa Sideris

Anthropocene Convergences: A Report from the Field

Dipesh Chakrabarty proposes that anthropogenic climate change presents scholars with a novel and daunting set of imperatives. It requires, among other adjustments, that we think and work across incommensurable timescales and disciplinary regimes. We must learn to “mix together immiscible chronologies,” as well as “rise above [our] disciplinary prejudices.”¹ Our situation is not without precedent, for the idea that humans might act as geological agents is not completely new.² Moreover, explaining such watershed events as the agricultural revolution of 10,000 years ago similarly required a convergence of diverse timescales and disciplines of geology, archeology, and history.³ Still, the idea of humans as a *geophysical* force akin to a dinosaur-decimating asteroid is something new under the sun. And as disciplinary mergers go, it is one thing to put historians in touch with geology but quite another to expect a scholar of postcolonial or subaltern studies to engage in meaningful and mutually respectful dialogue with an evolutionary biologist—particularly (let us say) a *sociobiologist* in the thrall of Enlightenment positivism and the quest for universal “laws” of human nature.⁴

Here, I focus on Chakrabarty’s invitation to blend immiscible timeframes and disciplines, primarily with reference to movements afoot in my own discipline of religious studies and adjacent fields. My aim is not so much to register disagreement with Chakrabarty’s portrait of the Anthropocene and what it signifies as to present some sobering examples of how this invitation is being received and enacted, and why no single discipline can define for us what it means to be human in the Age of the Human.

1 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 220, 215.

2 Dipesh Chakrabarty, “The Geophysical Agency of Humans and Climate Change,” *Global Energy Affairs*, 19 September 2013, accessed 18 June 2015, <http://globalenergyinitiative.org/insights/161-climate-change-and-the-geophysical-agency-of-humans.html>.

3 Chakrabarty, “Four Theses,” 219.

4 Here I refer to E. O. Wilson, whose ideas Chakrabarty invokes. Some may object to my invocation of sociobiology, given Wilson’s move to embrace group selection theory, but Wilson has never broken with the basic dogma that such complex behaviors as morality, religion, and artistic expression are fundamentally biological in nature.

Thinking Like a Species

Anthropogenic climate change, and the attendant onset of humans' geological agency, entails a new understanding of humans as a collective entity, a species.⁵ Species-level thinking—a concept Chakrabarty attributes to E. O. Wilson, among others—works hand-in-glove with a turn to deep history. As Chakrabarty notes, Wilson believes that deep-historical perspectives—which move across large spans of time—and species thinking are both necessary if humans are to survive into the future. I want to pick up this strand of Chakrabarty's engagement with Wilson and consider its implications for developing a genuinely interdisciplinary dialogue around the Anthropocene and what it means to conceive of ourselves as a species.

“No single discipline can define for us what it means to be human in the Age of the Human.”

Thinking big is currently in vogue, but deep-historical and species-level thinking—even an incipient Anthropocene concept—have been knocking around my discipline for decades. For example, in 1992 in a book immodestly entitled *The Universe Story*, Thomas Berry, a cultural historian and religion scholar who referred to himself as a “geologist,” and his protégé, a mathematical cosmologist named Brian Swimme, predicted that “in the future the Earth will function differently than it has functioned in the past.” In this emerging era, the “entire complex of life systems of the planet will be influenced by the human in a comprehensive manner.”⁶ They envision a fourth geological era to follow the Paleozoic, the Mesozoic, and the Cenozoic, and optimistically christen it the “Ecozoic,”⁷ a period marked by “mutually enhancing human-Earth relations” and by recognition that our species now occupies the geological driver's seat.⁸

Clive Hamilton and Jacques Grinevald argue convincingly that there are no genuine precursors to the Anthropocene, which they define as a sudden (not incremental) and dangerous shift, a radical rupture in Earth history as well as in the very idea of evolu-

5 Chakrabarty, “Four Theses.”

6 Brian Swimme and Thomas Berry, *The Universe Story* (New York: HarperCollins Publishers, 1992).

7 The Ecozoic is posited not as an epoch but an era of much longer duration.

8 Swimme and Berry, *Universe Story*, 280.

tionary “advance to a higher stage.”⁹ However, I think there *are* precursors to the idea of a “good Anthropocene.” Indeed, some Anthropocene lookalikes rejected by Hamilton and Grinevald bear the earmarks; the Ecozoic is one candidate. Proponents of a good Anthropocene typically also regard the planetary crisis as a grand adventure, an exciting challenge that can be met by human ingenuity and smart technology, and—controversially—by jettisoning traditional approaches to wilderness conservation while welcoming engineering strategies for the planet and its lifeforms.¹⁰

Swimme and Berry’s confident appraisal of the coming Ecozoic is nurtured by a belief that the universe purposefully gropes its way towards consciousness. Theirs is an anthropic universe: the emergence of a self-reflective species such as our own was implicit in the unfolding of the universe from its inception. A pivotal moment for the cosmos is when humans emerge as the supreme consciousness of the universe, and—even more specifically—when we begin to reflect on ourselves as a species. Humans have often conceived of themselves as cultures, ethnic groups, or international organizations, Swimme and Berry note, but “what we seldom think about is the human as species.”¹¹ We must “reinvent the human at the species level,” fully and reflectively embracing that we are an interdependent species.¹²

These ideas have percolated from the musings of French paleontologist and Jesuit priest Pierre Teilhard de Chardin (1881–1955), a key mentor to Swimme and Berry and, incidentally, a personal hero to Anthropocene booster Andrew C. Revkin.¹³ Teilhard understood our planet to unfold in a series of developmental layers or envelopes: lithosphere, hydrosphere, biosphere, and finally and most significantly, the noösphere, which is an additional, *thinking* layer beyond the biosphere, an evolutionary stage driven by the human phenomenon. The noösphere begins to transform the biosphere, acting as a kind

9 Clive Hamilton and Jacques Grinevald, “Was the Anthropocene Anticipated?” *The Anthropocene Review* 2, no. 1 (2015): 59.

10 See, for example, Andrew C. Revkin, “Exploring Academia’s Role in Charting Paths to a ‘Good’ Anthropocene,” *New York Times*, 16 June 2014, accessed 18 June 2015, <http://dotearth.blogs.nytimes.com/2014/06/16/exploring-academias-role-in-charting-paths-to-a-good-anthropocene/>. See also Clive Hamilton’s reply: “The Delusion of the ‘Good Anthropocene’: A Reply to Andrew Revkin,” *CliveHamilton.com*, 17 June 2014, accessed 18 June 2015, <http://clivehamilton.com/the-delusion-of-the-good-anthropocene-reply-to-andrew-revkin/>.

11 Swimme and Berry, *Universe Story*, 259.

12 Thomas Berry, *The Christian Future and the Fate of the Earth*, eds. Mary Evelyn Tucker and John Grim (Maryknoll, NY: Orbis Books, 2009), 117.

