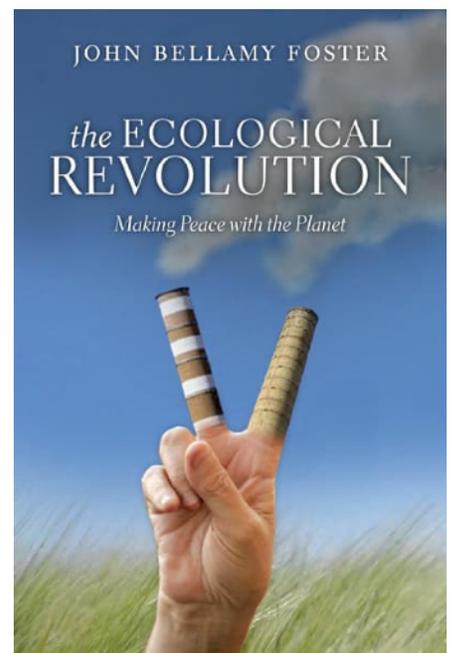


The Long Ecological Revolution

John Bellamy Foster

Aside from the stipulation that nature follows certain laws, no idea was more central to the scientific revolution of the seventeenth century, and to the subsequent development of what came to be known as modern science, than that of the conquest, mastery, and domination of nature. Up until the rise of the ecological movement in the late twentieth century, the conquest of nature was a universal trope, often equated with progress under capitalism (and sometimes socialism). To be sure, the notion, as utilised in science, was a complex one. As Francis Bacon, the idea's leading early proponent, put it, *nature is only overcome by obeying her*. Only by following nature's laws, therefore, was it possible to conquer her.¹

After the great Romantic poets, the strongest opponents of the idea of the conquest of nature during the Industrial Revolution were Karl Marx and Frederick Engels, the founders of classical historical materialism. Commenting on Bacon's maxim, Marx observed that in capitalism the discovery of nature's *autonomous laws appears merely as a ruse so as to subjugate it under human needs*, particularly the needs of accumulation. Yet despite its clever *ruse*, capital can never fully transcend nature's material limits, which continually reassert themselves, with the result that *production moves in contradictions which are constantly overcome but just as constantly posited*. Its treatment of natural limits as mere barriers to be overcome, not as actual boundaries, gives capital its enormously dynamic character. But that same refusal to recognise natural limits also means that capital tends to cross critical thresholds of environmental sustainability, causing needless and sometimes irrevocable destruction.²



¹ Francis Bacon, *Novum Organum* (Chicago: Open Court, 1994), 29, 43. On the Baconian *ruse* and Marx's response, see William Leiss, *The Domination of Nature* (Boston: Beacon, 1974). In Latin, as in most languages with gendered nouns, *nature (natura)* is feminine, bringing out the patriarchal aspects of Bacon's views. For a powerful ecofeminist critique, see Carolyn Merchant, *The Death of Nature* (New York: Harper and Row, 1980).

² Karl Marx, *Grundrisse* (London: Penguin, 1973), 334–35, 409–10. Oddly, Michael Löwy quotes this same passage from Marx as a *good example of the sections of Marx's work that bear witness to an uncritical admiration for the 'civilising actions of capitalist production,'* and the overcoming of natural boundaries. Though plausible on its face, Löwy's position reflects a deep misunderstanding of Marx's argument, part of a dialectical critique of the Baconian *ruse*—that nature is to be conquered by a kind of subterfuge—and of the general attitudes of bourgeois science. Equally important is the theoretical context in which Marx wrote, namely the dialectic of barriers and boundaries first introduced in Hegel's *Logic*. Based on this dialectical understanding, Marx insists that capital is ultimately unable to overcome natural boundaries, even as it temporarily surmounts them by treating them as mere barriers. This overarching contradiction leads to perpetual, recurrent crises. Michael Löwy, *Marx, Engels, and Ecology*, *Capitalism Nature Socialism* 28, no. 2 (2017):10–21. For a comprehensive treatment of Marx's argument, see John Bellamy Foster, *Marx's Grundrisse and the Ecological Contradictions of Capitalism*, in Marcello Musto, ed., *Karl Marx's Grundrisse* (London: Routledge, 2008), 100–02. See also István Mészáros, *Beyond Capital* (New York: Monthly Review Press, 1995), 568.

Marx pointed in *Capital* to such *rifts* in the socio-ecological metabolism of humanity and nature engendered by capital accumulation, and to the need to restore that metabolism through a more sustainable relation to the earth, maintaining and even improving the planet for successive human generations as *boni patres familias* (good heads of the household).³

In his *Dialectics of Nature*, written in the 1870s, Engels turned the Baconian ruse on its head in order to emphasise ecological limits:

*Let us not, however, flatter ourselves overmuch on account of our human victories over nature. For each such victory nature takes its revenge on us. Each victory, it is true, in the first place brings about the results we expected, but in the second and third places it has quite different, unforeseen effects which only too often cancel out the first.... Thus at every step we are reminded that we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature—but that we, with flesh, blood, and brain, belong to nature, and exist in its midst, and that all our mastery of it consists in the fact that we have the advantage over all other creatures of being able to learn its laws and apply them correctly.*⁴

Although key parts of Marx and Engels's ecological critique remained long unknown, their analysis was to have a deep influence on later socialist theorists. Still, much of actually existing socialism, particularly in the Soviet Union from the late 1930s through the same extreme conquest of nature that societies. A decisive domination of nature had ecological movement in century, particularly Rachel Carson's *Silent Spring* in 1962. Here criticism of the ecological destruction brought on by modern science and technology and by unbridled industrialism—associated with a simplistic notion of human progress focusing on economic expansion alone—led to an alternative emphasis on sustainability, coevolution, and interconnection, of which ecology was emblematic. Science was said to have been misused, insofar as it had aided in the violation of nature's own laws, ultimately threatening human survival itself. Through the development of the concept of the biosphere and the rise of the Earth System perspective (in which Soviet ecology played a crucial role), science increasingly came to be integrated with a more holistic, dialectical view, one that took on new radical dimensions that challenged the logic of the subordination of the earth and humanity to profit.⁵

much of actually existing socialism, particularly in the Soviet Union from the late 1930s through the mid-1950s, succumbed to the same extreme modernising vision of the conquest of nature that characterised capitalist societies

Recent years have brought these issues renewed relevance, with the climate crisis and the introduction of the Anthropocene as a scientific classification of the changed human relation to the planet. The Anthropocene is commonly defined within science as a new geological epoch succeeding the Holocene epoch of the last 12,000 years; a changeover marked by an *anthropogenic rift* in the Earth System since the Second World War.⁶ After centuries of

³ Karl Marx, *Capital*, vol. 1 (London: Penguin, 1976), 636–38; *Capital*, vol.3 (London: Penguin, 1981), 754, 911, 949; John Bellamy Foster, *Marx's Ecology* (New York: Monthly Review Press, 2000).

