Climate and Capital: On Conjoined Histories

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It is hard, as humans, to get a perspective on the human race.
—Jan Zalasiewicz, *The Earth after Us*

Anthropogenic global warming brings into view the collision—or the running up against one another—of three histories that, from the point of view of human history, are normally assumed to be working at such different and distinct paces that they are treated as processes separate from one another for all practical purposes: the history of the earth system, the history of life including that of human evolution on the planet, and the more recent history of industrial civilization (for many, capitalism). Humans now unintentionally straddle these three histories that operate on different scales and at different speeds. The very language through which we speak of the climate crisis is shot through with this problem of human and in- or nonhuman scales of time. Take the most ubiquitous distinction we make in our everyday prose between nonrenewable sources of energy and the "renewables." We consider fossil fuels nonrenewable on our terms, but as Bryan Lovell—a geologist who worked as an advisor for British Petroleum and an ex-president of the Geological Society of London—points out, fossil fuels are renewable if only we think of them on a

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scale that is (in his terms) *inhuman*: "Two hundred million years from now, a form of life requiring abundant oil for some purpose should find that plenty has formed since our own times."[1]

Paleoclimatologists tell a very long history when it comes to explaining the significance of anthropogenic global warming. There is, first of all, the question of evidence. Ice core samples of ancient air—more than 800,000 years old—have been critical in establishing the anthropogenic nature of the current warming.[2] There are, besides, paleoclimatic records of the past in fossils and other geological materials. In his lucid book on the oil industry's response—not always or uniformly negative—to the climate crisis, Lovell writes that the group within the industry who supplied it with compelling evidence of the serious challenge that greenhouse gas emissions posed to the future of humanity were geologists who could read deep climate histories buried in sedimentary rocks to see the effects of "a dramatic warming event that took place 55 million years ago." This is known as the late Paleocene-Eocene Thermal Maximum (PETM).

> Comparison of the volume of carbon released to the atmosphere [then] . . . and the volume we are now releasing ourselves strongly suggests that we are indeed facing a major global challenge. We are in danger of repeating that 55 million-year-old global warming event, which disrupted Earth over 100,000 years. That event took place long before *Homo sapiens* was around to light so much as a campfire.[3]

How far the arc of the geological history explaining the present climate crisis projects into the future may be quickly seen from the very subtitle of David Archer's *The Long Thaw: How Humans Are Changing the Next 100,000 Years of Earth's Climate*. "Mankind is becoming a force in climate comparable to the orbital variations that drive glacial cycles," writes Archer.[4] "The long lifetime of fossil fuel CO_2," he continues, "creates a sense of fleeting folly about the use of fossil fuels as an energy source. Our fossil fuel deposits, 100 million years old, could be gone in a few centuries, leav-

1. Bryan Lovell, *Challenged by Carbon: The Oil Industry and Climate Change* (New York, 2010), p. 75.
2. See *Climate Change 2007: The Physical Science Basis*, ed. Susan Solomon et al. (2007; Cambridge, 2009), box 6.2, p. 446.
3. Lovell, *Challenged by Carbon*, p. xi.
4. David Archer, *The Long Thaw: How Humans Are Changing the Next 100,000 Years of Earth's Climate* (Princeton, N.J., 2009), p. 6; hereafter abbreviated *LT*.

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ing climate impacts that will last for hundreds of millennia. The lifetime of fossil fuel CO_2 in the atmosphere is a few centuries, plus 25% that lasts essentially forever" (*LT*, p. 11). The carbon cycle of the Earth—as Archer explains and as Curt Stager repeats—will eventually clean up the excess CO_2 we put out in the atmosphere, but it works on an inhumanly long timescale.[5]

The climate crisis thus produces problems that we ponder on very different and incompatible scales of time. Policy specialists think in terms of years, decades, at most centuries, while politicians in democracies think in terms of their electoral cycles. Understanding what anthropogenic climate change is and how long its effects may last calls for thinking on very large and small scales at once, including scales that defy the usual measures of time that inform human affairs. This is another reason that makes it difficult to develop a comprehensive politics of climate change. Archer goes to the heart of the problem here when he acknowledges that the million-year timescale of the planet's carbon cycle is "irrelevant for political considerations of climate change on human time scales." Yet, he insists, it remains relevant to any understanding of anthropogenic climate change because "ultimately the global warming climate event will last for as long as it takes these slow processes to act."[6]

Significant gaps thus open up in the existing literature on the climate problem, between cognition and action, between what we scientifically know about it—the vastness of its non- or inhuman scale, for instance—and how we think about it when we treat it as a problem to be handled by the human means at our disposal. The latter have been developed for addressing problems we face on familiar scales of time. I call these gaps or openings in the landscape of our thoughts rifts because they are like fault lines on a seemingly continuous surface; we have to keep crossing or straddling them as we think or speak of climate change. They inject a certain degree of contradictoriness in our thinking, for we are being asked to think about different scales simultaneously.

I want to discuss here three such rifts: the various regimes of probability that govern our everyday lives in modern economies and which now have to be supplemented by our knowledge of the radical uncertainty of the climate; the story of our necessarily divided human lives having to be supplemented by the story of our collective life as a species, a dominant species, on the planet; and having to make room within our inevitably

5. See Curt Stager, *Deep Future: The Next 100,000 Years of Life on Earth* (New York, 2011), chap. 2.

6. Archer, *The Global Carbon Cycle* (Princeton, N.J., 2010), p. 21; hereafter abbreviated *GC*.

anthropocentric thinking for forms of disposition towards the planet that do not put humans first. We have not yet overcome these dilemmas to settle decidedly on any one side of them. They remain rifts.

In what follows, I elaborate on these rifts with a view to demonstrating that the analytics of capital (or of the market), while necessary, are insufficient instruments in helping us come to grips with anthropogenic climate change. I will go on to conclude by proposing that the climate crisis makes visible an emergent but critical distinction between the global and the planetary that will need to be explored further in order to develop a perspective on the human meaning(s) of global warming.

