

THE SEVENTH *HISTORY AND THEORY* LECTURE

ANTHROPOCENE TIME

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ABSTRACT

Beginning with the question of how a sense of geological time remains strangely withdrawn in contemporary discussions of the Anthropocene in the human sciences and yields place to the more human-centered time of world history, this article proceeds to discuss the differences between human-historical time and the time of geology as they relate to the concept of the Anthropocene. The article discusses the difficulty of developing a mode of thinking about the present that would attempt to hold together these two rather different senses of time and ends with a ground-clearing exercise that might enable the development of such thought.

Keywords: Anthropocene, geological time, historical time, world history, Earth history

For François Hartog

MANY ANTHROPOCENES?

The Anthropocene is the perhaps the only term of geological periodization that has been widely debated among humanist scholars with no formal training in stratigraphy, the branch of geology concerned with the ordering of earthly strata and their relationship to geological time. “[T]here are many Anthropocenes out there, used for different purposes along different lines of logic in different disciplines,” writes the earth scientist Jan Zalasiewicz, who chairs the International Commission on Stratigraphy’s Working Group tasked with making a submission for formalizing this proposed name for a new geological epoch.² The different Anthropocenes Zalasiewicz mentions circulate in the human sciences as partisan, passionate

1. The original version of this essay was delivered at Harvard University on March 1, 2017 as the seventh *History and Theory* lecture. Versions were also presented to audiences at the University of Technology, Sydney, and the Australian National University. I am grateful to Ethan Kleinberg and his colleagues for the invitation to give this lecture and to my various audiences for their comments and questions. Thanks are also due to Jan Zalasiewicz, Bruno Latour, François Hartog, Sanjay Seth, Ethan Kleinberg, Homi K. Bhabha, Peter Gordon, Clive Hamilton, Joyce Chaplin, Ewa Domanska, Fredrik Albritton Jonsson, Miranda Johnson, Devleena Ghosh, James Goodman, Gerard Siarny, Aniket De, Paul Gillen, and Rochona Majumdar for their comments, suggestions, and criticisms.

2. Jan Zalasiewicz, “The Extraordinary Strata of the Anthropocene,” in *Environmental Humanities: Voices from the Anthropocene*, ed. S. Oppermann and S. Iovino (London: Rowman and Littlefield International, 2017), 124. I am grateful to Professor Zalasiewicz for sharing this essay with me. My arguments here do not in any way assume or need to assume that the proposal to formalize the Anthropocene will be ratified. I don’t think that Zalasiewicz’s argument that I use in this essay makes that assumption either.

accounts of what caused the Anthropocene, when it should be dated from, who is responsible for the onset of this epoch, and even what the proper designation of this epoch should be. Many argue about the politics of the name and propose, for instance, that the epoch be more properly called “the Capitalocene” or “econocene” so that a vague and undifferentiated humanity—“anthropos”—is not held responsible for bringing about this time and that the blame is laid squarely at the door of a system: capitalism or the global economic system.

The Anthropocene debate thus entails a constant conceptual traffic between Earth history and world history. There is widespread recognition now that we are passing through a unique phase of human history when, for the first time ever, we consciously connect events that happen on vast, geological scales—such as changes to the whole climate system of the planet—with what we might do in the everyday lives of individuals, collectivities, institutions, and nations (such as burning fossil fuels). There is also agreement—however provisional—among scholars who debate the term Anthropocene that, irrespective of when we date it from (the invention of agriculture, expansion and colonization by Europe, the Industrial Revolution, or the first testing of the atomic bomb), we are already *in* the Anthropocene.

The Anthropocene requires us to think on the two vastly different scales of time that Earth history and world history respectively involve: the tens of millions of years that a geological epoch usually encompasses (the Holocene seems to have been a particularly short epoch if the Anthropocene thesis is right) versus the five hundred years at most that can be said to constitute the history of capitalism. Yet in most discussions of the Anthropocene, questions of geological time fall out of view and the time of human world history comes to predominate. This one-sided conversion of Earth-historical time into the time of world history extracts an intellectual price, for if we do not take into account Earth-history processes that outscale our very human sense of time, we do not quite see the depth of the predicament that confronts humans today. Zalasiewicz’s arresting remark that to link the problem of the stratigraphic boundary separating the Anthropocene from its predecessor epoch, the Holocene, with events in the world history of humans alone “would run counter to a peculiarity of geological time, which is that, at heart, it is *simply time*—albeit in very large amounts”—serves as my point of entry into the Anthropocene debate.³ What I go on to develop in this essay is a distinction that Zalasiewicz introduces in this context between human-centered and planet-centered thinking.

But before we follow up on the logic of Zalasiewicz’s argument that brings into view the geological aspect of the time of the Anthropocene, we need to begin by explaining why the time of geology presently flits in and out of our attention.

WHY GEOLOGICAL TIME FALLS OUT OF THE ANTHROPOCENE DEBATE

Even though it refers to a new period in the planet’s geological history and therefore to geological time, the term “Anthropocene” was used from its very

3. Zalasiewicz, “The Extraordinary Strata of the Anthropocene,” 124.

inception as a measure not of geological time but of the *extent* of human impact on the planet. According to John Bellamy Foster, the appearance of the Soviet geochemist Vladimir I. Vernadsky's pioneering book, *The Biosphere*, in 1926 "corresponded to the first introduction of the term Anthropocene (together with Anthropogene) by his colleague, the Soviet geologist Aleksei Pavlov."⁴ From the very beginning, the term referred to the extraordinary scale of human influence on the planet. Foster cites Vernadsky on the subject: "Proceeding from the notion of the geological role of man, the geologist A. P. Pavlov [1854–1929] . . . used to speak of the *anthropogenic era*, in which we live. . . . He rightfully emphasized that man . . . is becoming a mighty and ever-growing geological force. . . ."⁵

The recent revival of the term originates from a conference of Earth system scientists in Mexico where the renowned chemist Paul Crutzen is said to have angrily remarked, "Stop using the word Holocene. We're not in the Holocene any more. We are in the . . . the . . . the . . . the Anthropocene!"⁶ When later, in the year 2000, Crutzen and the lake biologist Eugene F. Stoermer proposed a general adoption of the idea of the Anthropocene, it was not the nature of geological time that was foremost in their considerations. They saw the word as a convenient shorthand for pointing to the size of the human footprint on the planet: "Considering . . . [the major] and still growing impacts of human activities on earth and the atmosphere . . . at all, including global, scales," they recommended the term Anthropocene for "the current geological epoch" as a way of registering "the central role of mankind in geology and ecology."⁷

The term Anthropocene helped focus public attention on the possibility that human beings now so dominated the planet that their collective impact was comparable to those of very large-scale planetary forces. The paleoclimatologist David Archer clearly saw the term Anthropocene as a rough measure of human impact on Earth processes: "Geologic time periods in the past are generally delineated by major changes in climate or by biological extinctions. Earth's alleged graduation from the Holocene to the Anthropocene is therefore a statement that humankind has become a powerful force in Earth evolution."⁸ He even gave us a precise estimate of the kind of planetary geophysical force that humans had become:

The deepest and most profound climate changes seem to take place on timescales of millennia and longer. The great ice sheets grow and usually melt on timescales of millennia, huge response to wobbles in the Earth's orbit. The natural carbon cycle acted as a positive feedback, amplifying the response to the orbit. . . . human climate forcing has the potential to overwhelm the orbital climate forcing, taking control of the ice ages. Mankind is becoming a force in climate comparable to the orbital variations that drive the glacial cycles.⁹

4. John Bellamy Foster, foreword to Ian Angus, *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System* (New York: Monthly Review Press, 2016), 11.

5. *Ibid.*

6. Will Steffen, "Commentary" on Paul J. Crutzen and Eugene F. Stoermer, "The Anthropocene," in *The Future of Nature: Documents of Global Change*, ed. Libby Robin, Sverker Sörlin, and Paul Warde (New Haven: Yale University Press, 2013), 486.

7. Paul J. Crutzen and Eugene F. Stoermer, "The Anthropocene," *IGBP* [International Geosphere-Biosphere Programme] *Newsletter* 41 (2000), 17, cited in Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35, no. 2 (2009), 209.

8. David Archer, *The Long Thaw: How Humans Are Changing the Next 100,000 Years of Earth's Climate* (Princeton: Princeton University Press, 2009), 64.

9. *Ibid.*, 6.

In explaining the term Anthropocene in 2011, a good ten years after it had been proposed, Will Steffen, Jacques Grinevald, Paul Crutzen, and John McNeill reiterated that the “concept of the *Anthropocene* . . . was introduced to capture this quantitative shift in the relationship between humans and the global environment.” “humankind . . . rivals some of the great forces of Nature in its impact on the functioning of the Earth system,” and has become “a global geological force in its own right.”¹⁰ Talking about a new geological epoch was a way of emphasizing the sheer scale of human impact on the planet.

Discussions, scientific or not, of human impact on the planet’s environment could never be completely separated from moral concerns. Should humans have so large an impact at all? Could they even afford to have such an impact without imperiling their own existence? These and similar questions were never far from the concerns of the researchers mentioned above. This is why they took on the citizenly role of publicizing their findings. Such moral concerns have perhaps always accompanied attempts to quantify human impact on Earth. It frames, for instance, John R. McNeill’s landmark book, *Something New under the Sun: An Environmental History of the Twentieth-Century World*, published in 2000, perhaps the most remarkable attempt to date by a historian to meticulously document human impact on the resources, atmosphere, and the biosphere of the planet. The book is framed by a moral judgment McNeill makes at the beginning: “Albert Einstein famously refused to ‘believe that God plays dice with the world.’ But in the twentieth century, humankind has begun to play dice with the planet, without knowing all the rules of the game.”¹¹ Even the authors of a pioneering 1957 scientific paper on “increase of atmospheric CO₂ during the past decades” that is now considered to have been of historical importance in the development of the science of anthropogenic climate change, Roger Revelle and Hans E. Suess, could not help using words that clearly reached beyond the purely scientific. “[H]uman beings,” they said, “are now carrying out a large scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries we are returning to the atmosphere and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years.”¹² A rising sense of alarm as climate science progressed in the 1970s and 80s resulted in the establishment in 1989 of a global body, the Intergovernmental Panel on Climate Change (IPCC). What was still a grand “experiment” on the part of humanity in Revelle and Suess’s prose in 1957 is transformed, as the IPCC presented their various assessment reports through the 1990s and the 2000s, into a message warning governments about the risks of a “dangerous” climate change facing humanity.