⁴ Karl Marx and Frederick Engels, *Collected Works*, vol. 25 (New York: International Publishers, 1975), 460–61.

⁵ John Bellamy Foster, *Late Soviet Ecology and the Planetary Crisis*, *Monthly Review* 67, no. 2 (June 2015): 1–20.

⁶ Clive Hamilton and Jacques Grinevald, *Was the Anthropocene Anticipated?* *Anthropocene Review* 3, no. 1 (2015): 67; Ian Angus, *Facing the Anthropocene* (New York: Monthly Review Press, 2016).

scientific understanding founded on the conquest of nature, we have now, indisputably, reached a qualitatively new and dangerous stage, marked by the advent of nuclear weapons and climate change, which the Marxist historian E. P. Thompson dubbed *Exterminism, the Last Stage of Imperialism*.⁷

From an ecological perspective, the Anthropocene—which stands not just for the climate crisis, but also rifts in planetary boundaries generally—creative, constructive, and the earth. In ecosocialist reconstitution of society at and sustainable basis. A ecological revolution is necessarily occur in stages, But given the threat to the habitation—marked by acidification, species freshwater, deforestation, this transformation requires regime of accumulation. logic of capital, whenever promote the *creative* Such a reconstitution of merely technological, but metabolic relation with and hence the whole realm reproduction.⁸

the Anthropocene—which stands not just for the climate crisis, but also rifts in planetary boundaries generally—marks the need for a more creative, constructive, and coevolutionary relation to the earth. In ecosocialist theory, this demands the reconstitution of society at large on a more egalitarian and sustainable basis. A long and continuing-ecological revolution is needed—one that will necessarily occur in stages, over decades and centuries. But given the threat to the earth as a place of human habitation—marked by climate change, ocean acidification, species extinction, loss of freshwater, deforestation, toxic pollution, and more—this transformation requires immediate reversals in the regime of accumulation. This means opposing the logic of capital, whenever and wherever it seeks to promote the creative destruction of the planet.

No revolutionary movement invariably confronted with doctrines designed to defend the status quo. In our era, ecological Marxism or ecosocialism, as the most comprehensive challenge to the structural crisis of our times, is being countered by capitalist ecomodernism—the outgrowth of an earlier ideology of modernism, which from the first opposed the notion that economic growth faced natural limits. If ecosocialism insists that a revolution to restore a sustainable human relation to the earth requires a frontal assault on the system of capital accumulation—and that this can only be accomplished by more egalitarian social relations and more consciously coevolutionary relations to the earth—ecomodernism promises precisely the opposite.⁹ Ecological contradictions, according to this ideology, can be surmounted by means of technological fixes and continued rapid growth in production, with no fundamental changes to the structure of our economy or society.¹⁰ The prevailing liberal

marks the need for a more coevolutionary relation to theory, this demands the large on a more egalitarian long and continuing needed—one that will over decades and centuries. earth as a place of human climate change, ocean extinction, loss of toxic pollution, and more—immediate reversals in the This means opposing the and wherever it seeks to *destruction* of the planet. society at large cannot be must transform the human nature through production, of social metabolic

exists in a vacuum; it is counterrevolutionary

⁷ E. P. Thompson, *Beyond the Cold War* (New York: Pantheon, 1982), 41–80; Rudolf Bahro, *Avoiding Social and Ecological Disaster* (Bath: Gateway, 1994), 19.

⁸ For the larger theoretical implications of the question of the relation of social relations to forces of production, and its connection to recent disputes in Marxian theory, see John Bellamy Foster, Harry Magdoff, and Robert W. McChesney, *Socialism: A Time to Retreat?* *Monthly Review* 52, no. 4 (September 2000): 1–7. The concept of social metabolic reproduction is central to the work of István Mészáros, beginning with his *Beyond Capital*.

⁹ The notion of a long ecological revolution is meant to draw on Raymond Williams's earlier notion of a long revolution. For Williams, cultural and ecological materialism were always intertwined, reflecting the long convergence of the Romantic and Marxist traditions. See Williams, *The Long Revolution* (New York: Columbia University Press, 1961), and *Politics and Letters* (London: New Left, 1979).

¹⁰ For critiques of ecological modernisation theory, see Richard York and Eugene A. Rosa, *Key Challenges to Ecological Modernisation Theory*, *Organization and Environment* 16, no. 3 (2003): 273–88; John Bellamy Foster, *The Planetary Rift and the New Human Exemptionalism*, *Organization and Environment* 25, no. 3 (2012): 211–37; and Jeffrey A. Ewing, *Hollow Ecology: Ecological Modernisation Theory and the Death of Nature*, *Journal of World-Systems Research* 23, no. 1 (2012): 126–55.

approach to ecological problems, including climate change, has long put capital accumulation before people and the planet. It is maintained that through new technologies, demographic shifts (such as population control), and the mechanisms of the global *free market*, the existing system can successfully address the immense ecological challenges before us. In short, the solution to the ecological crises produced by capitalist accumulation is still more capitalist accumulation. All the while, we have been rapidly nearing the *climate cliff* (i.e., the breaking of the carbon budget) represented by the trillionth metric ton of carbon released into the atmosphere, now less than twenty years away if current trends continue.¹¹

In these dire circumstances, it is dispiriting but not altogether surprising that some self-styled socialists have jumped on the ecomodernist bandwagon, arguing against most ecologists and ecosocialists that what is required to address climate change and environmental problems as a whole is simply technological change, coupled with progressive redistribution of resources. Here again, the Earth System crisis is said not to demand fundamental changes in social relations and in the human metabolism with nature. Rather it is to be approached in instrumentalist terms as a formidable barrier to be overcome by means of extreme technology.

