

Ecology and the transition from capitalism to socialism

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The transition from capitalism to socialism is the most difficult problem of socialist theory and practice. To add to this the question of ecology might therefore be seen as unnecessarily complicating an already intractable issue. I shall argue here, however, that the human relation to nature lies at the heart of the transition to socialism. An ecological perspective is pivotal to our understanding of capitalism's limits, the failures of the early socialist experiments, and the overall struggle for egalitarian and sustainable human development.

My argument has three parts. First, it is crucial to understand the intimate connection between classical Marxism and ecological analysis. Far from being an anomaly for socialism, as we are often led to believe, ecology was an essential component of the socialist project from its inception—notwithstanding the numerous later shortcomings of Soviet-type societies in this respect. Second, the global ecological crisis that now confronts us is deeply rooted in the "world-alienating" logic of capital accumulation, traceable to the historical origins of capitalism as a system. Third, the transition from capitalism to socialism is a struggle for sustainable human development in which societies on the periphery of the capitalist world system have been leading the way.

Classical Marxism and ecology

Research carried out over the last two decades has demonstrated that there was a powerful ecological perspective in classical Marxism. Just as a transformation of the human relation to the earth was, in Marx's view, an essential presupposition for the transition from feudalism to capitalism, so the rational regulation of the metabolic relation to nature was understood as an essential presupposition for the transition from capitalism to socialism.[1] Marx and Engels wrote extensively about ecological problems arising from capitalism and class society in general, and the need to transcend these under socialism. This included discussions of the nineteenth-century soil crisis, which led Marx to develop his theory of metabolic rift between nature and society. Basing his analysis on the work of the German chemist Justus von Liebig, he pointed to the fact that soil nutrients (nitrogen, phosphorus and potassium) were removed from the soil and shipped hundreds and thousands of miles to the cities where they ended up polluting the water and the air and contributing to the poor health of the workers. This break in the necessary metabolic cycle between nature and society demanded for Marx nothing less than the "restoration" of ecological sustainability for the sake of "successive generations".[2]

In line with this, Marx and Engels raised the main ecological problems of human society: the division of town and country, soil depletion, industrial pollution, urban maldevelopment, the decline in health and crippling of workers, bad nutrition, toxicity, enclosures, rural poverty and isolation, deforestation, human-generated floods, desertification, water shortages, regional climate change, the exhaustion of natural resources (including coal), conservation of energy, entropy, the need to recycle the waste products of industry, the interconnection between species and their environments, historically conditioned problems of overpopulation, the causes of famine, and the issue of the rational employment of science and technology.

This ecological understanding arose from a deep materialist conception of nature that was an essential part of Marx's underlying vision. "Man", he wrote, "*lives from nature, i.e. nature is his body*, and he must maintain a continuing dialogue with it if he is not to die. To say that man's

physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature".[3] Not only did Marx declare in direct opposition to capitalism that no individual owned the earth, he also argued that no nation or people owned the earth; that it belonged to successive generations and should be cared for in accordance with the principle of good household management.[4]

Other early Marxists followed suit, although not always consistently, in incorporating ecological concerns into their analyses and embodying a general materialist and dialectical conception of nature. William Morris, August Bebel, Karl Kautsky, Rosa Luxemburg and Nikolai Bukharin all drew on ecological insights from Marx. The Ukrainian socialist Sergei Podolinsky's early attempt at developing an ecological economics was inspired to a considerable extent by the work of Marx and Engels. Lenin stressed the importance of recycling soil nutrients and supported both conservation and pioneering experiments in community ecology (the study of the interaction of populations within a specific natural environment). This led to the development in the Soviet Union in the 1920s and early 1930s of probably the most advanced conception of ecological energetics or trophic dynamics (the basis of modern ecosystem analysis) in the world at the time. The same revolutionary-scientific climate produced V. I. Vernadsky's theory of the biosphere, A. I. Oparin's theory of the origin of life and N. I. Vavilov's discovery of the world centres of germplasm (the genetic sources of the world's crop plants). In the West, and in Britain in particular, leading scientists influenced by Marxism in the 1930s, such as J. B. S. Haldane, J. D. Bernal, Hyman Levy, Lancelot Hogben and Joseph Needham, pioneered in exploring the dialectics of nature. It is even possible to argue that ecological science had its genesis almost entirely in the work of thinkers on the left (socialist, social democratic and anarchist).[5]

