

Jason W. Moore: The Socio-Ecological Crises of Capitalism

It's become axiomatic on the left that we're facing a twin crisis of capitalism and the environment. We tend to think of environmental crises as something fairly new, as an affliction of our modern industrial era. Why is that not accurate?

JWM: Well, there two things that are going on here. The first is the issue of a twin crisis, and the second is the notion of environmental crisis. Now the problem with thinking through and talking about this great term "environmental crisis" is it's a bit like pornography. People know it when they see it, but it's hard to define. And what I've been trying to do for some time now is to really think through how capitalism has emerged since the fifteenth and sixteenth centuries as a way of reshaping the relation between humans and the rest of nature.

Now I put it in these terms because this immediately helps us get away from the notion that in one box there's a "social crisis," and in another box that there is something that we can call an "environmental crisis." These are in fact a singular process of transformation that today we call a crisis. I think that this is what the inflationary price crescendo of 2008 with the food price shocks, the oil price shocks, coupled with a financial meltdown of that year, has really driven it home. There is a growing awareness, even if it is rarely stated in such terms, of a profound interconnection between biophysical transformations and biophysical problems and crises, on the one hand, with the central institutions of the capitalist world economy, on the other—of financial markets, of large transnational firms, of capital intensive agriculture, and so on.

So if we start from a premise that these are in fact unified processes, we get away from the notion that if we just fix the markets, fix the machines, if we just fix this or that problem that we put in a nice convenient, tidy little box—maybe it's population, maybe it's imperialism, maybe it's something else—then we open up a whole set of questions about how we are all part of nature. We open up a new way of seeing those large, so-called "social" processes that we always refer to—globalization, imperialism, industrialization—as themselves ecological projects—ecological projects that seek to rework the relations between human beings (human nature) and the rest of nature.

Much of the analysis from the left and the environmental movement tends to focus on impacts and effects. That is, that society or capitalism is the cause and the way the natural world is despoiled is the effect. In your piece “Ecology and the Accumulation of Capital” you refer to it as the foot and the footprint. Why isn’t this a helpful way to understand the dynamics at play?

JWM: Yes. This is an absolutely important thing to reflect upon and there’s a lot of very high-powered academic discourse that goes on around this. But I think that the central idea is that once we start to classify a certain set of social processes as social, rather than as socio-ecological, we start to create the very firewall, the very binary, the very kind of divide that we are trying to overcome. That is, we on the left are trying to overcome the creation of what Raymond Williams, the great Welsh literary theorist, called the “singular abstractions of society and nature.” This is a very, very modern concept and there’s no denying that a tremendous amount of quite useful science and technology has emerged out of it—this idea that “nature” is in one box and “society” is in another.

This sort of binary would have been a completely foreign notion to pre-capitalist societies, whether we were talking about medieval Europe or early Imperial China. There was always the notion that nature and society were inextricably connected with each other. That’s not to say that these were ecological edens—quite the contrary in many cases.

However, what we see in the modern world-system, which is a capitalist world economy from the fifteenth and sixteenth centuries, is something that we all take for granted now, the tremendous divorce between an extraordinary mass of wealth in the form of money capital, and an extraordinary mass of wealth in the form of nature, including human nature. This divorce was precisely what was impossible before capitalism. Only through a socio-ecological system that systematically, progressively removed peasants from the land, and established the conditions for productivity revolutions in “cheap food,” do we see the possibility for money capital to command and shape the most basic contours of life. We can think today of all the great financial flows and accumulations of fictitious wealth in the form of financial securities, and despite the recent devaluations, we can see that these flows and accumulations are pivotal to the natures that are being transformed and reworked in very violent and radically transformative ways.

So the question is: what’s the problem with this divorce, this binary of nature in one box, and society in another? Well, the problem is that the starting point is precisely the sort of symbolic universe of modernity, this divide between nature and society that we see in ecological footprint discussions. And in fact if you go and you read the work of somebody like Mathis Wackernagel,

who is the central figure in this tradition, there is the constant appeal to what can only be called neoliberal discourses—pleas for the efficiency of markets and for the reduction of waste, and so on and so forth. There's not this sense that the market itself is a bundle of ecological and social relations.

