Why Ecological Revolution?

JOHN BELLAMY FOSTER

It is now universally recognized within science that humanity is confronting the prospect—if we do not soon change course—of a planetary ecological collapse. Not only is the global ecological crisis becoming more and more severe, with the time in which to address it fast running out, but the dominant environmental strategies are also forms of denial, demonstrably doomed to fail, judging by their own limited objectives. This tragic failure, I will argue, can be attributed to the refusal of the powers that be to address the roots of the ecological problem in capitalist production and the resulting necessity of ecological and social revolution.

The term “crisis,” attached to the global ecological problem, although unavoidable, is somewhat misleading, given its dominant economic associations. Since 2008, we have been living through a world economic crisis— the worst economic downturn since the 1930s. This has been a source of untold suffering for hundreds of millions, indeed billions, of people. But insofar as it is related to the business cycle and not to long-term factors, expectations are that it is temporary and will end, to be followed by a period of economic recovery and growth—until the advent of the next crisis. Capitalism is, in this sense, a crisis-ridden, cyclical economic system. Even if we were to go further, to conclude that the present crisis of accumulation is part of a long-term economic stagnation of the system—that is, a slowdown of the trend-rate of growth beyond the mere business cycle—we would still see this as a partial, historically limited calamity, raising, at most, the question of the future of the present system of production.1

When we speak today of the world ecological crisis, however, we are referring to something that could turn out to be final, i.e., there is a high probability, if we do not quickly change course, of a terminal crisis—a death of the whole anthropocene, the period of human dominance of the planet. Human actions are generating environmental

(continued on inside back cover)
changes that threaten the extermination of most species on the planet, along with civilization, and conceivably our own species as well.

What makes the current ecological situation so serious is that climate change, arising from human-generated increases in greenhouse gas emissions, is not occurring gradually and in a linear process, but is undergoing a dangerous acceleration, pointing to sudden shifts in the state of the earth system. We can therefore speak, to quote James Hansen, director of NASA’s Goddard Institute of Space Studies, and the world’s most famous climate scientist, of “tipping points...fed by amplifying feedbacks.”

Four amplifying feedbacks are significant at present: (1) rapid melting of arctic sea ice, with the resulting reduction of the earth’s albedo (reflection of solar radiation) due to the replacement of bright, reflective ice with darker blue sea water, leading to greater absorption of solar energy and increasing global average temperatures; (2) melting of the frozen tundra in northern regions, releasing methane (a much more potent greenhouse gas than carbon dioxide) trapped beneath the surface, causing accelerated warming; (3) recent indications that there has been a drop in the efficiency of the carbon absorption of the world’s oceans since the 1980s, and particularly since 2000, due to growing ocean acidification (from past carbon absorption), resulting in faster carbon build-up in the atmosphere and enhanced warming; (4) extinction of species due to changing climate zones, leading to the collapse of ecosystems dependent on these species, and the death of still more species.

Due to this acceleration of climate change, the time line in which to act before calamities hit, and before climate change increasingly escapes our control, is extremely short. In October 2009, Luc Gnacadja, executive secretary of the United Nations Convention to Combat Desertification, reported that, based on current trends, close to 70 percent of the land surface of the earth could be drought-affected by 2025, compared to nearly 40 percent today. The United Nations Intergovernmental Panel on Climate Change (IPCC) has warned that Himalayan glaciers could disappear altogether by 2035. Rivers fed by these glaciers currently supply water to over half the world’s population. Their melting will give rise to enormous floods, followed by acute water shortages.

Many of the planetary dangers associated with current global warming trends are by now well-known: rising sea levels engulfing islands and low-lying coastal regions throughout the globe; loss of tropical forests; destruction of coral reefs; a “sixth extinction” rivaling the great die-downs in the history of the planet; massive crop losses; extreme weather events; spreading hunger and disease. But these dangers are heightened by the fact that climate change is not the entire world ecological crisis. For example, independently of climate change, tropical forests are being cleared as a direct result of the need for profits. Soil destruction is occurring, due to current agribusinesses. Toxic wastes are being diffused throughout the environment, run-off from the overuse of fertilizer is affecting lakes, and ocean regions, contributing to oxygen-poor “dead zones.”

Since the whole earth is affected by the vast scale of human on the environment in complex and unpredictable ways, even serious catastrophes could conceivably be set in motion. One area of concern is ocean acidification due to rising carbon emissions. As carbon dioxide dissolves, it turns into carbonic making the oceans more acidic. Because carbon dioxide dissolves more readily in cold than in warm water, the cold waters of the north pole could become more corrosive as well as the living shells of shellfish, affecting the entire ocean food chain the same time, ocean acidification appears to be reducing the uptake of the oceans, speeding up global warming.