Obviously not all major figures or all developments in the socialist tradition can be seen as ecological. Soviet Marxism succumbed to an extreme version of the productivism that characterised early twentieth-century modernity in general, leading to its own version of ecocide. With the rise of the Stalinist system the pioneering ecological developments in the Soviet Union were largely crushed (and some of the early ecologically oriented Marxists such as Bukharin and Vavilov were killed). Simultaneously, a deep antipathy to natural science emerging out of an extreme negation of positivism led to the abandonment of attempts to theorise the dialectics of nature in Western Marxism, seriously weakening its link to ecology—though the question of the domination of nature was raised by the Frankfurt School as part of its critique of science. If today socialism and ecology are once again understood as dialectically interconnected, it is due both to the evolution of the ecological contradictions of capitalism and the development of socialism's own self-critique.

Capitalism's world alienation

The key to understanding capitalism's relation to the environment is to examine its historical beginnings, i.e., the transition from feudalism to capitalism. This transition was enormously complex, occurring over centuries, and obviously cannot be fully addressed here. I shall focus on just a few factors. The bourgeoisie arose within the interstices of the feudal economy. As its name suggests, the bourgeoisie had its point of origin as a class primarily in the urban centres and mercantile trade. What was necessary, however, in order for bourgeois society to emerge fully *as a system*, was the revolutionary transformation of the feudal mode of production and its replacement by capitalist relations of production. Since feudalism was predominantly an agrarian system, this meant of course transformation of agrarian relations, i.e., the relation of workers to the land as a means of production.

Capitalism therefore required for its development a new relation to nature, one which severed the direct connection of labour to the means of production, i.e., the earth, along with the dissolution of all customary rights in relation to the commons. The *locus classicus* of the industrial revolution was Britain, where the removal of the workers from the land by means of expropriation took the form of the enclosure movement from the fifteenth to the eighteenth centuries. Under colonialism and imperialism an even more brutal transformation occurred on the outskirts or the external

areas of the capitalist world economy. There all preexisting human productive relations to nature were torn asunder in what Marx called the “extirpation, enslavement and entombment in mines of the indigenous population”—the most violent expropriation in all of human history.[6]

The result was proletarianisation within the centre of the system as masses of workers were thrown out of work and moved to the city. There they were met by the capital being amassed through organised robbery, giving rise to what Marx called “modern industry”. Simultaneously, various forms of servitude and what we now call precarious work were imposed on the periphery, where social reproduction was always secondary to the most rapacious imperialist exploitation. The surplus forcibly extracted from the periphery fed industrialisation at the centre of the world economy.[7]

What made this new system work was the incessant accumulation of capital in one cycle after another, with each new phase of accumulation taking the last as its starting point. This meant ever more divided, more alienated human beings, together with a more globally destructive metabolism between humanity and nature. As Joseph Needham observed, the “conquest of Nature” under capitalism turned into “the conquest of man”; the “technological instruments utilised in the dominance of Nature” produced “a qualitative transformation in the mechanisms of social domination”. [8]

There is no doubt that this dialectic of domination and destruction is now spiraling out of control on a planetary scale. Economically, overall inequality between the centre and periphery nations of the world system is increasing together with the intensification of class inequality within each capitalist state. Ecologically, the world’s climate and the life-support systems of the entire earth are being transformed by a process of runaway global warming.[9]

In addressing this planetary environmental problem it is useful to turn to Hannah Arendt’s concept of “world alienation”, introduced fifty years ago in *The Human Condition*. “World alienation” for Arendt began with the “alienation from the earth” at the time of Columbus, Galileo, and Luther. Galileo trained his telescope on the heavens, thereby converting human beings into creatures of the cosmos, no longer simply earthly beings. Science seized on cosmic principles in order to obtain the “Archimedean point” with which to move the world, but at the cost of immeasurable world alienation. Human beings no longer apprehended the world immediately through the direct evidence of their five senses. The original unity of the human relation to the world exemplified by the Greek polis was lost.

