

The Planet: An Emergent Humanist Category

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Earth System Science (ESS), the science that among other things explains planetary warming and cooling, gives humans a very long, multilayered, and heterotemporal past by placing them at the conjuncture of three (and now variously interdependent) histories whose events are defined by very different timescales: the history of the planet, the history of life on the planet, and the history of the globe made by the logics of empires, capital, and technology. One can therefore read Earth system scientists as historians writing within an emergent regime of historicity. We could call it the planetary or Anthropocenic regime of historicity to distinguish it from the global regime of historicity that has enabled many humanist and social-science historians to deal with the theme of climate change and the idea of the Anthropocene. In the latter regime, however, historians try to relate the Anthropocene to histories of modern empires and colonies, the expansion of Europe and the development of navigation and other communication

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technologies, modernity and capitalist globalization, and the global and connected histories of science and technology.¹

It is my contention that when we read together—as we must—histories produced on these two registers, the category *planet* emerges as a category of humanist thought, a category of existential and, therefore, philosophical concern to humans. Martin Heidegger pronounced the word *planet* as being of no interest to philosophers when he introduced *earth* as a philosophical category in 1936, distinguishing it carefully from the word *planet*. “What this word [earth] says,” he wrote, “is not to be associated with the idea of a mass of matter deposited somewhere, or with the merely astronomical idea of a planet.”² His lecture on “The Origin of the Work of Art” delivered in Frankfurt that year explained “earth” as that which made life possible. It was the ground for humans’ attempt to dwell: “Upon the earth and in it, historical man grounds his dwelling in the world” (“OWA,” p. 46). Or, as he put it in another essay: “Earth is the serving bearer, blossoming and fruiting, spreading out in rock and water, rising up into plant and animal.”³ When mortals dwelled on earth, they “saved” it. “Saving,” Heidegger explained, “does not only snatch something from a danger. . . . To save the earth is more than to exploit it or even wear it out. Saving the earth does not master the earth and does not subjugate it, which is merely one step from spoliation.”⁴ Human worlds and the earth are in a relationship of strife and are yet mutually bonded. “World and earth are essentially different from one another,” writes Heidegger, “and yet are never separated. The world grounds itself on the earth, and earth juts through the world. . . . The opposition of world and earth is a striving” (“OWA,” pp. 48–49).⁵

1. The phrase “regimes of historicity” registers my debt to François Hartog from whose work I borrow the idea. The word *regime* implies some kind of ordering, the ordering of historical time. “Why ‘regime’ rather than ‘form?’” asks Hartog. He answers the question by referring to the word’s association in French with “the idea of degrees . . . of mixtures and composites, and an always provisional or unstable equilibrium” and thus to a provisional state of order (François Hartog, *Regimes of Historicity: Presentism and Experiences of Time*, trans. Saskia Brown [New York, 2017], p. xv).

2. Martin Heidegger, “The Origin of the Work of Art,” in *Poetry, Language, Thought*, trans. Albert Hofstadter (New York, 1975), p. 42; hereafter abbreviated “OWA.”

3. Heidegger, “Building Dwelling Thinking,” in *Poetry, Language, Thought*, p. 149.

4. *Ibid.*, p. 150.

5. I should make it clear that my employment of Heideggerian terms like “earth” or “world” is conceptual and not philological. In other words, I assume that our capacity to understand Heidegger’s concepts is never fatally crippled by the fact that not all languages may possess words that correspond exactly to those that Heidegger used.

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Heidegger's turn toward philosophizing the earth produced a minor intellectual tumult among his followers. In "The Truth of the Work of Art" (1960), Hans-Georg Gadamer remembered what "a new and startling thing" it was to have the category "earth" thus introduced as a foil to Heidegger's concept of the "world."⁶ Fourteen years later, writing on the occasion of Heidegger's eighty-fifth birthday, Gadamer returned to this subject and mentioned how "quite unusual" it was "to hear talk of the earth and the heavens, and of a struggle between the two—as if these were concepts of thought that one could deal with in the same way that the metaphysical tradition had dealt with the concepts of matter and form."⁷

The earth/world distinction and the earth/planet distinction cut in different ways for Heidegger's readers today. If his earth/world distinction helped him formulate his ideas on human dwelling, his earth/planet distinction, by contrast, roughly maps onto the distinction that some Earth system scientists make between the zone of the planet that is critical to the maintenance of life—the critical zone, as it is called—and the rocky, hot, and molten interior of the planet. The "critical zone" is "Earth's near surface layer from the tops of the trees down to the deepest groundwater, where most human interactions with the Earth's surface take place and the locus of most geomorphological activity."⁸ Using Heidegger's language, we can say that the harder we work the earth in our increasing quest for profit and power, the more we encounter the planet. *Planet* emerged from the project of globalization, from "destruction" and the futile project of human mastery (what Heidegger would call "impotence of will") ("OWA," p. 47). Yet it is neither the globe nor the world and definitely not the earth. It belongs to a domain where this planet reveals itself as an object of astronomical and geological studies and as a very special case containing the history of life—all of these dimensions vastly out-scaling human realities of space and time.

A profound difference separates the planet from the three categories we have thought with so far in thinking world or global history: world, earth, and globe (sometimes treated as synonymous with the planet). These are all categories that, in various ways, reference the human. They have this orientation in common. We see the globe as created by human institutions and technology. Humans and earth, as Heidegger saw it, stand in a face-to-face relationship.⁹ But the planet is different. We cannot place it in a

6. Hans-Georg Gadamer, "The Truth of the Work of Art," in *Heidegger's Ways*, trans. John W. Stanley (Albany, N.Y., 1994), p. 99.

7. Gadamer, "Martin Heidegger—85 Years," in *Heidegger's Ways*, p. 117.

8. Andrew S. Goudie and Heather A. Viles, *Geomorphology in the Anthropocene* (New York, 2016), p. 7.

9. Heidegger writes: "We come and stand facing a tree, before it, and the tree faces, meets us. Which one is meeting here? The tree, or we? Or both? Or neither? We come and stand—just

communicative relationship to humans. It does not as such address itself to humans, unlike, say, the Heideggerian “earth”—or maybe even James Lovelock’s or Bruno Latour’s Gaia—that does.¹⁰ To encounter the planet is to encounter something that is the condition of human existence and yet profoundly indifferent to that existence.

Humans have empirically encountered the planet—deep earth—always in their history, as earthquakes, volcanic eruptions, and tsunamis, without necessarily encountering it as a category in humanist thought. They have—as shown by Voltaire’s debate with the dead Gottfried Wilhelm Leibnitz after the 1755 earthquake in Lisbon or by Mahatma Gandhi’s debate with Rabindranath Tagore after the 1934 earthquake in Bihar—dealt with the planet without having to call it by that name.¹¹ The planet was folded into human debates about morality, theodicy, and more recently into the idea of natural disaster.¹² But as evidence gathers that the nature/human distinction is, ultimately, unsustainable and that human activities world-wide may even contribute to the increasing frequency of earthquakes, tsunamis, and other “natural” disasters, the planet *as such* has emerged as a site of existential concern for those who write its histories in what I have called the planetary or anthropocenic regime of historicity. These are none other than Earth system scientists themselves. Their accounts show the Earth

as we are, and not merely with our head or our consciousness—facing the tree in bloom, and the tree faces, meets us as the tree it is” (Heidegger, *What Is Called Thinking?* trans. J. Glenn Gray [1954; New York, 2004], p. 42).

10. Poetically, and politically, Latour gives Gaia a persona and a face to enable humans to face Gaia; see Bruno Latour, *Facing Gaia: Eight Lectures on the New Climatic Regime*, trans. Catherine Porter (Medford, Mass., 2017), pp. 280–84.

11. Immanuel Kant’s essays on earthquakes are fascinating in this regard; see Immanuel Kant, “On the Causes of Earthquakes on the Occasion of the Calamity that Befell the Western Countries of Europe towards the End of Last Year (1756),” “History and Natural Description of the Most Noteworthy Occurrences of the Earthquake that Struck a Large Part of the Earth at the End of the Year 1755 (1756),” and “Continued Observations on the Earthquakes that Have Been Experienced for Some Time” (1756), trans. Olaf Reinhardt, in *Natural Science*, trans. Reinhardt et al., ed. Eric Watkins (New York, 2012), pp. 327–36, 337–64, 365–73. See also Edgar S. Brightman, “The Lisbon Earthquake: A Study in Religious Valuation,” *The American Journal of Theology* 23 (Oct. 1919), pp. 500–18; José Oscar de Almeida Marques, “The Paths of Providence: Voltaire and Rousseau on the Lisbon Earthquake,” *Cadernos de Cadernos de História e Filosofia da Ciência* 15, no. 1 (2005): 33–57; and Dipesh Chakrabarty, “The Power of Superstition in Public Life in India,” *Economic and Political Weekly*, 17 May 2008, pp. 16–19.

