

The Return of the Dialectics of Nature: The Struggle for Freedom as Necessity

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It is a fundamental premise of Marxism that as material conditions change, so do our ideas about the world in which we live. Today we are seeing a vast transformation in the relations of human society to the natural-physical world of which it is a part, evident in the emergence of what is now referred to as the Anthropocene Epoch in geological history, during which

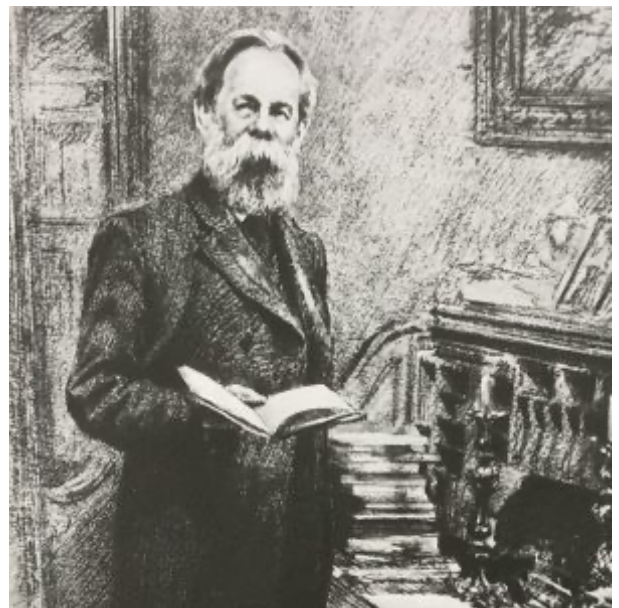
An “anthropogenic rift” in the biogeochemical cycles of the earth, arising from the capitalist system, is now threatening to destroy the earth as a safe home for humanity and for innumerable species that live on it on a timeline not of centuries, but of decades... The point today is not simply to understand the world, but to change it before it is too late.

humanity has become the major force in Earth System change. An

“anthropogenic rift” in the biogeochemical cycles of the earth, arising from the capitalist system, is now threatening to destroy the earth as a safe home for humanity and for innumerable

species that live on it on a timeline not of centuries, but of decades.¹ This necessarily demands a more dialectical conception of the relation of humanity to what Karl Marx called the “universal metabolism of nature.”² The point today is not simply to understand the world, but to change it *before it is too late*.

Given that Marxism has been, since its conception in the mid-nineteenth century, the primary basis of the critique of capitalist society, it naturally could be expected to lead the way in the ecological critique of capitalism. But while



Frederick Engels. Drawing by N. Zhukov, 1930s, Museum of Karl Marx and Frederick Engels, Moscow.

¹ ↪ Clive Hamilton and Jacques Grinevald, “Was the Anthropocene Anticipated?,” *Anthropocene Review*, 2, no. 1 (2015): 59–72.

² ↪ Karl Marx and Frederick Engels, *Collected Works*, vol. 30, (New York: International Publishers, 1975–2004), 54–66.

historical materialists and socialists more broadly can be said to have played the leading, formative role in the development of the ecological critique—particularly within the sciences—the key contributions of socialist ecology, principally in Britain, took place outside the main tendencies that were to define twentieth-century Marxism as a whole. Beginning in the 1920s and 1930s, a deep chasm emerged within Marxian theory, impeding the development of a coherent ecological view within the left. The dogmatism with which, on one side of this chasm, official Soviet thought by the mid-1930s approached the issue of the dialectics of nature and dialectical materialism more generally, had its counterpart, on the other side, in Western Marxism’s categorical rejection of the dialectics of nature and the materialist conception of nature. To speak of “The Return of the Dialectics of Nature: The Struggle for Freedom as Necessity” is thus to refer to the transcendence in our time, based on classical historical materialism and the dialectical naturalism that arose in Britain in the interwar period, of the principal contradictions hindering the development of a unified Marxian ecological critique.

Post-Lukácsian Marxism and the Critique of the Dialectics of Nature

A major shift occurred in Marxian thought nearly a century ago following the publication in 1923 of Georg Lukács’s *History and Class Consciousness*, giving birth to what is now known as the Western Marxist philosophical tradition, but which could more accurately be referred to as “post-Lukácsian Marxism.”³ Lukács employed Hegelian dialectics to argue that the proletariat was the identical subject-object of history, giving a new philosophical coherence to Marxism and at the same time redefining dialectical thought in terms of totality and mediation.

Yet, in what was to become a defining trait of Western Marxism, Lukács, in conformity with the neo-Kantian tradition, rejected Frederick Engels’s own notion of a dialectics of nature, on the alleged grounds that Engels had followed “Hegel’s mistaken lead” in seeing the dialectic as fully operative in external nature.⁴ Lukács applied Giambattista Vico’s principle that we can understand history (the transitive realm) because we have “made it,” and thus dialectical reflexivity can be said to apply in all such situations. Conversely, by the same logic, we cannot understand nature (the intransitive realm) dialectically, in the same sense, since it is devoid of a subject.⁵

At the same time, Lukács, it should be noted, did not categorically reject the dialectics of nature in *History and Class Consciousness*, subscribing rather to the notion, as Engels himself did, that there exists a “merely objective dialectics” of nature, capable of being perceived by the “detached observer.”⁶ This could then be seen as underlying the higher historical subject-object dialectics of human social practice. In this way, Lukács, following Engels in this respect, conceived of a hierarchy of dialectics, extending from merely objective dialectics, all the way up to the dialectics of the identical subject-object of history. Moreover, in his later works, beginning with his *Tailism* manuscript written within just a few years of *History and Class Consciousness*, Lukács was to become a strong advocate of a *dialectics of nature and society* rooted in Marx’s theory of social metabolism.⁷

³ ↪ Georg Lukács, *History and Class Consciousness*, trans. Rodney Livingstone, (London: The Merlin Press, 1971); Roy Bhaskar, *Reclaiming Reality* (London: Routledge, 2011), 131.

⁴ ↪ Lukács, *History and Class Consciousness*, 24; Martin Jay, *Marxism and Totality* (Berkeley: University of California Press, 1984), 115–18.

⁵ ↪ Giambattista Vico, *The New Science*, trans. Thomas Goddard Bergin and Max Harold Fisch (Ithaca, NY: Cornell University Press, 1976), 493; John Bellamy Foster, *The Return of Nature* (New York: Monthly Review Press, 2020), 17.

⁶ ↪ Lukács, *History and Class Consciousness*, 207; Marx and Engels, *Collected Works*, vol. 25, 492.

⁷ ↪ Georg Lukács, *In Defense of History and Class Consciousness: Tailism and the Dialectic*, trans. Esther Leslie (London: Verso, 2000), 102–7; Georg Lukács, *The Ontology of Social Being*, vol. 3, trans. David Fernbach (London: The Merlin Press, 1980).

Yet post-Lukácsian Marxists took the categorical rejection of the dialectics of nature as a defining principle of Western Marxism and even of Marx's own thought. Engels was in this way separated from Marx. As Jean-Paul Sartre wrote: "In the historical and social world...there really is dialectical reason; by transferring it to the 'natural' world, and forcibly inscribing it there, Engels stripped it of rationality: there was no longer a dialectic which man produced by producing himself, and which, in turn produced man; there was only a contingent law, of which nothing could be said except it is so and not otherwise."⁸ This criticism went hand-in-hand with a hostility toward materialism and scientific realism, in the sense of the rejection of the materialist conception of nature, and a distancing from the achievements of science.⁹ Serious ecological analysis was therefore missing from the Western Marxist philosophical tradition.

