

Marx, Value and Nature

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Raoul Peck's 2017 film *The Young Karl Marx* opens with a quiet scene of poor "peasant proletarians," men, women, and children, dirty and in rags, gathering dead wood in a forest. Suddenly they are attacked by a troop of mounted police armed with clubs and swords. Some of the gatherers are killed; the rest are captured. The scene then cuts to Karl Marx, age twenty-four, in the Cologne offices of the *Rheinische Zeitung*, where he was editor, writing an article on "The Debates on the Law on the Theft Wood." He penned five instalments under this title from October to November 1842, and it was this more than anything else that brought the Prussian censors down on the newspaper and its talented young editor and writers.¹ In the film, we see the young Marx and his associates debating the course that had led them to defy both the Prussian state and their own liberal industrialist paymasters. Marx was intransigent; there was no other possible path. As he later explained in his famous 1859 Preface to a *Critique of Political Economy*, it was his attempt to address the expropriation of the customary forest rights of the poor that first drove him to the systematic study of political economy.²



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The criminalisation of forest usufruct was a major issue in Germany at the time. In 1836, at least 150,000 of the 207,478 total prosecutions in Prussia were for "wood pilfering" and related offences. In the Rhineland, the proportion was even higher. These prosecutions led to heavy fines and imprisonment. In Baden in 1842, one in every four inhabitants had been convicted of wood-stealing. Central to Marx's argument was the application of "the category of theft where it ought not to be applied": not only the gathering of dead wood, but also the gathering of dead leaves and the picking of berries

¹ ↪ Karl Marx and Frederick Engels, *Collected Works*, vol. 1 (New York: International Publishers, 1975), 224–63. On the term "peasant proletariat," see V. I. Lenin, *Collected Works*, vol. 20 (Moscow: Progress Publishers, 1972), 132–35.

² ↪ Karl Marx, *Contribution to a Critique of Political Economy* (Moscow: Progress Publishers, 1970), 19–20.

(a customary right accorded to children) were declared to be theft, even though these were long-established forms of traditional appropriation for the poor. The “customary right” of the poor to the free appropriation of dead wood, Marx insisted, did not apply to the live, “organic” tree or to “hewn timber”—which could be seen as the property of the private owners—but only to what was already dead. The forest usufruct of the poor was being turned “into a monopoly of the rich,” through a process of expropriation by “money-grubbing petty traders...and Teutonic landed interest[s].” Marx in response referred to the “elemental nature” of the forest system and, as historian Peter Linebaugh indicates, rooted his argument in an appeal to “the bioecology of the forest” and the “complex society” that it supported, including the way that the right of the poor to dead wood mirrored their more general impoverished position and relation to nature.³

Questions regarding the expropriation of land/nature and of human beings never ceased to occupy Marx in his subsequent works, appearing in his Economic and Philosophical Manuscripts and in his two great discussions of “so-called primitive accumulation” in the Grundrisse and Capital. In Peck’s film, the assault of the forest police on the poor is a recurring nightmare, in which Marx sees himself running alongside the landless rural workers as they are being chased down by the authorities.

The Appropriation and Expropriation of Nature

Marx’s crucial distinction between appropriation and expropriation, around which his ecological as well as economic critique of capitalism revolves, is evident in his response to Pierre-Joseph Proudhon, as dramatically portrayed in *The Young Karl Marx*. Proudhon is shown giving a speech in which he makes his famous declaration that “property is theft.”⁴ From the audience, Marx asks, “what kind of property, bourgeois property?” Proudhon answers, “property in general.” Marx remarks that this is “an abstraction.”⁵

For Marx, as he indicates in a later encounter with Proudhon in the film, the latter’s statement is logically untenable, for if property in general is defined as theft, and all proprietary claims are thus invalid, then the question arises: what is theft? It was necessary, in Marx’s view, to distinguish appropriation, or property in its many varied historical forms, from expropriation, i.e., appropriation without an equivalent (in Marx’s terms, also without exchange and without reciprocity).⁶ Classical political theory, from

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³ ↪ Marx and Engels, *Collected Works*, vol. 1, 225, 233–35; Peter Linebaugh, *Stop Thief!* (Oakland: PM, 2014), 43–60; T. C. Banfield, *Industry of the Rhine*, Series I (London: Knight, 1846), 111; John Bellamy Foster, *Marx’s Ecology* (New York: Monthly Review Press, 2000), 66–68; David McLellan, *Karl Marx* (New York: Harper and Row, 1973), 56.

⁴ ↪ Joseph-Pierre Proudhon, *What Is Property?* (Cambridge: Cambridge University Press, 1993), 13–16, 70. Marx first referred to Proudhon in October 1842, around the time he wrote the first instalment of his piece on the theft of wood. Marx and Engels, *Collected Works*, vol. 1, 220. In *The Holy Family* Marx and Engels argued that Proudhon’s critique of political economy in *What Is Property?* was “the criticism of political economy from the standpoint of political economy,” that is, he took the bourgeois criterion of the exchange of equivalents as the sole basis of his critique. Marx and Engels, *Collected Works*, vol. 4, 31–32; David McNally, *Against the Market* (London: Verso, 1993), 141–45.

⁵ ↪ The encounter between Proudhon and Marx in Peck’s film is of course imaginary, but fits well enough with the known facts. See J. Hampden Jackson, *Marx, Proudhon and European Socialism* (London: English Universities Press, 1957), 50–70. The point on property in general as an “abstraction” is taken from Karl Marx, *Grundrisse* (London: Penguin, 1973), 85. Marx originally thought highly of the critique of private property in *What Is Property?*, but faulted Proudhon for his lack of analysis of property forms. Marx and Engels, *Collected Works*, vol. 4 (New York: International Publishers, 1975), 31–32.

⁶ ↪ On Marx’s distinction between appropriation and expropriation, see John Bellamy Foster and Brett Clark, “The Expropriation of Nature,” *Monthly Review* 69, no. 10 (2018): 1–27.

