

The Anthropocene Crisis

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For it is because we are kept in the dark about the nature of human society—as opposed to nature in general—that we are now faced (so the scientists concerned assure me), by the complete destructibility of this planet that has barely been made fit to live in.
—Bertolt Brecht¹

The Anthropocene, viewed as a new geological epoch displacing the Holocene epoch of the last 10,000 to 12,000 years, represents what has been called an “anthropogenic rift” in the history of the planet.² Formally introduced into the contemporary scientific and environmental discussion by climatologist Paul Crutzen in 2000, it stands for the notion that human beings have become the primary emergent geological force affecting the future of the Earth system. Although often traced to the Industrial Revolution in the late eighteenth century, the Anthropocene is probably best seen as arising in the late 1940s and early 1950s. Recent scientific evidence suggests that the period from around 1950 on exhibits a major spike, marking a Great Acceleration in human impacts on the environment, with the most dramatic stratigraphic trace of the anthropogenic rift to be found in fallout radionuclides from nuclear weapons testing.³



Viewed in this way, the Anthropocene can be seen as corresponding roughly to the rise of the modern environmental movement, which had its beginnings in the protests led by scientists against above-ground nuclear testing after the Second World War, and was to emerge as a wider movement following the publication of Rachel Carson’s *Silent Spring*

¹ ↪ Bertolt Brecht, *Brecht on Theatre* (New York: Hill and Wang, 1964), 275.

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

³ ↪ Paul J. Crutzen and Eugene F. Stoermer, “The Anthropocene,” *Global Change Newsletter*, May 1, 2000, 17; Paul J. Crutzen, “Geology of Mankind,” *Nature* 415, no. 6867 (2002): 23; Colin N. Waters et al., “The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene,” *Science* 351, no. 6269 (2016): 137, 137, 2622-1–2622-10.

in 1962. Carson's book was soon followed in the 1960s by the very first warnings, by Soviet and U.S. scientists, of accelerated and irreversible global warming.⁴ It is this dialectical interrelation between the acceleration into the Anthropocene and the acceleration of a radical environmentalist imperative in response that constitutes the central theme of Ian Angus's marvelous new book. It is his ability to give us insights into the Anthropocene as a new emergent level of society-nature interaction brought on by historical change—and how the new ecological imperatives it generates have become the central question confronting us in the twenty-first century—that makes Facing the Anthropocene so indispensable.

Today it seems likely that the Anthropocene will come to be linked within science to the post-Second World War era in particular. Nonetheless, as in the case of all major turning points in history, there were signs of minor spikes at earlier stages along the way, going back to the Industrial Revolution. This reflects what the Marxian philosopher István Mészáros calls the “dialectic of continuity and discontinuity,” characterizing all novel emergent developments in history.⁵ Although the Anthropocene concept arose fully only with the modern scientific conception of the Earth system, and is now increasingly seen as having its physical basis in the Great Acceleration after the Second World War, it was prefigured by earlier notions, arising from thinkers focusing on the dramatic changes in the human-environmental interface brought on by the rise of capitalism, including the Industrial Revolution, the colonization of the world, and the era of fossil fuels.

“Nature, the nature that preceded human history,” Karl Marx and Frederick Engels remarked as early as 1845, “no longer exists anywhere (except perhaps on a few Australian coral islands of recent origin).”⁶ Similar views were presented by George Perkins Marsh, in *Man and Nature* in 1864, two years before Ernst Haeckel coined the word ecology, and three years before Marx published the first volume of *Capital*, with its warning of the metabolic rift in the human relation to the earth.⁷

It was not until the last quarter of the nineteenth and the early twentieth century, however, that the key concept of the biosphere, out of which our modern notion of the Earth system was to develop, arose, with the publication, most notably, of *The Biosphere* by the Soviet geochemist Vladimir I. Vernadsky in 1926. “Remarkably,” Lynn Margulis and Dorian Sagan write in *What is Life?*, “Vernadsky dismantled the rigid boundary between living organisms and a nonliving environment, depicting life globally before a single satellite had returned photographs of Earth from orbit.”⁸

The appearance of Vernadsky's book corresponded to the first introduction of the term Anthropocene (together with Anthropogene) by his colleague, the Soviet geologist Aleksei Pavlov, who used it to refer to a new geological period in which humanity was the main driver of planetary geological change. As Vernadsky observed in 1945, “Proceeding from the notion of the geological role of man, the geologist A. P. Pavlov (1854–1929) in the last years of his life used to speak of the anthropogenic era, in which we now live.... He rightfully emphasized that man, under our very eyes, is becoming a mighty and ever-growing geological force.... In the 20th Century, man, for the first time in the history of the Earth, knew and embraced the whole biosphere, completed the geographic map of the planet Earth, and colonized its whole surface.”⁹