There are endless predictive uncertainties in all of this. Nevertheless, it is mounting that the continuation of current trends is inevitable, even in the short-term. The only rational answer, the radical change of course. Moreover, given certain imminent points, there is no time to be lost. Catastrophic changes in the ecosystem could be set irreversibly in motion within a few decades, at the IPCC, in its 2007 report, indicated that an atmospheric concentration of 450 parts per million (ppm) should not be exceeded and that this was the safe point for carbon stabilization. These findings are already out of date. “What science has revealed past few years,” Hansen states, “is that the safe level of carbon dioxide is not more than 350 ppm,” as compared with 387 ppm. That means that carbon emissions have to be reduced faster and more drastically than originally thought, to bring the overall carbon content in the atmosphere down. The reality is that, “if we burn all the fuels, or even half of remaining reserves, we will send the planet the ice-free state with sea level about 250 feet higher than today. It take time for complete ice sheet disintegration to occur, but a civilization would be created with changes occurring out of control of generations.” More than eighty of the world’s poorest and most vulnerable countries have now declared that carbon dioxide emissions should be reduced.
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vulnerable countries have now declared that carbon dioxide atmospheric
concentration levels must be reduced below 350 ppm, and that the rise in global average temperature by century’s end must not exceed 1.5°C.⁷

**Strategies of Denial**

The central issue that we have to confront, therefore, is devising social strategies to address the world ecological crisis. Not only do the solutions have to be large enough to deal with the problem, but also all of this must take place on a world scale in a generation or so. The speed and scale of change necessary means that what is required is an ecological revolution that would also need to be a social revolution. However, rather than addressing the real roots of the crisis and drawing the appropriate conclusions, the dominant response is to avoid all questions about the nature of our society, and to turn to technological fixes or market mechanisms of one sort or another. In this respect, there is a certain continuity of thought between those who deny the climate change problem altogether, and those who, while acknowledging the severity of the problem at one level, nevertheless deny that it requires a revolution in our social system.

We are increasingly led to believe that the answers to climate change are primarily to be found in new energy technology, specifically increased energy and carbon efficiencies in both production and consumption. Technology in this sense, however, is often viewed abstractly as a *deus ex machina*, separated from both the laws of physics (i.e., entropy or the second law of thermodynamics) and from the way technology is embedded in historically specific conditions. With respect to the latter, it is worth noting that, under the present economic system, increases in energy efficiency normally lead to increases in the scale of economic output, effectively negating any gains from the standpoint of resource use or carbon efficiency—a problem known as the “Jevons Paradox.” As William Stanley Jevons observed in the nineteenth century, every new steam engine was more efficient in the use of coal than the one before, which did not prevent coal burning from increasing overall, since the efficiency gains only led to the expansion of the number of steam engines and of growth in general. This relation between efficiency and scale has proven true for capitalist economies up to the present day.⁸

Technological fetishism with regard to environmental issues is usually coupled with a form of market fetishism. So widespread has this become that even a militant ecologist like Bill McKibben, author of *The End of Nature*, recently stated: “There is only one lever even possibly big enough to make our system move as fast as it needs to, and that is the force of markets.”⁹

Green-market fetishism is most evident in what is called “carbon trading”—a catch phrase for the creation, via governments, of a market in carbon trading and so-called “offsets.” The importance I know about cap and trade is that it is a proven failure. Although it failed in Europe as part of the implementation of the Kyoto Protocol, failed where it was supposed to count: in reducing emissions. Carbon trading schemes have been shown to be full of holes. Offsets a jumble of dubious forms of trading that have no effect on emissions. The reason that is the only area in which carbon trading schemes have actually been effective is in promoting profits for speculators and corporations, who are frequently supportive of them. Recently, Friends of the Earth released a report entitled *Subprime Carbon* which pointed to the tendency, under cap and trade agreements, of what could turn out to be one of the largest financial derivatives market in the history of the planet! All of this has caused Hansen to refer to cap and trade as “the real doom,” locking in “disasters for our children and grandchildren.”

The masquerade associated with the dominant response to warming is illustrated in the climate bill passed by the U.S. House of Representatives in late June 2009. The bill, if enacted, would not just reduce greenhouse gas emissions 17 percent relative to 2005 by 2020, which translates into 4-5 percent less U.S. global warming than in 1990. This then would still not reach the target of a 6-8 percent cut (relative to 1990) for wealthy countries to Kyoto accord set for 2012, and that was supposed to have been a minor, first step in dealing with global warming—at a time when the problem was seen as much less severe. The goal presented by the House bill, even if reached, would therefore prove vastly inadequate.