John Locke to G. W. F. Hegel to Marx, locates the basis of civil society and the state in appropriation—the active term for property or the right to possession through labour.⁷

As Marx explained in *The Poverty of Philosophy* and in the *Grundrisse*, all human society rests on free appropriation from nature, which is the material basis of labour and production. This is another way of saying that all society depends on property. There can be no human existence without the appropriation of nature, without production, and without property in some form. “All production is appropriation of nature on the part of an individual within and through a specific form of society. In this sense it is a tautology to say that property (appropriation) is a precondition of production.” For Marx, to declare that “property is theft,” as Proudhon did, was therefore to skirt the fundamental issue—the development of various forms of appropriation in human history from the communal to the more extreme forms of private commodification.⁸ This approach allowed Marx to develop a powerful critique of capitalist society that was both economic and ecological.⁹ Proudhon’s conception left no way out for humanity; since appropriation in some form was a universal basis of society and life itself, to declare that property in general was theft, irrespective of particular property forms, was a dead end for revolutionary movements.¹⁰

A parallel can be drawn here with Hegel’s notion of alienation as objectification, which in his philosophy could be transcended through the unification of subject and object, but only in thought, i.e., in the absolute knowledge of the Hegelian philosopher. For Marx, who rejected the idealist solution, objectification was inherent in human existence, since human beings were objective, sensuous, material beings, deriving their sustenance from outside themselves. Hence it was not objectification, in Marx’s view, but rather the “alienated mediation” intrinsic to capitalist commodity production that was subject to transcendence, and this had to be accomplished in material reality, not simply in thought.¹¹ Similarly, human beings, as objective, material beings, could not be freed from the appropriation from nature, i.e., from property in all its varied forms, which was an objective condition of their existence. What was possible, however, was the revolutionary liberation of humanity from the more alienated, expropriative forms of the human social metabolism with nature.

These same issues have reemerged today in debates on the meaning and method of what is broadly termed ecosocialism. For Raj Patel and Jason W. Moore, in their *A History of the World in Seven Cheap Things*, “appropriation”

⁷ ↪ C. B. Macpherson, *The Political Theory of Possessive Individualism* (Oxford: Oxford University Press, 1962), 194–62; John Locke, *Two Treatises on Government* (Cambridge: Cambridge University Press, 1988), 297–301; G. W. F. Hegel, *The Philosophy of Right* (Oxford: Oxford University Press, 1952), 41–45. In Locke’s case the bourgeois concept of appropriation was used to justify *expropriation*, as from Native Americans, on the fallacious grounds that they had not transformed the land through their labour. Locke, an investor in the Royal African Company, also justified the physical expropriation of human beings, in the case of the enslavement of Africans. See Barbara Arneil, *John Locke and America: The Defence of English Colonialism* (Oxford: Oxford University Press, 1996), 168–200; Peter Olsen, “John Locke’s Liberty Was for Whites Only,” *New York Times*, December 25, 1984.

⁸ ↪ Karl Marx, *The Poverty of Philosophy* (New York: International Publishers, 1963), *Grundrisse*, 87–88, 488–49. See also Engels’s reference to “Proudhon’s theft thesis” in Marx and Engels, *Collected Works*, vol. 6 (New York: International Publishers, 1976), 260.

⁹ ↪ Karl Polanyi, *Primitive, Archaic, and Modern Economies* (Boston: Beacon, 1968), 8–93, 106–07, 149–56.

¹⁰ ↪ Marx and Engels, *Collected Works*, vol. 1, 228.

¹¹ ↪ Karl Marx, *Early Writings* (London: Penguin, 1970), 389–92; Georg Lukács, *History and Class Consciousness* (London: Merlin, 1971), xxiii–xxiv; István Mészáros, *Marx’s Theory of Alienation* (London: Merlin, 1975); John Bellamy Foster and Brett Clark, “Marxism and the Dialectics of Ecology,” *Monthly Review* 68, no. 5 (October 2016): 1–17.

in general, as in Proudhon, is defined as “a kind of ongoing theft.”¹² Both here and in Moore’s earlier *Capitalism in the*

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Web of Life, the focus is on the “appropriation of work” in all of its forms—by which is meant “work” in the sense of physics (i.e., the measure of the energy transfer that occurs when an external force is applied to an object and moves it). In this naturalistic sense, we can speak of the “work” of a river or oil well, in the same terms as that of a human being. Appropriation, or property, conceived by Patel and Moore as the theft of “work,” is thus universal and inescapable, associated with physical motion itself.¹³ Such appropriation of external nature, Moore tells us, outweighs the

exploitation of labour in production.¹⁴

No one of course would doubt that the appropriation of nature underlies all human production. Human beings are objective, material beings; as every child knows, we, like all other living beings, cannot exist without free appropriation from nature. Indeed, all material human production, as Marx stresses, is nothing but the change in form of what nature itself creates.¹⁵ But to argue, as do Patel and Moore, that the human appropriation of nature in general (that is, of its “work” or energy) is “a kind of ongoing theft,” and that this is the core of the ecological crisis, implicitly attributes the whole problem to the very existence of human beings—a misanthropic position.

Such a perspective, common to most mainstream environmental thought, necessarily distracts from the alienated mediation of the human-social metabolic relation to nature, and from capitalism’s specific forms of expropriation of nature and their effects on ecosystems. In the classical Marxian perspective, it is precisely because human history has created a mode of production (capitalism) that alienates the metabolic relations between human beings and nature, thereby creating a metabolic rift and rupturing the conditions of ecological reproduction, that we can hope to restore that essential metabolism—through a revolutionary overturning of the capitalist integument and the creation of a new, coevolutionary material reality. This is Marx’s core ecological message.

In the classical historical materialist view, the free appropriation of nature by humanity (the use of nature’s free gifts) is not to be condemned out of hand as theft. Indeed, “actual labour,” for Marx, “is [nothing but] the appropriation of nature for the satisfaction of human needs, the activity through which the metabolism between man and nature is mediated.”¹⁶ Nor should the concern be primarily, as in bourgeois society, with the mere “cheapness” of nature.¹⁷ Rather, it is the

¹² ↪ Raj Patel and Jason W. Moore, *A History of the World in Seven Cheap Things* (Berkeley: University of California Press, 2017), 81, 95. Elsewhere Moore defines appropriation as the identification, channeling, and securing of “unpaid work” outside the commodity system and embracing everything in nature that is “unpaid.” But since nature is never “paid,” this amounts in practice in his work to the notion of the appropriation of extra-human work encompassing all physical forces, i.e., appropriation in its very broadest sense (even divorced from the classical political-economic and philosophic sense of appropriation as property).

¹³ ↪ For a concise discussion of the relation of physics to capitalism and ecological crisis, see Erald Kolasi, “The Physics of Capitalism,” *Monthly Review* 70, no. 1 (May 2018): 29–43.