12. See Andrea Westermann, “Disciplining the Earth: Earthquake Observation in Switzerland and Germany at the Turn of the Nineteenth Century,” *Environment and History* 17 (Feb. 2011): 53–77, and Frank Oberholzner, “From an Act of God to an Insurable Risk: The Change in the Perception of Hailstorms and Thunderstorms since the Early Modern Period,” *Environment and History* 17 (Feb. 2011): 133–52.

system to be in danger of being gravely disturbed—these histories have bared the planet as an entity to reckon with in debating human futures. *Planet* is not a lazy word in these narratives. It is a dynamic ensemble of relationships—much as G. W. F. Hegel's *state* or Karl Marx's *capital* were—an ensemble that constitutes the Earth system. It is at such moments of concern expressed by scientists over the state of the Earth system that the planet (that is, Earth system) emerges as a category of humanist thought. Heidegger's stance against science and his assumption that the nature of human dwelling can be imagined without thinking of the "astronomical" object, our planet, are positions we can't support in the time of the Anthropocene.

The nature of this new category *planet* is best explored, it seems to me, by distinguishing it from the idea of the globe with which it has often been identified in the past. I begin by elaborating on this distinction between the globe and the planet. The category *earth*—relevant to this exercise but not directly addressed here—contains a further distinction between the land and the sea that, as we will see, remained central to Carl Schmitt's thoughts on human dwelling that I want to draw upon to frame my overall argument.¹³ I am, of course, not the first person to take a planetary turn. My thoughts on the globe/planet distinction began a few years ago in an engagement with Gayatri Chakravorty Spivak's invocation of planetarity, though, as readers will see, I have now pushed them in a particular direction.¹⁴

The Global and the Planetary: The Globe of Globalization¹⁵

The word *globe* as it has appeared in the literature on globalization is not the same as the word *globe* in the expression global warming.¹⁶ The story of globalization has humans at its center and narrates how humans historically forged a human sense of the globe. Fields like world history and global history, for all their differences, have contributed to our understanding of

13. See Carl Schmitt, *Dialogues on Power and Space*, trans. Samuel Garrett Zeitlin, ed. Frederico Finchelstein and Andreas Kalyvas (Malden, Mass., 2015). Thanks to Bruno Latour for drawing my attention to this text.

14. See Chakrabarty, "Climate and Capital: On Conjoined Histories," *Critical Inquiry* 41 (Autumn 2014): 21. Spivak elaborates on planetarity in Gayatri Chakravorty Spivak, *Death of A Discipline* (New York, 2003). For more on Spivak's insights into planetarity, see Elizabeth M. DeLoughrey, "Planetarity: Militarized Radiations," *Allegories of the Anthropocene* (Durham, N.C., 2019), pp. 63–97. See also Eugene Thacker's *In the Dust of This Planet*, vol. 1 of *Horror of Philosophy* (Alresford, 2011).

15. The following section expands and elaborates on a proposition I put forward in Chakrabarty, "Planetary Crises and the Difficulty of Being Modern."

16. I am indebted to Catherine Malabou for the articulation of this formulation. See Chakrabarty, "Afterword," *The South Atlantic Quarterly* 116 (Jan. 2017): 166.

this process. Take two texts, separated by almost three hundred years—Thomas Hobbes’s *Leviathan* (1651) and Hannah Arendt’s *The Human Condition* (1958)—one inaugurating modern political thought, the other renewing political philosophy at a time when space travel had just begun. Notice how much their sense of what the earth was for humans (“knowledge of the face of the earth”) was conditioned, even across centuries, by the history of European expansion, trade, the mapping, and navigation of the seas (and eventually the air), along with the development of instruments of navigation and mobility—in other words, processes and institutions that created the modern sense of the globe.¹⁷ It is as if Hobbes’s historical references, in one of his most remembered passages, describing the condition of humans before the rise of the state—“In such condition [the state being absent], there is no place for Industry; because the fruit thereof is uncertain: and consequently no Culture of the Earth [earth here understood as *land to be cultivated*]; no Navigation, nor use of the commodities that may be imported by Sea; . . . no Instruments of moving, and removing such things as require much force; no Knowledge of the face of the Earth; no account of Time”—repeated themselves verbatim as Arendt positioned herself in the late 1950s, observing the same historical process that Hobbes had seen in an earlier phase of its development.¹⁸ “As a matter of fact,” she wrote:

the discovery of the earth, the mapping of her lands and the chartering of her waters [once again the land/sea distinction], took many centuries and has only now begun to come to an end. Only now has man taken full possession of his mortal dwelling place and gathered the infinite horizons . . . into a globe whose majestic outlines and detailed surface he knows as he knows the lines in the palm of his hand. Precisely when the immensity of available space on earth was discovered, the famous shrinkage of the globe began, until eventually in our world . . . each man is as much an inhabitant of his earth as he is an inhabitant of his country. Men now live in an earth-wide continuous whole. . . . Nothing, to be sure, could have been more alien to the purpose of the explorers and circumnavigators of the early modern age than this closing-in process; they went to enlarge the earth, not shrink her into a ball. . . . Only the wisdom of hindsight sees the obvious, that nothing can remain immense if it can be measured.¹⁹

17. See Joyce E. Chaplin, *Round about the Earth: Circumnavigation from Magellan to Orbit* (New York, 2013).

18. Thomas Hobbes, *Leviathan*, ed. C. B. MacPherson (1651; New York, 1968), p. 186.

19. Hannah Arendt, *The Human Condition* (1958; Chicago, 1998), p. 250.

These quotations from two fundamental thinkers in the European tradition show how central the story of European expansion is to their narratives of the making of the globe.

Schmitt's *The Nomos of the Earth*, though relatively old, is still percipient enough to give us a handle over the history of this particular version of the globe. Schmitt tells a story of how the idea of law got dislodged from its association with earth, understood as land and dwelling, when the seas opened up to an expanding and imperial Europe. *Nomos* was originally land-bound and was about *appropriation* of land, a process that Schmitt argued was profoundly connected to a fundamental human orientation to land and territory (as seen most clearly in the case of Australian Aboriginals, say), and thus to strife and war between humans over appropriation of land.²⁰ The sea was just an extensive surface that did not allow for boundaries; all human ideas about *nomos* were firmly grounded in the occupation of particular patches of land, and thus to the practice of erecting boundaries. Schmitt even cites a Biblical passage showing a human imagination of an ideal planet that had no sea.²¹ It was only when appropriation of land was secured—by “migrations, colonizations, and conquests”—that humans could engage in the processes required for social formation: “distribution,” by which Schmitt meant the setting up of an order, and “production,” which referred to the organization of the economic life of a society (*N*, p. 328). Thus, in Schmitt's schema, the chain of logic went like this: appropriation->distribution->production. The sense of being at home in a particular place could come about only after the process of appropriation had been completed. Appropriation was thus related to the idea of dwelling. Yet, as Schmitt writes, “the distribution remains stronger in memory than does the appropriation, even though the latter was the precondition of the former” (*N*, p. 329). However, adds Schmitt, this land-bound sense of “the first *nomos* of the world was destroyed about 500 years ago when the great oceans were opened up” (*N*, p. 352).

Nomos gradually ceased to be something land-based and thus orienting for humans. It lost its connection to dwelling. There thus came about a separation, at the intellectual level of jurisprudential thought, between the ought and the is, between *nomos* and *physis* (this separation being the precondition for, among other things, international law). The coming of air travel and eventually the space age would only expand this separation of *nomos* and *physis* and leave humans with two options in the future: either

20. See Schmitt, *The Nomos of the Earth: In the International Law of the Jus Publicum Europaeum*, trans. G. L. Ulman (New York, 2003); hereafter abbreviated *N*.

21. See the discussion also in Schmitt, *Dialogues on Power and Space*.

feeling “homeless” (as the globe is home for nobody) or working towards a unity in which all humans come to regard the globe as their home.

Most histories of globalization assume—to stay with Schmitt’s schema—that the struggle between humans for appropriation of land, sea, or space is now over. Humans are now spread all over the globe, there is nowhere else to go, we control the skies and the waters. We are in a postimperial age, on this account, so our struggle is in the sphere of what Schmitt called “distribution”—that is, about establishing a just order so that the idea of *nomos* continues to remain unrelated to *physis*. Many climate-justice arguments, for instance, relate to a just distribution of an abstract and global carbon space. The particulars of this argument are not my concern here—except that a climate-ravaged world with migrants and refugees can reopen arguments about appropriation. The point relevant here is that in Schmitt’s and others’ histories of globe-making, the words planet and globe remain synonymous, as Schmitt’s own usage reveals:

The first attempts in international law to divide the earth as a whole according to the new global concept of geography began immediately after 1492. These were also the first adaptations to the new, planetary image of the world. [*N*, p. 87]

The compound term “global linear thinking” . . . is also better than “planetary” or similar designations, which refer to the whole earth, but fail to capture its characteristic type of division. [*N*, p. 88]

The English island [at the time of the Treaty of Utrecht in 1713] remained a part of or rather the center of this European planetary order. [*N*, p. 173]

I speak of a new *nomos* of the earth. That means that I consider the earth, the planet on which we live, as a whole, as a globe, and seek to understand its global division and order. [*N*, p. 351]

This mode of equating the planet with the globe remained with Schmitt even in his later texts such as *Land and Sea*: “As [the nineteenth-century German geographer, Ernst] Kapp remarked, the compass lent the ship a spiritual dimension which enabled man to develop a strong attachment to his ship, a sort of affinity or kinship. From then on, the remotest oceanic lands could come into contact with each other, and the planet opened itself to man.”²² Here “planet” was simply another word for *globe*; it referred to the planet we live on, the earth taken “as a whole.”

