

Rachel Carson Center Perspectives

How to cite:

Albritton Jonsson, Fredrik. "Anthropocene Blues: Abundance, Energy, Limits." In: "The Imagination of Limits: Exploring Scarcity and Abundance," edited by Frederike Felcht and Katie Ritson, *RCC Perspectives* 2015, no. 2, 55–63.

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Leopoldstrasse 11a, 80802 Munich, GERMANY

ISSN 2190-8087

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Deutsches Museum 



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Anthropocene Blues: Abundance, Energy, Limits

The ability of the human species to transform the planetary environment has reached an unprecedented scale and magnitude in the past few decades. We have collectively become a “geological agent” capable of changing the global climate through our carbon emissions. The atmospheric chemist Paul Crutzen traces this growing crisis back to the invention of the double-condensing steam engine by James Watt and the mineral energy economy ushered in by Britain’s Industrial Revolution. For Crutzen, Watt’s invention in 1784 marked the beginning of a new epoch of geological time—the Anthropocene.¹

The concept of the Anthropocene has been gaining public and scholarly recognition in recent years, although both its scientific legitimacy and broader social meaning are still being discussed. As a physical concept it describes the new scale of anthropogenic changes in the geology and ecology of the planetary system, including the mass extinction of species, the melting of the polar ice caps, the rise of the oceans, and shifts in precipitation patterns. One influential definition of the Anthropocene sees climate change as part of a much wider pattern of overshoot caused by the ecological footprint of consumer society, a process that threatens nine “planetary boundaries” that maintain humanity in “a safe operating space.”² The concept of the Anthropocene thus has an explicitly ethical and historical dimension. Crutzen’s term invites us to reevaluate deeply held ideas about the character of modern society and the place of humanity in the natural world. The old story of the Industrial Revolution as a technological triumph here meets a far less flattering narrative of far-reaching unintended environmental consequences from fossil fuel use.

Scholars are only beginning to investigate the implications of the Anthropocene for the social sciences and the humanities. Stephen Gardiner calls climate change a “perfect

- 1 Paul J. Crutzen and Eugene F. Stoermer, “The Anthropocene,” *IGBP Newsletter* 41 (May 2000): 17–18. Cf. Colin N. Waters, Jan A. Zalasiewicz, Mark Williams, Michael A. Ellis, and Andrea M. Snelling, eds., *A Stratigraphical Basis for the Anthropocene* (London: Geological Society, 2014), 1–21.
- 2 Will Steffen, Jacques Grinevald, Paul Crutzen, and John McNeill, “The Anthropocene: Conceptual and Historical Perspectives,” *Philosophical Transactions of the Royal Society A* 369 (2011): 842–67. <http://dx.doi.org/10.1098/rsta.2010.0327>; Johan Rockström et al., “Planetary Boundaries: Exploring the Safe Operating Space for Humanity,” *Ecology and Society* 14, no. 2 (2009), <http://www.ecologyandsociety.org/vol14/iss2/art32/>.

moral storm” because agency is dispersed both spatially and temporally. Poor countries and distant generations pay the consequences for the consumption pattern of affluent countries in the present. How do we balance the wants of consumer society against the needs of developing nations in the present and the rights of future generations?³

The unintended consequences of energy consumption have given rise to a wide-ranging debate about possible remedies. Techno-optimists look to economic growth and a transition to renewables as complementary paths out of the crisis. With sustained growth, future generations will have greater means to handle a deepening crisis. Yet such arguments often minimize the environmental impact of growth and overlook the possibility that climate change will seriously reduce growth rates over time. The transition to renewables raises other problems of cost and implementation. How quickly can we change our infrastructure and consumer behavior? What political tools or cultural forces are most suited to the task? Some critics insist that only far-reaching social, economic, and technological transformation will solve the problem in the long term. They promote a post-carbon economy in a steady state. They see human flourishing as a cultural and political project incompatible with ever-increasing economic growth. However, these critics have reached little clarity on how such a social transition to *sufficiency* might actually be achieved.⁴

Historians and other scholars in the humanities have a great deal to contribute to these debates. Virtually all the key questions we face—planning for the long term, coping with climate change, ensuring intergenerational equity, reducing our ecological footprint, and facilitating an energy transition—have long, tangled histories. By exploring the diverse repertoire of responses of human societies to such issues in the past, we gain a wider sense of possibility in the present. Scientists cannot define the risks to the planet without assistance from the humanities and social sciences. As Julia Adeney Thomas observes, the very idea of endangerment at the heart of the climate change crisis raises a question of values and valuation, as a subject of inquiry not just in ethics and economics, but also anthropology, sociology, history, art, and literature. To their credit, many scientists recognize their debt to the realm of culture and art for guiding principles and metaphors: think

3 Stephen Gardiner, *A Perfect Moral Storm: The Ethical Tragedy of Climate Change* (Oxford: Oxford University Press, 2013).