But that's the interesting thing. In the world left today, in a sense we do see a convergence around a dialectical sense of how nature and society are interwoven. There was a time when industrial struggles in large factory settings were regarded as social and peasant struggles or conservation movements were seen as environmental. But in fact what we see today, and nowhere more clearly than the ongoing struggles for justice around world agriculture, is a fusing of all of these moments. There is an emergent sensibility that Wall Street is a way of organizing global nature—every bit as directly as a farm or mine, albeit with different specific forms. So what I would say is that in some ways the movements are very much ahead of the scholars in this respect, that there is an intuitive and often very practical grasp of what is nature, that nature is both the state and industries in the big cities and the “factories in the field” in capital-intensive agriculture, along with global financial markets, all at once.

This way of seeing promises a way out of the great impasse that we saw in the world after 1968, which was that you had one set of movements that was oriented towards something they called environmental issues, and another that was oriented towards social issues, economic justice issues and so forth. I think that we are beginning to see a move towards a transcendence of that divide. At no time has this been more necessary.

How do you conceive of the dialectical relationship between these different elements?

JWM: What I mean is there is literally no moment that we can think of that is biophysical and not social at the same time. In other words, no one symbolic box that we can say, here's a set of *social* interactions that have to do with culture, sexuality, or identity or perceptions of environmental change, and on the other hand, here are biophysical changes that are somehow independent of all that.

This of course is not to deny the very obvious fact that there are global cycles: a nitrogen cycle, a climate system, and all manner of biophysical processes. The point is that in the abstract—and that is what they are when we are saying that there is a global nitrogen cycle—that doesn't tell us very much. When these abstractions of the biophysical world tell us something concrete, is when we understand how human societies have formed, have developed, have experience fundamental shifts, or declined, in the *relation* with those biophysical cycles. What is “concrete,” then, becomes a matter of the specific

ways that extra-human nature crystallizes with human transformations of all nature, both in terms of perception and material constructions.

This is very important if we want to understand the global environmental crisis, or as I prefer to talk about it, *ecological* crisis. This language, “environmental crisis,” is often thrown about much too promiscuously on the left. *Monthly Review* is a good example of this. For all its brilliance in opening our eyes to real problems that are central to the way capitalism works, there is still the notion that the limits are outside of us. This means that you can have a discussion of the accumulation crisis and you can have a discussion of the environmental crisis and you don’t need to connect the dots. This is a very dangerous way of moving forward, even as we recognize the great contribution of those to have set these so-called “twin crises” right in front of us.

Would it be fair to say that socio-ecological crises are characteristic not only of capitalism but of class society?

JWM: Yes. Certainly civilizations—and we know this from the work of Jared Diamond, Clive Ponting, John Bellamy Foster, and many others—civilizations have been in the business of despoiling their surrounding environments for a very long period of time. Now what capitalism does when it begins to emerge, in a very powerful and real way after 1450, is to accelerate the pace of environmental degradation, and in fact to use environmental degradation as a way to accumulate money capital. And we see this in the great sugar plantation frontiers as they move across the Atlantic world, the great silver mining frontiers in present-day Bolivia and Mexico, that there is a new pace of transformation. And essentially how capitalism works from the very beginning is a kind of ecological hit and run. It goes where the ecological wealth can be extracted fastest and most profitably. So great forests were mowed down in a matter of decades—whereas for the Romans or for the Chinese or for the Mesopotamians, that took a matter of centuries.

So there was a radically accelerated pace of transformation that goes on from the earliest moments in the rise of capitalism. What that meant is that there was a constant search for a new frontier, for a new greenfield site. They went to Madera, a tiny island in the middle of the Atlantic. The Portuguese in the fifteenth century set up plantations. Sugar is a hugely fuel-intensive crop. They cut down all the trees. Production collapsed and they moved on. They moved on to another little island called São Tomé and then to a very big continent, in the northeast of Brazil. The story goes on from there.

What is often not recognized, and this is central to what I call the industrial society myth in environmental thought, is that this was not simply the act of greedy and predatory colonialists. Now of course the colonialists were often

greedy and often predatory, sucking up the ecological wealth and bringing in African slaves to work the sugarcane fields, and in themselves suffer the greatest ecological degradations, that is, death. But this was not only going on in the Americas. It was not only a colonial process. It was very much a capitalist process, because we see the very same thing going on with the greatest superpower of the sixteenth and seventeenth centuries, the Dutch Empire.

The Dutch go to Poland; they go to Southern Norway. They go all around the coast of the Baltic and cut down forests—exactly like what we see in Brazil. And of course from Brazil, the sugar frontier moves on to the Caribbean and the same process goes on again. This frontier movement is absolutely central to understanding capitalism as an ecological regime, as a way of ordering the relation between humans and the rest of nature.