22. Schmitt, *Land and Sea*, trans. Simona Draghici (1954; Washington, D.C., 1997), p. 11.

The same is true, incidentally, of Heidegger's use—when he actually did use them—of the words *planet* or *planetary*. The expression “planetary imperialism” turns up towards the very end of Heidegger's “The Age of the World Picture,” which has influenced much recent thinking on images of the earth taken from space.²³ He writes: “In the planetary imperialism of technologically organized man, the subjectivism of man attains its acme, from which point it will descend to the level of organized uniformity and there firmly establish itself. This uniformity becomes the surest instrument of total, i.e., technological, rule over the earth.”²⁴ “Planetary” refers here to the earth as a single planet *taken by itself*, not studied in comparison to other planets. This becomes obvious also from the way Heidegger, in another essay, assigns the “planet” to an “advancing world history.”²⁵ Since both imperialism and world history are categories of human history, the word “planet” in Heidegger's usage refers to nothing other than the globe. In fact, it is the connection he makes between “man's” “planetary imperialism,” “his” technological rule, and the rising to a peak of “man's” subjectivism that allows Heidegger to develop a critique of this “planetary imperialism” in a way that generates in turn a powerful critique of a certain dominant “anthropology” (Heidegger's word):

Where the world becomes picture, what is, in its entirety, is juxtaposed as that for which man is prepared and which, correspondingly, he therefore intends to bring before himself and have before himself, and consequently intends in a decisive sense to set in place before himself. . . . The Being of whatever is, is sought and found in the representedness of the latter.²⁶

The globe of globalization embodies this anthropocentric and anthropological practice of representation.

The Global and the Planetary: The Globe of Global Warming

Anthropogenic global warming is no doubt connected to the story of globalization. One could even argue that a certain period in the history

23. See Benjamin Lazier, “Earthrise; or, The Globalization of the World Picture,” *The American Historical Review* 116 (June 2011): 602–30, and Kelly Oliver, “The Earth's Refusal: Heidegger,” *Earth and World: Philosophy after the Apollo Missions* (New York, 2015), pp. 111–62.

24. Heidegger, “The Age of the World Picture,” in *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York, 1977), p. 152.

25. Heidegger, “Plato's Doctrine of Truth,” trans. Thomas Sheehan, in *Pathmarks*, trans. Sheehan et al., ed. William McNeill (1967; New York, 1998), p. 182.

26. Heidegger, “The Age of the World Picture,” pp. 129–30; and for a gloss on “anthropology,” see p. 153. For more on discussion of Heidegger's use of the words *earth*, *world*, and *planet*, see Oliver, “The Earth's Refusal: Heidegger.” See also Dana R. Villa, “The Critique of Modernity,” *Arendt and Heidegger: The Fate of the Political* (Princeton, N.J., 1996), pp. 171–208.

of globalization now known as “The Great Acceleration” (1950 onwards) overwhelmingly contributed to the forging of this connection, so much so that some scholars have pinned the beginning of the Anthropocene down to this period itself.²⁷ But the science of global warming takes us away from an earth- and human-bound imagination. For this reason, it also effects a profound unsettling of the narrative of globalization. ESS is a mode of looking at this planet that, in contrast to the globe of globalization, *necessarily has other planets in view* in order to create models of how this planet works (and the principles of representation involved are different from those involved in invoking the globe). Contrary to what we might imagine, the science of global warming is not even specific to this planet—it is part of what is called planetary science.²⁸ Indeed, our current warming is simply an instance of what is called planetary warming. Such warming has happened both on this planet and on other planets, humans or no humans, and with widely different consequences. It just so happens that the current warming of the earth is primarily a result of human actions.

It is not at all an accident that two of the foundational scientists associated with this science—Lovelock and James Hansen—began their careers, respectively, by studying Mars and Venus. Hansen 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 the 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, he writes with an obvious touch of irony, that it would be a “temporary obsession.”²⁹

27. See J. R. McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (Cambridge, Mass., 2014).

28. See Raymond T. Pierrehumbert, *Principles of Planetary Climate* (New York, 2010). Thus, as geologist colleagues point out, there exist university departments that are devoted to studying Earth and planetary sciences that include work on other planets done following Earth-science methods (not those of astronomy).

29. James Hansen, *Storms of My Grandchildren: The Truth About the Coming Climate Catastrophe and Our Last Chance to Save Humanity* (New York, 2009), pp. xiv, xiv–xv, xv.

ESS was a product of the Cold War and the military and civil competition that it spawned in space. This history has been recounted by Joshua Howe, Spencer Weart, and more recently by Ian Angus and Clive Hamilton, and need not be repeated here in detail.³⁰ While some of the basic ideas related to ESS go back to the nineteenth and early twentieth centuries, NASA first set up its ESS committee in 1983 when it realized that the planet needed to be studied as a whole by different kinds of scientists.³¹ It is a deeply interdisciplinary science, synthesizing “elements of geology, biology, chemistry, physics, and mathematics.”³² The International Geosphere-Biosphere Programme, launched in 1987, defined *Earth system* as follows:

The term “Earth system” refers to Earth’s interacting physical, chemical, and biological processes. The system consists of the land, oceans, atmosphere and poles. It includes the planet’s natural cycles—the carbon, water, nitrogen, phosphorus, sulphur and other cycles—and deep Earth processes. Life too is an integral part of the Earth system. Life affects the carbon, nitrogen, water, oxygen and many other cycles and processes. The Earth system now includes human society. Our social and economic systems are now embedded within the Earth system. In many cases, the human systems are now the main drivers of change in the Earth system.³³

Will Steffen, an Earth system scientist, thus described the intellectual ambit of this emergent science:

Crucial to the emergence of this perspective has been the dawning awareness of two fundamental aspects of the status of the planet. The first is that the Earth itself is a single system, within which the biosphere is an active, essential component. . . . Second, human activities are now so pervasive and profound . . . that they affect the Earth at a global scale in complex, interactive, and accelerating ways. . . . that

30. See Spencer R. Weart, *The Discovery of Global Warming* (Cambridge, Mass., 2008); Joshua P. Howe, *Behind the Curve: Science and the Politics of Global Warming* (Seattle, 2014); Clive Hamilton, *Defiant Earth: The Fate of Humans in the Anthropocene* (Malden, Mass., 2017); and Ian Angus, *Facing the Anthropocene: Fossil Capitalism and the Crisis of the Earth System* (New York, 2016). See also Joseph Masco, “Bad Weather: On Planetary Crisis,” *Social Studies of Science* 40 (Feb. 2010): 7–40; DeLoughrey, “Planetarity: Militarized Radiations”; and Perrin Spencer, *The Postwar Origins of the Global Environment: How the United Nations Built Spaceship Earth* (New York, 2018).

31. See Weart, *The Discovery of Global Warming*, pp. 144–45.

32. Tim Lenton, *Earth System Science: A Very Short Introduction* (New York, 2016), p. 1; hereafter abbreviated ESS.

33. The International Geosphere-Biosphere Programme, “Earth System Definitions,” www.igbp.net/globalchange/earthssystemdefinitions.4.d8b4c3c12bf3be638a80001040.html

threaten the very processes and components, both biotic and abiotic, upon which humans depend.³⁴

“System” is used in the singular in ESS to underscore the systemic nature of the planetary processes under study.

Latour and Tim Lenton have recently raised the question whether the so-called Earth system is indeed one system or if we should even think about it as constituting “a whole.”³⁵ To my nonspecialist ears, their question certainly sounds legitimate. I do not know if multiple, different, and yet interacting flows and feedback loops in earth processes do indeed constitute a system. But it has to be noted that this position is somewhat in tension with Lenton and Andrew Watson’s statement that “the many processes that interact together to set the living conditions at the surface of the planet” constitute “a very coherent system.”³⁶ There are clearly some very widely shared working agreements among scientists in this area while there are some major differences as well indicating, perhaps, how young this interdisciplinary science still is. In his introductory book on Earth system science, Lenton, for example, writes about the “fuzzy lower boundary to the Earth system”:

The temptation is to include the whole of the interior of the planet in the Earth system—and this is exactly what NASA’s 1986 report did when considering the longest timescales. . . . However, for many Earth system scientists, the planet Earth is really comprised of two systems—the surface Earth system that supports life, and the great bulk of the inner Earth underneath.

Lenton focuses deliberately on “the thin layer of a system at the surface of the Earth—and its remarkable properties,” the critical zone that I mentioned above (ESS, p. 17).³⁷ Lee R. Kump, James F. Kasting, and Robert G. Crane’s *The Earth System*, on the other hand, deals with what the authors

34. Quoted in Angus, *Facing the Anthropocene*, p. 29.

35. See Bruno Latour’s fascinating discussion of this problem in Latour, “Third Lecture: Gaia, a (Finally Secular) Figure for Nature,” in *Facing Gaia*, pp. 75–110. See also Latour and Lenton, “Extending the Domain of Freedom, or Why Gaia Is So Hard to Understand,” *Critical Inquiry* 45 (Spring 2019): 659–80.

