



The Earth-System Crisis and Ecological Civilization: A Marxian View

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ABSTRACT

The Holocene epoch in geological history of the last 10,000–12,000 years has given way to a new geological epoch which natural scientists are calling the Anthropocene, marked by humanity's emergence as the main driver of change in the Earth system as a whole, threatening the future of civilization, a majority of ecosystems on the planet, and the human species itself. From a historical-materialist perspective, this planetary emergency constitutes a *crisis of civilization*. Human civilization arose in the relatively benign environment of the Holocene. In contrast, the Anthropocene is an epoch of increased ecological constraints and dangers, marked by what has been called the Great climacteric, objectively requiring the creation of a new more sustainable society, or ecological civilization. The making of such an ecological civilization is closely linked to the long revolutionary transition from capitalism to socialism.

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1. Introduction

It is common today to argue that the Holocene epoch in geological history has given way to a new geological epoch of the Anthropocene, in which human beings are increasingly the main geological force affecting the Earth system, overshadowing all other factors. This marks a Great Climacteric or *age of epochal transition* in human history. From the perspective of historical social science, this presents us with a fundamental problem: that of a crisis of civilization or a prolonged emergency.¹ Not only does the growing rift in the Earth system threaten, with the continuation of capitalist business as usual, the entire realm of human civilization, in the sense of an advanced, ordered society, it could potentially undermine the conditions of human life itself, as well as that of innumerable other species (Hansen 2009; Angus 2016; Kolbert 2014). In this way, the Anthropocene represents an unprecedented challenge.

Civilization—the rise of which was preceded by settled agriculture and the growth of an economic surplus, and which is commonly associated with the development of writing and class-based urban society—had its origins in the geological epoch of the Holocene. Although certain regional civilizations have collapsed in the past, partly due to ecological factors, overall the Holocene has been conducive to the rise of highly ordered societies. In contrast, the Anthropocene epoch, arising as a result of capitalist development, raises the

question of a crisis on a planetary scale and of the necessary forging of an *ecological civilization*, that is, the shift to a society of substantive equality and ecological sustainability. It is no accident that this has been recognized most fundamentally in China, which, despite its own deep ecological contradictions, draws on the theoretical legacy of historical materialism—adding to its long civilizational—cultural dynamic a materialist revolutionary outlook. Nor should it surprise us that the question of ecological civilization has become pivotal to Marxian theory in the twenty-first century, building on its classical roots, and is now engendering a worldwide ecosocialist movement.

To address the historical specificity of the crisis of contemporary civilization and the challenge of creating an ecological civilization, it is necessary to begin with the historical conditions marked by today's Great Capitalist Climacteric. Only then can we address the necessary epochal transition before us. Moreover, it is important to recognize that this is linked to the question of capitalism and socialism, that is, the organization of production: the metabolism of nature and society.

Approaching the question of ecological civilization from a Marxian perspective, moreover, requires, first and foremost, a critical outlook on the concept of civilization itself, recognizing its historical class-based character and how this is related to our present ecological crisis. To speak of the making of an ecological civilization is also to evoke the long transition from capitalism to socialism.

2. The Great Capitalist Climacteric

It is commonplace today to refer to a global ecological crisis. Yet, the concept of crisis, though indispensable, is inadequate by itself to express the full extent of the ecological challenge that humanity faces in the Anthropocene epoch.² The world is facing a prolonged Earth-system emergency, requiring a radical transition in the social metabolism of humanity and nature. The Anthropocene itself has been defined as an “anthropogenic rift” in the Earth system endangering civilization and innumerable species, including our own, associated with the crossing of planetary boundaries (Rockström et al. 2009; Hamilton and Grinevald 2015, 67; also see Wark 2015).³ From a historical materialist perspective, this raises the question of a social-environmental transition which must accelerate in a revolutionary manner if the challenge of the Anthropocene is to be met. Such an ecological and social revolution would necessarily constitute a protracted process, occurring in stages with all sorts of advances and retreats.⁴ The material roots of this transition in the social-environmental relation have long been in the making and have their basis in the development of capitalism and class-based civilization more generally.

Here it is useful to turn to the notion of “The Great Climacteric” introduced by environmental geographers Ian Burton and Robert Kates in the 1980s to refer to the social aspects of the changing human relation to the environment beginning with the Industrial Revolution in the late eighteenth century. Burton and Kates (1986) figuratively used the date of Thomas Malthus's 1798 *Essay on Population* as the starting point for the Great Climacteric and saw this as extending to the year 2048, 250 years later (also see Foster 2015a). A Great Climacteric in this sense represents a long transition in the life of a whole society or civilization associated with changing relations of production and environmental relations.

As Burton and Kates (1986, 339) wrote: “Applied to population, resources, and environment throughout the world,” the notion of a Great Climacteric, “captures the

idea of a period that is critical and where serious change for the worse may occur. It is a time of unusual danger.” It also raises the issue of the search for “a new global equilibrium” between human beings and the planet. Such a new, dynamic equilibrium state, involving evolutionary change, along with relatively stable, resilient relations, they argued, would need to be reached by the mid-twenty-first century. The idea of a Great Climacteric in society, viewed in this way (but without the Malthusian framework), is consistent with the emergence of the Anthropocene—seen as having its roots initially in the Industrial Revolution with the rise of fossil fuels, but maturing only with the Great Acceleration in the post–Second World War era. The most dramatic stratigraphic traces of the Great Acceleration marking the Anthropocene are to be found in radionuclides from above-ground nuclear weapons testing in the late 1940s and 1950s (McNeill and Engelke 2014; Waters et al. 2016). The Great Climacteric thus stands both for a planetary emergency and for the necessity of a *social-historical transition* to transform the human relation to the Earth system so as to conform to the requirements of sustainable human development (Burkett 2005).

Given that the world economy has now reached a scale where its normal operations, such as current forms of energy use, threaten to disrupt the biogeochemical cycles of the entire Earth system (Foster 2002, 73; McNeill and Engelke 2014, 4; Angus 2016, 149–51), it is clear that some kind of adjustment will be necessary between what Karl Marx called the “social metabolism” of production and the “universal metabolism of nature”—in the direction of a more sustainable society (Marx and Engels 1975, vol. 30, 54–66; Marx 1976, 949; Foster 2013). Otherwise the Earth system itself will necessarily impose its own limits on human society, leading to the demise of civilization, with untold costs to our own and other species.