13 Andrew C. Revkin, “Teilhard de Chardin’s ‘Planetary Mind’ and our Spiritual Evolution,” *On Being* with Krista Tippett, 23 January 2014, accessed 18 June 2015, <http://www.onbeing.org/program/teilhard-de-chardins-planetary-mind-and-our-spiritual-evolution/4965>.

of planetary or communal mind; our species begins to direct the course of evolutionary unfolding. While Swimme and Berry remain on guard against the extreme techno-optimism characterizing Teilhard's thought, an unmistakable sense of celebration attends the Ecozoic moment when humans take hold of the evolutionary reins. In short, there are many resonances between the noösphere and the Ecozoic, and between both concepts and the good Anthropocene.

A Common Story

The Universe Story is one of a handful of projects that narrate, in quasi-mythic form, the entire cosmic history, from the Big Bang to the dawn of our global environmental crisis. A variety of grandiose names are appended to these narratives—The Epic of Evolution, The Great Story, or Big History.¹⁴ These projects blend human and cosmic history (as well as science and religion) into a comprehensive common story that properly emplaces humans in the cosmos. One recent iteration is a multimedia phenomenon called “Journey of the Universe” launched by the abovementioned Swimme together with religion scholar Mary Evelyn Tucker. As with Swimme and Berry's narrative, a central claim is that humans represent the universe becoming conscious of itself.¹⁵ Interestingly, it is E. O. Wilson who coined the phrase “Epic of Evolution,” and many a cosmic storyteller regards him as an architect of a new cosmology that will unify the human species and bind it more intimately to the Earth.¹⁶ The binding agent is science itself—or, rather, science in mythic form. Some celebrants of the Epic have created musical and ritual accompaniments to the story, seeking to infuse it with an experiential dimension.

What I am suggesting then, in outlining these projects, their genealogy, and their affinities with Anthropocene discourse, is that these efforts embody and respond to key elements of Chakrabarty's portrait of our Anthropocene moment. They collapse con-

14 See “The Great Story,” accessed 18 June 2015, http://thegreatstory.org/what_is.html.

15 Tucker and Swimme also invoke the language of the Anthropocene. Humans have “crossed over into an Earth whose very atmosphere and biosphere are being shaped by human decisions . . . With our machines and our numbers we have become a geological force.” Brian Swimme and Mary Evelyn Tucker, *Journey of the Universe* (New Haven: Yale University Press, 2011), 101–2.

16 Wilson first alluded to an epic of evolution in his *On Human Nature* (Cambridge, MA: Harvard University Press, 1978). For a fuller examination of these movements and their relationship to science, see Lisa Sideris, “Science as Sacred Myth? Ecospirituality in the Anthropocene Age,” *Journal for the Study of Religion, Nature, and Culture* 9, no. 2 (2015): 136–53.

ventional boundaries between human and natural history,¹⁷ foster self-recognition of humans as a species, and implicate human agency across geological timescales. In their utilization of multiple genres—myth, ritual, film, art, and song—they might even be seen to foster something Chakrabarty considers impossible, namely, a “phenomenology of us as a species,” an emotional or experiential identification with the species concept.¹⁸ Moreover, they claim to combine insights from across the disciplinary spectrum, and even to breathe new life into the humanities.¹⁹ So, we do not have to imagine what it would look like if scholars were to take up the challenges Chakrabarty puts before us. From where I am standing—in religious studies—it seems these projects are well underway. Preliminary results are in. In my view, the results are dispiriting.

A Perilous Journey

While he finds Wilson’s ideas alluring, Chakrabarty is attuned to the perils of inviting a vision of humans as a species, or a “natural condition,” to dominate scholarship across the disciplines. He believes our current situation confronts us with questions of human collectivity, but he resists a homogenizing vision of “global identity,” and sees “obvious value” in retaining “postcolonial suspicion of the universal.”²⁰ He does not abandon one scale of history for another, but asks that we attend to these registers simultaneously (even if doing so radically challenges historical understanding). The specter of “essentialism” is real to him, as are the dangers of “the political uses of biology.”²¹ Still, I am not convinced that Chakrabarty fully appreciates the way in which scaling-up our imagination of the human has engendered—and perhaps is bound to engender—essentialist, reductionist, or homogenizing portraits of the human, not to mention inadequate forms of interdisciplinarity. Wilson’s species concept, in and of itself, carries a lot of troubling baggage.²²

17 It might be said that they collapse cosmic history into *human* history, counterintuitive as that sounds, insofar as humans have been seen as implicitly present since the Big Bang.

18 Chakrabarty, “Four Theses,” 220.

19 See, for example, Mary Evelyn Tucker’s “Overview” of the *Journey of the Universe*, accessed 18 June 2015, <http://www.journeyoftheuniverse.org/>.

20 Chakrabarty, “Four Theses,” 222.

21 *Ibid.*

22 Wilson’s work routinely pursues grand and controversial themes: human nature and sociobiology; free will and determinism; the unity of science. His bold pronouncements on these themes, moreover, tend to be interconnected, as parts of an overarching metaphysics.

Citing Daniel Lord Smail's work on deep history, for example, Chakrabarty suggests that the aforementioned perils are not so grave. Species, after all, are not fixed or homogeneous entities, and the quest to identify human nature has proven largely futile and is, therefore, not something to fret about. Furthermore, Chakrabarty ventures that all disciplines engage in reductionism or abstraction: the category of personhood is "no less a reduction of or an abstraction from the embodied and whole human being, than, say, the human skeleton discussed in anatomy class."²³ Well, perhaps. But we should note that Wilson's brand of species-thinking, unlike Smail's, (or Darwin's) *does* entail that "humans possess a species-specific nature and morality."²⁴ These bold assertions are uncritically received by Epic of Evolution devotees. They, like Wilson, are not especially sensitive to the limits of biological explanation. They will not entertain conversations about human nature not "firmly grounded in the sciences" and believe that "one world calls for one story."²⁵ As they gaze out into the cosmos, or deep into our evolutionary past, the new self-appointed narrators of the Anthropocene do not contemplate a differentiated humanity polarized into rich and poor—as Chakrabarty at least occasionally does—but humanity in a universalizing spirit. Our destiny is to become "universe people . . . a form of human being that is natural to the universe."²⁶

What is worse, Wilson and his admirers castigate humanities scholars for failing to place these settled accounts of human nature at the center of their research, as if humanists' reluctance to do so stemmed from a failure of courage rather than an appreciation of the diverse conceptual tools available to us from across the disciplines. Wilson's attachment to the relative fixity and universality of human nature is inseparable from his investment in a form of faux interdisciplinarity he calls consilience.²⁷ Consilience, the unity of all knowledge, is predicated upon a clear disciplinary hierarchy. Disciplines oriented to the study of human culture will eventually fall out into science, Wilson predicts, as science progressively colonizes and explains material that was once their purview. Hence, the lasting value of the arts and humanities lies in their capacity to express in poetic, visual, or narrative form—and thereby disseminate and celebrate—the discoveries of science.