It's the difference between what I call the five-century theory of capitalism and the two-century theory of capitalism. The two-century theory says it is industrialization. The fact of the matter is that capitalism was profoundly technologically dynamic, and highly industrial, long before the Industrial Revolution. In fact, the Industrial Revolution comes about in response to what I call a *developmental* ecological crisis. It was an ecological crisis of the mid-eighteenth century that was implicated in the shift to coal, to steam power and the profound global transformations of nature that we had seen over the ensuing century and a half.

Now this is important because today we talk about something we call peak oil. Peak oil is not the fundamental product of industrial society, so much as it is a capitalist way of organizing this human/extra-human nature relation that I've been talking about. There are a variety of theories of peak oil. The most widely circulated theory has to do with a simple relation that the pace of production is outrunning the pace of discovery of new fields; that is to say that production is running ahead of the oil frontier. And when that happens, the theory tells us, the price of oil will go up, up, up.

Now we have to be careful of how this argument is developed. The central point I would like to drive home is that peak oil, in itself, is not a novel occurrence. That what we saw in the mid-eighteenth century was, in a sense, "peak charcoal," because charcoal made from the great forests of Europe and the Americas, this charcoal was the key energy source for metal production, for glass making, for sugar refining, for the most basic economic activities of early capitalism. Until we begin to see past the surface of this resource as a geological reality, rather than oil as commodity that reveals the deeper structures of our times, then we are left with the notion that the problem is an external problem, that capitalism will collapse because of an external scarcity. But in fact there is no such thing as an external scarcity, because oil is just a

goopy substance; it becomes a fossil fuel through modernity's crystallization of human/extra-human nature.

This is useful because it is a way of understanding, a way of thinking about a long history of transformations in civilization and in the modern world where historical limits of food, energy, and resources were overcome. At the time, as for Thomas Malthus in the later eighteenth century, many people believed these historical limits were in fact external, absolute limits. This is the case with much, but not all, peak oil discourse on the "end of oil" today. So we can only begin to understand the precise nature of these *historical limits* of food, energy, and resources, to understand how today might be a different sort of ecological systemic crisis, from the recognition of capitalism's demonstrated capacity, in previous centuries, to transcend these developmental ecological crises.

Now what I mean by that—let me give you an example with the great forest crisis of early modern capitalism. From 1750 to 1800, there was a tremendous problem in delivering energy supplies to the base of productive centers of world capitalism—that is, metal production, shipbuilding, various kinds of food processing and so forth. That was obviously an historical, ecological limit. It was an ecological crisis that was produced by the relations of the system itself. And what we so often forget today is that capitalism is not only a crisis-generating machine or system, but that it has developed through these ecological crises. And indeed the ecological crisis of the eighteenth century is a good example of this.

It's important to understand that there are different kinds of ecological crises that we've seen historically. The kind that I just mentioned is a *developmental ecological crisis*, that is a crisis of a specific phase of capitalism's nature-society relations, something that we first see in the middle of the eighteenth century. The other world-historical form of ecological crisis I would call an *epochal ecological crisis*. This is what we see in late-medieval Europe, in the thirteenth and fourteenth centuries. This was an ecological crisis that created so much instability, so much turbulence in medieval Europe that feudalism went by the wayside and a new order emerged. This new order was capitalism. It wasn't planned. It very much emerged out of the chaos of the situation. But feudalism was never reestablished because of the very ecological problems that it created, because the socio-ecological limits that feudalism encountered were also limits that feudalism produced.

What form did the ecological crisis take that helped end feudalism and fed the emergence of early capitalism?

JWM: That's an excellent question. If we look at what happened in medieval Europe—in feudal Europe at the beginning of the fourteenth century—

we see some very similar processes to what we see today. At the dawn of the fourteenth century, there was an agricultural system that had very much over-extended itself. That was issuing declining returns, declining yields. The climate had begun to shift, towards colder and wetter weather, at the time because of non-anthropogenic factors. The essence of the problem was that feudalism had pushed itself outward, had developed to where it was increasingly vulnerable to very small socio-ecological disturbances. When those disturbances became greater and greater, as in the early fourteenth century, the climate became colder, it became wetter, it became more difficult to grow food. There were already problems with soil exhaustion. There were already problems with declining yields, so when a shift in the climate came in—today, we call this the “Little Ice Age”—this paved the way for increasingly serious famines, increasingly serious food crises.

This in turn combined with the great commercialization and urbanization processes of the previous centuries to create a very favorable environment for epidemic disease. And as know, these conditions reached a world-historical tipping point with the Black Death in the middle of the fourteenth century. There was of course a population crash, but the main point I would like to underscore is that epidemic disease was not an “output” or a “footprint” of the feudal system and its crises—the Black Death, in itself, expressed a civilizational vortex of class struggle on the land, subsistence crises, and much beyond.