But the small print in the bill makes achieving even this meager goal unrealistic. The coal industry is given until 2011 to comply with the bill’s pollution reduction mandates, with possible extensions after 2020. As Hansen observes, the bill “builds in approval of new coal-fired plants”! Agribusiness, which accounts for a quarter of U.S. greenhouse gas emissions, is entirely exempt from the mandated reduction cap and trade provisions of the House bill would give annual cap-and-trade emission allowances to some 7,400 facilities across the States, most of them handed out for free. These pollution allowances would increase up through 2016, and companies would be permitted to “bank” them indefinitely for future use. Corporations would then be able to sell off their unused allowances, or trade them among themselves, while free riders increase the costs paid by those who do have to follow the law.
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to fulfill their entire set of obligations by buying offsets associated with pollution control projects until 2027. To make matters worse, the Senate counterpart to the House bill, now under deliberation, would undoubtedly be more conservative, giving further concessions and offsets to corporations. The final bill, if it comes out of Congress, will thus be, in Hansen’s words, “worse than nothing.”

Similar developments can be seen in the preparation for the December 2009 world climate negotiations in Copenhagen, in which Washington has played the role of a spoiler, blocking all but the most limited, voluntary agreements, and insisting on only market-based approaches, such as cap and trade.

Recognizing that world powers are playing the role of Nero as Rome burns, James Lovelock, the earth system scientist famous for his Gaia hypothesis, argues that massive climate change and the destruction of human civilization as we know it may now be irreversible. Nevertheless, he proposes as “solutions” either a massive building of nuclear power plants all over the world (closing his eyes to the enormous dangers accompanying such a course)—or geoengineering our way out of the problem, by using the world’s fleet of aircraft to inject huge quantities of sulfur dioxide into the stratosphere to block a portion of the incoming sunlight, reducing the solar energy reaching the earth. Another common geoengineering proposal includes dumping iron filings throughout the ocean to increase its carbon-absorbing properties.

Rational scientists recognize that interventions in the earth system on the scale envisioned by geoengineering schemes (for example, blocking sunlight) have their own massive, unforeseen consequences. Nor could such schemes solve the crisis. The dumping of massive quantities of sulfur dioxide into the stratosphere would, even if effective, have to be done again and again, on an increasing scale, if the underlying problem of cutting greenhouse gas emissions were not dealt with. Moreover, it could not possibly solve other problems associated with massive carbon dioxide emissions, such as the acidification of the oceans.

The dominant approach to the world ecological crisis, focusing on technological fixes and market mechanisms, is thus a kind of denial; one that serves the vested interests of those who have the most to lose from a change in economic arrangements. Al Gore exemplifies the dominant form of denial in his new book, Our Choice: A Plan to Solve the Climate Crisis. For Gore, the answer is the creation of a “sustainable capitalism.” He is not, however, altogether blind to the faults of the present system. He describes climate change as the “greatest market failure in history” and decries the “short-term” perspective of ent-day capitalism, its “market triumphantalism,” and the “fundamental flaws” in its relation to the environment. Yet, in defiance of all this assures his readers that the “strengths of capitalism” can be harned to a new system of “sustainable development.”

The System of Unsustainable Development

In reality, capitalism can be defined as a system of unsustainable production. In order to understand why this is so, it is useful to turn to Marx, the core of whose entire intellectual corpus might be interwoven as a critique of the political economy of unsustainable development and its human and natural consequences.

Capitalism, Marx explains, is a system of generalized commodity production. There were other societies prior to capitalism in commodity markets played important roles, but it is only in capitalism that a system emerges that is centered entirely on the production of commodities. A “commodity” is a good produced to be exchanged for profit in the market. We call it a “good” because it has a use value, i.e., it normally satisfies some use, otherwise there would be no need for it. But it is the exchange value, i.e., the money in which the profit that it generates, that is the exclusive concern of the capitalist.

What Marx called “simple commodity production” is an idiom of economic formation—often assumed to describe the society in which we live—in which the structure of exchange is such that a commodity embodying a certain use value is exchanged for money (acts as mere means of exchange), which is, in turn, exchanged for another commodity (use value) at the end. Here, the whole exchange process beginning to end can be designated by the shorthand C-M-C. In a process, exchange is simply a modified form of barter, with money merely facilitating exchange. The goal of exchange is concrete uses, embodying qualitative properties. Such use values are consumed—thereby bringing a given exchange process to an end.