Probability and Radical Uncertainty

Modern life is ruled by regimes of probabilistic thinking. From evaluating lives for actuarial ends to the working of money and stock markets, we manage our societies by calculating risks and assigning probability values to them.[7] "Economics," writes Charles S. Pearson, "often makes a distinction between risk, where probabilities of outcomes are known, and uncertainty, where probabilities are not known and perhaps unknowable."[8] This is surely one reason why economics as a discipline has emerged as the major art of social management today.[9] There is, therefore, an understandable tendency in both climate-justice and climate-policy literature—the latter dominated by economists or law scholars who think like economists—to focus not so much on what paleoclimatologists or geophysicists who study planetary climate historically have to say about climate change but rather on what we might call the physics of global warming that often presents a predictable, static set of relationships of probability and proportion; if the share of greenhouse gases in the atmosphere goes up by X, then the probability of the earth's average surface temperature going up by so much is Y.[10]

7. A thoughtful series of essays connecting public perceptions of risks with their management through statistical analyses and political and legal regulation is to be had in Cass R. Sunstein, *Risk and Reason: Safety, Law, and the Environment* (New York, 2002); hereafter abbreviated *RR*.

8. Charles S. Pearson, *Economics and the Challenge of Global Warming* (New York, 2011), p. 25 n. 6; hereafter abbreviated *E*.

9. A classic text on this topic is Frank H. Knight, *Risk, Uncertainty, and Profit* (1921; Mineola, N.Y., 2006). Knight would have objected to my use of the word *art* with regard to the discipline of economics, for he considered it to be part of the sciences. He begins the book with the statement: "Economics, or more properly theoretical economics, is the only one of the social sciences which has aspired to the distinction of an exact science" while praising physics for securing "our present marvelous mastery over the forces of nature" (pp. 3, 5).

10. See, for example, the chart reproduced in *The Economics of Climate Change: The Stern*

Such a way of thinking assumes a kind of stability or predictability—however probabilistic it may be—on the part of a warming atmosphere that paleoclimatologists, focused more on the greater danger of tipping points, often do not assume. This is neither because policy thinkers are not concerned about the dangers of climate change nor because they are ignorant of the profoundly nonlinear nature of the relationship between greenhouse gases and the rise in the planet's average surface temperature. But their methods are such that they appear to hold or bracket climate change as a broadly known variable (converting its uncertainties into risks that have been acknowledged and evaluated) while working out options that humans can create for themselves striving together or even wrangling among themselves. The world climate system, in other words, has no significant capacity to be a wild card in their calculations insofar as they can make policy prescriptions; it is there in a relatively predictable form to be managed by human ingenuity and political mobilization.[11]

The rhetoric of the climate scientists in what they write to persuade the public, on the other hand, is often remarkably vitalist. In explaining the danger of anthropogenic climate change, they often resort to a language that portrays the climate system as a living organism. There is not only the famous case of James Lovelock, comparing life on the planet to a single living organism that he christened Gaia—a point that even the "sober" Archer accommodates in his primer on the global carbon cycle as a fair but "philosophical definition" (*GC*, p. 22).[12] Archer himself describes the "car-

Review, ed. Nicholas Stern (New York, 2007), p. 200. See also Eric A. Posner and David Weisbach, *Climate Change Justice* (Princeton, N.J., 2010), chap. 2.

11. In a series of essays, the economist Martin Weitzman has emphasized how the usual cost-benefit analyses of *welfare loss* due to climate change assume temperature rises on the lower side; the uncertainties of calculating the *damage function* consequent on a catastrophic rise of 10–20°C in the average global surface temperature throw economic calculations haywire. Weitzman remarks:

> Even just acknowledging more openly the incredible magnitude of the deep structural uncertainties . . . involved in climate-change analysis—and explaining better to policy makers that the artificial crispness conveyed by conventional [Integrated Assessment Model] IAM–based [cost-benefit analyses] CBAs . . . is especially and unusually misleading compared with more-ordinary non-climate-change CBA situations—might elevate the level of public discourse concerning what to do about global warming. [Martin L. Weitzman, "Some Basic Economics of Extreme Climate Change," 19 Feb. 2009, www.environment.harvard.edu/docs/faculty_pubs/weitzman_basic.pdf, p. 26]

See also Weitzman, "GHG Targets as Insurance against Catastrophic Climate Damages," *Journal of Public Economic Theory* 14 (Mar. 2012): 221–44.

12. Lovelock himself defends the concept of Gaia at least as a metaphor; see James Lovelock, *The Vanishing Face of Gaia* (New York, 2009), p. 13; hereafter abbreviated *V*.

bon cycle of the Earth" as "alive" (*GC*, p. 1). The image of climate as a temperamental animal also inhabits the language of Wallace (Wally) Broecker, who, with Robert Kunzig, thus describes his studies:

> Every now and then, . . . nature has decided to give a good swift kick to the climate beast. And the beast has responded, as beasts will—violently and a little unpredictably. Computer models . . . [are] certainly a valid approach. But studying how the beast has responded in the past under stress is another way to prepare ourselves for what might happen as we take a whack at it ourselves. That's the idea that has obsessed Broecker for the past twenty-five years, and with each passing year it has come to seem more urgent.[13]

Or notice how Hansen uses the word "lethargic" in explaining climate change:

> The speed of glacial-interglacial change is dictated by 20,000-, 40,000-, and 100,000-year time scales for changes of Earth's orbit—but this does not mean that the climate system is inherently *that* lethargic. On the contrary. Human-made climate forcing, by paleoclimate standards, is large and changes in decades, not tens of thousands of years. [*SM*, p. 71]

The vitalism of this prose does not arise because climate scientists are less "scientific" than economists and policy makers. The vitalist metaphors issue from climate scientists' anxiousness to communicate and underscore two points about Earth's climate: that its many uncertainties cannot ever be completely tamed by existing human knowledge and that its exact tipping points are inherently unknowable. As Archer puts it:

> The IPCC forecast for climate change in the coming century is for a generally smooth increase in temperature. . . . However, actual climate changes in the past have tended to be abrupt. . . . Climate models . . . are for the most part unable to simulate the flip flops in the past climate record very well. [*LT*, p. 95]

It is in fact this sense of a "climate beast" that is missing from both the literature inspired by economics and by political commitments on the Left. John Broome, a lead author of the Working Group III of the IPCC 2007 report and himself an economist-turned-philosopher, looks forward to a future where climate models continue to "narrow" the probabilities

13. Wallace S. Broecker and Robert Kunzig, *Fixing Climate: What Past Climate Changes Reveal about the Current Threat—and How to Counter It* (New York, 2008), p. 100.

that "should be assigned to various possibilities." For economic reasoning to have a better grasp of the world, "detailed information about probabilities" is needed, and, adds Broome, "we are waiting for it to be supplied by scientists."[14] But this may misunderstand the nature of the planet's climate and the models humans make of it. Climate uncertainties may not always be like measurable risks. "Do we really need to know more than we know now about how much the Earth will warm? *Can* we know more?" asks Paul Edwards rhetorically. "It is now virtually certain that CO_2 concentrations will reach 550 ppm (the doubling point) sometime in the middle of this century," and the planet "will almost certainly overshoot CO_2 doubling." Climate scientists, he reports, are engaged in the speculation "that *we will probably never get a more exact estimate than we already have.*"[15]