23 Chakrabarty, "Four Theses," 215.

24 Edward O. Wilson, *In Search of Nature* (Washington, DC: Island Press, 1996), 99.

25 See Loyal Rue and Ursula Goodenough, "A Consilient Curriculum," in *The Evolutionary Epic: Science's Story and Humanity's Response*, eds. Cheryl Genet et al. (Santa Margarita, CA: Collins Foundation Press, 2009), 181.

26 Swimme and Tucker, *Journey*, 113.

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

Variations on this problematic division of labor characterize the narrative projects that are presently encroaching upon my discipline.²⁸

As scholars pursue convergences among disparate disciplines and timescales, they will find some collaborators more egalitarian than others. Among the inegalitarian partners, as John M. Meyer rightly notes, are enthusiasts of consilience who seek to reconcile disciplinary differences by uniting all under the banner of biology.²⁹ Scientists who exhort humanists to embrace their portrait of the human may fail to recognize that the sciences themselves reveal multiple registers and scales, and thus multiple images of the human. Even within biological science alone—say paleobiology, microbiology, and biochemistry—we find visions of the human that are incommensurable with one another, as Julia Adeney Thomas argues.³⁰ The species-level view of humans as a collective agent and discrete entity might be recognizable to paleobiologists, but a microbiologist would reject this image in favor of one that regards each of us as a conglomerate of multiple species, akin to a coral reef. Where paleobiology may seem to underwrite species solidarity—the ethic at the heart of universalizing narratives like the Epic of Evolution or Universe Story—the microbiologist’s perspective makes it difficult to talk about a human “we” at all. “While 99.9 percent of our human DNA is shared,” Thomas notes, “our microbial cells may have as little as 50 percent of their genetic profile in common.” For those who look to science to inspire or justify a narrative of species oneness “this finding is disturbing.”³¹

Again, no single discipline can define for us what it means to be human in the Age of the Human. Instead of turning away from the messiness and inexactitude of these immiscible scales and their possible meanings—or forcing a reconciliation that does violence to their autonomy and richness—we might look instead “with *wonder* at the incommensurable yet accurate ways in which ‘the human’ emerges in various disciplines, especially in the Anthropocene.”³² Ambitious disciplinary mergers such as those being forged in and around my own field of study will be productive and equitable only when scholars take seriously that *no single framework can adequately interrogate the Anthropocene*. We must say this again and again, and we must mean what we say, and say what we mean.

28 Loyal Rue and Ursula Goodenough, “A Consilient Curriculum,” 181.

29 John M. Meyer, “Less is More,” in “Minding the Gap: Working Across Disciplines in Environmental Studies,” eds. Robert Emmett and Frank Zelko, *RCC Perspectives* 2014, no. 2: 15–18.

30 Julia Adeney Thomas, “History and Biology in the Anthropocene: Problems of Scale, Problems of Value,” *American Historical Review* 119, no. 5 (2014): 1587–607.

31 Thomas, “History and Biology,” 1595.

32 *Ibid.*, 1589 (emphasis added).

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Daniel deB. Richter

The Crisis of Environmental Narrative in the Anthropocene

The public is very familiar with declensionist narratives about the environment, with stories about extinction, degradation, contamination, deforestation, and climate change, even if declension as a term has circulated primarily among environmental historians and literary critics. Environmental scientists, including in my own field of soil sciences, perhaps think less often about the narrative structures through which our work is communicated and gains wider influence. Geologists are debating whether the contemporary geologic epoch of the Holocene is to be renamed the Anthropocene.¹ To many, the Anthropocene will promote the declension narrative to a global scale. Indeed, the Anthropocene presents all sorts of problems, not the least of which is that if declension is our sole environmental narrative, human beings are but agents of planetary destruction. While scholars today freely discuss post-Holocene problems, consider schoolteachers in the Anthropocene who must motivate their students in the face of nature's loss! New environmental narratives are needed to counter and enrich that of environmental declension.

The need for new environmental narratives is hardly new. Ted Steinberg's "Down, Down, Down, No More" cried out for an alternative to that of declension.² In fact, when geographer Carl Sauer wrote in the 1930s he tried to motivate by boldly asking whether human beings would ever be able to distinguish "loot from yield."³ The late Thomas Berry wrote explicitly for people in the Anthropocene.⁴

Here, we make a Georgic narrative to counter that of declension. Derived from Virgil's *Georgics*, a cycle of poems that frame Earth as the home of nature and human beings, Georgic narratives frame the natural world as a home not only highly vulnerable to human action but one entirely dependent for its survival and quality of human beings' "toil, relent-

1 Jan Zalasiewicz, et al., "When Did the Anthropocene Begin? A Mid-Twentieth Century Boundary Level is Stratigraphically Optimal," *Quaternary International* 383 (2015): 196–203; Matt Edgeworth et al., "Diachronous Beginnings of the Anthropocene: The Lower Bounding Surface of Anthropogenic Deposits," *The Anthropocene Review* 2, no. 1 (2015): 33–58.

2 Ted Steinberg, "Down, Down, Down, No More: Environmental History Moves Beyond Declension," *Journal of the Early Republic* 24, no. 2 (2004): 260–66.

3 Carl O. Sauer, "Theme of Plant and Animal Destruction in Economic History," *Journal of Farm Economics* 20, no. 4 (1938): 765–75.

4 Thomas Berry, *The Dream of the Earth* (New York: Sierra Club Books, 1990).

less toil.”⁵ Simply put: if declension narratives separate human beings from a natural world we loot, the Georgic has human beings intimately working constructively with the natural world, *no matter the future prospects*.

As a case study, I would like to apply the Georgic narrative to think about large-scale environmental degradation and remediation, using the Southern Piedmont of the United States where my work on soil has focused. In the Southern Piedmont, cultivation largely for Old South cotton led directly to some of the most serious land and human degradation in North America. While the agricultural economy of the early nation benefited greatly from Piedmont cotton, often raised by enslaved laborers, the region’s erosive rainfall, erodible soil, and farming practices over only around 100 years combined to eliminate about 15 centimeters of soil from nearly 25 million acres.⁶ Farming transformed the region and its people, according to Fisk University Professor Charles Spurgeon Johnson, into “a miserable panorama of unpainted shacks, rain-gullied fields, straggling fences, rattle-trap Fords, dirt, poverty, disease, drudgery, and monotony that stretches for a thousand miles across the cotton belt.”⁷ Soil historically mobilized from Piedmont cotton farms will pollute the region’s streams and rivers for decades, centuries, and even millennia. The region’s riparian wetlands are inundated with up to a meter or more of what is technically called “legacy sediment.”⁸ Following about 1920, countless Piedmont farm families, most poverty-stricken, abandoned their farms in a painful exodus to cities or to regions with more promising agriculture.⁹ This human-natural history fits well into a declension narrative.