Although there was the famous criticism of "the domination of nature" in the work of Frankfurt School theorists Max Horkheimer and Theodor Adorno, it never got past the criticism of Enlightenment science—only to accede pessimistically in the end to its unavoidable necessity.¹⁰ Herbert Marcuse's treatment of "The Revolt of Nature" in *Counter-Revolution and Revolt* did not go beyond the notion of the domination (and pollution) of nature's "sensuous

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aesthetic qualities" as a means for the domination of humanity and the need for an environmental rebellion in response.¹¹ There could, in fact, be no meaningful analysis of nature-society where both the materialist conception of nature and the dialectics of nature were denied, leaving Marxist theory with no dialectical critical-realist analysis on which to base an ecological critique. At most, within Western Marxist philosophical discourse, the relation of human beings to nature

was reduced to technology, which was then subject to critique as the positivistic fetishism of technique, divorced from the wider question of the natural world and the human-social relation within it.

What was missing in such a one-dimensional approach was any notion of nature itself as an active power. As Roy Bhaskar wrote in criticism of these tendencies of Western Marxism: "Marxists [meaning Western Marxist philosophers] have...for the most part considered only one part of the nature-social relation, that is, technology, describing the way human beings appropriate nature, effectively ignoring the ways (putatively studied in ecology, social biology, and so on) in which, so to speak, nature reappropriates human beings."¹²

Yet, a powerful strain of ecological dialectics and critical, non-mechanistic materialism persisted in the natural sciences in the British Isles, evolving out of a tradition that drew on both Marx and Charles Darwin, and that later became the heir of the early revolutionary Soviet ecology of the 1920s and early 1930s. It was this "second foundation" of Marxist thought within the natural sciences which survived in the West, particularly in Britain, and that stretched back to Marx and Engels themselves, that was to play the formative role in the development of an ecological critique, and which was to constitute the main story told in *The Return of Nature*.¹³

⁸ ↪ Jean-Paul Sartre, *Critique of Dialectical Reason*, vol. 1, trans. Alan Sheridan-Smith (London: Verso, 2004), 32.

⁹ ↪ Sebastiano Timpanaro, *On Materialism*, trans. Lawrence Garner (London: Verso, 1975), Karl Jacoby, "Western Marxism" in *A Dictionary of Marxist Thought*, ed. Tom Bottomore (Oxford: Blackwell, 1983), 523–26; Lucio Colletti, *Marxism and Hegel*, trans. Lawrence Garner (London: Verso, 1973), 191–92.

¹⁰ ↪ Max Horkheimer and Theodor Adorno, *The Dialectic of Enlightenment*, trans. John Cumming (New York: Continuum, 1998), 224, 254; Alfred Schmidt, *The Concept of Nature in Marx*, trans. Ben Fowkes (London: New Left, 1971), 156; Max Horkheimer, *The Eclipse of Reason* (New York: Continuum, 2004), 123–27.

¹¹ ↪ Herbert Marcuse, *Counter-Revolution and Revolt* (Boston: Beacon, 1972), 59–78.

¹² ↪ Bhaskar, *Reclaiming Reality*, 132.

¹³ ↪ Foster, *The Return of Nature*, 7.

From Marx's Ecology to The Return of Nature

The Return of Nature has as its central area of inquiry the question of the organic interconnections between socialism and ecology that emerged in the century following the deaths of Darwin and Marx in 1882 and 1883, respectively, focusing in particular on developments in Britain and the United States. It follows a thread that was established in my book *Marx's Ecology* twenty years earlier. That work is best known for its explanation of Marx's theory of metabolic rift. But the real intent of the book was to explain how Marx's materialism had developed, going back to his confrontation in his doctoral thesis with Epicurus's ancient materialist philosophy. Marx's ecological perspective, it was argued, had developed as a counterpart to his understanding of the materialist conception of nature underlying the materialist conception of history.

A full materialist outlook, such as that developed by Marx, has three aspects: (1) ontological materialism, focusing on the physical basis of reality independent of human thought and existence, and out of which the human species itself emerged; (2) epistemological materialism, which is best understood as dialectical critical-realist; and (3) practical materialism, focusing on human praxis and its basis in labor. Since Marx and Engels rejected mechanical or metaphysical materialism, their materialism was necessarily dialectical in all three aspects: ontology, epistemology, and practice.¹⁴ In Marx, materialism was closely related to mortality ("death the immortal") applicable to all of existence, defining the material world.¹⁵ In this perspective derived from ancient Greek materialism, nothing comes from nothing, and nothing being destroyed is reduced to nothing. The human social world, in Marx's conception, was, in the sense of Epicurean materialism, an emergent form or level of organisation within the natural-material universe. Energy (matter

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and motion), change, contingency, the emergence of new assemblages or organisational forms, all characterise the natural-physical world, which could be explained in terms of itself, as a process of natural

history.¹⁶ Marx's analysis was from the outset rooted in the evolutionary theory of which Darwin's theory of natural selection was the nineteenth-century culmination.

Marx in his critique of political economy added to this overall materialist view the threefold ecological conception of: (1) the universal metabolism of nature; (2) the social metabolism (or the specifically human relation to nature through the labor and production process); and (3) the metabolic rift (representing the ecological destruction that ensues when the social metabolism comes into conflict with the universal metabolism of nature).¹⁷ The labor and production process was thus the key not only to the mode of production in a given historical form of society, but also represented the human relation to nature, and thus social-ecological relations. Marx's theory of metabolic rift, which was first developed in the context of the rift in the soil nutrient cycle caused by the shipment of food and fibre to the new urban centers—where the essential nutrients, such as nitrogen, phosphorous, and potassium, ended up as pollution rather than returning to the soil—constituted the most advanced attempt in his day to capture the human-ecological relation. All subsequent ecological thought, up to ecosystem theory and Earth System analysis, was to be rooted in this same essential approach, focusing on metabolism.

¹⁴ ↪ Bhaskar, *Reclaiming Reality*, 115.

¹⁵ ↪ Lucretius, *On the Nature of the Universe*, ed. Ronald Melville, Don Fowler and Peta Fowler (Oxford: Oxford University Press, 1999), 93 (III: 869).

¹⁶ ↪ Anthony Arthur Long, "Evolution vs. Intelligent Design in Classical Antiquity," Townsend Center for the Humanities, 2006, available at berkeley.edu; Anthony Arthur Long, *From Epicurus to Epictetus* (Oxford: Oxford University Press, 2006); John Bellamy Foster, Brett Clark, and Richard York, *Critique of Intelligent Design* (New York: Monthly Review Press, 2008), 155–77.

¹⁷ ↪ John Bellamy Foster, "[Marx and the Rift in the Universal Metabolism of Nature](#)," *Monthly Review* 65, no. 7 (December 2013): 1–19.

Nevertheless, the argument of Marx's Ecology left the story of the formative role played by socialist thinkers after Marx in the emergence of ecology largely unaddressed. Moreover, there remained the contentious issue of the dialectics of nature, associated with Engels in particular. These issues were to be taken up in *The Return of Nature*. Although Marx's Ecology was a straightforward attempt to capture Marx's materialist and ecological views, the story told in *The Return of Nature* was much more complex, not least of all because it had to transgress certain divisions within Marxism itself.