¹⁴ ↪ In *The Condition of the Working Class in England*, Engels defined “work” as “the expenditure of force.” See Marx and Engels, *Collected Works*, vol. 4, 431. Lancelot Hogben declared that Engels later welcomed the new developments in thermodynamics and the general theory of work that arose in physics through James Prescott Joule and others as, in Hogben’s words, “the beginning of a new chapter in the history of knowledge.” But no one could suggest that Marx and Engels’s analysis confused the specificity of human labour with “work” in the sense of physics. Lancelot Hogben, *Science for the Citizen* (New York: Knopf, 1938), 65; Marx and Engels, *Collected Works*, vol. 25 (New York: International Publishers, 1987), 370, 505.

¹⁵ ↪ Karl Marx, *Capital*, vol. 1 (London: Penguin, 1976), 133–34.

¹⁶ ↪ Marx and Engels, *Collected Works*, vol. 30 (New York: International Publishers, 1988), 40.

¹⁷ ↪ Marx can only be ironic when addressing the demands for “Cheap Food” by the bourgeois free traders of his time. See Marx, *The Poverty of Philosophy*, 207.

it is the expropriation of nature in the sense of the appropriation of land or resources without reciprocity (maintenance of the “conditions of reproduction”) by capital that constitutes theft in this sphere.

the nineteenth-century German chemist Justus von Liebig called the natural-material “law of replenishment” (or “law of compensation”) necessary for ecological reproduction.²⁰

Capitalism’s destructive relation to the ecological realm depends on this robbery of what Marx referred to as “the elemental powers of nature”—robbery not in the sense that these elements are not “paid,” as Moore says, but rather in the violation of the law of replenishment.²¹ Like Erysichthon in Greek mythology, capital requires ever more rounds of

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expropriation just to keep going, even to the point of eating everything in existence—including, ultimately, itself.²² The dialectic of expropriation and exploitation, leading in the end to exterminism, thus lies at the core of the classical historical-materialist critique of capital. For Marx, it was not the appropriation of dead wood from the forest by peasant-proletarians, but rather capital’s alienated expropriation of all wood (and all land) to feed its insatiable drive for accumulation that constituted the essential reality of the plundering of the material world: a “tragedy of the commodity,” not a tragedy of the commons.²³

If the exploitation of labour is the force behind capitalist valorisation and accumulation, it follows that it cannot continue this contradictory process on an ever-increasing scale without new rounds of creative destruction at the boundaries of the system—the expropriation of the natural environment, along with the expropriation of social reproductive work, human communication, knowledge, and more.²⁴ In *Capital* and in his later writings, Marx pointed to attempts under capitalism to speed up the turnover time in timber production by relying on faster-growing trees and in meat production through the breeding of livestock, arguing that this necessarily pressed against natural laws (and in the case of livestock, promoted cruelty toward animals).²⁵

For Marx, the metabolic rift—the alienated mediation between humanity and nature—was a product of the “robbing” or expropriation of the soil, and thus of nature, thereby hindering “the operation of the eternal natural condition for the

¹⁸ ↪ Paul Burkett, “Nature’s Free Gifts and the Ecological Significance of Value,” *Capital and Class* 68 (1999): 89–110; Foster and Clark, “The Expropriation of Nature.”

¹⁹ ↪ Marx and Engels, *Collected Works*, vol. 33, 301.

²⁰ ↪ Justus von Liebig, *Letters on Modern Agriculture* (London: Walton and Maberly, 1859), 254–55; Kohei Saito, *Karl Marx’s Ecosocialism* (New York: Monthly Review Press, 2017), 197. The law of compensation, which related to replenishment of renewable resources, should be supplemented by Herman Daly’s broader rules of sustainability: (1) Renewable resources must be used no faster than they regenerate; (2) Non-renewable resources should be used no faster than renewable substitutes can be put into place; (3) Pollution and wastes should be emitted no faster than they can be absorbed, recycled, or made harmless. See the Sustainable Water Resources Roundtable, “What Is Sustainability?” <http://acwi.gov>.

²¹ ↪ Marx and Engels, *Collected Works*, vol. 1, 234.

²² ↪ Ovid, *Metamorphoses* (New York: Norton, 2004), 298; Richard Seaford, *Ancient Greece and Global Warming* (London: Classical Association, 2009).

²³ ↪ See Stefano B. Longo, Rebecca Clausen, and Brett Clark, *The Tragedy of the Commodity* (New Brunswick, NJ: Rutgers University Press, 2015).

²⁴ ↪ On capitalism’s need for unlimited environmental expansion, see John Bellamy Foster, Brett Clark, and Richard York, *The Ecological Rift* (New York: Monthly Review Press, 2010), 207–11. Nancy Fraser, “Behind Marx’s Hidden Abode: For an Expanded Conception of Capitalism,” *New Left Review* 86 (2014): 55–72, and “Expropriation and Exploitation in Racialised Capitalism,” *Critical Historical Studies* 3, no. 1 (2016): 163–78; Michael C. Dawson, “Hidden in Plain Sight: A Note on Legitimation Crises and the Racial Order,” *Critical Historical Studies* 3, no. 1 (2016): 143–61; John Bellamy Foster and Brett Clark, “Women, Nature, and Capital in the Industrial Revolution,” *Monthly Review* 69, no. 8 (2018): 1–24.

²⁵ ↪ Karl Marx, *Capital*, vol. 2 (London: Penguin, 1978), 321–22; John Bellamy Foster, “Marx as a Food Theorist,” *Monthly Review* 68, no. 7 (December 2016): 14–15.

lasting fertility of the soil.” This in turn demanded the “systematic restoration” of this metabolism in a future society of associated producers capable of governing “the human metabolism with nature in a rational way...accomplishing it with the least expenditure of energy,” and developing most fully their individual and collective human powers.²⁶

Value and Nature

With the rise of ecosocialism, brought on by the planetary rift, ecological critiques of the capitalist system have deepened and multiplied. But as in any period of headlong theoretical advance, this has yielded starkly different perspectives and positions, resulting in new debates over the conception, scope, and purpose of Marx’s value critique. Left environmentalists and political ecologists such as Stephen Bunker, Alf Hornborg, Zehra Taşdemir Yaşin, and Giorgos

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Kallis have sought to jettison or deconstruct the labour theory of value altogether, arguing that nature in general, energy, and individual species create value in the abstract, which is not restricted to human labour—or that, in Hornborg’s case, economic value is simply normative.²⁷ Such analyses frequently come from theorists

working outside the field of critical political economy, who tend to confuse concepts of energy use, use value, intrinsic value, and normative value with the economic system of commodity value based on abstract labour under capitalism.