Arendt noted that Marx was acutely aware of this world alienation from his earliest writings, pointing out that the world was “denatured” as all natural objects—the wood of the wood-user and the wood-seller—were converted into private property and the universal commodity form. Original or primitive accumulation, the alienation of human beings from the land, as Marx described it, became a crucial manifestation of world alienation. However, Marx, in Arendt’s view, chose to stress human self-alienation rooted in labour rather than world alienation. In contrast, “world alienation, and not [primarily] self-alienation as Marx thought”, she concluded, “has been the hallmark of the modern age”.

“The process of wealth accumulation, as we know it”, Arendt went on to observe, depended on expanding world alienation. It “is possible only if the world and the very worldliness of man are sacrificed”. This process of the accumulation of wealth in the modern age “enormously increased human power of destruction” so “that we are able to destroy all organic life on earth and shall probably be able one day to destroy even the earth itself”. Indeed, “Under modern conditions”, she explained, “not destruction but conservation spells ruin because the very durability of conserved objects is the greatest impediment to the turnover process, whose constant gain in speed is the only constancy left wherever it has taken hold”. [10]

Arendt had no final answers to the dire problem she raised. Despite tying world alienation to a system of destruction rooted in wealth accumulation, she identified it with the development of

science, technology, and modernity rather than capitalism as such. World alienation in her view was the triumph of *homo faber* and *animal labourans*. In this tragic conception, her readers were called upon to look back to the lost unity of the Greek polis, rather than, as in Marx, toward a new society based on the restoration at a higher level of the human metabolism with nature. In the end world alienation for Arendt was a Greek tragedy raised to the level of the planet.

There is no doubt that the concrete manifestations of this world alienation are evident everywhere today. The latest scientific data indicate that global emissions of carbon dioxide from fossil fuels experienced a "sharp acceleration...in the early 2000s" with the growth rate reaching levels "greater than for the most fossil-fuel intensive of the Intergovernmental Panel on Climate Change emissions scenarios developed in the late 1990s". Further, "the mean global atmospheric CO₂ concentration" has been increasing "at a progressively faster rate each decade". The most rapid acceleration in emissions has been in a handful of emergent industrialising countries such as China, but "no region" in the world is currently "decarbonising its energy supply". All ecosystems on earth are in decline, water shortages are on the rise, and energy resources are becoming more than ever the subject of global monopolies enforced by war.

The "man-made fingerprint of global warming" has been detected "on 10 different aspects of Earth's environment: surface temperatures, humidity, water vapor over the oceans, barometric pressure, total precipitation, wildfires, change in species of plants and animals, water run-off, temperatures in the upper atmosphere, and heat content in the world's oceans". The cost now descending on the world if it doesn't radically change course is a *regression* of civilisation and life itself beyond comprehension: an economy and ecology of destruction that will finally reach its limits.¹¹

Socialism and sustainable human development

How are we to meet this challenge, arguably the greatest that human civilisation has ever faced? A genuine answer to the ecological question, transcending Arendt's tragic understanding of world alienation, requires a revolutionary conception of sustainable human development—one that addresses both human self-estrangement (the alienation of labour) and world alienation (the alienation of nature). It was Ernesto "Che" Guevara who most famously argued in his "Man and Socialism in Cuba" that the crucial issue in the building of socialism was not economic development but human development. This needs to be extended by recognising, in line with Marx, that the real question is one of sustainable human development, explicitly addressing the human metabolism with nature through human labour.^[12]