⁴ ↪ Spencer Weart, “Interview with M. I. Budyko: Oral History Transcript,” March 25, 1990, <http://aip.org>; M. I. Budyko, “Polar Ice and Climate,” in J. O. Fletcher, B. Keller, and S. M. Olenicoff, eds., *Soviet Data on the Arctic Heat Budget and Its Climatic Influence* (Santa Monica, CA: Rand Corporation, 1966), 9–23; William D. Sellars, “A Global Climatic Model Based on the Energy Balance of the Earth Atmosphere System,” *Journal of Applied Meteorology* 8, no. 3 (1969): 392–400; M. I. Budyko, “Comments,” *Journal of Applied Meteorology* 9, no. 2 (1970): 310.

⁵ ↪ István Mészáros, *The Power of Ideology* (New York: New York University Press, 1989), 128.

⁶ ↪ Karl Marx and Frederick Engels, *Collected Works*, vol. 5 (New York: International Publishers, 1976), 40.

⁷ ↪ George P. Marsh, *Man and Nature* (Cambridge, MA: Harvard University Press, 1965); Frank Benjamin Golley, *A History of the Ecosystem Concept in Ecology* (New Haven, CT: Yale University Press, 1993), 2, 207; Karl Marx, *Capital*, vol. 1 (London: Penguin, 1976), 636–39; *Capital*, vol. 3 (London: Penguin, 1981), 949.

⁸ ↪ Lynn Margulis and Dorian Sagan, *What Is Life?* (New York: Simon and Schuster, 1995), 47; Vladimir I. Vernadsky, *The Biosphere* (New York: Springer, 1998). The concept of the biosphere was originally introduced by the French geologist Edward Suess in 1875, but was developed much further by Vernadsky, and came to be associated primarily with him.

⁹ ↪ Vladimir I. Vernadsky, “Some Words about the Noösphere,” in Jason Ross, ed., *150 Years of Vernadsky*, vol. 2 (Washington, D.C.: 21st Century Science Associates, 2014), 82; E. V. Shantser, “The Anthropogenic System (Period),” in *The Great Soviet Encyclopedia*, vol. 2 (New York: Macmillan, 1973), 140. Shantser's article introduced the word “Anthropocene” in English.

Simultaneously with Vernadsky's work on the biosphere, the Soviet biochemist Alexander I. Oparin and the British socialist biologist J. B. S. Haldane independently developed in the 1920s the theory of the origin of life, known as the "primordial soup theory." As summed up by Harvard biologists Richard Levins and Richard Lewontin, "Life originally arose from inanimate matter [what Haldane famously described as a 'hot dilute soup'], but that origination made its continued occurrence impossible, because living organisms consume the complex organic molecules needed to recreate life de novo. Moreover, the reducing atmosphere [lacking free oxygen] that existed before the beginning of life has been converted, by living organisms themselves, to one that is rich in reactive oxygen." In this way, the Oparin-Haldane theory explained for the first time how life could have originated out of inorganic matter, and why the process could not be repeated. Equally significant, life, arising in this way billions of years ago, could be seen as the creator of the biosphere within a complex process of coevolution.¹⁰

It was Rachel Carson, in her landmark 1963 speech "Our Polluted Environment," famously introducing the concept of ecosystem to the U.S. public, who most eloquently conveyed this integrated ecological perspective, and the need to take it into account in all of our actions. "Since the beginning of biological time," she wrote,

there has been the closest possible interdependence between the physical environment and the life it sustains. The conditions on the young earth produced life; life then at once modified the conditions of the earth, so that this single extraordinary act of spontaneous generation could not be repeated. In one form or another, action and interaction between life and its surroundings have been going on ever since.

This historic fact has, I think, more than academic significance. Once we accept it we see why we cannot with impunity make repeated assaults upon the environment as we now do. The serious student of earth history knows that neither life nor the physical world that supports it exists in little isolated compartments. On the contrary, he recognizes the extraordinary unity between organisms and the environment. For this reason he knows that harmful substances released into the environment return in time to create problems for mankind.