In Marx’s critique of the historically specific capitalist valorisation process, value is the crystallisation of socially necessary abstract labour—“labour as the expenditure of labour power.”²⁸ Essential to this critique is the recognition that natural-material use values, while elemental to each and every commodity and the basis of all real wealth, are excluded from capitalism’s value generation calculus, insofar as no [human] labour is incorporated in their production. As Marx himself put it in the Grundrisse, “the purely natural material in so far as no human labour is objectified in it...has no [economic] value under capitalism.”²⁹ This contradictory character of capitalist commodity production, manifested in the opposition between use value and exchange value, places the narrow form of the capitalist value calculus at loggerheads with real wealth, which has its sources in both natural-material use values and concrete human labour.³⁰

Since use value plays no direct role in the internal logic of valorisation under capitalism, this gives rise, in both classical and neoclassical economics, to the notion of the “free gift of Nature to capital.”³¹ Capitalist exploitation and accumulation, as Marx explains, ultimately depend on capital’s usurping of nature’s gifts for itself, thereby monopolising

²⁶ ↪ Marx, *Capital*, vol. 1, 637–38; *Capital*, vol. 3 (London: Penguin, 1981), 959.

²⁷ ↪ See, for example, Stephen Bunker, *Underdeveloping the Amazon* (Chicago: University of Chicago Press, 1985), 31–36, 44–45; Alf Hornborg, “Towards an Ecological Theory of Unequal Exchange,” *Ecological Economics* 25, no. 1 (1998): 130, and *Global Ecology and Unequal Exchange* (London: Routledge, 2011), 104; Zehra Taşdemir Yaşin, “The Adventure of Capital with Nature: From the Metabolic Rift to the Value of Nature,” *Journal of Peasant Studies* 44, no. 3 (2017): 391–93; Giorgos Kallis and Erik Swyngedouw, “Do Bees Produce Value?” *Capitalism Nature Socialism* 28, no. 3 (2017): 1–15. For critiques of such views, see Matthew T. Huber, “Value, Nature, and Labour: A Defence of Marx,” *Capitalism Nature Socialism* 28, no. 1 (2017): 39–52, and Paul Burkett, *Marx and Nature* (Chicago: Haymarket, 2014).

²⁸ ↪ Karl Marx, *Texts on Method* (Oxford: Basil Blackwell, 1975), 200.

²⁹ ↪ Marx, *Grundrisse*, 366. In classical political economy, rent, defined as a deduction from total surplus value, does serve to give certain natural resources exchange values, without these resources in any way generating commodity value as such—for the latter has its source exclusively in abstract labour.

³⁰ ↪ Karl Marx, *Critique of the Gotha Programme* (New York: International Publishers, 1938), 3–4.

³¹ ↪ Marx and Engels, *Collected Works*, vol. 37 (New York: International Publishers, 1998), 732–33. The notion of the “free gift of nature” to capital was not invented by Marx but was axiomatic in the work of all the classical political economists, including Thomas Robert Malthus and Adam Smith. It was left to Marx, however, to give this concept a critical reading by explaining that these free gifts were monopolised by capital in the context of the alienation of nature and humanity.

the means of production and wealth in its entirety.³² This alienation of nature has its counterpart in the alienation of labour—that is, in the emergence of a class with no basis of existence except the sale of its own labour power.

Understood in this way, the historically constructed commodity value form under capitalism is not one in which energy or bees directly participate, but is instead a product of human social-class relations.³³ To see nature or energy, not just socially necessary abstract labour, as generating commodity value would only serve to naturalise and universalise the capitalist value process, eliding its specific social and historical character and its relation to the alienation and exploitation of labour. Even neoclassical economics—along with the ecological economics of Nicholas Georgescu-Roegen—attributes all value-added in the economy to labour or human services, and none to nature or energy.³⁴ Capitalism thus excludes nature, (including the corporeal nature of human beings) from its value form—a fundamental and in many ways fatal contradiction of the system.

In contrast to the frontal attacks on Marx's value theory described above, Moore's subtler approach appears at first to conform to Marxian value theory, attributing value to labour. But on closer examination, his analysis effectively robs Marx's own approach of all significance and undermines any coherent ecological (or economic) critique of capitalism. As Moore puts it, his "argument proceeds from a certain destabilisation of value as an 'economic category.'" ³⁵ Unlike Marx's critique of capitalist valorisation, which recognises that under capitalism all value is the crystallisation of socially necessary labour, and which makes a hard and fast distinction between value and wealth, Patel and Moore, in *A History of the World in Seven Cheap Things*, seek to obliterate these distinctions altogether. Hence they pronounce that "value is a specific crystallisation of 'the original sources of wealth': human and extra-human work."³⁶ Here Marx is quoted against himself, presenting his famous definition of wealth as the basis of a definition of value, thereby erasing an absolutely crucial distinction separating Marx from bourgeois economics. Indeed, the core of Marxian critique rests on the distinctions between use value and exchange value and between wealth and value.

Likewise, in *Capitalism in the Web of Life*, Moore seeks to transform Marx's notion of the "law of value," which focused on quid pro quo as the basis of capitalist commodity exchange, into its opposite, in relation to the "world ecology" as a whole.³⁷ For Moore, the "law of value" centres on the absence of a quid pro quo (in exchange terms) between capital and Cheap Nature—an absence which then becomes the ultimate basis, in his "expansive value" analysis, of capitalist

³² ↪ None of this of course means, for example, that raw materials utilised in production *lack commodity value*, in Marx's conception. They acquire value as a result of the labour-power expended in obtaining and processing them. Additionally, rent of land is a deduction from total surplus value, which then enters into the costs to industry. Still, it remains true that while raw materials and other natural-material use values employed in production (as constant capital) have value, they *do not generate value*, as does socially necessary abstract labour. Further, capital's monopoly of the productive powers provided by nature, viewed as a "free gift of Nature to capital," constitutes the ultimate source of its class domination and its wider destructive tendencies. Karl Marx, *Theories of Surplus Value, Part Two* (Moscow: Progress Publishers, 1968), 45–46.

³³ ↪ See Foster and Burkett, *Marx and the Earth*, 107–10.

³⁴ ↪ For a critical description of how standard capitalist economic accounting fails to incorporate household and subsistence labour (mainly by women) and nature into value-added accounting, see Marilyn Waring, *Counting for Nothing* (Toronto: University of Toronto Press, 2009). On Georgescu-Roegen's position, see John Bellamy Foster and Paul Burkett, *Marx and the Earth* (Chicago: Haymarket, 2016), 135.