Too often the transition to socialism has been approached mechanistically as the mere expansion of the means of production, rather than in terms of the development of human social relations and needs. In the system that emerged in the Soviet Union the indispensable tool of planning was misdirected to production for production's sake, losing sight of genuine human needs, and eventually gave rise to a new class structure. The detailed division of labour, introduced by capitalism, was retained under this system and extended in the interest of higher productivity. In this type of society, as Che critically observed, "the period of the building of socialism...is characterised by the extinction of the individual for the sake of the state".^[13]

The revolutionary character of Latin American socialism today derives its strength from an acute recognition of the negative (as well as some positive) lessons of the Soviet experience, partly through an understanding of the problem raised by Che: the need to develop socialist humanity. Further, the Bolivarian vision proclaimed by Hugo Chávez has its own deep roots of inspiration drawing on an older pre-Marxian socialism. Thus it was Simon Bolívar's teacher Simón Rodríguez who wrote in 1847: "The division of labour in the production of goods only serves to brutalise the workforce. If to produce cheap and excellent nail scissors, we have to reduce the workers to machines, we would do better to cut our finger nails with our teeth." Indeed, what we most admire today with regard to Bolívar's own principles is his uncompromising insistence that equality is "the law of laws".^[14]

The same commitment to the egalitarian, universal development of humanity was fundamental to Marx. The evolution of the society of associated producers was to be synonymous with the positive transcendence of human alienation. The goal was a many-sided human development. Just as “all history is nothing but a continuous transformation of human nature”, so “the *cultivation* of the five senses is the work of all previous history”. Socialism thus appears as the “complete emancipation of the senses”, of human sensuous capacities and their wide-ranging development. “Communism, as fully developed naturalism”, Marx wrote, “equals humanism, and as fully developed humanism equals naturalism”. [15]

The contrast between this revolutionary, humanistic-naturalistic vision and today's dominant mechanical-exploitative reality could not be starker. We find ourselves in a period of imperialist development that is potentially the most dangerous in all of history. [16] There are two ways in which life on the planet as we know it can be destroyed—either instantaneously through global nuclear holocaust, or in a matter of a few generations by climate change and other manifestations of environmental destruction. Nuclear weapons continue to proliferate in an atmosphere of global insecurity promoted by the world's greatest power. War is currently being waged in the Middle East over geopolitical control of the world's oil at the same time that carbon emissions from fossil fuels and other forms of industrial production are generating global warming. Biofuels offered up today as a major alternative to pending world oil shortages are destined only to enlarge world hunger. [17] Water resources are being monopolised by global corporations. Human needs are everywhere being denied: either in the form of extreme deprivation for a majority of the population of the world, or, in the richer countries, in the form of the most intensive self-estrangement conceivable, extending beyond production to a managed consumption, enforcing life-long dependence on alienating wage labour. More and more life is debased in a welter of artificial wants dissociated from genuine needs.

All of this is altering the ways in which we think about the transition from capitalism to socialism. Socialism has always been understood as a society aimed at reversing the relations of exploitation of capitalism and removing the manifold social evils to which these relations have given rise. This requires the abolition of private property in the means of production, a high degree of equality in all things, replacement of the blind forces of the market by planning by the associated producers in accordance with genuine social needs, and the elimination to whatever extent possible of invidious distinctions associated with the division of town and country, mental and manual labour, race divisions, gender divisions, etc. Yet, the root problem of socialism goes much deeper. The transition to socialism is possible only through a revolutionising practice that *revolutionises human beings themselves*. [18] The only way to accomplish this is by altering our human metabolism with nature, along with our human-social relations, transcending both the alienation of nature and of humanity. Marx, like Hegel, was fond of quoting Terence's famous statement “Nothing human is alien to me”. Now it is clear that we must deepen and extend this to: *Nothing of this earth is alien to me*. [19]