The best current example of this tendency on the left in the United States is the Summer 2017 issue of *Jacobin*, entitled *Earth, Wind, and Fire*. According to the authors in this special issue and their related works, the solution to climate change and other ecological problems is primarily one of innovation in the development and application of new technologies and does not require a critique of the process of capital accumulation or economic growth. Activist groups such as Greenpeace and most ecosocialists come under attack for their *catastrophism* or apocalypticism, their direct action, and their emphasis on the need for qualitative changes in the human relation to the environment.¹² The entire issue, packed with colourful charts and graphics, espouses a techno-optimism in which ecological crises can be solved through a combination of non-carbon energy (including nuclear power), geoengineering, and the construction of a globe-spanning negative-emissions energy infrastructure.

If this stance is *socialist*, it is only in the supposedly progressive, ecomodernist sense of combining state-directed technocratic planning and proposals for more equitable vision, ecological necessities to notions of economic and that are treated as living system to be conquered. As if to *Jacobin* issue includes as an Leon Trotsky, taken from his *Literature and Revolution* (1924):

In this vision, ecological necessities are once again subordinated to notions of economic and technological development that are treated as inexorable. Nature is not a living system to be defended, but a foe to be conquered

market regulation with income distribution. In this are once again subordinated technological development inexorable. Nature is not a defended, but a foe to be punctuate this position, the epigraph a quotation from

Faith merely promises to move mountains; but technology, which takes nothing "on faith," is actually able to cut down mountains and move them. Up to now this was done for industrial purposes (mines) or for railways (tunnels); in the future this will be done on an immeasurably larger scale, according to a general industrial and artistic plan. Man will occupy himself with re-registering mountains and rivers, and will earnestly and repeatedly make improvements in nature. In the end, he will have rebuilt the

¹¹ Trillionthtonne.org.

¹² Peter Frase, *By Any Means Necessary*, *Jacobin* 26 (2017): 81.

*earth, if not in his own image, at least according to his own taste. We have not the slightest fear that this taste will be bad.*¹³

Trotsky was hardly alone in promoting such reckless productivism in the early 1920s, and can be at least partly excused as an individual of his time. To repeat the same error nearly a century later, however, when we face the destabilisation of the world's ecosystems and human civilisation itself, is to capitulate to the forces of destruction. The current attempt to claim the conquest of nature and ecomodernisation as a *socialist* project is dangerous enough that it warrants a thorough critique. Otherwise, we risk turning back the clock on the vital political and theoretical advances made by the ecological left over the last half-century.

The New Promethean Socialism

The first half of Jacobin's playfully titled *Earth, Wind, and Fire* issue is fairly uncontroversial from a left standpoint, cataloguing capitalism's environmental depredations and calling for radical change. However, editorial board member Connor Kilpatrick sets the tone for the issue's second part when he suggests that Donald Trump and capitalist entrepreneurs appeal to a broad public by promising a future of economic growth and new technology, while the ecological movement offers only *a politics of fearmongering and austerity*.¹⁴ The second half makes the implications of Kilpatrick's criticism explicit, developing over the course of several articles a thoroughly ecomodernist, techno-utopian vision that is ultimately incompatible with the goals and methods of the grassroots ecological movement.

The penultimate article in the issue, Leigh Phillips and Michal Rozworski's *Planning the Good Anthropocene*, along with Phillips's prior work, captures the essence of this putatively progressive ecomodernist perspective. Phillips is the author of the 2015 book *Austerity Ecology and the Collapse-Porn Addicts*, and Rozworski is a Toronto-based union researcher and commentator, who frequently writes for Jacobin.¹⁵ In his book, Phillips directs polemical attacks on such varied left thinkers, living and dead, as Theodor Adorno, Ian Angus, Brett Clark, David Harvey, Max Horkheimer, Derrick Jensen, Naomi Klein, Annie Leonard, Herbert Marcuse, Bill McKibben, Lewis Mumford, Juliet Schor, Richard York, and myself. He also challenges the boundaries of leading same time, Phillips gives approval to Erle Ellis, Breakthrough Institute fellows); Alex Williams the *Accelerate Manifesto*; on the notion of Mother

One chapter in Phillips's Leonard, is titled *In* attacking the work of with *Monthly Review*, is *Rift*.¹⁶ Phillips dismisses the

Phillips dismisses the idea that Marx advanced ecological values, despite mountains of evidence to the contrary, and accuses the entire ecological left of doom-mongering and catastrophism. [Naomi] Klein is said to promote an eco-austerity that is ultimately no different from the neoliberal version. Phillips flatly rejects the notion that there are limits to economic growth, asserting that you can actually have infinite growth on a finite world, by making more with less. According to some estimates, he informs us, the planet can sustain up to 282 billion people...by using all the land.

concept of planetary Earth System scientists. At the his ecomodernist seal of Roger Pielke, Jr., and the (where both are senior and Nick Srnicek, authors of and Slavoj Žižek (for his attack Earth).

book, criticizing Greenpeace's *Defense of Stuff*; another, several thinkers associated called *There Is No 'Metabolic* idea that Marx advanced

¹³ Leon Trotsky, *Literature and Revolution* (New York: Russell and Russell, 1957), 251.

¹⁴ Connor Kilpatrick, *Victory Over the Sun*, Jacobin 26 (2017): 22–23.