4 John S. Dryzek, Richard B. Norgaard, and David Schlosberg, *The Oxford Handbook of Climate Change and Society* (Oxford: Oxford University Press, 2011); Juliet Schor, *Plenitude: New Economics of Wealth* (New York: Penguin, 2010); Thomas Princen, *The Logic of Sufficiency* (Cambridge, MA: MIT Press, 2005).

of James Lovelock's idea of Gaia, Edward Wilson's notion of biophilia, or Jim Hansen's portrayal of the "storms of our grandchildren."⁵

The concept of stewardship is another good case in point. Johan Rockström and his co-authors argue that the human species must become a steward of the earth system to maintain it in a safe and stable state, as close to the Holocene norm as possible.⁶ Stewardship is of course an ancient idea, with roots in the Judeo-Christian tradition as well as in Islam, Hinduism, and other religions. We can track the practice of stewardship in many places and periods. States have pursued policies of resource management as a means to economic and military power. Local communities have sought to manage common pool resources by regulating access to them. Frequently, successful forms of stewardship and conservation have propped up strongly hierarchical and inequitable social systems. Geoffrey Parker examines a striking case of authoritarian stewardship in his study of how the Tokugawa state in seventeenth-century Japan coped with the Little Ice Age. The regime weathered the cold spell by imposing a system of military rule, censorship, infanticide, and paternalism. Stewardship by necessity involves a politics of natural limits. Efforts to calculate and regulate the optimal use of scarce resources cannot be separated from broader social and political controversies about the nature of property, justice, and the public good.⁷

Consumption and Inequality

For some observers, this question of social interest is a reason to jettison the concept of the Anthropocene wholesale. Two historians of capitalism, Andreas Malm and Alf Hornborg, have expressed grave misgivings about seeing the human species as the

5 Julia Adeney Thomas, "History and Biology in the Anthropocene: Problems of Scale, Problems of Value," *American Historical Review* 119 (2014): 1588; James Lovelock, *Revenge of Gaia: Earth's Climate Crisis and the Fate of Humanity* (New York: Basic Books, 2007); E. O. Wilson, *Biophilia: The Human Bond with Other Species* (Cambridge, MA: Harvard University Press, 1986); James Hansen, *The Storms of My Grandchildren: The Truth about the Coming Climate Catastrophe Change and Our Last Chance to Save Humanity* (New York: Bloomsbury, 2010); Hansen's book ends with a short work of science fiction.

6 Rockström et al., "Planetary Boundaries."

7 Dale Jamieson, *A Companion to Environmental Philosophy* (Malden, MA: Blackwell, 2001); Prasenjit Duara, *The Crisis of Global Modernity: Asian Traditions and a Sustainable Future* (Cambridge: Cambridge University Press, 2015); Geoffrey Parker, *Global Crisis: War, Climate Change and Catastrophe in the Seventeenth Century* (New Haven: Yale University Press, 2013), 505–6; on the politics of natural limits, see Fredrik Albritton Jonsson, *Enlightenment's Frontier: The Scottish Highlands and the Origins of Environmentalism* (New Haven: Yale University Press, 2013).

causes of climate change. Rather than the “Anthropocene,” they prefer the term “capitalocene,” or maybe the “econocene.” It is a fundamental mistake, they argue, to attribute carbon emissions to humanity as a collective when only one segment of the world population has been responsible for most of the fossil fuel consumption. Indeed, Malm and Hornborg attribute the original cause of climate change to the coercive power of a small group of factory owners who ushered in the use of steam machines in English textile production. Talk of the human species as a geological force merely distracts us from the task of analyzing the social structure of capitalism. The Anthropocene, on this count, is the brainchild of a well-intentioned but misguided understanding of historical development.⁸

This critique, however, is one-sided, for the science of the Anthropocene is hardly indifferent to matters of inequality. Crutzen observed in his 2002 piece “Geology of Mankind” that “only 25 percent of the world population” was responsible for the degradation of the global environment. Recent writers on the Anthropocene have also adopted the concept of the Great Acceleration—the postwar boom in resource use and pollution—to understand the nature of the Anthropocene boundary. Crucially, this is not just a diagnosis of unequal consumption but also a forecast about the growing emissions of developing countries. The Great Acceleration began in North America and western Europe but has spread far afield and is likely to become an even more pervasive force if fossil fuel use persists.⁹