10. Will Steffen, Jacques Grinevald, Paul Crutzen, and John McNeill, “The Anthropocene: Conceptual and Historical Perspectives,” *Philosophical Transactions of the Royal Society A* 369, no. 1938 (2011), 843.

11. John R. McNeill, *Something New under the Sun: An Environmental History of the Twentieth-Century World* (New York: Norton, 2000), 3.

12. Roger Revelle and Hans E. Suess, “Carbon Dioxide Exchange between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ during the Past Decades,” *Tellus* 9, no. 1 (1957), 18–27, reproduced in *The Warming Papers: The Scientific Foundation for the Climate Change Forecast*, ed. David Archer and Raymond Pierrehumbert (Oxford: Wiley-Blackwell, 2011), 277.

From the very beginning of its career, then, the Anthropocene has had two lives, sometimes in the same texts: a scientific life involving measurements and debates among qualified scientists, and a more popular life as a moral-political issue. So long as the Anthropocene was seen mainly as a measure of human impact, though acknowledged as the impact that ushered in a new period in the planet's history, the focus remained on the force and its wielder (humanity, capitalist classes, rich nations, capitalism), and questions of geological time simply fell into the shadows. Moral questions about culpability and responsibility have necessarily dominated this debate. Not surprising, perhaps, if we remember Sheila Jasanoff's observation: "Representations of the natural world attain stability and persuasive power . . . not through forcible detachment from context, but through constant, mutually sustaining interactions between our senses of the *is* and the *ought*: of how things are and how they should be."¹³

TRANSLATING "FORCE" INTO "POWER," FROM EARTH HISTORY TO WORLD HISTORY

It is the moral side of the Anthropocene debate—questions of historical responsibility for the warming that has happened so far—that requires us to translate ideas that have deeply to do with Earth history, geology, and geological time into the language of world history.¹⁴ This entails, however, two important acts of displacement: the displacement-translation of the category "force"—referring to the physical pull that one material body exerts on another (to go by the Newtonian understanding of it), thus humanity as a geological force—into the human-existential category of power and its sociological-institutional correlates; and the accompanying dislodging of the problem of the Anthropocene from the realm of geological time to the time of human or world history.¹⁵

The displacement of the category of physical force onto the historical-existential category of power is visible in the writings of two groups of scholars and/or activists: those who want to assign culpability for the offense of creating the global environmental crisis, and those who seek in the crisis of global warming an ethical horizon for the future of humanity as a whole. Sometimes, we may find both tendencies in the same text. Take two documents that were published in the early 1990s: the first-ever report of the IPCC that was published in 1990, and a 1991 tract by two Indian environmental activists, Anil Agarwal and Sunita Narain, who, to my knowledge, were the first to propose that in the interest of

13. Sheila Jasanoff, "A New Climate for Society," *Theory, Culture & Society* 27, nos. 2-3 (2010), 236.

14. The most outstanding, original, and learned philology of the term "Anthropocene" to my knowledge is Robert Stockhammer's essay, "Philology of the Anthropocene," in *Meteorologies of Modernity: Weather and Climate Discourses in the Anthropocene*, ed. Sarah Fekadu, Hanna Straß-Senol, and Tobias Döring, *Yearbook of Research in English and American Literature* 33 (Tübingen: Narr, 2017), 43-64.

15. Sometimes, of course, "force" and "power" are used loosely to mean the same thing, but for the sake of clarity of exposition, I will treat them as belonging, respectively, to "natural" and "social" history. This is not an arbitrary distinction. The historical-existential nature of the category "power" is what enables Foucault's nominalist exercise in describing the nature of power in his *History of Sexuality*, vol. 1: *An Introduction*, transl. Robert Hurley [1976] (New York: Vintage Books, 1978), part 3, ch. 2, 92-97.

“climate justice,” national emissions of greenhouses gases (GHGs) be computed on a per-capita basis. “There is *concern*,” said the first IPCC report in its summary for policymakers, “that human activities may be inadvertently changing the climate of the globe through the enhanced greenhouse effect . . . which will cause the temperature of the Earth’s surface to increase. . . . If this occurs, consequent changes may have a significant impact on society.”¹⁶ Agarwal and Narain objected to such sweeping use of the word “human,” though the immediate target of their polemic was not the first IPCC report but a report of the World Resources Institute (WRI) on the “global environment” published in the same year as the IPCC report, 1990.¹⁷ Questioning what they saw as the spurious “one world-ism” of the WRI report, Agarwal and Narain described the report as an “excellent example of environmental colonialism” that, they suspected, actually “intended” to “perpetuate the global inequality in the use of the earth’s environment and its resources” by blaming “developing countries for global warming” when “the accumulation in the earth’s atmosphere of these gases [GHGs] is mainly the result of the gargantuan consumption of the developed countries, particularly the United States.”¹⁸

For Agarwal and Narain, it was as though the talk about climate change was creating a cruel and unfair “regime of historicity”—to speak with François Hartog—that threatened to foreclose the world-historical time of development in which India or China saw themselves as operating. They imagined their future was an open vista of modernization that the US and Soviet Union inspired after the Second World War.¹⁹

Many developing countries fear that the proposed climate convention [Rio 1992] will put serious brakes on their development by limiting their ability to produce energy, particularly from coal . . . , and undertake rice agriculture and animal care programmes. . . . [S]adly, the focus today is on poor developing countries and their minuscule resource use is frowned upon as hysteria is built up about their potential increase in consumption. . . . the dream of every Chinese to own a refrigerator is being described as a curse.²⁰

16. *Climate Change: The IPCC Scientific Assessment*, ed. J. T. Houghton, G. J. Jenkins, J. J. Ephraums [1990] (Cambridge, UK: Cambridge University Press, 1991), “Policymakers Summary,” xiii.

17. Anil Agarwal and Sunita Narain, *Global Warming in an Unequal World: A Case of Environmental Colonialism* [1991] (New Delhi: Centre for Science and Environment, 2003), 20, n. 1.

18. *Ibid.*

19. François Hartog, *Regimes of Historicity*, transl. Saskia Brown [2003] (New York: Columbia University Press, 2015). Hartog, of course, tells a European—though not Euro-centric—story of a modern “regime of historicity” (a vision of an open futural time) in Europe that spanned the eighteenth and nineteenth centuries and came to an end with the two world wars and succumbed to a “presentism”—future collapsing into the present—at the end of the twentieth century. One could argue, however, that a renewed regime of modern historicity got a second life outside of Europe from the 1950s when decolonizing new nations fell under the spell of modernization theories emanating from both the Soviet Union and the United States during the Cold War era. Incidentally, Ursula Heise describes the Anthropocene precisely in terms that are reminiscent of Hartog’s description of “presentism”—“as a future that has already arrived.” Ursula K. Heise, *Imagining Extinction: The Cultural Meanings of Endangered Species* (Chicago: University of Chicago Press, 2016), 203, 219–220.

20. Agarwal and Narain, *Global Warming*, 1. See also “Overview” by Sha Zukang, the Under Secretary-General for Economic and Social Affairs of the United Nations in *World Economic and Social Survey, 2009: Promoting Development, Saving the Planet* (New York: United Nations, 2009), v–xxii, for a very similar point of view.

Thus the argument that came to be known as a “climate justice” argument functioned also as a strategy for bargaining, in effect, for a longer life for a developmental regime of historicity for nations like India and China (which is not to deny their point about climate justice). A particular and familiar narrative was encrypted in the reference to “colonialism” in the very title of Agarwal and Narain’s tract and the explicit “third-world”-ist vocabulary of their text. This was putting the problem squarely in terms of world history.

Once the idea of the Anthropocene had been mooted, Swedish academics Andreas Malm and Alf Hornborg were among the first to fire a salvo against the proposition that global warming was “anthropogenic” in nature, objecting, in the manner of Agarwal and Narain, to the use of the word “anthropos.” “Realising that climate change is ‘anthropogenic,’” they wrote, “is really to appreciate that it is *sociogenic*.”²¹

The succession of energy technologies following steam—electricity, the internal combustion engine, the petroleum complex: cars, tankers, aviation—have all been introduced through investment decisions, sometimes with crucial inputs from certain governments but rarely through democratic deliberation. The privilege of instigating new rounds appears to have stayed with the class ruling commodity production.

Citing the facts that “as of 2008, the advanced capitalist countries or the ‘North’ composed 18.8% of the world population, but were responsible for 72.7 [per cent] of the CO₂ emitted since 1850,” they asked: “Are these facts reconcilable with a view of *humankind* as the new geological agent?” Starting from the premise that “uneven distribution is a condition for the *very existence* of the modern, fossil-fuel technology,” they argued for the “need to probe the depths of social history,” something that “geologists, meteorologists and their colleagues are not necessarily well-equipped to study.”²² The need of the hour was to stay faithful to—and not “abandon”—“the fundamental concerns of social science, which importantly include theorization of *culture and power*.”²³ How else, they asked in concluding their essay, “can we even imagine a dismantling of the fossil[-fuel] economy?” “Species-thinking on climate change is conducive to mystification and political paralysis.”²⁴

Many others have followed suit, among them notably the sociologist Jason Moore, who recommended that the new geological epoch be given a name suggestive of the more immediate factors that in his opinion brought it about: Capitalocene.²⁵ Moore acknowledged that this “is an ugly word in an ugly

21. Andreas Malm and Alf Hornborg, “The Geology of Mankind? A Critique of the Anthropocene Narrative,” *Anthropocene Review* 1, no. 1 (2014), 66. Matthew Lepori, “There Is No Anthropocene: Climate Change, Species-Talk, and Political Economy,” *Telos* 172 (Fall 2015), 103-124 makes similar points.

22. Malm and Hornborg, “The Geology of Mankind?,” 64, 66.

23. *Ibid.*, 62. Emphasis added.

24. *Ibid.*, 67.

25. Jason W. Moore, *Capitalism and the Web of Life: Ecology and the Accumulation of Capital* (London: Verso, 2015). Donna Haraway writes that “personal email communication from both Jason Moore and Alf Hornborg in late 2014 told me Malm proposed the term Capitalocene in a seminar in Lund, Sweden, 2009, when he was still a graduate student. I first used the term independently in public lectures in 2012.” Haraway, “Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin,” *Environmental Humanities* 6, no. 1 (2015), 163, fn. 6. However, Christian Schwägerl, in *The*

system,” but “the Age of Capitalism does not merit an aesthetically pleasing moniker.”²⁶ I do not wish to either endorse or criticize the appellation that Moore decided on; my point is to show how applying this nomenclature entailed, once again, the act of folding the concept of “force”—humans as a geophysical force—into the human-existential category of “power” that is intrinsic to world history. Here is Moore on the subject, beginning with unsurprising banter: “[The dominant Anthropocene narrative] tells us that the origins of the modern world are to be found in England. . . . The motive force behind this epochal shift? In two words: coal and steam. The driving force behind coal and steam? Not class. Not capital. Not imperialism. Not even culture . . . you guessed it: the *Anthropos*: Humanity as an undifferentiated whole. . . .” And his critique follows:

The Anthropocene makes for an easy story . . . because it does not challenge the naturalized inequalities, alienation, and violence inscribed in modernity’s strategic relations of *power* and *production*. . . . This erasure, this elevation of the *Anthropos* as a collective actor has encouraged . . . a meta-theory of humanity as a collective agent, without acknowledging the forces of capital and empire that have cohered in *modern world history*.²⁷

Needless to say, the word “force” used here by Moore with reference to capital does not connote the Newtonian meaning of the word.