As US Marxian economist Paul Sweezy wrote back in 1989, “the general nature of the [environmental] crisis,” can be seen

as a radical (and growing) disjunction between on the one hand the demands placed on the environment by the modern global economy, and on the other hand the capacity of the natural forces embedded in the environment to meet these demands.

He depicted the capitalist system as a juggernaut aimed at ever-greater accumulation of capital as an end in itself. Individual capitals were “checked,” in this expansive drive,

only . . . by the impersonal forces of the market and in the longer run, when the market fails, by devastating crises. Implicit in the very concept of this system are interlocked and enormously powerful drives to both creation and destruction. On the plus side, the creative drive relates to what humankind can get out of nature for its own uses; on the negative side, the destructive drive bears most heavily on nature’s capacity to respond to the demands placed upon it. Sooner or later, of course, these two drives are contradictory and incompatible. And since . . . the adjustment must come from the side of the demands imposed on nature rather than from the side of nature’s capacity to respond to those demands, we have to ask whether there is anything about capitalism as it has developed over recent centuries to cause us to believe that the system could curb its destructive drive and at the same time transform its creative drive into a benign environmental force. The answer, unfortunately, is that there is absolutely nothing in the historic record to encourage such a belief. (Sweezy 1989a, 6)

Sweezy saw these same creative/destructive drives as applying not simply to capitalism but also to the “really existing socialism” of his day. Here he argued, however, that post-

revolutionary societies—rising out of conditions of underdevelopment and having to survive in a larger and hostile capitalist world economy—were under pressure to emulate and catch up with the more advanced capitalist economies. Due to these historical conditions, the impact of post-revolutionary societies on the environment had thus far been scarcely distinguishable from that of their capitalist counterparts. Nevertheless, post-revolutionary societies did not have the same *inner* drive to environmental destruction—since they were not inherently ruled by the capital accumulation process (Sweezy 1980, 139–51). The existence of planning, moreover, made it more likely that such countries could effectively address environmental problems once these were brought to the forefront of their societal agendas.⁵

This argument points to what we might call—going beyond Burton and Kates’ formulation—the Great Capitalist Climacteric, which requires the re-establishment of a kind of equilibrium between production and the planet, transcending the alienation of labor and nature. However, rather than a mere static equilibrium, this can be conceived as a dynamic one of co-evolution or creative sustainability. A failure on the part of society to push beyond the status quo in order to construct such a sustainable order can only lead to *cumulative catastrophe* (McNeill 1992; Foster 2011). The threatened catastrophe is one of civilization and potentially of the human species itself, along with innumerable other living species. The way out at present can only be by means of a transitional ecological civilization, which while still carrying the vestiges of class society, moves toward socialism and sustainable human development.

3. The Critique of Civilization

The question of the crisis of civilization is continually being raised by today’s science, confronted as it is with the reality of climate change. As Kevin Anderson of the Tyndall Centre for Climate Change in the UK stated in “Climate Change Going Beyond Dangerous—Brutal Numbers and Tenuous Hope,” an increase in global average temperatures by 2°C is “beyond dangerous,” while an increase by 4°C—the world to which we are presently heading under business as usual—threatens global civilization itself. “It is fair to say,” he writes,

based on many (and ongoing) discussions with climate change colleagues, that there is a widespread view that a 4°C future is *incompatible with any reasonable characterization of an organized, equitable, and civilized global community*. A 4°C future is also beyond what many people think we can reasonably adapt to. Besides the global society, such a future will also be devastating for many if not the majority of ecosystems. Beyond this, and perhaps more alarmingly, there is a possibility that a 4°C world would not be stable, and that it might lead to a range of “natural” feedbacks, pushing the temperatures still higher. (Anderson 2012, 29; italics added)

Not only is 4°C incompatible with global civilization, but it does not even represent the full range of climate change possible this century under business as usual according to the Intergovernmental Panel on Climate Change, since its projections envisage the possible rise of global average temperature by 6°C by 2100 with a continuation of capitalist business as usual.

In socialist terms, the ecological crisis of civilization is most usefully viewed through the lens of the historical *critique of civilization*—a critique introduced into socialist theory by French utopian socialist Charles Fourier, and later developed further in the work of

thinkers such as Marx, Frederick Engels, and William Morris. The concept of “civilization” first appeared in eighteenth-century France, and soon after in England and Germany, and was closely related to the concept of culture (Williams 1983; Braudel 1994). It took its principal meaning from a contrast with barbarism, and in that sense grew out of the Latin distinction between “modes of life that are civil” identified with the city-state or *civitas*, and the ways of life of barbarians—as that was articulated, for example, by the Roman geographer Strabo (c. 64 BC–AD 24) (Strabo 1923, 290). In contrast, in today’s social sciences and humanities, civilization “in the singular”—French historian Fernand Braudel wrote in his *A History of Civilizations*—is often taken to “denote something which all civilizations share, however unequally,” namely, cultural assets that are a product of development, such as “writing, mathematics, the cultivation of plants, and the domestication of animals” (Braudel 1994, 7–8; see also Childe 1954, 30–31). The historical precondition for civilization, in this sense, was settled agriculture and the production of an economic surplus. Hence civilization, as a generic stage of human development, is commonly associated with the rise of written language, the urban revolution, the state, class divisions, and private property.⁶

Fourier was best known for his critique of civilization, whereby he questioned the forms of property, production/overproduction, division of labor, wage slavery, poverty, and patriarchy associated especially with the latest phase of civilization, now known as capitalism. Civilization, in his view, represented both a higher stage of cultural and economic development (in comparison to what he called the stages of savagery and barbarism), and, at the same time in many ways a step backward or barbarism at a higher level—in that it stood for a more intense, while anarchic, form of production and exploitation.

