

Capitalism in the Web of Life

Ecology and the Accumulation of Capital

Jason W. Moore

INTRODUCTION

The Double Internality: History as if Nature Matters

We must recognize in materialism the enthusiastic effort to transcend the dualism which postulates two different worlds as equally substantial and true, [and] to nullify this tearing asunder of what is originally One. (Hegel, 1971)

The human prospect in the twenty-first century is not an altogether happy one. From the outset, our future can be specified at two levels of abstraction. The first is humanity-in-nature. Human engagement with the rest of nature has, over the past decade, reached the point “where abrupt global environmental change can no longer be excluded.”¹ The second is capitalism-in-nature. The unfolding crisis of neoliberal capitalism—now in between the *signal* crisis of 2008 and the unpredictable but inevitable onset of terminal crisis—suggests we may be seeing something very different from the familiar pattern. That pattern is one in which new technologies and new organizations of power and production emerged after great systemic crises, and resolved the older crises by putting nature to work in powerful new ways. The neoliberal revolution after the 1970s is only the most recent example. Today, however, it is increasingly difficult to get nature—including human nature—to yield its “free gifts” on the cheap. This indicates we may be experiencing not merely a transition from one phase of capitalism to another, but something more epochal: the breakdown of the strategies and relations that have sustained capital accumulation over the past five centuries. *Capitalism in the Web of Life* is about how the mosaic of relations that we call capitalism work *through* nature; and how nature works *through* that more limited zone, capitalism. This double movement—of capitalism through nature, of nature through capitalism—is what I call the “Double Internality.”

Since 2008, the flood of instability and change manifest in the allegedly separate domains of “Nature” and “Society” has become impossible to ignore. This poses problems—often unrecognized—of conceptual language, with the proliferation of crisis language (energy, finance, employment, austerity, climate, food, etc.) creating more, rather than less, uncertainty about the present historical moment. For critical scholars, the rush of world events has overwhelmed many. No new synthesis—*yet*—has emerged. Instead, a broad consensus has taken shape. The turbulence of the twenty-first century derives from “converging crises.”² This convergence’s most salient expression is the “triple crisis” of food, energy, and finance.³ While many prefer a different, or longer, list of crisis categories—surely

climate must be included!—the import of environmental factors, conditions, and relations has registered in critical political economy as never before. This is an advance over the crisis discourse of the 1970s, when political ecology and political economy rarely overlapped. The converging crises argument is the highest stage of “Green Arithmetic”: political economy plus Nature equals converging crises.

Or does it? My sense of Green Arithmetic is that it appears to work because we assume Society plus Nature add up. But does this assumption hold up under closer examination? *Capitalism in the Web of Life* opens an alternative path. I argue that “Society” and “Nature” are part of the problem, intellectually and politically; the binary Nature/Society is directly implicated in the colossal violence, inequality, and oppression of the modern world; and that the view of Nature as external is a fundamental condition of capital accumulation. Efforts to transcend capitalism in any egalitarian and broadly sustainable fashion will be stymied so long as the political imagination is captive to capitalism’s either/or organization of reality. And relatedly, efforts to discern the limits of capitalism today—such discernment is crucial to any anti-systemic strategy—cannot advance much further by encasing reality in dualisms that are immanent to capitalist development.

Green Arithmetic and its language of converging crises does more than misrecognize nature and capitalism. It is unable to grasp the specific working-out of the present turning point. “The economy” and “the environment” are not independent of each other. Capitalism is not an economic system; it is not a social system; it is *a way of organizing nature*.

We can begin with a guiding distinction about this phrase: “a way of organizing nature.” Capitalism’s governing conceit is that it may do with Nature as it pleases, that Nature is external and may be coded, quantified, and rationalized to serve economic growth, social development, or some other higher good. This is capitalism *as a project*. The reality—the *historical process*—is radically different. While the manifold projects of capital, empire, and science are busy making Nature with a capital ‘N’—external, controllable, reducible—the web of life is busy shuffling about the biological and geological conditions of capitalism’s process. The “web of life” is nature as a whole: *nature* with an emphatically lowercase *n*. This is nature as us, as inside us, as around us. It is nature as a flow of flows. Put simply, humans make environments and environments make humans—and human organization.

There is no widely accepted term for the process through which civilizations, themselves forces of nature, are caught up in the co-production of life. And so Green thinkers, even those who pioneered new ways of seeing and thinking humanity’s place in nature, have tended to default to an older vocabulary: Society with a capital ‘S’.⁴ This is observation more than critique: we are products of our times. And those times are today different, different even from two decades ago. A new paradigm is now possible—it is breaking out all over, especially among younger scholars. I will call that new paradigm *world-ecology*. This book is a contribution to it, though far from an encompassing definition. World-ecology—or whatever name we end up attaching to this paradigm—is not only intellectually, but politically, necessary if we are to meet the challenges of the twenty-first century.

