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The Great Capitalist Climacteric

By John Bellamy Foster

November 1, 2015

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Humanity today is confronted with what might be called the Great Capitalist Climacteric. In the standard definition, a climacteric (from the Greek *klimaktēr* or rung on the ladder) is a period of critical transition or a turning point in the life of an individual or a whole society. From a social standpoint, it raises issues of historical transformation in the face of changing conditions.¹ In the 1980s environmental geographers Ian Burton and Robert Kates referred to “the Great Climacteric” to address what they saw as the developing global ecological problem of the limits to growth, stretching from 1798 (the year of publication of Thomas Malthus’s *Essay on the Principle of Population*) to 2048, 250 years later. “Applied to population, resources, and environment throughout the world,” the notion of a Great Climacteric, they wrote, “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.”²

I will use the term the Great Capitalist Climacteric here to refer to the necessary epochal social transition associated with the current planetary emergency. It refers both to the objective necessity of a shift to a sustainable society and to the threat to the existence of *Homo sapiens* (as well as numerous other species) if the logic of capital accumulation is allowed to continue dictating to society as a whole. The current world of business as usual is marked by rapid climate change, but also by the crossing or impending crossing of numerous other planetary boundaries that define “a safe operating space for humanity.”³ It was the recognition of this and of the unprecedented speed of Earth system change due to social-historical factors that led scientists in recent years to introduce the notion of the Anthropocene epoch, marking the emergence of humanity as a geological force on a planetary scale.⁴ As leading U.S. climatologist James Hansen explains, “The rapidity with which the human-caused positive [climate] forcing is being

introduced has no known analog in Earth's history. It is thus exceedingly difficult to foresee the consequences if the human-made climate forcing continues to accelerate."⁵

With the present rate of carbon emission, the world will break the global carbon budget—reaching the trillionth metric ton of combusted carbon and generating a 2°C increase in global average temperature—within a generation or so.⁶ Once we reach a 2°C increase, it is feared, we will be entering a world of climate feedbacks and irreversibility where humanity may no longer be able to return to the conditions that defined the Holocene epoch in which civilization developed. The 2°C “guardrail” officially adopted by world governments in Copenhagen in 2009 is meant to safeguard humanity from plunging into what prominent UK climatologist Kevin Anderson of the Tyndall Center for Climate Change has called “extremely dangerous” climate change. Yet, stopping carbon emissions prior to the 2°C boundary, Anderson tells us, will at this point require “revolutionary change to the political economic hegemony,” going against the accumulation of capital or economic growth characteristics that define the capitalist system. More concretely, staying within the carbon budget means that global carbon emissions must at present be cut by around 3 percent a year, and in the rich countries by approximately 10 percent per annum—moving quickly to zero net emissions (or carbon neutrality). For an “outside chance” of staying below 2°C, Anderson declared in 2012, the rich (OECD, Annex I) countries would need to cut their emissions by 70 percent by 2020 and 90 percent by 2030.⁷

Yet, despite the widespread awareness of the planetary emergency represented by global warming, carbon emissions have continued to rise throughout the world. The failure of capitalism to implement the necessary cuts in carbon dioxide can be explained by the threat that this poses to its very existence as a *system of capital accumulation*. As a result civilization is faced by a threat of self-extinction that over the long run is as great as that posed by a full nuclear exchange—and in a process that is more inexorable. The present reality of global capitalism makes it appear utopian to call for a revolutionary strategy of “System Change Not Climate Change.” But the objective of stopping climate change leaves the world with no other option, since avoiding climate-change disaster will be even more difficult—and may prove impossible—if the global population does not act quickly and decisively.

Some observers have been quick to conclude that 2°C will inevitably be crossed given prevailing social reality and the failure of current climate

negotiations, and that we should therefore simply accept this and shift the target, choosing to stop climate change before it reaches a 3°C or a 4°C increase. This is a view that the World Bank has subtly encouraged.⁸ It is necessary, however, to take into account the likely non-linear effects of such global warming on the entire Earth system. Beyond 2°C, the level of uncertainty, and the threat of uncontrollable Earth warming due to “slow feedbacks” and the crossing of successive thresholds (tipping points), are magnified enormously.⁹ Human actions to cut greenhouse gas emissions might then come too late, not simply in the sense of an increase in catastrophic events such as extreme weather or the effects of sea level rise, but also in the even more ominous sense of humanity’s loss of the power to stabilize the climate (and civilization). We do not know when and where such a global tipping point will be reached, but today’s climate science tells us that it is much closer to a 2°C increase than was thought when that boundary was originally proposed. What was once believed to be “dangerous climate” change arising at 2°C is now considered to be “highly dangerous.”¹⁰ If uncontrollable global warming—driven by the reduction in the albedo effect (the reflectivity of the earth), the release of methane from the permafrost, and other slow feedbacks—were to take over, human beings would have little choice but simply to try to adapt in whatever ways they could, watching while their own future, and even more that of future generations, evaporated before their eyes.¹¹

Indeed, even the 2°C guardrail approach, Hansen argues, is too conservative. If major sea level rise engulfing islands and threatening coastal cities throughout the world and displacing hundreds millions of people is to be avoided, society needs to aim at reaching 350 parts per million (ppm) of atmospheric carbon (down from the present 400 ppm) by 2100, which would require cutting net carbon emissions by about 6 percent per annum globally.¹²

As bad as all of this is, it is essential to keep in mind that climate change is only one part of the Great Capitalist Climacteric confronting the world in the twenty-first century—although related to all the others. The world economy has already crossed or is on the brink of crossing a whole set of planetary boundaries, each one of which represents a planetary emergency in its own right, including ocean acidification, loss of biological diversity, the disruption of the nitrogen and phosphorus cycles, disappearance of fresh water, land cover change (particularly deforestation), and growing pollution from synthetic chemicals (leading to biomagnification and bioaccumulation of toxins in living organisms).¹³ The common denominator behind all of these

rifts in the biogeochemical cycles of the planet is the system of capital accumulation on a global scale. This points to the need for truly massive, accelerated social change exceeding in scale not only the great social revolutions of the past, but also the great transformations of production marked by the original Agricultural Revolution and the Industrial Revolution: namely, a twenty-first century Ecological Revolution.