36. Lenton and Andrew Watson, *Revolutions that Made the Earth* (New York, 2011), p. vii; hereafter abbreviated *R*.

37. “We should recognize that Gaia is not a globe at all but a thin biofilm, a surface, a pellicle no more than a few kilometers thick that has not made inroads very far up in the atmosphere nor very far down in the deep earth below, no matter how long you consider the history of life forms. That is why it is important to shift from the global vision of Gaia to what some scientists now call the ‘critical zone’” (Latour and Lenton, “Extending the Domain of Freedom,” p. 676).

regard as “four parts” of the Earth system: the atmosphere, the hydrosphere, the biota, and the solid Earth. What their text helps to clarify is that this new science is as much about taking a systems approach to the study of how the Earth “works” as it is about observing how “the processes active on Earth’s surface are *functioning together* to regulate climate, the circulation of the ocean and atmosphere, and the recycling of the elements [such as carbon, nitrogen, oxygen, and more],” with the biota—life—playing “an important role in all these processes.”³⁸

The deeper parts of the planet affect the biosphere for sure (as plate tectonics does, for example, or volcanic eruptions) and are fundamentally important in supplying geochemically fresh landscapes; the question is whether they constitute parts of the Earth system.³⁹ However this is resolved, there is no denying that planetary processes operating on different scales and involving the actions of both the living and the nonliving are often interlocked in complicated, complex, and precarious ways, and it is the fact of their being interlocking and interactive in character that is highlighted by the use of the term *Earth system*. For Erle C. Ellis, observations and computer modeling of the Earth system clearly documented in the 1990s that “human activities were changing in tandem with changes in Earth’s atmosphere, lithosphere, hydrosphere, biosphere, and climate,” leading scientists and others experts associated with the International Geosphere-Biosphere Programme to announce in one voice in 2001—this is known as the Amsterdam Declaration on Global Change—that “the Earth system behaves as a single, regulating system comprised of physical, chemical, biological and human components.”⁴⁰ It is somewhat odd that this declaration should have separated the “human component” from the physical, chemical, and biological ones, but clearly a political point was made by such a separation.

38. Lee R. Kump, James F. Kasting, and Robert G. Crane, *The Earth System* (Upper Saddle River, N.J., 2004), pp. 3, xi; my emphasis. Jan Zalasiewicz writes:

It is true that the Earth surface is where the most immediate and significant (to us, now) processes take place, but most of the fundamental chemical cycles include shorter and longer detours and modifications within the Earth’s surface, certainly down to the deeper mantle in some instances and perhaps further. Most of the Earth’s water may have been derived from the Earth’s mantle (and most of our oceans seem to be slowly being subducted back there, albeit very slowly, on a billion-year timescale). Shallower zones within the crust/lithosphere are active on shorter, though still geological, time-scales. [Jan Zalasiewicz, email to author, 6 Oct. 2018]

39. See Zalasiewicz, email to author, 6 Oct. 2018. Zalasiewicz thinks that the deeper parts of the world are definitely a part of the Earth system.

40. Erle C. Ellis, *Anthropocene: A Very Short Introduction* (New York, 2018), pp. 31, 32; hereafter abbreviated A.

The immediate roots of this interdisciplinary science, as I have mentioned before, go back to the Cold War years of the 1960s when Lovelock, working for Carl Sagan's unit in NASA, developed his now-famous ideas regarding Gaia, proposing that the life on Earth created the conditions for its continued maintenance, as though the Earth behaved as one super-organism that he christened, on advice from William Golding, Gaia.⁴¹ The concept was further developed in the 1970s by Lynn Margulis. Lovelock's early homeostatic view of the planet did not survive scientific skepticism, but his fundamental question as to what made the Earth so continuously habitable for life, something the two neighboring planets Mars and Venus were not, survived into ESS as the so-called habitability problem that today is central, for instance, to disciplines like astrobiology or to the search for earth-like exoplanets in the universe.

The important point for our discussion is that the chief protagonist of the story that ESS tells is not humans or human life but complex, multicellular life in general. In contrast to the story of capitalist globalization, this outlook lays out a perspective on humans and other forms of life without humans being at the center of the story. We simply come too late in the story to be its protagonist. This science, of course, is produced by humans and therefore practices a human version of nonanthropocentrism, an attempt by humans to understand their own story by standing outside, as it were, of the story of humans (as the historical sciences of geology and evolutionary biology routinely do). Besides, as Lovelock himself pointed out, ESS entails a view of the planet that is essentially taken from the outside. Lovelock wrote: "To my mind, the outstanding spin-off from space research is not new technology. The real bonus has been that for the first time in human history we have had a chance to look at the Earth from space, and the information gained from *seeing from the outside* our azure-green planet in all its global beauty has given rise to a whole new set of questions and answers."⁴²

41. Lovelock himself writes: "The idea of an Earth system science . . . came into my mind at the Jet Propulsion Laboratory in California in September 1965. The first paper to mention it was published in the *Proceedings of the American Astronautical Society* in 1968. . . . The Gaia hypothesis arose in the period before it received its name" (James Lovelock, *The Vanishing Face of Gaia: A Final Warning* [New York, 2009], p. 159). But he considered the name of this science "anodyne," for, while he regarded the relationship between ESS and the Gaia theory as "friendly," "to understand Gaia," he thought, "requires an *instinctive* familiarity with the dynamics of systems in action, and this not a normal part of Earth or life science" (pp. 161, 167; my emphasis). See also Lovelock, "What Is Gaia?" *The Revenge of Gaia: Earth's Climate Crisis and the Fate of Humanity* (New York, 2007), pp. 15–38.

42. Lovelock, *Gaia: A New Look at Life on Earth* (1979; New York, 1995), pp. 7–8, my emphasis; hereafter abbreviated G.

Lovelock was right to say that space travel afforded humans a chance to view the planet from outside, but we should note that while this was indeed the first time some humans actually saw their planet as a whole, humans have imagined the planet from the outside for a long time, at least in European history. Ayesha Ramachandran's *The Worldmakers* presents a fascinating study of this aspect of European imagination in the sixteenth century. Gerhard Mercator's *Atlas*, writes Ramachandran, "define[d] an intellectual watershed by seeking to envision the totality of the world." His 1569 navigational projection still provides "the basis" for the "Web Mercator platform used by Google Maps and in ArcGIS systems today."⁴³ Influential in this tradition was also the later-Christianized-but-originally-Stoic conception of *kataskopos*—the imaginary "360-degree 'view from above' . . . through which man could transform himself from being a prisoner within the world to becoming a spectator from without"—that was disseminated in renaissance Europe by the popular, fifth-century commentary by Macrobius on Cicero's *Somnium Scipionis*, a part of Cicero's *De re publica* (54–51 BC).⁴⁴ It described the Roman general Scipio Aemilianus dreaming of himself looking down on the earth from the starry sphere above.

These were, however, attempts to imagine the earth as it might have appeared to the naked human eye placed somewhere in the sky. One could argue that images of the earth beamed back from space by modern space travelers represent a point of culmination in this history.⁴⁵ What distinguishes the "new set of questions" that Lovelock speaks of is that they did not arise from a simple naked-eye view, imagined or real, of the planet from space. The question as to why "since plants and especially forests became established on the land surface, around [more than] 370 million years ago, oxygen has remained between about 17% and 30% of the atmosphere," could not have been raised or answered without asking questions of physics, chemistry, geology, and biology and without comparing this planet with planets like Mars and Venus (*R*, p. 301). To quote Lovelock again:

43. Ayesha Ramachandran, *The Worldmakers: Global Imagining in Early Modern Europe* (Chicago, 2015), p. 24.

44. *Ibid.*, p. 56. Thanks also to David Orsbon, who kindly let me read his unpublished "The Person of Natura" (2017). The philosopher Sverre Raffnsøe tells me, however, that while "the original Stoic conception of *kataskopos* can certainly be described as a 'view from above,'" he does not think that "it can be characterized as a view 'from without' already in antiquity. In Cicero's *Somnium Scipionis*, Scipio Aemilianus still 'only' finds himself looking down from the highest place in the world to find Carthage and Rome dwarfed. Only later can the Christianized viewer truly aim to become a 'spectator from without'" (Sverre Raffnsøe, email to author, 9 July 2019).

45. See the discussion in Ronald Weber, *Seeing Earth: Literary Responses to Space Exploration* (Athens, Ohio, 1985).

“Thinking about life on Mars gave some of us a fresh standpoint from which to consider life on Earth and led us to formulate a new, or perhaps revive a very ancient, concept of the relationship between the Earth and its biosphere” (*G*, p. 8). The planetary is a necessarily comparatist enterprise.