World-ecology makes one old argument, and one new one. On the one hand, the new paradigm unfolds from a rich mosaic of relational thinking about capitalism, nature, power, and history. On the other hand, world-ecology says that the relationality of nature implies a new method that grasps humanity-in-nature as a world-historical process. In this respect, Capra’s insistence that the world’s crises—debt, biodiversity, poverty, climate—are unified through a “crisis of perception” is correct.⁵ But we can take this insistence further. Modernity’s structures of knowledge, its dominant relations of power, re/production, and wealth, its patterns of environment-making: these form an organic whole. Power, production, and perception entwine; they cannot be disentangled because they are unified, albeit unevenly

and in evolving fashion. World-ecology asks us to put our post-Cartesian worldview to work on the crucible of world-historical transformation—understood not as history from above but as the fundamental co-production of earth-moving, idea-making, and power-creating across the geographical layers of human experience. Our task is to see how these moments fit together, and how their combinations change, quantitatively and qualitatively. From this perspective, I ask the reader to consider capitalism as a *world-ecology*, joining the accumulation of capital, the pursuit of power, and the co-production of nature in dialectical unity. Far from asserting the unfettered primacy of capitalism’s capacity to remake planetary natures, capitalism as world-ecology opens up a way of understanding capitalism as already co-produced by manifold species, extending even to our planet’s geo-biological shifts, relations, and cycles.

The crisis today is therefore not multiple but singular and manifold. It is not a crisis of capitalism *and* nature but of modernity-*in*-nature. That modernity is a capitalist world-ecology. Rather than collapse distinctions—the danger of Green holism—this perspective allows for the multiplication of questions that turn on the *oikeios*: the creative, generative, and multi-layered relation of species and environment. The *oikeios* names the relation through which humans act—and are acted upon by the whole of nature—in our environment-making. Through the *oikeios*, premised on the dialectic of life-making, we may open new pathways for investigating how capitalism’s historical geographies—past and present—are premised on specific configurations of humanity-in-nature. Such a perspective allows us to move beyond the “What?” and the “Why?” of today’s crises and towards a deeper understanding of *how* the crisis is likely to unfold in coming decades.

Key to realizing such a deeper understanding is developing a language, a method, and a narrative strategy that puts the *oikeios* at the center. Although the challenge cannot be reduced to conceptual language, neither can we make headway without confronting the problem of language. We must “name the system,” to borrow a phrase from the generation of Sixties radicals. If naming can be a first step to seeing, it is also more than a discursive act. In the circumstances of civilizational crisis, as the old structures of knowledge come unraveled without yet being interred, the imperative and the power of fresh conceptual language can become a “material force,” as Marx might say.⁶ Radicals have been good at this for a long time. The languages of gendered and racial domination have been significantly discredited, if as yet inadequately transcended. But I think the violence of the Nature/Society dualism has been given a pass. By this I mean something different from the Green critique of capitalism’s “war on the earth.”⁷ Rather, I am arguing that the dualism of Nature/Society—with a capital ‘N’ and a capital ‘S’—is complicit in the violence of modernity at its core. Just as we have been learning to move beyond the dualisms of race, gender, sexuality, and Eurocentrism over the past four decades, it is now time to deal with the source of them all: the Nature/Society binary. For this dualism drips with blood and dirt, from its sixteenth-century origins to capitalism in its twilight, every bit as much as the others. Perhaps even more.

If the politics of the present conjuncture demand a new vocabulary, the problems run much deeper. The old language—Nature/Society—has become obsolete. Reality has overwhelmed the binary’s capacity to help us track the real changes unfolding, accelerating, amplifying before our eyes. And yet, a new language—one that comprehends the irreducibly dialectical relation between human and extra-human natures in the web of life—has yet to emerge. Not for want of trying, I know: cyborgs, assemblages, networks, hybrids, and many more have been offered as a way forward. They *have* pointed the way forward. They have not, however, directly challenged the dualist framing of world history. For those concerned about the earth, its people, and the web of life, the great patterns and processes of modern world history have remained firmly encaged within the prison house of the Cartesian binary. No theoretical critique will open the cage. Such opening requires that we build an alternative

to the logic of dualism, and this requires new methodological procedures, narrative strategies, and conceptual language *all at the same time*.

The Cartesian narrative unfolds like this. Capitalism—or if one prefers, modernity or industrial civilization—emerged *out of* Nature. It drew wealth *from* Nature. It disrupted, degraded, or defiled *Nature*. And now, or sometime very soon, Nature will exact its revenge. Catastrophe is coming. Collapse is on the horizon.

How we tell stories of our past, and how we respond to the challenges of the present, are intimately connected. For many environmentalists and Green scholars, the separation of humanity and nature has encouraged a way of thinking about history that privileges what humanity *does to* nature. This way of thinking lends itself quite readily to the catastrophist and collapse narratives that have gained such traction in Green Thought, and among wider scholarly and popular audiences.⁸ An alternative begins neither with “humans” nor with “nature” but with the *relations* that co-produce manifold configurations of humanity-in-nature, organisms and environments, life and land, water and air. “History,” in this sense, is the history of a “double internality”: humanity-in-nature/nature-in-humanity. (And yes, there is a longer history of earth and all the rest that precedes humans.) In this double internality, everything that humans do is *already* joined with extra-human nature *and* the web of life: nature as a whole that includes humans.