Malm and Hornborg also fail to deal adequately with the geological aspect of the Anthropocene concept. Paul Crutzen and his allies choose to speak of humanity rather than nations or classes because they wish to stress the external impact of humanity on other species and the earth system itself. This is a scientist’s view of humanity as a physical phenomenon, on an aggregate scale beyond individual and social experience. (It is well worth keeping in mind that the anthropogenic climate change began as an unintended and unnoticed consequence of industrialization.) In the distant future, the rupture caused by humanity’s sudden entry as a driving force in the earth system will be

8 Andreas Malm and Alf Hornborg, “The Geology of Mankind: A Critique of the Anthropocene Narrative,” *The Anthropocene Review* 1 (2014): 62; cf. Richard B. Norgaard, “The Econocene and the Delta,” *San Francisco Estuary and Watershed Science* 11, no. 3 (2013).

9 Paul Crutzen, “Geology of Mankind,” *Nature* 415 (January 2002); Will Steffen, Wendy Broadgate, Lisa Deutsch, Owen Gaffney, and Cornelia Ludwig, “The Trajectory of the Anthropocene: the Great Acceleration,” *Anthropocene Review* 2 (2015): 1–18.

apparent to geologists by means of its golden spike—a specific sediment layer marking the beginning of the industrial era of mankind—probably accompanied by fossil traces of a mass extinction among other species. Geologically speaking, it will not be possible to distinguish separate human cultures, let alone social classes, in this Anthropocene sediment—only an undifferentiated human impact on the strata of the world.¹⁰

Such a planetary perspective on the condition of human life is not entirely foreign to economic and social theory. Already in the late Enlightenment, we find T. R. Malthus contemplating the idea of humanity as a physical force pressing on the limits of the planet. After Malthus, the normative universalism of the Enlightenment became interwoven with the cornucopian promise of the industrial economy. Competing ideologies of individual liberty and free trade, welfare and social justice gained much of their technological and social credence thanks to the cheap and abundant energy content of coal, gas, and oil. But economic expansion also produced forecasts of environmental crisis and permanent limits to growth. In the postwar era, neo-Malthusian observers developed a calculus of ghost acres and ecological footprints. They attacked the Western standard of living by asking how many planets it would take to universalize this form of consumption. The more recent idea of the carbon footprint applies the same logic to greenhouse gas emissions and climate change. In this way, environmental critics want to demonstrate the biophysical side of Enlightenment project, that is, they seek to show the per capita weight of fossil fuel economies on the earth system. Malm and Hornborg themselves appear to employ this argument when they insist that “the affluence of high-tech modernity cannot possibly be universalized—become an asset of the species.”¹¹

The question of how we might link together the histories of capital and climate is at the heart of Dipesh Chakrabarty’s seminal essay “The Climate of History.” Since the Enlightenment, Chakrabarty argues, the work of historians has focused on problems of liberty and progress, ignoring the biophysical context of life on the planet. Civil history has been divorced from the deep time of natural history. Now, the crisis of climate change challenges us to bring the two forms of history together. We have unintentionally “slid into” a new condition, which “forces on us a recognition of some of the parametric . . .

10 Waters et al., *A Stratigraphical Basis for the Anthropocene*.

11 Alison Bashford, *Global Population: History, Geopolitics and Life on Earth* (New York: Columbia University Press, 2014); Björn-Ola Linnér, *The Return of Malthus: Environmentalism and Post-War Popular-Resource Crises* (Cambridge: White Horse Press, 2003); Mathis Wackernagel and William Rees, *Our Ecological Footprint: Reducing Human Impact on the Earth* (Gabriola Island: New Society Publishers, 1996); Malm and Hornborg, “Geology of Mankind,” 64.

conditions” for human life. These boundaries 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.” Chakrabarty gives as an example of one of these boundary conditions, the “long summer” of the Holocene, a sustained period of relatively moderate climate which coincided with the Neolithic Revolution and the rise of complex societies. To understand our new situation, we need to put the “global histories of capital” in “conversation” with “the species history of humans.” We need to “scale up our imagination of the human” to understand our new capacity as a collective geological force. But this is no easy proposition, Chakrabarty warns. The history of species and the history of capitalism operate with starkly different chronologies and scales. Moreover, there can be no human “self-understanding” at the level of the species: “We humans never experience ourselves as a species. We can only intellectually comprehend or infer the existence of the human species but never experience it as such.” We are left with a paradox: we need to incorporate a planetary perspective into our historical understanding, but at the same time we must guard against naïve talk that we can act rationally and politically at the level of the species.¹²