Yet the Earth and its peoples are nothing if not dynamic. Nearly 100 years have now passed since the peak of soil erosion and farm abandonment. Forests have regrown on much former farmland; eroded fields have been converted to other uses including new home sites. Most impressive are the many small Piedmont farms and gardens that are recultivating formerly eroded lands to supply food to local farmers’ markets, restaurants, and grocery stores. A new narrative is growing in the Piedmont, a narrative we

5 David Ferry, translator, *The Georgics of Virgil* (New York: Farrar, Straus and Giroux, 2006).

6 Stanley W. Trimble, *Man-Induced Soil Erosion on the Southern Piedmont: 1700–1970* (Ankeny, IA: Soil & Water Conserv. Soc., 2008).

7 C. S. Johnson, E. R. Embree and W. W. Alexander, *The Collapse of Cotton Tenancy* (Chapel Hill, NA: UNC Press, 1935).

8 L. A. James, “Legacy Sediment: Definitions and Processes of Episodically Produced Anthropogenic Sediment,” *Anthropocene* 2 (2014): 16–26.

9 Daniel deB. Richter and Daniel Markewitz, *Understanding Soil Change: Soil Sustainability over Millennia, Centuries, and Decades* (Cambridge: Cambridge University Press, 2001).

can rightly call Georgic because it only arises from persistent human labor aimed at renewing or regenerating the land.

On Duke University's campus in Durham, North Carolina, a 50-year-old Blomquist Garden and new Duke Campus Farm are today both growing on eroded farmland. While the campus farm is only moderately eroded, gullies that deeply scar former farm fields make up the Blomquist Garden with some three meters deep. The eroded soil of the campus farm produces food for the campus and a growing community. At the Blomquist Garden, natural regeneration of pines is encouraged and a large collection of the South's native flora is tended directly on the gullied old fields. Thousands of visitors each year are attracted to the Blomquist Garden and campus farm, yet remarkably few yet appreciate the full meaning of what they are visiting. Both are presented mainly within the declension narrative, as a celebration of nature and plant life, as a rustic and natural refuge and welcome respite from the hectic industrial business of human affairs. How much more compelling and significant would these places be if they were presented with a Georgic narrative and experienced explicitly as human-natural creations with their characters derived not only from their celebrated plant life but also from their long-laboring gardeners and farmers?

What makes Duke's Blomquist Garden and campus farm invaluable is hardly their Duke financial endowments but the Georgic narrative that tells us that skillful human labor over decades and "relentless toil" can promote aesthetic and ecologic values even on severely degraded land.¹⁰ While the rain that waters the Piedmont's soils may still run off through old farm field gullies, today's runoff carries far less eroded soil than that in the past, owing to blankets of organic matter and the anchorage of human-assisted plant roots. If aesthetic values, prolific plant life, and cleaner water can spring from the deeply scarred Southern Piedmont, a Georgic narrative can run counter to that of environmental declension, and reinforce the important, long, and hard work that will be required to sustain our planet in the Anthropocene.

10 J. F. Richards, *The Unending Frontier: An Environmental History of the Early Modern World* (Berkeley: University of California Press, 2003).

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Whose Anthropocene?
A Response

Dipesh Chakrabarty

Whose Anthropocene? A Response

I am very grateful to the editors and contributors for the honor of making an essay of mine the main focus of the February 2015 University of South Carolina workshop that led to this volume, and for the volume itself. It is an enormous privilege for any author to have an article of his or hers submitted to critical interrogation by such learned and thoughtful colleagues from a variety of disciplines, attempting conversation across the human and the natural sciences, which is not an easy task even under the most favorable of circumstances. As the main beneficiary of this exercise, however, I thank not only the colleagues whose opinions are represented in this volume but also those who participated in the original workshop and thus gave me a number of exciting opportunities to share my work and thoughts in the enriching week we spent together in Columbia, South Carolina, in February 2015.

In the interest of space and time, I have organized my responses to my generous interlocutors under five headings, in order to discuss some of the questions that to me appear crucial to debates on global warming: (a) the importance, to social scientists, of the biogeological aspects of climate change (a point raised by Carol Boggs and Lori A. Ziolkowski), (b) Anthropocene and the inequities of a capitalist mode of production (Kathleen McAfee, Jessica Barnes, Carol Hee, Laura A. Watt), (c) politics and law in and of the Anthropocene (John M. Meyer, Barnes, Josh Eagle), (d) the usefulness or otherwise of species-thinking (Lisa Sideris, McAfee, Barnes), and (e) the kind of stories we need to tell in these times (Daniel deB. Richter, Alexa Weik von Mossner, Timothy J. LeCain, Sideris, Hee). Needless to say, I do not have space to address every question raised though I do not deny their importance. Nor do I hope—or even wish—to resolve all these questions to everybody's satisfaction. Many of the questions we discuss here belong to ongoing debates, and I do not claim to possess any final answers. Climate change itself is an unfolding problem, and human responses to it—both practical and intellectual—will no doubt vary with the actual futures we come to face. Even this short list of issues I have used to organize this response says something about the times we are passing through. Ten years ago, before the fourth aggregate report of the IPCC became the subject of great publicity in print and electronic media, a typical laundry list of questions to debate in a forum such as this would have been different. Climate change is with us; it has happened, and continues to happen. But

debates in the social and human sciences are still in their infancy. Many of us attack the problem with weapons forged in times when globalization (of media, capital) seemed to be the key issue for the world. Globalization and global warming are connected, but are not identical problems. The questions they raise, and the methods by which we define these problems, are related but have some distinct differences. It is through debates such as this that these differences will emerge more clearly.

Biogeological Aspects of Climate Change

I fundamentally agree with Boggs that one can no longer separate the biological agency of humans from their geological agency in the way in which I appeared to do in my essay “The Climate of History,” though the separation continues to mark much of the policy literature. One generally finds two approaches to the problem of climate change. One dominant approach is to look on the phenomenon simply as a one-dimensional challenge: How do humans achieve a reduction in their emissions of greenhouse gases (GHGs) in the coming few decades? The climate problem is seen in this approach as a challenge of how to source the energy needed for the human pursuit of some universally accepted ends of economic development, so that billions of humans are pulled out of poverty. The main solution proposed here is for humanity to make a transition to renewable energy as quickly as technology and market signals permit. The accompanying issues of justice concern relations between poor and rich nations and between present and future generations: What would be a fair distribution of the “right to emit GHGs”—since GHGs are seen as scarce resources—between nations in the process of this transition to renewables? Should not the less developed and more populous countries (like China and India) have a greater right to pollute, while the developed nations take on more responsibility to make deep cuts in their emissions? The question of how much sacrifice the living should make as they curb emissions, to ensure that unborn humans inherit a world that enables a better quality of life than the present generation, remains a more intractable one, and its political force is reduced by the fact that the unborn are not here to argue about their share of the atmospheric commons.