This argument is—and at the same time is not—a commonplace. *Capitalism in the Web of Life* builds on the groundbreaking contributions of what I will call Green Thought (an imprudent but necessary generalization). Green Thought, broadly conceived, is that diverse tradition in the humanities and social sciences concerned with environmental change, past and present. It comprises some elements of the physical sciences, especially those scholars concerned with planetary change.⁹ This book highlights three of Green Thought’s defining features: the reduction of humanity to a unified actor; the reduction of market, production, political, and cultural relations to “social” relations; and the conceptualization of Nature as independent of humans, even when the evidence suggests the contrary.

Today, more than forty years after the first Earth Day, there is broad agreement among many environmentally oriented scholars, and most environmentalists, that humans are a part of nature. This is the perspective of humanity-in-nature. What to do with this awareness has been a vexing problem. It is one thing to say that humans are natural forces, and quite another to say that human organizations—families, empires, corporations, markets, and all the rest—are natural forces. Green Thought has embraced the former and resisted the latter. To say that humans are a part of nature feels good. To say that human organization is a part of nature feels wrong to most environmentalists, inside and outside the universities. For critical scholars—Red, Green, and many blends in between—the consensus is clear: capitalism acts upon a nature that operates independently of humanity. (And vice versa.) For a broader public concerned about climate and sustainability, a cognate consensus now reigns: humanity makes a “footprint” on the earth, which must be reduced.

Is the image of nature as passive mud and dirt—a place where one leaves a footprint—really the best metaphor to capture the vitality of the web of life? I think we can do better. This book tries to show that the hardened dualism of Nature/Society is not the only possible distinction. It is not even the best. To say that humans are a part of nature is to highlight the *specificity* of humanity within the web of life—its specific forms of *sociality*,¹⁰ its capacities for collective memory and symbolic production, and much more.

It has been a rocky road indeed to travel from humanity-in-nature to capitalism-*in*-nature. Does not such a journey deprive us of our ability to distinguish between “good” and “bad” human interactions with the rest of nature? Does it not leave us powerless to explain the specifically human, and the specifically natural, in the contemporary plunge into global crisis?

I do not think so. This book is an effort to explain why. And it is an attempt to show that a view of humanity as natural force allows us to see new connections between human nature, global power and production, and the web of life. In an era of tightly linked transformations of energy, climate, food and agriculture, labor markets, urbanization, financialization, and resource extraction, the imperative is to grasp the inner connections that conduct flows of power, capital, and energy through the grid of capital accumulation—and in so doing, to shed new light on the limits of that very grid.

So the question bears repeating: If not Nature/Society, then *what?* The alternative, long outlined by Green Thought but rarely (*rarely*) practiced, inverts the Cartesian privileging of substances over relations. Instead of a contemporary world produced by two discrete, interacting, substances—Society and Nature—we might instead look at the history of modernity as co-produced, *all the way down and through*. One substance, Humanity, does not co-produce historical change with another substance, Nature. Rather, the species-specificity of humans is already co-produced within the web of life. Everything that humans do is a flow of flows, in which the rest of nature is always moving through us. The forms of sociality that we evolve reflect a species-specificity that is unusually plastic. In this, “consciousness” is not outside but inside. Consciousness itself is a “state of matter.”¹¹ The stories of human organization are co-produced by *bundles* of human and extra-human nature. Humans build empires on their own as much as beavers build dams on their own. Both are “ecosystem engineers.”¹² Neither exists in a vacuum.

To “bundle,” however, does not carry us nearly far enough. Even this metaphor inadequately grasps the intimacy, porosity, and permeability of humans and human organizations within the web of life. Absent a conceptual vocabulary that names the relations—rather than the end-points of Nature/Society—we will tend to default to a binary that reasserts the independence of human and extra-human natures. We must have a way of naming—and building the conversation through—the relation of life-making. In this relation, species make environments, and environments make species. It is a relation open to inorganic phenomena as well: plate tectonics, orbital variation, meteors, and much more “make” environments too. So we begin with an open conception of life-making, one that views the boundaries of the organic and inorganic as ever-shifting.¹³ It is a multi-layered relation through which there are no basic units, only webs within webs of relations: “worlds within worlds.”¹⁴

THE OIKEIOS: TOWARDS ENVIRONMENT-MAKING

Capitalism in the Web of Life takes flight by naming this relation of life-making: the *oikeios*. From this relation—as much methodological orientation as ontological claim—we can see manifold species-environment configurations emerge, evolve, and ultimately become something else entirely. In what follows, ecology, nature, and all manner of cognate phrases derive from the *oikeios*. To be clear, the *oikeios* is a relation that includes humans, and one through which human organization evolves, adapts, and transforms. Human organization is at once product and producer of the *oikeios*: it is the shifting configuration of this relation that merits our attention. In this spirit I understand “capital” and “capitalism” as producers and products of the *oikeios*. Capitalism as *world-ecology* is therefore not the ecology of the world, but a patterned history of power, capital, and nature, dialectically joined.¹⁵

As we see in [Chapter One](#), the concept of the *oikeios* goes back to Theophrastus. My usage extends the concept, drawing on trailblazing insights, from scholars across the Two Cultures, on dialectical method.¹⁶ Naming the relation through which the mosaic of species-environment configurations form and re-form—above all those swirling around (and within)

humanity—is indispensable. To go forward without naming the relation is to end up where we began: re-labeling Society and Nature as human and extra-human nature.