The reasoning behind Edwards's statement is relevant to my argument. "If engineers are sociologists," writes Edwards, "then climate scientists are historians." Like historians, "every generation of climate scientists revisit the same data, the same events—digging through the archives to ferret out new evidence, correct some previous interpretation," and so on. And "just as with human history, we will never get a single, unshakable narrative of the global climate's past. Instead we get versions of the atmosphere, . . . convergent yet never identical" (*VM*, p. 431). Moreover, "all of today's analyses are based on the climate we have experienced in historical time." "'Once the world has warmed by 4°C,'" he quotes scientists Myles Allen and David Frame, "'conditions will be so different from anything we can observe today (and still more different from the last ice age) that it is inherently hard to say when the warming will stop.'" Their point, Edwards explains, is this: not only do we not know if "there is some 'safe' level of greenhouse gases that would 'stabilize' the climate" for humans; thanks to anthropogenic global warming, we may "never" be in a position to find out whether such a point of stabilization can exist in human timescales (*VM*, p. 439).

The first rift that I speak of thus organizes itself around the question of the tipping point of the climate, a point beyond which global warming could be catastrophic for humans. That such a possibility exists is not in doubt. Paleoclimatologists know that the planet has undergone such warming in the geological past (as in the case of the PETM event). But we cannot predict how quickly such a point could arrive. It remains an uncertainty that is not amenable to the usual cost-benefit analyses that are a

14. John Broome, *Climate Matters: Ethics in a Warming World* (New York, 2012), pp. 128, 129.

15. Paul N. Edwards, *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (Cambridge, Mass., 2010), pp. 438–39; hereafter abbreviated *VM*.

necessary part of risk-management strategies. As Pearson explains, "BC [benefit-cost analysis] is not well suited for making catastrophe policy" and acknowledges that the "special features that distinguish uncertainty in global warming are the presence of nonlinearities, thresholds and potential tipping points, irreversibilities, and the long time horizon" that make "projections of technology, economic structure, preferences and a host of other variables 100 years from now increasingly questionable" (*E*, pp. 31, 26). "The implication of uncertainty, thresholds, tipping points," he writes, "is that we should take a precautionary approach," that is, "avoid taking steps today that lead to irreversible changes" (*E*, p. 30). But "the precautionary principle," as Sunstein explains, also involves cost-benefit analysis and some estimation of probability: "Certainly we should acknowledge that a small probability (say, 1 in 100,000) of serious harm (say, 100,000 deaths) deserves extremely serious attention" (*RR*, p. 103). But we simply don't know the probability of the tipping point being reached over the next several decades or by 2100, for the tipping point would be a function of the rise in global temperature and multiple, unpredictable amplifying feedback loops working together. Under the circumstances, the one principle that James Hansen recommends to policy thinkers concerns the use of coal as a fuel. He writes: "If we want to solve the climate problem, we must phase out coal emissions. Period."[16] Not quite a "precautionary principle" but what in the literature on risks would be known as "the maximin principle": "choose the policy with the best worst-case outcome" (*RR*, p. 129 n. 40). But this would seem unacceptable to governments and business around the world; without coal, on which China and India are still dependent to a large degree (68–70 percent of their energy supply), how would the majority of the world's poor be lifted out of poverty in the next few decades and thus be equipped to adapt to the impact of climate change? Or, would the world, scrambling to avoid the tipping point of the climate, make the global economy itself tip over and cause untold human misery? Thus, would avoiding "the harm" itself do more harm, especially as we do not know the probability of reaching the tipping point in the coming few decades? This is the dilemma that goes with the application here of the precautionary or the maximin principle, as both Sunstein and Pearson explain (see *E*).[17] It is not surprising that Stephen Gardiner's chapter on

16. James Hansen, *Storms of My Grandchildren: The Truth about the Coming Climate Catastrophe and Our Last Chance to Save Humanity* (New York, 2009), p. 176; hereafter abbreviated *SM*.

17. Sunstein acknowledges that "the worst-case scenario involving global warming" calls for the application of the maximin principle and yet recommends the "'cap-and-trade' system"—which assumes a gradual transition to renewables — as it "seems to be the most

cost-benefit analyses in the context of climate change is named "Cost-Benefit Paralysis"[18]

At the heart of this rift is the question of scale. On the much more extended canvas on which they place the history of the planet, paleoclimatologists see climatic tipping points and species extinction as perfectly repeatable phenomena, irrespective of whether or not we can model for them. Our strategies of risk management, however, arise from more human calculations of costs and their probabilities over plausible human timescales. The climate crisis requires us to move back and forth between thinking on these different scales all at once.

Our Divided Lives as Humans and Our Collective Life as a Dominant Species

Human-induced climate change gives rise to large and diverse issues of justice: justice between generations, between small island-nations and the polluting countries (both past and prospective), between developed, industrialized nations (historically responsible for most emissions) and the newly industrializing ones. Peter Newell and Matthew Paterson express a sense of discomfiture about the use of the word *human* in the expression *human-induced climate change*. "Behind the cosy language used to describe climate change as a common threat to all humankind, "they write, "it is clear that some people and countries contribute to it disproportionately, while others bear the brunt of its effects. What makes it a particularly tricky issue to address," they go on to say, "is that it is the people that will suffer most that currently contribute least to the problem, i.e. the poor in the developing world. Despite often being talked about as a scientific question, climate change is *first and foremost* a deeply political and moral issue."[19] In her endorsement of their book, the Indian environmentalist Sunita Narain remarks that "Climate Change we know is intrinsically linked to the model of economic growth in the world."[20] The climate crisis—write John Bellamy Foster, Brett Clark, and Richard York in their thoughtful book, *The*

promising, in part because it is so much less expensive than the alternatives" (*RR*, p. 129). This amounts to replacing the maximin principle by the precautionary one. We can only infer how little understood the challenge of global warming-related "uncertainty" was among scholars who assumed that the usual strategies of risk management would be an adequate response to the problem.

18. See Stephen M. Gardiner, "Cost-Benefit Paralysis," *A Perfect Moral Storm: The Ethical Tragedy of Climate Change* (New York, 2011), chap. 8.

19. Peter Newell and Matthew Paterson, *Climate Capitalism: Global Warming and the Transformation of the Global Economy* (New York, 2010), p. 7; my emphasis.