The branch of science that deals with these interrelations is Ecology... We cannot think of the living organism alone; nor can we think of the physical environment as a separate entity. The two exist together, each acting on the other to form an ecological complex or ecosystem.¹¹

Nevertheless, despite the integrated ecological vision presented by figures like Carson, Vernadsky's concepts of the biosphere and biogeochemical cycles were for a long time downplayed in the West due to the reductionist mode that prevailed in Western science and the Soviet background of these concepts. Soviet scientific works were well known to scientists in the West and were frequently translated in the Cold War years by scientific presses and even by the U.S. government—though unaccountably Vernadsky's *The Biosphere* was not translated into English until 1998. This was a necessity since in some fields, such as climatology, Soviet scientists were well ahead of their U.S. counterparts. Yet this wider scientific interchange, crossing the Cold War divide, was seldom conveyed to the public at large, where knowledge of Soviet achievements in these areas was practically nonexistent. Ideologically, therefore, the concept of the biosphere seems to have long fallen under a kind of interdict.

Still, the biosphere took center stage in 1970, with a special issue of *Scientific American* on the topic.¹² At around the same time the socialist biologist Barry Commoner warned in *The Closing Circle* of the vast changes in the human relation to the planet, beginning with the atomic age and the rise of modern developments in synthetic chemistry. Commoner pointed back to the early warning of capitalism's environmental disruption of the cycles of life represented by Marx's discussion of the rift in the metabolism of the soil.¹³

¹⁰ ↪ Richard Levins and Richard Lewontin, *The Dialectical Biologist* (Cambridge, MA: Harvard University Press, 1985), 277; A. I. Oparin, "The Origin of Life," in J. D. Bernal, *The Origin of Life* (New York: World Publishing, 1967), 199–234; and J. B. S. Haldane, "The Origin of Life," in Bernal, *The Origin of Life*, 242–49.

¹¹ ↪ Rachel Carson, *Lost Woods* (Boston: Beacon, 1998), 230–31.

¹² ↪ G. Evelyn Hutchinson, "The Biosphere," *Scientific American* 233, no. 3 (1970): 45–53.

¹³ ↪ Barry Commoner, *The Closing Circle: Nature, Man, and Technology* (New York: Knopf, 1971), 45–62, 138–75, 280.

In 1972, Evgeni K. Fedorov, one of the world's top climatologists and a member of the Presidium of the Supreme Soviet of the USSR, as well as the leading Soviet supporter of Commoner's analysis (writing the "Concluding Remarks" to the Russian edition), declared that the world would need to wean itself from fossil fuels: "A rise in temperature of the earth is inevitable if we do not confine ourselves to the use, as energy sources, of direct solar radiation and the hydraulic energy of wave and wind energy, but [choose instead to] obtain energy from fossil [fuels] or nuclear reactions."¹⁴ For Fedorov, Marx's theory of "metabolism between people and nature" constituted the methodological basis for an ecological approach to the question of the Earth system.¹⁵ It was in the 1960s and 1970s that climatologists in the USSR and the United States first found "evidence," in the words of Clive Hamilton and Jacques Grinevald, of a "worldwide metabolism."¹⁶

The rise of Earth system analysis in the succeeding decades was also strongly impacted by the remarkable view from outside, emanating from the early space missions. As Howard Odum, one of the leading figures in the formation of systems ecology, wrote in *Environment, Power and Society*:

*We can begin a systems view of the earth through the macroscope of the astronaut high above the earth. From an orbiting satellite, the earth's living zone appears to be very simple. The thin water and air-bathed shell covering the earth—the biosphere—is bounded on the inside by dense solids and on the outside by the near vacuum of outer space.... From the heavens it is easy to talk of gaseous balances, energy budgets per million years, and the magnificent simplicity of the overall metabolism of the earth's thin outer shell. With the exception of energy flow, the geobiosphere for the most part is a closed system of the type whose materials are cycled and reused.*¹⁷

"The mechanism of overgrowth," threatening this "overall metabolism," Odum went on to state, "is capitalism."¹⁸ Today's concept of the Anthropocene thus reflects, on the one hand, a growing recognition of the rapidly accelerating role of anthropogenic drivers in disrupting the biogeochemical processes and planetary boundaries of the Earth system and, on the other, a dire warning that the world, under "business as usual," is being catapulted into a new ecological phase—one less conducive to maintaining biological diversity and a stable human civilization.

It is the bringing together of these two aspects of the Anthropocene—variously viewed as the geological and the historical, the natural and social, the climate and capitalism—in one single, integrated view, that constitutes the main achievement of Facing the Anthropocene. Angus demonstrates that "fossil capitalism," if not stopped, is a runaway train, leading to global environmental apartheid and what the great British Marxist historian E. P. Thompson referred to as the threatened historical stage of "exterminism," in which the conditions of existence of hundreds of millions, perhaps billions, of people will be upended, and the very basis of life as we know it endangered. Moreover, this has its source in what Odum called "imperial capitalism," imperiling the lives of the most vulnerable populations on the planet in a system of forced global inequality.¹⁹