The *oikeios* lets us ask two important questions from the beginning. Both invert Green Thought's most basic questions: How did humanity become separated from nature? And how do humans disrupt nature, causing environmental degradation? (And eventually, crisis?) From the perspective of the *oikeios*, we are led to very different questions. First, how is humanity *unified* with the rest of nature within the web of life? Second, how is human history a *co-produced* history, through which humans have put nature to work—including other humans—in accumulating wealth and power?

The first question—how is humanity *unified* with and within nature?—encourages us to ask how specific human organizations are premised on internal variation realized through the web of life. There is a widespread conviction among critical scholars that Nature/Society is the best way to highlight the specificity of “social” relations. Holism seems to obscure this. But holism only obscures specificity when severed from a dialectical method. Dualism is a blunt instrument for discerning specificity. The most elementary forms of differentiation—let us say, class, race, and gender, although this hardly exhausts matters—unfold as bundles of human and extra-human natures, interweaving biophysical and symbolic natures at every scale. The relations of class, race, and gender unfold through the *oikeios*; they are irreducible to the aggregation of their so-called social and ecological dimensions. And if I have framed the point through the *oikeios*—which permits an alternate way of seeing differentiation—the elements of the argument have been with us for a long time. Modern class relations emerge through early capitalism's primitive accumulation—an audacious movement of environment-making if there ever was one. Modern gender relations were forged through this same process of capitalist agrarian transformation—on both sides of the Atlantic—and symbolically encoded, not least through the era's successive scientific revolutions.¹⁷ Modern racism was born of the transatlantic slave trade, the human pivot of the sugar commodity frontier: among the era's decisive motors of capital accumulation and greatest commodity-centered force for landscape transformation that humanity had ever seen.¹⁸

I write these words because some may be tempted to read this argument as another case of *big history* and *big theory*. In my view, there is no such thing as big history or big theory, only history and theory that informs our knowledge of historical-geographical patterns. These may be patterns that obtain over large and small space, long or short *durées*. Patterns of class, race, and gender—and of course, others—can be made more sensible through a method that seeks to pinpoint the rules and patterns of reproducing power and wealth, production and reproduction, in specific historical systems ... and specific historical natures. (Such systems are, to be sure, multi-layered and uneven.) And if these rules have often been called structural, I prefer a different metaphor: civilizations as “coral reefs of human existence,” but not only of human existence.¹⁹ Their physical structures, ways of seeing, and methods of producing are born of trillions of creatures reproducing daily and intergenerational life.

My focus in this book is trained upon capitalist civilization—a co-produced world-ecology of capital, power, and nature. And if the capitalist world-ecology “as a whole” is more than the sum of its parts, it is also surely less. One cannot do everything at once. Whatever insights I have gained stem from a world-ecology perspective—pivoting the *oikeios*—that has allowed me to grapple with the problem of capital accumulation and the transformation of the earth in new ways.

The *oikeios* enables—but on its own does not accomplish—a theory of capital accumulation in the web of life. For me, the *oikeios* is compelling because it allows me to name the relational process implicit in two of the most frequently quoted passages in geographical thought since the 1970s. The first is that capital incessantly drives towards the “annihilation of space by time.”²⁰ Capital seeks to create a world in which the speed of capital

flows—its turnover time—constantly accelerates. The privileging of time over space in capital's project is not passive but active: every effort to accelerate turnover time implies a simultaneous restructuring of space. The second is Lefebvre's powerful observation that capital not only occupies, but also *produces*, space.²¹ Space is not incidental; the accumulation of capital *is* the production of space. Accumulation crises do not only produce spatial restructuring after the fact; they are, *in themselves*, products and producers of spatial configurations whose contradictions have reached a boiling point. From these two observations, the signal contribution of nearly a half-century of radical geographical thought goes something like this: all social relations are spatial relations; social relations develop through, and actively co-produce, space; spatial configurations are always in motion, but are also "fixed" for definite periods of time. Space is, then, not simply "out there" but joins in specific complexes of social relations and "built environments" that shape the possibilities for contingency, but not infinitely so.²²

When geographers say *space*, may we not also say *nature*? All social relations are spatial relations, relations within the web of life. Socio-spatial relations develop through nature. All species "build" environments—they are "ecosystem engineers." But some engineers are more powerful than others. Humans have been especially powerful. This is not simply because of thought and language—which are of course central—but also because hominid evolution favored distinctive extroversions: a smaller digestive system and the use of fire as an external stomach; a narrower birth canal and community as external womb; less hair and the production of clothing and shelter as external fur. That list could be extended. The point is to highlight the ways in which evolutionary processes were powerfully co-produced: humanity is a species-environment relation.