20. Sunita Narain, blurb for Newell and Paterson, *Climate Capitalism*, back cover.

Ecological Rift—is "at bottom, the product of a social rift: the domination of human being by human being. The driving force is a society based on class, inequality, and acquisition without end."[21]

A very similar position was put forward in 2009 when the Department of Economic and Social Affairs of the United Nations published a report carrying the title *Promoting Development and Saving the Planet*.[22] In signing off on the report, Sha Zukang, UN under-secretary general for economic and social affairs, wrote: "The climate crisis is the result of the very uneven pattern of economic development that evolved over the past two centuries, which allowed today's rich countries to attain their current levels of income, in part through not having to account for the environmental damage now threatening the lives and livelihoods of others" ("O," p. viii). Characterizing climate change as a "development challenge," Zukang went on to remark how a certain deficit of trust marks the attitude of the non-Western countries towards the West (see "O," p. xviii). The report actually expanded on his point: "How developing countries can achieve catch-up growth and economic convergence in a carbon-constrained world and what the advanced countries must do to relieve these concerns have become leading questions for policymakers at the national and international levels ("O," p. 3). The original formulation of this position, to the best of my knowledge, goes back to 1991 when two well-known and respected Indian environmental activists, the late Anil Agarwal and Narain, authored a booklet titled *Global Warming in an Unequal World: A Case of Environmental Colonialism* published by their organization, Centre for Science and Environment, in Delhi.[23] This booklet did much to generate the idea of *common but differentiated responsibilities* and the tendency to argue from figures of per capita emissions of greenhouse gases that became popular as part of the Kyoto protocol.[24]

There are good reasons why questions of justice arise. Only a few nations (some twelve or fourteen, including China and India in the last decade or so) and a fragment of humanity (about one-fifth) are historically responsible for most of the emissions of greenhouse gases so far. This is

21. John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift: Capitalism's War on the Earth* (New York, 2010), p. 47.

22. See Sha Zukang, "Overview," *Promoting Development and Saving the Planet* (New York, 2009), www.un.org/en/development/desa/policy/wess/wess_archive/2009wess.pdf; hereafter abbreviated "O."

23. See Anil Agarwal and Narain, *Global Warming in an Unequal World: A Case of Environmental Colonialism* (New Delhi, 1991); hereafter abbreviated *GW*.

24. See United Nations Environment Programme, "Rio Declaration of the United Nations Conference on Environment and Development," www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163

true. But we would not be able to differentiate between humans as actors and the planet itself as an actor in this crisis if we did not realize that, leaving aside the question of intergenerational ethics that concerns the future, anthropogenic climate change is not inherently—or logically—a problem of past or accumulated intrahuman injustice. Imagine the counterfactual reality of a more evenly prosperous and just world made up of the same number of people and based on exploitation of cheap energy sourced from fossil fuel. Such a world would undoubtedly be more egalitarian and just—at least in terms of distribution of income and wealth—but the climate crisis would be worse! Our collective carbon footprint would only be larger—for the world's poor do not consume much and contribute little to the production of greenhouse gases—and the climate change crisis would have been on us much sooner and in a much more drastic way. It is, ironically, thanks to the poor—that is, to the fact that development *is* uneven and unfair—that we do not put even larger quantities of greenhouse gases into the biosphere than we actually do. Thus, logically speaking, the climate crisis is not *inherently* a result of economic inequalities—it is really a matter of the quantity of greenhouses gases we put out and into the atmosphere. Those who connect climate change exclusively to historical origins/formations of income inequalities in the modern world raise valid questions about historical inequalities; but reducing the problem of climate change to that of capitalism (folded into the histories of modern European expansion and empires) only blinds us to the nature of our present, a present defined by the coming together of the relatively short-term processes of human history and other much longer-term processes that belong to earth-systems history and the history of life on the planet.

Agarwal and Narain's insistence, however, that the natural carbon sinks—such as the oceans—are part of the global commons and hence best distributed among nations by applying the principle of equal access on a per capita basis if the world were to "aspire . . . to such lofty ideals like global justice, equity and sustainability," raises by implication a very important issue: the simultaneously acknowledged and disavowed problem of population (*GW*, pp. 5–9). Population is often the elephant in the room in discussions of climate change. The "problem" of population—while due surely in part to modern medicine, public health measures, eradication of epidemics, the use of artificial fertilizers, and so on—cannot be attributed in any straightforward way to a logic of a predatory and capitalist West, for neither China nor India pursued unbridled capitalism while their populations exploded. If India had been more successful with population control or with economic development, her per capita emis-

sion figures would have been higher (that the richer classes in India want to emulate Western styles and standards of consumption would be obvious to any observer). Indeed, the Indian minister in charge of the environment and forests, Jairam Ramesh, said as much in an address to the Indian parliament in 2009: "per-capita is an accident of history. It so happened that we could not control our population."[25]

Population remains a very important factor in how the climate crisis plays out. Chinese and Indian governments continue to build coal-fired power stations, justifying the move by referring to the number of people who urgently need to be pulled out of poverty; coal still remains the cheapest option for fulfilling this purpose. The Indian government is fond of quoting Gandhi on the present environmental crisis: "Earth [*prithvi*] provides enough to satisfy every man's need but not enough for every man's greed."[26] Yet "greed" and "need" become indistinguishable from each other in arguments in defense of continued use of coal, the worst offender among fossil fuels. India and China want coal; Australia and other countries want to export it. It is still the cheapest variety of fossil fuel. In 2011, "'coal represented 30 percent of world energy'" and that was "'the highest share it [had] had since 1969.'"[27] Coal use was expected to increase by 50 percent by 2035, bringing enormous export opportunities to companies in South America. "American coal companies," remarked the report in the *New York Times*, "badly want to export coal from the country's most productive mines in the Powder River Basin in Wyoming and Montana" as they saw that in the longer term, thanks to China and India, coal's future

25. Shri Jairam Ramesh et al., "Climate Change and Parliament," in *Handbook of Climate Change and India: Development, Politics, and Governance*, ed. Navroz K. Dubash (New York, 2012), p. 238. D. Raghunandan argues that this "climate justice" position that India championed at many international forums on climate change was informed more by "geopolitical assessments" than by any "deep scientific understanding" (D. Raghunandan, "India's Official Position: A Critical View Based on Science," in *Handbook of Climate Change and India,* pp. 172, 173).