¹⁵ Leigh Phillips, *Austerity Ecology and the Collapse-Porn Addicts* (Winchester, UK: Zero, 2015).

contrary, and accuses the entire ecological left of *doom-mongering* and *catastrophism*. Klein is said to promote an *eco-austerity* that is ultimately no different from the neoliberal version. Phillips flatly rejects the notion that there are limits to economic growth, asserting that *you can actually have infinite growth on a finite world, by making more with less*. According to some estimates, he informs us, *the planet can sustain up to 282 billion people...by using all the land*.¹⁶

For Phillips, bigger is beautiful: *The socialist must defend economic growth, productivism, Prometheanism*. The former Soviet Union, for example, is faulted not for its extreme productivism, but only for its lack of democratic planning and insufficient concern for

sweepingly nature: *We are nature, and natural*. It follows that *our from nature; they are logic, one might add, so Human progress means natural limits. Viewed in freedom. Growth is value only insofar as they society. Thus we should not because of their the loss of species means a the services that living*

Overall, the New Left of are faulted for rejecting ever more production— sees the Brazilian Landless step with social needs, precisely because it attempts to reconnect workers to the land. What is required is a *high-energy planet, not modesty, humility and simple living*. Ecomodernism would concentrate the land and rely on large-scale agricultural production.¹⁸

So enamoured is Phillips of nuclear power as the solution to climate change that he says that *a substantial, global reversal of neoliberalism and an embrace of a strong, democratic public-sector ethos* is climatically advantageous mainly because it will allow us to deploy *what is absolutely the strongest weapon we have in our arsenal against global warming*, namely nuclear power. No mention of Fukushima here.¹⁹

a sweepingly anthropocentric definition of nature: We are nature, and all that we do to nature is natural. It follows that our skyscrapers are not separate from nature; they are nature. (By the very same logic, one might add; so are our nuclear weapons.) Human progress means transgressing all purported natural limits. Viewed in these terms, energy is freedom. Growth is freedom. Other species have value only insofar as they provide utilitarian benefits to society. Thus we should care when species go extinct, not because of their intrinsic worth...but because the loss of species means a decline in the effectiveness of the services that living systems provide to humans

human welfare. He presents a anthropocentric definition of *all that we do to nature is skyscrapers are not separate nature*. (By the very same are our nuclear weapons.) transgressing all purported these terms, *energy is freedom*. Other species have provide utilitarian benefits to *care when species go extinct, intrinsic worth...but because decline in the effectiveness of systems provide to humans*.¹⁷

the 1960s and its successors the *Promethean ambition of more stuff*. Likewise, Phillips Workers Movement as out of

¹⁶ Phillips, *Austerity Ecology*, 9, 23 32–33, 39–40, 59–63, 67–68, 88, 132, 217–34, 246–49, 252; Leigh Phillips, *Why Eco-Austerity Won't Save Us from Climate Change*, Guardian, November 4, 2015. In attacking the notion that Marx developed an ecological critique through his theory of metabolic rift, Phillips claims incorrectly that the concept of metabolism in science is restricted to chemical operations within the body, in isolation from its *exchange* with its environment. He also rejects recent scholarship (beginning with Hal Draper) suggesting that the famous phrase *the idiocy of rural life* in the standard English-language edition of the Communist Manifesto was a faulty translation. In nineteenth-century usage, the German word *Idiotismus* retained the meaning of its Greek origin, *idiotes* (a private or isolated person) and is more correctly translated as *isolation*—conveying the idea that rural workers were isolated from the polis. Phillips simply declares that since Marx was not afraid of being politically incorrect he would not have shied away from calling rural workers *idiots* (in the contemporary English-language sense). Here one can only quote Spinoza's famous phrase: *Ignorance is no argument*.

¹⁷ Phillips, *Austerity Ecology*, 60, 76, 85, 252–63. It should be noted that *Prometheanism* has two historic meanings. The first, derived from Lucretius, associates the Promethean myth with the Enlightenment and seventeenth-century scientific revolution. The second and more common contemporary meaning, used here, uses it to denote extreme productivism or industrialism. Marx referred to Prometheus in both senses, lauding Epicurus as the Prometheus of the Enlightenment in antiquity, and later criticising Proudhon for his mechanistic Prometheanism. See Foster, *Marx's Ecology*, 10, 59, 126–30.

¹⁸ Phillips, *Austerity Ecology*, 89, 190, 255.

¹⁹ Phillips, *Austerity Ecology*, 202-03.

Phillips and Rozworski bring this same perspective to their contribution to Jacobin's special issue—and were no doubt enlisted for that precise purpose. They tout nuclear power as a viable alternative to fossil fuels, as part of a broader ecomodernist fantasy in which economic growth has no limits and humanity rules as the *collective sovereign of Earth*. Although they endorse some form of state planning, they raise no direct objection to the commodification of nature, labor, and society under capitalism, and seem unconcerned by the ways that existing structures of production and consumption distort and exploit human needs. Instead, the future lies entirely with the new machines that can provide humanity with ever more goods, while commanding on an ever-increasing scale *the biogeo-physical processes we must understand, track, and master* in order to *coordinate ecosystems*. The goal is self-consciously one of Promethean control of nature through science and technology. It is hardly surprising therefore that Phillips's outlook, as first articulated in *Austerity Ecology and the Collapse-Porn Addicts*, has been lauded by the premier corporate-funded ecomodernist think tank, the Breakthrough Institute, or that the title phrase of the Phillips and Rozworski piece, *The Good Anthropocene*, is lifted directly from Breakthrough Institute's *An Ecomodernist Manifesto*.²⁰

In another bold appropriation, Peter Frase, author of the 2016 book *Four Futures: Life After Capitalism*, entitles his contribution to the issue *By Any Means Necessary*—a phrase made famous by Malcolm X, but here denoting planetary-wide interventions in nature. *Four Futures* shows Frase to be enamoured with the idea of the Promethean mastery over the earth. The *grand future* he depicts in what purports to be a realistic ecosocialist scenario (albeit drawing on science fiction) consists of *terraforming our own planet, reconstructing it into something that can continue to support us and at least some of the other living creatures that currently exist—in other words making an entirely new nature*. Like Phillips and Rozworski, Frase has no interest in reducing our impact on nature or treading lightly on the earth; rather we must *manage and care for nature*—the better to serve our own interests. Following the conservative philosopher of science and Breakthrough Institute senior fellow Bruno Latour, Frase insists that in the face of the global ecological crisis we need to be engaged in *Loving Our [Frankenstein] Monsters*. That is, we must learn to identify with the technological-industrial world we have created (or are in the process of creating), with its planned markets, smart parking meters, robo-bees, and new potentialities for geoengineering the planet—all viewed as perfectly compatible with *socialist ecology*.²¹