Much the same can be observed about all manner of epidemiological forces that seem to be moving to center stage in recent world history—avian and swine flus, skyrocketing rates of cancer far beyond increases in life expectancy, and the rapid proliferation of all manner of “syndromes,” from autism to autoimmune disorders, that no one really seems to understand very well, in terms of their root causes in their nature-society dialectic. In 2009 Obama declared a national state of emergency around swine flu. In one sense this was a singular event that passed from our memories in a few weeks. In another, however, this event speaks to a structural crisis of capitalism as ecological regime. Mike Davis has made this case in his wonderful book on the avian flu. What we see is a series of fractures and tensions that begin to multiply in the life of a historical system such as feudalism, and such as we see in the system today. Never before, certainly not for well over a century, have we seen so many points of tension and fracture in the modern world.

You argue that in history crises, both precapitalist and capitalist, have been resolved by plunder—by expansion into new frontiers as well as technical innovation—although under capitalism the speed and intensity of these processes has been accelerated. You suggest that land productivity has been

of central importance to precapitalist societies, whereas labor productivity is central to capitalist society. What's the basis of that distinction and why is it relevant in understanding the current crisis?

JWM: This distinction between the productivity of land and the productivity of labor is really one of the central dividing points between capitalism and other historical systems that we've known. The only thing that capital values is labor productivity. It's not so much that capital ignores nature. It divides nature in this profoundly alienating and explosive way—sometimes creative, sometimes destructive, usually both. The danger is always that the biophysical well-being of watersheds or of soils and many other aspects of ecological life, that those are sacrificed simply to raise the number of bushels produced per person per hour.

How I talk about this in “Ecology and the Accumulation of Capital” is that there has always been, and capitalism is in a sense defined by, this very close connection between what I call productivity and plunder. On the one hand, there are all these extraordinary technological innovations that have raised the productivity of labor power, of *human* nature. The steam engine is probably the greatest example of this. On the other hand, all of these innovations, without exception, have been premised on the plunder of nature. This is at the core of many discussions of fossil capitalism today—that when you take coal out of the ground or natural gas or oil out of the ground, it is being used to raise the productivity of labor.

So when people—and very many good people on the left—talk about the possibilities of a technological fix to today's problems, what they are doing is taking one part of this twin process and saying technology can do everything now. Well, technology has never done everything. In fact, technology, if we think of the great sort of epoch-making technologies of the modern world—the railroads of the nineteenth century, the automobile of the twentieth century—these were inventions that only existed through the massive conquest of global nature. It's really important to put these two things together.

And let me just put one other idea out there to think about. The rising labor productivity over the course of the modern world has been paired with a rising toxicity of the global environment. Every phase of capitalism is not just more productive in terms of human nature, not just more voracious of extra-human nature, but also more toxic. By this I don't simply mean there's more pollution, that more coal is burned, that more oil is burned, so there are more pollutants in a general sense in the atmosphere and the air that we breathe. I mean that what we see from the earliest moments of capitalism are new kinds toxic effluents that radically transform the existing socio-ecological order.

The greatest example of this in the seventeenth century was mercury mining. Mercury was used to extract silver from the great mines of the

Americas. And while mercury had been used by civilizations for a very long time, there was this revolution in the volume of mercury simply dumped into the surrounding environments, including the bodies of indigenous peoples. In the present moment—and we see this in calls, such as from George Monbiot, for a return to nuclear power—we see nuclear power as an example of this. You have waste that’s not simply waste; it’s not simply garbage. It is waste that threatens to unwork or at best destabilize the basis of human life on this planet, indeed the whole web of life. You see this also with herbicide regime of capital-intensive agriculture—in the U.S. the widely used herbicide, atrazine, demasculinizes male frogs. We might well ask if this is one of a growing number of “canaries in the coalmine.” That’s part of how labor productivity is linked up not only in the conquest of global nature, in the sense of how people discuss the new enclosures around biotechnology and intellectual property rights, but also that there is this powerful moment of toxifying the biosphere. There are resource frontiers, agricultural frontiers, and these are profoundly interconnected with waste frontiers. Sooner or later, toxification catches up with business as usual.

Another thing that is tied to labor productivity and the accumulation of capital is food. If food can be made available at a cheap price, workers can be paid a lower wage, and the cost of labor goes down.