Ian Angus, who has produced a thoughtful Marxist-historical analysis of the Anthropocene—and who, incidentally, does not like the term Capitalocene and acknowledges that Earth system scientists recommending the Anthropocene do not necessarily deny questions of climate justice or human differentiation—effects the same displacement by splitting the Anthropocene into two separate phenomena: a “biophysical” Anthropocene and a “socio-economic” one.²⁸ The biophysical Anthropocene—“a qualitative change in Earth’s most critical physical characteristics that has profound implications for all living things”—is important, “but to properly understand the Anthropocene, we must see it as a *socio-ecological* phenomenon,” the “culmination of two centuries of capitalist development,” a period of “economic and social change during which the Holocene ended and the Anthropocene began.”²⁹

Anthropocene: The Human Era and How It Shapes Our Planet, transl. Lucy Renner Jones [2011] (Santa Fe and London: Synergetic Press, 2014), 65, n. 132, gives an alternative origin for the term: “The term ‘Kapitalozän’ . . . was coined by Prof. Elmar Altvater from the Freie Universität, Berlin, during a discussion at the German Council of Foreign Relations.”

26. Moore, *Capitalism*, 173, n. 13.

27. *Ibid.*, 169-171. Emphasis added.

28. Ian Angus, *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System* (New York: Monthly Review Press, 2016), 231-232, where he describes Capitalocene as a “category mistake”: “capitalism is a 600-year-old social and economic system, while the Anthropocene is a 60-year-old Earth System epoch. . . . the new epoch will continue long after capitalism is a distant memory.”

29. *Ibid.*, 109-110. The move that Malm, Hornborg, Moore, Angus, and others made—of analyzing anthropogenic climate change through inequalities among humans and hence through appeals to theorizations of “culture and power”—are not surprising. This is how many world-history analysts had earlier dealt with global environmental problems and their histories: by focusing on how they were mediated by human inequalities, the rise of “developmentalist projects,” and state power in parts of the world in the period 1500–1800, and changing human constructions of nature under conditions of modernity. See, for instance, *Uncommon Ground: Rethinking the Human Place in Nature*, ed. William Cronon [1995] (New York: Norton, 1996); *Rethinking Environmental History*:

The displacement-translation of “force” into “power” is also undertaken by those who, in order to motivate humans to do something to mitigate the effects of their planetary footprint, appeal to the human sense of their own time-scales. Even Earth scientists defending the idea of geological time have found it important, strategically, to concede the point that “in wider society, geological time-scales are often used as reasons for non-action on societal, intra- and intergenerational timescales (‘climate has always changed,’ ‘coral reefs have become extinct several times, but reappeared’ and so on).”³⁰

The sense that the scientist-communicator of anthropogenic climate change has to constantly move between different scales of time haunts, for example, Archer’s book, *The Long Thaw*. Archer’s geologist eyes are trained to see how humans have already changed the climate of the planet for the next 100,000 years at least. But, he asks, in the very first chapter of the book: “Why should we mere mortals care about altering climate 100,000 years from now? . . . The rules of economics, which govern much of our behavior, tend to limit our focus to even shorter time frames.” So Archer uses temporal scales that can connect to the reader’s sense of pride and shame. “How would it feel,” he asks his reader, “if the ancient Greeks, for example, had taken advantage of some lucrative business opportunity for a few centuries, aware of potential costs—such as, say, a stormier world, or the loss of 10% of agricultural production to rising sea levels—that could persist to this day? This is not how I want to be remembered.”³¹ This may not be effective rhetoric goading people into action, but the translation of physical “force” into the very human terms of “power” and “responsibility” may be seen to be at work in all texts searching for a planetary human ethics in the present time.

Both geological time and historical time are expressive of human categories, but they are tinged with different kinds of affect. It is, of course, only within the sense of time that informs world history that we can speak of hope or despair. A certain degree of metaphorical use of the idea of the Anthropocene is therefore recommended by some Earth system scientists themselves, and note their quick switch from “force” to “power.” “[T]he Anthropocene used as metaphor might help trigger new normative and ethical thinking. If humanity now has the *power* of being a ‘geological force,’ it follows that such power should be used carefully and sparingly. . . . That, at least, might enable the Anthropocene to symbolize hope rather than despair”—thus Zalasiewicz.³² This, of course, assumes that humanity is one, and that this “one” can act as an individual person does, using one’s capacity (“power to be a geophysical force”) with care and responsibility. The astrobiologist David Grinspoon’s recent book with the telltale title, *Earth in*

World-System History and Global Environmental Change, ed. Alf Hornborg, J. R. McNeill, and Joan Martinez-Alier (Lanham, MD, and New York: Altamira Press, 2007); *The Environment and World History*, ed. Edmund Burke and Kenneth Pomeranz (Berkeley: University of California Press, 2009). The expression “developmentalist projects” is Kenneth Pomeranz’s. See his introduction to the Burke and Pomeranz volume.

30. Jan Zalasiewicz, Will Steffen, Reinhold Leinfelder, Mark Williams, and Colin Waters, “Petrifying Earth Process: The Stratigraphic Imprint of Key Earth System Parameters in the Anthropocene,” *Theory, Culture, Society* 34, no. 2-3 (2017), 98.

31. Archer, *The Long Thaw*, 10.

32. Zalasiewicz *et al.*, “Petrifying Earth Process,” 98. Emphasis added.

Human Hands, gives us yet another example of what I have come to think of as code-switching between the physical category of force and the social-existential categories of “consciousness” and “power.” “Nobody can credibly deny,” he writes, “that we are in a time of rampant human influence on Earth. Defined in this crude way, the Anthropocene obviously exists, so why insist it must be bad? What do you propose? That we convince everyone to feel bad about their rotten species?” The ethical task, Greenspoon thinks, is for humanity to be a *conscious* geological force: “Our choice is over what kind human-influenced Earth we will have. We may lament this truth, but we no longer have the option to choose not to be geological change agents. . . . How to do it right—that should be our concern.”³³ Humans, writes the Earth scientist Daniel Schrag, are at a “point of no return.” “In the Anthropocene,” he adds, “the survival of nature as we know it may depend on the control of nature [by humans]—a precarious position for the future of society, of biological diversity and of the geobiological circuitry that underpins the Earth system.”³⁴ Clive Hamilton, who has played a pioneering role in discussions of climate change by humanist scholars, argues in his book *Defiant Earth* for a “new anthropocentrism”—likening humanity to a “conscious force.” In a “geological epoch in which humans now rival the great forces of nature,” the “future of the entire planet, including many forms of life, is now contingent on the decisions of a *conscious force*, even if the signs of it acting in concert are only embryonic (and may be still born). In the face of this brute fact, . . . denying the uniqueness and power of humans becomes perverse.”³⁵

If we had to name, from among world historians, a patron saint for this vision of a world-historical future for humanity in which humans take collective responsibility for their physical impact on the planet, it would be William H. McNeill. At a world history conference held in 1994 at Wesleyan University, he even proposed a world-historical role for world-historians: “by constructing a perspicacious and accurate world history, historians can play a modest but useful part in facilitating a tolerable future for humanity as a whole and for all its different parts . . . inasmuch as a clear and vivid sense of the whole human past can help to soften future conflicts by making clear what we all share.”³⁶ This called for

33. David Grinspoon, *Earth in Human Hands: Shaping Our Planet's Future* (New York: Grand Central Publishing, 2016), 242-243.

34. Daniel Schrag, “Geobiology of the Anthropocene,” in *Fundamentals of Geobiology*, ed. Andrew H. Knoll, Donald E. Canfield, and Kurt O. Kornhauser (Oxford: Blackwell, 2012), 434.

35. Clive Hamilton, *Defiant Earth: The Fate of Humans in the Anthropocene* (Cambridge, UK: Polity, 2017), ch. 2. Emphasis added. I am grateful to Professor Hamilton for sharing his book manuscript with me.

36. William H. McNeill, “The Changing Shape of World History,” in *World History: Ideologies, Structures, and Identities*, ed. Philip Pomper, Richard A. Elphick, and Richard T. Vann (Malden, MA: Blackwell, 1998), 39-40. This view was somewhat different from what another pioneering scholar of world history, Marshall Hodgson, McNeill’s colleague at the University of Chicago, thought of very large-scale histories of humanity: “If world history is philosophically possible, it will in any case be subject to two important limitations. It will not only be unlikely to deal with all or even most of the events that have troubled mankind from the beginning; further it is unlikely to bear the type of human meaning which a sensitive history of a particular small community can have.” Marshall Hodgson, “The Objectivity of Large-scale Historical Inquiry: Its Peculiar Limits and Requirements,” in Marshall G. S. Hodgson, *Rethinking World History: Essays on Europe, Islam, and World History* ed. Edmund Burke III (Cambridge, UK: Cambridge University Press, 1993), 258. For a fascinating account of Hodgson’s intellectual background and his interactions with McNeill at the University of

an intellectual partnership between scientists and world historians, as McNeill argued a few years later in a 2002 essay: “It is time for historians to . . . begin to connect their own professional thinking and writing with the revised scientific version of the nature of things.”³⁷ A total history of humanity was the history of the species: “We are . . . at one with our predecessors, immersed in processes we do not control and can only dimly understand—a process nonetheless that has made us . . . the most disturbing . . . and . . . extraordinarily powerful factor in upsetting the multiple levels of . . . equilibria within which we exist. . . . Perspicacious history of how we got to where we are might even improve human chances of survival.”³⁸ A year later, in 2003, he wrote: “our species as a whole [has become] an unexampled threat to other life-forms. Long-term disaster may well loom ahead: but so far so good . . . humankind’s greatest age may still lie ahead. Or, just as probably, we may be precipitously rushing toward any of several disastrous terminations of our altogether extraordinary career on earth.”³⁹

This turn toward human capacities for a solution to our global environmental crisis also marks the end of John L. Brooke’s magisterial survey of the history of humanity through various climate regimes on this planet. “In the final analysis,” writes Brooke,

our current circumstance needs to be seen both as a crisis in the relation of humanity to the earth system, and as a moment in the long-term transformation of economic systems on a scale with any of the great ruptures of the human past. . . . What is necessary, what all the pragmatists are working for, what the pessimists despair of, and what the deniers reject . . . is a global solution. *We hold it in our collective capacity to address the earth system crisis that is now upon us.* That capacity must be mobilized by an informed political will.⁴⁰

Once again the solution to problems on the scale of Earth history is sought in the human time scales of politics and world history. I will have more to say about the displacement effected here.