Criticizing bourgeois civilization, Fourier wrote, “the vicious circle of industry has been so clearly recognized, that people on all sides are beginning to suspect it, and feel astonished *that, in civilization, poverty should be the offspring of abundance*” (Fourier 1971, 88; italics in the original). “Fourier’s critique of civilization,” Jonathan Beecher wrote,

was nothing if not comprehensive. When the occasion demanded, he was able to list up to 144 “permanent vices” of civilization running from the slavery of the wage system to the “excitation of hurricanes and all sorts of climatic excesses.” (Beecher 1986, 197)

Hence, the term civilization had a complex, often pejorative, meaning in nineteenth-century socialist thought. Marx and Engels too used the term in this way—although frequently employing it more broadly to refer to pre-capitalist as well as capitalist class formations. As Sven Beckert (2015, 244) states in *The Empire of Cotton*:

Whether celebrating the material advances generated from slavery or calling for slavery’s abolition, many contemporaries agreed by the 1850s that global economic development required physical coercion. Karl Marx sharpened the arguments made all around him by concluding in 1853 that ‘bourgeois civilization’ and ‘barbarity’ were joined at the hip.

“Civilization,” as far back as antiquity, Engels (1972, 224–25) wrote, “was defined first and foremost by its sharpening of the opposition between town and country.” It was precisely this that created the rift in the social metabolism between civilization and the environment, which was intensified with the exploitation of the urban proletariat under capitalism (Marx 1976, 637–38; Engels 1979, 92).

Other early Marxian thinkers, notably William Morris, were to expand on this critique of civilization. For Morris, it was the entire culture of class society, of which capitalism was only a manifestation, that was the target. “Revolution” was both “the intelligence of civilization” and its negation (Morris 1896, 116). The countries within “the ring of civilization” for Morris (2003, 81–84; italics in the original) were characterized by “organized misery”; they “were glutted with the abortions of market, and force and fraud were used unsparingly to ‘open up’ countries *outside* that pale. . . . When the civilized World-Market coveted a country not yet in its clutches, some transparent pretext” was invented to justify an invasion. Without denying the significance of civilization in the sense of the general advancement of culture, Morris compared it unfavorably in many ways to “non-civilisation,” as this was cynically referred to in the West. For Morris, all of this reflected the class-based, imperialist nature of capitalism which saw itself as the epitome of culture and civilization, while perpetrating a greater barbarism.

When addressing ecological problems, Marx often saw them as reflecting the contradictions of civilization in the broader historical sense, as well as bourgeois society more specifically. Thus in writing in *Capital*, volume 2, on deforestation, he stated: “The development of civilisation and industry in general has always shown itself so active in the destruction of forests that everything that has been done for their conservation and production is completely insignificant in comparison” (Marx 1978, 322). Likewise, in writing about land cover change and desertification, as this had appeared since ancient times, Marx famously observed (in relation to the work of the German agronomist Carl Fraas): “Climate and flora change in *historical* times,” i.e., in the period of civilization or written history. Indeed,

with cultivation—depending on its degree—the “moisture” so beloved by the peasants gets lost (hence also the plants migrate from south to north). . . . The first effect of cultivation is useful, but finally devastating through deforestation, etc. . . . The conclusion is that cultivation—when it proceeds in natural growth and is not *consciously controlled* . . . leave deserts behind it, Persia, Mesopotamia, etc., Greece. So once again an unconscious socialist tendency! (Marx and Engels 1975, vol. 42, 558–59; Saito 2016; italics in the original)⁷

Commenting on this passage by Marx on Fraas, leading Soviet climatologist, Fedorov (1972, 145–47), wrote:

This quote can well apply to many present-day Western researchers of the problem of interaction between society and the natural environment. Just like Fraas [in his day] they feel that the spontaneously developing culture leads to a crisis in the relationship between society and nature, and their calculations provide a fairly good illustration of just how this may happen. And, just like Fraas, they display (possibly unconsciously) certain “socialist tendencies.”

Here Federov had in mind the implicit criticism of capitalism and contemporary civilization that pervaded Western ecological thought in the early 1970s. What was emerging was the recognition of the deep contradiction in the metabolism with nature as a whole highlighted in the nineteenth century by Marx. Indeed, Marx and Engels, Federov emphasized, “regarded interaction (metabolism) between people and nature as a vital element of human life and activity.”

Marx saw the “unconscious socialist tendency,” arising from ecological degradation, as evident in the whole history of developing civilization (Marx and Engels 1975 vol. 5, 32), though manifesting itself fully only under capitalism. His theory of metabolic rift was

developed specifically to address the disruption in the relation between human beings and the soil that developed as a result of industrialized agriculture and the extreme division between town and country, as “the urban population . . . achieve[s] an ever-growing preponderance.” Large-scale capitalist agriculture, he argued, progressively “disturbs the metabolic interaction between man and the earth” (Marx 1976, 637–38). It thus creates a “rift” in the soil nutrient cycle, thereby “robbing the soil,” and “ruining the more long-lasting sources of that fertility” (Marx 1981, 949). By creating a break in the social metabolism between human beings and the earth, undermining the universal metabolism of nature, it disrupts the eternal-natural conditions of soil fertility. In this way

it produces conditions that provoke an irreparable rift in the interdependent process of social metabolism, a metabolism prescribed by the natural laws of life itself. The result of this is a squandering of the vitality of the soil, which is carried by trade far beyond the bounds of a single country. (Marx 1981, 949)

The significance of this emerging ecological climacteric, for Marx, was that it disrupted the conditions of production that had allowed for the development of civilization up to that point. The answer to this civilizational crisis, coming to a head under capitalism, was the necessary creation of a socialist society in which the associated producers rationally regulated the metabolism between humanity and nature—doing so in a way that conserved their energy, and that fulfilled their own specific human-species needs. No individual, Marx observed, owns the earth, not even all the people on the globe own the earth; they are simply “its possessors, its beneficiaries” and are responsible for maintaining it for future generations as “boni patres familias” (good heads of the household) (Marx 1981, 911).