Marx, however, insisted that a capitalist economy, in reality, altogether differently, with exchange taking the form of M-C-M money capital (M) is used to purchase commodities (labor power means of production) to produce a commodity that can be sold for money, M' (i.e., M + ΔM or surplus value) at the end. This process set in motion, never stops of its own accord, since it has no natural. Rather, the surplus value (profit) is reinvested in the next round.
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the object of generating $M''$; and, in the following round, the returns are again reinvested with the goal of obtaining $M''$; and so on, *ad infinitum*.14

For Marx, therefore, capital is *self-expanding value*, driven incessantly to ever larger levels of accumulation, knowing no bounds. "Capital," he wrote, "is the endless and limitless drive to go beyond its limiting barrier. Every boundary is and has to be a [mere] barrier for it [and thus capable of being surpassed]. Else it would cease to be capital—money as self-reproductive.” It thus converts all of nature and nature’s laws as well as all that is distinctly human into a mere means of its own self-expansion. The result is a system, fixated on the exponential growth of profits and accumulation. “Accumulate, accumulate! That is Moses and the prophets!”15

Any attempt to explain where surplus value (or profits) comes from must penetrate beneath the exchange process and enter the realm of labor and production. Here, Marx argues that value added in the working day can be divided into two parts: (1) the part that reproduces the value of labor power (i.e., the wages of the workers) and thus constitutes necessary labor; and (2) the labor expended in the remaining part of the working day, which can be regarded as surplus labor, and which generates surplus value (or gross profits) for the capitalist. Profits are thus to be regarded as residual, consisting of what is left over after wages are paid out—something that every businessperson instinctively understands. The ratio of surplus (i.e., unpaid) labor to necessary (paid) labor in the working day is, for Marx, the rate of exploitation.

The logic of this process is that the increase in surplus value appropriated depends on the effective exploitation of human labor power. This can be achieved in two ways: (1) either workers are compelled to work longer hours for the same pay, thereby increasing the surplus portion of the working day simply by adding to the total working time (Marx calls this “absolute surplus value”); or (2) the value of labor power, i.e., the value equivalent of workers’ wages, is generated in less time (as a result of increased productivity, etc.), thereby augmenting the surplus portion of the working day to that extent (Marx calls this “relative surplus value”).

In its unrelenting search for greater (relative) surplus value, capitalism is thus dependent on the revolutionization of the means of production with the aim of increasing productivity and reducing the paid portion of the working day. This leads inexorably to additional revolutions in production, additional increases in productivity, in what constitutes an endless treadmill of production/accumulation. The logic of accumulation concentrates more and more of the wealth and power of society in fewer and fewer hands, and generates a mous industrial reserve army of the unemployed.

This is all accompanied by the further alienation of labor, human beings of their creative potential, and often of the envirional conditions essential for their physical reproduction. “The system,” Marx wrote, “is turned into systematic robbery of necessary for the life of the worker while he is at work, i.e., light, air and protection against the dangerous or the unhealthy of the production process.”16

For classical political economists, beginning with the physiocr Adam Smith, nature was explicitly designated as a “free gift” tal. It thus did not directly enter into the determination of exchange value (value), which constituted the basis of the accumulation vate capital. Nevertheless, classical political economists did see as constituting public wealth, since this was identified with use and included not only what was scarce, as in the case of exchange uses, but also what was naturally abundant, e.g., air, water, etc.

Out of these distinctions arose what came to be known Lauderdale Paradox, associated with the ideas of James Maclavine Earl of Lauderdale, who observed in 1804 that private (exchange values) could be expanded by destroying public (use values)—that is, by generating scarcity in what was ft abundant. This meant that individual riches could be auumg landowners/monopolizing the water of wells and charging a p what had previously been free—or by burning crops (the pro the earth) to generate scarcity and thus exchange value. Even itself, if it became scarce enough, could expand private riches, was possible to put a price on it. Lauderdale saw such artific ation of scarcity as a way in which those with private monop land and resources robbed society of its real wealth.17