Within this broad description of the first approach, however, are nested many disagreements. Most imagine the problem to be mainly one of replacing fossil fuel-based energy sources by renewables; many also assume that the same mode of production and con-

sumption of goods will continue. These latter analysts imagine a future in which the world is more technologically advanced and connected than now, but with the critical difference that a consumerist paradise will be within the reach of most, if not all, humans. Some others—on the left—would agree that a turn to renewables is in order, but argue that because it is capitalism’s constant urge to “accumulate” that has precipitated the climate crisis, the crisis itself provides yet another opportunity to renew and reinvigorate Marx’s critique of capital. I am not sure about the kind of economy that these latter scholars visualize as replacing the global capitalist regime, but there is clearly an assumption that a globalized, crowded (nine to ten billion people), and technologically connected post-capitalist world can somehow come into being and avoid the pitfalls of the drive to accumulate. And then there are those who think of not just transitioning to renewable sources of energy but of actually scaling back the economy, de-growing it, and thus reducing the ecological footprint of humans while desiring a world marked by equality and social justice for all. Still others think—in a scenario called “the convergence scenario”—of reaching a state of economic equilibrium globally whereby all humans live at more or less the same standard of living. And then, of course, there are those who think of the most desirable future as capitalist or market-based growth with sustainability.

Against all this, there is another way to view climate change: as part of a complex family of interconnected problems, all adding up to the larger issue of a growing human footprint on the planet that has, over the last couple of centuries and especially since the end of the Second World War, seen a definite ecological overshoot on the part of humanity. This overshoot, of course, has a long history but one that has picked up pace in more recent times. The Israeli historian Yuval Noah Harari explains the issue well in his book, *Sapiens: A Brief History of Humankind*. “One of the most common uses of early stone tools,” writes Harari, “was to crack open bones in order to get to the marrow. Some researchers believe that this was our original niche.” Why? Because, Harari explains, “genus *Homo*’s position in the food chain was, until quite recently, solidly in the middle.”¹ Humans could eat dead animals only after lions, hyenas, and foxes had had their shares and cleaned the bones off all the flesh sticking to them! It is only “in the last 100,000 years,” says Harari, “that man jumped to the top of the food chain.”² This has not been an evolutionary change. As Harari explains:

1 Yuval Noah Harari, *Sapiens: A Brief History of Humankind* (New York: Harper Collins, 2015), 9.

2 Ibid.

Other animals at the top of the pyramid, such as lions and sharks, evolved into that position very gradually, over millions of years. This enables the ecosystem to develop checks and balances that prevent lions and sharks from wreaking too much havoc. As the lions became deadlier, so gazelles evolved to run faster, hyenas to cooperate better, and rhinoceroses to be more bad-tempered. In contrast, humankind ascended to the top so quickly that the ecosystem was not given time to adjust.³

The problem of humans' ecological footprint, we can say, was ratcheted up over the last 500 years with European expansion and colonization of faraway lands inhabited by other peoples, and the subsequent rise of industrial civilization. But a further ratcheting up by several significant notches happened after the end of the Second World War when human numbers and consumption rose exponentially, thanks to the widespread use of fossil fuels, not only in the transport sector but also in agriculture and medicine. GHG emissions gave humans the capacity to interfere in Earth systems processes that regulate the climate of the whole planet, in short yielding the geological agency that I wrote about in my essay under discussion. This planet-wide geological agency of humans, however, cannot be separated—as Boggs and Ziolkowski usefully remind us—from the way humans interfere in the distribution of natural life on the planet. Not only have marine creatures not had the evolutionary time to adjust to our new-found capacity to hunt them out of existence through deep-sea fishing technology, but our GHG emissions now also acidify the oceans, threatening the biodiversity of the great seas, and thus endangering the very same food chain that feeds us. Ziolkowski is thus absolutely right to point out that it is the human record left in the rocks of this planet as fossils and other forms of evidence—such as terraforming of the ocean bed—that will constitute the long-term record of the Anthropocene, perhaps more so than the excess GHGs in the atmosphere. If human-driven extinction of other species results—say, in the next few centuries—in a Great Extinction event, then (my geologist friends tell me), even the epoch-level name of the Anthropocene may be too low in the hierarchy of geological periods.⁴

Viewed thus, climate change indeed points to what Boggs calls a “biogeological force of humanity.” Boggs, Ziolkowski, and Richter remind us that the climate change problem

3 Ibid., 11–12.

4 “If global warming and a sixth extinction take place in the next couple of centuries, then an epoch will seem too low a category in the hierarchy [of the geological timetable].” Personal communication with Professor Jan Zalasiewicz, 30 September 2015.

is not a problem to be studied in isolation from the general complex of ecological problems that humans now face on various scales—from the local to the planetary—creating new conflicts and exacerbating old ones between and inside nations. There is no single silver bullet that solves all the problems at once; nothing that works like the mantra of transition to renewables to avoid an average rise of 2°C in the surface temperature of the planet. What we face does indeed look like a wicked problem, one that we may diagnose but not be able to “solve” once and for all.⁵

Anthropocene and the Inequities of Capitalism

Here let me address some critical questions raised by McAfee that have also been raised by others in additional contexts. I am a little surprised that she finds my position to be the same as E. O. Wilson’s, who recommends that we think of ourselves as a species and act as a rational species. Let me put aside for the moment the questions I actually raised about our not having ontological access to our being-a-species, which makes the question of acting like a “rational species” very problematic. I thought I had also argued for a double position (in the “Four Theses” essay): of both acknowledging the role of (scientific) reason in defining and adapting to climate change—for without scientific research and verification, there is no problem called “global warming”—but also of maintaining a postcolonial vigilance against “universals” that actually hide particular interests. I also cautioned that human politics—even leftist politics—could never be about rationality alone. This is the reason that I struggled somewhat towards the conclusion of that essay with Adorno’s idea of a negative universal. I tend to share her criticisms of ecomodernists who plan for a “good Anthropocene” and I am sympathetic towards Clive Hamilton’s critique of the “good Anthropocene” thesis. But surely the findings of science do more than simply reflect relations of power (which they also do)? I would repeat something I have said in that essay and elsewhere: that climate change would only accentuate the inequities of the global capitalist order as the impact of climate change—for now and in the immediate future—falls more heavily on poorer nations and on the poor of the rich nations.

5 See the detailed and excellent discussion in Frank P. Incropera, *Climate Change: A Wicked Problem—Complexity and Uncertainty at the Intersection of Science, Economics, Politics, and Human Behavior* (New York: Cambridge University Press, 2016).