26. Quoted in Y. P. Anand and Mark Lindley, "Gandhi on Providence and Greed," www.academia.edu/303042/Gandhi_on_providence_and_greed, p. [1]. Gandhi is supposed to have said this in Hindi in 1947 to his secretary, Pyarelal Nayyar, who reproduced it in his book, *Mahatma Gandhi: The Last Phase*, 2 vols. (Ahmedabad, 1956–1958), 2: 552. Anand and Lindley say that Gandhi was influenced by the work of J. C. Kumarappa, in turn a Gandhian economist to whose book *Economy of Permanence* (1945) Gandhi contributed a preface. Interestingly, India's *National Action Plan on Climate Change* incorrectly paraphrases Gandhi's dictum as saying "the earth has enough resources to meet people's needs, but will never have enough to satisfy people's greed," thus missing the emphasis that Gandhi typically put on the individual's sense of moral responsibility (Government of India, *National Action Plan on Climate Change,* pmindia.gov.in/climate_change_english.pdf, p. 1).

27. Peter Galuszka, "With China and India Ravenous for Energy, Coal's Future Seems Assured," *New York Times*, 12 Nov. 2012, www.nytimes.com/2012/11/13/business/energy-environment/china-leads-the-way-as-demand-for-coal-surges-worldwide.html?_r=0

seemed "bright—mainly because it is cheaper than its competitors."[28] This vast market for coal would not have come about without China and India justifying the use of coal by referring to the needs of their poor.

Population is also a problem because the total size and distribution of humanity matters in how the climate crisis unfolds, particularly with regards to species extinction. There is the widely accepted point that humans have been putting pressure on other species for quite some time now; I do not need to belabor it. Indeed, the war between humans and animals such as rhinoceroses, elephants, monkeys, and big cats may be seen every day in many Indian cities and villages. That we have consumed many varieties of marine life out of existence is also generally accepted. Ocean acidification threatens the lives of many species (see *SM*). And, clearly, as many have pointed out, the exponential growth of human population in the twentieth century has itself had much to do with fossil fuels through the use of artificial fertilizers, pesticides, and irrigation pumps.[29]

But there is another reason why the history of human evolution and the total number of human beings today matter when we get to the question of species survival as the planet warms. One way that species threatened by global warming will try to survive is by migrating to areas more conducive to their existence. This is how they have survived past changes in the climatic conditions of the planet. But now there are so many of us, and we are so widespread on this planet, that we stand in the way. Curt Stager puts it clearly:

> Even if we take a relatively moderate emissions path into the future and thereby hope to avoid destroying the last polar and alpine refuges, warming on the scale [expected] . . . will still nudge many species toward higher latitudes and elevations. In the past, species could simply move . . . but this time they'll be trapped within the confines of habitats that are mostly immobilized by our presence. . . . As Anthropocene warming rises toward its as yet unspecified peak, our long-suffering biotic neighbors face a situation that they have never encountered before in the long, dramatic history of ice ages and interglacials.[30]

They can't move because we're standing in their way.

28. Ibid.

29. See Vaclav Smil, *Harvesting the Biosphere: What We Have Taken from Nature* (Cambridge, Mass., 2013), p. 221, and Tom Butler, Daniel Lerch, and George Wuerthner, "Introduction: Energy Literacy," in *The Energy Reader: Overdevelopment and the Delusion of Endless Growth*, ed. Butler, Lerch, and Wuerthner (Sausalito, Calif., 2012), pp. 11–12.

30. Stager, *Deep Future*, pp. 62–66. See also the discussion in *SM*, pp. 145–46.

The irony of the point runs deeper. The spread of human groups throughout the world—the Pacific islands were the last to be settled by around 3,500 BP—and their growth in the age of industrial civilization now make it difficult for human climate refugees to move to safer and more inhabitable climes.[31] Other humans will stand in their way. Burton Richter puts the point thus:

> We [humans] were able to adapt to [climate] change in the past . . . but there were tens of thousands of years to each swing compared with only hundreds of years for the earth to heat up this time. The slow pace of change gave the relatively small population back then time to move, and that is just what it did during the many temperature swings of the past, including the ice ages. The population now is too big to move *en masse*, so we had better do our best to limit the damage that we are causing.[32]

The history of population thus belongs to two histories at once: the very short-term history of the industrial way of life—of modern medicine, technology, and fossil fuels (fertilizers, pesticides, irrigation)—that accompanied and enabled the growth in our numbers and the much, much longer-term evolutionary or deep history of our species, the history through which we have evolved to be the dominant species of the planet, spreading all over it and now threatening the existence of many other life-forms. The poor participate in that shared history of human evolution just as much as the rich do. P. K. Haff has convincingly argued in a recent paper that it would not be possible to sustain the lives of seven—soon to be nine—billion people on the planet without modern forms of energy and communications technology touching all our lives in some significant ways. Minus this network of connections, he argues, the total human population on earth will collapse to about ten million. The "technosphere," he argues, has become the condition of possibility enabling so many of us, both rich and poor, to live on this planet and act as its dominant species.[33]

The per capita emission figures, while useful in making a necessary and corrective polemical point in the political economy of climate change, hide the larger history of the species in which both the rich and the poor par-

31. See Michael Denny and Lisa Matisoo-Smith, "Rethinking Polynesian Origins: Human Settlement of the Pacific," lens.auckland.ac.nz/images/4/41/Pacific_Migration_Seminar_Paper_2011.pdf

32. Burton Richter, *Beyond Smoke and Mirrors: Climate Change and Energy in the Twenty-Fitst Century* (New York, 2010), p. 2.

33. See P. K. Haff, "Technology as a Geological Phenomenon: Implications for Human Well-Being," *Geological Society of London,* 24 Oct. 24, 2013, sp.lyellcollection.org/content/early/2013/10/24/SP395.4.full.pdf+html. I owe this reference to Jan Zalasiewicz.

ticipate. Population is clearly a category that joins the two histories together.