In *By Any Means Necessary*, Frase focuses on climate change. Chiding the ecological movement for its *green moralising*, he calls on the left wholeheartedly to embrace attempts to geoengineer the planet. He praises Oliver Morton's 2015 book *The Planet Remade*, which proposes to inject sulfur aerosols into the atmosphere to block the sun's rays (though scientists have pointed out that the added calamitous effects of this are likely to be far worse than global warming alone).²² Frase himself makes a case for *cloud brightening*, by which clouds can be made to reflect more sunlight away from the earth. *We have to recognise*, he writes, *that we are, and have been for a long time, the manipulators and managers of nature*. If the left fails to embrace planetary geoengineering, *the bourgeoisie will simply carry out their work without us*. In Frase's view, socialists have no choice but to climb onto the geoengineering bandwagon, even if this

²⁰ Leigh Phillips and Michal Rozworski, *Planning the Good Anthropocene*, Jacobin 26 (2017): 133–36; Phillips, *Austerity Ecology*, 67–68; *The Year of the Good Anthropocene: Top Breakthroughs of 2015*, Breakthrough Institute; Leigh Phillips, *Science Writer and Journalist*, Breakthrough Institute <http://thebreakthrough.org/people/profile/leigh-phillips>; Ecomodernism Manifesto, 7.

²¹ Peter Frase, *Four Futures: Life After Capitalism* (London: Verso, 2016), 91–119. Frase's notion of *Loving Our Monsters* is taken from Bruno Latour's article *Love Your Monsters: Why We Must Care for Our Technologies As We Do Our Children*, Breakthrough Institute, Winter 2012.

²² The most popular geoengineering solution, the injection of sulfur particles into the atmosphere (sometimes euphemistically called *solar radiation management*) is widely regarded in the scientific community as a solution more dangerous than climate change itself, since it would do nothing to stop the build-up of carbon emissions in the atmosphere, while creating whole new planetary dangers. The moment such sulfur injection stopped, climate change would resume on higher levels than ever before, as determined by the higher carbon dioxide concentration in the environment. The dangers of this form of geoengineering include a drier planet with more severe droughts and monsoons, possible erosion of the ozone layer, and disruption of photosynthesis. Further, it would do nothing to mitigate ocean acidification. Cloud brightening, endorsed by Frase, raises similar objections: if done over the Atlantic, it could contribute to the desertification of the Amazon, introducing new global ecological problems without alleviating any of the underlying causes of climate change. Nicolas Jones, *Solar Geoengineering: Weighing the Costs of Blocking the Sun's Rays*, Yale Environment 360, January 9, 2014, <http://e360.yale.edu>; Christopher Mims, 'Albedo Yaughts' and Marine Clouds: A Cure for Climate Change? Scientific American, October 21, 2009.

means going against the ecological movement. Still, *the purpose of raising the prospect of geoengineering in a left context, he says, is not as a substitute for decarbonization, but as part of a larger portrait of ecosocialism.*

There is no danger, Frase assures us, to be found in geoengineering technology itself, only in how it is managed (a sophism akin to *guns don't kill people, people do*). Defending himself in advance against *the charge of hubris and Prometheanism*, he states

Engels—that *the socialist controlling nature. Nature and there are always* But missing from his social relations themselves effect qualitative shifts in with nature. Rather, the keeping the whole as possible, with neither

missing from his analysis is any notion that social relations themselves must change in order to effect qualitative shifts in the human metabolism with nature. Rather, the object seems to be keeping the whole juggernaut going as much as possible with neither social nor ecological relations seriously addressed

relations seriously addressed in what amounts to a technological tinkerer's solution. The only alternative to such an extreme ecomodernist strategy, we are led to believe, is a *hair shirt* austerity—a term that Frase uses in common with Phillips to ridicule the ecological movement.²³

Daniel Aldana Cohen's article *The Last Stimulus* promotes a form of Green New Dealism. Against those on the left who argue for the need to develop a steady-state economy—a system no longer governed by the drive for unsustainable and destructive economic growth—Cohen insists that we should take seriously the hype surrounding green capitalism:

Global political and financial leaders now want to invest a trillion dollars a year in clean energy alone. The budget for climate adaption policies will be comparably huge.... Business as "usual" is changing fast.... Thanks to political pressure, millions of workers' retirement funds are already investing in a happy old age in a stable climate. Globally, trillions of dollars in workers' retirement savings are up for grabs.... Regional and national governments all over the world are setting up green banks, financial institutions to help shape the booming investment in the energy transition.... This past year, employment in the solar sector expanded seventeen times faster than in the economy as a whole.

From this, Cohen derives his thesis that *so far, green capitalists are the ones shaping the future. They get it. We could too.* While not an advocate of unbridled Prometheanism like Phillips and Frase, he nevertheless sees the solution largely in the fairly conventional terms of state management of technology, the market, and urban development.²⁴

Christian Parenti, a *Nation* columnist and author of *Tropic of Chaos: Climate Change and the New Geography of Violence* (2012), is the best-known of the *Earth, Wind, and Fire* contributors. The foreboding title of his article, *If We Fail*, refers to the worst-case scenario of unmitigated climate change, namely the *Venus Syndrome*. As described by climatologist James Hansen and recounted by Parenti, the earth would end up *a lifeless rock swathed in boiling-hot, toxic, water vapors*. Parenti seizes on this apocalyptic image to urge the left to accept drastic technological solutions, which fortunately, he says, are well within reach. Citing an experiment in Iceland, he advocates the building of carbon

²³ Frase, *By Any Means Necessary*, 73–81; Phillips, *Austerity Ecology*, 105.