In other words, the Earth system of ESS is produced not simply by a physical view of the planet from outside but by reconstituting it into an abstract figure in the imagination with the help of the sciences—including information obtained from satellites positioned in space as well as from ancient ice-core samples—*while keeping other planets always in view even if only implicitly*. ESS produces a reconstituted planet, the Earth system, an entity no one ever encounters physically but that is, in Timothy Morton’s terms, an interconnected series of “hyperobjects”—such as a planetary climate system—(re)created by the use of big data.⁴⁶ Delf Rothe has aptly remarked that the Anthropocene is both withdrawn from and inaccessible to earthlings like humans: It is, writes Rothe, “equally totalising and withdrawn: [it] is a new planetary real—a state-shift of the entire Earth System that cannot be known or sensed directly.”⁴⁷

There remains, therefore, an interesting tension between ESS and the idea of Gaia. Lovelock was never happy with the name ESS, which he found “anodyne,” while Lenton and Watson begin their book with the comment: “‘Gaia’ and the ‘Earth system’ are for us, close to being synonymous. . . . [But] ‘Earth system science’ . . . is . . . less personalized and polarized” (*R*, pp. vii–viii).⁴⁸ ESS is business-as-usual positive science made up of observed and simulated data and their analyses, but a certain moment of scientific-poetic intuition, such as the moment when the idea later named Gaia flashed through Lovelock’s mind, always haunts it.

The Global and the Planetary Diverge

Arendt completed the *The Human Condition* in the shadow of the first artificial satellite, the Soviet sputnik, adventuring into space. She thought that space technology announced what she referred to as the “earth alienation” of humans, indicating the capacity of the human species to ensure its survival, on other planets if need be, at the great cost of losing their profound sense of being earthbound.⁴⁹ A line of famous German thinkers—Oswald Spengler, Heidegger, Karl Jaspers, Gadamer, Arendt, and Schmitt

46. See Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis, 2013).

47. Delf Rothe, “Global Security in A Posthuman Age? IR and the Anthropocene Challenge,” in *Reflections on the Posthuman in International Relations: The Anthropocene, Security and Ecology*, ed. Clara Eroukhmanoff and Matt Harker (Bristol, 2017), p. 92.

48. See also Latour and Lenton, “Extending the Domain of Freedom.”

49. Arendt, *The Human Condition*, p. 264.

among them—watched with foreboding the fast advance of global technology and feared the final “uprooting” of humans, a collapse of the ever-present human project of dwelling by worlding the earth.⁵⁰ What we see in the history of ESS, however, is not an end to the project of capitalist globalization but the arrival of a point in history where the global *discloses* to humans the domain of the planetary. We need to keep in mind the poetic nature of Lovelock’s vision that constituted the inaugural moment of ESS. True, there had been antecedents of the Gaia theory before, but none came with the epiphany of Lovelock’s thought about Gaia. Lovelock writes: “The idea of the Earth as a kind of living organism . . . arose in a most respectable scientific environment. . . . It came because my work there led me to look at the Earth’s atmosphere from the top down, from space. . . . The air is a mixture that somehow always keeps constant in composition. My flash of enlightenment that afternoon was the thought that to keep [air’s composition] constant something must be regulating it and that somehow the life at the surface was involved” (G, p. xiv).

The consciousness that ESS ushers us into simply could not have arisen without the development of technology that “rifled” not only “the bowels of their mother Earth”—as John Milton described early mines—but also the seemingly empty vault of the heavens and all that lies beyond.⁵¹ Consider this: it was the very technology of space exploration that came out of the Cold War and the growing weaponization of atmosphere and space that eventually brought the Gaia moment into our awareness. Or think of our capacity to explore deep earth: climate scientists would not have been able to bore into ice of eight hundred thousand years ago if the US defense establishment and the much-denounced oil and mining companies had not developed the technology for drilling that was then modified to deal with ice.⁵²

Sustainability and Habitability: Distinguishing the Global from the Planetary

The difference between the global and the planetary is perhaps best illustrated by a quick contrast between two ideas central, respectively, to the

50. See Lazier, “Earthrise,” and Chakrabarty, “The Human Condition in the Anthropocene,” in vol. 35 of *The Tanner Lectures on Human Values*, ed. Mark Matheson (Salt Lake City, Utah, 2016), pp. 137–88.

51. John Milton, *Paradise Lost*, ed. John Leonard (New York, 2000), p. 20.

52. See Mary R. Albert and Geoffrey Hargreaves, “Drilling through Ice and into the Past,” *Oilfield Review* 25 (Winter 2013/2014): 4–15; P. G. Talalay, “Perspectives for Development of Ice-Core Drilling Technology: A Discussion,” *Annals of Glaciology* 55, no. 68 (2014): 339–350; Richard B. Alley, “Going to Greenland,” *The Two-Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future* (Princeton, N.J., 2000), pp. 17–30.

two modes of thinking the two categories in question here, the globe and the planet. These are the ideas of sustainability and habitability.

Sustainability is a deeply political idea in the Arendtian sense of the word *politics*; it allows for the emergence of novelty in human affairs in a way that always involves some discussion about the welfare of the unborn. It owed its development to Europe's experience of agriculture and farming at a time of European expansion, and thus belongs firmly to the history of the global.⁵³ The most widely used definition of sustainable development is the one that the World Commission on Environment and Development (WCED), often known as the Brundtland Commission after its chair Geo Brundtland, adopted in 1983 in its publication *Our Common Future*: "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs."⁵⁴ Paul Warde has written a differentiated history of the idea from the seventeenth century on—*Nachhaltigkeit* (the German word for lastingness or sustainability) is traceable in its earlier forms to the 1650s in texts on the management of agriculture and forestry in England, Germany, and France. His essay clarifies:

that the modern notion of sustainability largely [drew] on ideas developed in the late eighteenth and early nineteenth centuries when new understandings of soil science and agricultural practice combined to develop the idea of a *circulation* of essential nutrients within ecologies, and hence allow the perception that disruption to circulatory processes could lead to permanent degradation.⁵⁵

One of the pioneers he mentions is Justus von Liebig, "chemist and admirer and follower of Alexander von Humboldt." Warde finds in Liebig's work "something like the modern conception of sustainability: that a

53. See the discussion in Paul Warde, "The Invention of Sustainability," *Modern Intellectual History* 8, no. 1 (2011): 153–70. Paul Warde has since spelled out his larger and fascinating argument in *The Invention of Sustainability: Nature and Destiny, c. 1500–1870* (New York, 2018).

54. Quoted in Stephen Morse, *Sustainability: A Biological Perspective* (New York, 2010), p. 6. Emma Rothschild, "Maintaining (Environmental) Capital Intact," *Modern Intellectual History* 8, no. 1 (2011): 193–212 draws interesting connections between modern economists' discussion of sustainability and their debates on capital theory in the 1920s and '30s. Deanna K. Kreisel writes, citing the *Oxford English Dictionary*, that "the term 'sustainable' was not used in the sense of minimizing environmental impact until 1976, and was not used to mean 'capable of being maintained at a certain level' until 1924" (Deanna K. Kreisel, "'Form against Force': Sustainability and Organicism in the Work of John Ruskin," in Nathan K. Hensley and Philip Steer eds., *Ecological Form: System and Aesthetics in the Age of Empire* [New York, 2019], p. 105).

55. Warde, "The Invention of Sustainability," p. 153.

society's development is beholden to fundamental biological and chemical processes [of the earth], but also that this was a complex dynamic system with feedback effects."⁵⁶

Warde's statement makes visible how a certain incipient consciousness about earth processes—an incipient planetary consciousness, as it were—always lurks in the background whenever the question of sustaining human civilization is raised. But it *lurks in the background*: the idea of sustainability puts human concerns first. Donald Worster shows that the very idea of the earth as something finite belongs to a family of certain deeply anthropocentric ideas of which environment and sustainability are two important members. Worster describes William Vogt's *Road to Ruin* (1948) as "one of the first [texts] to use the word 'environment.'" Vogt defined *environment* as "the sum total of soil, water, plants, and animals on which *all humans depend*."⁵⁷ The word *environment* thus came to be something expressive of a human-centered concern, as if the only reason to speak of environing something was that the something was us. Fairfield Osborn's *Our Plundered Planet* (1948), published in the same year, was prepared to see the human species as "part of one great biological schema" while being sensitive to rich-poor differences. He was familiar with the facts of the deep history of the planet as they were understood in his time but, like others, had his sights firmly trained on what that history meant for humans. His aim was to help humans "learn to care for the greater good of nature and of humans as part of that whole," the idea of a "whole" referring in this case to issues like balance and harmony between humans and their earthly environment.⁵⁸

This anthropocentric idea of sustainability dominated the twentieth century and continues beyond it as a mantra of green capitalism.⁵⁹ An absurd extreme of such a humancentric conception was demonstrated early in the last century when the idea of "maximum sustainable yield," adapted from the history of "scientific" management of forests, became hegemonic in the literature on "managing fisheries." Peter Anthony Larkin put the matter

56. *Ibid.*, pp. 168, 170. Karl Marx's deep interest in von Liebig's work is noted in Paul Burkett, "Introduction to the Haymarket Edition," *Marx and Nature: A Red and Green Perspective* (Chicago, 2014), p. xix, and discussed in detail in John Bellamy Foster, *Marx's Ecology: Materialism and Nature* (New York, 2000).