JWM: Yes, the issue of cheap food is absolutely paramount to the present moment, because the big question about the crisis we are living through is this: will the crisis we are living through give rise to a new period of world accumulation? Are we likely to see a new period of world economic growth, such as we saw between the end of the Second World War and the early 1970s for example, or in an earlier era, during the apex of British world power, between the 1840s and the 1870s? Will the present “crisis” give rise to another one of these middle-run phases of world growth? Or are we perhaps in an era that looks much more like the fourteenth century in medieval Europe, where the pressures were building for an epochal ecological crisis and a transition to a new way of organizing the relations between humans and the rest of nature? As we know, that new way of organizing global nature can be very good or very bad. From this perspective, we can talk about the issue of cheap food and how it’s related to neoliberalism as a phase of world history.

Neoliberalism was this phase of world economic history that began in the early 1970s and was associated with the American defeat in Vietnam, the end of the gold standard, the recycling of OPEC dollars into New York banks, the coup d’état in Chile that overthrew the democratically elected government of Allende, and much beyond this. The point that I wish to underscore is

that neoliberalism, in contrast to all previous phases of capitalism, was about *taking*, first, and *making*, second. In the 1970s, everyone was talking about a new scientific-technological revolution that would unleash another revolution in labor productivity—automated factories, robotization, and all that. But it turns out that this was not at all the path of technological revolution in the late twentieth century. The one country that went furthest in automated production, Japan, entered a deep stagnation around 1990. And the greatest economic miracle of our times, China, was miraculous on the basis of labor-intensity, not capital-intensity. The greatest innovations of the past three decades are found, of course, in information technologies, especially in moving information faster and in surveillance technologies. So, it became possible for trillions of dollars of financial securities to move faster and faster and faster, and this acceleration of turnover time helped capital to move through successive financial bubbles between 1997 and 2008. It was a way of accelerating history so as to put off the settling of accounts. Today, the accounts still have not been settled. We are still in a kind of bubble, something we might call the “bailout bubble.”

The only way out of this bubble, this long series of financial crises that really began in 1997, is by building a better mousetrap, finding a new combination of productivity and plunder. And this is where we see big problems around the provision of cheap food. Now, the neoliberal era, from the 1970s on, was characterized the cheap food in human history. Part of this was the result of the Green Revolution strategy, developed first in the U.S. in the 1930s and globalized, most famously, with the agricultural revolution of the 1960s in India. This second phase of the Green Revolution, centered in South and Southeast Asia, began in the 1960s and really flowered over the next fifteen years. The crucial point to remember is that this phase of the Green Revolution was not a neoliberal process. It was not a neoliberal project in the sense that it was geared toward national food security, in a sort of quasi-market way.

Now what happens in the era of neoliberalism is essentially a redistribution of power from farmers to big agribusiness. This is the second part of the cheap food story. Remember that neoliberalism is primarily about taking, and not about making. This redistribution of power and wealth from the producers of food to the accumulators of capital was a direct result of the U.S.-led “Washington Consensus,” especially the neoliberal regime that reshaped the economies of the Global South after the debt crises in the 1980s. The middle-run strategy was to bring more peasants into the world market, increase aggregate production on the world market, and depress food prices. All things being equal, falling food prices were “good” for economies such as the U.S., where real wages were falling, but the full impact of this was obscured by cheaper food.

The strength of the middle-run strategy was also its weakness, and this is now becoming apparent. All of this happened without a revolution in agricultural productivity. Indeed, growth rates for the major cereal crops—corn, wheat, rice—peaked in the mid-1980s, and have been slowing down ever since. Now, advocates of biotechnology have come along to argue that this slowdown can be reversed. But biotechnology is only partly a technology—it is an effort to forge a new socio-ecological regime of accumulation. What has become clear is that the rapid diffusion of genetically modified crops since the mid-1990s has yielded absolutely zero in terms of launching a new agricultural revolution. Biotechnology has not succeeded in raising what scientists call the intrinsic yield of crops. There's been no Green Revolution-type boom in the delivery of the food surplus.

What that means is what neoliberalism did was essentially reorganize the world food system to release a huge amount of cheap food. And what we saw between 1975 and 2003 was the cheapest food in the history of the modern world, going back all the way back to the fifteenth and sixteenth centuries. This is central to the economic vitality of neoliberalism: cheap food. Cheap food is so important because it is the primary factor in determining the floor and ceiling of wages for the world's workers. Workers must be fed enough to reproduce themselves. This is why subsistence crises were abolished first, in the seventeenth and eighteenth centuries, in heavily proletarianized regions such as the Netherlands.