³⁵ ↪ Jason W. Moore, "[The Capitalocene, Part II: Abstract Social Nature and the Limits to Capital](http://researchgate.net)" (June 2014): 29, <http://researchgate.net>; accessed April 13, 2018.

³⁶ ↪ Patel and Moore, *A History of the World in Seven Cheap Things*, 101.

³⁷ ↪ As Paul Baran wrote: "The law of value [can be seen] as a set of propositions describing the characteristic features of the economic and social organisation of a particular epoch of history called capitalism. This organisation is characterised by the prevalence of the principle of *quid pro quo* in economic (and not only economic) relations among members of society; by the production (and distribution) of goods and services as commodities; by their production and distribution on the part of independent producers with the help of hired labour for an anonymous market with the view to making profit.... It is by the dominance of this law of value that the capitalist order differs from all others: from antiquity in which slavery dominated the conditions of production and distribution; from feudalism which system was based on a comprehensive network of rights, duties and traditions; from socialism in which planning becomes the overriding principle" (Paul A. Baran to Stanley Moore, August 5, 1960, in Paul A. Baran and Paul M. Sweezy, *The Age of Monopoly Capital* [New York: Monthly Review Press, 2017], 253).

valorisation—in total contradiction to Marx’s own analysis.³⁸ He thus contends that value in its all-encompassing expansive form (including non-labour value) derives primarily from the appropriation of work/energy in general, of which the exploitation of labour is simply an epiphenomenon.

Hence, for Moore, the secret of accumulation is “capitalism’s unified logic of appropriating human and extra-human ‘work’ that is transformed into value.” In this view, the capitalist world ecology/economy and the entire human interaction with nature amount to the appropriation of the “four cheaps”: labour-power, food, energy, and raw materials.³⁹ Labour-power is thus presented as no more significant with respect to the law of value than food, energy, and natural resources. (In his later work with Patel, Moore expanded the framework from four to seven cheaps, adding nature, work, money, lives, and care work and dropping labour-power and raw materials.) This convoluted formulation, however, effectively inhibits any coherent critique of capitalist value production, much less any meaningful understanding of the ecological crises engendered by the capitalist system.⁴⁰

Moore’s argument regarding the four (or seven) cheaps is rooted in his more elastic conception of what constitutes value under capitalism and in civilisation in general, with which he aims to present nothing less than a “new law of value,” encompassing both labour exploitation and the appropriation of physical nature/energy.⁴¹ “Laws of value,” he writes, are phenomena “that shape and cohere a civilisation.” They are the product in large part of the appropriation of the physical “work,” i.e., energy of the universe. Such “expansive value relations,” as he calls them, “lead a double life,” extending beyond the labour process and value production proper, as well as beyond the phenomenon of unpaid human labour, to include all the “extra-human work” involved in the capitalist world ecology. These wider realms of “unpaid work/energy” associated with the “zone of appropriation” far outweigh the exploitation of labour in the determination of the overall, expansive value dimensions of a given civilisation.⁴²

“The law of value,” Moore thus contends, “far from reducible to abstract social labour, finds its necessary conditions of self-expansion through the creation and subsequent appropriation of Cheap Nature,” i.e., appropriation of the web of life in general.⁴³ Again, we are left at a level of obscurity equivalent to Proudhon’s “property is theft.” The “law of value” is said to be based ultimately on the “appropriation of the unpaid ‘work of nature’” (along with the unpaid labour of women in the household and other forms of unpaid human labour). Both “the accumulated work/energy of fossil fuel formation” and the exploitation of labour power in a factory are “moments inscribed in the law of value.” The

³⁸ ↪ Moore, *Capitalism in the Web of Life*, 14, 191. The fact that much of nature or the Earth System is necessarily outside the value circuit of capital gives rise to the Lauderdale Paradox, in which public wealth (particularly the wealth of nature outside the economy) is destroyed by the enhancement of *private riches* in a commodity exchange economy. Private wealth depends on scarcity as one of its conditions, and thus on the destruction of nature’s abundance, such as ample clean water, breathable air, and so on. To try to incorporate both private riches and public wealth in this sense *within* the “law of value,” as in Moore’s analysis, only confuses matters by eliding the contradiction between capitalist commodity production and the world of nature as a whole—i.e., between the robber and the robbed. See Foster, Clark, and York, *The Ecological Rift*, 53–72.

³⁹ ↪ Moore, *Capitalism in the Web of Life*, 14, 17.

⁴⁰ ↪ Moore argues that capitalism produces (or “co-produces”) the natural world, effectively placing the activities of the physical universe and those of society on the same plane. In contrast, as Marx explains, the most that any form of social production can accomplish is to change the *form* in which biogeochemical processes occur and shift them around, often disrupting them and leading to unforeseen and often dangerous consequences. To speak of the anthropogenic production of nature is thus to attribute supra-natural, godlike forces to human society. Karl Marx, *Letters to Kugelmann* (New York: International Publishers, 1934), 73; Marx, *Capital*, vol. 1, 133–34; Foster, *Marx’s Ecology*; Brett Clark and Richard York, “Rifts and Shifts: Getting to the Root of Environmental Crises,” *Monthly Review* 60, no. 6 (2008): 13–24.

⁴¹ ↪ Moore, *Capitalism in the Web of Life*, 69–70.

⁴² ↪ Jason W. Moore, “Value in the Web of Life, or, Why World History Matters to Geography,” *Dialogues in Human Geography* 7, no. 3 (2017): 327–28, *Capitalism in the Web of Life*, 53–54, 65–66, 73, and “The Rise of Cheap Labour,” in Moore, ed., *Anthropocene or Capitalocene* (Oakland: PM, 2016), 98. The critique of Moore’s expansive value-related analysis here was influenced by Kamran Nayeri, “*Capitalism in the Web of Life—A Critique*,” *Climate and Capitalism*, July 19, 2016, <http://climateandcapitalism.com>; Jean Parker, “*Ecology and Value Theory*,” *International Socialism* 153 (2017); Ian Angus, “*Do Seven Cheap Things Explain the History of Capitalism?*” *Climate and Capitalism*, January 10, 2018; Andreas Malm, *The Progress of this Storm* (London: Verso, 2018), 178–96.