I say “for now and the immediate future” for a good reason. For there is a more basic misunderstanding at work when I get criticized for saying that there is one respect in which the crisis of climate change is different from the crises of capitalism: in the case of the crisis posed by climate change, I said: “There are no lifeboats for the rich,” meaning that the rich could not escape this crisis. Andreas Malm and Alf Hornborg took me to task for saying this and others have too. Now McAfee, citing them, repeats the charge: “Contra Chakrabarty, the rich may face the same storms and they *do* have lifeboats.” Barnes is also in strong agreement with McAfee and others on this point. I give examples of Australian or Californian fires, but she remains incredulous: “I am not fully convinced by this argument. As a large body of scholarship within environmental justice and political ecology has demonstrated, the burden of environmental risks, whether climate change-related or not, falls unevenly on different social groups, mediated by class, race, gender, and ethnicity. Fires in wealthy neighborhoods may be devastating, but are probably less devastating to households that have home insurance, have invested in fire safety measures, or own cars to flee in response to warnings.”

I find it ironic that some scholars on the left should speak with a similar assumption to that made by members of the rich who do not necessarily deny climate change but believe that, whatever the extent of the warming and destabilization of the climate, they will always be able to buy their way out of the problem! This is understandable coming from economics textbooks that envision capitalism as an economic system that will always face periodic crises and overcome them, but never face a crisis of such proportions that it could upset all capitalist calculations. It is easy to think within that logic that climate change was just another of those business cycle-type challenges that the rich had to ride out from time to time. Why would scholars on the left write from the same assumptions? Climate change is not a standard business cycle crisis. Nor is it a standard “environmental crisis” amenable to risk-management strategies. The danger of a climate tipping point is unpredictable but real.

Left unmitigated, climate change affects us all, rich and poor. They are not affected in the same way, but they are all affected. A runaway global warming leading to a Great Extinction event will not serve the rich very well. A massive collapse of human population caused by climate dislocation—were it to happen—would no doubt hurt the poor much more than the rich. But would it not also rob global capitalism of its reserve army of “cheap” labor on which it has so far depended? A world with freakish weather,

more storms, floods, droughts, and frequent extreme weather events cannot be beneficial to the rich who live today or to their descendants who will have to live on a much more unfriendly planet. Remember that the American scientist James Hansen's book, *Storms for My Grandchildren*, spoke of the perils that future generations of Americans will face. Hansen's book was about his own grandchildren, not the grandchildren of friends Hansen may have in India or China. Besides, if the rich could simply buy their way out of this crisis and only the poor suffered, why would the rich nations do anything about global warming unless the poor of the world were powerful enough to force them to be altruistic? Rich nations were never known for their altruism!

McAfee recommends a politics of solidarity of the poor: "Today reality calls for a politics that identifies and forges links among the multiple fractions of humanity who comprise the *majority* of us and who are impoverished, materially and otherwise, by the effects of global warming and other ongoing consequences of capitalism and colonialism." I wish her well with that project, but I do not know that politics will ever correspond to any one, single reading of "reality." A better case for rich nations and classes to act on climate change is couched in terms of their enlightened self-interest. The science of global warming allows us to do so by precisely making the point that for all its differential impact, it is a crisis for the rich and their descendants as well—as Hansen's popular book amply makes clear. So yes, a politics of even broader solidarity is called for.

Politics in/of the Anthropocene

Meyer and Barnes are both sensitive to social justice questions, and are concerned to ensure that there is no "climate reductionism" in operation in our discussions, occluding from view issues of human inequality and oppression. But they do not reduce the climate problem to human injustice alone. While the point of their cautionary words is well taken, I find myself in broad agreement with them.

The more difficult question to ponder is whether or not the climate crisis—as symptomatic of humanity's ecological overshoot—also signals the first glimpse we might have of a possible limit to our very human-centered thinking about justice, and thus to our political thought as well. Global warming accentuates the planetary tendency

towards human-driven extinction of many other species, with some scientists suggesting that the planet may have already entered the beginnings of a long (in human terms) Great Extinction event.⁶ Anthropogenic climate change thus produces a crisis in the distribution of natural reproductive life on the planet. But our political and justice-related thinking remains very human-focused. We still do not know how to think conceptually—politically or in accordance with theories of justice—about justice towards nonhuman forms of life, not to speak of the inanimate world. Thinkers of animal rights have extended questions of justice towards some animals, but their theories are limited by strict requirements relating to the threshold of sentience in animals. Besides, some philosophers also argue that, whatever the practical value of a category such as life in biology, “life as such” cannot be a strict philosophical category. Yet we cannot think “extinction” without using the category “life,” however difficult it may be to define it. The really difficult issue that arises when scholars write about humans being stewards of the planet is what our relationship, conceptually, would be to bacteria and viruses, given that many of them are not friendly to the human form of life (while many are). Yet it is undeniable that the natural history of species life on this planet involves the histories and activities of bacteria and viruses.

So while I agree that politics as we know it continues and will continue into the Anthropocene, and that there is no politics of the Anthropocene as such (but much politics about the label “Anthropocene,” as we know!), a deepening of the climate crisis and of the ecological overshoot of which it is a symptom may indeed lead us to rethink the European tradition of political thought that has, since the seventeenth century and thanks to European expansion, become everybody’s inheritance today.

Species Thinking

Now to the question of whether or not we should think of humans through the biological category of “species,” alongside other historical categories such as “capitalism,” as we think through this crisis. I find Sideris’s words of caution valuable. And I have never subscribed to the idea of “consilience” of the sciences, though some big names in the subfield of Big History recommend it. Nor have I ever invested our species with

6 Gerardo Ceballos et al., “Accelerated Modern Human-induced Species Losses: Entering the Sixth Mass Extinction,” *Science Advances* 1, no. 5 (2015): 1–5.

any particular moral significance that could work as a telos for human history. Let this not be a debate about E. O. Wilson. He is a serious and respected thinker, but there can be legitimate disagreements over his work. The question is not about him but rather about human beings as a biological species, and how we might make room for that natural history in our accounts: Can the story of ecological overshoot by humans be thought of not simply as the story of modernization and its inherent inequalities but also as the story of a particular species—*Homo sapiens*—coming to dominate the biosphere to such an extent that its own existence was challenged? Think of the story as Harari tells it. Today with their consumption, numbers, technology and so on, humans—yes, all humans, rich and poor—put pressure on the biosphere (the rich and poor do it in different ways and for different reasons) and disturb what I called above the distribution of life on the planet. Harari puts the point well: “Humankind ascended to the top [of the food chain] so quickly that the ecosystem was not given time to adjust. Moreover, humans themselves failed to adjust. Most top predators of the planet are majestic creatures. Millions of years of domination have filled them with self-confidence. *Sapiens* by contrast is more like a banana republic dictator. Having so recently been one of the underdogs of the savannah, we are full of fears and anxieties over our position. . . .” He concludes: “Many historical calamities, from deadly wars to ecological catastrophes, have resulted from this over-hasty jump.”⁷

If one could imagine someone watching the development of life on this planet on an evolutionary scale, they would have a story to tell about *Homo sapiens* rising to the top of the food chain within a very, very short period in that history. The more involved story of rich-poor differences would be a matter of finer resolution in that story. As I have said elsewhere, the ecological overshoot of humanity requires us to both zoom into the details of intra-human injustice—otherwise we do not see the suffering of many humans—and to zoom out of that history, or else we do not see the suffering of other species and, in a manner of speaking, of the planet.⁸ Zooming in and zooming out are about shuttling between different scales, perspectives, and different levels of abstraction. One level of abstraction does not cancel out the other or render it invalid. But my point is that the human story can no longer be told from the perspective of the 500 years (at most) of capitalism alone.