This sense of ecological crisis as a crisis not simply of capitalism but also representing a broader threat encompassing the entire range of human culture and civilization took a concrete form in Marx and Engels’s writings on *Ireland and the Irish Question* (1971). Here Marx gave material expression to the ecological destruction that the colonial-capitalist system was forcing upon workers and the dispossessed. This is evident in the “Record of a Speech on the Irish Question Delivered by Karl Marx to the German Workers’ Educational Association in London on December 16, 1867.” In examining the Great Irish Famine of 1845–46, Marx depicted it as a product in part of the despoliation of the soil resulting from destructive colonial intensification of the metabolic rift that he had already described in relation to English agriculture.

Fertilizers [i.e., soil nutrients] were exported with the produce and the rent and the soil was exhausted. Famines often set in here and there, and owing to the potato blight there was a general famine in 1846. A million people died of starvation. The potato blight resulted from the exhaustion the soil, it was a product of English rule (Marx and Engels 1971, 141).⁸

Marx, however, was not principally concerned here with the Great Irish Famine itself. Rather his analysis focused on the subsequent transformation of Irish agriculture in the mid-nineteenth century, during which people were being replaced on the land by cattle and sheep under the colonial rationale that the land was unsuited for crops for people. In his notes to an earlier undelivered lecture on the Irish question, he referred to “the gradual deterioration and exhaustion of the source of national life, the soil” (Marx and Engels 1971, 123; see also Slater 2008). Commenting on the decrease in yield per acre from 1847 to 1865, he pointed to a drop in the production of oats by 16%, flax by 48%, turnips by

36%, and potatoes by 50% (Marx and Engels 1971, 135–36). With the exhaustion of the soil, the population had deteriorated physically. There was “an *absolute increase* in the number of deaf-mutes, blind, insane, idiotic, and decrepit inhabitants” in the decreasing population (Marx and Engels 1971, 137; italics in the original).

“The Irish question,” Marx declared, “is therefore not simply a question of nationality but a question of land and existence. *Ruin or revolution is the watchword*” (Marx and Engels 1971, 142; italics added). Here the question of revolution stemmed not simply from the nationality question, or colonialism, nor merely from labor exploitation; instead it raised the larger issue of the *ecological ruin* of the peasantry and agricultural laborers as an unconscious tendency to revolution, i.e., the objective conditions forcing transformative change. It followed that not only class and nationality, but also ecological ruin, a general devastation threatening the entire culture, could constitute the basis for revolution.

4. Exterminism or Ecological Civilization

Similar considerations to those raised by Marx, borne of the historic critique of class-based civilization, coupled with a growing perception for global environmental destruction, led twentieth-century ecological and social critics like Lewis Mumford, E. P. Thompson, and Rudolf Bahro to refer to the growing ecological threat to civilization as a whole. For Mumford (1961, 53) in *The City in History*, as a result of modern industrial development, particularly capitalism, “the very survival of civilization, or indeed of any large and unmutated portion of the human race is now in doubt.” Earlier in *The Condition of Man*, he had observed:

What happened to Greece, Rome, China, or India has no parallel in the world today: when those civilizations collapsed they were surrounded by neighbors that had reached nearly equal levels of culture, whereas if Western civilization should continue its downward course it will spread ruin to every part of the planet. (Mumford 1944, 392)⁹

Mumford’s view of civilization, although not strictly Marxist in form, was complex and radical, derived from the historical critique long embedded in socialist thought whereby civilization itself was regarded as a transitional, class-based cultural formation—both a form of advance and a new barbarism. As he wrote in 1966 in *The Myth of the Machine*,

I use the term “civilization” in quotation marks . . . to denote the group of institutions that first took form under kingship. Its chief features, constant in varying proportions throughout history, are the centralization of political power, the separation of classes, the lifetime division of labor, the mechanization of production, the magnification of military power, the economic exploitation of the weak, and the universal introduction of slavery and forced labor for industrial and military purposes. These institutions would have completely discredited both the primal myth of divine kingship and the derivative myth of the machine had they not been accompanied by another set of collective traits that deservedly claim admiration: the invention and keeping of the written record, the growth of visual and musical arts, the effort to widen the circle of communication and economic intercourse far beyond the range of any local community; ultimately the purpose [of which was] to make available to all men the discoveries and inventions and creations, the works of art and thought, the values and purposes that any single group has discovered. The negative institutions of “civilization,” which have besmirched and bloodied every page of history, would never have endured so long but for the fact that its positive goods, even though they were arrogated to the use of a dominant minority, were ultimately of service to the whole human community. (Mumford 1967, 186)

It was this complex understanding of civilization, which carried with it both the collective cultural legacies of the past, as well the alienated heritage of barbarism, exploitation, and conflagration, that informed the work of the most acute socialist ecological analysts faced with the more universal dangers of the late twentieth century.

Protesting against the in-built tendency toward a nuclear conflagration, as well as environmental destruction, with the reigniting of Cold War hostilities under Reagan, Thompson (1982) penned “Notes on Extermination, the Last Stage of Civilisation.” The term “exterminism” was applied to “those characteristics of a society—expressed, in differing degrees, within its economy, its polity and its ideology—which thrust it in a direction whose outcome must be the extermination of multitudes” (Thompson 1982, 41–79; also see Angus 2015, 179–80). Thompson was particularly concerned with the dangers of nuclear holocaust, but gave the concept a wider scope that also pointed to environmental destruction.

These grave concerns were carried forward by Bahro, who observed:

In order to furnish a basis for resistance to rearmament plans, the visionary British historian E. P. Thompson wrote an essay in 1980 about *exterminism*, as the last stage of civilisation. Exterminism doesn't just refer to military overkill, or to the neutron bomb—it refers to *industrial civilization as a whole*. . . . Thompson's statements about the “increasing determination of the extermination process,” about the “last dysfunction of humanity, its total self-destruction,” characterize the situation as a whole As an inseparable consequence of military and economic progress we are in the act of destroying the biosphere which gave birth to us.