Are Humans Special? The Moral Rift of the Anthropocene

The climate crisis reveals the sudden coming together—the enjambment, if you will—of the usually separated syntactic orders of recorded and deep histories of the human kind, of species history and the history of the earth systems, revealing the deep connections through which the planet's carbon cycle and life interact with each other. But this knowledge does not follow, however, that humans will stop pursuing, with vigor and vengeance, our all-too-human ambitions and squabbles that unite and divide us at the same time. Will Steffen, Paul Crutzen, and John McNeill have drawn our attention to what they call—after Polyani, I assume—the period of "The Great Acceleration" in human history, circa 1945 to 2015, when global figures for population, real GDPs, foreign direct investment, damming of rivers, water use, fertilizer consumption, urban population, paper consumption, transport motor vehicles, telephones, international tourism, and McDonald's restaurants (yes!) all began to increase dramatically in an exponential fashion.[34] This period, they suggest, could be a strong candidate for an answer to the question, When did the Anthropocene begin? The Anthropocene may stand for all the climate problems we face today collectively, but it is impossible for me, as a historian of human affairs, not to notice that this period of so-called great acceleration is also the period of great decolonization in countries that had been dominated by European imperial powers and that made a move towards modernization (the damming of rivers, for instance) over the ensuing decades and, with the globalization of the last twenty years, towards a certain degree of democratization of consumption as well. I cannot ignore the fact that "the great acceleration" included the production and consumption of consumer durables—such as the refrigerator and the washing machine—in Western households that were touted as "emancipatory" for women.[35] Nor can I forget the pride with which today the most ordinary and poor Indian citizen possesses his or her own smart phone or cheap substitute.[36] The lurch into the Anthropocene has also been globally the story of some long-anticipated social justice, at least in the sphere of consumption.

34. See Will Steffen, Paul J. Crutzen, John R. McNeill, "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?" *AMBIO* 36 (Dec. 2007): 614–21.

35. For an Australian example of this, see Lesley Johnson, *The Modern Girl: Childhood and Growing Up* (New South Wales, 1993).

36. See Assa Doron and Robin Jeffrey, *The Great Indian Phone Book: How the Cheap Cell Phone Changes Business, Politics, and Daily Life* (Cambridge, Mass., 2013).

This justice among humans, however, comes at a price. The result of growing human consumption has been a near-complete human appropriation of the biosphere. Jan Zalasiewicz cites some sobering statistics from the researches of Vaclav Smil:

> Smil has taken our measure from the most objective criterion of all: collective weight. Considered simply as body mass . . . we now bulk up to about a third of terrestrial vertebrate body mass on Earth. Most of the other two-thirds, by the same measure, comprise what we keep to eat: cows, pigs, sheep and such. Something under 5% and perhaps as little as 3%, is now made of the genuinely wild animals—the cheetahs, elephants, antelopes and the like. . . . Earlier in the Quaternary [the last two million years], . . . humans were just one of some 350 large . . . vertebrate species.

"Given the precipitate drop in the numbers of wild vertebrates, one might imagine that vertebrate biomass as a whole has gone down," writes Jalasiewicz. "Well, no," he continues: "Humans have become very good at, firstly, increasing the rate of vegetable growth, by conjuring nitrogen from the air and phosphorus from the ground, and then directing that extra growth towards its brief stopover in our captive beasts, and thence, to us. . . . The total vertebrate biomass has increased by something approaching an order of magnitude above 'natural' levels (staggering, isn't it . . .)," Zalasiewicz remarks.[37] Smil concludes his massively researched book, *Harvesting the Biosphere*, with these cautionary words: "If billions of poor people in low-income countries were to claim even half the current per capita harvests prevailing in affluent economies, too little of the Earth's primary production would be left in its more or less natural state, and very little would remain for mammalian species other than ours."[38]

This raises a question that bears striking similarity to the question that Europeans often asked themselves when they forcibly or otherwise took over other peoples' lands: by what right or on what grounds do we arrogate to ourselves the almost exclusive claims to appropriate for human needs the biosphere of the planet? John Broome confronts this question in his book on "ethics in a warming world." In a section entitled "What Is Ulti-

37. Jan Zalasiewicz, "The Human Touch," *The Paleontology Newsletter* 82, www.palass-pubs.org/newsletters/pdf/number82/number82.pdf, p. 24. While Zalasiewicz's summary of Smil's researches is extremely helpful, it should be remembered that most of Smil's effort is directed at reminding the reader of the methodological challenges involved in measuring the changes reported on here and how approximate and provisional the relevant numbers are. Zalasiewicz's figures here are based on Smil, "Harvesting the Biosphere: the Human Impact," *Population and Development Review* 37 (Dec. 2011): 613–36. I owe this reference to Zalasiewicz.

38. Smil, *Harvesting the Biosphere*, p. 252.

mately Good?" Broome acknowledges that climate change raises this question: "in particular the question if nature—species, ecosystems, wildernesses, landscapes—has value in itself." That question he decides is "too big" for his book and yet still proceeds to offer these thoughts on the value of nature: "Nature is undoubtedly valuable because it is good for people. It provides material goods and services. The river brings us our clean water and takes away our dirty water. Wild plants provide many of our medicines, . . . Nature also brings emotional good to people. But the significant question raised by climate change is whether nature has value in itself. . . . This question is too big for this book. I shall concentrate on the good of the people."[39]

But is "the good of the people" an unquestionable good? Are we special? Archer also begins his book *The Long Thaw* addressing this very question. Science, Archer thinks, is humbling for humans, for it does not hold up the case for human specialness. It rather tells us we are not "biologically 'special'"—"we are descended from monkeys, and they from even humbler origins." Geological evidence, he further writes, "tells us that the world is much older than we are, and there's no evidence that it was created especially for us. . . . This is all very humbling" (*LT*, p. 2). But the tricky question of the assumed specialness of humans takes us into a past much longer than that of capital and into territories that we never had to cross in thinking about the inequalities and injustices of the rule of capital.

The idea that humans are special has, of course, a long history. We should perhaps speak of anthropocentrisms in the plural here. There is, for instance, a long line of thinking—from religions that came long after humans established the first urban centers of civilization and created the idea of a transcendental God through to the modern social sciences—that has humans opposed to the natural part of the world. These later religions are in strong contrast, it seems, with the much more ancient religions of hunting-gathering peoples (I think here of the Australian Aboriginals and their stories) that often saw humans as part of animal life (as though we were part of *Animal Planet* and not simply watching it from outside the idiot box). The humans were not necessarily special in these ancient religions. They ate and were eaten like other animals. They were part of life. Recall Émile Durkheim's position on totemism. In determining "the place of man" in the scheme of totemistic beliefs, Durkheim was clear that totemism pointed to a doubly conceived human or what he called the "double nature" of man: "Two beings co-exist within him: a man and an animal." And again: "we must be careful not to consider totemism a sort of

39. Broome, *Climate Matters*, pp. 112–13.

animal worship. . . . Their [men and their totems] relations are rather those of two things who are on the same level and of equal value."[40] The very idea of a transcendental God puts humans in a special relationship to the Creator and to his creation, the world.