It is, clearly, also historical. Capitalism's dynamism owes much to a specific, and absurd, way of dealing with this relation: by severing it symbolically, and then acting accordingly. (Thus, what was "natural" became a crucible of legitimation.) This specific and absurd mode of environment-making is revealed in today's biocidal wreckage. For five centuries it has served to liberate, then fetter, then restructure and renew capital accumulation. The attendant accumulation crises have been cyclical—making possible contingent outcomes through crisis—but also cumulative. Importantly, the cumulative trend shapes the possibilities for the cyclical resolution of accumulation crises: a point underscored by contemporary resource depletion and the accumulation of greenhouse gases in the atmosphere.

Like many readers, I suspect, I have little patience with grand theory. No one theory can answer the questions I pose in this book. Only a relational method and made of theorizing will suffice. My intention is to elaborate a method that carries the core insights of Marxism and environmental historiography into a new synthesis. This synthesis says that environment-making is much more than a story of environmental consequences. It is a story of how power and re/production in its quotidian, civilizational, and commercial forms are, *already*, environmental history. Power and production—and so much more—are "environmental." This allows us to move from environmental histories *of* modernity to modernity's projects and processes *as* environmental history—as environment-making processes. My point of departure therefore privileges the patterned and the specific. Specificities emerge within world-historical patterns, what I call *historical natures*²³—even and especially when the topic seems removed from these concerns (e.g. labor, financialization).

Dualism does not allow for greater specificity in our understanding of "social" relations for a very good reason: it takes human differentiation as forming outside the *oikeios*. This comprises not only the accumulation of capital but also enduring patterns of class, gender, race, and nation. Are these not better understood as products and producers of the *oikeios*? From here we may ask, How do humans *fit* into the web of life, understood as a totality of distinctive and interpenetrating evolutionary trajectories? And how are the cycles and trends

of human organization subjected to recurrent moments of chaos and restabilization? For me, the implications of privileging the differentiated unities of humanity-in-nature/nature-in-humanity have made it impossible to go back to the dualist view. Rather than separate humans from nature, capitalist civilization has enmeshed individual life-activity into a web of life whose interconnections are much denser, more geographically expansive, and more intimate than ever before. And far from being a recent development, the processes that have turned our breakfasts, our cars, and our working days into world-historical activity find their origins in the “long” sixteenth century (1451–1648).

The unity of humans with the rest of nature gets us part of the way towards a world-ecological reading of human history. And yet, this kind of philosophical statement—humans are a part of nature, and so on—has been around for a long time. The *oikeios* is offered as a bridge between philosophical claim and historical method. The bridge works by inverting the premise of most environmental thought in the humanities and social sciences. Rather than presume humanity’s separation, in the recent or distant past, the *oikeios* presumes that humanity has always been unified with the rest of nature in a flow of flows. What changes are the ways in which specific aspects of humanity, such as civilizations, “fit” within nature.

In this book, nature assumes three major forms: human organization; extra-human flows, relations, and substances; and the web of life. These are not independent; rather, they are interpenetrating, and their boundaries and configurations shift in successive historical-geographical eras. This last is pivotal: nature is not “just there.” It is *historical*. This way of seeing leads us to a second major inversion. Instead of asking what capitalism *does to* nature, we may begin to ask how nature *works for* capitalism? If the former question implies separation, the latter implicates unification: capitalism-in-nature/nature-in-capitalism. It allows us to grapple with a new set of relations, hitherto obscured by the dualism of Nature/Society.

How is nature’s work/energy transformed into value? This is the crux of the problem faced by capitalism today. The question shifts our thinking away from too much of one thing (humans, or capitalism) and too little of another thing (Nature), and towards the *longue durée* relations and strategies that have allowed capitalism-in-nature to survive. And capitalism has survived not by destroying nature (whatever this might mean), but through projects that compel nature-as-*oikeios* to work harder and harder—for free, or at a very low cost. Today, it is becoming increasingly difficult to get nature—of any kind—to work harder. Inverting the problem of degradation shifts our initial premise from working *on* to working *through* nature. (And, in turn, to being worked *through* by the web of life.) This opens a new set of questions about how this limit—the limit of putting nature to work—may be a fundamental barrier to capital accumulation in the twenty-first century.

These inversions—of humanity-in-nature, of nature working for capitalism—are dialectical, not mechanical. Hence, the double internality. Capitalism does, of course, impose real and violent transformations on planetary life. But the unilateral model—doing *to* rather than acting *through*—cannot get us where we need to go. It cannot move us towards a deeper, *and more practical*, understanding of capitalism’s manifold crisis today. These two inversions open a new vista through which we can explore and reconstruct how capitalism produces new conditions for its recurrent booms, and through which the contradictions that follow have been resolved. By situating these dynamics within the *longue durée* of historical capitalism, we can throw into sharp relief the relation between cyclical movements (phases of capitalism) and the accumulation of socio-ecological contradictions in life, capital, and power over the past five centuries.