THE TIME OF WORLD HISTORY

The time of world history is, ultimately, the same as what Reinhart Koselleck identified as the time of human history. The texture of human-historical time, as Koselleck famously suggested, is made up of the warp and woof of two fundamental categories that for Koselleck constituted “an anthropological condition” for history itself: “the space of experience” and “the horizon of expectation.”⁴¹

Chicago, see Michael Geyer, “Marshall G. S. Hodgson: The Invention of World History from the Spirit of Nonviolent Resistance” (forthcoming). I understand from Professor Geyer that the Hodgson papers archived at the University of Chicago contain “quite a bit of science and some very intense and very critical discussions of Teilhard de Chardin (among other things about the mistake of anthropocentrism).” Personal communication, February 11, 2017.

37. William H. McNeill, “Passing Strange: The Convergence of Evolutionary Science with Scientific History,” *History and Theory* 40, no. 1 (2001), 5.

38. *Ibid.*, 15.

39. William H. McNeill, “At the End of an Age?” *History and Theory* 42, no. 2 (2003), 251, 252.

40. John L. Brooke, *Climate Change and the Course of Global History: A Rough Journey* (Cambridge, UK: Cambridge University Press, 2014), 578-579. Emphasis added.

41. Reinhart Koselleck, “‘Space of Experience’ and ‘Horizon of Expectation:’ Two Historical Categories,” in *Futures Past: On the Semantics of Historical Time*, transl. Keith Tribe [1979] (Cambridge, MA, and London: MIT Press, 1985), 270.

Koselleck expressed powerfully what many thinkers over the ages had thought about the human sense of historical time. Recall Augustine, for instance: “The present of past things is memory; the present of present things is direct perception; and the present of future things is expectation.”⁴²

Neither human historical time nor the time of geology, both being of human making, is empty of affect. But they engage, as mentioned before, very different types of affect. There have, of course, been arguments about whether or not the sheer chronology of world history should be looked upon as working like a sack of empty time indifferent to the events we pour into it. Some scholars have recommended this thought on moral grounds: “Empty time has to be taken in a sense that implies more than a mathematical method to bring abstract order to given data. Time has to be taken as a potential bond of life, history as a garden with a common concept of life, real life. This is the only way to provide a common ground for historical narratives, for keeping history as a universal reality together. We may produce all kinds of historical concepts and historical temporality, but we do not escape the necessity to hold fast to the concept of empty time as the open field on which histories may arise, keeping in touch with one another.”⁴³ But Koselleck’s anticipatory rebuttal of this point is also worth recalling. He agrees that in constructing historical time that is always “tied to social and political units of action, to particular acting and suffering human beings, and to their institutions and organizations,” one may very well need “measures of time that derive from the mathematical-physical understanding of nature . . . : the dates or length of a life or of an institution, the nodal or turning points of political or military series of events, . . . [and so on].” But such a mathematical-physical understanding of time cannot act as the ground for human history:

an interpretation of the interrelations that result already leads beyond the natural or astronomically processed determinations of time. Political constraints on decisions made . . . [and other considerations], in their mutual interaction or dependence finally [force] us to adopt social and political determinations of time that, although they are naturally caused, must be defined as specifically historical.⁴⁴

Experience, Koselleck explains, is “present past” and could include a “rational reworking” of the past as well as “unconscious modes of conduct which do not have to be present in awareness.” Expectation is “the future made present,” oriented to “that which is to be revealed.”⁴⁵ The two could interpenetrate—“only the unexpected has the power to surprise and this surprise involves a new experience”—and Koselleck would spend many pages explaining how in the time of the modern, in *Neuzeit*, “the difference between experience and expectation is increasingly enlarged,” and “eager expectations” may also “remove themselves

42. Saint Augustine, *Confessions*, transl. R. S. Pine-Coffin, Book XI, § 20, 269.

43. Lucian Hölscher, “Time Gardens: Historical Concepts in Modern Historiography,” *History and Theory* 53, no. 4 (2014), 591.

44. Reinhart Koselleck, “Time and History,” in *The Practice of Conceptual History: Timing History, Spacing Concepts*, transl. Todd Samuel Presner et al. (Stanford: Stanford University Press, 2002), 110. See also Koselleck’s essay, “Concepts of Historical Time and Social History,” in the same volume, 115-130, and John Zammito’s review essay, “Koselleck’s Philosophy of Historical Time(s) and the Practice of History,” *History and Theory* 45, no. 1 (2004), 124-135.

45. Koselleck, “Space of Experience,” 272.

from all previous experience.”⁴⁶ “In brief,” he summed up: “it is the tension between experience and expectation that, in ever-changing patterns, brings about new resolutions and through this generates historical time.”⁴⁷ This means historical time cannot be separated from certain kinds of human affect—“prospects of the future, raising hopes and anxieties, making one precautionary or planful”—they all go into the making of historical time.⁴⁸ This is what climate change as “world history” is: a stage for the play of various human emotions including those of hope and despair. One could indeed look upon the Paris climate deal of 2015 as such an intense and frenetic piece of world history.⁴⁹

In contrast, one could say that human affect that usually relates to the time of geology would be very different. Several geological events, personalities, and periods have, of course, entered human time as culturally processed events or phenomena—the Jurassic age or dinosaurs, for instance, or the 1816 eruption of the Tambora volcano in Indonesia.⁵⁰ But most geological events do not undergo such affective processing. We have no obvious emotions about the great oxygenation event of 2.5 billion years ago—though human life would be inconceivable without that event—or about the Ordovician-Silurian great extinction event that took place more than 440 million years ago.

THINKING GEOLOGICAL TIME

How then does the question of “simple” geological time—time to which Earth system history with its million-year carbon cycles properly belongs—erupt in this landscape of understanding that constantly relocates both the ideas of humans wielding a geophysical force and the new geological epoch of the Anthropocene in the affective past, present, and future of human power and responsibility?

The recent story of the Anthropocene reversed the usual relationship between geologists’ work and the big themes of human or even other kinds of histories.⁵¹ “Geologists tend not to think about history, much,” writes Zalasiewicz, for the story they eventually want to put together concerns not only the geology of this planet but also of “the billion strong” planets and moons orbiting “other stars in the galaxy,” not to mention “the planetary bodies that will be present in the one

46. *Ibid.*, 274, 275, 284.

47. *Ibid.*, 275.

48. *Ibid.*, 274. As Christophe Bouton pointed out in his commentary on Koselleck, “[Koselleck’s] . . . categories ‘capacity to die and capacity to kill’ . . . are a basic transcendental structure of history since, according to Koselleck, the threat of violent death is the background of any history, from the hunter-gatherers to the atomic age. Without the capacity to kill one another, ‘the histories we all know would not exist.’” Christophe Bouton, “The Critical Theory of History: Rethinking the Philosophy of History in the Light of Koselleck’s Work,” *History and Theory* 55, no. 2 (2016), 178.

49. Andrew Light, “Climate Diplomacy,” in *The Oxford Handbook of Environmental Ethics*, ed. Stephen Gardiner and Allen Thompson (Oxford: Oxford University Press, 2017).

50. See W. J. T. Mitchell, *The Last Dinosaur Book: The Life and Times of a Cultural Icon* (Chicago: University of Chicago Press, 1998); Bernd Scherer, “Die Monster,” in *Das Anthropozän: Zum Stand der Dinge*, ed. Jürgen Renn and Bernd Scherer (Berlin: Matthes & Seitz, 2016), 226-241; Wolfgang Behringer, *Tambora und das Jahr ohne Sommer: Wie ein Vulkan die Welt in die Krise stürzte* (Munich: C. H. Beck, 2016).

51. See my “The Human Significance of the Anthropocene,” in *Modernity Reset!*, ed. Bruno Latour (Cambridge, MA: MIT Press, 2016).

hundred billion or so other galaxies within the known Universe” that we cannot even see into yet. So how does a geologist get to place “any particular, strange and novel event within” a big story, “such as—for instance—the extraordinary set of processes that we humans have precipitated?” From where does a practicing geologist start to think about the proposed new geological epoch of the Anthropocene? The usual starting point for the geologist, writes Zalasiewicz, is seldom the big story itself but “fragments”—“small shards of the greater whole that have attracted the attention of some passing geologist, using that last word extremely loosely.” The larger synthesis “typically emerges” once sufficient detail has been “collected together” to generate recognizable patterns in “what seemed initially to be bewilderingly chaotic.”⁵² He gives the example of the Carboniferous Period that lasted from about 359 to 299 million years ago and that produced coal-rich strata of rocks. Generations of geologists mapped out these rocks in extreme detail for practical, “here-and-now” purposes. The larger story that “those Carboniferous rocks are a memory of something else entirely—of a world of primeval swamp forests, with amphibians and giant dragonflies, without flowers, or birds, or mammals” was seldom the main concern of working geologists. The big history of that distant past, “now separated off as a segment of time some 60 million years long”—the story of the Carboniferous Period—“may now be reconstructed in imagination” for these rocks, but “never again touched, or seen, or experienced.”⁵³

However, so long as we think of the name and the concept of the Anthropocene as a measure—and a critique—of the impact humans have had on the geobiology of the planet, we cannot escape the moral pull of world history, for questions of empires, colonies, institutions, classes, nations, special-interest lobbies—in a word, the world system created by European empires and capitalism—are then never far from our concerns. This is clearly the reason why the Anthropocene, perhaps, is the only suggested name of a geological period that has critically engaged—if not outraged—many scholars in the human sciences. The archaeologist and anthropologist Kathleen D. Morrison, for instance, proposed that the task at hand was to “provincialize the Anthropocene” in order to expose the “hidden Eurocentrism” of the concept. It represented, in her judgment, “an effort to expand (rather homogenized) European historical experiences, frameworks and chronologies onto the rest of the world.” For her, the problem remains that “most proposals for an Anthropocene era adopt a rather limited historical perspective, assuming that significant environmental impact began only with the (European, and especially British) Industrial Revolution.” “Provincializing the Anthropocene” meant therefore “that we no longer take European agricultural or industrial history as a starting point.”⁵⁴ Instead, Morrison pointed to other possible beginnings: “large-

52. Zalasiewicz, “The Extraordinary Strata,” 1.

53. *Ibid.*, 3. The story of William Smith, “a surveyor in England, who was the first to recognize that fossils added information about the rocks in which they were found,” illustrates Zalasiewicz’s point. See David N. Reznick, *The Origin Then and Now: An Interpretive Guide to the Origin of Species* (Princeton: Princeton University Press, 2010), 268. See also <http://www.ucmp.berkeley.edu/carboniferous/carboniferous.php> (accessed February 4, 2017).