Natural science can take us only so far on these issues. Since the source of the Great Capitalist Climacteric lies in the historical constitution of human society, necessitating a social revolution, we must turn to social science as a guide. Yet, the dominant social science has as its underlying premise—structuring its entire frame of analysis—the notion that the critique of capitalism is off limits. This is so much the case that even the name “capitalism,” as John Kenneth Galbraith pointed out in *The Economics of Innocent Fraud*, was increasingly replaced in the 1980s by the “meaningless designation” of “the market system.”¹⁴ When capitalism is referred to at all today in the mainstream it is as a mere synonym for the watered down notion of a competitive market society, viewed as the end (telos) of human history—both in the sense that all of history is seen as the unfolding of a natural tendency toward market capitalism, and that capitalism itself is “the end of history.”¹⁵

The result of such ahistorical thinking is that conventional thought, with only minor exceptions, has virtually no serious social scientific analysis on which to rely in confronting today’s Great Capitalist Climacteric. Those who swallow whole the notion that there is no future beyond capitalism are prone to conclude—in defiance of the facts—that the climate crisis can be mitigated within the present system. It is this *social denialism* of liberal-left approaches to the climate crisis, and of the dominant social science, that led Naomi Klein to declare in *This Changes Everything* that “the right is right” in viewing climate change as a threat to capitalism. The greatest obstacle before us, she insists, is not the *outright denialism* of the science by the far right, but rather the *social denialism* of the dominant liberal discourse, which, while giving lip service to the science, refuses to face reality and recognize that capitalism must go.¹⁶

If conventional social science is crippled at every point by corrupt adherence to a prevailing class reality, the postmodern turn over the last few decades has generated a left discourse that is just as ill-equipped to address the Great Capitalist Climacteric. Largely abandoning historical analysis (grand narratives) and the negation of the negation—that is, the idea of a revolutionary forward movement—the left has given way to extreme

skepticism and the deconstruction of everything in existence, constituting a profound “dialectic of defeat.”¹⁷

Although some hope is to be found in the Green theory or “ecologism” that has emerged in the context of the environmental movement, such views are typically devoid of any secure moorings within social (or natural) science, relying on neo-Malthusian assumptions coupled with an abstract ethical orientation that focuses on the need for a new, ecocentric world-view aimed at protecting the earth and other species.¹⁸ The main weakness of this new ecological conscience is the absence of anything remotely resembling “the confrontation of reason with reality,” in the form of a serious ecological and social critique of capitalism as a system.¹⁹ Abstract notions like growth, industrialism, or consumption take the place of investigations into the laws of motion of capitalism as an economic and social order, and how these laws of motion have led to a collision course with the Earth system.

It is therefore the socialist tradition, building on the powerful foundations of historical materialism – and returning once more to its radical foundations to reinvent and re-revolutionize itself – to which we must necessarily turn in order to find the main critical tools with which to address the Great Capitalist Climacteric and the problem of the transition to a just and sustainable society. A period of self-criticism within Marxian theory, commencing in the 1960s and developing over decades, eventually gave rise to a revolution in its understanding of social-ecological conditions. Yet, like most intellectual revolutions the new insights arose only by standing “on the shoulders of giants” – that is, based on the rediscovery and reconstruction of prior understandings, in the face of changing conditions.

The advance of Marxian ecology was the product of a massive archaeological dig in the scientific foundations of Marx’s thought, allowing for the development of a much richer understanding of the relation of the *materialist conception of history* to the *materialist conception of nature* – and generating a deeper, wider social-ecological critique of capitalist society.

By the end of the last century this return to Marx’s ecology had resulted in three crucial scientific breakthroughs: (1) the rediscovery of what could be called Marx’s “ecological value-form analysis”; (2) the recovery and reconstruction of his theory of metabolic rift; and (3) the retrieval of the two types of ecological crisis theory embedded in his analysis. These critical breakthroughs were to generate new strategic insights into revolutionary praxis in the Anthropocene.

The Three Critical Breakthroughs of Ecological Marxism

What has often been called the Western Marxist tradition that arose in the 1920s and '30s, was distinguished primarily by its rejection of the dialectics of nature and Soviet-style dialectical materialism.²⁰ The interpretation of Marx's approach to the relation of nature and society in the Western Marxist tradition found its most systematic early expression in Alfred Schmidt's 1962 *The Concept of Nature in Marx*, originally written as a doctoral thesis under the supervision of Frankfurt School philosophers Max Horkheimer and Theodor Adorno. Schmidt recognized the central importance of Marx's notion of social metabolism in the development of a revolutionary, new conception of nature. Yet, this was to be set aside in Schmidt's wider criticism, which attributed to Marx the same narrow instrumentalist-productivist vision purportedly characteristic of the "dialectic of Enlightenment" as a whole.²¹

In the 1970s and '80s Schmidt's overall negative assessment of Marx on nature was adopted by what has now come to be known as "first-stage ecosocialism," associated with figures such as Ted Benton and Andre Gorz.²² Benton argued that Marx had gone overboard in his criticism of Malthus's population theory to the point of denying natural limits altogether.²³ The mature Marx (as distinguished from the Marx of the *Economic and Philosophical Manuscripts*) was thus seen as devoid of positive ecological values and as promoting a crude "Promethean" productivism. A common practice of first-stage ecosocialism was to graft both neo-Malthusian concepts and the primarily ethical standpoint of Green theory onto more traditional Marxian theory, creating a hybrid ecosocialism or what was referred to as "the greening of Marxism."²⁴ As Raymond Williams critically observed, the result was a tendency to "run together two kinds of thinking" associated with Green theory and Marxism, rather than going back to the roots of historical materialism to uncover its own ecological premises.²⁵