This point needs a separate and longer discussion but for a completely random and arbitrary—arbitrary, for I could have chosen examples from other religious traditions, including Hinduism—example of this for now, consider the following remarks from Fazlur Rahman. By way of explaining the term *qadar*—meaning both "power and measuring out"—that the Qur'an uses in close association with another word, *amr*, meaning "'command'" to express the nature of God, Rahman remarks thus on God's relationship to man as mediated through nature:

> [The] all-powerful, purposeful, and merciful God . . . 'measures out' everything, bestowing upon everything the right range of its potentialities, its laws of behavior, in sum, its character. This measuring on the one hand ensures the orderliness of nature and on the other expresses the most fundamental, unbridgeable difference between the nature of God and the nature of man: the Creator's measuring implies an infinitude wherein no measured creature . . . may literally share.

This is why "nature does not and cannot disobey God's commands *[amr]* and cannot violate natural laws."[41] While this enjoins very clearly that man must not play God, it does not mean, as Rahman clarifies, that "man cannot discover those laws and apply them for the good of man."[42] God is kind because he has stocked the world with provisions for us![43] Environmentalists, similarly, have long cited a verse in Genesis in which "the Lord says '[Let men] have dominion . . . over all the earth, and over every

40. Émile Durkheim, *The Elementary Forms of Religious Life*, trans. Joseph Ward Swain (1915; Mineola, N.Y., 2008), pp. 134, 139.

41. Fazlur Rahman, *Major Themes of the Qur'an* (Chicago, 2009), pp. 12, 13, 12–13.

42. Ibid., p. 13.

43. An interesting text claiming—from a mixture of Hindu and Budhhist perspectives—a special relationship between man and God is Rabindranath Tagore's 1930 Oxford Hibbert Lectures published as *The Religion of Man* (1931) in which Tagore showed an awareness of a Hindu theological position that conceived of God as indifferent to human affairs but rejected it in favor of a Buddhist understanding of infinity that "was not the idea of a spirit of an unbounded cosmic activity, but the infinite whose meaning is in the positive ideal of goodness and love, which cannot be otherwise than human" (Rabindranath Tagore, *The Religion of Man*, in *A Miscellany,* in *The English Writings of Rabindranath Tagore*, ed. Sisir Kumar Das, 4 vols. [New Delhi, 1994–2007], 3:111).

creeping thing that creeps on earth.' He enjoins man to 'be fruitful and multiply and fill the earth and subdue it.'"[44]

The literature on climate change thus reconfigures an older debate on anthropocentrism and so-called nonanthropocentrism that has long exercised philosophers and scholars interested in environmental ethics: do we value the nonhuman for its own sake or because it is good for us?[45] Nonanthropocentrism, however, may indeed be a chimera for, Feng Han points out in a different context, "human values will always be from a human (or anthropocentric) point of view."[46] While ecologically minded philosophers in the 1980s made a distinction between "weak" and "strong" versions of anthropocentrism, they supported the weak versions. Strong anthropocentrism had to do with unreflexive and instinctive use or exploitation of nature for purely human preferences; weak anthropocentrism was seen as a position arrived at through rational reflection on why the nonhuman was important for human flourishing.[47]

Lovelock's work on climate change, however, produces a radically different position, on the other side of the rift as it were. He packs it into a pithy proposition that works almost as the motto of his book, *The Vanishing Face of Gaia*: "to consider the health of the Earth without the constraint that the welfare of humankind comes first" (*V*, pp. 35–36). He emphasizes: "I see the health of the Earth as primary, for we are utterly dependent upon a healthy planet for survival" (*V*, p. 36). In an interview given to the BBC in 2009, he even contemplated the prospect of a crash of human population, for he thought that "living the way we do," not more than one billion lives were sustainable without harm to life on the planet.[48] What does it mean for humans, given their inescapable anthropocentrism, to consider "the

44. Ernest Partridge, "Nature as a Moral Resource," *Environmental Ethics* 6 (Summer 1984): 103.

45. See, for instance, Lawrence Buell, "The Misery of Beasts and Humans: Nonanthropocentric Ethics versus Environmental Justice," *Writing for An Endangered World: Literature, Culture, and Environment in the U.S. and Beyond* (Cambridge, Mass., 2001), pp. 224–42.

46. Feng Han, "The Chinese View of Nature: Tourism in China's Scenic and Historic-Interest Areas" (PhD diss., Queensland University of Technology, 2008), eprints.qut.edu.au/16480/1/Feng_Han_Thesis.pdf, pp. 22–23. I am grateful to Ken Taylor for drawing my attention to this thesis. Han, of course, is echoing Eugene Hargrove; see Eugene C. Hargrove, "Weak Anthropocentric Intrinsic Value," *The Monist* 75 (Apr. 1992): 183–207, and Karyn Lai, "Environmental Concern: Can Humans Avoid Being Partial? Epistemological Awareness in the *Zhuangzi*," in *Nature, Environment, and Culture in East Asia: The Challenge of Climate Change*, ed. Carmen Meinert (Boston, 2013), p. 79.

47. See, for example, Bryan G. Norton, "Environmental Ethics and Weak Anthropocentrism," *Environmental Ethics* 6 (Summer 1984): 131–48. Norton was the first to propose the idea of weak anthropocentrism that has since been taken up by many.

48. NightHitcher, "James Lovelock—Population Reduction 'Max 1 Billion,'" www.youtube.com/watch?v=dBUvZDSY2Do

Earth as primary" or to contemplate the implications of Archer's statement that the world was not "created especially for us"? I will consider this question in the following and concluding section of this essay.

Climate and Capital, the Global and the Planetary

In *Living in the End Times*, Slavoj Žižek critiqued my essay "The Climate of History: Four Theses." Some of his comments concern points about the "true" nature of Hegelian dialectic, which I will not discuss here. But he also made a point about the relationship between anthropogenic climate change and "the capitalist mode of production" that allows me to get into my final stride in this essay. Responding to my points that there were "natural parameters" to our existence as a species that were relatively independent of our choices between capitalism and socialism and that we therefore needed to think deep history of the species and the much shorter history of capital together, Žižek remarked:

> Of course, the natural parameters of our environment are 'independent of capitalism or socialism'—they harbor a potential threat to all of us, independently of economic development, political system, etc. However, the fact that their stability has been threatened by the dynamic of global capitalism nonetheless has a stronger implication than the one allowed by Chakrabarty: in a way, we have to admit that *the Whole is contained by its Part*, that the fate of the Whole (life on earth) hinges on what goes on in what was formerly one of its parts (the socio-economic mode of production of one of the species on earth).