⁴³ ↪ Moore, *Capitalism in the Web of Life*, 67.

atmosphere is “put to work” in absorbing greenhouse gases, for which it too is “unpaid,” thus contributing to capitalist valorisation.⁴⁴

Here Moore’s expansive law of value, based on a “world of unpaid work” in which the “law of value in capitalism is the

To be clear, there can be no doubt that capitalism depends on the physical appropriation of nature generally, and in ever greater quantities. Thus Moore writes of my own work that “Foster’s insight was to posit capitalism as an open-flow metabolism, one that requires more and more Cheap Nature just to stay in place.” Rather, the issue is how this relates to value, accumulation, expropriation, and ecological crisis under capitalism.

law of Cheap Nature,” runs into an unresolved problem, since such a conception is virtually without bounds, encompassing not just the planetary environment but the entire universe. As he is forced to admit, an entire “world of unpaid work” in this sense simply “cannot be quantified.”⁴⁵ Although he declares that “value does not work unless most work is not valued,” this rests on a simple tautology, since the “work” referred to includes everything subject to the laws of motion of physics, insofar as it relates in the last instance to the economy—from

subsistence agriculture to a beehive to a waterfall to a radioactive isotope to a nuclear reaction.⁴⁶ “Coal and oil,” he writes, “are dramatic examples of this process of appropriating unpaid work.”⁴⁷

It is this universal “unpaid” appropriation of the work/energy of the earth, as an eternal condition of human existence, which Patel and Moore describe as “ongoing theft,” leading in the end to ever more expensive “cheaps.”⁴⁸ Yet although capital may end up possessing natural powers for which it does not pay, just as it does not pay for the worker’s ability to think, only confusion can result from attempts to treat such appropriation of nature’s capacity for work, in the sense of physics, as quantifiable and somehow commensurate with economic value production in capitalist social relations.⁴⁹ Nor does it help much to characterise a waterfall, even one used to generate electricity, as “unpaid.”

In Moore’s “new law of value,” all of material existence, whether paid social labour, unpaid social labour, or the unpaid work/energy of the universe, matters largely to the extent that it is harnessed to the capitalist valorisation process. The work/energy carried out by the sun, and that of the Earth System that over millions of years led to the formation of coal and oil deposits—plus the physical work that coal and oil perform in present-day production as low-entropy energy sources—all enter into the determination of Moore’s expanded law of commodity value, which he claims can account for the “transforming [of] nature’s work into the bourgeoisie’s [economic] value.” Physics, ecology, and economy all get

⁴⁴ ↪ Moore, *Capitalism in the Web of Life*, 101–02. By defining appropriation as drawing on the “work” of nature in general, while also claiming that appropriation as such is theft, Moore implicitly categorises all human property and production as theft. Moreover, there is no basis here for distinguishing bourgeois appropriation (property) from other forms of appropriation (property), a distinction that lay at the core of Marx’s own analysis.

⁴⁵ ↪ Moore is referring not only to human labour outside the formal economy but, more importantly, to all the “work” performed in the physical world of nature as well. Moore, *Capitalism in the Web of Life*, 95.

⁴⁶ ↪ Moore, *Capitalism in the Web of Life*, 54. Hornborg has argued that “Moore’s attempts to theorise the appropriation of ecological framework yields a turgid and obscure idiom,” which Hornborg blames on “Marxian dogma.” But Moore’s approach does not reflect any inherent shortcomings in Marxian theory, but rather Moore’s own neglect of crucial theoretical distinctions in the classical Marxian mode. This can be seen most starkly in his attempt to use a Marxian idiom, without its necessary conceptual framework, to develop a theory that erases distinctions between bourgeois appropriation and all other property forms (by relying on the concept of appropriation in general), and between human social labour and the expenditure of work/energy in the universe. None of this can be blamed on Marx or Marxian theory. Alf Hornborg, *Global Magic* (London: Palgrave Macmillan, 2016), 169.

⁴⁷ ↪ Moore, *Capitalism in the Web of Life*, 71. To be clear, there can be no doubt that capitalism depends on the physical appropriation of nature generally, and in ever greater quantities. Thus Moore writes of my own work that “Foster’s insight was to posit capitalism as an open-flow metabolism, one that requires more and more Cheap Nature just to stay in place.” Rather, the issue is how this relates to value, accumulation, expropriation, and ecological crisis under capitalism. Moore, *Capitalism in the Web of Life*, 84.

⁴⁸ ↪ Patel and Moore, *A History of the World in Seven Cheap Things*, 81, 95.

⁴⁹ ↪ Marx, *Grundrisse*, 357–58. For a good discussion of some of these issues, see Ali Douai, “Value Theory in Ecological Economics,” *Environmental Values* 18 (2009): 257–84.

rolled into one, erasing fundamental distinctions, crucial to Marx's ecological (and economic) critique. Indeed "the capital relation," for Moore, "transforms the work/energy of all natures into...value."⁵⁰

The viewpoints discussed above either deny the labour theory of value under capitalism outright (as in Bunker,

It is argued here that the metabolic relation between human beings and nature is an alienated and contradictory one, driving a wedge between the antagonistic laws of motion (and law of value) of capitalism and the Earth System... Properly understood, an ecological crisis cannot be quantified in dollars and cents, or in terms of Cheap Nature, much less "unpaid nature."

Hornborg, Yaşin, and Kallis), or stretch it to the point of absurdity in search of "a single logic of wealth, power, and nature" under capitalism (as in Moore). In contrast, it is argued here that the metabolic relation between human beings and nature is an alienated and contradictory one, driving a wedge between the antagonistic laws of motion (and law of value) of capitalism and the Earth System.⁵¹

Ecological crises do not arise simply or even mainly because the world economy (or the world ecology) appropriates the work of external nature without payment, nor because Cheap Nature is becoming Expensive Nature, undermining capitalism's bottom line. Properly understood, an ecological crisis, or crisis of sustainable human development, cannot be quantified in dollars and cents, or in terms of Cheap Nature, much less "unpaid nature."