Taking the double internality of human organization as our guiding thread, we can begin to reconstruct narratives of two *simultaneous* movements. the first is capitalism’s internalization of planetary life and processes, through which new life activity is continually

brought into the orbit of capital and capitalist power. The second is the biosphere's internalization of capitalism, through which human-initiated projects and processes influence and shape the web of life. This guiding thread—framed as a double internality—allows us to move beyond a kind of “soft” dualism that re-presents the dialectic of human and extra-human natures as an alternative to Nature/Society.

My focus in this book is capitalism as project and process: the logic of capital and the history of capitalism. This capitalism is not, as we have seen, a narrow set of economic or social relations, since these categories are part of the problem. Capitalism is, rather, best understood as a *world-ecology* of capital, power, and re/production in the web of life. The point of view of capitalism as a whole—and the decisive conditions and contradictions of the accumulation process—is but one possible vantage point. Without a world-historical reconstruction, however, the critique of Nature/Society dualism will remain theoretical when it needs to be methodological and *historical*. My central thesis is that capitalism is historically coherent—if “vast but weak”—from the long sixteenth century; co-produced by human and extra-human natures in the web of life; and cohered by a “law of value” that is a “law” of Cheap Nature. At the core of this law is the ongoing, radically expansive, and relentlessly innovative quest to turn the work/energy of the biosphere into capital (value-in-motion).

The concept of work/energy looms large in this argument. It allows us to pierce the Cartesian fog that surrounds the unity of human and extra-human work.²⁴ Marx's observation that large-scale industry is a mechanism for turning “blood into capital” was no mere polemic. It was a means of highlighting the ways that the capital-relation transforms the work/energy of *all* natures into a frankly weird crystallization of wealth and power: value ([Chapter Two](#)).

Work/energy helps us to rethink capitalism as a set of relations through which the “capacity to do work”—by human and extra-human natures—is transformed into value, understood as socially necessary labor-time (abstract social labor). “Work/energy” (or *potential* work/energy) may be capitalized—as in commodified labor-power via the cash nexus—or it may be appropriated via non-economic means, as in the work of a river, waterfall, forest, or some forms of social reproduction. My conceptualization follows White's view of

energy as the capacity to do work. Work, in turn, is the product of a force acting on a body and the distance the body is moved in the direction of that force. Push a large rock and you are expending energy and doing work; the amount of each depends on how large the rock and how far you push it. The weight and flow of water produce the energy that allows rivers to do the work of moving rock and soil: the greater the volume of water in the river and the steeper the gradient of its bed, the greater its potential energy.²⁵

White's sketch is focused on the geophysical work/energy implied in the historical geography of a river (the Columbia, in this instance). But work/energy is also about organic life: from photosynthesis to hunting prey to bearing children. What bears emphasis is *how* the work/energy of the web of life is incorporated into the relations of power and re/production. Food—in capitalism as for all civilizations—is a crucial nexus of all these (see [Chapter Ten](#)). The work/energy concept allows us to transcend the metabolic fetish of Green materialism, in which living flows are narrowly biophysical, can be disrupted, and can be subsequently repaired to some Edenic, pristine state. The work/energy alternative sees metabolism through the double internality: flows of power and capital in nature, flows of nature in capital and power. In this, the issue is not “metabolic rift” but *metabolic shift* ([Chapter Three](#)).

To this conception of work/energy we may add an outline of labor productivity. Labor productivity is understood in terms of the rate of exploitation and the production of surplus value. The usual Marxist model turns on the relation of machinery and labor-power: more

powerful machines allow the average worker to produce more average commodities. Many wrinkles have been added to the model: organizational innovation, labor process rationalization, the impact of transportation, information, and communications technologies. Within this model, the rate of exploitation (surplus value production) increases when the average worker produces a rising mass of value (often, a rising physical volume of commodities), so long as wages increase more slowly than productivity. Alternatively, exploitation may advance when the worker produces a static mass of value, so long as wages decrease. Thus, accumulation may advance on the basis of rising wages and rapidly advancing productivity, as during Fordism, or on the basis of falling (or static) wages and very slow productivity growth, as during the neoliberal era. Part of this dynamic is captured in the classic distinction between relative and absolute surplus value. In this, a twentieth century auto plant would embody relative surplus value (rising labor productivity per hour) whereas textile production in the sixteenth century typifies absolute surplus value, in which the production of surplus value was determined by the number of hours worked, not by rising output per hour.