7 Harari, *Sapiens*, 11–12.

8 Dipesh Chakrabarty, “The Human Significance of the Anthropocene,” in *Modernity Reset*, ed. Bruno Latour (Cambridge, MA: MIT Press, forthcoming).

Humans remain a species in spite of all our differentiation. Suppose all the radical arguments about the rich always having lifeboats and therefore being able to buy their way out of all calamities including a Great Extinction event are true; and imagine a world in which some very large-scale species extinction has happened and that the survivors among humans are only those who happened to be privileged and belonged to the richer classes. Would not their survival also constitute a survival of the species eventually (even if the survivors quickly differentiated themselves into, as seems to be the human wont, dominant and subordinate groups)?

Stories We Tell, and Questions of Hope

Faced with the problem of the ecological over-reach of humans, what kind of stories do we now tell about ourselves, and how? Many scholars have challenged, both in writing and in conversation, my proposition that because we do not have any ontological access to our “being species” we cannot experience being a species, and have suggested that creative and imaginative work of fiction, films, music, and painting, may indeed enable us to have such access. Here I must say that my statement was intended as a provocation to both thought and action, though I stand by the philosophical claim that I was making. But I am a deep believer in the role of the arts and imaginative work in this crisis, and have no problems accepting the general points made by Richter, Weik von Mossner, and others. Even angry, anti-capitalist narratives blaming the rich for all the ills of humanity may have a positive political role to play in this crisis.

One point I would make in response to Richter’s proposition about the need for a Virgilian “Georgic” narrative, however, is that the scholarship collected here already documents the multiple and sometimes contradictory narratives that we produce to explain our situation to ourselves. Hee documents the story of the business sector optimistically embracing a sustainability narrative, though she herself points out the need, ultimately, for a change in our consumerist lifestyle, a point that many sections of business may not yet agree with. They would rather combine sustainability with consumerism in their pursuit of an Edenic story of profits and plenty. Watt, on the other hand, shows in her extremely thoughtful statement how difficult it is for us in our comfortable everyday lives to let go of some of the luxuries (such as a 24-hour supply of hot water) that we have come to consider basic—not just to our sense of hygiene and cleanliness but to our

deepest sense of ourselves as well! And LeCain ends his powerful opening neomaterialist essay on a note that is far from the Georgic one that Richter is looking for. He writes: “It is difficult to predict what the history of the ‘nonhuman human’—the human who is as much coal, oil, and other things as culture and idea—might look like. But I think it is safe to say that phenomena like justice and freedom, as well as their opposites, will increasingly be understood not solely as human ideas or creations, but as products of the powerful material things we partner with.” LeCain gives agency to an entangled entity—humans partnering somewhat blindly with other materials as they seek to make themselves at home in a planet that was not necessarily designed to see humans as the culminating point of its history! Yet this partnership is all we have, and the stories we tell about it will change and become richer in their diversity as the ecological crisis unfolds. All I can say at this stage is that if there is one source of hope, it lies in human creativity and resilience. Its expression will take multiple narratives and forms. A crisis is indeed a time for renewed creativity.

Let me then, in the end, thank all my colleagues here again for the honor they have done me by responding in such generous, critical, and vigorous fashion to some thoughts I put out once, having been jolted out of my comfortable niche in postcolonial studies by the crisis of climate change. Nature is perhaps not dialectical in the way that Friedrich Engels once thought it was, but thinking still is! That is why I am as grateful for affirmative thoughts as I am for the thoughts that resist mine, for how would thinking proceed if not by pitting itself against all that resists it? A crisis not only invites renewed creativity in the domain of arts alone; it also calls for some new and creative thinking too. And that remains a collective, human task in the end, one in which we all participate, whatever our differences.

About the Authors

Jessica Barnes is Assistant Professor in the Department of Geography and the Environment and Sustainability Program at the University of South Carolina. Her work focuses on the culture and politics of resource use and environmental change in the Middle East. Her current project draws on ethnographic and archival work to examine food security in Egypt. Her more recent publications include *Cultivating the Nile: The Everyday Politics of Water in Egypt* (2014) and *Climate Cultures: Anthropological Perspectives on Climate Change* (coedited with Michael Dove, 2015). She holds a PhD in sustainable development from Columbia University.

Carol Boggs is Director of the School of the Earth, Ocean and Environment and Professor of Biological Sciences and the Environment and Sustainability Program at the University of South Carolina. She has served on various organizational and editorial boards, including the board of the Rocky Mountain Biological Laboratory. As a former Stanford University Fellow she received the highly regarded Dinkelspiel Award for distinctive contributions to undergraduate education. Boggs' research interests focus on conservation biology, using butterflies to understand the effects of natural and anthropogenic environmental changes at both the individual and community level over ecological and evolutionary time.

Dipesh Chakrabarty is the Lawrence A. Kimpton Distinguished Service Professor of History, South Asian Languages and Civilizations and the College at the University of Chicago. His contributions to the fields of history and postcolonial theory have earned him an extensive list of visiting scholarships, as well as the 2014 Toynbee prize for significant academic and public contributions to humanity as a social scientist. His publication "The Climate of History: Four Theses" (2009) forms the focus of this volume.

Josh Eagle is the Solomon Blatt Professor of Law, a Distinguished Professor of Environmental Law, and affiliate of the Marine Sciences Program and the School of Earth, Ocean, and Environment at the University of South Carolina. Eagle specializes in ocean and coastal, natural resource, and property law, on which he has published a book and over 20 articles and chapters. His expertise in environmental law has qualified him to serve on a National Research Council panel and to testify before Congress on environmental cases of international importance. He co-founded the Stanford Fisheries Policy Project at Stanford Law School.

Robert Emmett is Director of Academic Programs at the RCC. He received his PhD in English from University of Wisconsin-Madison and later worked as visiting Assistant Professor at University of Wisconsin-Milwaukee, teaching environmental writing, American literary history, and environmental justice. His research interests include environmental history, urban ecology, and US environmental literature. His research has most recently focused on the role of environmental issues in politics and ethics, and the development of emerging interdisciplinary fields in the environmental humanities. His book, *Cultivating Environmental Justice: A Literary History of US Garden Writing*, is forthcoming in 2016.