54. Kathleen D. Morrison, “Provincializing the Anthropocene,” *Seminar* 673 (September 2015), 75. Morrison has since revised and enlarged this essay; see Kathleen D. Morrison, “Provincializing

scale human burnings,” for instance, that have for a very long time “reshaped vegetation regimes,” or agriculture, “another major means by which our species has reshaped not only vegetation, but also soils, slopes, hydrology, disease environments, the distribution of wild plants and animals and has made possible new configurations of human population.”⁵⁵ One could add to this list megafauna extinction, rice production, and other big events, including the invention of fire, suggesting the force of human impact on the planet.

In a significant paper published in 2015, two British geographers, Simon L. Lewis and Mark A. Maslin, starting from the premise “that formal establishment of an Anthropocene epoch would mark a fundamental change in the relationship between humans and the Earth system,” suggested two possible dates for when the Anthropocene may have begun: 1610 and 1964. They agreed that to define a geological time unit, “formal criteria must be met.” Yet dating the beginning of the Anthropocene also remained for them a necessarily moral-political exercise: “defining an early start date may, in political terms, ‘normalize’ global environmental change. Meanwhile, agreeing [to] a later start date related to the Industrial Revolution may, for example, be used to assign historical responsibility for carbon dioxide emissions to particular countries or regions during the industrial era.” Besides, they added, “the formal definition of the Anthropocene makes scientists arbiters, to an extent, of the human–environment relationship, itself an act with consequences beyond geology. Hence there is more interest in the Anthropocene than other epoch definitions.”⁵⁶

In the end, Lewis and Maslin preferred 1610 to 1964 as a point from which to date the Anthropocene. They gave evidence-based scientific reasoning for their preference: a decline in atmospheric CO₂ (7–10 ppm between 1570 and 1620) coinciding with a massive decline in population in the Americas following arrival of Europeans (from 64 million in 1492 to 6 million “via exposures to diseases . . . , war, enslavement and famine”).⁵⁷ But they also mobilized world-historical arguments to justify their choice.

The choice of either 1610 or 1964 [showing a “distinct peak in radioactivity” from detonation of nuclear bombs] would probably affect the perception of human actions on the environment. . . . [1610] implies that colonialism, global trade and coal brought about the Anthropocene. Broadly, this highlights social concerns, particularly the *unequal power relationships* between different groups of people, economic growth, the impact of globalized trade, and our current reliance on fossil fuels. . . . Choosing the bomb spike tells a story of *an elite-driven technological development* that threatens planet-wide destruction.⁵⁸

They saw the Anthropocene as something that brought together Earth history and world history: “The impact of the meeting of Old and New World human populations—including the geologically unprecedented homogenization of Earth’s

the Anthropocene: Eurocentrism in the Earth System,” in *Nature in History*, ed. G. Cederlöf and M. Rangarajan (New Delhi: Oxford University Press, forthcoming). This revised essay reached me too late for me to make use of it here.

55. Morrison, “Provincializing the Anthropocene,” 79.

56. Simon L. Lewis and Mark A. Maslin, “Defining the Anthropocene,” *Nature* 519, no. 7542 (2015), 171.

57. *Ibid.*, 175, 176.

58. *Ibid.*, 177. Matter quoted within square bracket is from 176.

biota—may serve to mark the beginning of the Anthropocene. . . . it represents a major event in world history [as well].”⁵⁹

Lewis and Maslin’s point of view has been both vigorously criticized and defended.⁶⁰ But the Anthropocene, so long as it is seen as a measure of humans’ impact on the planet, can have only plural beginnings and must remain an informal rather than a formal category of geology, capable of bearing multiple stories about human institutions and morality. The issue cannot be separated from political and moral concerns. Questions of stratigraphic significance—such as: Is there enough evidence in the strata of the planet for stratigraphers to be able to argue that the thresholds of the Holocene epoch have been exceeded?—then get written over by varieties of world history, deep and shallow, big and small. Zalasiewicz’s paper, which I began with, is of interest in this debate for this very reason: it removes—perhaps for the first time in the decade-old controversy about the Anthropocene—the cobweb (or should I say, the human web) of world-historical time to bring into view what he calls the time, “simply,” of geology.

Zalasiewicz makes some crucial moves that should be noted. He recognizes that when “the Anthropocene was born—in a practical sense, at least—with Paul Crutzen’s inspired improvisation at a conference in Mexico just fifteen years ago, the usual procedures were turned upside down.”⁶¹ The idea came from “the Earth system community, monitoring planetary change in real time.” But they were not necessarily stratigraphers. When the Anthropocene Working Group of the Sub-commission on Quaternary Research, “a component body of the International Commission of Stratigraphy (the decision-making body that oversees the Geological Time Scale)” was set up, the “first task” of the group was “to see whether there is in effect, a stratal unit on Earth that may be systematically recognized and assigned, *as a material body*, to the Anthropocene Epoch.” In geologists’ parlance, such a “material time-rock unit, parallel to the ‘time’ unit, would be termed an Anthropocene series.”⁶² In this particular essay and elsewhere, Zalasiewicz and his colleagues have gone to great lengths explaining what materials (including techno-fossils) such a time-rock unit would most likely be made of.⁶³

This quest for stratigraphic records proper to the Anthropocene is centered on the question of whether it could be argued that there is enough evidence in the lithosphere and on the surface of the planet to support the proposition that the planet has exited the threshold of the Holocene Epoch. The critical questions for stratigraphers are not “how globally important”—in human terms—the new boundary is, or “when was the first sign of influence of some major new factor in the Earth system?,” a question that understandably concerned many who debated

59. *Ibid.*, 175.

60. See Clive Hamilton, “Getting the Anthropocene So Wrong,” *Anthropocene Review* 2, no. 1 (2015), 1-6; Jan Zalasiewicz *et al.*, “Colonization of the Americas, ‘Little Ice Age’ Climate, and Bomb-Produced Carbon: Their Role in Defining the Anthropocene,” *Anthropocene Review* 2, no. 2 (2015), 117-127; Simon L. Lewis and Mark A. Maslin, “A Transparent Framework for Defining the Anthropocene Epoch,” *Anthropocene Review* 2, no. 2 (2015), 128-146.

61. Zalasiewicz, “The Extraordinary Strata,” 3.

62. *Ibid.*, 4.

63. For a recent statement, see Zalasiewicz *et al.*, “Petrifying Earth Process.”

the moral aspects of the idea of the Anthropocene. As Zalasiewicz puts it: “in terms of the definition of a ‘stratigraphic Anthropocene,’ [at issue is] . . . change to the Earth system rather than a change to the extent to which [we] are recognizing human influence.” It is important to be able to show with stratigraphic evidence that “the planetary system is *recognizably* changing.” The task of making a formal proposition for the Anthropocene does not necessarily require the stratigrapher to be interested in the “whodunnit?” part of the story. The impact on the lithosphere is what matters; the author of the impact is not important. The name Anthropocene carries no special literal or human significance for them, for “it just happens to be the activities of the human species that are currently the main perturbing force.” “The Anthropocene,” writes Zalasiewicz, “would remain just as important geologically, because of the scale of the planetary (and hence stratal) effects, if it had some other cause [other than human activities, that is].” “Indeed,” he remarks, “the concept would then probably be rather easier for humans to comprehend and react to.”⁶⁴ From this stratigraphic perspective—necessary if one were to formalize the new geological epoch—the Anthropocene, as Zalasiewicz puts it, is “*seen as a planet-centred, rather than human-centred phenomenon.*”⁶⁵

It is his concern with what he calls the “stratigraphic Anthropocene” that enables Zalasiewicz to distill his point about geological time, as distinct from the time of human history. “The question of the [epochal] boundary has aroused a good deal of comment,” he writes, “not least as regards the protracted and progressive nature of significant human influence on the Earth, ranging from the beginnings of the extinctions of the terrestrial megafauna, starting as long as 50,000 years ago . . . through the development and spread of agriculture beginning some ten thousand years ago, to the origin and spread of urbanization a little later.” The resulting “time-transgressive human-altered surface layer,” called the archaeosphere, has sometimes been seen as “the most visible reflection” of the Anthropocene. But “this would be a parallel,” comments Zalasiewicz, “of *archaeological time terms* such as ‘Paleolithic,’ ‘Bronze Age,’ and so on, which are all different ages in different regions, reflecting the cultural state [and we might add, power relations] of the local human populations.” One could add “Capitalocene” to this list of human-centered, rather than, planet-centered definitions of the Anthropocene. And they would all, says Zalasiewicz,

run counter to a peculiarity of geological time that, at heart, is *simply time*—albeit in very large amounts. A time boundary (whether geochronological or chronostratigraphical) is just an interface in time, of no duration whatsoever—it is less than an instant—between one interval of time (which may be millions of years long) and another. It is inherently synchronous within the domain across which it operates, which is that of the home planet.⁶⁶

64. The names of geological periods usually have little to do with the factors that may have brought these periods into being. Thus name *Cretaceous* is “from the Latin word for chalk,” *Jurassic* “after the Jura hills on the Franco-Swiss border,” *Triassic* “because across much of central Europe it had a tripartite character: two sandstone formations . . . separated by a distinctive limestone,” *Silurian* “from the name of an ancient British tribe,” *Cambrian* “after the Roman name for Wales,” *Devonian* named “after the English county of Devonshire,” and so on. Why should not the principle apply to the “stratigraphic Anthropocene”? See Martin J. S. Rudwick, *Earth’s Deep History: How It Was Discovered and Why It Matters* (Chicago: University of Chicago Press, 2014), 142-143.

65. Zalasiewicz, “The Extraordinary Strata,” 11.

66. *Ibid.*, 9. Emphasis added.