Marx (following Ricardo) strongly embraced the Lau Paradox, and its criticism of the inverse relation between riches and public wealth. Nature, under the system of gene commodity production, was, Marx insisted, reduced to being a free gift to capital and was thus robbed. Indeed, the fact that the working day was unpaid and went to the surplus of the ca meant that an analogous situation pertained to human labor itself a “natural force.” The worker was allowed to “work for l life, i.e. to live, only in so far as he works for a certain time gratis capitalist...[so that] the whole capitalist system of production t
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r, i.e., the value equivalent of workers' wages, is generated in less
as a result of increased productivity, etc.), thereby augmenting
surplus portion of the working day to that extent (Marx calls this
tive surplus value").
its unrelenting search for greater (relative) surplus value, cap-
m is thus dependent on the revolutionization of the means of
ction with the aim of increasing productivity and reducing the
portion of the working day. This leads inexorably to additional
utions in production, additional increases in productivity, in
stitutes an endless treadmill of production/accumulation.
ologic of accumulation concentrates more and more of the wealth
and power of society in fewer and fewer hands, and generates an
mous industrial reserve army of the unemployed.
This is all accompanied by the further alienation of labor, robbing
human beings of their creative potential, and often of the environ-
tal conditions essential for their physical reproduction. "The factory
system," Marx wrote, "is turned into systematic robbery of what is
ecessary for the life of the worker while he is at work, i.e., space,
light, air and protection against the dangerous or the unhealthy con-
taminants of the production process."16
For classical political economists, beginning with the physiocrats and
Adam Smith, nature was explicitly designated as a "free gift" to cap-
tal. It thus did not directly enter into the determination of exchange
value (value), which constituted the basis of the accumulation of priv-
ate capital. Nevertheless, classical political economists did see nature
as constituting public wealth, since this was identified with use values,
and included not only what was scarce, as in the case of exchange val-
ues, but also what was naturally abundant, e.g., air, water, etc.
Out of these distinctions arose what came to be known as the
Lauderdale Paradox, associated with the ideas of James Maitland, the
eight Earl of Lauderdale, who observed in 1804 that private riches
(exchange values) could be expanded by destroying public wealth
(use values)—that is, by generating scarcity in what was formerly
abundant. This meant that individual riches could be augmented by
landowners monopolizing the water of wells and charging a price for
what had previously been free—or by burning crops (the produce
of the earth) to generate scarcity and thus exchange value. Even the
air itself, if it became scarce enough, could expand private riches, once
it was possible to put a price on it. Lauderdale saw such artificial cre-
ation of scarcity as a way in which those with private monopolies of
land and resources robbed society of its real wealth.17
Marx (following Ricardo) strongly embraced the Lauderdale
Paradox, and its criticism of the inverse relation between private
riches and public wealth. Nature, under the system of generalized
commodity production, was, Marx insisted, reduced to being merely
a free gift to capital and was thus robbed. Indeed, the fact that part
of the working day was unpaid and went to the surplus of the capitalist
meant that an analogous situation pertained to human labor power,
itself a "natural force." The worker was allowed to "work for his own
life, i.e. to live", only in so far as he works for a certain time gratis for the
capitalist...[so that] the whole capitalist system of production turns on
the prolongation of this gratis labour by extending the working day or by developing the productivity, i.e., the greater intensity of labour power, etc." Both nature and the unpaid labor of the worker were then to be conceived in analogous ways as free gifts to capital. 

Given the nature of this classical critique, developed to its furthest extent by Marx, it is hardly surprising that later neoclassical economists, exercising their primary role as apologists for the system, were to reject both the classical theory of value and the Lauderdale Paradox. The new marginalist economic orthodoxy that emerged in the late nineteenth century erased all formal distinctions within economics between use value and exchange value, between wealth and value. Nature’s contribution to wealth was simply defined out of existence within the prevailing economic view. However, a minority of heterodox economists, including such figures as Henry George, Thorstein Veblen, and Frederick Soddy, were to insist that this rejection of nature’s contribution to wealth only served to encourage the squandering of common resources characteristic of the system. “In a sort of parody of an accountant’s nightmare,” John Maynard Keynes was to write of the financially driven capitalist system, “we are capable of shutting off the sun and the stars because they do not pay a dividend.”

For Marx, capitalism’s robbing of nature could be seen concretely in its creation of a rift in the human-earth metabolism, whereby the reproduction of natural conditions was undermined. He defined the labor process in ecological terms as the “metabolic interaction” between human beings and nature. With the development of industrial agriculture under capitalism, a rift was generated in the nature-given metabolism between human beings and the earth. The shipment of food and fiber hundreds, and sometimes thousands, of miles to the cities meant the removal of soil nutrients, such as nitrogen, phosphorus, and potassium, which ended up contributing to the pollution of the cities, while the soil itself was robbed of its “constituent elements.” This created a rupture in “the eternal natural condition for the lasting fertility of the soil,” requiring the “systematic restoration” of this metabolism. Yet, even though this had been demonstrated with the full force of natural science (for example, in Justus von Liebig’s chemistry), the rational application of scientific principles in this area was impossible for capitalism. Consequently, capitalist production simultaneously undermined “the original sources of all wealth—the soil and the worker.”