Mainstream environmentalists seek to solve ecological problems almost exclusively through three mechanical strategies: (1) technological bullets, (2) extending the market to all aspects of nature, and (3) creating what are intended as mere islands of preservation in a world of almost universal exploitation and destruction of natural habitats. In contrast, a minority of critical human ecologists have come to understand the need to change our fundamental social relations. Some of the best, most concerned ecologists, searching for concrete models of change, have thus come to focus on those states (or regions) that are both ecological and socialistic (in the sense of relying to a considerable extent on social planning rather than market forces) in orientation. Thus Cuba, Curitiba and Porto Alegre in Brazil, and Kerala in India, are singled out as the leading lights of ecological transformation by some of the most committed environmentalists, such as Bill McKibben, best known as the author of *The End of Nature*. [20] More recently Venezuela has been using its surplus from oil to transform its society in the direction of sustainable human development, thereby laying the foundation for a greening of its production. Although there are contradictions to what has been called Venezuelan “petro socialism”, the fact that an oil-generated

surplus is being dedicated to genuine social transformation rather than feeding into the proverbial "curse of oil" makes Venezuela unique.[21]

Of course there are powerful environmental movements within the centre of the system as well to which we might look for hope. But severed from strong socialist movements and a revolutionary situation they have been constrained much more by a perceived need to adapt to the dominant accumulation system, thereby drastically undermining the ecological struggle. Hence, revolutionary strategies and movements with regard to ecology and society are world-historical forces at present largely in the periphery, in the weak links and breakaways from the capitalist system.

I can only point to a few essential aspects of this radical process of ecological change as manifested in areas of the global South. In Cuba the goal of human development that Che advanced is taking on a new form through what is widely regarded as "the greening of Cuba". This is evident in the emergence of the most revolutionary experiment in agroecology on earth, and the related changes in health, science, and education. As McKibben states, "Cubans have created what may be the world's largest working model of a semisustainable agriculture, one that relies far less than the rest of the world does on oil, on chemicals, on shipping vast quantities of food back and forth... Cuba has thousands of *organopónicos*—urban gardens—more than two hundred in the Havana area alone." Indeed, according to the World Wildlife Fund's *Living Planet Report*, "Cuba alone" in the entire world has achieved a high level of human development, with a human development index greater than 0.8, while also having a per capita ecological footprint below the world's average.[22]

This ecological transformation is deeply rooted in the Cuban revolution rather than, as frequently said, simply a forced response in the Special Period following the fall of the Soviet Union. Already in the 1970s Carlos Rafael Rodríguez, one of the founders of Cuban ecology, had introduced arguments for "integral development, laying the groundwork"—as ecologist Richard Levins points out—for "harmonious development of the economy and social relations with nature". This was followed by the gradual flowering of ecological thought in Cuba in the 1980s. The Special Period, Levins explains, simply allowed the "ecologists by conviction" who had emerged through the internal development of Cuban science and society to recruit the "ecologists by necessity", turning many of them too into ecologists by conviction.[23]

Venezuela under Chávez has not only advanced revolutionary new social relations with the growth of Bolivarian circles, community councils, and increased worker control of factories, but has introduced some crucial initiatives with regard to what István Mészáros has called a new "socialist time accountancy" in the production and exchange of goods. In the new Bolivarian Alternative for the Americas (ALBA), the emphasis is on *communal exchange*, the exchange of activities rather than exchange values.[24] Instead of allowing the market to establish the priorities of the entire economy, planning is being introduced to redistribute resources and capacities to those most in need and to the majority of the populace. The goal here is to address the most pressing individual and collective requirements of the society related in particular to physiological needs and hence raising directly the question of the human relation to nature. This is the absolute precondition of the creation of a sustainable society. In the countryside preliminary attempts have also been made to green Venezuelan agriculture.[25]