HUMAN-CENTERED AND PLANET-CENTERED WAYS OF THINKING

Let us stay for a moment with the distinction that Zalasiewicz made between human-centered and planet-centered ways of thinking. Aspects of the thesis about humans constituting a geological force comparable to the Milankovitch effect that controls the glacial-interglacial cycles entail thinking on temporal scales that are indeed too large for any political-affective apprehension, and hence for the making of politics or policy. Some of the earth processes are extremely slow in human terms. As David Archer says, the million-year carbon cycle of the planet is “irrelevant for political considerations of climate change on human time scales,” but “ultimately the global warming climate event will last for as long as it takes these slow processes to act.”⁶⁷ Soil, fossil fuel, and biodiversity are not renewable on human time scales. Past catastrophes, write Charles H. Langmuir and Wally Broecker in their book *How to Build a Habitable Planet*, show that “biodiversity recovers only on timescales of millions of years.”⁶⁸ These are all events or processes that have been affected by human activity but they act themselves out not on the time scale of world history but on geological scales of time.

Geological time is not identical to absolute mathematical time. There remains a *material* side of time for geologists, for there is no geological time without geological objects. Ultimately, for the purposes of our discussion, this time is written into the strata of the planet. “And indeed it is these strata, with their radionuclides, fly ash, microplastics, supermarket chicken bones and so on that form the core of the argument for the ‘geological [stratigraphic] Anthropocene,’” writes Zalasiewicz.⁶⁹

But however we think of geological time—and over a long number of years Christian theology (geology as the Book of Nature), astronomy, physics, evolutionary biology, and other areas of thought have contributed to its history—it belongs in part to a class of time that has always been seen (long before geology) as opposed to the sense or scale of temporality of human history.⁷⁰ Saint Augustine saw this kind of time as expressed in numbers “to which we cannot give a name”; Buffon thought of it as time that did not “conform to the limited powers of our intelligence”; Darwin described its “vastness” as “incomprehensible”; self-described geologists in the early nineteenth century came to accept

67. David Archer, *The Global Carbon Cycle* (Princeton: Princeton University Press, 2010), 21, cited in Dipesh Chakrabarty, “Climate and Capital: On Conjoined Histories,” *Critical Inquiry* 41, no. 1 (2014), 3.

68. Charles H. Langmuir and Wally Broecker, *How to Build a Habitable Planet: The Story of Earth from the Big Bang to Humankind* (Princeton: Princeton University Press, 2012), 591.

69. Jan Zalasiewicz, personal communication, February 27, 2017. See also Jan Zalasiewicz *et al.*, “Chronostratigraphy and Geochronology: A Proposed Realignment,” *GSA Today* 23, no. 3 (2013), and Jan Zalasiewicz, Mark Williams, and Colin Waters, “Can an Anthropocene Series be Defined and Recognized?,” *Geological Society, London, Special Publications* (March 2014). Bronislaw Szerszynski, “The Anthropocene Monument: On Relating Geological and Human Time,” *European Journal of Social Theory* 20, no. 1 (2017), 193 has an illuminating discussion of this point.

70. I am grateful to Fredrik Albritton Jonsson for discussions on this point.

it as something that—in the words of one of their great historians—was “literally beyond human imagination” even if “no quantitative figures could [yet] be attached to it.”⁷¹ All these descriptions, of course, do not speak of “empty time,” shorn, as such, of human affect. Augustine, Buffon, and Darwin all speak of this time only in its relationship to being human, thus marking it as representing a limit to the time of historicity, as a conceptual-temporal place where “meaning-making” of human history—the tension between the horizon of expectation and the horizon of experience—ceases to work.⁷²

The narrative of world history has now collided (in our thoughts) with the much longer-term geological history of the planet or—as we now think of it—of the Earth system.⁷³ Earth system science that draws on planetary histories represents a later and viable mutation of James Lovelock’s Gaia hypothesis that was advanced in the 1960s. Without our being able to see the planet as some kind of a system—a system of “steady state disequilibrium” maintained by an external energy source (the sun) that moves interlocking processes and feedback loops supportive of life over the long run—there would have been no science of planetary climate change, and no scientific formulation of the problem either.⁷⁴ The history of the publication of Langmuir and Broecker’s *How to Build a Habitable Planet* captures something of the youth of Earth system science as a discipline. Broecker published this book in 1984 under the same title and as its sole author. But that was a time, as Langmuir and Broecker point out in the second edition, “when dark energy and dark matter were not yet discovered, the ocean ridges were barely mapped, hydrothermal vents on the sea floor were barely known, the Antarctic ice core had not been drilled, the ‘snowball Earth’ hypothesis had not been fully formulated, global warming was not yet an urgent topic, and no extrasolar planet had been discovered.” One could say, in a Latourian vein, that it took all these technologies and discoveries for scientists to think into being the “Earth system” as an object of study. In their 2012 revised edition of the book, the authors included “discussion of life, . . . Earth history, the rise of oxygen, . . .

71. St. Augustine, *Concerning the City of God against the Pagans* [1467], transl. Henry Bettenson and introduced by John O’Meara [1972] (Harmondsworth, UK: Penguin, 1984), book, XII, ch. 14, 486, §13; Buffon cited in Paolo Rossi, *The Dark Abyss of Time: The History of the Earth and the History of Nations from Hooke to Vico* [1979], transl. Lydia G. Cochrane [1984] (Chicago: University of Chicago Press, 1987), 108; Darwin cited in Pascal Richet, *A Natural History of Time*, transl. John Venerella [1999] (Chicago: University of Chicago Press, 2007), 212; Martin J. S. Rudwick, *Worlds before Adam: The Reconstruction of Geohistory in the Age of Reform* (Chicago: University of Chicago Press, 2008), 564. On Darwin’s response to the vastness of the deep past, see Joe D. Burchfield, “Darwin and the Dilemma of Geological Time,” *Isis* 65, no. 3 (1974), 300-321.

72. The relation between the (modern) time of human history and time of the geological past receives a stimulating discussion in Szerszynski, “The Anthropocene Monument,” where he shows how eighteenth- and early-nineteenth century geology “drew on the practices of erudite and antiquarian history. . . to [produce] a history of the Earth” (115). There remain differences, however, in methods of constructing historical and geological times: “[H]istorians of human culture have modern examples of revolution or mass hysteria to examine for comparison with records of the past. But, . . . given the complexity of geological events, our lack of experience of all geological environments and of geological spans of time, and our interest in the singularity of each event, geologists simply cannot project the present onto the past.” Robert Frodeman, “Geological Reasoning: Geology as an Interpretive and Historical Science,” *GSA Bulletin* 107, no. 8 (1995), 965.

73. Chakrabarty, “Climate and Capital.”

74. Langmuir and Broecker, *Habitable Planet*, 16-17.

volcanism and the role of the solid Earth in habitability” in addition to taking “a ‘systems’ approach to the history and understanding of our planet.” “If there is one theme that we hope comes through in the book,” they wrote in their preface, “it is of a connected universe in which human beings are an outgrowth and an integral part.”⁷⁵

While Earth system science is central to ideas about planetary climate change and understanding the Anthropocene, the key questions driving the discipline concern the history of life on Earth and the supportive Earth processes, all considered on geological if not astronomical scales of time: What makes a planet habitable not just for human life but for complex life in general? Do humans have a necessary place in planetary evolution? Are there others like us out there somewhere?⁷⁶ “A critical unknown,” write Langmuir and Broecker in pondering these questions, “is the fraction of a planetary lifetime that a technological civilization exists. Does such a civilization self-destruct in a few hundred years or last millions of years? For such a civilization to last, the species must sustain planetary habitability rather than ravage planetary resources.”⁷⁷ Broecker and Langmuir acknowledge that the question of what makes a planet habitable is perhaps impossible to answer until we find other planets that sustain complex life; but they proceed on the assumption that the key principles that Earth’s history embodies “appear likely to apply on a universal scale”—“natural selection [for example] is a general process clearly not restricted to a particular time or place.”⁷⁸ The habitability question in planet-centered thinking is what eventually gave rise to the subdiscipline of “astrobiology.”

The habitability problem, so central to astrobiology and so different from the human-centered idea of sustainability, does not even entail any necessary assumption that humans exist on other planets. In imagining technological civilizations elsewhere, all that astrobiologists need to assume is the existence of what they call SWEIT or “Species with Energy-Intensive Technology.”⁷⁹ Astrobiology looks at the Earth and other planets from an imaginary floating point in space: “For a technological civilization to persist they would need to correspond with a planet as a natural system.”⁸⁰ Depending on how a SWEIT acted, a planet could go from “being a ‘habitable planet’ to an ‘inhabited planet’ i.e. one that carries intelligence and consciousness of a global scale, for the benefit of the planet and all its life.” But there could also be an “abortive and failed mutation,” and a planet could regress to an earlier stage of evolution of life, suffer reduced biodiversity, or be even rendered virtually dead.⁸¹

Zalasiewicz’s essay that I have been discussing evinces a similar view of the planet, looked at from outside and as if through a series of time-lapse photographs: “[After the ‘Great Oxygenation Event’ 2.5 billion years ago,] the world

75. *Ibid.*, xv.

76. See, for instance, the very first page of *Habitable Planet*.

77. *Ibid.*, 650.

78. *Ibid.*, 537.

79. See Adam Frank and Woodruff Sullivan, “Sustainability and the Astrobiological Perspective: Framing Human Futures in a Planetary Context,” *Anthropocene* 5 (March 2014), 32-41.

80. Langmuir and Broecker, *Habitable Planet*, 668.

81. *Ibid.*, 645-646, 668.

changed colour, going from the greys and greens of a chemically reducing world to reds, oranges, and browns, as a swathe of oxide and hydroxide minerals appeared.”⁸² Similarly, Langmuir and Broecker’s vision of an “inhabited planet” that has internalized technical intelligence is close to the geologist Peter Haff’s proposition regarding there being a technosphere on Earth, a layer he considers analytically distinguishable from the lithosphere, atmosphere, or biosphere, and to study which one has to adopt an extra-terrestrial point of view: “[H]umans have become entrained within the matrix of technology and are now borne along by a supervening dynamics from which they cannot simultaneously escape and survive. . . . technology is the next biology.”⁸³

The protagonist of Earth system history is thus the Earth system itself, not humans. Humans, in any case, come very late in that history. The time of such history is the time of geology, vast and incomprehensible in terms of the concerns of human history though it is available to our cognitive and affective faculties. The Anthropocene, as a stratigraphically justified geological epoch, belongs to this order of time. Or so argues Zalasiewicz. In old Althusserian terms, the history of the Earth system is all “process without a subject.” In the vocabulary of Bruno Latour, this is a narrative of many dispersed and networked actors, none acting with the sense of internal autonomy with which humanist historians suffuse the word “agency.” Yet in social-science debates about the Anthropocene, geological time gets written over by the human time of world history, and humans emerge as the subject of the drama of the Anthropocene, not just in the writings of scholars in the human sciences but often in those of earth scientists themselves. It is clear why it happens, for the science of Earth systems history has been made possible by the same technologies that have also produced, mapped, and measured the deleterious impact on the biosphere of the complex of species and life-forms represented by humans, their dependent or co-evolving living entities, and their technology. This species–technology complex has flourished at the expense of many other species and now threatens to push the Earth system into another phase altogether.