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Here we have to understand that the simultaneous rejection of both the materialist conception of nature and the dialectics of nature within Western Marxism was an inheritance of the neo-Kantian tradition, which had its origin within German philosophy with Friedrich Lange's 1865 work, *The History of Materialism*. Lange attempted to use Kant's notion of the noumenon, or the unknowable thing-in-itself, as the basis for demolishing materialism, a viewpoint that was carried forward in more sophisticated ways by later neo-Kantians. It was with the rise of neo-Kantianism that epistemology came to occupy its dominant place within philosophy, pushing aside ontology, and also displacing the dialectical logic associated with G. W. F. Hegel. Materialist ideas and natural science were seen as inherently positivistic. Room was made again for religion and idealist philosophy via the Kantian noumena or things-in-themselves.¹⁸ Closely related to this, as Marx and Engels noted, were the agnostic, dualistic views of British scientists such as Thomas Huxley and John Tyndall.¹⁹

In opposition to the neo-Kantian dualism of Lange, which rejected both materialism and Hegelian dialectics, Marx responded by boldly stating: "Lange is naive enough to say that I 'move with rare freedom' in empirical matter. He hasn't the least idea that this 'free movement in matter' is nothing but a paraphrase for the method of dealing with matter—that is the dialectic method."²⁰ Likewise, in *Capital*, Marx wrote: "My dialectical method is, in its foundations, not only different from the Hegelian, but exactly opposite to it.... With me...the ideal is nothing but the material world reflected in the mind of man, and translated into the forms of thought."²¹

In referring to the reflection of the "material world in the mind of man," Marx had no simplistic notion of mirroring in mind, but rather a dialectical conception of reflection (and reflexivity) and a situated conception of knowledge, in which reason and both objective and subjective agency play central roles within an ever-changing historical reality. Marx's position, while realist, was therefore a form of "dialectical critical realism." As Bhaskar has explained, Marx's dialectical "method, though naturalist and empirical is not positivist, but rather realist.... His epistemological dialectics [his critical

¹⁸ ↪ On neo-Kantianism and its consequences for dialectical and materialist philosophy, see Evald Vassilievich Ilyenkov, *Dialectical Logic*, trans. H. Campbell Creighton (Delhi: Aakar Books, 2008), 289–319; Frederick C. Beiser, *After Hegel* (Princeton, NJ: Princeton University Press, 2014); Foster, *The Return of Nature*, 264–69. In the words of Lukács, who started out as a neo-Kantian, "according to Kant's theory the world given to us is only appearance, with a transcendental unknowable thing-in-itself behind it." (Georg Lukács, *Conversations with Lukács*, ed. Theo Pinkus [London: The M

¹⁹ ↪ Marx and Engels, *Collected Works*, vol. 45, 50, 462.

²⁰ ↪ Karl Marx, *Letters to Kugelmann* (New York: International Publishers, 1934), 112. Marx was replying to the second edition of Friedrich Albert Lange's *On the Workers' Question* (1870).

²¹ ↪ Karl Marx, *Capital*, vol. 1, trans. Ben Fowkes (London: Penguin, 1976), 102.

realism] commits him to a *specific* [materialist] ontological dialectics and a *conditional* [historical] relational dialectics as well.”²²

From a classical historical-materialist standpoint, the dialectics of nature can be seen as part of a dialectical hierarchy. Thus, in terms of what Marx in *Capital* called “its foundations,” it stands for the material world characterised by motion, contingency, change, and evolution: the dialectic as material process. Central here is the notion that nature (apart from human beings) in the contingent, emergent effects of its manifold processes can be said to have a kind of agency, even if

In between these two abstract realms, of the merely objective and the merely subjective dialectics, lies the mediating realm of human labor and production, the dialectics of nature and society (what Lukács was to call the “ontology of social being”), arising from practice, which is, for Marx, the key to materialist dialectics.

this is unconscious agency. At a social level, the dialectic can be seen in terms of human consciousness and practice, the realm of the identical subject-object of the human-historical realm, standing for human society as an emergent form of nature. In its alienated form under capitalism, the human-social realm often appears to be independent of the material world of nature, or even as completely dominant over nature—though this is a fallacy. In between these two abstract

realms, of the merely objective and the merely subjective dialectics, lies the mediating realm of human labor and production, the dialectics of nature and society (what Lukács was to call the “ontology of social being”), arising from practice, which is, for Marx, the key to materialist dialectics.²³

Marx gives us two basic ways of looking at this mediation of nature and society through production (which, for him, in its broadest sense accounts for all human appropriation of nature and thus all material activity). In one of these pathways (most evident in his early writings but also apparent in his later works, such as his *Notes on Adolph Wagner*, written in 1879–80) the human relation to the universal metabolism of nature is seen in terms of human sensuous interaction with nature, which in classical German philosophy was closely tied to aesthetics, but which Marx linked to production as well. The second is in his theory of the labor and production process as the social metabolism between human beings and nature, representing the active relation of human beings to the earth. For Marx, we can know the world, including, to a considerable extent, the intransitive realm beyond the human subject, because we are part of it through our production and our sensuous existence, and we live in the context conditioned by nature’s laws, albeit in an emergent form in which historical laws, via specific modes of production, also condition human existence, mediating between nature and humanity.²⁴ Engels later adds to this, in line with Marx, the role of mathematics and scientific experiments as ways in which humanity connects dialectically to the wider, “merely objective” realm, employing methods of scientific inference arising originally from the human material relation to nature.²⁵

²² ↪ Bhaskar, *Reclaiming Reality*, 120. Kai Heron, writing from a Lacano-Hegelian perspective, has recently stated that Marxian ecology based on Marx’s theory of metabolic rift is unable “to account for the contingent emergence of ourselves” as “subjects, from nature.” *This, however, is exactly what the theory of contingent emergence developed in classical historical materialism*, which is carried forward by today’s dialectical critical realism (including Marxian ecology) is, in the final analysis, all about. To call this “contemplative materialism” thus misses the point: today the issue is the formation of a revolutionary ecological subject, conceived in terms of the “transformative model of social activity,” viewed as a contemporary expression of historical materialism. Kai Heron, “Dialectical Materialisms, Metabolic Rifts and the Climate Crisis,” *Science and Society* 85, no. 4 (2021): 501–26; Roy Bhaskar, *Dialectic: The Pulse of Freedom* (London: Verso, 1993), 2, 152–73.

²³ ↪ Georg Lukács, *The Ontology of Social Being*, vol. 2, trans. David Fernbach (London: The Merlin Press, 1978), 6–7, 103. Writing of “the hidden nature speculation in Marx” and Marx’s concept of metabolism, Alfred Schmidt observed: “Only in this way”—that is, through the mediation of human activity—“can we speak of a ‘dialectic of nature.’” Schmidt’s intention was to reduce the notion of the “merely objective dialectic of nature,” referred to by Lukács in *History and Class Consciousness*, to the dialectics of nature and society. (Alfred Schmidt, *The Concept of Nature in Marx*, trans. Ben Fowkes [London: New Left, 1971], 79.)

²⁴ ↪ See John Bellamy Foster, “The Dialectics of Nature and Marxist Ecology,” in *Dialectics for the New Century*, ed. Bertell Ollman and Tony Smith (Basingstoke: Palgrave Macmillan, 2008), 50–82; Andrew Feenberg, *Lukács, Marx, and the Sources of Critical Theory* (Totowa, NJ: Rowman and Littlefield, 1981); John Bellamy Foster and Paul Burkett, *Marx and the Earth* (Chicago: Haymarket, 2016), 50–66.

²⁵ ↪ Marx and Engels, *Collected Works*, vol. 25, 13–14, 503; Lukács, *History and Class Consciousness*, xix.

In essence, while neo-Kantianism was rooted within a categorical division between the human subject and the objective natural world—between phenomena and noumena—that could not be transcended, Marxian materialist dialectics was grounded in human corporeal existence within the physical world, in a context of emergence, or integrated levels. Here the dualism between humanity and nature was not a fundamental assumption but rather was seen as a result of an alienated consciousness rooted in an alienated system. We can know nature, as Engels was to write in *The Dialectics of Nature*, because “we, with flesh, blood and brain, belong to nature, and exist in its midst.”²⁶

The Dialectics of Nature and the Creation of Ecology

The Return of Nature, moving on from where *Marx’s Ecology* left off, had a double burden. The historical narrative was concerned with explaining the various ways in which a tradition of socialist ecological analysis had arisen within art and science, in many ways dominating the ecological critique of contemporary capitalist society in the century from the

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deaths of Darwin and Marx up to the rise of the modern environmentalist movement. But at a deeper, more theoretical level, *The Return of Nature* was concerned as well with the ways in which a *materialist dialectics of nature*, often combined with other traditions, such as radical Romanticism and Darwinian evolutionary theory, guided the development of modern ecology, based on the insights of

socialist thinkers. Here the conception of the dialectics of nature, in its various forms—despite its categorical rejection by post-Lukácsian Marxists—could be perceived as playing the crucial role in a process of ecological discovery and critique.