²⁴ Daniel Aldana Cohen, *The Last Stimulus*, *Jacobin* 26 (2017): 83–95.

capture and sequestration (CCS) plants that would strip carbon from the atmosphere and sequester it by depositing it in basalt rock. This CCS-in-basalt approach, he claims, offers a *fairly simple*, readymade solution to the climate problem. The only difficulty he sees is that such a CCS scheme must be sponsored by the state rather than left to private enterprise, since it offers few opportunities for profit. And this is where progressives with their support of affirmative government have an essential role to play. The *good news* is that a *radical climate solution, counterintuitively perhaps, requires that we use more, not less, energy. But energy, in the form of solar energy, is the one economic input that is truly infinite.*

Parenti does not, however, address the immense obstacles to the building of CCS plants on the scale and with the speed he imagines. As the energy analyst Vaclav Smil has pointed out, *In order to sequester just a fifth of current CO₂ emissions we would have to create an entirely new worldwide absorption-gathering-compression-transportation-storage industry whose annual throughput would have to be about 70 percent larger than the annual volume now handled by the global crude oil industry, whose immense infrastructure of wells, pipelines, compressor stations and storage took generations to build.* CCS technology requires unimaginable quantities of water: as much as 130 billion tons every year, or about half the annual flow of the Columbia River, would be needed to capture and sequester carbon dioxide equal to the annual emissions of the United States alone. And the problems only start there, since the larger technological, economic, and ecological obstacles to such massive attempts at negative-emissions technologies are gargantuan, raising unimaginable difficulties.

If Phillips in his analysis argues that all is nature—that everything in society, from farms to factories to skyscrapers, is *natural*—Parenti suggests the opposite: all is society, to the point that the natural world can scarcely be said to exist at all. It is easy from this

standpoint to argue, as he does, in favor of meat partial solutions to our ecological problems—while factories and fish farms as ecological problems—while ecosystems and the animals themselves are rendered invisible. *Our mission as a retreat from, or to preserve, but rather to become fully makers. Extreme technology will be central to a socialist rescue, or civilisation will not* (all is nature and all is way, the object is identical: to contradictions and seek the total conquest of the environment, effectively maintaining, rather than fundamentally transforming, existing social and economic structures.²⁵

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In her short article *We Gave Greenpeace a Chance*, cultural critic Angela Nagle takes that organisation and the broader ecological movement to task. She rejects what she calls Greenpeace's *diminutive direct action* and the '*deep green*' *primitivism* often associated with the radical environmental movement. Instead she opts once again for hyper-technological solutions to environmental problems, including the global expansion of nuclear energy plants, declaring that *human interference in the natural world is now the only way to save it.* With respect to Trump's claim that global

²⁵ Christian Parenti, *If We Fail*, Jacobin 26 (2017): 114–27; *A Radical Approach to the Climate Crisis*, Dissent (Summer 2013); *Tropic of Chaos* (New York: Nation, 2012); Andy Skuce, *We'd Have to Finish One New Facility Every Working Day for the Next 70 Years'—Why Carbon Capture is No Panacea*, Bulletin of the Atomic Scientists, October 4, 2016; *The Quest for CCS*, Corporate Knights, January 6, 2016, <http://corporateknights.com>; Vaclav Smil, *Global Energy: The Latest Infatuations*, American Scientist 99 (May–June 2011): 219.

warming is a myth concocted by China to make US manufacturing noncompetitive, Nagle quips that on first hearing this her *only sense of shock...was that someone was actually talking about manufacturing again*. Like Phillips, Rozworski, Frase, and Parenti, she urges the left to abandon its *aversion to ambitious technologies and Promethean modernity* and to love our monsters.²⁶

Other articles in the issue launch similarly one-sided attacks on the Sierra Club (Branko Marcetic, *People Make the World Go Round*) and food cooperatives (Jonah Walters, *Beware Your Local Food Cooperative*). In the latter article, we are led to believe that some of the more radical food cooperatives in the 1970s were simply the product of *Maoist true believers and self-styled guerrillas, schooled in the messianic Marxism-Leninism of the late New Left and following the model of the Black Panther Party*—in a series of pejoratives designed to throw scorn on these experiments.²⁷

What is remarkable about the contributions to Jacobin's special issue on the environment and related works by its writers and editors is how removed they are from genuine socialism—if this involves a revolution in social and ecological relations, aimed at the substantive equality and sustainability. What we get is a techno-utopian *solution* that ignores the social relations along with human needs and the environment. Unlike radical ecology generally, directed, technocratic, and economic, reinforced by a system that does not fundamentally challenge the ecological crisis used here to justify the ecological values. The issue's contributors instead endorse a *Good Anthropocene*, or a renewed conquest of nature, as a means of perpetuating the basic contours of present-day commodity society, including, most disastrously, its imperative for unlimited exponential growth. Socialism, conceived in these terms, becomes nearly indistinguishable from capitalism—not a movement to replace generalised commodity society, but homologous with the fundamental structure of capitalist modernity. At best, this represents a foreshortening of the socialist vision for the sake of success in the liberal political arena. But the cost of such a compromise with the status quo is the loss of any conception of an alternative future.

The ecological crisis brought on by capitalism is used here to justify the setting aside of all genuine ecological values. The issue's contributors instead endorse a "Good Anthropocene," or a renewed conquest of nature, as a means of perpetuating the basic contours of present-day commodity society, including, most disastrously, its imperative for unlimited exponential growth. Socialism, conceived in these terms, becomes nearly indistinguishable from capitalism—not a movement to replace generalised commodity society, but homologous with the fundamental structure of capitalist modernity

creation of a world of environmental instead is a mechanistic, the climate problem that of science and technology, and the wider ecological Marxism and this vision of a state-redistributive market planetary geoengineering, challenge the commodity brought on by capitalism is setting aside of all genuine issue's contributors instead *Anthropocene*, or a as a means of perpetuating

The Long Ecological Revolution

How then are we to see the necessary ecological and social revolution of our time? In the nineteenth century, Engels emphasised the imperative for society to develop in accord with nature as the only genuine scientific view: *Freedom does not consist in any dreamt-of independence from natural laws, but in the knowledge of these laws, and the*

²⁶ Angela Nagle, *We Gave Greenpeace a Chance*, Jacobin 26 (2017): 130–31. One might think that Parenti's references to the Venus Syndrome would leave him open to charges of *catastrophism*. But such criticisms are seldom levelled at those taking ecomodernist stances, precisely because they tend to present ready-made technological solutions that minimise challenges to the status quo.