It was in this context that a "second-stage ecosocialism," challenging the first, arose in the 1990s in the work of various Marxian political economists. Socialist theorists proceeded to dig into the very foundations of classical historical materialism and its value-theoretical framework. The first critical breakthrough, dramatically altering our understanding of Marx on ecology, was provided by Marxian economist Paul Burkett, who in his 1999 *Marx and Nature* recovered the ecological value-form analysis underpinning Marx's

entire critique of political economy.²⁶ It was the early Soviet economist, I.I. Rubin, who had first emphasized the double nature of Marx's value theory as consisting of: (1) a theory of the value-form, or what Marxian economist Paul Sweezy in the United States was to call "the qualitative value problem," and (2) a theory of the quantitative determination of value and price. It was the value-form analysis, focusing on the social form that value assumes and the larger qualitative aspects of capitalist valorization connecting it to class and production, which was to be Marx's singular achievement—altering as well the understanding of the quantitative aspects of value.²⁷ In Burkett's work, Marx's value-form theory was elaborated to explain systematically for the first time the ecological value-form analysis embedded in classical historical materialism.²⁸

From this standpoint, Marx's entire critique was seen as rooted in the contradictory relations between what he called "production in general," characterizing human production in all of its forms, and the historically specific capitalist labor and production process.²⁹ In production in general the human labor process transforms the products of nature, or natural-material use values, which constitute real material wealth. However, in capitalism, conceived as a specific mode of production, this characteristic of production in general takes a more alienated form, as the majority of workers are estranged from the means of production, and particularly the land, and are thus proletarianized—able to survive only by selling their labor power.

All value, the classical political economists argued, came from labor. But *classical-liberal* political economists saw this as a universal, trans-historical reality, while *Marx*, in sharp contrast, conceived it as a historically specific one, confined to capitalism. Nature was excluded, as Marx stressed, from the direct creation of value/exchange value under capitalism.³⁰ This is still reflected in our national income or GDP statistics, which account for economic growth entirely in terms of the *value added* of human services, measured in the form of wages or property income.³¹ The capitalist calculation of value or economic growth thus has as one of its underlying premises, to quote Marx, the notion of the "free gift of Nature to capital."³² Nature's powers are presumed by the system to be a direct gift to capital itself, for which no exchange must be made.³³ This means, in truth, that nature, or real wealth, is robbed. As the socialist ecological economist, K. William Kapp, wrote in the 1960s, "capitalism must be regarded as an economy of unpaid costs."³⁴ (It should be noted here that the existence of rents for land and resources does not alter the essential fact that nature is excluded from the value calculation. Instead, rents ensure that part of the

surplus produced by society is redistributed to those who are able to monopolize the “rights” to natural resources.)

The second critical breakthrough in Marxian ecology was the recovery of what has come to be known as Marx’s theory of metabolic rift. Marx’s adoption of the concept of metabolism to address the systemic relations of nature and society was evident beginning with his writings in the *Grundrisse* in the late 1850s and in all of his major political-economic writings thereafter—up through his 1879–1880 *Notes on Adolph Wagner*. In 1850 Marx encountered what amounted to an early ecological system perspective, in the extension of the concept of metabolism (*Stoffwechsel*) to the interconnected relations of plants and animals, through *Mikrokosmos*, written by his close friend and political associate, the socialist physician-scientist Roland Daniels.³⁵

Marx was later to be influenced by the German chemist Justus von Liebig’s critique of British industrial agriculture, particularly the introduction to the 1862 edition of Liebig’s great work on agricultural chemistry. Liebig’s virulent critique of capitalist agriculture was concerned with the nineteenth-century soil crisis. He noted that the essential soil nutrients, such as nitrogen, potassium, and phosphorus, were shipped in the form of food and fiber to the new densely populated urban-industrial centers, where they contributed to the pollution of the cities, and were lost to the soil. Hence, Liebig and Marx both referred to industrial capitalist agriculture as a robbery system, leaching the soil of its nutrients. Britain in this period was forced to make up for its robbing the soil of its nutrients by imperialistically importing bones from the Napoleonic battlefields and the catacombs of Europe, and guano from Peru, in order to obtain the natural fertilizer to replenish English fields. The global metabolic rift, according to Marx, meant that capitalism disrupted “the eternal natural condition” of life itself. It therefore produced “an irreparable rift in the interdependent process of social metabolism, a metabolism prescribed by the natural laws of life itself.”³⁶ This rift could also be seen in the unequal ecological exchange between countries, whereby capital in the center systematically robbed the periphery of its soil and resources.³⁷

Marx’s overall analysis in this respect is best understood in terms of a triad of concepts discussed in his *Economic Manuscripts of 1861–1862* and *Capital*: “the universal metabolism of nature,” the “social metabolism,” and the metabolic rift.³⁸ Human beings, he argued, exist within the “universal metabolism of nature,” from which they extract nature’s use values, and transform these in production, i.e., the “social metabolism,” in order to meet their needs for

subsistence and development. Yet, capitalism, as a historically specific form of production, systematically alienates workers from the means of production (the land, nature, tools) thereby proletarianizing labor, and making possible capitalist exploitation and accumulation. In the process, both the soil and the worker, the “original sources of all wealth,” were undermined, generating a metabolic rift. The result, Marx argued, was the necessity of the “restoration” of this metabolism, which however, could only take place in a higher society, i.e. socialism.³⁹

It was with such considerations in mind that Marx introduced the most radical conception of ecological sustainability ever developed. As he wrote in *Capital*:

From the standpoint of a higher socio-economic formation, the private property of particular individuals in the earth will appear just as absurd as the private property of one man in other men. Even an entire society, a nation, or all simultaneously existing societies taken together, are not the owners of the earth. They are simply its possessors, its beneficiaries, and have to bequeath it in an improved state to succeeding generations, as *boni patres familias* [good heads of the household].⁴⁰

In Marx, ecological sustainability together with substantive equality defined the entire basis of socialism/communism. “Freedom, in this sphere,” he wrote, “can consist only in this, that socialized man, the associated producers, govern the human metabolism with nature in a rational way...accomplishing it with the least expenditure of energy and in conditions most worthy and appropriate for their human nature.”⁴¹

The third critical breakthrough of second-stage ecosocialism was the retrieval of Marx’s dual conception of ecological crisis in capitalist society. In the first form of ecological crisis, depicted in *Capital*, the focus was on natural resource scarcity. Here the problem is how increasing scarcities of resources and environmental amenities in general lead to enhanced ecological costs, thereby squeezing profit margins. This can be seen in Marx’s treatment of the British cotton crisis during the U.S. Civil War, the role of resources in elevating the cost of constant capital in his theory of the tendency of the rate of profit to fall, and in his discussions of the need of capital to conserve constant capital. Increasing resource costs with the degradation of the environment can create huge problems for capitalist accumulation. Here it is evident how imperialism, in keeping the price of internationally sourced raw material prices low, helps promote capital accumulation in the center of the system.