Texts, Langmuir and Broecker’s included, written by Earth system scientists to communicate the message of the current planetary environmental crisis speak necessarily in two voices. They think simultaneously in two ways, as it were: human-centered and planet-centered. There is the vast story of life on this planet and the general questions of habitability of a planet, questions to which humans are not central. But there is also the theme of the impact of human activities on the Earth. “Human civilization has led to the first global community of a single

82. Zalasiewicz, “Extraordinary Strata,” 5.

83. Peter Haff, “Technonology as a Geological Phenomenon: Implications for Human Well-Being,” in *A Stratigraphical Basis for the Anthropocene*, ed. C. N. Waters *et al.* (London: Geological Society, Special Publications, vol. 395, 2014), 302. This argument makes for a very interesting distinction between intelligence and subjectivity. If one thinks of intelligence as a problem-solving property of different forms of life, we find it in life-forms that have no “subjectivity,” so to speak, if consciousness is seen as a consequence of the development of the brain. Termites building a mound have to solve some of the same problems of structure that builders of a skyscraper need to address. See the discussion in Andrew Y. Glikson and Colin Groves, *Climate, Fire and Human Evolution: The Deep Time Dimensions of the Anthropocene* (Cham, Switzerland: Springer, 2016), 185-187. I am grateful to Daniel Smail for discussions on this point.

species, destruction of billions of years of accumulation of resources, a change in atmospheric composition, a fourth planetary energy revolution, and mass extinction. . . . The potential for planetary change is almost as great as that caused by the origin of life or the rise of oxygen”—thus write Langmuir and Broecker. They even suggest that the designation of the new geological period may have to be ratcheted up to the higher level of the Anthropozoic era. An Anthropozoic era could, they warn, “be an abortive and failed mutation, as the intelligent species destroys itself and its environment.” “Should we fail,” write Langmuir and Broecker, “and another form of intelligent life comes along in a few tens of millions of years, they would find a planet devoid of most of its treasure chest,” and a “second effort at planetary civilization would be correspondingly more difficult.”⁸⁴

Similarly, the concluding pages of a book on the deep-time dimensions of the Anthropocene written by earth scientist and paleoclimatologist Andrew Glikson and primatologist and mammologist Colin Groves contain the following warning:

It has been lost on *Homo sapiens* that, by analogy to its own life processes which depend on the oxygen-carbon cycle mediated by the lungs, so does the biosphere depend on the planetary oxygen and carbon cycle. The phenomenon of a mammal species perpetrating a mass extinction defies explanation in terms of Darwinian evolution. . . . Having lost a sense of reverence towards Earth, there is no evidence humans are about to rise above the realm of perceptions, dreams, myths, legends, and denial. . . . With a majority oblivious to the fast changing climate, disinformed by vested interests and their media outlets, betrayed by cowardly leaders and discouraged by the sheer magnitude of the event, beyond human power, . . . humanity is drifting into unparalleled catastrophes. . . .⁸⁵

And they give a name to this catastrophic process: Planeticide.⁸⁶

I can imagine many scholars in the social sciences wanting to take Glikson and Groves to task for either making *Homo sapiens* the subject of a possible planetary tragedy or for seeing the whole of humanity as “one.” Some might even object to the “catastrophism” of their prose. In the hands of many social scientists, as we have seen, the subject being indicted would be different—class, developed nations, patriarchal decision-structures, capitalist accumulation, European empires and colonization of lands and peoples, and so on. Some, like Christophe Bonneuil and Jean-Baptiste Fressoz, might even question the power and authority that scientists claim for themselves in defining the Anthropocene: “This then is a prophetic narrative that places the scientists of the Earth system, with their new

84. Langmuir and Broecker, *Habitable Planet*, 645-646.

85. Glikson and Groves, *Climate, Fire and Human Evolution*, 193, 194-195.

86. *Ibid.*, 194. If human activities eventually lead to a Sixth Great Extinction of species, it will be a “first” for the planet. Never before has a species caused a mass extinction event. They were all caused by “some strong combination of asteroid impacts, clusters of volcanic eruptions, ice ages, and/or indications of large changes in ocean chemistry.” Reznick, *The Origins*, 310. See also Andrew Glikson and Emily Spence, “Planet Eaters: Chain Reactions, Black Holes, and Climate Change,” Appendix D to Andrew Glikson, *The Event Horizon: Imagining the Real* (Canberra: privately published by Andrew Glikson, 2016), 92-95. I am deeply grateful to Dr. Glikson for sharing with me his thoughts and writings on the Anthropocene. I should also mention here that, as a geologist, he prefers to keep the term informal and chooses to speak of early, middle, and late Anthropocene, using the term more as an expression of human impact on the planet rather than as pointing to a specific stratigraphic series.

supporters in the human sciences, at the command post of a dishevelled planet and its errant humanity. A geo-government by scientists!”⁸⁷ They oppose “handing full powers to the experts and losing the specific resources that every community has, which in their diversity and local attachments are essential motors for a just ecological transition.”⁸⁸ At the other extreme, there may be those who want to see in the Anthropocene an opportunity for humans to redeem themselves by becoming effective stewards of the planet, a kind of God species.⁸⁹

These diverse human concerns are entirely legitimate, including—especially if the scientists are not given any uncontested authority to define the problem of anthropogenic global warming—even the concerns of the so-called climate-change deniers. Faced not only with planetary environmental problems, but also with enormous inequities of the human world, it is only reasonable for humans to debate their options: the pace of transition to renewable energy, geo-engineering, climate justice issues, sequestering of carbon, harvesting of rainwater, food security, climate refugee policy, adaptation and mitigation measures, and other related issues. Whether humans in the end will necessarily continue to improve and be able to prove themselves a “wise” species is a question reminiscent of a joke that Kant tells in his *The Conflict of Faculties*: “A doctor who consoled his patients from one day to the next with hopes of a speedy convalescence, pledging to one that his pulse beat better, to another an improvement in his stool, to the third the same regarding his perspiration, etc., received a visit from one of his friends. ‘How is your illness, my friend,’ was his first question. ‘How should it be? I am dying of improvement, pure and simple!’”⁹⁰ Kant, as is well known, made his hope for human progress conditional on a number of factors: (a) “instruction [of humanity] by repeated experience,” (b) “the condition of a wisdom from above” (Providence), and (c) “the prospects of an immeasurable time, provided [he said, with an eye on the history of evolution of life] at least that there does not, by some chance, occur a second epoch of natural revolution which will push aside the human race to clear the stage for other creatures like that which . . . submerged the plant and animal kingdoms before men ever existed.”⁹¹ Whether humans still have the prospects of “an immeasurable time” is, of course, a moot point in the present debate over climate change.

Bonneuil and Fressoz fear that geologists and scientists who look on global warming as both a geological event and a “human” responsibility or a responsibility of *Homo sapiens* will destroy politics. “What is left for a politics on the geological scale to which the Anthropocene summons us?,” they ask. “What can we still do on the individual and collective scale given the massive scale of the Anthropocene? The risk is that the Anthropocene and its grandiose time frame

87. Christophe Bonneuil and Jean-Baptiste Fressoz, *The Shock of the Anthropocene: The Earth, History, and Us*, transl. David Fernbach (London: Verso, 2016), 80.

88. Bonneuil and Fressoz, *The Shock*, 94.

89. Mark Lynas, *The God Species* (Washington, DC: National Geographic, 2011).

90. Immanuel Kant, “An Old Question Raised Again: Is the Human Race Constantly Progressing?,” in *The Conflict of the Faculties*, transl. Mary J. Gregor [1979] (Lincoln and London: University of Nebraska Press, 1992), 169. Lewis Beck translated this particular essay in 1957 (see publisher’s note on the frontispiece).

91. *Ibid.*, 159, 161, 169.

anaesthetize politics. Scientists would then hold a monopoly position in both defining what is happening to us and in prescribing what needs to be done.⁹² They feel, like Kant, that “in the face of the omnipotence of nature . . . the human being is . . . but a trifle.”⁹³ What they overlook, however, is that their indictment of consumerism and capitalism shares the same temporal ground with arguments that look for a solution to the Anthropocene in policies advocated by climate science and a collective sense of responsibility (as at the Paris climate negotiations, for instance, in 2015). For all their differences, these different positions situate the discussion exclusively in the time of world history.

One can see at work the process of displacement that would make the time of geology obscure—“humans as a geological force” and the Anthropocene are here themes traversed by questions of power and responsibility. The displacement, first of all, substitutes for the very distributed agency (to speak with Latour again) of Earth processes, technology, humans and other species some kind of an autonomous figure of agency (whether it is a unified figure of humanity or a particular class does not matter) to which both culpability and responsibility may be assigned. The agent here is always in a relationship of synecdoche to the distributed agency of the Earth processes. In other words, the mode of being in which humans collectively may act as a geological force is not the mode of being in which humans—individually and collectively—can become conscious of being such a force. The talk of a “conscious” or responsible “force” collapses—ahead of any actual histories allowing for such a fusion—the two different modes of being human.