Now there are a whole series of factors that are coming unraveled as we speak, and have been doing so with great velocity over the past few years. The era of cheap food now seems to be over. For a world-economy that is still very much faltering, moving into what looks to be a very serious depression—there's a lot of boosterism in the press, but it looks very serious still—the end of cheap food is very bad news. This is not a view limited to radicals. Even the United Nations Food and Agriculture Organization estimates that, for a basket of key food commodities, we can expect price increases 10–35 percent over the next decade. And this presumes that agricultural productivity does not decline by very much, which may well be overly optimistic. The progress of global warming has been implicated in what agronomists call “yield suppression” for the big four cereal crops—wheat, rice, corn, and soy.

Now let's put the FAO's forecast of 10–35 percent food price increases in perspective. At the end of the nineteenth century, the world-economy also experienced a great depression and it came out of this in large measure because food prices went down and they went down very sharply, by about 27 percent for basic food grains in the thirty to forty years before World War I. So we need to start sorting through the tea leaves here to really look at the signifi-

cance of cheap food, and to take our recognition that the cheap food is not good quality food, that it is toxic food in many cases, and take this to the next level to understand what it is that makes the meat unhealthy or what makes the grains very low in nutrition.

On the left, we tend to think of crises of capital accumulation as crises of overproduction—that is, too many competitors producing too many goods, leading to a glut of products and falling prices and profits. But you point out that Marx also wrote about crises of underproduction, and suggest that we should dust off that concept again.

JWM: This is very important in understanding the present crisis in capitalism. This crisis, in my view, is a terminal crisis that will probably unfold over the next few decades, but one that nevertheless signifies a crisis of capitalism as we have known it for over six centuries. Now what we have become accustomed to thinking about in terms of economic crises in capitalism is the theory of overproduction. That is, too many commodities, too many goods are out there. Consumers either can't buy them or have already bought them. So you have vast warehouses, as you see today, of automobiles sitting idle. Nobody can sell them; there's no consumer market to buy them. This is an overproduction crisis.

When I started to look into the history of capitalism, and began to look seriously at what was going on in terms of the basic nature/society contradictions of the system, what I discovered was another great crisis tendency, the tendency towards underproduction crisis. Over the course of the first three centuries of capitalism, between about 1450 and the 1750s more or less, the great problem was *under*production. That is, it was difficult to get the timber to the shipyards. It was difficult to get the energy, the charcoal, to the ironworks or the sugar refineries. It was difficult to get the basic elements of production to the factory gate. This was an underproduction crisis, and it was the driving force of the late-eighteenth-century crisis, what I have called a developmental crisis of capitalism as ecological regime. I'll take up this issue and how it relates to scarcity and to Malthusianism in a moment. And let's be clear that Marx uses the language of underproduction himself, in a way diametrically opposed to Malthus; that is, Marx viewed underproduction and so-called scarcity as internal to historical capitalism.

The big question is, how did capitalism overcome this underproduction crisis of the later eighteenth century? Well, what happened was the marriage of coal-fired, productivity maximizing innovation, in the form of the steam engine, with the conquest of global nature. The great steam power and coal revolutions of the nineteenth century illuminate this marriage ever so clearly—

these great ribbons of steel, the railroads, and also steamships, were designed not just to move capital and people to new areas, like Australia or the American West or India; they were equally designed to suck in an unprecedented bounty of global nature, including human nature as new labor power. Remember that American industrial capitalism in the later nineteenth century was built by immigrants fleeing the great agrarian crises in Eastern Europe and East Asia; and these agrarian crises were the result of an American agricultural revolution in the Midwest combined with the global market created by Britain, and made possible by the steam engine. It was this great leap forward in capitalism's capacity to suck in nature's free gifts that allowed it to suspend this tendency towards underproduction. Indeed, the tendency was largely checked throughout the twentieth century. It is testimony to capitalism's remarkable technological dynamism that today, even most on the left continue to think of economic crises as too many goods chasing too few people.

Now what we are seeing, I suggest, are the first signs of a return to this underproduction crisis tendency. The tendency towards overproduction, at the same time, is not abolished. Both tendencies are working at the same time. We've touched on food. And I think what we are seeing is an exhaustion of the agricultural revolution model that we have known for the past five or six centuries. That is, the Dutch came to world power because they were Europe's best farmers—in any event, the most productive, the most competitive, the most dynamic. Then the English came. And of course we know from our textbooks in the U.S. that there was a great agricultural revolution in the American Midwest with reapers and mowers and threshers and the U.S. became the granary of the world. And the story has rolled on for a very long time.