To express the extermination-thesis in Marxian terms, one could say that the relationship between productive and destructive forces is turned upside down. Like others who looked at civilization as a whole, Marx had seen the trail of blood running through it, and that “civilisation leaves deserts behind it.” In ancient Mesopotamia it took 1500 years for the land to grow salty, and this was only noticed at a very late stage, because the process was slow. Ever since we began carrying on a productive material exchange with nature, there has been this destructive side. And today we are forced to think apocalyptically, not because of culture-pessimism, but because this destructive side is gaining the upper hand. (Bahro 1994, 19; italics in the original)

Today warnings of the potential collapse of civilization, now on a global, not just a regional scale, have reemerged, reflecting the growing recognition of the anthropogenic rift in the Earth system. Such warnings today are coming first and foremost from natural scientists (and historians of science), in works like Martin Rees's *Our Final Hour* (2003), Jared Diamond's *Collapse* (2011), James Lovelock's *The Revenge of Gaia* (2006), James Hansen's *The Storms of My Grandchildren* (2009), and Naomi Oreskes and Erik Conway's *The Collapse of Western Civilization* (2014). What such mainstream analyses typically lack, however, is a social-historical critique of capitalism and of class-based civilization in general, together with a vision of ecological civilization.

In Diamond's *Collapse*, it is recognized that modern society is accelerating down a “non-sustainable course.” Under these circumstances, “the only question,” he writes, “is whether the world's environmental problems . . . will become resolved in pleasant ways of our own choice, or in unpleasant ways not of our choice, such as warfare, genocide, starvation, disease epidemics, and collapse of societies” (Diamond 2011, 498). Indeed, some societies in the “Third World” are already, he argues in an imperialistic vein, collapsing, while the real question is whether this will be extended to “First World societies” (7).

Yet Diamond's reified analysis of societies is curiously devoid of social and historical categories, much less class analysis. The whole question of environmentally induced civilizational collapse throughout history is treated in his book largely in terms of individualistic, behavioristic, demographic, and technological categories. In this kind of flattened analysis, issues such as class, the division of labor, mode of production, capitalism, the state, and inequality are notable in their absence. The mediation between society and the environment is addressed largely in technocratic or scientific terms. Nowhere is this lack of social and historical framework more evident than in Diamond's strident defense of "big business" on the environment, including major oil companies like Chevron. This is accompanied by a long disquisition—hidden in "further readings" to the final chapter—in which he argues that whether there is an environmental collapse of present-day society simply rests on the behavior and values of individuals, acting as voters and as consumers (441–85, 555–60).¹⁰ The form of civilization that he wants to preserve, and that he identifies with civilization as a whole, is neo-liberal civilization.

Standard liberal analyses of this kind can be contrasted to the classical Marxian view, with its critique of class-based civilization and capitalism, and its advocacy of a revolutionary transition to socialism. From a historical materialist perspective, civilization—itself a historical product—is something to be both critically defended in certain respects and opposed in others, with the goal being its historical transcendence. This reflects civilization's dual role as the repository of historical cultures, along with its destructive, exploitative, imperialist, and frequently barbaric character. The critical defense of and at the same time opposition to civilization was a crucial part of the whole revolutionary argument. In referring in the opening pages of *The Communist Manifesto* to the choice between the "revolutionary reconstitution of society at large" or the "common ruin of the contending classes" Marx and Engels (1964, 2) had in mind the downfall of the Roman Empire where there had been a civilizational collapse. The answer for the founders of historical materialism was always a revolutionary transcendence (*Aufhebung*), not the collapse of civilization but its transformation. The Marxian theory of change focuses on revolution, and not on breakdown, either of the economy or the ecology.

Nothing could be more opposed to this historical materialist conception, therefore, than the view that a *collapse* of civilization is actually to be welcomed, in the manner, for example, of world-ecology theorist Jason Moore (2014, 17; see also 2015a, 86; 2015b, 19) who has repeatedly opined:

Is the "collapse" of a civilization that plunges nearly half its population into malnutrition to be feared? The Fall of Rome after the fifth century and the collapse of feudal power in Western Europe ushered in golden ages in living standards for the vast majority.¹¹

Certain self-styled anarchist "anticivilization" thinkers like Jensen (2005; McBay, Keith, and Jensen 2011) have gone so far as to promote the idea of a vanguard dedicated to the immediate "taking down" of civilization itself by way of violence, destroying dams and electrical grids. All hope, Jensen contends, lies in the elimination of a life based on cities.

Such an emphasis—as in Moore in particular—on the positive aspects of civilizational collapse, akin to the Fall of Rome, but in today's circumstances (notably, climate change) necessarily raising the specter of the catastrophic demise of global civilization, portending the death and dislocation of hundreds of millions, perhaps billions, of people (Lovelock

2006, 147, 15; Hansen 2009, 236, 259–60), is grossly irresponsible from a historical materialist standpoint. This is all the more the case since the greatest immediate impact will be on the world's poor, particularly populations in the periphery who have been subjected to centuries of imperialism. Although socialists, looking back historically, may have understandably sympathized with the barbarian invaders against imperial Rome (as in William Morris's romances [see Morris 1890]), it is in the nature of historical materialism always to identify with the radical transformation and transcendence of societies from within and the development of a higher society. "Socialism or barbarism," as raised most notably by Rosa Luxemburg (2004, 321; Angus 2014), cannot be twisted into meaning that we should conceive barbarism or catastrophic civilizational decline as a viable, indirect path to socialism.¹²

It is here that the vital question of ecological civilization asserts itself. With the brief, contradictory renaissance of Soviet ecological thought in the late 1970s and early 1980s, which sought to challenge the then hegemonic view in the USSR (Foster 2015b), the ecological problem came to be characterized—in line with classical historical materialist thought—as a general *problem of civilization*. This was evident in the important collection, edited by Ursul (1983a), *Philosophy and the Ecological Problems of Civilisation*, to which some of the Soviet Union's leading ecological scientists and philosophers contributed. This led to the concept of "ecological civilization" itself, with a discussion of "Ecological Civilization" appearing in Soviet works in 1983–84.¹³ The same notion entered almost immediately into Chinese Marxism as well, where it was to become a central category of analysis—and where today it has taken on a very prominent role in ongoing discussions of China's developmental path.