Yet, there is also to be found in Marx a theory of ecological crisis proper, or a crisis of sustainable human development, going beyond the value calculus of the system itself—as exemplified by the theory of metabolic rift. Simply because capitalism is a robbery system, in Liebig and Marx’s sense, it externalizes most of the costs of environmental (and social) degradation on nature and society without this directly affecting its bottom line. Thus such phenomena as desertification and deforestation—both of which were discussed by Marx—have implications for sustainable human development but do not enter directly into the value calculation of the commodity system. A metabolic rift that disrupts biogeochemical cycles may be fully compatible with continued accumulation. In its relative insulation from the environmental degradation that it systematically creates everywhere around it, capitalism is unique among modes of production.

As Burkett writes, “For Marx...capital accumulation can maintain itself through environmental crises. In fact, this is one thing that makes capitalism different from previous societies. It has the ability to continue with its competitive, profit-driven pattern of accumulation despite the damage this does to natural conditions.”⁴² Today we see economic growth continue while the disruptions of the biogeochemical cycles of the entire planet upon which all living beings depend for their existence do not enter into the accounting. In fact, these disruptions and rifts open new profit-making opportunities for capital such as the agrichemical (fertilizers and pesticides) industry or today’s carbon markets.

Most of the concrete research inspired by Marxian theories of ecological crisis in recent years has focused on the theory of metabolic rift, since it is *the crisis of sustainable human development* that defines the current planetary emergency. Moreover, the metabolic rift perspective has provided an understanding of systemic environmental changes not reducible simply to issues of scale and carrying capacity or to the economics of the system—thereby probing new dimensions of the problem. Marx’s metabolic rift analysis intersects with the treadmill of production analysis (which grew out of his theory of accumulation), and at the same time relates to developments in natural science, thus tying into the most developed ecological perspectives.⁴³ It points to the deep contradictions associated with capital’s division of nature (alongside the division of labor).

For example, the metabolic rift allows us to understand more fully the implications—of which Marx was already critical in the nineteenth century—of the attempts of the system to accelerate the growth rates of animals in

factory-style production, by removing them from their ecosystems, changing their food intake, breeding, and so on. Animals are decomposed, their various body parts manipulated, converted into mere processes of production to be commodified to the n th degree.⁴⁴

The metabolic rift analysis was also seen by Marx and Engels in terms of open-system thermodynamics, in the context of which, as Engels observed in 1882, humanity was “squandering” the fossil fuels associated with “past solar energy” while failing to make good use of present solar energy.⁴⁵

Marxism and the Great Capitalist Climacteric

It is on the basis of this set of critical theoretical breakthroughs – constituting a scientific revolution in Marxian theory reaching back into the very foundations of historical materialism – that it is possible to draw five broad conclusions about the ecological and social revolution that is now necessary in the face of today’s Great Capitalist Climacteric.

First, the problem threatening the global environment is the *accumulation of capital under the present phase of monopoly-finance capital*, and not just economic growth in the abstract. That is, issues of the qualitative nature of development as well as quantitative development are involved. This raises the question of the ecological value form associated with capitalism in its monopoly-finance phase, geared to the promotion of economic and ecological waste as a stimulus to accumulation. Today the rich economies are well developed and capable of satisfying the material needs of their populations, and of emphasizing qualitative human development. Capitalism, however, requires continual value expansion and commodity consumption, with increasing throughputs of energy and materials.⁴⁶ This is promoted today by means of a massive sales effort, amounting to well over a trillion dollars a year in the United States, and through a vast outpouring of economic waste in the form of synthetic goods that are toxic to the environment.⁴⁷ As the Marxian economist Paul Baran wrote in the 1960s, “people steeped in the culture of monopoly capitalism do not want what they need and do not need what they want.”⁴⁸ On top of this vast waste system (including military waste), which drives accumulation, is a financialized superstructure that has enabled the system to transfer wealth and income more rapidly to the 0.01 percent at the top of society.⁴⁹ In the new financial architecture that has emerged the credit-debt system dominates over the entire global economy. It is this irrational system of artificially stimulated growth, economic waste, financialized

wealth, and extreme inequality that needs to be overturned if we are to create a society of ecological sustainability and substantive equality.

If economic growth in the wealthy countries continues as at present—even by the standards of our current period of relative economic stagnation—there is very little or no chance of avoiding breaking the world climate budget with disastrous global consequences. It is the growth in the scale of the economy, and the destructive tendencies of our ecologically inefficient, technologically destructive society, geared to roundabout production—whereby plastic spoons are made in China and shipped to the United States where they have a lifetime use of a few minutes before reentering the waste stream, generating all sorts of toxic chemicals in the process—that are threatening the biogeochemical processes of the entire planet. Capital's social metabolic processes attempt to recreate the planet in its own image, treating all planetary boundaries as mere barriers to surmount, thus generating a global metabolic rift on a rapidly warming planet. All of this points to the need to place limits on economic growth, and specifically on the expansion of today's disaster capitalism.

Second, capitalism is suffering at present from an *epochal crisis*—both economic and environmental. This is manifested in overaccumulation, stagnation, and financialization, on the one hand, and ecological rifts and disruptions, both within each and every ecosystem and on the level of the planet as a whole, on the other.⁵⁰ These two long-term structural crises of the system are not reducible to each other, except in the sense that they are both induced by the logic of capital accumulation. What we have called ecological crisis proper is largely invisible to the value accounting of the capitalist system, and is systematically given a lower priority in relation to economic imperatives. Society is constantly told that the solution to economic stagnation is economic growth by any means: usually involving the promotion of neoliberal disaster capitalism. Yet such an economic solution—which is beyond the power of the system to effect in a long-term, stable way, but only on a temporary, ad-hoc basis—would be fatal to the planetary environment, which requires less, not more expansion of the economic treadmill. The epochal crisis of economy and ecology within the capitalist system is thus likely to continue, with both fault lines widening, as long as the logic of capital prevails. This conflict between economic and ecological objectives is not a contradiction of analysis, but of the capitalist system itself.