57. Donald Worster, *Shrinking the Earth: The Rise and Decline of Natural Abundance* (New York, 2016), pp. 140, 141; my emphasis.

58. Quoted in *ibid.*, p. 140. For an intellectual and institutional history of the idea of *environment*, see Warde, Libby Robin, and Sverker Sörlin, *The Environment: A History of the Idea* (Baltimore, Md., 2018).

59. For a sustained critique of the neoliberal adoption of the idea or slogan of sustainability, see Ruth Irwin, *Heidegger, Politics and Climate Change: Risking It All* (New York, 2008).

with a touch of humor when he gave a keynote address to the Annual Meeting of the American Fisheries Society in 1976:

About 30 years ago, when I was a graduate student, the idea of managing fisheries for maximum sustainable yield was just beginning to really catch on. . . . Briefly, the dogma was this: any species each year produces a harvestable surplus, and if you take that much, and no more, you can go on getting it forever and ever (Amen). . . . Moreover, it was assumed that the animals were well aware of what was being organized for them as their role in the scheme of things. Organisms were allowed to breed with those of their own species, or interact with individuals of other species, but not in ways that might upset the maximum sustained yield.⁶⁰

In the literature on sustainability, earthly processes constitute a mute background for human activities. Stephen Morse's book on the subject of sustainability devotes only one of its 259 pages to the history of life on the planet, and that only because he needs to give the issue of sustainability an earthly context. But he points out that the word "sustainability" is not "used much" in describing life's continuity on this planet: "Instead we talk of the 'durability' or 'resilience' of life; its ability to continue after shocks . . . , of which there have been many since the birth of the planet." Now there, in that fragment of a sentence, a glimpse of a planetary consciousness shines through. But the word *sustainability*, as Morse correctly insists, applies only to humans. It is "a human-centric term," he acknowledges, and is "applied to people and the interactions we have with our environment. Thus when we are talking of the role of biology within sustainability, we mean the role that biology plays vis-à-vis people, and we are talking of very short timescales" relative to timescales involved in the history of life.⁶¹

The key term in planetary thinking that one could contrapose to the idea of sustainability in global thought is *habitability*. Habitability does not reference humans. Its central concern is life, complex, multicellular life, in general, and what makes *that*, not humans alone, sustainable. What, ask ESS specialists, makes a planet friendly to complex life for hundreds of

60. P. A. Larkin, "An Epitaph for the Concept of Maximum Sustainable Yield," *Transactions of the American Fisheries Society* 106 (Jan. 1977): 1, 1–2. An excellent article documenting the overly political and economic nature of biology as applied to fisheries management in the Europe and North America is Jennifer Hubbard's "In the Wake of Politics: The Political and Economic Construction of Fisheries Biology, 1860–1970," *Isis* 105 (June 2014): 364–78. For a brief biographical note on Larkin, see snaccooperative.org/ark:/99166/w6fj6xxx

61. Morse, *Sustainability*, pp. 5, 5–6.

millions of years? The problem of habitability therefore should be distinguished from the discussion on life that has gone on in the humanities under the rubric of biopolitics. The idea of biopolitics that connects life to questions of disciplinary power, state, capitalism, and so on, and rejects “a biological or metaphysical thematization of life,” would squarely be a part of what I have characterized here as global thought.⁶² The question at the center of the habitability problem is *not* what life is or how it is managed in the interest of power but rather what makes a planet friendly to the continuous existence of complex life.

Of course, the difficulty scientists face in discussing what makes a planet habitable is that the sample size of habitable planets available so far for study is only one. The necessary pluralism of the planetary thus appears to come somewhat undone with the question of life and habitability. But, as Langmuir and Broecker write, “While Earth’s history is inevitably specific as a story of one planet, principles that it embodies [such as evolution by natural selection or ‘increased stability through networks and increased access to and utilization of energy’] appear likely to apply on a universal scale.”⁶³ The immediately relevant point is that humans are not central to the problem of habitability, but habitability is central to human existence. If the planet were not habitable for complex life, we simply would not be here. This is illustrated, for instance, by the share of oxygen in the atmosphere, which is currently around 21 percent and has been stable for a very long time.⁶⁴ As Langmuir and Broecker point out, this is “a striking disequilibrium state, because O₂ is such a highly reactive molecule.” Oxygen reacts with “metals, carbon, sulfur, and other atoms to form oxides” (*HB*, p. 458). “What controls the atmospheric O₂ concentrations today?” ask Kump, Kasting, and Crane in their book on ESS:

The answer, surprisingly, is that we do not know for sure, although researchers do have a number of ideas. Whatever the oxygen control mechanism is, it appears to be very efficient. The modern atmospheric O₂ level is 21% by volume, or 0.21 bar. It seems unlikely that the O₂ concentration has strayed from this level by more than ±50% since the last Denovian Period, about 360 million years ago. The evidence

62. Jeffrey T. Nealon, *Plant Theory: Biopower and Vegetable Life* (Stanford, Calif., 2016), pp. 53–54.

63. Charles H. Langmuir and Wally Broecker, *How to Build A Habitable Planet: The Story of Earth from the Big Bang to Humankind* (Princeton, 2012), p. 537; hereafter abbreviated *HP*.

64. “It has been modeled to go above this level—perhaps to some 30 percent in the Carboniferous—or below it (in the putative ‘oxygen crisis’ of the Permian-Triassic boundary)” (Zalasiewicz, email to author, 6 Oct. 2018).

is that forests have existed since that time and, while they have always been able to burn, they have never disappeared entirely.⁶⁵

An O₂ molecule resides in the atmosphere for four million years before getting absorbed into the earth's crust. "This may sound like a long time," remarks Lenton, "but it is far shorter than the 550 million years or so over which there have been oxygen-breathing animals on the planet. It is also far shorter than the 370 million years over which there have been forests." "Thus, remarkably," he concludes, "the amount of atmospheric oxygen has remained within habitable bounds for complex animal and plant life despite all of the oxygen molecules having been replaced over a hundred times" (*ESS*, p. 44). This remarkable stability of the share of oxygen in the atmosphere allowing us to breathe is ensured by the Earth system or what I have called "the planet."

Earth system scientists appear to agree that different forms of life both on land and in the sea, the rate of burial of organic carbon in the sea, the phosphorus and long-term carbon cycles of the planet, all have a role to play in replenishing and maintaining the share of oxygen in the atmosphere that allows complex life to flourish (see *ESS*, pp. 44–46; *G*, pp. 6, 59–77; and *HP*, pp. 458–63).⁶⁶ This is why within a planetary mode of thinking, the threat of the Anthropocene lies in what it might mean not simply for immediate human futures but for long-term futures as well. Global warming produces for Earth system scientists the fear of another great extinction of life—possible in the next three hundred to six hundred years—that might make the planet regress to a more primitive level of biodiversity.⁶⁷ As Langmuir and Broecker argue, fossil fuel, soil, and biodiversity are critical to human flourishing, and they have two things in common: they all have to do with the history of life on the planet, and none of them are renewable on human scales of time (see *HP*, pp. 589–95). The planetary, ultimately, is about how some very long-term planetary processes involving both the living and the nonliving have provided, and keep providing, the enabling conditions for both human existence and flourishing. Our recent interference with some of these processes, however, has raised for humans a particularly intractable question with a sense of urgency surrounding

65. Kump, Kasting, and Crane, *The Earth System*, p. 225.

66. See also *ibid.*, pp. 159, 225–29.

67. See Anthony D. Barnosky et al., "Has the Earth's Sixth Mass Extinction Already Arrived?" *Nature*, 3 Mar. 2011, pp. 51–57. It should be noted that the calculations on species extinction in this paper were arrived at without factoring in climate change.

it, the question—to use the evocative words of William Connolly—of “facing the planetary.”⁶⁸

Facing the Planetary

For all their differences, thinking globally and thinking in a planetary mode are not either/or questions for humans. The planetary now bears down on our everyday consciousness precisely because the accentuation of the global in the last seventy or so years—all that is summed up in the expression “the great acceleration”—has opened up for humanist intellectuals the domain of the planetary. Even the everyday distinction we make between renewable and nonrenewable sources of energy makes a constant reference, by implication, to human and geological scales of time, to the hundreds of millions of years that the planet would take to renew fossil fuels. Similarly, all talk about there being “excess” carbon dioxide in the atmosphere refers implicitly to the normal rate at which the carbon sinks of the planet take up this gas. Langmuir and Broecker emphasize the critical importance to humans of counting soils and biodiversity among the “non-renewable resources,” not simply fossil fuels (*HP*, p. 593).⁶⁹ Practical plans to make profit by developing technology that uses the sun as an infinite source for energy for industrial and industrializing societies are attempts to bring into the fold of the global an aspect of what we have called the planetary. We are all living, whether we acknowledge it or not, at the cusp of the global and the planetary. The age of the global as such is over. And yet the quotidian is about both invoking the planetary and losing sight of it the next moment.