A dialectical aesthetic as well as a dialectical conception of labor could be seen as underlying William Morris’s understanding of nature-society relations. Dialectical conceptions also informed E. Ray Lankester’s evolutionary and ecological materialism. But the thread of the dialectics of nature only fully enters the narrative of *The Return of Nature* once the work of Engels is considered. In many ways, Engels’s famous claim that “Nature is the proof of dialectics” is the key, provided we understand what he meant by this in more contemporary terms by saying, “Ecology is the proof of dialectics.”²⁷

Although Engels has been heavily criticised by numerous thinkers for adopting a crude “reflectionist” view of knowledge, a close inspection of his work shows such claims are clearly false when placed in the context of his actual arguments.²⁸ Almost invariably, when Engels refers to “reflection,” he immediately turns around and indicates that what we perceive as objectively conditioned by the material world around us (of which we are part) is a result not simply of conditions external to ourselves, but also a product of our active role in changing the world around us, and our understanding of it through our self-conscious reason. Our rules of scientific interference, our logic, our mathematics, our scientific experiments, our modelling, all have their roots in principles derived from human labor and production;

²⁶ ↪ Marx and Engels, *Collected Works*, vol. 25, 461.

²⁷ ↪ Marx and Engels, *Collected Works*, vol. 25, 23; Foster, *The Return of Nature*, 254.

²⁸ ↪ Leszek Kołakowski, *Main Currents in Marxism*, trans. Paul Stephen Falla (New York: W. W. Norton, 2005), 324–25; Shlomo Avineri, *The Social and Political Thought of Karl Marx* (Cambridge: Cambridge University Press, 1968), 67, 86; Norman Levine, *Dialogue with the Dialectic* (London: George Allen and Unwin, 1984), 10–12.

that is, our metabolic relation to the world at large. “Reflection,” as Marx and Engels use it—which invariably implies reflexivity, and which is employed by them in the Hegelian, dialectical sense—is anything but positivist in character.²⁹

Similarly, in attributing agency and thus dialectical relations of a “merely objective” kind to nature itself, Engels does this in a manner that emphasises reciprocal relations, reflexivity, change, contingency, development, attraction-and-repulsion (contradiction), and emergence (or integrative levels) within nature itself, relying on Hegel’s complex notion of

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“reflection determinations” from the “Doctrine of Essence” in his Logic.³⁰ The purpose is to capture the active, systemic, non-mechanistic relations that constitute the natural world, from which evolution (in the broadest sense) arises, and out of which humanity itself emerges. For Engels, as for Marx, it is our understanding of our own position within nature and our metabolism with the universal metabolism of nature that gives us

the essential clues to those physical properties and principles that extend beyond ourselves. In this regard, Engels does not hesitate to attribute a kind of agency to nature, the material world itself, understood in its broadest terms as in motion and constituted by the “transformation of energy.”³¹

Engels’s well-known three “laws” of the dialectics of nature, better understood today as underlying ontological principles, perfectly manifested this outlook.³² The first law, or the transformation of quantity into quality and vice-versa, is now known in natural science as “phase transition” (or as a “threshold effect”) and was explained in precisely that way by the Marxist mathematician Hyman Levy.³³ It can be seen as referring to the general phenomenon of integrative levels or the emergence of new organisational forms and assemblages within the material world, a view directly opposed to reductionist approaches to nature, and leading to a hierarchy of natural laws, the product of evolution, transformation, and change. Such an analysis is essential to all science today.

The notion of the unity/identity of opposites, or what Lukács, following Hegel, called “the identity of identity and non-identity,” which has played such a large role in Marxian dialectics, was aimed at overthrowing notions of fixity, dualism, reductionism, and mechanism, focusing on the contradictions and feedback loops that induce transformative change.³⁴

This then points to the third ontological principle, in which emergence now can be seen as the result of contradictions (“the incompatible development of different elements within the same relation”) arising from material-historical changes, and leading to the “negation of the negation,” an expression common to Hegel, Marx, and Engels. In the Marxian

²⁹ ↪ On Hegel’s complex, dialectical concept of reflection (and its relation to reflexivity and refraction), see Michael Inwood, *A Hegel Dictionary* (Oxford: Blackwell, 1992), 247–50. For the distinction between the mechanistic and Marxian conceptions of reflection, see Roger Garaudy, *Marxism in the Twentieth Century*, trans. René Hague (New York: Charles Scribner’s Sons, 1970) 53–54. Lukács was to relate the origins of dialectical reflection, in the Marxian sense, directly to praxis and production (the metabolism with nature), stating: “The most primitive kind of work, such as quarrying of stones by primeval man, implies a correct reflection of the reality he is concerned with. For no purposive activity can be carried out in the absence of an image, however crude, of the practical reality involved.” (Lukács, *History and Class Consciousness*, xxv.) This complex, dialectical view of the concept of “reflection” had roots that went back to Immanuel Kant, who wrote of the “Amphiboly of the Conceptions of Reflection.” See Immanuel Kant, *Critique of Pure Reason* (London: J. M. Dent, 1934), 191–208.

³⁰ ↪ See Marx and Engels, *Collected Works*, vol. 25, 43, 493–94; G. W. F. Hegel, *The Science of Logic*, trans. A. V. Miller (New York: Humanities, 1969), 399, 405–12, 490–91, 536; Foster, *The Return of Nature*, 244–51; George Lukács, *The Young Hegel*, trans. Rodney Livingstone (Cambridge, MA: The MIT Press, 1975) 280; Georg Lukács, *The Ontology of Social Being*, vol. 1, trans. David Fernbach (London: The Merlin Press, 1978), 74–82.

³¹ ↪ Marx and Engels, *Collected Works*, vol. 25, 13.

³² ↪ Marx and Engels, *Collected Works*, vol. 25, 110–32, 356–61; Craig Dilworth, “Principles, Laws, Theories, and the Metaphysics of Science,” *Synthese* 101, no. 2 (1994): 223–47.

³³ ↪ Marx and Engels, *Collected Works*, vol. 25, 115–19, 356–61; Hyman Levy, *The Universe of Science* (London: Watts and Co., 1932), 30–32, 117, 227–28.

³⁴ ↪ Lukács, *Conversations with Lukács*, 73–75.

version, this phrase stands for the way in which the past mediates between the present and the future in material-historical development, producing a dialectic of continuity and change.³⁵ Engels himself referred to the “spiral form of development,” which occurs when the residuals of the past and the active elements of the present coalesce to generate what Ernst Bloch was to call the “not-yet,” or an altogether new reality. For Bhaskar, this takes the form of the “absenting of absence,” or the transformative action directed at what has been inherited from the past in order to create a future existence.³⁶

In a sense, the negation of the negation is a historical, evolutionary conception of emergence. Although emergence of new levels of organisation was articulated in Engels’s first “law,” in terms of the transformation of quantity to quality and vice-versa, now, following the generative principle of the unity of opposites (of contradiction), it takes on a developmental character: the emergence of a new form as a result of a historical process of reciprocal action or contradiction. This is what Bloch meant when he wrote that the “essential distinction between Hegel’s dialectic and all previous candidates” was that “it is not stilled in the unity of contraries or contradictions.”³⁷ In Marxian terms, the past is never simply past but rather mediates between the present (the moment of praxis) and the future.