²⁷ Branko Marcetic, *People Make the World Go Round*, Jacobin 26 (2017): 106–07; Jonah Walters, *Beware Your Local Food Cooperative*, Jacobin (Summer 2017): 137–38.

possibility this gives of systematically making them work towards definite ends. This holds good in relation both to the laws of external nature and to those which govern the bodily and mental existence of men themselves—two classes of laws which we can separate from each other at most only in thought but not in reality.²⁸ Moreover, there was no way to shortchange natural necessity. Engels argued that the Baconian ruse of the conquest of nature—obeying nature’s laws for the sole purpose of promoting capital accumulation—would ultimately prove disastrous, since it ignored the larger consequences in the pursuit of short-term gain. In contrast, the object of *scientific socialism* was not a vain attempt to conquer nature, but rather the advancement of human freedom in accord with the conditions imposed by the material world.²⁹

Today, the growing awareness of such problems, and of the inescapable human connection to the natural world as a whole, has led scientists to explore more sustainable forms of development, as in agroecology, bio-mimicry, and systems of ecological resilience. *The overarching goal of an ecological society*, Fred Magdoff and Chris Williams write in their new book *Creating an Ecological Society, is to maintain the long-term health of the biosphere while equitably providing for human needs*.³⁰ This is not an impossible task, but it does require the development of science at a higher level—one not simply concerned with mechanical manipulation of the earth and its inhabitants for private gain, but founded on the understanding and concern for the complex collectivities that constitute living systems and human life itself. This requires ecological planning, but that in turn is only possible if social relations also change, reconceiving freedom in terms of needs deeper and wider than those of individual self-interest in a commodity economy.

What this means is that we should not be stampeded by the climate crisis—however catastrophic its likely consequences—into embracing the very same attitudes toward the human relation to the natural world that generated the current unprecedented threats to human civilisation. To do so is to seal our fate. We cannot escape the long-term ecological consequences of capitalist development through the Faustian bargain of building more and more nuclear power plants around the globe, or by recklessly injecting sulfur particles into the atmosphere—all for the purpose of infinitely expanding commodity production and capital accumulation. Beyond their technical and economic infeasibility, such plans must be opposed because of the immense, unforeseen repercussions that would inevitably result. To argue, for example, for CCS technology as the primary solution to the climate crisis (there is no question that such technology might play a positive role at some level) is to argue for devoting an immense share of resources to such plants, rivalling in scale the world’s entire existing energy infrastructure, with all sorts of added ecological and social costs and consequences.³¹

There are better and faster ways of addressing the climate crisis through revolutions in social relations themselves.

Moreover, any purportedly environmental problem that change, ignoring or even planetary boundaries, and technological, represents a constitutes a refusal to realm of freedom, to meet

any purportedly socialist approach to environmental problem that focuses only on climate change, ignoring or even rejecting the idea of other planetary boundaries, and sees the solution as purely technological, represents a failure of nerve

socialist approach to the focuses only on climate rejecting the idea of other sees the solution as purely failure of nerve. It embrace a new, wider the challenge that historical

²⁸ Marx and Engels, *Collected Works*, vol. 25, 105.

²⁹ Marx and Engels, *Collected Works*, vol. 25, 461–63.

³⁰ Fred Magdoff and Chris Williams, *Creating an Ecological Society* (New York: Monthly Review Press, 2017), 247.

³¹ Carbon capture technology is most likely to be effective in the form of bio-energy with carbon capture and storage (BECCS).

reality now imposes on us.³² Humanity cannot continue to develop in the twenty-first century without embracing more collective and sustainable forms of production and consumption in line with biospheric realities.

Here it is important to recognise that today's monopoly-finance capitalism is a system built on waste. The larger part of production is squandered on negative (or specifically capitalist) use values, in such forms as military spending; marketing expenditures; and the planned obsolescence, consumption of ever destructive goods is those things that people as Marxist economist Paul A. Baran wrote, *people steeped in the culture of monopoly capitalism do not want what they need and do not need what they want.*³⁴ Beyond the mere physical necessities of food, shelter, clothing, clean water, clean air, and so on, these include love, family, community, meaningful work, education, cultural life, access to the natural environment, and the free and equal development of every person. The capitalist order drastically limits or perverts all of this, creating artificial shortages in essential goods in order to generate a driving desire for non-essentials, all for the purpose of greater profitability and polarisation of income and wealth. The United States alone currently spends more than a trillion dollars a year both on the military and on marketing—the latter aimed at inducing people to buy things that they would not otherwise be disposed to purchase.³⁵

There is no doubt that the current planetary ecological crisis requires technological change and innovation.

Improvements in solar and wind power and other alternatives to fossil fuels are an important part of the ecological equation. It is not true, technologies needed to emergency are new, or that alone is the answer. The notwithstanding, there is no ecological crisis as a whole social relations. Any in the present must be based capital accumulation. Nor state, acting as a kind of Rather, a long ecological world's needs would mean metabolism with nature, both nature and human Above all we must be ecological conditions for definition of sustainability.

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there is no solution to the global ecological crisis as a whole compatible with capitalist social relations. Any ecological defences erected in the present must be based on opposition to the logic of capital accumulation... a long ecological revolution adequate to the world's needs would mean altering the human-social metabolism with nature, countering the alienation of both nature and human labour under capitalism. Above all we must be concerned with maintaining ecological conditions for future generations—the very definition of sustainability

however, that all the address the planetary technological development wonders of smart machines solution to the global compatible with capitalist ecological defences erected on opposition to the logic of can intervention by the social capitalist, do the trick. revolution adequate to the altering the human-social countering the alienation of labour under capitalism. concerned with maintaining future generations—the very

³² The conception of freedom as the recognition of necessity is fundamental to Marxist theory. It was first introduced in Hegel's Logic and was incorporated into the materialist conception of history by Engels in *Anti-Dühring*. See Marx and Engels, *Collected Works*, vol. 25, 105–06.