I worry that this distinction between absolute and relative surplus value has too often been hardened into categorical difference. For one, the usual Marxist thinking on the subject presumes early capitalism as static, certainly not a system characterized by the production of relative surplus value. The great advances of the nineteenth century obscured the *equally* significant advance in labor productivity after 1450 (see [Chapters Seven](#) and [Eight](#)). My point, however, extends beyond the historical observation. The reason both Reds and Greens see “real” capitalism emerging after 1800 turns on a reluctance to look at how capital, science, and empire appropriated nature—including the unpaid work/energy of humans—in service to surplus value production. In metals and mining, shipbuilding, agriculture, textiles, and many other strategic sectors of early capitalism, labor productivity advanced dramatically through new techniques and procedures of harnessing nature’s bounty. Early capitalism mobilized technical innovation, systemic violence, and symbolic innovation to lengthen the working day *as well as* to produce and appropriate Cheap Nature so as to reduce *de facto* unit labor costs. In such situations—here I think of Norwegian forests or Polish grain or even African slaves—the appropriation of “natural fertility” (Marx) may act like an increase in relative surplus value. Appropriated nature becomes a productive force. If one includes the conquest of the Americas, the direct and indirect implications for labor productivity growth were gigantic. The appropriation of global natures and the accumulation of capital are closely joined through the production of surplus value. From this perspective, we may reasonably ask: Does the ongoing closure of frontiers today signal an exhaustion of capitalism’s Cheap Nature strategy, with its prodigious history of appropriating uncommodified nature as a way to advance labor productivity?

These questions suggest a rethinking of value. Value operates through a dialectic of exploitation and appropriation that illuminates capitalism’s peculiar relation with, and within, nature. The relations of exploitation produce abstract social labor. The relations of appropriation, producing abstract social nature, enabled the expanded accumulation of abstract social labor. On the one hand, the system turns on a weird coding of what is valuable, installing human work within the commodity system as the decisive metric of wealth. This work is usually conceptualized as wage-labor: a term that I will treat expansively, and not limited to the ideo-typical figure of the proletarian.²⁶ In this domain, the exploitation of labor-power is the pivot upon which all else turns. On the other hand, the exploitation of wage-labor works only to the degree that its reproduction costs can be checked. The mistake is to see capitalism as defined by wage-labor, any more than it is defined by the world market. Rather, the crucial question turns on the historical-geographical connections between wage-work and its necessary conditions of expanded reproduction. These conditions depend on

massive contributions of unpaid work, outside the commodity system but necessary to its generalization. Sometimes this is called the domain of social reproduction,²⁷ although the adjective “social” here seems especially unsuitable—where does the “social” moment of raising children end, and the “biological” moment begin? Clearly, we are dealing with a zone of reproduction that transcends any neat and tidy separation of sociality and biology, which are better viewed as internal to each other. Neither is this zone of reproduction—the domain where unpaid work is produced for capital—a narrowly human affair. For unpaid work not only makes possible the production of potential—or the reproduction of actual—labor-power as “cheap” labor; it also involves the unpaid work of extra-human natures. In this domain of reproduction, the *appropriation* of unpaid work is central (Chapters Two and Nine).

My use of *appropriation* therefore differs from that of Marx, who deployed the term more or less interchangeably with the exploitation of wage-labor. Appropriation, in what follows, names those extra-economic processes that identify, secure, and channel unpaid work outside the commodity system into the circuit of capital. Scientific, cartographic, and botanical revolutions, broadly conceived, are good examples, themes we explore in [Chapter Eight](#). Movements of appropriation, in this sense, are distinct from movements of the exploitation of wage-labor, whose tendential generalization is premised on the generalization of appropriative practices. So important is the appropriation of unpaid work that the rising rate of exploitation depends upon the fruits of appropriation derived from Cheap Natures, understood primarily as the “Four Cheaps” of labor-power, food, energy, and raw materials.

This Cheap Nature project—appropriating uncapitalized nature as the pedestal of labor productivity—cannot be understood as a narrowly economic process. At the heart of modernity’s co-productions is the incessant reworking of the boundaries between the human and the extra-human. Yes, the distinction between humans and the rest of nature is longstanding. Never before, however, had a civilization organized around a *praxis* of external nature: a world-praxis in which representations, rationality, and empirical investigation found common cause with capital accumulation in creating Nature as external. The boundary setting between what was, and what was not, “natural” was intellectually arbitrary—and often deeply racist and patriarchal. It was not, however, *historically* arbitrary, but patterned strongly on capital’s law of value as a law of Cheap Nature. Consider the tightly bound connection between science and gender across the early modern era;²⁸ the early sixteenth-century debates between Las Casas and Sepúlveda over “natural slaves”;²⁹ or the colonial designation of indigenous peoples in the later sixteenth-century Andes and elsewhere as *naturales*.³⁰ Of course, early capitalism’s boundary-setting procedures were more than representational and ideological; they were also bound up with new modes of knowledge production. Bookended by Copernicus and Newton (c. 1470s-1720s) we see “irreversible and fundamental changes ... [in] Western regimes for the *discovery, development and diffusion of such knowledge ... radically transformed in scope and scale.*”³¹

But there was more to this than the accelerating “comprehension of the natural world.”³² Such comprehension unfolded within a historical project that aimed at rendering nature external—Nature with a capital ‘N’—the better that it could be subordinated and rationalized, its bounty extracted, in service to capital and empire.