In Bolivia the rise of a socialist current (though embattled at present) embedded in the needs of indigenous peoples and the control of basic resources such as water and hydrocarbons offers hope of another kind of development. The cities of Curitiba and Porto Alegre in Brazil point to the possibility of more radical forms of management of urban space and transportation. Curitiba, in McKibben's words, "is as much an example for the sprawling, decaying cities of the first world as for the crowded, booming cities of the Third World". Kerala in India has taught us that a poor state or region, if animated by genuine socialist planning, can go a long way toward unleashing human potentials in education, health care, and basic environmental conditions. In Kerala, McKibben observes, "the Left has embarked on a series of 'new democratic initiatives' that come as close as anything on the planet to actually incarnating 'sustainable development.'"[26]

To be sure, these are mainly islands of hope at present. They constitute fragile new experiments in social relations and in the human metabolism with nature. They are still subject to the class and imperial war imposed from above by the larger system. The planet as a whole remains firmly in the grip of capital and its world alienation. Everywhere we see manifestations of a metabolic rift, now extended to the biospheric level.

It follows that there is little real prospect for the needed global ecological revolution unless these attempts to revolutionize social relations in the struggle for a just and sustainable society, now emerging in the periphery, are somehow mirrored in movements for ecological and social revolution in the advanced capitalist world. It is only through fundamental change at the centre of the system, from which the pressure on the planet principally emanates, that there is any genuine possibility of avoiding ultimate ecological destruction.

For some this may seem to be an impossible goal. Nevertheless, it is important to recognize that there is now an ecology as well as a political economy of revolutionary change. The emergence in our time of sustainable human development in various revolutionary interstices within the global periphery could mark the beginning of a universal revolt against both world alienation and human self-estrangement. Such a revolt if consistent could have only one objective: the creation of a society of associated producers rationally regulating their metabolic relation to nature, and doing so not only in accordance with their own needs but also those of future generations and life as a whole. Today the transition to socialism and the transition to an ecological society are one.

Notes

1. Karl Marx, *Capital*, vol. 3 (New York: Vintage, 1981), 959.
2. Karl Marx, *Capital*, vol. 1 (New York: Vintage, 1976), 636–39, *Capital*, vol. 3, 754, 911, 948–49.
3. Karl Marx, *Early Writings* (New York: Vintage, 1974), 328. Documentation of Marx and Engels's ecological concerns listed above can be found in the following works: Paul Burkett, *Marx and Nature* (New York: St. Martin's Press, 1999); John Bellamy Foster, *Marx's Ecology* (New York: Monthly Review Press, 2000); and Paul Burkett and John Bellamy Foster, "Metabolism, Energy, and Entropy in Marx's Critique of Political Economy", *Theory & Society* 35 (2006): 109–56. On the problem of local climate change as it was raised by Engels and Marx in their time (speculations on temperature changes due to deforestation) see Engels's notes on Fraas in Marx and Engels, *MEGA* IV, 31 (Amsterdam: Akademie Verlag, 1999), 512–15.
4. Marx, *Capital*, vol. 3, 911.
5. On ecological insights of socialists after Marx see Foster, *Marx's Ecology*, 236–54. On early Soviet ecology see also Douglas R. Weiner, *Models of Nature* (Bloomington: Indiana University Press, 1988). On Podolinsky see John Bellamy Foster and Paul Burkett, "Ecological Economics and Classical Marxism", *Organisation & Environment* 17, no. 1 (March 2004): 32–60.
6. Karl Marx, *Grundrisse* (London: Penguin, 1973), 471–79, and *Capital*, vol. 1 (London: Penguin, 1976), 915.
7. On precarious work see Fatma Ülkü Selçuk, "Dressing the Wound", *Monthly Review* 57, no. 1 (May 2005): 37–44.
8. Joseph Needham, *Moulds of Understanding* (London: George Allen and Unwin, 1976), 301.
9. Branko Milanovic, *Worlds Apart* (Princeton: Princeton University Press, 2005); John Bellamy Foster, "The Imperialist World System", *Monthly Review*, vol. 59, no. 1 (May 2007): 1–16.
10. Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), 248–73; Karl Marx and Frederick Engels, *Collected Works* (New York: International Publishers, 1975), vol. 1, 224–63.
11. Michael R. Raupach, et al., "Global and Regional Drivers of Accelerating CO2 Emissions", *Proceedings of the National Academy of Sciences* 104, no. 24 (June 12, 2007): 10289, 10288; Associated Press, "Global Warming: It's the Humidity", October 10, 2007.
12. See Paul Burkett's "Marx's Vision of Sustainable Human Development", *Monthly Review* 57, no. 5 (October 2005): 34–62.
13. Ernesto "Che" Guevara, "[Man and Socialism in Cuba](#)". Che was referring to bourgeois criticisms of socialist transition but it was clear that he saw this problem as an actual contradiction of early socialist experiments that had to be transcended. See also Michael Löwy, *The Marxism of Che*