Ecological civilization in the Marxian sense means the struggle to transcend the logic of all previous class-based civilizations, and particularly capitalism, namely, the interconnections between the domination/alienation of nature and the domination/alienation of humanity. This view provided the framework for *Philosophy and the Ecological Problems of Civilisation* (Ursul 1983b, 15). The preface to that book raised the danger of "the extinction of the biosphere."¹⁴ The opening chapter by Fedoseev (1983, 31), vice-president of the USSR Academy of Sciences, delved into the issue of "rejection of the gains of civilization," implicit in many Green attempts to address the ecological problem, that advocated historically disembodied utopias (either backward-looking or technocratic). Leading ecological philosopher Frolov (1983, 35–42), following Marx, emphasized that the human metabolism with nature was mediated by the labor and production processes and by science and thus depended on the mode of production. Philosopher Trusov (1983, 70) wrote dialectically of "the principle of the exploitation and defense of nature," and of "the unity of the use and reproduction of natural resources." Notably, philosopher V. A. Los explored how "culture is becoming an antagonist . . . of nature" and referred to the need to construct a new "ecological culture" or civilization, reconstructing on more sustainable grounds the role of science and technology in relation to the environment. As he explained:

It is in the course of shaping an ecological culture that we can expect not only a theoretical solution of the acute contradictions existing in the relations between man and his habitat under contemporary civilization, but also their practical tackling. (Los 1983, 339)

Hence, from a historical-materialist standpoint the emerging global ecological crisis pointed to the objective necessity for an ecological revolution and ecological civilization,

as a crucial step in the transition to an ecological socialism.¹⁵ This was in line with the long history of ecological analysis within Marxism. Marx and Engels had dealt with ecological contradictions beyond simply the degradation of the soil and the division between town and country, encompassing such issues as industrial pollution, the depletion of coal reserves, the destruction of forests, the degradation of food (through adulteration and additives), etc. Engels remarked in a letter to Marx that that humanity was “a squanderer of *past solar heat*,” exhausting coal supplies, as well as other natural resources (Marx and Engels 1975, vol. 46, 411; italics in the original). In recent years, Marx’s theory of metabolic rift has been extended by Marxian theorists to address numerous problems, encompassing the manifold rifts in: the carbon metabolism (climate change), ocean metabolism, land cover, forestry, fire management, agriculture, food systems, fertilizers, animal husbandry, freshwater supplies, mining, and urban agriculture (See Wishart, Jonna, and Besek 2013). It has also been used to develop analyses of unequal ecological exchange, ecological imperialism, and environmental justice. One of the principal concerns has been the emergence of rifts in planetary boundaries in the Anthropocene. Significantly, the Anthropocene itself, as indicated above, has been described within science as an “anthropogenic rift” in the Earth system (Hamilton and Grinevald 2015, 67).

We are thus moving toward a more unified understanding of both the global metabolic rift, and the recognition of necessity of a transitional ecological civilization. An ecological civilization cannot be seen as a simple technological or modernizing response to the immense ecological challenges of Great Climacteric associated with the Anthropocene. Rather it requires changes in the forces and relations of production and in the state and society: a massive shift, but necessarily occurring in stages, toward realized socialism/communism, i.e., a social formation aimed at substantive equality and ecological sustainability, emphasizing sustainable human development—one that involves collective action and planning. It requires that cultural resources, the long heritage of humanity in its many social formations, be brought to bear on the need to create a bridge to a sustainable future.

5. Ecological Civilization, East and West/North and South

Civilization should never of course be seen as a monopoly of, or as emerging primarily in, the West. In 1974, the great British scientist, Marxist and sinologist, Joseph Needham, one of the foremost synthesizing thinkers of the twentieth century, gave a talk on “An Eastern Perspective on Western Anti-Science.” Here Needham addressed the environmental problem, and its relation to the misuse of science under capitalism. Having recently read William Leiss’s (1972) *The Domination of Nature*, Needham commented on how the domination of nature by mechanistic science was connected in Western capitalist culture to the domination of humanity. This had led irrationally—as its dialectical opposite—in the 1970s to a growing Western tradition of anti-science. In response, Needham pointed to revolutionary China as the locus of an alternative, less alienated, more coherent tradition. What was needed, he explained, in Marxian terms, was “a stage in human consciousness so advanced that intelligence can regulate its relationship to Nature, minimizing the self-destructive aspects of human desires, and maximizing the freedom of the human individual within a classless and egalitarian society” (Needham 1976, 300–1). He pointed to Herbert Marcuse’s recognition that the distinctive aspects of non-Western cultures—in those places where capitalism had not triumphed—when

combined with the critical viewpoint of historical materialism could be, in Needham's (1976, 301) words, the key to "avoiding the repressive and destructive uses of advanced technologies." As he had already indicated in his *Science and Civilization in China*, a distinctive feature of Chinese science, despite its backwardness in some respects, was "an organic philosophy of Nature . . . closely resembling that which modern science has been forced to adopt after three centuries of mechanical materialism" (Needham 1954, 4). Chinese civilization and the Chinese Revolution, in his view, thus offered resources of hope for a quite different future.

China has of course has changed tremendously in the four decades since Needham made these observations. It would be wrong to downplay the deep ecological and social challenges that China itself faces in its current developmental path and its complex contradictory relation to the capitalist road. Beijing is known through the world not only as a great cultural and political center, but also today for having some of the worst—if not *the* worst—urban air pollution on the entire planet. And China faces other horrendous environmental problems. Yet, Western scientists, such as James Hansen and Michael E. Mann, disturbed by the failure of Western economies to address climate change, are increasingly turning to China as a source not so much of optimism as hope (Hansen 2010, 2015; Mann and Kump 2015; Chemnick 2016; see also Eagleton 2015).¹⁶

This emphasis of some Western scientists on China as a potential beacon of hope with respect to the climate, in the face of the default of the neoliberal West, was dramatically illustrated in the widely read environmental book, *The Collapse of Western Civilization: A View from the Future* by leading science historians Oreskes and Conway (2014). Set in the year 2393, the book is a science-fiction history in which an unknown Chinese historian of the late twenty-fourth century looks back at how climate change led to untold disaster around the world and the final collapse of Western civilization and its capitalist society. Meant as a serious warning, most of the book is actually a discussion of historically documented events in the late twentieth and early twenty-first century. It focuses on how the anarchic world-capitalist system, centered in the West—in what is referred to the "Penumbral Age" of neo-liberalism—failed to address climate change, resulting, in the end, in its own collapse. However, what is most telling in this story related by the anonymous Chinese historian three centuries in the future, is how late twenty-first century China, unlike any other society, managed to respond in a planned and coordinated manner, including moving its population inward in response to sea level rise, saving its people and culture.¹⁷