Rather, at the heart of today's metabolic rift, as Marx argued, is the logic of the alienated capitalist system of

Ecological crises proper are thus not crises of economic value, but of the disruption and destruction of conditions of ecological reproduction and human development at the expense of future human generations and living species more generally.

accumulation, in which all natural boundaries are treated as mere barriers to be surmounted, opening up anthropogenic rifts in the fundamental biogeochemical cycles that constitute the overall Earth System.⁵²

Ecological crises proper are thus not crises of economic value, but of the disruption and destruction of conditions of ecological reproduction and human development at the expense of future human generations and living species more generally.⁵³ Viewed in this way, the primary ecological contradiction resides in the expropriation of nature as a free gift to capital, leading to "the squandering of the powers of the earth." This is what Marx meant when he said that the soil was "robbed" of the conditions of its reproduction, thereby generating a rift in the metabolism of humanity and the earth.⁵⁴

It is not so much the appropriation of nature's work/energy as an inherent condition of human society and production, and indeed of life itself, that we should be primarily concerned with—although the increase in environmental throughput is central—so much as the ever-expanding ecological rifts imposed on the Earth System by the antagonistic logic of capital. Put differently, it is not the mere fact of the free appropriation of physical work/energy by human beings (an objective condition of existence) that is the chief source of our ecological contradictions, but rather the rapacious

⁵⁰ ↪ Moore, *Capitalism in the Web of Life*, 71, 101–02, "Value in the Web of Life," 328, and "The Rise of Cheap Labour," 89. It should be noted that classical rent theory, which was concerned with the incorporation of natural resources in the capitalist economy and which was key to Marx's own economic analysis in this area, is completely ignored in *Capitalism in the Web of Life*. On the ecological aspects of Marx's rent theory, see Burkett, *Marx and Nature*, 74–75, 90–103.

⁵¹ ↪ Moore, "Value in the Web of Life," 327, *Capitalism in the Web of Life*, 85, 137, 236. On Moore's social monism, see Moore, *Capitalism in the Web of Life*, 85. For a critique, see John Bellamy Foster, "Marxism in the Anthropocene: Dialectical Rifts on the Left," *International Critical Thought* 6, no. 3 (2016): 393–421; John Bellamy Foster and Brett Clark, "Marx's Ecology and the Left," *Monthly Review* 68, no. 2 (2016): 1–25.

⁵² ↪ On the dialectic of barriers and boundaries, see Marx, *Grundrisse*, 334–35, 409–10, 539; Foster, Clark, and York, *The Ecological Rift*, 53–72, 284–86.

⁵³ ↪ On the contradictions that arise when ecological crisis is seen mainly as a question of economic crisis brought on by increased costs of natural resources, and not in terms of the degradation of nature itself, see John Bellamy Foster, "Capitalism and Ecology: The Nature of the Contradiction," *Monthly Review* 54, no. 4 (September 2002): 6–16.

⁵⁴ ↪ Marx, *Capital*, vol. 1, 637–38, vol. 3 949.

expropriation of nature by capital and the metabolic rift itself—i.e., the commodity system’s historically specific disruption of the elemental conditions and biogeochemical cycles of natural reproduction on which human existence and that of countless other species ultimately depend.

Against the Expropriation of the Earth

One of Marx’s most profound insights was that “productive forces” under capitalism turned into “destructive forces.” The very “productivity of labour” under capitalism led to “progress here, regression there.” He attributed this regression specifically to the degradation of “natural conditions,” to “the exhaustion of forests, coal and iron mines, and so on”—

The expropriation and removal of human beings from the natural conditions of production through the capitalist seizure of the earth, created the alienated conditions for the exploitation of workers.

even extending to the negative effects of regional climate change.⁵⁵ Beginning with his earliest works, he conceived of the expropriation and alienation of land/nature as a necessary counterpart, even a prior condition, of the expropriation and alienation of the

labourer. In the Economic and Philosophical Manuscripts, he observed that capitalism, even more than feudalism before it, was rooted in “the domination of the earth as of an alienated power over man.”⁵⁶ The expropriation and removal of human beings from the natural conditions of production through the capitalist seizure of the earth, created the alienated conditions for the exploitation of workers. By the same token, private riches were everywhere enhanced by the destruction of public wealth (the Lauderdale Paradox).⁵⁷

“So-called primitive accumulation,” Marx went on to explain in *Capital*, “means the expropriation of the immediate producers,” involving the dual expropriation of the direct producers and of the earth.⁵⁸ The imposition of these

The system of capital, Marx famously remarked, “comes dripping from head to toe, from every pore, with blood and dirt”... Today the gross exploitation (or super-exploitation) through the global labour arbitrage of the mass of the workers in the global South is giving rise to a “planet of slums” and imperialist warfare imposed on the periphery.

conditions (marked by the historic enclosures of the commons), the growth of the proletariat, and the alienation of both labour and land, produced the elemental destructiveness of the capitalist system. As Max Weber observed during his trip to Indian Territory (today Oklahoma) in 1905, “with almost lightning speed everything that stands in the way of capitalist culture is being crushed.” Like Liebig and Marx before him, Weber

pointed to capitalist culture in this sense as a system of robbery, Raubbau (or Raubsystem), that destroyed the earth and natural resources along with any precapitalist economic formations standing in its way.⁵⁹ This Raubsystem, however, was not attributed to the notion that property (appropriation) was theft, but to the specific historical forms of the capitalist expropriation of humanity and nature.

The expropriation of the earth has invariably been accompanied by the expropriation of humans as corporeal beings, through innumerable forms of labour bondage and servitude always present at the logical and historical boundaries of the system, helping to make capitalism possible. Such expropriation is always an essential part of the system,

⁵⁵ ↪ Marx, *Capital*, vol. 3, 369; Marx and Engels, *Collected Works*, vol. 5 (New York: International Publishers, 1975), 52; John Bellamy Foster, “Capitalism and the Accumulation of Catastrophe,” *Monthly Review* 63, no. 7 (December 2011): 1–17; Saito, *Karl Marx’s Ecosocialism*, 239–55.

⁵⁶ ↪ Marx, *Early Writings*, 318.

⁵⁷ ↪ Foster, Clark, and York, *The Ecological Rift*, 53–72.

⁵⁸ ↪ Marx, *Capital*, vol. 1, 871, 927.

⁵⁹ ↪ John Bellamy Foster and Hannah Holleman, “Weber and the Environment,” *American Journal of Sociology* 117, no. 6 (2012): 1650–55.