Third, if accumulation or economic growth is to be halted in the rich countries, even temporarily, out of sheer ecological necessity, this would

require a vast new system of redistribution. As Lewis Mumford indicated in 1944 in *The Condition of Man*, a stationary state or steady-state economy is only possible under conditions of “basic communism,” a term which Mumford (after Marx) used to refer to a society in which distribution is organized “according to need, not according to ability or productive contribution.”⁵¹ There must be a vast redirection of society’s social surplus to genuine human requirements and ecological sustainability as opposed to the giant treadmill of production generated by the profit system. It is by creating a society directed to use value rather than exchange value that we can find the resources to develop a world that is sustainable because it is just, and just because it is sustainable. Society will need to be reordered, as Epicurus said, and Marx concurred, according to the principle of *enough*—that is, through a rich development of human needs, applicable to everyone.⁵²

Fourth, Marx provided a model of socialism as one of sustainable human development.⁵³ In order to meet the challenge of the Great Capitalist Climacteric it will be necessary to shift power to the associated producers, who, acting in accord with science and communal values, will need to regulate the complex, interdependent metabolism between nature and society according to their own developed human needs and in conformity with the requirements of the earth metabolism. In today’s context, this will require what Marx called the “restoration” of the essential human-natural metabolism, healing the metabolic rift.⁵⁴ In discussing the principle of “metabolic restoration,” Del Weston wrote in her book *The Political Economy of Global Warming*: “The need is for human societies to live within metabolic cycles—that is, production, consumption and waste—thereby forming part of a self-sustaining cycle in which the only new inputs are energy from the sun.... Nature, in the new economics, will be recognised as the ultimate source of wealth.”⁵⁵ Moreover, given the present planetary emergency we have to move fast to create this new economics and new ecological relation to the earth, diverting resources massively to creating the new energy infrastructure that can exist within the solar budget, while at the same time promoting Mumford’s “basic communism,” or a society based on the principle of to each according to need.

Fifth, the hoped for revolutionary change can only occur through human agency. Although it is widely recognized that the world needs an ecological and social revolution, the question remains: From whence and by what agency will such a revolution arise? Ecological Marxists suggest that we may already be seeing signs of the rise of what could be called a nascent “environmental proletariat”—a broad mass of working-class humanity who recognize, as a

result of the crisis of their own existence, the indissoluble bond between economic and ecological conditions.⁵⁶ Degraded material conditions associated with intermingled economic and ecological crises are now being encountered on a daily basis by the great majority of the world's population and affecting all aspects of their lives. At the ground level, economic and ecological crises are becoming increasingly indistinguishable. Food crises, land grabs, electricity shutdowns, water privatization, heightened pollution, deteriorating cities, declining public health, increasing violence against oppressed populations—are all converging with growing inequality, economic stagnation, and rising unemployment and underemployment. In South Africa, for example, the class struggle is now as much an environmental as an economic struggle—already exhibiting signs of an emerging environmental working class.⁵⁷ The logical result is a coming together of material revolts against the system—what David Harvey has usefully referred to as a “co-revolutionary” struggle.⁵⁸ This is best exemplified by the global environmental/climate justice movement and through the radical direct action movement that Naomi Klein calls “Blockadia.”⁵⁹

Traditional working-class politics are thus coevolving and combining with environmental struggles, and with the movements of people of color, of women, and all those fighting basic, reproductive battles throughout society. Such an ecological and social struggle will be revolutionary to the extent that it draws its force from those layers of society where people's lives are most precarious: third world workers, working-class women, oppressed people of color in the imperial core, indigenous populations, peasants/landless agricultural workers, and those fighting for fundamentally new relations of sexuality, gender, family, and community—as well as highly exploited and dispossessed workers everywhere.

A revolutionary struggle in these circumstances will need to occur in two phases: an *ecodemocratic phase* in the immediate present, seeking to build a broad alliance—one in which the vast majority of humanity outside of the ruling interests will be compelled by their inhuman conditions to demand a world of sustainable human development. Over time this should create the conditions for a second, more decisive, *ecosocialist phase* of the revolutionary struggle, directed at the creation of a society of substantive equality, ecological sustainability, and collective democracy. All of this points to the translation of classical Marx's ecological critique into contemporary revolutionary praxis.⁶⁰

In the *ecodemocratic* phase, the goal would be to carry out those radical reforms that would arrest the current destructive logic of capital, by fighting for changes that are radical, even revolutionary, in that they go against the logic of capital, but are nonetheless conceivable as concrete, meaningful forms of struggle in the present context. These would include measures like: (1) an emergency plan of reduction in carbon emissions in the rich economies by 8–10 percent a year; (2) implementing a moratorium on economic growth coupled with radical redistribution of income and wealth, conservation of resources, rationing, and reductions in economic waste; (3) diverting military spending, now universally called “defense spending” to *the defense of the planet* as a place of human habitation; (4) the creation of an alternative energy infrastructure designed to stay within the solar budget; (5) closing down coal-fired plants and blocking unconventional fossil fuels such as tar sands oil; (6) a carbon fee and dividend system of the kind proposed by Hansen, that would redistribute 100 percent of the revenue to the population on a per capita basis; (7) global initiatives to aid emerging economies to move toward sustainable development; (8) implementation of principles of environmental justice throughout the society and linking this to adaptation to climate change (which cannot be stopped completely) to ensure that people of color, the poor, women, indigenous populations, and third world populations do not bear the brunt of catastrophe; and (9) adoption of climate negotiations and policies on the model proposed in the Peoples’ Agreement on Climate Change in Cochabamba, Bolivia in 2010. Such radical change proposals can be multiplied, and would need to effect all aspects of society and individual human development. The rule in the *ecodemocratic* phase of development would be to address the epochal crisis (ecological and economic) in which the world is now caught, and to do so in ways that go against the logic of business as usual, which is indisputably leading the world toward cumulative catastrophe.