In this way, Engels, in line with Marx, provided a dialectics of nature that was also a dialectics of emergence.³⁸ His

What Engels referred to metaphorically as the “revenge” of nature was evident in deforestation, desertification, species extinctions, floods, destruction of the soil, pollution, and the spread of disease. Few other thinkers (outside of Marx and Justus von Liebig) in the nineteenth century captured so powerfully and succinctly the dialectic of ecological destruction under capitalism.

analysis recognised the unity and complexity of nature, as well as the “alienated mediation” of nature and society represented by capitalism’s irreversible rifts in nature’s own metabolism.³⁹ This led to his powerful condemnation of capitalism’s conquest of nature, as if of a foreign people, undermining ecological conditions. What Engels referred to metaphorically as the “revenge” of nature was evident in deforestation, desertification, species extinctions, floods, destruction of the soil, pollution, and the spread of disease.⁴⁰

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Contrary to those who have argued (but without any substantive warrant) that Engels sought to subsume the dialectic of human society in the dialectic of nature, his work *The Dialectics of Nature*, although incomplete, was structured so as to move from the analysis of the “merely objective dialectics” of nature via natural science, to an anthropological basis in “The Part Played by Labour in the Transition from Ape to Man.” Here the analysis was grounded in the *dialectics of*

³⁵ ↪ Bertel Ollman, *The Dance of the Dialectic* (Urbana: University of Illinois Press, 2003), 17; Marx and Engels, *Collected Works*, vol. 25, 120–32; Karl Marx, *Capital*, vol. 1, 929. The notion of the negation of the negation arises out of Hegel’s attempts to explain determinate negations that express continuity and change. See G. W. F. Hegel, *The Phenomenology of Spirit*, trans. A. V. Miller (Oxford: Oxford University, 1977), 51.

³⁶ ↪ Marx and Engels, *Collected Works*, vol. 25, 313; J. D. Bernal, “Dialectical Materialism,” in *Aspects of Dialectical Materialism*, ed. Hyman Levy (London: Watts and Co., 1934), 103–4; Bhaskar, *Dialectic: The Pulse of Freedom*, 150–52, 377–78; Ernst Bloch, *The Principle of Hope*, vol. 1, trans. Neville Plaice, Stephen Plaice, and Paul Knight (Cambridge, MA: MIT Press, 1986), 9–18, 306–13; Jay, *Marxism and Totality*, 183–86. An account of the dialectic as a spiral form of development was developed by William Morris and E. Belfort Bax, probably in conjunction with Engels, in *The Manifesto of the Socialist League*. See William Morris and E. Belfort Bax, *The Manifesto of the Socialist League* (London: Socialist League Office, 1885), 11. The characterization of the dialectic as a spiral also appears in E. Belfort Bax, *The Religion of Socialism* (Freeport, NY: Books for Libraries, 1972), 2–5.

³⁷ ↪ Bloch, *The Principle of Hope*, vol. 1, 71.

³⁸ ↪ Kaan Kangal, “Engels’s Emergentist Dialectics,” *Monthly Review* 72, no. 6 (November 2020): 18–27, John Bellamy Foster, “Engels’s Dialectics of Nature in the Anthropocene,” *Monthly Review* 72, no. 6 (November 2020): 1–17.

³⁹ ↪ Karl Marx, *Early Writings*, trans. Rodney Livingstone and Gregor Benton (London: Penguin, 1974), 260–61.

⁴⁰ ↪ Marx and Engels, *Collected Works*, vol. 25, 459–64; Foster, *The Return of Nature*, 177–215, 273–87.

nature and society, evolving out of human labor and production and the human social metabolism with nature.⁴¹ This conformed to the structure adopted in *Anti-Dühring* in which the argument proceeded logically from natural philosophy to political economy and socialism, with political economy and the mode of production seen as relatively autonomous from the dialectics of nature as such, since conditioned by the dialectics of human history. What in fact mediated between the two, for Engels as for Marx, was human labor and production, that is, the social metabolism. Herein lay the actual material realm of human beings constituting the *dialectic of nature and society*, or what the later Lukács was to call the “ontology of social being.”

Indeed, all critical-dialectical thought, encompassing both the “merely objective dialectics of nature,” and what could be called its polar opposite, the “merely subjective dialectics of society,” began for Engels, as for Marx, with the human

All of our most fundamental scientific concepts regarding extra-human nature had their historical origins in human interactions with nature and the inferences that were drawn from them.

social metabolism via labor and production, constituting the objective ground of all human existence: the *dialectic of nature and society*. Human self-consciousness required that the objective world become its own, but this could only be achieved on the basis of ontological principles

expressing the specifically human relation to the universal metabolism of nature.

All of our most fundamental scientific concepts regarding extra-human nature had their historical origins in human interactions with nature and the inferences that were drawn from them. To picture how this works, we can turn to the ancient Greeks. Empedocles in the middle of the fifth century BCE developed an experiment proving the corporeal nature of invisible and motionless air by demonstrating its resistance. This influenced Greek notions of flight. Thus, in Aeschylus’s play *Agamemnon*, written shortly after, in which two eagles in flight (representing the two heads of the house of Atreus) are said to be rowing with “winged oars beating the waves of the wind,” like the ships below, what is being presented is something more than simply a loose poetic metaphor. Rather it was a direct application of the physical principle (the corporeal nature of air) derived from Empedocles’s experiment.⁴² In order to describe poetically the resistance that a bird’s wings would experience in flight, Aeschylus drew on experience derived from human labor, referring to the oars of ships and the resistance that propelled the ships forward as they rowed. While such an example may seem quaint, and although we have infinitely more sophisticated explanations of a bird’s flight today, what is significant is that basic scientific principles with regard to external nature arose from the earliest times through inferences from human interactions (primarily human production) with the natural world; inferences that then, in Epicurus’s famous phrase, had to “await confirmation.”⁴³ Although the scope of our experiments, our instruments, and our interactions with the universe have expanded, the fact that the basic concepts with which we approach extra-human natural phenomena arise first and foremost from our own material experience in interacting with nature remains the same.

⁴¹ ↩ For a standard criticism of Engels in this respect, see Levine, *Dialogue with the Dialectic*, 8–12. For a response, see John L. Stanley, *Mainlining Marx* (New Brunswick, NJ: Transaction, 2002).

⁴² ↩ Benjamin Farrington, *Head and Hand in Ancient Greece* (London: Watts and Co., 1947) 11–15; Aeschylus, *The Oresteia*, trans. George Thomson (New York: Alfred A. Knopf, 2004).

⁴³ ↩ Epicurus, *The Epicurus Reader*, trans. Brad Inwood and Lloyd P. Gerson (Indianapolis: Hackett, 1994), 42. Epicurus was known for his method of scientific inference as well as his epistemology. A few fragments of his writings have been preserved in the form of letters or collections of maxims. However, all of his 300 books are lost, except for parts of his *On Nature*, which have been recovered from the Herculaneum papyri. Nevertheless, we have a brief summary from Diogenes Laertius of his *Canon*, which was the first distinct epistemological work in the ancient Greek tradition. The most intact Epicurean treatment of the method of scientific inference (retrieved from the Herculaneum papyri) was Philodemus’s work on method and signs. See Epicurus, *The Epicurus Reader*, 41–42; Gisela Striker, “Epistemology,” in *The Oxford Handbook of Epicurus and Epicureanism*, ed. Philip Mitsis (Oxford: Oxford University Press, 2020), 43–58; Philodemus, *Philodemus: On Methods of Inference*, ed. Philip Howard De Lacey and Estelle Allen De Lacey (Philadelphia: American Philosophical Association, 1941).