But what we've seen in the era of neoliberalism since the 1980s is a real stagnation of this agricultural revolution model. So biotechnology comes in, in a big way since the 1990s, but it has not delivered a rising food surplus. In fact what we are looking at in a wide range of official reports from the United Nations, the FAO, and many others, is a forecast of declining agricultural productivity growth. Again, this looks a lot like Europe in the early fourteenth century, although for very different reasons. And we also see this around questions of oil. Now what a lot of people don't realize is that before the great price inflationary crescendo of 2008 when oil hit \$147 a barrel in July 2008, that crisis was driven in part by these big oil corporations in part turning towards stock buybacks. They were taking advantage of the financial expansion to buy back their stock, with the presumption that the financial expansion would push stock prices ever higher. And on the other hand they weren't investing in oil exploration and drilling. There were real problems of investment, really since the late 1980s. The International Energy Agency, which is the rich group of

countries' energy watchdog, became very hysterical in their 2008 report, the *World Energy Outlook*, where the IEA said there's too little investment going on, and the investment that is going on is often dominated by state oil companies that have different interests than what we have known in capitalism for the past five or six centuries.

There is a real breakdown of how capitalism is working in the basic sectors of the capitalist world-ecology. Not just the world-economy, but the world-ecology—that is, the way that capitalism organizes the human- and extra human-nature relationship. We see this in oil and we see this in agriculture. This is something that we all should be thinking about very seriously—the breakdown of historical investment mechanisms. When Marxists talk about accumulation, what we're really talking about—it's much more than this of course—but in simple terms what we're talking about is investment. And that was always the saving grace of capitalists. Yes, they were brutal, they were violent, they were horrible. And at the same time, the investments that they sunk into production delivered the goods to enough people to keep the system working, to deliver *enough* social goods to *enough* people that there was kernel of truth in capitalists' arguments about “development” and “progress.” Now if we have an underproduction tendency that's coming back after nearly two centuries is coming back into primacy, then we have a very serious issue with the legitimacy of capitalism.

You distinguish between epochal and developmental crises. Do you view the most recent crisis of capitalism as an epochal crisis or one that will at least in the short-term develop into another moment within perhaps an unfolding crisis?

JWM: Yes, this is really the question we really all need to be thinking about. What kind of crisis is this? Will we see another wave of capitalist development over the next twenty-five to thirty years? Now the conditions for this can be summarized very glibly, which is one part productivity, technical innovations, social innovations and so on, one part plunder, expansion into new frontiers. It's a twin process, as I've indicated. Together, this movement of productivity and plunder has delivered cheap energy, cheap raw materials, and above all, cheap food and labor, for the better part of six centuries. Productivity and plunder have been so inextricably linked in modern world history since the sixteenth century that it's impossible to identify an epoch-making technological innovation that does not fundamentally depend on the movement into new frontiers.

So when we ask the question “Is another phase of global capitalist development on the horizon?” we need to right away go and ask, “Where are the new frontiers that would make that possible?” People often say to me, well,

what about Africa? That's the new frontier. Well, it's hard for me to think of a region that's more thoroughly transformed by the modern world-system than Africa, from the slave trade of the early modern era to the cash-crop colonialism of the late nineteenth and early twentieth centuries to the ravages of structural adjustment of the 1980s and since. We need to look at where those frontiers are and we also need to look at where's the energy going to come from. Okay, so Africa is often regarded as a new oil frontier, but will this work if African consumption is repressed? And since oil and modern "development" are so deeply intertwined, what does this mean for capitalism's promise of a broadly defined social development?

But frontiers are not merely geographical places. They are also socio-ecological relations that uncork a new stream of nature's goodies for free or low cost: cheap food, cheap energy, cheap raw materials, cheap labor. In every great era of capitalist development, we see these four factors come together, through new technologies and new enclosures. Although the supply of one or more these factors has always flowed from specific countries or regions, the crucial point in the discussion is that cheap food, oil, and so forth benefited capitalism as a whole, not merely this or that country. So, yes, Angola may have oil; and Brazil, land; and China and India, labor. But do any of these modest energy, food, or labor frontiers promise to grease the wheels of accumulation for the next three decades? This is the big point, the systemic point—cheap food and cheap energy is a world-historical process. No phase of capitalism has emerged in the absence of cheap food and energy, and no "great leaps forward" in the provision of cheap food or energy are on the horizon.