- Guevara (New York: Monthly Review Press, 1973), 59–73.
14. Rodríguez quoted in Richard Gott, *In the Shadow of the Liberator* (London: Verso, 2000), 116; Simón Bolívar, "Message to the Congress of Bolivia", May 25, 1826, *Selected Works* (New York: The Colonial Press, 1951), vol. 2, 603.
15. Karl Marx, *The Poverty of Philosophy* (New York: International Publishers, 1963), 146, and *Early Writings* (New York: Vintage, 1974), 348, 353.
16. István Mészáros, *Socialism or Barbarism* (New York: Monthly Review Press, 2002), 23.
17. A powerful critique of biofuel production has been authored by Fidel Castro Ruiz in a series of reflections over the past years. See <http://www.monthlyreview.org/castro/index.php>.
18. See Paul M. Sweezy, "The Transition to Socialism", in Sweezy and Charles Bettelheim, *On the Transition to Socialism* (New York: Monthly Review Press, 1971), 112, 115; Michael Lebowitz, *Build it Now* (New York: Monthly Review Press, 2006), 13–14.
19. G. W. F. Hegel, *Introductory Lectures on Aesthetics* (London: Penguin, 1993), 51; Karl Marx, "Confessions", in Teodor Shanin, *Late Marx and the Russian Road* (New York: Monthly Review Press, 1983), 140.
20. See Bill McKibben, *Hope, Human and Wild* (Minneapolis: Milkweed Editions, 1995), and *Deep Economy* (New York: Henry Holt, 2007).
21. Michael A. Lebowitz, "An Alternative Worth Struggling For", *Monthly Review* 60, no. 5 (October 2008): 20–21.
22. McKibben, *Deep Economy*, 73. See also Richard Levins, "How Cuba is Going Ecological", in Richard Lewontin and Richard Levins, *Biology Under the Influence* (New York: Monthly Review Press, 2007), 343–64; Rebecca Clausen, "Healing the Rift: Metabolic Restoration in Cuban Agriculture", *Monthly Review* 59, no. 1 (May 2007): 40–52; World Wildlife Fund, *Living Planet Report 2006*, http://assets.panda.org/downloads/living_planet_report.pdf, 19; Peter M. Rosset, "Cuba: A Successful Case Study of Sustainable Agriculture", in Fred Magdoff, John Bellamy Foster, and Frederick H. Buttel, eds., *Hungry for Profit* (New York: Monthly Review Press, 1999), 203–14.
23. Levins, "How Cuba is Going Ecological", 355–56 in Lewontin and Levins, *Biology Under the Influence*, 367.
24. Lebowitz, *Build it Now*, 107–09; On the theory of communal exchange that influenced Chávez see István Mészáros, *Beyond Capital* (New York: Monthly Review Press, 1995), 758–60. On "socialist time accountancy" see Mészáros's *Crisis and Burden of Historical Time* (New York: Monthly Review Press, 2008).
25. David Raby, "The Greening of Venezuela", *Monthly Review* 56, no. 5 (November 2004): 49–52.
26. McKibben, *Hope*, 62, 154.