Engels's analysis of the dialectics of nature was developed mainly in his *Anti-Dühring*, which he read to Marx as it was written in draft form (and to which Marx contributed a chapter as well as notes on the Greek atomists), along with his unfinished *Dialectics of Nature*.⁴⁴ It was all clearly provisional, a work in progress, and incomplete. The British socialist scientists who were to be strongly influenced by Engels's materialist dialectics viewed it as a great, unfinished, and open-ended work of scientific inquiry; one far exceeding, as J. D. Bernal noted, the works in the philosophy of science in Engels's own time, represented by Herbert Spencer and William Whewell in England and Lange in Germany.⁴⁵

For many of the leading British socialist thinkers of the early twentieth century—figures as varied as Lankester, Arthur G. Tansley, Benjamin Farrington, George Thomson, Bernal, Joseph Needham, Lancelot Hogben, and Christopher Caudwell—a key point of reference was Epicurean materialism, which was seen as offering not only a deep “materialist conception of nature,” but also, via the swerve (*clinamen*, declension), the concept of contingency, understood as a movement away from a purely mechanical worldview. The Epicurean swerve was a notion stressed by Marx in his doctoral dissertation, which became available in the 1920s.⁴⁶ This was viewed by the British socialist scientists as connecting to a dialectical world view and to Engels's dialectics of nature. Epicurus, as Needham emphasised, conceived nature as arising *of itself*, while swerving away from all rigid determinism.⁴⁷

The result of this historical-materialist *Wissenschaft* (a term often translated as science, but also referring to knowledge more generally when approached systematically on any topic) was a great renaissance of dialectical naturalism.⁴⁸ This included, to point to just a few of the many pioneering developments:

- (1) Lankester's thesis that all major epidemics in animals and humans in the present age are the result of human production, and capitalism in particular;⁴⁹
- (2) Haldane's theory (in parallel with that of the Soviet biologist A. I. Oparin) of the material origins of life—a discovery which was tied to a recognition of how life had created the earth's atmosphere, linked to the Russian biochemist V. I. Vernadsky's analysis of the biosphere;⁵⁰
- (3) Haldane's role in the neo-Darwinian evolutionary synthesis and his integration of this with the dialectics of nature based on Engels's writings;⁵¹

⁴⁴ ↪ Foster, *The Return of Nature*, 253.

⁴⁵ ↪ D. Bernal, *World Without War* (New York: Prometheus, 1936), 1–2.

⁴⁶ ↪ Marx and Engels, *Collected Works*, vol. 1, 34–107, 403–514. As the Epicurean scholar Cyril Bailey pointed out, Marx was the first figure in modern times to recognise the significance of Epicurus's swerve. Cyril Bailey, “Karl Marx on Greek Atomism,” *Classical Quarterly* 22, no. 3–4 (1928): 205–6. Marx drew on a wide body of fragments in writing his dissertation (and his seven *Epicurean Notebooks*) at a time when these had not previously been collected, including one fragment recovered from the charred papyri in the Herculaneum library. Michael Heinrich, *Karl Marx and the Birth of Modern Society* (New York: Monthly Review Press, 2019), 296. On the influence of Epicurus on the British Marxists of the 1930s and '40s, see Foster, *The Return of Nature*, 369–70. Benjamin Farrington, in particular, played a major role in introducing the British Marxian scientists to Epicurus, not only through his own works, but also in facilitating the reading of Marx's doctoral dissertation by thinkers in this tradition. See Lancelot Hogben, *Lancelot Hogben, Scientific Humanist* (London: The Merlin Press, 1998), 105; Benjamin Farrington, *Science and Politics in the Ancient World* (London, George Allen and Unwin, 1939); Benjamin Farrington, *The Faith of Epicurus* (London, Weidenfeld and Nicolson, 1967); George Thomson, *The First Philosophers* (London: Lawrence and Wishart, 1955), 311–14.

⁴⁷ ↪ Joseph Needham, *Time: The Refreshing River* (London: George Allen and Unwin, 1948), 55, 124, 191.

⁴⁸ ↪ See Joseph Fracchia, “Dialectical Itineraries,” *History and Theory* 38, no. 2 (1991): 169–97.

⁴⁹ ↪ Ray E. Lankester, *The Kingdom of Man* (New York: Henry Holt, 1911), 159–91; John Bellamy Foster, Brett Clark, and Hannah Holleman, “Capital and the Ecology of Disease,” *The Jus Semper Global Alliance* (July 2021).

⁵⁰ ↪ B. S. Haldane, *The Science of Life* (London: Pemberton, 1968), 6–11; J. D. Bernal, *The Origin of Life* (New York: World Publishing, 1967), 24–35; Richard Levins and Richard Lewontin, *The Dialectical Biologist* (Cambridge, MA: Harvard University Press, 1985), 277; Vladimir I. Vernadsky, *The Biosphere*, trans. David B. Langmuir (New York: Springer Verlag, 1998).

⁵¹ ↪ B. S. Haldane, *The Marxist Philosophy and the Sciences* (New York: Random House, 1939); Foster, *The Return of Nature*, 383–98.

- (4) Bernal's operationalisation of the dialectics of nature and the negation of the negation in terms of a theory of the role of residuals in effecting the emergence of new forms of inorganic/organic organisation;⁵²
- (5) Needham's theory of integrative levels or emergence, encompassing both natural and social history;⁵³
- (6) Tansley's introduction of the concept of ecosystem, in which he was influenced by Lankester's earlier ecological analysis and Marxist mathematician Levy's dialectical systems theory;⁵⁴
- (7) Hogben's and Haldane's devastating scientific refutation of the genetic basis of race;⁵⁵
- (8) Haldane's early empirical analysis, based on his father's research, of the build-up of carbon dioxide in the atmosphere;⁵⁶
- (9) Bernal's leading role in the critique of the social relations of science;⁵⁷
- (10) Caudwell's attempt to explore the interconnections in the dialectics of art and science;⁵⁸
- (11) Farrington's and Thomson's pioneering research into Epicurean materialism and its relation to the development of Marxist thought;
- (12) Bernal's critique of nuclear-weapons development and treatment of how this threatened the end of life in its present form.⁵⁹

And collectively, this manifested itself as the detailed critique of ecological degradation and destruction integrated into the work of all of these thinkers.

Not only were the scientific and cultural achievements associated with these leading figures in materialist dialectics within realms of science and art of great importance in their time (though later effaced by the Cold War), they were also connected fairly directly with the battles that occurred beginning in the 1950s, with the advent of the Anthropocene, around the sustainability of the natural environment and the rise of the environmental movement. These developments helped inspire the work of leftist scientists like Barry Commoner, Rachel Carson, and, later on, figures such as Stephen Jay Gould, Richard Levins, Richard Lewontin, Steven Rose, Hilary Rose, and Helena Sheehan, and still more recent analysts such as Howard Waitzkin, Nancy Krieger, and Rob Wallace. The reality is that there is a powerful tradition of historical-materialist analysis within and related to natural science that has often fallen outside the purview of Western Marxism.⁶⁰

The problem here is well-illustrated by a couple of statements by Perry Anderson, one of the premier Marxist cultural theorists and historians in Britain from the 1960s to the present day. Writing in the *New Left Review* in 1968, Anderson referred to the "false science...and the fantasies of Bernal."⁶¹ The undeniable fact that Bernal was one of the leading scientific figures in Britain in the 1930s through the 1960s, famous for his major discoveries, and a Marxist, recognised as one of the great intellectual luminaries of his time—even if sometimes deviating into a kind of Soviet positivism—gets

⁵² ↪ D. Bernal, "Dialectical Materialism," 103–4; Henri Lefebvre, *Metaphilosophy*, trans. David Fernbach (London: Verso, 2016) 301–2.

⁵³ ↪ Needham, *Time: The Refreshing River*, 233–72.

⁵⁴ ↪ G. Tansley, "The Use and Abuse of Vegetational Concepts and Terms," *Ecology* 16, no. 3 (1935): 284–307; Levy, *The Universe of Science*.

⁵⁵ ↪ Foster, *The Return of Nature*, 337–39.

⁵⁶ ↪ B. S. Haldane, "Carbon Dioxide Content of Atmospheric Air," *Nature* 137 (1936): 575; Foster, *The Return of Nature*, 397, 612–13.

⁵⁷ ↪ D. Bernal, *The Social Function of Science* (New York: Macmillan, 1939).

⁵⁸ ↪ Christopher Caudwell, *Studies and Further Studies in a Dying Culture* (New York: Monthly Review Press, 1971); Foster, *The Return of Nature*, 417–56.

⁵⁹ ↪ Foster, *The Return of Nature*, 489–96; Bernal, *World Without War*; Bernal, *The Origin of Life*, xvi, 176–82.