The Rise of Fossil Fuel Economies

Energy history may offer one way forward. In an important move, Chakrabarty insists that fossil fuel consumption has been integral to the project of modernity. We could extend this argument further by exploring how the energy content of coal and oil lent legitimacy and practical force to the ambitions of reformers and revolutionaries across the political spectrum from socialism to laissez faire. In this sense, energy history might reveal an unexamined basis for ideology, politics, and culture after the Enlightenment. Yet we still know quite little about the past and present of fossil fuel consumption. Only relatively recently have there been serious attempts among economic historians to gather a continuous record of energy use from the eighteenth century to the present. There are also significant gaps in our understanding of the politics and culture of energy consumption.¹³

12 Dipesh Chakrabarty, “The Climate of History: Four Theses,” *Critical Inquiry* 35, no. 2 (2009): 217–18, 220.

13 Astrid Kander, Paolo Malanima, and Paul Warde, *Power to the People: Energy in Europe over the Last Five Centuries* (Princeton: Princeton University Press, 2014); David Nye, “Consumption of Energy” in *The Oxford Handbook of the History of Consumption*, ed. Frank Trentmann (Oxford: Oxford University Press, 2013), 307–25; Nye, *Consuming Powers: A Social History of American Energies* (Cambridge, MA: MIT Press, 2005). An important exception here is the large literature on the political economy of oil, see for example Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011).

The neglect of energy in the scholarship is in itself a historical problem worth our attention. It is something of a commonplace for critics in the climate change debates to describe the social cause of climate change and the lack of political action to mitigate emissions in terms of a “fossil fuel addiction.” But the metaphor of addiction glosses over many questions. How do fossil fuels differ from other commodities? What social, technological, and political forces paved the way for the transition to coal, oil, and gas? How can we track distinct patterns of energy use in different political regimes and cultures? How have markets and technology shaped our knowledge as well as our ignorance of such matters?¹⁴

Industrial Britain—the first fossil fuel economy—is not a bad place to start looking for some preliminary answers. We can explore the significance of coal to Victorian society at a number of levels. For colliers, coal porters, housewives, maidservants, and numerous other people, handling coal was a basic feature of everyday life. But as an object of political concern, it merited only intermittent attention, triggered by government investigations into mining accidents, collier strikes, and forecasts about resource exhaustion. Fears about the diminution of British coal reserves surfaced in the 1830s and again in the 1860s. Coal also occupied a peculiar place in the religious life of the era. Geologists praised it as a providential gift and a vital resource to be husbanded with skill and prudence. The conservative politician Sir Robert Peel promoted a national policy of stewardship to save coal for the benefit of future generations. Household manuals amplified the religious injunction to economize fuel. The providential politics of coal was also linked to the discovery of deep time and climate change. Images of prehistory circulated widely in Victorian popular culture. Coal was identified as the product of prehistoric tropical vegetation, common before the age of the Saurian reptiles (dinosaurs). Geology thus offered a new frame for national history. Over eons of time, a generous providence had improved the climate of Britain to a more temperate and sober norm fit for rational improvement, while at the same time turning its tropical plant life into a marvelous source of fuel.¹⁵

14 One prominent public figure who makes use of the language of addiction is James Hansen; see *Storms of My Grandchildren*, 97, 220.

15 Martin Rudwick, *Bursting the Limits of Time* (Chicago: University of Chicago Press, 2007); Rudwick, *Words before Adam* (Chicago: University of Chicago Press, 2010); Rolf Sieferle, *The Subterranean Forest* (Cambridge: White Horse Press, 2010).

Fossil fern from a coal deposit. Source: John Lindley and William Hutton, *The Fossil Flora of Great Britain: Or Figures and Descriptions of the Vegetable Remains Found in a Fossil State in This Country* (London: James Ridgway and Sons, 1833–35), vol. 2, plate 156.



By pursuing the history of energy in this broad sense, we are able to situate Victorian Britain at the intersection between the histories of capital and climate, along the lines suggested by Dipesh Chakrabarty. Nineteenth-century consumers learned to think of coal on multiple scales, as a product of deep time, a finite national stock, and a household good to be managed economically. Fears of exhaustion helped create a cycle of political interest. Finally, geologists invented a new climate norm, which contrasted the stability and moderation of the present age with the heat of the Carboniferous period. In this way, Victorians began to think of their own society as the product of benign climate change. That dichotomy between deep time and civilization set the stage for one of the central claims of Anthropocene science: the recognition that human civilization has thrived only in the long summer of the Holocene.

Suggested Reading

Albritton Jonsson, Fredrik. "Cornucopianism: A Preliminary Genealogy," *Critical Historical Studies* 1, no. 1 (2014): 151–68.

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