Is this forgetting a problem? Connolly has asked this question. “By ‘the planetary,’” he writes:

I mean a series of temporal force fields, such as climate patterns, drought zones, the ocean conveyor system, species evolution, glacier flows, and hurricanes that exhibit self-organizing capacities to varying degrees and that impinge upon each other and human life in numerous ways. . . . The combination of capitalist processes and the

68. See William E. Connolly, *Facing the Planetary: Entangled Humanism and the Politics of Swarming* (Durham, N.C., 2017).

69. In pointing to the importance of biodiversity to agriculture, Kump, Kasting, and Crane point out that the real question here is biodiversity and not simply whether the world can feed seven, nine, or twelve billion people: “the potential problem with modern agriculture is not that it is not productive enough but that it is *uniform*” (Kump, Kasting, and Crane, *The Earth System*, p. 374).

amplifiers in nonhuman geological forces must be encountered together. Such a combination poses existential issues today.⁷⁰

Connolly is right to say that “the combination of capitalist processes” and the planetary ones have to be “encountered together.” But what does it mean to encounter them “together?” How exactly does one encounter *together* (in thought) disparate forms of thinking, even when they appear intertwined, and the global and the planetary—with their respective anthropocentric and nonanthropocentric emphases and with their references to vastly different and incommensurable scales of time—often represent two rather different orientations to the globe and the planet?

The global, as I have said, refers to matters that happen within human horizons of time, the multiple horizons of existential, intergenerational, and historical time, though the processes might involve planetary scales of space. Planetary processes, including the ones that humans have interfered with, operate on various time tables, some compatible with human times, others vastly larger than what is involved in human calculation. Thus air and surface water have “short recycling times,” as do many metals, but soils and ground water take “‘thousands of years’” to replenish themselves. “Biodiversity,” write Langmuir and Broecker, “is perhaps the most precious planetary resource, for which the timescale of replenishment, known from past mass extinctions, is tens of millions of years” (*HP*, p. 580). Humans today have become a planetary force in that they can interfere with some of these very long-term processes, but “fixing them” with the help of technology is still well beyond our present capabilities. What would it mean for us to bring together in our thought all these different timescales and, in Connolly’s terms, face them?

Temporality, moreover, is not the only thing that distinguishes the global from the planetary. The two modes of thinking represent two different kinds of knowledge and, for humans, two different ways of comporting themselves to the world within which they find themselves.⁷¹ The global with humans at its center is ultimately all about forms and values. This is why the planet when equated to the globe can be politicized (we can talk about its deliberate destruction by Exxon or about creating “planetary sovereignty”).⁷² Debates on issues like climate justice, climate refugees and

70. Connolly, *Facing the Planetary*, p. 4.

71. The distinction I want to draw here *does not quite derive from* but is inspired by Heidegger’s discussion of Plato that makes particular reference to the famous allegory of the cave discussed in the *Republic*; see Heidegger, “Plato’s Doctrine of Truth,” pp. 136–54.

72. See Geoff Mann and Joel Wainwright, “Planetary Sovereignty,” *Climate Leviathan: A Political Theory of Our Planetary Future* (New York, 2018), pp. 129–56. “Planetary sovereignty” refers here to some kind of world government or world order that will manage global warming.

their rights, democracy and global warming, climate change and inequalities of income, race, gender, good and bad Anthropocene proceed on the assumption that we have ideas, however contested by competing ideas, about ideal *forms* of justice, rights, democracy, and so on, in order to be able to judge and pronounce on a situation. These questions that deeply involve the question of forms, and the politics of debating them, belong to the global.

But the planetary as such, disclosing vast processes of unhuman dimensions, cannot be grasped by recourse to any ideal form. There is no ideal form for the earth as a planet or of its history or for the history of any other planet. While the planetary mode of thinking asks questions of habitability, and habitability refers to some of the key conditions enabling the existence for various life-forms including *Homo sapiens*, there is nothing in the history of the planet that can claim the status of a moral imperative. It is only as humans that we emphasize the last five hundred million years of the planet's life—the last one-eighth of the Earth's age—for that is the period when the Cambrian explosion of life-forms occurred, creating conditions without which humans would not have been. From the viewpoint of anaerobic bacteria, however, which lived on the surface of the planet before the great oxygenation of the atmosphere about 2.45 billion years ago, the atmosphere might look like a history of disasters (as recognized by such human-given names as the Oxygen Holocaust). The planet exists, as Quentin Meillassoux says, “as anterior to the emergence of thought and even of life—*posited, that is, as anterior to every form of human relation to the world.*”⁷³

The Planet and the Political

Faced with the radical otherness of the planet, however, a deeply phenomenological urge on the part of many scientists is to recoil back into the human-historical time of the present and address the planet as a matter of profound human concern—as a critical question of human futures and as an entity to be governed by humans. But the governance question, whether posed in terms of sustainability or habitability, is at base an existential concern that can only belong to the present. The critical difference is that in answering this existential question, Earth system scientists' ideas point to a profound shift in conceptions of how humans are to dwell on earth. It is as if Schmitt's land/sea opposition, the opposition between our “terrestrial modes of being [*eines terranen Daseins*]”—signifying the desire

73. Quentin Meillassoux, *After Finitude: An Essay on the Necessity of Contingency*, trans. Ray Brassier (New York, 2009), p. 10.

for rest, stability, house, property, marriage, family, and so on—and our “maritime existence” symbolized by the restless and perpetual movement of the technology-driven, imperial-European, ocean-going ship has finally come to be realized in the picture of a geoengineered, “intelligent” planet making its voyage through the infinite seas of the universe.⁷⁴

In 1999, Hans Joachim Schellnhuber, the physicist who set up the Potsdam Institute for Climate Impact Research in 1992, asked what Erle Ellis regards as “the pivotal question” of the Anthropocene: “‘Why should Prometheus not hasten to Gaia’s assistance?’ . . . Can humans help to bend Earth’s trajectory towards better outcomes for both humanity and non-human nature?” (A, p. 144). Ellis endorses the view, albeit cautiously: “Hopes for a technocratic Prometheus are more than just pipe dreams. . . . The prospects for anthropocenes much better than the one we are now creating are very real” (A, p. 157). Lenton writes: “Whilst human transformation of the planet was initially unwitting, now we are increasingly collectively aware of it. . . . This changes the Earth system fundamentally, because it means that one species can consciously, collectively shape the future trajectory of our planet.” Such evolving “human consciousness” itself becomes a “new property of the Earth system” (ESS, pp. 107, 117). “Human civilization,” we hear from Langmuir and Broecker, “has led to the first global community of a single species, destruction of billions of years of accumulation of resources, a change in atmospheric composition, a fourth planetary energy revolution, and a mass extinction.” Yet, they argue, “there is the potential in human civilization for Earth to pass from ‘habitable planet’ to ‘inhabited planet,’ i.e., one that carries intelligence and consciousness on a global scale, for the benefit and further development of the planet and all its life” (HP, p. 645).

This human concern opens out into another argument that is truly planetary and yet is drawn back immediately into human horizons. How long can a highly developed technological civilization last, ask Langmuir and Broecker? “*Does such a civilization self-destruct in a few hundred years or last for millions of years? For such a civilization to last, the species driving the technology must [consciously and collectively] sustain and foster planetary habitability rather than ravage planetary resources*” (HP, p. 650). Hence their hope that humans would be able one day “to view themselves and act as an integral and responsible part of a planetary system” (HP, pp. 599–600). This, they write in concluding their book on the history of the Earth system, “is the challenge of human civilization, to become a part of a

74. Schmitt, “Dialogue on New Space,” *Dialogues on Power and Space*, pp. 73, 74.

natural system to permit and perhaps to even to participate in further planetary evolution" (*HP*, p. 668).

Lenton and Latour—even as they acknowledge that “in politics the blind lead the blind”—express the view that hope might lie in scientists collaborating with “citizens, activists, and politicians” so that enough “sensors” (the scientific-technological equivalent of the blind person’s white cane) could be put in place to enable them all “to *quickly* realize [and presumably fix] where things are going wrong.” Being thus able to track “the lag time between environmental changes and reactions of societies,” they add, “is the only practical way in which we can *hope* to add some self-awareness to Gaia’s self-regulation.”⁷⁵ As a student of human pasts and politics, I find this vision of a future where scientists, activists, and politicians and their respective constituencies move “quickly,” to recognize errors made on a very large social scale, certainly reasonable but perhaps unlikely.

In any case, the language of hope (and despair), when we are confronted with the planet, turns us towards the present, for hoping and despairing are things we do in the human *now* while the planetary places humans against an unhuman backdrop. This seeming rapprochement between the time-scale of the planetary and the time in which human hope and despair arise is intellectually fragile. It remains open to criticism for its assumption that humans can somehow get around being the kind of “pluriverse” that they are and that Schmitt saw as the ground for the friend/enemy distinction in his famous concept of the political.⁷⁶ The human political is constitutionally plural and, as we know from problems of the IPCC trying to produce strategies for governing climate change, it cannot be easily subordinated by any one rational strategy. The anthropocenic regime of historicity as visible in ESS sets humans against a background of relationships and time that necessarily cannot be addressed from within the temporal horizon of human experiences and expectations—that is, from within the global regime of historicity. Yet that is the reconciliation that even Earth system scientists seek to achieve as historians of human futurity. Their understandably human and presentist concerns end up obscuring the profound otherness of the planet that their research also reveals.