The logic of the *ecodemocratic* phase of the struggle, if it were carried out fully, would create the conditions for an *ecosocialist* phase in which the mobilization of the population on their own behalf, and the cultural and economic changes that this brings about, would give the impetus to the creation of a society of *from each according to ability, to each according to need*.⁶¹ The system of social metabolic reproduction would be reconstituted on a more communal basis taking into account not only present and future generations, but the Earth system itself and the diversity life within it. The necessary social and ecological planning would start from local needs and local communities and would be integrated with larger political-executive

entities responsible for coordination and implementation in relation to these needs.

Such a society would be democratic in the classical sense of the word – rule of society by the people, the associated producers.⁶² It was this that Marx had in mind when he stressed (as quoted above) that “socialized man, the associated producers, [would] govern the human metabolism with nature in a rational way...accomplishing it with the least expenditure of energy and in conditions most worthy and appropriate for their human nature.” For Marx in the nineteenth century this was a struggle for human freedom; today, in the twenty-first century, it is a struggle for human freedom *and human survival*.

In 1980, the British Marxist historian E.P. Thompson wrote a cautionary essay for *New Left Review* entitled “Notes on Exterminism, The Last Stage of Civilization.” Although directed particularly at the growth of nuclear arsenals and the dangers of global holocaust from a nuclear exchange in the final phase of the Cold War, Thompson’s thesis was also concerned with the larger realm of ecological destruction wrought by the system. Rudolf Bahro later commented on Thompson’s ideas in his *Avoiding Social and Ecological Disaster*, explaining: “To express the exterminism-thesis in Marxist terms, one could say that the relationship between productive and destructive forces is turned upside down. Marx had seen the trail of blood running through it, and that ‘civilisation leaves deserts behind it.’”⁶³ Today this ecologically ruinous trend has been extended to the entire planet with capitalism’s proverbial “creative destruction” being transformed into a destructive creativity endangering humanity and life in general.⁶⁴

“The dream that man can make himself godlike by centering his energies solely on the conquest of the external world,” Mumford wrote in *The Condition of Man*, “has now become the emptiest of dreams: empty and sinister.”⁶⁵ The result is a kind of *economics of exterminism*. Today making war on the planet is fought as a means to the end of capital accumulation, in which the limits of the earth itself have become invisible to the narrow value calculations of the system. Turning this economics of exterminism around, and creating a more just and sustainable world at peace with the planet is our task in the Great Capitalist Climacteric. If we cannot accomplish this humanity will surely die with capitalism. The prophesy of all defenders of the current order over the last century will then be fulfilled. Capitalism will mark the end of human history by bringing to an end human civilization – and even human existence.

The Great Capitalist Climacteric presents us with a fatal choice: *System Change Not Climate Change!*

Notes

1. The term “the Great Climacteric” was used in 1975 by François Bédarida to refer to the debate over changes that occurred in Britain in the Edwardian period and after, marked by hegemonic decline in Britain’s position in the capitalist world system, once England was no longer “the workplace of the world.” See François Bédarida, *A Social History of England, 1851–1975* (London: Methuen, 1979), 99–103. In a famous June 22, 1941 speech, Winston Churchill referred to Hitler’s invasion of Russia as the “fourth climacteric” of the Second World War in Europe. See Winston Churchill, “Alliance with Russia,” <http://winstonchurchill.org>.
2. Ian Burton and Robert W. Kates, “The Great Climacteric, 1798–2048: The Transition to a Just and Sustainable Human Environment,” in Robert W. Kates and Ian Burton, eds., *Geography, Resources and Environment* (Chicago: University of Chicago Press, 1986), vol. 2, 393.
3. Johan Rockström, et al., “A Safe Operating Space for Humanity,” *Nature* 461, no. 24 (September 2009): 472–75.
4. See Ian Angus, “When Did the Anthropocene Begin...and Why Does It Matter?,” *Monthly Review* 67, no. 4 (September 2015): 1–11.
5. James E. Hansen and Makiko Sato, “Climate Sensitivity Estimated from Earth’s Climate History,” draft paper, 2012, <http://columbia.edu>.
6. <http://trillionthtonne.org>, accessed September 24, 2015.
7. Kevin Anderson, “Why Carbon Prices Can’t Deliver the 2°C Target,” August 13, 2013, <http://kevinanderson.info>, “Avoiding Dangerous Climate Change,” November 25, 2013, <http://kevinanderson.info>, “Climate Change Going Beyond Dangerous: Brutal Numbers and Tenuous Hope,” *Development Dialogue* (September 2012): 35, <http://whatnext.org>; Dawn Stover, “Two Degrees of Climate Change May Be Too Much,” *Bulletin of the Atomic Scientists* (September 4, 2015), <http://thebulletin.org>; <http://trillionthtonne.org>.
8. The World Bank (working with the Potsdam Institute for Climate Change) in its *Turn Down the Heat* reports argue that 1.5°C warming is “locked in” in the sense that staying below 2°C and getting back to 1.5°C is the most that is economically and technically feasible today. It goes on to suggest that the 2°C boundary will likely be exceeded and that a 4°C world needs to be avoided – in that way subtly changing the debate. World Bank, *4° – Turn Down the Heat: Confronting the New Climate Normal*, November 23, 2014, xvii, 5, *Turn Down the Heat: Why a 4° World Must Be Avoided*, 2012, <http://documents.worldbank.org>, xiii. See also Oliver Geden, “Climate