Marx’s critique of capitalism as an unsustainable system of production was ultimately rooted in its “preconditions,” i.e., the historical bases under which capitalism as a mode of production became possible. These were to be found in “primitive accumulation,” or the expropriation of the commons (of all customary rights to the land), and the expropriation of the workers themselves—of their means of subsistence. It was this expropriation that was to help lay the grounds for the capitalist in particular. The turning of the land into private property meant means of accumulation, was at the same time the basis for the destruction of the metabolism between human beings and the earth

This was carried out on an even greater and more devastating scale in relation to the pillage of the third world. Here, trade in human goods went hand-in-hand with the seizure of the land and resou the entire globe as mere plunder to feed the industrial mills of Europe and elsewhere. Whole continents (or at least those portions of European colonialism was able to penetrate) were devastated. This process yet complete, with depeasantization of the periphery and the expanding agribusiness, constituting one of the chief forms of unsustainability and ecological destruction in the present day.

Marx’s whole critique thus pointed to the reality of capitalism as a system of unsustainable development, rooted in the unsustainable production and pillage of human and natural agents. As he put it: “A la défiguration is the watchword of every capitalist and of every country. Capital therefore takes no account of the health and the life of the worker [or the human-nature metabolism], unless forces it to do so.”

He wryly observed in Capital that, when the Germans improved their windmill (in the form to be taken over by the Dutch), one of its concerns, vainly fought over by the emperor Frederick I, the king and the clergy, was who was “the ‘owner’ of the wind.” Now this observation on early attempts to commodify the air takes on greater irony—at a time when markets, in what Gore himself calls “subprime carbon assets,” are helping to generate a speculatively viable with respect to earth’s atmosphere.

**Toward Ecological Revolution**

If the foregoing argument is correct, humanity is facing an unprecedented challenge. On the one hand, we are confronting the question of a terminal crisis, threatening most life on the planet, civilizing the very existence of future generations. On the other hand, at to solve this through technological fixes, market magic, and the notion of a “sustainable capitalism” are mere forms of ecological denia
prolongation of this gratis labour by extending the working day by developing the productivity, i.e., the greater intensity of labour, etc. Both nature and the unpaid labor of the worker were then conceived in analogous ways as free gifts to capital.\footnote{18}

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**Toward Ecological Revolution**

If the foregoing argument is correct, humanity is facing an unprecedented challenge. On the one hand, we are confronting the question of a terminal crisis, threatening most life on the planet, civilization, and the very existence of future generations. On the other hand, attempts to solve this through technological fixes, market magic, and the idea of a “sustainable capitalism” are mere forms of ecological denial; since the very foundation of the market economy is predicated on the destruction of the commons. The capitalist system is clearly unsustainable, and we need an alternative vision that respects the limits of the natural world and the rights of all human beings to a healthy and just future.
they ignore the inherent destructiveness of the current system of unsustainable development—capitalism. This suggests that the only rational answer lies in an ecological revolution, which would also have to be a social revolution, aimed at the creation of a just and sustainable society.

In addressing the question of an ecological revolution in the present dire situation, both short-term and long-term strategies are necessary, and should complement each other. One short-term strategy, directed mainly at the industrialized world, has been presented by Hansen. He starts with what he calls a “geophysical fact”: most of the remaining fossil fuel, particularly coal, must stay in the ground, and carbon emissions have to be reduced as quickly as possible to near zero. He proposes three measures: (1) coal burning (except where carbon is sequestered—right now not technologically feasible) must cease; (2) the price of fossil fuel consumption should be steadily increased by imposing a progressively rising tax at the point of production: well head, mine shaft, or point of entry—redistributing 100 percent of the revenue, on a monthly basis, directly to the population as dividends; (3) a massive, global campaign to end deforestation and initiate large-scale reforestation needs to be introduced. A carbon tax, he argues, if it were to benefit the people directly—the majority of whom have below average per-capita carbon footprints, and would experience net gains from the carbon dividends once their added energy costs were subtracted—would create massive support for change. It would help to mobilize the population, particularly those at the bottom of society, in favor of a climate revolution. Hansen’s “fee and dividend” proposal is explicitly designed not to feed the profits of vested interests. Any revenue from the carbon tax, in this plan, has to be democratically structured so as to redistribute income and wealth to those with smaller carbon footprints (the poor), and away from those with the larger carbon footprints (the rich).