Carol Hee is Associate Professor at the University of North Carolina's Kenan-Flagler Business School at Chapel Hill, where she teaches corporate environmental strategy and sustainability, and serves as faculty co-chair of the UNC Sustainability Advisory Committee. Her areas of expertise include life cycle assessment, sustainability strategic planning and reporting, and evaluation of corporate social responsibility initiatives. Hee is co-chair of the annual NC Clean Tech Summit, and along with colleagues shares an Obama-Singh 21st Century Knowledge Initiative Award. Carol Hee received both a doctoral degree in marine biogeochemistry and an MBA from UNC-Chapel Hill.

Timothy J. LeCain is Associate Professor of History and Director of Graduate Studies at Montana State University in Bozeman, Montana. His publications include nearly 50 articles, op-ed pieces, and reviews. His most recent major article, "Against the Anthropocene: A Neo-Materialist Perspective," (2016) appeared in the Dutch journal *History, Culture, and Modernity*. His forthcoming book, *The Matter of History: How Things Create the Past*, develops a bold new theoretical and methodological approach emphasizing the ways in which the material environment creates humans, both as biological and cultural creatures. In 2016, he will be a fellow at the Oslo Center for Advanced Studies.

Thomas Lekan is Associate Professor of History, Director of the History Center and associate member of the Environment and Sustainability Program at the University of South Carolina. He was also a Carson Fellow from January 2013 until July 2013. His research focus in the environmental humanities includes areas such as global-scale nature conservation, ecotourism, and the history of urban planning. His publications include several books and articles on environmental history in Germany, and a forthcoming book entitled *Saving the Serengeti: Tourism, the Cold War, and the Paradox*

of European Conservation in Postcolonial Africa, 1950–1985. He is also currently involved in several pieces exploring, from different perspectives, the visual culture of the Anthropocene and environmentalism.

Kathleen McAfee received a PhD in Geography from the University of California at Berkeley after working in community and international development. Before joining the Department of International Relations at San Francisco State University she taught at Yale and held the Fulbright Canada Research Chair in Sustainability. She has been a consultant to UN agencies and a participant-observer in international social movements for agroecology, food sovereignty, and environmental justice. Her current work explores “selling nature to save it” with market-based responses to unsustainable growth and climate change, and limits and alternatives to growth-obsessed capitalism in Latin America and degrowth in Europe. She was a Carson Fellow from July 2014 until December 2014.

John M. Meyer is Professor in the Department of Politics, and the Programs in Environmental Studies and Environment and Community at Humboldt State University, California. He was also a Carson Fellow from November 2012 until July 2013. Meyer’s most recent publications include *Engaging the Everyday: Environmental Social Criticism and the Resonance Dilemma* (2015). He is also coeditor of the *Oxford Handbook of Environmental Political Theory* (2016) and the forthcoming *The Greening of Everyday Life: Challenging Practices, Imagining Possibilities*. His current research focuses on the ways in which environmental concerns may form effective social criticism.

Daniel deB. Richter is Professor of Soils and Ecology at Duke University, North Carolina, and lead investigator of the Calhoun Critical Zone Observatory in South Carolina. He is the 2015 chair of the National CZO Lead Principal Investigators, and with Daniel Markewitz is author of *Understanding Soil Change* (2001). Richter is Director of the International Network of Long-term Soil Experiments (LTSEs) and a member of the Anthropocene Working Group of the International Commission on Stratigraphy, a group contemplating the naming of the contemporary geologic epoch.

Lisa Sideris directs the Consortium for the Study of Religion, Ethics, and Society, and is an Associate Professor in the Religious Studies Department at Indiana University. She was a Carson Fellow from July 2010 until December 2010, and has written several books including a volume on the life and works of Rachel Carson entitled *Rachel Carson: Legacy and*

Challenge (2008). Her work on religious environmental ethics, Darwinism, and ecotheology appears in major journals and guides. Sideris serves as Associate Editor of the *Journal for the Study of Religion, Nature, and Culture*. Her current research explores wonder in environmental discourse and the casting of scientific accounts of evolutionary and cosmic unfolding as global, sacred myths.

Laura A. Watt is Associate Professor and Chair of Environmental Studies and Planning at Sonoma State University, specializing in environmental history. Her long-term research aims to explore the history of protected landscapes to bolster their sustainability in terms of both natural and cultural systems. She uses landscape as a tool for understanding complex interactions between people and their environments. A firm grounding in property theory contributes to her interest in the interplay between public and private ownership in protecting rural landscapes. Her book, *The Paradox of Preservation: Wilderness and Working Landscapes at Point Reyes National Seashore*, is forthcoming in Fall 2016 with the University of California Press.

Alexa Weik von Mossner is Assistant Professor of American Studies at the University of Klagenfurt. She has published widely on eco-cosmopolitanism, affective narratology, and various ecocritical issues in American literature and film. She is the author of *Cosmopolitan Minds: Literature, Emotion, and the Transnational Imagination* (2014), editor of *Moving Environments: Affect, Emotion, Ecology, and Film* (2014), and coeditor of *The Anticipation of Catastrophe: Environmental Risk in North American Literature and Culture* (with Sylvia Mayer, 2014). Her new book, *Affective Ecologies*, is under contract for the *Cognitive Approaches to Culture* series at Ohio State University Press. She was a Carson Fellow from June 2010 until June 2011.

Lori A. Ziolkowski is an Assistant Professor in the Department of Earth and Ocean Sciences and on the Marine Sciences Program at the University of South Carolina. She received her PhD in Earth System Science from University of California, Irvine. She trained as a traditional open-ocean oceanographer, and has extensive research experience on oceanographic cruises and fieldwork in Northern Canada and Alaska. Her research involves the use of the isotopic composition of chemical compounds to understand Earth's climate system. Her recent research focuses on coastal and land-based projects, including Arctic climate change and the biodegradation of spilled oil.

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perspectives@carsoncenter.lmu.de

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Editors:

Brenda Black

Stephanie Hood

Harriet Windley

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Rachel Carson Center for Environment and Society
LMU Munich
Leopoldstrasse 11a
80802 Munich
GERMANY

Design by Stefan Zinsbacher

Cover photo © Thomas Lekan Workshop participants viewed the famous cypress and tupelos of Congaree National Park near Columbia, SC, a designated US federal wilderness with a long history of Native American, Euro-American, and African-American land use. The trees are well-adapted to periodic flooding from the nearby Congaree River.

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In “The Climate of History: Four Theses,” Dipesh Chakrabarty examined the idea of the Anthropocene—the dawn of a new geological period dominated by human activities—in the context of history and philosophy, raising fundamental questions about how we think historically in an era when human and geological timescales are colliding. Developing out of a 2015 workshop, this volume of *RCC Perspectives* offers critiques of these “Four Theses” by scholars of environmental history, political philosophy, religious studies, literary criticism, environmental planning, geography, law, biology, and geology. The essays suggest many ways in which Chakrabarty’s arguments both reflect and further catalyze an ongoing transformation in intellectual culture and research on environment and society in the Anthropocene. The volume concludes with a response to the essays from Chakrabarty himself.

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