- Advisers Must Maintain Integrity," *Nature* (May 7, 2015): 27–28, <http://nature.com>.
9. Hansen and Sato, "Climate Sensitivity Estimated from Earth's Climate History," 14; Fred Pearce, "What Is the Carbon Limit?," *Environment* 360, November 6, 2014, <http://e360.yale.edu>.
 10. James Hansen, et al., "Ice Melt, Sea Level Rise, and Superstorms," *Atmospheric Chemistry and Physics Discussions* 15 (2015): 20061–63, 20114–22, <http://atmos-chem-phys-discuss.net>. On the issue of "unequivocal" and "irreversible damage" associated with the 2°C boundary and the enormous dangers that this implies see Heidi Cullen, *The Weather of the Future* (New York: Harper, 2011), 261–71.
 11. James Hansen is the main proponent today of the idea of a possible runaway global warming, first raised in the late 1960s. This is associated with the Venus syndrome or the notion that the heating up of the world's oceans can so alter the atmosphere that Earth comes to resemble Venus. Long before such a scenario could develop, however, humanity would have lost the ability to control climate change through its own actions. It is this then that becomes the real issue. See Hansen and Sato, "Climate Sensitivity"; James Hansen, *Storms of My Grandchildren* (New York: Bloomsbury, 2009), 226–36.
 12. ↪Hansen, et al., "Ice Melt, Sea Level Rise, and Superstorms."
 13. Will Steffen, et al., "Planetary Boundaries: Guiding Human Development on a Changing Planet," *Science* 347, no. 6223 (January 15, 2015), <https://sciencemag.org>. Biogmagnification is the magnification of toxins up the food chain, bioaccumulation is the concentration within an individual organism.
 14. John Kenneth Galbraith, *The Economics of Innocent Fraud* (Boston: Houghton Mifflin, 2004), 3–9.
 15. Ellen Meiksins Wood, *Democracy Against Capitalism* (Cambridge: Cambridge University Press, 1995), 146–53; Francis Fukuyama, *The End of History and the Last Man* (New York: Free Press, 2006).
 16. Naomi Klein, *This Changes Everything: Capitalism vs. the Climate* (New York: Simon and Schuster, 2014), 31–63.
 17. This phrase is taken from Russell Jacoby, *The Dialectic of Defeat* (Cambridge: Cambridge University Press, 1981). On the rejection of history in postmodernist discourse see John Bellamy Foster, "In Defense of History," in Ellen Meiksins Wood and John Bellamy Foster, eds., *In Defense of History* (New York: Monthly Review Press, 1997), 184–93.
 18. For accounts of Green theory and ecologism see Andrew Dobson, *Green Political Thought* (London: Routledge, 1995); Mark J. Smith, *Ecologism* (Minneapolis: University of Minneapolis Press, 1998).
 19. Paul A. Baran, *The Longer View* (New York: Monthly Review Press, 1969), 32.
 20. Russell Jacoby, "Western Marxism," in Tom Bottomore, ed., *A Dictionary of Marxist Thought* (Oxford: Blackwell, 1983), 523–26.

21. Alfred Schmidt, *The Concept of Nature in Marx* (London: New Left Books, 1971), 9–10, 155–62; Max Horkheimer and Theodor Adorno, *Dialectic of Enlightenment* (New York: Continuum, 2001; originally 1944).
22. On the first, second, and third stages of ecosocialist discourse see John Bellamy Foster, “Foreword,” in Paul Burkett, *Marx and Nature* (Chicago: Haymarket, 2014), vii–xiii.
23. Ted Benton, “Marxism and Natural Limits,” *New Left Review* 178 (1989): 55, 60, 64; Andre Gorz, *Capitalism, Socialism, Ecology* (London: Verso, 1994). For a detailed assessment of Malthus’s theory and Marx’s critique of Malthus see John Bellamy Foster, *Marx’s Ecology* (New York: Monthly Review Press, 2000), 81–104, 141–49.
24. Ted Benton, ed., *The Greening of Marxism* (New York: Guilford Press, 1996).
25. Raymond Williams, *Resources for Hope* (London: Verso, 1989), 210.
26. Burkett, *Marx and Nature*, 79–98.
27. I.I. Rubin, *Essays on Marx’s Theory of Value* (Detroit: Black and Red, 1972), 71–75, 107–23; Paul M. Sweezy, *The Theory of Capitalist Development* (New York: Monthly Review Press, 1970; originally 1942), 23–40. The understanding of the relation of the qualitative value (or value-form) analysis in Marx to ecological issues marked the work of Japanese Marxist Shigeto Tsuru, especially, who became one of the leading environmental thinkers in Japan and the world as a whole in the 1960s to 1980s. See Shigeto Tsuru, *Towards a New Political Economy* (Tokyo: Kodansha Ltd., 1976).
28. Elmar Altvater’s *The Future of the Market* provided an important reinterpretation of Marx’s ecological analysis, preceding Burkett’s *Marx’s and Nature*. See Elmar Altvater, *The Future of the Market* (London: Verso, 1993).
29. On “production in general” see Karl Marx, *Grundrisse* (London: Penguin, 1973), 85–88.
30. In Marx’s theory the concept of value in its most general form encompasses both use value and exchange value. In this sense Marx saw nature (apart from labor) as contributing to *use value*, i.e., in the material aspects underlying every commodity. But it is more usual to see value in *exchange value* terms, and in this sense nature does not enter directly into value calculations of the system or into the constitution of capital. For a detailed discussion see Paul Burkett, “Nature’s ‘Free Gifts’ and the Ecological Significance of Value,” *Capital and Class* 23 (1999): 89–110.
31. A property of capitalist income accounting is to exclude domestic labor since it does not contribute directly to profits and accumulation, and thus is left out of GDP. Not only are domestic workers, primarily women, robbed in such a situation, but the family becomes a way in which capitalist externalizes its costs. The similarity to the exclusion of nature from value has been strongly emphasized by ecofeminist thinkers. See, in particular, Marilyn Waring, *Counting for Nothing* (Toronto: University of Toronto Press, 1999).