This emphasis on planning and coordination offers us a clue as to why scientists and historians of science in the West are so ready to see China, despite its own serious environmental problems, as a potential ray of hope in the necessary ecological transition in the Anthropocene. This can be analyzed further by turning to an article that Sweezy wrote on "Socialism and Ecology" in 1989, in the midst of the fall of the Soviet bloc. Referring to the socialist planned economies, he stated:

The lesson of this experience [the history of the past seven decades or so at the time of writing] is not that socialist planning is necessarily environmentally destructive but that up to now it has never transcended the capitalist context from which it emerged. If and when the time comes that a socialist country is able to reorder its priorities from catching up and defense [with respect to capitalism] to protection and preservation of the

environment—seen as the life and death questions they are rapidly becoming—it cannot be excluded in advance that the planning system can be adapted to serve the needs of the new situation.

This is the reason it is so important that actually existing socialism should survive its present crisis. There are no guarantees, but at least it is a system with a potential that capitalism [due to its unlimited drive to accumulation] totally lacks. If all the existing socialist countries take the capitalist road in the present conjuncture, so much time will have been lost that it may be too late for civilized humanity to restore the necessary conditions for its own survival. (Sweezy 1989b, 8)

It is precisely for this reason, in the increasingly desperate conditions represented by the Anthropocene and the Great Capitalist Climacteric, that so much hope—much of it of course utopian, but nonetheless completely rational in today's desperate circumstances—is now being directed at China. Some of Sweezy's worst fears were realized, and the planned economies did generally move down the capitalist road, in the majority of cases, abandoning socialism entirely.¹⁸ China, however, while clearly taking the “capitalist road” to socialism, never completely renounced its socialist goals, nor gave up on the planning system entirely. It remained in important respects still a post-revolutionary society, deeply affected by the capitalist world market, with all the contradictory characteristics and manifold possibilities which that entailed.

Bearing all of this in mind, the question arises as to whether China, propelled from below, might once again make a great change. Could China, as some scholars and activists suggest, initiate an ecological revolution based on rural reconstruction and an abandonment of its current hyper-industrialist path (Wen et al. 2012)? Could it play a role of global leadership in relation to the Anthropocene—a role that the United States as the hegemonic power has currently abdicated (a fact punctuated by Trump's rise to the presidency)? Or is China too immersed in the capitalist road, too characterized by extremes of inequality, too unable to draw on social forces at its roots, to make this switch? These are key questions that cannot be answered at present. It is certain, though, that the response of the Chinese people themselves to these challenges will be crucial on a global level.

Recognizing the importance of China's role, and that of other countries of the global South, in any conceivable path toward a new ecological civilization, still leaves enormous uncertainty as to what will actually happen. But it nonetheless points to where the needed ecological revolution might conceivably take hold and under what possible conditions. It should not surprise us, given its complex and distinctive history, that while China's primary goal has been catching up with the economic development of the West—thereby promoting very high rates of growth with the attendant horrendous environmental problems—it has also at the same time, looking to the future, raised the issue of “ecological civilization,” and has taken huge steps at shifting resources and technology toward environmental amelioration (Seligsohn 2015; Foster 2016). China stands today paradoxically at a kind of turning point of its own, which will have an enormous impact on the world as a whole: it is known worldwide for some of the most serious forms of environmental damage on earth, while at the same time no country seems to be accelerating so rapidly into the new world of alternative energy.¹⁹ The question is not so much whether China itself can successfully accomplish a transition to an ecological civilization in terms of its present productive relations;

rather it is a matter of whether China might be the site, or one of a number of sites (possibly stretching across the global South and in isolated locales in the global North—one thinks here of the current indigenous-led pipeline battle at Standing Rock in North Dakota), in which a world ecological revolution might be launched.²⁰ With all of its environmental contradictions, China has forcefully raised the issue of the forging of an “ecological civilization” as a project—something that is still lacking among the leading capitalist powers within the hegemonic core of the world economy.

What is certain is that human history is at a turning point. Never before has it faced such a challenge. As Noam Chomsky (2015, 94) has stated, “It seems to me unlikely that civilization can survive really existing capitalism and the sharply attenuated democracy that goes along with it.” Hence, in Chomsky’s view, there is no alternative but a revolt against capitalism, including the entire capitalist world market. The dire facts constituting today’s Earth-system emergency are stubborn things, and the world’s options are clearly limited. What is needed in the end across the globe as a whole, in order to create the new, essential ecological civilization, is nothing less than a worldwide ecological and social revolution against the capitalist mode of production—a revolution that is most likely to emerge first in the global South, given the depth of the economic and ecological crises there and the struggle against economic and ecological imperialism. In the Great Capitalist Climacteric, the future depends on the rise globally of a *new environmental proletariat*, representing the greater part of today’s endangered humanity, and providing the revolutionary impetus for a more substantively equal and ecologically sustainable world.²¹ “Ruin or revolution,” as Marx declared in the nineteenth century, “is [now] the watchword” in the road ahead (Marx and Engels 1971, 142).