Hansen has emerged as a leading figure in the climate struggle, not only as a result of his scientific contributions, but also due to his recognition that at the root of the problem is a system of economic power, and his increasingly radical defiance of the powers that be. Thus, he declares: “the trains carrying coal to power plants are death trains. Coal-fired plants are factories of death.” He criticizes those such as Gore, who have given up to cap and trade, locking in failure. Arguing that the unwillingness and inability of the authorities to act means that desperate measures are necessary, he is calling for mass “civil resistance.” In June 2009, he was arrested, along with thirty-one others, in the exercise of civil resistance against mountain top removal coal mining.

In strategizing an immediate response to the climate problem, it is crucial to recognize that the state, through government regulation and spending programs, could intervene directly in the climate crisis. Carbon dioxide could be considered an air pollutant to be regulated by law. Electrical utilities could be mandated to obtain their energy increasing from renewable sources. Solar panels could be included as a mandate part of the building code. The state could put its resources behind major investments in public environmental infrastructure and planning, including reducing dependence on the automobile through massive funding of public transportation, e.g., intercity trains and light rail, and the necessary accompanying changes in urban development and infrastructure.

Globally, the struggle, of course, has to take into account the reality of economic and ecological imperialism. The allowable carbon-concentration limits of the atmosphere have already been taken up as a result of the accumulation of the rich states at the center of the world system. The economic and social development of poor countries is, therefore, now being further limited by the pressing need to impose restriction on carbon emissions for the sake of the planet as a whole—despite the fact that underdeveloped economies had no role in the creation of the problem. The global South is likely to experience the effects of climate change much earlier and more severely than the North, and has few economic resources with which to adapt. All of this means that a non-imperialistic, and more sustainable, world solution depends initially on what is called “contraction and convergence”—a drastic contraction in greenhouse gas emissions overall (especially in the rich countries), coupled with the convergence of per-capita emissions in all countries to levels that are sustainable for the planet. Since, however, science suggests that even low greenhouse gas emissions may be unsustainable over the long run, strategies have to be developed to make it economically feasible for countries in the periphery to introduce solar and renewable technologies—reinforcing those necessary radical changes in social relations that will allow them to stabilize and reduce their emissions.

For the anti-imperialist movement, a major task should be creating stepped-up opposition to military spending (amounting to trillion dollars in the United States in 2007) and ending government subsidies to global agribusiness—with the goal of shifting those monies into environmental defense and the meeting of the social need of the poorest countries, as suggested by the Bamako Appeal. It must be firmly established as a principle of world justice that the wealthier countries owe an enormous ecological debt to poorer countries, du
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to the robbing by the imperial powers of the global commons and the pillage of the periphery at every stage of world capitalist development.

Already, the main force for ecological revolution stems from movements in the global South, marked by the growth of the Via Campesina movement, socialist organizations like Brazil’s MST, and ongoing revolutions in Latin America (the ALBA countries) and Asia (Nepal). Cuba has been applying permaculture design techniques that mimic energy-maximizing natural systems to its agriculture since the 1990s, generating a revolution in food production. Venezuela, although, for historic reasons, an oil power economically dependent on the sale of petroleum, has made extraordinary achievements in recent years by moving toward a society directed at collective needs, including dramatic achievements in food sovereignty.29

Reaching back into history, it is worth recalling that the proletariat in Marxian theory was the revolutionary agent because it had nothing to lose, and thus came to represent the universal interest in abolishing, not only its own oppression, but oppression itself. As Marx put it, “the living conditions of the proletariat represent the focal point of all inhuman conditions in contemporary society. However, it [the proletariat] cannot emancipate itself without abolishing the conditions which give it life, and it cannot abolish these conditions without abolishing all those inhuman conditions of social life which are summed up in its own situation.”30

Later Marxist theorists were to argue that, with the growth of monopoly capitalism and imperialism, the “focal point of inhuman conditions” had shifted from the center to the periphery of the world system. Paul Sweezy contended that, although the objective conditions that Marx associated with the proletariat did not match those of better-off workers in the United States and Europe in the 1960s, they did correspond to the harsh, inhuman conditions imposed on “the masses of the much more numerous and populous underdeveloped dependencies of the global capitalist system.” This helped explain the pattern of socialist revolutions following the Second World War, as exemplified by Vietnam, China, and Cuba.31