Given this premise, his conclusion followed:

> [We also] have to accept the paradox that . . . the key struggle is the particular one: one can solve the universal problem (of the survival of human species) only by first resolving the particular deadlock of the capitalist mode of production. . . . The key to the ecological crisis does not reside in ecology as such.[49]

Žižek's proposition with regard to the role of the capitalist mode of production in the drama of climate change goes well beyond what I have proposed in this essay. That capitalist or industrial civilization, dependent on large-scale availability of cheap fossil-fuel energy, is a proximate or

49. Slavoj Žižek, *Living in the End Times* (Brooklyn, 2010), pp. 334, 332, 333–34. See also Dipesh Chakrabarty, "The Climate of History: Four Theses," *Critical Inquiry* 35 (Winter 2009): 192–222.

efficient cause of the climate crisis is not in doubt. I am in agreement with most scholars on that point. But Žižek puts capitalism in the driver's seat; it is the "part" that now determines "the whole." My position is different: to say that the history and logic of a particular human institution has gotten caught up in the much larger processes of the earth systems and evolutionary history (stressing the lives of several species including ourselves) is not to say that human history is the driver of these large-scale processes. These latter processes continue over scales of space and time that are much larger than those of capitalism—hence the rifts we have discussed. As Stager and Archer point out, however much "excess" CO_2 we put out today, the long-term processes of the earth system, its million-year carbon cycle, for instance, will most likely "clean it up" one day, humans or no humans (*CC,* p. 20).[50] Which is why it seems logically more consistent to see these long-term earth-system processes as coactors in the drama of global warming. This is also suggested by the fact that, unlike the problems of wealth accumulation or income inequalities or the questions posed by globalization, the problem of anthropogenic climate change could not have been predicted from within the usual frameworks deployed to study the logics of capital. The methods of political economic investigation and analyses do not usually entail digging up 800,000 year-old ice-core samples or making satellite observations of changes in the mean temperature of the planet's surface. Climate change is a problem defined and constructed by climate scientists whose research methods, analytical strategies, and skill-sets are different from those possessed by students of political economy.

Once we grant processes belonging to the deeper history of Earth and life the role of coactors in the current crisis, playing themselves out on both human and nonhuman scales, the prescience of a sentence Gayatri Chakravorty Spivak wrote a while ago comes into view: "The planet is in the species of alterity, belonging to another system; and yet we inhabit it."[51] Spivak was on to something. Her formulation takes a step towards pondering the human implications of the kind of planetary studies that inform and underpin the science of climate change.

This science drives a clear wedge between an emergent conception of the planetary and the existing ideas regarding the global. For even though the current phase of warming of the earth's atmosphere is indeed anthropogenic, it is only contingently so; humans have no intrinsic role to play in

50. See Stager, *Deep Future*, chap. 2.

51. Gayatri Chakravorty Spivak, *An Aesthetic Education in the Era of Globalization* (Cambridge, Mass., 2012), p. 338.

the science of planetary warming as such. The science is not even specific to this planet; it is part of what is called planetary science. It does not belong to an earth-bound imagination. A textbook used in many geophysics departments to teach planetary warming is simply called *Principles of Planetary Climate.*[52] Our current warming is an instance of planetary warming that has happened both on this planet and on other planets, humans or no humans, and with different consequences. It just so happens that the current warming of the earth is of human doing. The "global" of globalization literature, on the other hand, cannot be thought without humans directly and is necessarily placed at the very center of the narrative.

It is not surprising then that some of the key scientists active in debates on global warming are scholars who used to study other planets. James Hansen, often thought of as the godfather of the science of global warming in the US, was initially a student of planetary warming on Venus and only later transferred his interests to Earth, out of concern and curiosity. Hansen writes: "In 1978, I was still studying Venus." He shifted to studying Earth because, he says,

> the atmosphere of our home planet was changing before our eyes, and it was changing more and more rapidly. . . . The most important change was the level of carbon dioxide, which was being added to the air by the burning of fossil fuels. We knew that carbon dioxide determined the climate on Mars and Venus. I decided it would be more useful and interesting to try to help understand how the climate of our own planet would change, rather than study the veil of clouds shrouding Venus.

He shifted the site of his research to this planet, thinking that it would be a "temporary obsession."[53]

Consider the case of Lovelock and his legendary, if controversial, theory of Gaia. His "moment of inspiration" reportedly came "one afternoon in September 1965" when he was in California working for NASA, "worrying about the composition of the atmosphere on Mars as opposed to that on Earth."[54] Why was Earth so rich in life while Mars seemed barren? Did the red planet once harbor life? Could life have left its imprint in the planet's atmosphere? Those were the questions driving Lovelock's investigations much as they still do many other students of the planetary system. What

52. See Raymond T. Pierrehumbert, *Principles of Planetary Climate* (New York, 2010).

53. Hansen, *Storms of My Grandchildren*, pp. xiv–xv, xv.

54. Michael Ruse, *The Gaia Hypothesis: Science on a Pagan Planet* (Chicago, 2013), p. 5. The mention of NASA also reminds us of the role that the cold war played in government patronage for such research.

makes a planet host and sustain life? Does life have a role to play in its own sustenance?[55] Similar questions inspired Zalasiewicz and Mark Williams to write *The Goldilocks Planet*.[56] In the trade, the life-harboring quality of a planet is called the "Habitability Problem," and as Pierrehumbert reminds us, "the book is far from closed" on this issue.[57]

The scientific problem of climate change thus emerges from what may be called comparative planetary studies and entails a degree of interplanetary research and thinking. The imagination at work here is not human-centered. It speaks to a growing divergence in our consciousness between the global—a singularly human story—and the planetary, a perspective to which humans are incidental.[58] The climate crisis is about waking up to the rude shock of the planet's otherness. The planet, to speak with Spivak again, "is in the species of alterity, belonging to another system." And "yet," as she puts it, "we inhabit it." If there is to be a comprehensive politics of climate change, it has to begin from this perspective. The realization that humans—all humans, rich or poor—come late in the planet's life and dwell more in the position of passing guests than possessive hosts has to be an integral part of the perspective from which we pursue our all-too-human but legitimate quest for justice on issues to do with the iniquitous impact of anthropogenic climate change.

55. This is, of course, the famous Gaia hypothesis.

56. See Zalasiewicz and Mark Williams, *The Goldilocks Planet: The Four Billion Year Story of Earth's Climate* (New York, 2012).

57. Pierrehumbert, *Principles of Planetary Climate*, p. 13.

58. I speak of the growing divergence between the planetary and the global because there is an established tradition of using the two words to mean the same thing. See, for instance, Carl Schmitt, *The Nomos of the Earth in the International Law of the Jus Publicum Europaeum*, trans. G. L. Ulmen (New York, 2006), pp. 86–88, 173, 351.