⁶⁰ ↪ Foster, *The Return of Nature*, 502–26; Foster, Clark, and Holleman, "Capital and the Ecology of Disease"; Helena Sheehan, *Marxism and the Philosophy of Science* (Atlantic Highlands, NJ: Humanities, 1985).

⁶¹ ↪ Perry Anderson, "Components of the National Culture," *New Left Review* I, no. 50 (1968): 3–57. Compare Eric Hobsbawm, *Fractured Times* (London: Little, Brown, 2013), 169–83.

short shrift here. More significantly, Anderson felt compelled to declare in 1983 that “problems of the interaction of the human species with its terrestrial environment [were] essentially absent from classical Marxism,” thereby excluding Marx and Engels’s contributions in this respect, suggesting that the whole tradition of explorations of the dialectics of nature (and of nature and society) by Marxist theorists was outside the sphere of historical materialism properly speaking.⁶² Similar positions were adopted by a host of other thinkers, such as George Lichtheim, Leszek Kołakowski, Shlomo Avineri, David McLellan, and Terrell Carver, all of whom sought to separate Engels from Marx and the dialectics of nature from Marxism.⁶³

How is it, then, that a dialectics of nature has been so powerful in unlocking the secrets of the universe? The reason is that nature and society are not different realities, but are co-evolving existences, in which society is asymmetrically dependent upon the larger natural world of which it is a part.

Insofar as this tendency of post-Lukácsian Marxism had a common basis, it had to do with postulations, inherited from neo-Kantianism and deeply embedded in the dominant traditions of philosophy, that rejected realism (critical or otherwise), and with it any possibility of a dialectics of nature. How is it, then, that a dialectics of nature has been so powerful in unlocking the secrets of the universe? The reason is that nature and society are not different realities, but are co-evolving existences, in which society is asymmetrically dependent upon the larger natural world of which it is a part. Our knowledge of nature, of ourselves, and of our place in the world, derives from this fact, spurred on in part by the very alienation of nature and the resulting self-consciousness that the capitalist system has generated. As Needham wrote:

Marx and Engels were bold enough to assert that it [the dialectical process] happens actually in evolving nature itself, and that the undoubted fact that it happens in our thought about nature is because we and our thought are part of nature. We cannot consider nature otherwise than as a series of levels of organisation, a series of dialectical syntheses. From the ultimate particle to atom, from atom to molecule, from molecule to colloidal aggregate, from aggregate to living cell, from cell to organ, from organ to body, from animal body to social association, the series of organisational levels is complete. Nothing but energy (as we now call matter and motion) and levels of organisation (or the stabilised dialectical syntheses) at different levels have been required for the building of our world.⁶⁴

For Caudwell, “the external world does not impose dialectic on thought, nor does thought impose it on the external world. The relation between subject and object, ego and Universe, is itself dialectic. Man, when he attempts to think metaphysically, contradicts himself, and meanwhile continues to live and experience reality dialectically.”⁶⁵

The French Marxist Roger Garaudy put this in more straightforwardly epistemological terms:

To say that there is a dialectic of nature, is to say that the structure and movement of reality are such that only a dialectical thought can make phenomena intelligible and allow us to handle them.

⁶² ↪ Perry Anderson, *In the Tracks of Historical Materialism* (London: Verso, 1983), 83.

⁶³ ↪ McLellan’s *Marxism After Marx* reflected the tendency not only to condemn but also to exclude from the Marxist canon those who were seen as falling outside the narrowly defined Western Marxist tradition. Thus, of the British Marxists up through the 1930s considered in *The Return of Nature*, including Morris, Hogben, Haldane, Bernal, Levy, Needham, Farrington, Thomson, and Caudwell, only the last is mentioned in the chapter on “British Marxism” in McLellan’s work, and this was confined to a mere two sentences. We are told that “Christopher Caudwell was the only really original pre-war British Marxist”—and then only for his treatment of “literature,” not his theory of art in general or his analysis of science. See David McLellan, *Marxism After Marx* (Boston: Houghton Mifflin, 1979), 30.

⁶⁴ ↪ Needham, *Time: The Refreshing River*, 14–15.

⁶⁵ ↪ Caudwell, *Studies and Further Studies in a Dying Culture*, 227 (Further Studies).

*That is no more than an inference: but it is an inference founded on the totality of human practice—an inference that is constantly subject to revision as a function of the progress of that practice...
At the current stage of the development of the sciences, the representation of the real which emerges from the sum total of confirmed knowledge, is that of an organic whole in a constant process not only of development but also of auto-creation. It is this structure that we call “dialectical.”⁶⁶*

Kant argued in his Critique of Judgment that, in dealing with the intransitive world of nature beyond our perceptions, it is necessary to conceive of it teleologically in order to say anything about it at all.⁶⁷ Science, however, has progressed far beyond this point, and while sometimes still presenting nature in teleological terms, it is more likely to resort to mechanical, systemic (systems theory), or dialectical terms.⁶⁸ The last of these most fully captures the universal metabolism of nature, encompassing its different integrative levels—including the inorganic and organic, the extra-human and human—connected with the results of human praxis.

The Dialectic of the Anthropocene

Why are these issues so important today, and why is there now a return to the dialectics of nature? This has to do with our own material conditions, which are increasingly dominated by the planetary emergency and the emergence of the Anthropocene, commencing around 1945 with the first nuclear detonation (followed by the bombings in Hiroshima and

The dialectic of nature in the twenty-first century is in many ways a dialectic of the Anthropocene... In the Anthropocene, humanity has arisen as the primary driver effecting changes in the Earth System. The dialectic of nature and society has thus evolved to the point that human production is generating an “anthropogenic rift” in the biogeochemical cycles of the planet.

Nagasaki), which represented a fundamental change in the human relation to the earth. As a result, the dialectic of nature in the twenty-first century is in many ways a dialectic of the Anthropocene. The Anthropocene Epoch is designated by science, though not yet officially, as a new epoch in the geological time scale, following the Holocene Epoch of the last 11,700 years. In the Anthropocene, humanity has arisen as the primary driver effecting changes in the Earth System. The dialectic of nature and society has thus evolved to the

point that human production is generating an “anthropogenic rift” in the biogeochemical cycles of the planet, resulting in the crossing of various planetary boundaries and representing the transgressing of critical thresholds in the Earth System that define a liveable climate for humanity.

Climate change is one such threshold or planetary boundary. In essence, the quantitative build-up of carbon dioxide in

The sources of these changes are not simply anthropogenic, but are due more concretely to the worldwide expansion of capitalism.

the atmosphere has resulted in a qualitative change in the climate sufficient to threaten human existence, and even that of most life on Earth. Other planetary boundaries that have been crossed or are in the process of being crossed are represented by ocean

acidification, loss of biological diversity (and species extinction), the disruption of nitrogen and phosphorus cycles, loss

⁶⁶ ↩ Garaudy, *Marxism in the Twentieth Century*, 61.

⁶⁷ ↩ Immanuel Kant, *Critique of Judgment*, trans. James Creed Meredith (Oxford: Oxford University Press, 1952) 50–54, 67–74, 77–86.

⁶⁸ ↩ Systems theory often overlaps with dialectics. See Richard Lewontin and Richard Levins, *Biology Under the Influence* (New York: Monthly Review Press, 2007), 101–24.

of ground cover (including forests), loss of fresh water sources (including desertification), and chemical and radioactive pollution of the environment.⁶⁹

The sources of these changes are not simply anthropogenic (something that will not be reversed so long as industrial civilisation continues to exist), but are due more concretely to the worldwide expansion of capitalism as an accumulative system geared to its own internal growth *ad infinitum* and embodying in that respect the most destructive relation to the earth conceivable. This was captured by Marx's theory of metabolic rift, now raised to the level of an anthropogenic rift in the Earth System.⁷⁰

Although we have a widely accepted name for the new *geological epoch*, characterised by the human economy's current role as the primary geological force on the level of the Earth System itself, we still have no name for the new *geological age*, nested within the Anthropocene Epoch that underlies the current Anthropocene crisis. Officially, in terms of geological ages, we are still in the Meghalayan Age of the last 4,200 years, dating from a period of climate change that was thought to have brought down some of the early civilisations (though this is currently a matter of dispute among scientists). But how are we to conceive of the new *geological age* associated with the inception of the Anthropocene Epoch?