Rates of exploitation are so heightened today as to pose problems of surplus absorption associated with the “overproduction of the means of production.”

determining its parameters. The system of capital, Marx famously remarked, “comes dripping from head to toe, from every pore, with blood and dirt.”⁶⁰ The role of slavery, genocide, and every kind of human servitude, including the vile robbing of the earth itself, was crucial both to capitalism’s origins and to its continuing antagonistic reproduction. Today the gross exploitation (or super-exploitation) through the global labour arbitrage of the mass of the workers in the global South is giving rise to a “planet of slums” and imperialist warfare imposed on the periphery, along with the continued expropriation of women’s unpaid labour.⁶¹

During what Eric Hobsbawm called “the Age of Capital”—the system’s period of greatest vitality, coming out of the Industrial Revolution—it was possible to focus mainly on capitalism’s progressive features, abstracting somewhat from expropriation.⁶² Marx’s critique thus centred not on expropriation as such, but on the exploitation of labour, and it was on proletarianised labour in this sense that he placed his hopes of revolutionary transition. Today, however, despite some remarkable technological developments—only partially attributable to the system—we are seeing a breakdown of the

In this new age of global plunder and dispossession... the Earth System itself is being destroyed as a habitable place for humanity.

main mechanisms of capitalist accumulation, with all that is solid once again melting into air. Rates of exploitation are so heightened today as to pose problems of surplus absorption associated with the “overproduction of the means of production.”⁶³ Hence, in the neoliberal era, capitalism, in its attempt to surmount the material conditions of its existence, has sought to bring all of reality within the logic of valorisation, via financialisation—reflecting what Karl Polanyi called the “utopian” conception of the market society.⁶⁴

In this new age of global plunder and dispossession, the struggle has increasingly shifted to profit upon expropriation, the seizing of all monetary flows, assets, and individual property, wherever they exist. Land grabs are a dominant factor in much of the global South.⁶⁵ Carbon trading has been introduced ostensibly to address climate change, but instead creating markets to profit upon it. The Earth System itself is being destroyed as a habitable place for humanity. Labour is being deconstructed, growing ever more precarious and insecure. In these circumstances, Marx’s sardonic dictum, “Accumulate, accumulate! That is Moses and the Prophets!” is more than ever the goal of the system, even as all life as we know it is imperilled.⁶⁶

To reduce the ecological problem of capital merely to a question of Cheap Nature, as if it were all simply a matter of internalising nature’s contributions into the market—a view ideologically justified by various theories of natural capital and ecological services—would be a grave mistake.⁶⁷ Rather, at the root of the contemporary environmental emergency

⁶⁰ ↪ Marx, *Capital*, vol. 1, 926.

⁶¹ ↪ Sven Beckert, *Empire of Cotton* (New York: Vintage, 2014); Fraser, “Behind Marx’s Hidden Abode”; Fraser, “Expropriation and Exploitation in Racialised Capitalism”; Dawson, “Hidden in Plain Sight”; Foster and Clark, “The Expropriation of Nature”; John Smith, *Imperialism in the Twenty-First Century* (New York: Monthly Review Press, 2016); Mike Davis, *Planet of the Slums* (London: Verso, 2007).

⁶² ↪ Eric Hobsbawm, *The Age of Capital* (New York: Vintage, 1996).

⁶³ ↪ Paul M. Sweezy, “The Communist Manifesto Today,” *Monthly Review* 50, no. 1 (May 1998): 8–10.

⁶⁴ ↪ Karl Polanyi, *The Great Transformation* (Boston: Beacon, 1944), 178.

⁶⁵ ↪ Costas Lapavistas, *Profiting without Producing* (London: Verso, 2013), 141–46.

⁶⁶ ↪ Marx, *Capital*, vol. 1, 742.

⁶⁷ ↪ Moore’s framework of Cheap Nature relies heavily on the monetary estimates of environmental services or ecosystem services developed by neoclassical environmental economics. Moore, *Capitalism in the Web of Life*, 64. See also the critique of natural-capital theory in John Bellamy Foster, “The Ecological Tyranny of the Bottom Line,” in Richard Hofrichter, ed., *Reclaiming the Environmental Debate* (Cambridge, MA: MIT Press, 2000): 135–53.

At the root of the contemporary environmental emergency is the sheer incompatibility of a system of capital accumulation with human existence and the Earth System.

is the sheer incompatibility of a system of capital accumulation with human existence and the Earth System. If capital has been immensely successful at exploiting human labour, its resulting crises of over-accumulation and surplus absorption now have as their counterpart the visible deconstruction of the planet as a place of human habitation, as the oceans fill with plastic and the atmosphere with carbon. The renewed thrust toward the expropriation of the planet in these circumstances is not a sign of capitalism's vitality but its threatened dissolution.

The world ecological movement arose in what is now commonly called the Anthropocene epoch in geological history, brought on by the Great Acceleration—the period of a rapidly increasing anthropogenic rift in biogeochemical cycles,

Today it can no longer rationally be denied that capitalist valorisation is an inherently destructive process, the enemy not only of the free, creative labour of human beings, but also of the earth as a place of habitation for humanity and many other species. Capitalism's famed "creative destruction," if allowed to continue, threatens the annihilation of "the chain of human generations."

usually dated to 1945 with the advent of the atomic bomb, or to the early 1950s with the above-ground nuclear testing of the hydrogen bomb and the resulting nuclear fallout.⁶⁸ The answer to the crisis of the Anthropocene, however, has to be far more revolutionary than that of the Green movement that arose in the 1960s, and which sought simply to preserve the environment and combat pollution, while hardly questioning the social system. Today it can no longer rationally be denied that capitalist valorisation is an inherently destructive process, the enemy not only of the free, creative labour of human beings, but also of the

earth as a place of habitation for humanity and many other species. Capitalism's famed "creative destruction," if allowed to continue, threatens the annihilation of "the chain of human generations."⁶⁹

In this century, the battle against the expropriation of the earth must unite with the fight against the expropriation of human beings, ultimately challenging the dialectic of expropriation and exploitation, and the entire "barbaric heart" of capital.⁷⁰ The future lies with the development of the twenty-first-century socialist/ecosocialist movement, to be rooted in a diverse, all-inclusive environmental working class. What is needed is the revolutionary reconstitution of the interdependent social metabolism with nature, bringing it under the rational control of human beings—aiming not only at ecological sustainability and the conservation of energy, but also at the full development of human needs and powers in and through society. Nothing else will do.

⁶⁸ ↪ Ian Angus, *Facing the Anthropocene* (New York: Monthly Review Press, 2016), 54–58; J. R. McNeill and Peter Engelke, *The Great Acceleration* (Cambridge, MA: Harvard University Press, 2014), 184–90.

⁶⁹ ↪ Karl Marx, *Capital*, vol. 3 (London: Penguin, 1981), 754.

⁷⁰ ↪ Curtis White, *The Barbaric Heart* (Sausalito: PoliPoint, 2009).

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