³³ John Bellamy Foster, *The Ecology of Marxian Political Economy*, *Monthly Review* 63, no. 4 (September 2011): 1–16

³⁴ Paul A. Baran, *The Longer View* (New York: Monthly Review Press, 1969), 30.

³⁵ On military spending, see John Bellamy Foster, Hannah Holleman, and Robert W. McChesney, *The U.S. Imperial Triangle and Military Spending*, *Monthly Review* 60, no. 5 (October 2008): 1–19. On marketing, see Michael Dawson, *The Consumer Trap* (Urbana: University of Illinois Press, 2005), 1. The total quantities of both military spending and marketing have increased massively in the years since these works were written.

From this standpoint, a multitude of things can be done now, if humanity mobilises itself to create an ecological society.³⁶ Given the vast waste inherent in the regime of monopoly-finance capital, which has penetrated into the very structure of production, it is possible to implement forms of revolutionary conservation that both expand the realm of human freedom and allow for rapid readjustment to the necessity imposed by the Earth System crisis. It is far more efficient and feasible to cut carbon emissions drastically than it would be to construct a globe-spanning CCS infrastructure, which would rival or exceed in size the current world energy infrastructure. It would be far more rational to carry out a rapid, revolutionary phase-out of carbon emissions than to risk imposing new threats to the diversity of life and human civilisation through attempts to geoengineer the entire planet.

Ecological Marxism offers an opening-up of human freedom and creativity in manifold ways, calling upon humanity as a whole to rebuild its world on ecological foundations in line with the earth itself. Promises of a global technological fix—which becomes more nonsensical if one looks beyond climate change to the numerous planetary boundaries threatened by the capitalist *conquest of nature*—can only lead to elite politics and elite management. It is the ultimate hubris, the final call for the human domination of nature as a means of class domination. Such Promethean views are designed to avoid the reality of the contemporary social and ecological crisis—namely, that revolutionary changes in the existing relations of production are unavoidable. Modernising the forces of production is not enough; more important is establishing the conditions for sustainable human development. Much can be learned from indigenous and traditional forms of working the land: because human society under capitalism has become alienated from the earth, it follows that less alienated societies offer vital insight into the practice of a more sustainable existence.

Critics on both left and right might reply that it is *too late* for an ecological revolution. The answer to this, as Magdoff and Williams eloquently state, is:

Too late for what? To struggle for a better world means taking the world as it is and working to transform it. Although the ecological and political conditions and trends are in many respects quite desperate, we are not condemned to continue degrading the environment or our social conditions.... A certain amount of global warming will continue regardless of what we do with all of its negative side effects.... However, we can stop the slide to an even more degraded Earth, poorer in species and in the health of remaining species. We can use the vast amount of available human and material resources to reorient the economy to benefit all people. An ecological society will allow us to do all the things that are currently off the table, that capitalism has repeatedly shown itself unable to achieve: providing all people with the ability to develop their full potential.³⁷

But to achieve these things, we will need to break with *business as usual*, that is, with the current logic of capital, and introduce an entirely different logic, aimed at the creation of a fundamentally different system of reproduction. To alienation of nature and treatment of the global people—divided by class, —as mere objects of

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different logic, aimed at the different social metabolic overcome centuries of human labour, including the environment and most gender, race, and ethnicity conquest, expropriation, and

³⁶ On the possibilities presented by an ecological revolution, see Fred Magdoff and John Bellamy Foster, *What Every Environmentalist Needs to Know About Capitalism* (New York: Monthly Review Press, 2011), 124–33; Magdoff and Williams, *Creating an Ecological Society*, 283–329.

³⁷ Magdoff and Williams, *Creating an Ecological Society*, 309–10.

exploitation, will require nothing less than a long ecological revolution, one which will necessarily entail victories and defeats and ever-renewed striving, occurring over centuries. It is a revolutionary struggle, though, that must commence now with a worldwide movement toward ecosocialism—one capable from its inception of setting limits on capital. This revolt will inevitably find its main impetus in an environmental proletariat, formed by the convergence of economic and ecological crises and the collective resistance of working communities and cultures—a new reality already emerging, particularly in the global South.³⁸

In the long ecological revolution before us, the world will necessarily proceed from one earthly struggle to another. If the advent of the Anthropocene tells us anything, it is that humanity, through a single-minded pursuit of economic gain benefitting a relative few, is capable of producing a fatal rift in the biogeochemical cycles of the planet. It is time therefore to find another path: one of sustainable human development. This constitutes the entire meaning of revolution in our time.

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Useful links:

- [The Jus Semper Global Alliance](#)
- [The Anthropocene Crisis](#)
- [True Sustainability and Degrowth in the Citizens Imaginary](#)
- [Monthly Review](#)

³⁸ On the concept of the environmental proletariat, see John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift* (New York: Monthly Review Press, 2010), 398–99, 440–41.

- ❖ **About Jus Semper:** The Jus Semper Global Alliance aims to contribute to achieving a sustainable ethos of social justice in the world, where all communities live in truly democratic environments that provide full enjoyment of human rights and sustainable living standards in accordance with human dignity. To accomplish this, it contributes to the liberalisation of the democratic institutions of society that have been captured by the owners of the market. With that purpose, it is devoted to research and analysis to provoke the awareness and critical thinking to generate ideas for a transformative vision to materialise the truly democratic and sustainable paradigm of People and Planet and NOT of the market.
- ❖ **About the author:** John Bellamy Foster is editor of Monthly Review and Professor of Sociology at the University of Oregon. He has written widely on political economy and ecology, including *The Endless Crisis* (with Robert W. McChesney) and *The Ecological Rift* (with Brett Clark and Richard York).
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Portal on the net: <https://www.jussemper.org/>
e-mail: informa@jussemper.org