The hope that humans will one day develop technology that will remain in a commensalist or congruent relationship to the biosphere for a period stretching into geological timescales—such a hope belongs to the realms of

75. Lenton and Latour, “Gaia 2.0: Could Humans Add Some Level of Self-Awareness to Earth’s Self-Regulation,” *Science*, 14 Sept. 2018, p. 1068, science.sciencemag.org/content/sci/361/6407/1066.full.pdf; my emphasis.

76. Schmitt, *The Concept of the Political*, trans. George Schwab (1932; Chicago, 2007), p. 53: “The political world is a pluriverse, not a universe.”

a reasonable utopia.⁷⁷ In spirit, it is no different from what Félix Guattari once wrote in his climate-unaware *Three Ecologies* (1989). With a sense of prophecy that today—after all the debate about geoengineering and humans as the “God species”—must at least sound a little dubious, Guattari wrote, that “the health” of the planet earth

will be increasingly reliant on human intervention, and a time will come when vast programmes will need to be set up in order to regulate the relationship between oxygen, ozone and carbon dioxide in the Earth’s atmosphere. . . . In the future much more than the simple defence of nature will be required; we will have to launch an initiative if we are to repair the Amazonian ‘lung,’ for example.⁷⁸

The “Amazonian ‘lung,’” like the conveyor belt (the North Atlantic Meridional Overturning Circulation) of the Atlantic, may well be a part of the Earth system, and it is much easier perhaps for humans—in human time—to destroy than to fix such parts. To try to derive any ethical or moral lessons from our new understanding of the Earth system—the multiple networks of connections in which our bodies are like nodal points, simply a site that many connections pass through—is to try to bring within the grasp of the global (the domain of forms and values and therefore of the political) the planetary that not only out-scales the human but also, as I have said, has nothing moral or ethical or normative about it. This urge itself is symptomatic of the predicament of the Anthropocene. It arises from the realization that the reach of the global, something Guattari called Integrated World Capitalism, has through the intensification of its energies completely discredited the nature/society or subject (human)/object (nature) distinction that has been taken for granted for so long in all discussions of modernity.⁷⁹ More than that, the institutions of human civilization, including technology, have interfered with some critical planetary processes. Planetary climate change is precisely an example of this point:

77. On all this, see Mark Williams et al., “The Anthropocene Biosphere,” *The Anthropocene Review* 2, no. 3 (2015): 196–219. One has to remember that even the weak 2015 Paris agreement between nations *simply assumes* that towards the end of this century humans will have the technology to draw down CO₂ from the atmosphere—that is, produce “negative” emissions. See Johan Rockström et al., “The World’s Biggest Gamble,” *Earth’s Future* 4 (2016): 465–70, and Oliver Geden, “The Paris Agreement and the Inherent Inconsistency of Climate Policy Making,” *WIREs Climate Change* 7 (Nov./Dec. 2016): 790–97.

78. Félix Guattari, *The Three Ecologies*, trans. Ian Pindar and Paul Sutton (New Brunswick, N.J., 2000), p. 66. Guattari, however, was prophetic about the rise of “men like Donald Trump” in the world he analyzed (p. 43).

79. Latour’s name, of course, has to be invoked here as one of the pioneers of this argument. For discussion of Guattari’s views, see Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, N.C., 2010), p. 113.

humans have broken the planet's short-term carbon cycle by producing an excess amount of carbon dioxide that human institutions and technology cannot yet manage to recycle.

Facing the planetary then requires us to acknowledge that the communicative setup within which humans saw themselves as naturally situated through categories like earth, world, and globe, has now broken down, at least partially. Many traditions of thought, including some religious ones, may have considered the earth-human relationship special; with regard to the planet, though, we are no more special than other forms of life. The planet puts us in the same position as any other creature.⁸⁰ Our creaturely life, collectively considered, is our animal life as a species, a life that, *pace* Kant, humans cannot ever altogether escape.⁸¹ Our encounter with the planet in humanist thought opens up a conceptual space for the emergence of a possible philosophical anthropology that will be able to think capitalism and our species life together, from *both* within and against our immediate human concerns and aspirations.

Political thought since the seventeenth century has been grounded in the idea of securing human life and property. This thought has remained constitutionally indifferent to human numbers—as it was, after all, the human individual who was the bearer of life, the possessor of rights, and, finally, the recipient of welfare. This political indifference to the total number of humans translated into an indifference to the biosphere; the reigning assumption being that the globe was always resourced enough to support in perpetuity the human-political project, no matter how demanding humans became of the earth. But our encounter with the planet or the Earth system allows us to see how some of the basic assumptions of this tradition now stand challenged. The harder we “work” the earth in pursuit of the worldly flourishing of a great number of humans, the more we encounter the planet. If human institutions, technology, and profit seeking that have so far worked in tandem to “secure” human life expanded to a point whereby planetary cycles broke down, the seas got warmer and more acidic, forests vanished,

80. I owe this point to discussions with Norman Wirzba whom I thank for sharing his unpublished essay, “Rethinking the Human in an Anthropocene World.” What I say here also resonates with some remarks that Joyce Chaplin has recently made: “The term Anthropocene . . . simultaneously promote[s] and diminish[es] humankind. . . . Our collective acts constitute a Great Acceleration . . . Hurrah for us? Not really. The net result has been a vast reminder that we are just another species, . . . dependent on natural resources for our flourishing and are vulnerable when those . . . become scarce” (Joyce Chaplin, “Can the Nonhuman Speak? Breaking the Chain of Being in the Anthropocene,” *Journal of the History of Ideas* 78 [Oct. 2017]: 512).

81. See Chakrabarty, “Humanities in the Anthropocene: The Crisis of An Enduring Kantian Fable,” *New Literary History* 47 (Spring/Summer 2016): 377–97.

biodiversity was stressed and species extinction hastened, the number of refugees in the world (now calculated to be around sixty-five million) likely trebled, the frequency of “extreme weather” events increased, and if the labor of humans and animals got displaced by the work of artificial intelligence, then a profound and tragic irony would reveal itself in such a course of human history. The institutions humans have used so far to secure human life have reached a point of expansion and development whereby that very fundamental premise of human politics—securing human life—is undermined. Late capitalism, in this sense, destroys the human-political project the world over. In such circumstances, there is surely the danger, as Latour points out, of a rebarbarization of the world, a prospect that many authoritarian leaders and parties today (including Donald Trump in the US and the Bharatiya Janata Party in India) implicitly or explicitly embody and hold out.⁸²

If the climate crisis of human flourishing brings into view planetary processes that humans in the past simply ignored, bracketed, or took for granted, it is reasonable to ask for an ethic that allows humans to develop “everyday tactics for cultivating an ability to discern the vitality of matter.”⁸³ But we also have to agree with Jane Bennett that such “attentiveness to matter and its powers will not solve the problem of human exploitation or oppression. . . . It can [only] inspire a greater sense of the extent to which all bodies are kin in the sense of inextricably enmeshed in a dense network of relations.”⁸⁴ Posthumanism by itself cannot address the political. Any theory of politics adequate to the planetary crisis humans face today would have to begin from the same old premise of securing human life but now ground itself in a new philosophical anthropology, that is in a new understanding of the changing place of humans in the web of life and in the connected but different histories of the globe and the planet.

As the geologist Jan Zalasiewicz once observed: “It is hard, as humans, to have a perspective on the human race.”⁸⁵ What indeed are the perspectives that ESS offers? Augustine turned to writing his *Confessions* when he realized that he had become a “question” for himself.⁸⁶ We could similarly ask: If one reads ESS as providing an (auto)biography of humans when

82. Latour spells out some of his thoughts on this question in Latour, *Down to Earth: Politics in the New Climatic Regime*, trans. Porter (Medford, Mass., 2018).

83. Bennett, *Vibrant Matter*, p. 119.

84. *Ibid.*, p. 13. Kelly Oliver’s attempt to develop an earth ethic out of the philosophy of Heidegger is somewhat similar in spirit; see Oliver, *Earth and World*.

85. Zalasiewicz, *The Earth after Us: What Legacy Will Humans Leave in the Rocks?* (New York, 2008), p. 1.

86. Saint Augustine, *Confessions*, trans. R. S. Pine-Coffin (New York, 1961), p. 212: “And then I turned to myself and asked, ‘Who are you?’”

humans have become a question for themselves, what indeed is that question that motivates this narrative? The question itself remains unasked but many second-order, derivative questions swim around in its gravitational field: Are humans now a “God Species”? Should humans make kin with other nonhuman beings? Should human societies aim to become a part of the natural systems of the planet? Will the Earth become an “intelligent” planet, thanks to the integration of the technosphere and the biosphere? Such questions—not yet answerable yet gaining in force every day—mark out how the category *planet* enters humanist thought, as a matter of human-existential concern, even as we come to realize that the planet does not address us in quite the same way as our older categories of *earth*, *world*, and *globe*.