Such are the dangers that only a new, radical approach to social science (and thus to society itself), Angus informs us—one that takes seriously Carson's warning that if we undermine the living processes of Earth this will "return in time" to haunt us—can provide us with the answers that we need in the Anthropocene epoch. Where such urgent change is concerned "tomorrow is too late."²⁰

¹⁴ ↪ E. Fedorov quoted in Virginia Brodine, *Green Shoots, Red Roots* (New York: International Publishers, 2007), 14, 29. See also E. Fedorov, *Man and Nature* (New York: International Publishers, 1972), 29–30; John Bellamy Foster, "Late Soviet Ecology and the Planetary Crisis," *Monthly Review* 67, no. 2 (June 2015): 9; M. I. Budyko, *The Evolution of the Biosphere* (Boston: Reidel, 1986), 406. Calls by prominent figures like Fedorov for a more rapid and radical response to environmental problems went largely unheeded by the Soviet state, with tragic results.

¹⁵ ↪ Fedorov, *Man and Nature*, 146.

¹⁶ ↪ Hamilton and Grinevald, "Was the Anthropocene Anticipated?" 64.

¹⁷ ↪ Howard T. Odum, *Environment, Power, and Society for the Twenty-First Century* (New York: Columbia University Press, 2007), 3.

¹⁸ ↪ Odum, *Environment, Power, and Society*, 263.

¹⁹ ↪ E. P. Thompson, *Beyond the Cold War* (New York: Pantheon, 1982) 41–80; Rudolf Bahro, *Avoiding Social and Ecological Disaster* (Bath, UK: Gateway, 1994), 19; Odum, *Environment, Power, and Society*, 276–78.

²⁰ ↪ Rolf Edburg and Alexei Yablokov, *Tomorrow Will Be Too Late* (Tucson, AZ: University of Arizona Press, 1991).

Yet the dominant social science, which serves the dominant social order and its ruling strata, has thus far served to obscure these issues, putting its weight behind ameliorative measures together with mechanistic solutions such as carbon markets and geoengineering. It is as if the answer to the Anthropocene crisis were a narrowly economic and technological one consistent with the further expansion of the hegemony of capital over Earth and its inhabitants—this despite the fact that the present system of capital accumulation is at the root of the crisis. The result is to propel the world into still greater danger. What is needed, then, is to recognize that it is the logic of our current mode of production—capitalism—that stands in the way of creating a world of sustainable human development transcending the spiraling disaster that otherwise awaits humanity. To save ourselves we must create a different socioeconomic logic pointing to different human-environmental ends: an ecosocialist revolution in which the great mass of humanity takes part.

But are there not risks to such radical change? Would not great struggles and sacrifices attend any attempt to overthrow the prevailing system of production and energy use in response to global warming? Is there any surety that we would be able to create a society of sustainable human development, as ecosocialists like Ian Angus envision? Would it not be better to err on the side of denialism than on the side of “catastrophism”? Should we not hesitate to take action at this level until we know more?

Here it is useful to quote from the great German playwright and poet Bertolt Brecht’s didactic poem “The Buddha’s Parable of the Burning House”:

*The Buddha still sat under the bread-fruit tree and to the others,
To those who had not asked [for guarantees], addressed this parable:
“Lately I saw a house. It was burning. The flame
Licked at its roof. I went up close and observed
That there were people still inside. I entered the doorway and called
Out to them that the roof was ablaze, so exhorting them
To leave at once. But those people
Seemed in no hurry. One of them,
While the heat was already scorching his eyebrows,
Asked me what it was like outside, whether it wasn’t raining,
Whether the wind wasn’t blowing, perhaps, whether there was
Another house for them, and more of this kind. Without answering
I went out again. These people here, I thought,
Must burn to death before they stop asking questions.
And truly, friends,
Whoever does not yet feel such heat in the floor that he’ll gladly
Exchange it for any other, rather than stay, to that man
I have nothing to say.” So Gautama the Buddha.²¹*

It is capitalism and the alienated global environment it has produced that constitutes our “burning house” today. Mainstream environmentalists, faced with this monstrous dilemma, have generally chosen to do little more than contemplate it, watching and making minor adjustments to their interior surroundings while flames lick the roof and the entire structure threatens to collapse around them. The point, rather, is to change it, to rebuild the house of civilization under different architectural principles, creating a more sustainable metabolism of humanity and the earth. The name of the movement to achieve this, rising out of the socialist and radical environmental movements, is ecosocialism, and Facing the Anthropocene is its most up-to-date and eloquent manifesto.



²¹ ↪ Bertolt Brecht, *Tales from the Calendar* (London: Methuen, 1961), 31–32.

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