My *Monthly Review* colleague Brett Clark and I, as professional environmental sociologists, have proposed the name Capitalinian (also referred to by geologist Carles Soriano as the Capitalian) for this first geological age of the Anthropocene, standing for the fact that it is the capitalist world-system that has created the present planetary emergency.⁷¹ The only solution—indeed, the only way of preventing the present mode of production from bringing about an Anthropocene extinction (or Quaternary Period extinction) event—is for human society to move beyond capitalism and the Capitalinian towards a future, more sustainable geological age within the Anthropocene, which we have labeled the Communian, after community, commune, and communal.

What is called the practical, relational dialectic, the dialectic of history is now therefore caught up with the dialectic of nature and society reflected in Marx's theory of metabolic rift. This has now been given a wider field of operation, only truly apparent in our time, in which the metabolism of the entire planet, or the dialectic of nature, is being affected by an anthropogenic rift in the Earth System and in ways that threaten our own existence, calling to mind Engels's "revenge" of nature and Lankester's "Nature's revenges."⁷²

It is important to understand that this Earth System crisis in the Capitalinian is tied to the long history of expropriation and exploitation that together constitute the foundation of capitalism's relation to the earth and humanity.

Expropriation went beyond the theft of land to the theft of human bodies themselves. This is associated with the "corporeal rift," marked by genocide, enslavement, and colonisation of much the world's population, underlying the relations of class exploitation.

Expropriation, in Marx's terms, meant appropriation without equivalent or reciprocity, that is, robbery. Marx thus spoke of the *robbery* of nature underlying the

⁶⁹ ↪ Johan Rockstrom et al., "A Safe Operating Space for Humanity," *Nature* 461 (2009): 472–75; Will Steffen et al., "Planetary Boundaries," *Science* 347, no. 6223 (2015): 736–46; Richard E. Leakey and Roger Lewin, *The Sixth Extinction* (New York: Anchor, 1996).

⁷⁰ ↪ Hamilton and Grinevald, "Was the Anthropocene Anticipated?," 67.

⁷¹ ↪ John Bellamy Foster and Brett Clark, "The Capitalinian: The First Geological Age of the Anthropocene," *The Jus Semper Global Alliance* (October 2021); Carles Soriano, "On the Anthropocene Formalization and the Proposal by the Anthropocene Working Group," *Geologica Acta*

⁷² ↪ Marx and Engels, *Collected Works*, vol. 25, 461; Lankester, *The Kingdom of Man*, 159–91.

metabolic *rift*.⁷³ But he also wrote about the expropriation of the land from the population, removing the workers from the most basic means of production and thus control over their own lives. The age that Marx critically referred to as “so-called original accumulation” (so-called, because it was defined not so much by accumulation as by robbery) was an age of expropriation.⁷⁴ Expropriation went beyond the theft of land to the theft of human bodies themselves. This is associated with what Clark and I have designated as the “corporeal rift,” marked by genocide, enslavement, and colonisation of much the world’s population, underlying the relations of class exploitation.⁷⁵

It is this wider logic of the expropriation of lands and bodies behind the capitalist system of exploitation that gave rise to

Today capitalism is thus involved in myriad ways in the expropriation of the entire earth and its population: a system of robbery so extensive that the human relation to the earth, the very basis of human existence, is now in danger of being severed.

the history of racial capitalism. This process of expropriation can also be seen in the robbing of women’s household labor (which led Marx in his day to refer critically to women in capitalism as the slaves in the household) and in the continuing agribusiness expropriation of the land of subsistence workers, primarily peasants. Even people’s leisure time away from work throughout the world is being expropriated in various ways in the accelerated

accumulative society of digital capitalism. Today capitalism is thus involved in myriad ways in the expropriation of the entire earth and its population: a system of robbery so extensive that the human relation to the earth, the very basis of human existence, is now in danger of being severed. The alienation of nature and the alienation of labor that characterise capitalism point, in the end, only to destruction.

Our practical dialectics today thus require a knowledge of *the dialectics of nature and society*. The merely objective dialectics of nature, excluding the human subject, and the merely subjective dialectics of society, excluding natural-physical existence, are not enough. A greater critical unity of thought and action is being forced upon us. Dialectics, as Lewontin and Levins explained, focuses on “wholeness and interpenetration, the structure of process more than things, integrated levels, historicity and contradiction.”⁷⁶

In ancient Greece, the Ionian philosophers, such as Heraclitus, focused on *material processes as dialectical*. For Heraclitus, describing the basic metabolic process underlying life:

As things change to fire, and fire exhausted falls back into things,
the crops are sold for money spent on food.⁷⁷

In contrast to the Ionians, the Eleatics, such as Parmenides (followed by Plato and much later, by Plotinus) conceived of a *dialectic of the idea*, or reason. Hegel can be seen as wedding these two vital streams together, building on all of modern philosophy and the Enlightenment in his idealist philosophy, but giving precedence to dialectics as idea or reason.⁷⁸ Marx’s materialist dialectics returned to material processes as underlying all reality, leading to an objective dialectic of

⁷³ ↪ Marx, *Capital*, vol. 1, 637–38.

⁷⁴ ↪ Marx, *Capital*, vol. 1, 871; John Bellamy Foster and Brett Clark, *The Robbery of Nature* (New York: Monthly Review Press, 2020), 43–61. Marx strongly preferred the concept of “original expropriation” to “original accumulation,” since what was at issue was expropriation, not accumulation. See Karl Marx, *Value, Price, and Profit*, in Karl Marx, *Wage-Labour and Capital/Value, Price and Profit* (New York: International Publishers, 1935), 38

⁷⁵ ↪ Foster and Clark, *The Robbery of Nature*, 78–103.

⁷⁶ ↪ Lewontin and Levins, *Biology Under the Influence*, 103.

⁷⁷ ↪ Heraclitus, *Fragments*, trans. Brooks Haxton (London: Penguin, 2001), 15.

⁷⁸ ↪ Bhaskar, *Dialectic: The Pulse of Freedom*, 115–16; Thomson, *The First Philosophers*, 271–95.

change and emergence, of the metabolism of nature and society, and ending in a dialectics of human history and practice.

This materialist dialectical synthesis, the dialectic of nature and society, remains of great importance today. We live in a time, as Marx and Engels noted in *The German Ideology*, in which humanity must struggle in revolutionary ways not simply for the advancement of human freedom, but also in order to avoid destruction due to what can be called “capitalism’s deadly threat” to the world and life in general. For Epicurus, Marx wrote, “the world [the earth] is our friend.”⁷⁹ Materialist dialectics tells us that our goal in the present moment must be one of creating a world of ecological sustainability and substantive equality, one which promotes sustainable human development. But this starts in our time with an ecological and social revolution that is forced upon us. Today, the struggle for freedom and the struggle for necessity coincide everywhere on the planet for the first time in human history, creating a prospect of ruin or revolution: either a fall into the depths to which the Capitalinian has brought us, or the creation of a new Communian Age.⁸⁰

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⁷⁹ ↩ Marx and Engels, *Collected Works*, vol. 5, 141. See also Walter Baier, Eric Canepa, and Haris Golemis, eds., *Capitalism’s Deadly Threat* (London: The Merlin Pr

⁸⁰ ↩ “The real ‘Golden Age’ of historical anthropology cannot be conceived of without the just as real ‘Golden Age’ of a new humanist cosmology.” (Bloch, *The Principle of Hope*, 138.)

❖ **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.

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