The displacement entailed here could be described as follows. If Earth system science was about producing and observing planetary processes (of which intelligence would be a part), and about thus describing not a subject (human, class, and so on) but some kind of an “it” that was plural in its internal construction—the planet as an unstable system made up of imperfectly interlocking processes (including the human as a planetary force)—the place of that “it” is now taken by a subject, an “I” (class, capitalists, nations). This is reminiscent of Lacan’s analytical take, using Freud on the nature of the subject: “*Where it was, the Ich—the subject . . . must come into existence.*”⁹⁴ Bonneuil and Fressoz describe—with reason—Earth system science as a “a view from nowhere” (though humans now cognitively inhabit this nowhere) and ask: “[W]hat if ‘Earth seen from nowhere’ and the narrative of ‘interactions between human species and the Earth system’ were not the most interesting perspective for relating to what has happened to us in the last two and a half centuries, not to mention predicting the future? Perhaps we should accept the Anthropocene concept without succumbing to its dominant narrative[,] . . . without handing full powers to the experts. . . .” The Earth system scientists are good at “alerting us” of danger but “they are ‘from the other side,’”

92. Bonneuil and Fressoz, *The Shock*, 80. Emphasis added.

93. Kant, “An Old Question,” 161.

94. Jacques Lacan, “On the Network of Signifiers,” in *The Four Fundamental Concepts of Psychoanalysis*, transl. Alan Sheridan, ed. Jacques-Alain Miller [1973] (Harmondsworth, UK: Penguin, 1977), 45.

they say, quoting words from René Char's 1949 poem, "Les Inventeurs."⁹⁵ Their words help us to see the second displacement in operation—something that needs to happen if the abyssal (for humans) time of geology were to be written over by the time of human concern. The "inside-out" perspective of human combatants of power and resistance replaces the "outside-in" point of view of Earth system science. If we imagine Earth system scientists as—in a Latourian vein— spokespeople for the "Earth system," the act of folding back into the world-historical time of humans the geological time of the planet's history effects another fascinating shift. It is as if the Earth system were saying to the conscious part of its constituents, humans—to borrow again from Lacan's language: "you never look at me from the place from which I see you."⁹⁶

GEOLOGICAL TIME, THE EVERYDAY, AND THE QUESTION OF THE POLITICAL

The Anthropocene, as Nigel Clark puts it bluntly, "confronts the political with forces and events that have the capacity to undo the political." He invites humanists to "embrace the fully *inhuman*" in their thoughts, putting them "in sustained contact with times and spaces that radically exceed any conceivable human presence."⁹⁷ The Anthropocene, in one telling, is a story about humans. But it is also, in another telling, a story of which humans are only parts, even small parts, and not always in charge. How to inhabit this second Anthropocene so as to bring the geological into human modes of dwelling are questions that remain. It could indeed take "decades, even centuries," Jasanoff warns, "to accommodate to . . . a revolutionary reframing of human–nature relationships."⁹⁸

As I have tried to demonstrate, one obstacle to contemplating such accommodation—and the related question of human vulnerability—is the attachment in much contemporary thought to a very particular construction of "the political" while the task may be, precisely, to reconfigure it. This attachment functions as a fearful and anxious injunction against thinking the geobiological, lest we end up "anesthetizing" or "paralyzing" the political itself.⁹⁹ Humans cannot afford to give up on the political (and on our demands for justice between the more powerful and the less), but we need to resituate it within the awareness of a predicament that now marks the human condition. Political thought has so far been human-centric, holding constant the "world" outside of human concerns or treating its eruptions into the time of human history as intrusions from an "outside." This "outside" no longer exists. What is "just" for humans over one period of time may imperil our existence over another. Besides, Earth system science has revealed

95. Bonneuil and Fressoz, "The Shock," 94, 95.

96. Lacan, "The Line and Light," in *Four Fundamental Concepts*, 103.

97. Nigel Clark, "Geo-politics and the Disaster of the Anthropocene," *Sociological Review* 62 (S1) (2014), 27-28. See also Nigel Clark, "Politics of Strata," *Theory, Culture and Society* 34, no. 2-3 (2017), 1-21, special issue on Geosocial Formations and the Anthropocene.

98. Jasanoff, "A New Climate," 237.

99. For a beginning, see Nigel Clark and Yasmin Gunaratnam, "Earthing the *Anthropos*? From 'Socializing the Anthropocene' to Geologizing the Social," *European Journal of Social Theory* 20, no. 1 (2017), 111-131, and Bronislaw Szerszynski, "The Anthropocene Monument: On Relating Geological and Human Time," *European Journal of Social Theory* 20, no. 1 (2017), 146-163.

how critically entangled human lives are with the geo-bio-chemical processes of the planet. Our concerns for justice cannot any longer be about humans alone, but we don't yet know how to extend these concerns to the universe of nonhumans (that is, not just a few species). There is also the task of having to bring within the grasp of the affective structures of human-historical time the vast scales of the times of geobiology that these structures do not usually engage. Our evolution did not prepare us for these tasks either, as the biologist David Reznick explains:

One useful perspective for envisioning what “sudden” means in geology is to think about how the world is changing today. We are in the midst of the sixth mass extinction. One hundred million years from now, the fossil record of our time will reveal dramatic evidence of the dispersal of humans . . . around 100,000 years ago, . . . the spread of agriculture beginning around 10,000 years ago, the advent of the industrial revolution, then the super-exponential growth of the human population. The current extinction event began during the Pleistocene with the beginning of the decline of the mammalian megafauna. . . . Then there was a global decline of forests, expansion of deserts and grasslands, accumulation of industrial wastes, and an accelerating rate of extinction. . . . The reason why we do not sense cataclysm, even though the geological record is certain to preserve it this way, is because of the difference in the time frame of our lives versus the time frame of the geological record. To us, 100 years is a long time. In the fossil record, 100,000 or even a million years can appear as an instant.¹⁰⁰

One can see the attractions today of folding the narrative of climate change into the familiar structures of intra-human concerns of the political that have been part of modernity since the seventeenth century and that were extended and deepened in the era that saw great waves of decolonization, civil liberties movements, feminist movements, agitations for human rights, and globalization. But all that was before the news of anthropogenic climate change broke in on the world of humanists. Anthropocene time puts pressure on another question: What does it mean to dwell, to be political, to pursue justice when we live out the everyday with the awareness that what seems “slow” in human and world-historical terms may indeed be “instantaneous” on the scale of Earth history, that living in the Anthropocene means inhabiting these two presents at the same time? I cannot fully or even satisfactorily answer the question yet, but surely we cannot even begin to answer it if “the political” keeps acting as an anxious prohibition on thinking of that which leaves us feeling “out-scaled.”¹⁰¹

Our sense of the planet has been profoundly based on what Edmund Husserl once famously called the “ontic certainty” of the world that human beings enjoyed. “The world is pre-given to us,” he wrote, “the waking, always somehow practically interested subjects . . . To live is always to live-in-certainty-of-the-world. Waking life is being awake to the world, being constantly and directly “conscious” of the world and of oneself as a living in the world, actually experiencing [*erleben*] and actually effecting the ontic certainty of the world.”¹⁰²

100. Reznick, *The Origin*, 311.

101. Thanks to Timothy Morton for discussions we had on this point when I visited Rice University a few years ago.

102. Edmund Husserl, *The Crisis of European Sciences and Transcendental Phenomenology: An Introduction to Phenomenological Philosophy*, transl. David Carr (Evanston, IL: Northwestern University Press, 1970), 142-143.

He would repeat the point in his short essay on “The Origin of Geometry,” the famous 1936 text that was included as appendix to his Vienna lectures of 1934.¹⁰³ The earth that corresponds to our everyday world-horizon cannot be an object of any objective science.

Jacques Derrida quotes from a Husserl “fragment” entitled (in English translation) “Fundamental Investigations on the Phenomenological Origin of the Spatiality of Nature” in which Husserl makes a distinction between the Copernican view of the world—(embodying some of the “planet-centered” view that Zalasiewicz mentioned) in which “we Copernicans, . . . men of modern time, . . . say the earth is not ‘the Whole of Nature,’ it is but one of the planets in the indefinite space of the world”—and our everyday relationship to the Earth. “The earth as a spherical body . . . certainly is not perceptible as a whole, by a single person and all at once,” he remarks. It is perceptible only “in a primordial synthesis as the unity of singular experiences bound to each other” though “it may be the experiential ground for all bodies in the experiential genesis of our world-objectification.” This Earth, Husserl asserts, cannot move: “It is on the Earth, toward the Earth, starting from it, but still on it that motion occurs. The Earth itself, in conformity to the original idea of it, does not move, nor is it at rest; it is in relation to the Earth that motions and rest first have sense.” The unity of this primordial Earth arises out of the unity of all humanity. Even if we looked at the Earth from another planet, then we would have “two pieces of a single Earth with one humanity,” for, as Derrida remarks, “the unity of all humanity determines the unity of the ground [the Earth] as such.”¹⁰⁴

Climate change challenges this ontic certainty of the Earth that humans have enjoyed through the Holocene epoch and perhaps for longer. Our *everyday thoughts* have begun to be oriented—thanks again to the current dissemination of geological terms such as the Anthropocene in public culture—by the geological fact that the Earth that Husserl took for granted as the stable and unshakable ground from which all human thoughts (even Copernican ones) arose actually has always been a fitful and restless entity in its long journey through the depths of geological time.¹⁰⁵ It is not that we have not known of catastrophes in the geological history of the planet. We have, but the knowledge did not affect our quotidian sense of an innate assurance that the Earth provides a stable ground on which we project our political purposes. The Anthropocene disturbs that certainty by bringing the geological into the everyday. Nigel Clark makes this observation one of the starting points for his fascinating book, *Inhuman Nature*, by noticing how scientific facts can never entirely displace the “visceral trust in earth, sky, life, and water” that humans come to possess; and yet see how all four of Clark’s terms are under question today: we do not know if the Earth (or Earth system) will honor our trust as we warm her up by emitting greenhouse gases into the sky;

103. Edmund Husserl, “The Origin of Geometry” appended to *ibid.*, 358.

104. Jacques Derrida, *Edmund Husserl’s Origin of Geometry: An Introduction*, transl. and preface by John Leavey Jr., ed. David B. Allen (New York: Nicolas Hay, 1979), 83–84.

105. Jan Zalasiewicz and Mark Williams, *The Goldilocks Planet: The Four Billion Year Story of the Earth’s Climate* (Oxford: Oxford University Press, 2012).

if fresh water will run short, and if life, as some predict, will be threatened with a sixth great extinction.¹⁰⁶

Wittgenstein once said: “We see men building and demolishing houses, and are led to ask: ‘How long has this house been here?’ But how does one come on the idea of asking [that] about a mountain, for example?”¹⁰⁷ Perhaps I can provide a historian’s answer to Wittgenstein’s question. A time has come when the geological and planetary press in on our everyday consciousness as when we speak of there being “excess” carbon dioxide in the atmosphere—“excess” only on the scale of human concerns—or of renewable and nonrenewable sources of energy (nonrenewable on human time scales). For humanists living in such times and contemplating the Anthropocene, questions about histories of volcanoes, mountains, oceans, and plate tectonics—the history of the planet, in short—have become as routine in the life of critical thought as questions about global capital and the necessary inequities of the world that it made.

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106. Nigel Clark, *Inhuman Nature: Sociable Life on a Dynamic Planet* (London: Sage, 2011), 5. I am indebted to Clark for drawing our attention to the Husserl text I discuss here.

107. Ludwig Wittgenstein, *On Certainty*, ed. G. E. M. Anscombe and G. H. von Wright, transl. Denis Paul and G. E. M. Anscombe [1969] (New York: Harper, 1972), 13e.