Looking at this today, I think it is conceivable that the main historic agent and initiator of a new epoch of ecological revolution is to be found in the third world masses most directly in line to be hit first by the impending disasters. Today the ecological frontline is arguably to be found in the inhabitants of the Ganges-Brahmaputra Delta and of the low-lying fertile coast area of the Indian Ocean and China Seas—the state of Kerala in India, Thailand, Vietnam, Indonesia. They, too, as in the case of Marx’s proletariat, have nothing to lose from the radical changes necessary to avert (or adapt to) disaster. In fact, with the universal spread of capitalist social relations and the commodity: the world proletariat and the masses most exposed to sea level rise, for example, the low-lying delta of the Pearl River and the Guang industrial region from Shenzhen to Guangzhou—sometimes over 200 miles wide—this, then, potentially constitutes the global epicenter of a new noncapitalist proletariat.32

The truly planetary crisis we are now caught up in, however, is a world uprising transcending all geographical boundaries. This is the way the ecological and social revolutions in the third world have accomplished by, or inspired, universal revolts against imperialist destruction of the planet, and the treadmill of accumulation. The recognition that the weight of environmental disaster is such that it crosses all class lines and all nationalities and positions, abolishing time by breaking what Marx called “the chain of successive generations” and creating a radical rejection of the engine of destruction in its present form, and putting into motion a new conception of global human-earth metabolism. As always, however, real change will have to come from those most alienated from the existing systems of power and wealth. The most hopeful development within the advanced capitalist world at present is the meteoric rise of the youth-based climate justice movement, which is emerging as a considerable force in direct action mobilization and in challenging the current climate negotiations.33

What is clear is that the long-term strategy for ecological revolt throughout the globe involves the building of a society of subsistence, i.e., the struggle for socialism. Not only are the two inextricable, but they also provide essential content for each other. There be no true ecological revolution that is not socialist; no true social revolution that is not ecological. This means recapturing Marx’s vision of socialism/communism, which he defined as a society with “the associated producers govern the human metabolism with n in a rational way, bringing it under their collective control... accomplishing it with the least expenditure of energy and in conditions worthy and appropriate for their human nature.”34

One way to understand this interdependent relationship between ecology and socialism is in terms of what Hugo Chávez has called the elementary triangle of socialism” (derived from Marx) consisting of (1) social ownership; (2) social production organized by workers; and (3) satisfaction of communal needs. All three components...
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What is clear is that the long-term strategy for ecological revolution
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elementary triangle of socialism are necessary if socialism is to be sustained. Complementing and deepening this is what could be called "the elementary triangle of ecology" (derived even more directly from Marx): (1) social use, not ownership, of nature; (2) rational regulation by the associated producers of the metabolic relation between humanity and nature; and (3) satisfaction of communal needs—not only of present but also future generations (and life itself).38

As Lewis Mumford explained in 1944, in his Condition of Man, the needed ecological transformation required the promotion of "basic communism," applying "to the whole community the standards of the household," distributing benefits "according to need, not ability or productive contribution." This meant focusing first and foremost on "education, recreation, hospital services, public hygiene, art, food production, the rural and urban environments, and, in general, "collective needs." The idea of "basic communism" drew on Marx's principle of substantive equality in the Critique of the Gotha Programme: "from each according to his ability, to each according to his needs!" But Mumford also associated this idea with John Stuart Mill's vision, in his most socialist phase, of a "stationary state"—viewed, in this case, as a system of economic production no longer geared to the accumulation of capital, in which the emphasis of society would be on collective development and the quality of life. For Mumford, this demanded a new "organic person"—to emerge from the struggle itself.

An essential element of such an ecological and socialist revolution for the twenty-first century is a truly radical conception of sustainability, as articulated by Marx:

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 [i.e., slavery]. 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].39

Such a vision of a sustainable, egalitarian society must define the present social struggle; not only because it is ecologically necessary for human survival, but also because it is historically necessary for the development of human freedom. Today we face the challenge of forging a new organic revolution in which the struggles for human equality and for the earth are becoming one. There is only one future: that of sustainable human development.38

Notes
4. Agence France Presse (AFP), "UN Warns of 70 Percent Desertification by 2025," October 4, 2005.
23. Marx, Capital, vol. 1, 381.
Climate change has brought the global environmental crisis to a turning point. The primary concern that must be noted is that the pace of climate change is accelerating much more rapidly than had been forecast. The combination of changing temperatures, melting ice caps, and the spread of disease are all adding to the effects of the warming earth, and in the next one or two decades, the highest estimates are being realized.

Accumulating evidence that today's warming is the result of a house-effect leading to runaway global warming is clear. There are few other explanations for the warming that is occurring. We must act now.

It is clear that the planet is in serious trouble. We must act now to save the planet. We must act now.