Notes

1. Civilization is often taken to mean an advanced, ordered society. The historical meaning of civilization, as understood within socialist thought, however, is much more complex and will be addressed in the following analysis.
2. In referring to an Earth-system crisis (or planetary emergency) the intent of course is to refer to a crisis of society (and to some extent life as it now exists) arising from the anthropogenic rift in the Earth system, rather than literally a crisis of the Earth system itself, which naturally supersedes society.
3. Wark (2015) has described the coming of the Anthropocene epoch as associated with a “series of metabolic rifts” (xiv). On planetary boundaries and the anthropogenic (metabolic) rift (see Rockström et al. 2009; Foster, Clark, and York 2010, 13–19).
4. Given prevailing realities in the capitalist world, an ecological revolution would need to occur in two phases: (1) an *ecodemocratic phase* based on a broad popular alliance, aimed particularly at energy transformation (though taking on other issues as well); and (2) an *ecosocialist phase* aimed at the formation of an ecological civilization, or a far-reaching transition to a socialist ecological formation (Magdoff and Foster 2011, 124–44; Foster 2015c, 10–12; italics in the original).
5. Sweezy’s outlook in 1989, in the context of capitalist economic crisis, growing global ecological degradation, and the destabilization of post-revolutionary societies, was fairly grim. “In this situation,” increasing planetary environmental peril, he wrote,

the prospect of an indefinite continuation of capitalism—a capitalism in crisis to boot—is truly terrifying. Civilization as we know it cannot survive even what a short while ago would have been considered historically a brief span of time. Socialism, if it misses out this first time, will likely never get a second chance. (Sweezy 1989b, 6)

6. These historical distinctions with respect to the concept of civilization are not meant to set aside—especially in the historical-materialist view—the reality that some pre-capitalist societies lacking all of the above characteristics, such as the traditional Iroquois culture with its advanced form of government, were in some respects more cohesive and cultured—less “barbaric” or brutal, and less unequal—than the colonizing societies that putatively sought to “civilize” them. In classical Marxism, traditional, pre-capitalist socio-economic formations were often seen as exhibiting more communal forms of social organization, which, if still existing in an undeveloped state, nonetheless prefigured social structures which would re-emerge in more advanced modes in socialism. It was for this reason that Engels (1972, 147–61), together with Marx, displayed such high respect for the Iroquois and for other traditional societies.
7. The above passage is often translated as “civilization . . . leaves deserts behind it” (Bahro 1994, 19).
8. The science behind the potato blight—its proximate cause in the form of *Phytophthora infestans* was only isolated in the 1860s by the German plant pathologist Anton de Bary—was poorly understood at the time Marx was writing. Yet, despite this, it was obvious to Marx that the potato blight, which had affected countries throughout Europe, and engendered mass starvation in Ireland, was related, in the Irish case, to the destruction of what had earlier in the century been a more diverse agriculture, leading to the absolute dependence of the poor tenant farmers in the colonial system on potatoes (a monocrop) for their subsistence. The potato was seen as allowing the Irish peasants to eke out a bare existence on the worst land, consisting of tiny plots, and with little fertilizer, while the major commercial agricultural produce of the country controlled by the colonial plantations was being exported, primarily to England. For Marx, the deficiencies of the entire agricultural system were thus quite clearly related to the overexploitation of the land in a colonial setting (see Fraser 2003; Schmidt 2015).
9. Mumford was of course not referring here to the superiority of Western civilization but rather to its irrationality, and its potential catastrophic planetary effects.
10. Recently the emphasis on mainstream theory in the face of growing catastrophic environmental events has come to emphasize the “resilience” of individual societies, seeking to remove any responsibility from states in the center for addressing ecological devastation in the periphery. For a critique of how resilience theory has evolved in this respect, see Cox and Cox (2016).
11. Moore subsequently realized that his claim that “nearly half” the world’s population was malnourished was exaggerated and in reiterating this in almost identical words a year later changed “half” to “third” (Moore 2015b, 19).
12. Today the phrase “Ecosocialism or Barbarism” is frequently heard (Kelly and Malone 2006; Angus 2014). This is a call for a socialist ecological civilization as opposed to an anti-ecological, and anti-social barbarism.
13. Following the 1983 publication of *Philosophy and the Ecological Problems of Civilisation*, it appears that vice president of the USSR Academy of Sciences, P. N. Fedoseev (also Fedoseyev), who had written the introductory essay on ecology and the problem of civilization in the above-edited book, incorporated a treatment of “Ecological Civilization” into the second edition of his *Scientific Communism* (Fedoseyev 1986; see Ursul 1983a; Pan 2014, 35; Gare 2015; Huan 2016, 2).
14. Soviet ecological thought in this period was influenced by the nuclear winter thesis, which projected the possible demise of the biosphere as a result of nuclear exchange, and which was a by-product of the research on climate change by Mikhail Budyko and others (Budyko, Golitsyn, and Izrael 1988, v–vi, 39–46). This was seen as linked to the whole ecological problem in a way uncommon in the West.
15. For an analysis that explains how ecological science and the critique of political economy can both be drawn upon in order to develop a conception of ecological civilization, in which socialist and ecological principles reinforce each other, see Magdoff (2011).
16. On the question of optimism versus hope see Eagleton (2015).

17. Oreskes and Conway (2014, 69) indicate that the reason that they chose a Chinese historian from the twenty-fourth century to tell the story of “the collapse of Western civilization,” and depicted China as the civilization that survived climate change, was in order to emphasize the importance of government regulation and government intervention, which had largely disappeared in the neo-liberal West, but not in the so-called “authoritarian societies.” In the circumspect language of liberal ideology this was meant as a reference to planning.
18. One dramatic exception to this was Cuba, which in the face of the collapse of the Soviet bloc managed to keep its own revolution going by taking a more revolutionary ecological path. This has best been explained by Lewontin and Levins (2007, 343–64).
19. China has been playing the leading role worldwide in the development of solar power technology. The proposal of the State Grid Corporation in China to build by 2050 a \$50 trillion global wind and solar power grid, called the Global Energy Interconnection, has attracted enormous attention. According to the World Economic Forum, China is proposing to construct wind farms in the North Pole and solar farms at the equator crossing international boundaries, and conceivably accounting for the majority of the world’s energy generation, superseding fossil fuels (Baculinao 2016).
20. A significant factor here is the very wide extent of environmental protest in China today, pushing the society towards more radical solutions to ecological problems (Foster and McChesney 2012, 179).
21. The principal basis for the notion of an environmental proletariat is Marx and Engels, and can be seen particularly in Engels’s *Condition of the Working Class in England* (1993), which concentrates on the overall environmental conditions of the working class, and sees that as constituting the basis for revolutionary action. However, Toynbee’s notion of an “internal proletariat” (as well as an “external proletariat”), characterized by “alienation from the dominant minority,” representing much of the creative power of any given civilization, is also useful here (Toynbee and Somervell 1946, 12; Foster 2015c, 11–12).

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