32. As Marx wrote, quoting the full sentence: "Natural elements entering as agents into production, which cost nothing, no matter what role they play in production, do not enter as components of capital, but as a free gift of Nature to capital, that is, as a free gift of Nature's productive power to labour, which, however, appears as the productive power of capital, as all other productivity under the capitalist mode of production." Karl Marx and Frederick Engels, *Collected Works* (New York: International Publishers, 1975), vol. 37, 732–33.
33. A somewhat analogous situation exists with respect to labor power. In Marx's theory, capitalist production generally requires that capital pay the worker the value of labor power, i.e. is its cost of reproduction. But this payment of the cost of reproduction merely allows capital to appropriate that labor power for a given amount of time, exploiting its power to produce, beyond the cost of its own reproduction. With respect to nature, though, capital is under less obligation to cover the costs of reproduction, and outright robbery of nature (the natural conditions of production) is the norm.
34. K. William Kapp, *The Social Costs of Private Enterprise* (Cambridge, MA: Harvard University Press, 1971), 231.
35. Roland Daniels, *Mikrokosmos* (Frankfurt am Main: Verlag Peter Lang, 1988; original ms. 1851), 49. Daniels's work followed the development of the first law of thermodynamics and the application of the principle of the conservation of energy to metabolism in the work of Julius Robert Mayer, one of the co-discoverers of the conservation of energy. See Julius Robert Mayer, "The Motions of Organisms and Their Relation to Metabolism," in R. Bruce Lindsay, ed., *Energy: Historical Development of the Concept* (Stroudsburg, PA: John Wiley and Sons, 1975), 284–307.
36. Karl Marx, *Capital*, vol. 1 (London: Penguin, 1976), 637–38, *Capital*, vol. 3, 949.
37. See Brett Clark and John Bellamy Foster, "Guano: The Global Metabolic Rift in the Fertilizer Trade," in Alf Hornborg, Brett Clark, and Kenneth Hermele, eds., *Ecology and Power* (London: Routledge, 2012), 68–82; John Bellamy Foster and Hannah Holleman, "The Theory of Unequal Ecological Exchange," *Journal of Peasant Studies* 41, no. 1–2 (March 2014): 199–233.
38. Karl Marx and Frederick Engels, *Collected Works*, vol. 30, 54–66; Marx, *Capital*, vol. 3, 949.
39. Marx, *Capital*, vol. 1, 638.
40. Karl Marx, *Capital*, vol. 3 (London: Penguin, 1981), 911.
41. Marx, *Capital*, vol. 3, 959.
42. Burkett, *Marx and Nature*, xx.
43. The classic neo-Marxian theory of ecological crisis within environmental sociology is known as "the treadmill of production" perspective and had its origins in Allan Schnaiberg, *The Environment* (Oxford: Oxford University Press, 1980). Schnaiberg's analysis was heavily influenced by analyses of economic crises and the environment in *Monthly Review*.

44. Marx's comments on the capitalist commodification of animals were largely in response to the French agriculturalist Léonce de Lavergne, whose ideas Marx addressed in *Capital* and in his excerpt notebooks. See Kohei Saito, "New Insights into Marx's Ecology through the MEGA-Edition," *Monthly Review*, forthcoming; John Bellamy Foster and Paul Burkett, *Marx and the Earth* (Brill, forthcoming); Léonce de Lavergne, *The Rural Economy of England, Scotland and Ireland* (London: William Blackwood and Sons, 1855).
45. Kenneth M. Stokes, *Man and the Biosphere* (Armonk, NY: M.E. Sharpe, 1992), 35–37; Marx and Engels, *Collected Works*, vol. 46, 411.
46. John Bellamy Foster, "The Absolute General Law of Environmental Degradation Under Capitalism," *Capitalism Nature Socialism* 3, no. 3 (1992): 77–81.
47. On the significance of economic and ecological waste to the Marxian critique of capitalism's ecological and social destruction see John Bellamy Foster, "The Ecology of Marxian Political Economy," *Monthly Review* 63, no. 4 (September 2011): 1–16.
48. Baran, *The Longer View*, 30.
49. For each additional dollar made by the bottom 90 percent of the population in the United States from 1990–2002 the top 0.01 percent (some 14,000 households) made an additional \$18,000. Correspondents of the "New York Times," *Class Matters* (New York: Times Books, 2005), 186.
50. On the contemporary phenomena of overaccumulation, stagnation, and financialization see John Bellamy Foster and Robert W. McChesney, *The Endless Crisis* (New York: Monthly Review Press, 2012).
51. Lewis Mumford, *The Condition of Man* (New York: Harcourt Brace Jovanovich, 1973), 411.
52. "Nothing is enough for someone for whom enough is little." Epicurus, *The Epicurus Reader* (Indianapolis: Hackett 1994), 39.
53. Paul Burkett, "Marx's Vision of Sustainable Human Development," *Monthly Review* 57, no. 5 (October 2005): 34–62.
54. Marx, *Capital*, vol. 1, 638; Stefano B. Longo, Rebecca Clausen, and Brett Clark, *The Tragedy of the Commodity* (New York: Rutgers University Press, 2015), 175–203.
55. Del Weston, *The Political Economy of Global Warming* (London: Routledge, 2014), 170–71; Marx, *Capital*, vol. 1, 637–38.
56. Foster, Clark, and York, *The Ecological Rift*, 47, 398, 440.
57. See Weston, *The Political Economy of Global Warming*, 113–52.
58. David Harvey, *The Enigma of Capital* (Oxford: Oxford University Press, 2010), 228–35.
59. Klein, *This Changes Everything*, 293–336.
60. On the two stages of ecological revolution see Fred Magdoff and John Bellamy Foster, *What Every Environmentalist Needs to Know About Capitalism* (New York: Monthly Review Press, 2011), 123–44.

61. Karl Marx, *Critique of the Gotha Programme* (New York: International Publishers, 1938), 10.
62. On the classic conception of democracy as the rule of society by the *demos* (the poor) see Ellen Meiksins Wood and Neal Wood, *Class Ideology and Ancient Political Theory* (Oxford: Blackwell, 1978).
63. Karl Marx and Frederick Engels, *Collected Works* (New York: International Publishers, 1975), vol. 42, 558–59.
64. E.P. Thompson, *Beyond the Cold War* (New York: Pantheon, 1982), 41–80; Rudolf Bahro, *Avoiding Social and Ecological Disaster* (Bath: Gateway Books, 1994), 19. This and the following paragraph draw on John Bellamy Foster, *The Ecological Revolution* (New York: Monthly Review Press, 2009), 27–28.
65. Mumford, *The Condition of Man*, 348, 412.

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