The history of capitalism is the history of creating new commodities—and the need for them—where commodities had not existed before, such as transforming women's unpaid labor into new products. Is there a push right now, as you see it—leaving aside fuel and water—to generate new internal markets where they previously never existed?

JWM: Yes. I think that is what's going on. But it's hard to see where that will be successful. Some of the most dynamic zones of the world's economy today, one thinks of the so-called BRIC countries—Brazil, Russia, India, China (although I'm not so certain how dynamic Russia is at the moment)—these are countries with vast internal frontiers. The world-historical question is not just will those frontiers be sufficient to bring down the cost of doing business, and create new conditions of accumulation for those countries. The national and the systemic aspects of this frontier process are dialectically connected. As we know, the BRIC countries do not exist in nice, tidy boxes. We are dealing with the systemic process and the question is: will those frontiers bring

down the cost of labor, bring down the cost of food, bring down the cost of energy not just on a national basis but on a systemic basis?

And let's not forget metals. For the first time in the long twentieth century, from World War I to 2008, we saw five commodity booms. The most recent one before 2003–08 was that of the 1970s. Until the past decade, these had always turned on agriculture and energy. This time however, metals were included in the mix. It's not there isn't plenty of metal of various sorts in the world; it's not that there isn't enough oil. It's that it is increasingly costly to extract these vital raw materials.

I think that's a sort of basic punch line here: that in order for accumulation to revive, in order for economic growth to revive beyond a short blip of a year or two, those vital raw materials, the labor supplies, the food supplies, the energy supplies, the metal supplies need to be delivered cheaply and indeed more and more cheaply over the coming decades.

What approaches and solutions do you think we should avoid and embrace in working for ways out of this system that creates these crises? You mentioned the nineteenth-century Protestant cleric Thomas Malthus, who argued there were natural limits built into the food supply. Are you concerned about the influence of his ideas on the environmental movement today?

JWM: I think the first lesson is that Malthus was wrong because he took the problem of limits outside of history, outside the history that women and men make in the modern world. So the issue is not that there is no scarcity—of course, capitalism is a system that is premised on scarcity. That's why markets in the capitalist era function the way that they do. So I think the mistake of the left has been in a certain reluctance to deal with the problems of scarcity, or in some cases back into an embrace of a neo-Malthusian scarcity mentality in which there are these “natural limits” that are outside of how capitalism functions historically as an ecological regime.

I think the second big lesson concerns technology. Technology is not a magic bullet. Technology is not alchemy; it doesn't create something out of nothing. So we need to understand this relationship between plunder and productivity, between technological innovation and the global conquest of nature.

Finally, there is the big question of what kind of crisis are we in the midst of. I believe we are in a crisis of capitalism as a historical system. Yes, as many people on the left point out—*Monthly Review* is excellent on this—this promises catastrophic loss of human life. At the same time, we need to take care to theorize, in a historically grounded way, capitalism and the ways that it has created new nature-society relations, repeatedly, that have overcome the

old limits, the old bottlenecks of commodity production and accumulation. I like to say that capitalism does not *have* an ecological regime; it is an ecological regime, and this means understanding socio-ecological frontiers as forests and fields, yes, but also as, say, labor frontiers in advanced capitalist centers. Since World War II, for example, capitalism has been very good at say bringing in internal labor frontiers, and the proletarianization of women in post-war America is a great example of this. The fact that American households were able to maintain their income levels after the 1970s by adding a second wage earner was a tremendous internal frontier, if you will, of commodification in the modern world-system.

What we need to remember is that these internal frontiers are not infinitely reproducible. There's not an endless stream of frontiers. Economists talk about a law of substitution, as when cheap whale oil ran out in the nineteenth century, because they killed all the whales that could be cheaply hunted. Petroleum products came to replace whale oil as the major industrial lubricant. Well, that's not an infinite process. There are substitutions that can be made, but they are not all created equal and they are not infinite. So this is part of what sometimes gets into the pores of many very good and lively left critics of capitalism's environmental contradictions. They've lost track of the relentless fact that the law of substitution is a historical law that the conquest of nature has been a powerful way of creating growth and that it has done so through specific innovations of reworking nature. Think of coal, and of steam power with railroads and steamships, or a jet airliner today with oil. These technology-resource combinations are not infinitely repeatable. I think that's really the important thing to reflect on when we ask ourselves: is this a crisis of a phase of capitalism, or of capitalism itself? And good people will disagree on this. But until we pose the question in these ways I think it's very difficult to have the kind of discussion that we really need to open up. It's really central to open up these questions of the relations of nature and society as inextricably bound.