As capitalism evolves and restructures, so do the terms of the double internality. Every phase of capitalism has woven together new *and* old strands of the *oikeios*: thus do new historical capitalisms and new historical natures flow together. These historical natures take shape out of modernity’s manifold revolutions—scientific, industrial, bourgeois, agricultural, financial, demographic, and all the rest. They unfold through, while creating anew, the *oikeios*.

The *oikeios* points us towards an alternative. Capitalism makes nature. Nature makes capitalism. Both are true, provided we take these as interpenetrated realities in which “capitalism” is co-produced. This is not—emphatically not—the co-production of two separate entities: Humanity and Nature. Capitalism is a co-produced history of human-initiated projects and processes bundled with (and within) specific natures. Historical-geographical specificity is called for at every step. The web of life itself evolves historically. In this, “nature” (and its cognates) is a way of conceptualizing not merely the objects of capitalist activity. For the web of life is more than “taps” and “sinks.” It is the field upon which capitalism unfolds. And we can go still further. Nature is no static field, but is itself renewing and evolving in cyclical and cumulative fashion. Nature is, above all, *historical*.

This means two things. First, capitalism does not “produce” nature in a linear fashion, but is an evolving whole that joins the accumulation of capital, the pursuit of power, and the co-production of nature. Second, capitalism is not a structurally invariant, monolithic Society, acting upon a structurally invariant, external Nature. Rather, the history of capitalism is one of successive *historical natures*, which are both producers *and* products of capitalist development. The point is elementary but underappreciated. At a time when no serious critical scholar would undertake a study of neoliberal capitalism by using “production in general,”³³ much of Green Thought continues to embrace a notion of “nature in general.” This point may seem far removed from contemporary political questions. I wish to suggest that it is anything but. For the concept of “nature in general” has made it easy for many scholars and activists to embrace the apocalyptic imaginaries of catastrophe and collapse. Absent the specification of historical natures that encompass humanity, nature-in-general has driven Green politics into an “either/or” position: sustainability or collapse.³⁴

Although the distinction between humans and the rest of nature has a long history that predates capitalism, the construct of Nature/Society is thoroughly modern. The notion that social relations (humans without nature) can be analyzed separately from ecological relations (nature without humans) is the ontological counterpoint to the real and concrete separation of the direct producers from the means of production. From this perspective, revolutions in ideas of nature and their allied scientific practices are closely bound to great waves of primitive accumulation, from early modernity’s Scientific Revolution to neoliberalism’s genomic revolutions ([Chapter Eight](#), “Abstract Social Nature”).

I have called this Nature/Society dualism Cartesian. The term *Cartesian* derives from René Descartes’ famous argument about the separation of mind and body. I use it to name philosophical and analytical worldviews—and modes of enquiry—that conceptualize society and nature as ontologically discrete. These worldviews emerged during an era of “scientific revolution.” We might also call it a Cartesian revolution. This revolution did three major things. It “imposed an ontological status upon entities (substance) as opposed to relationships (that is to say energy, matter, people, ideas and so on became things).” Second, “it imposed ... a line in which a logic of either/or (rather than both/and) predominated.”³⁵ And finally, it strongly favored the “idea of a purposive control over nature through applied science.”³⁶

Descartes hardly stands alone; he represents a broader historical movement towards the dualisms at the core of bourgeois thought. The emergence of Nature—the environment—was a symbolic-material process that began at least a century before Descartes, and continues to this day. One can quibble about names, but Descartes’ biography is instructive: he wrote most of his major works between 1629 and 1649 while living in the Dutch Republic, the “model capitalist nation of the seventeenth century,” and the epicenter of a world-ecological revolution that stretched from Southeast Asia to the north Atlantic.³⁷

The relation between Descartes and Dutch capitalism is worth emphasizing, since new ideas of nature and the material transformations of capitalism are closely joined. The example of Descartes illustrates how different phases of capitalism—as environmental history—entail not only massive deforestation, pollution, food insecurity, and resource exhaustion, but also implicate new ways of seeing the world. Viewed in this light, the systematizing thrust of Descartes’ intellectual endeavors—his concern for the “systematic rationality of the universe”³⁸—can be viewed as both symptomatic of, and contributing to, the seventeenth century’s massive reorganization of power, capital, and nature. If the accumulation of capital is the proletarianization of labor,³⁹ it is also the production of knowledges aimed at controlling, mapping, and quantifying the worlds of commodification and appropriation. For early modern materialism, the point was not only to interpret the world but to control it: “to make ourselves as it were the masters and possessors of nature.”⁴⁰ In the history of capitalism, the “material” and the “symbolic” form an organic whole.

Cartesian dualism is a peculiar creature. These abstractions of Nature/Society separate symbolically what is unified practically in the history of capitalism: the life activity of the human species in the web of life. On the one hand, the binary is clearly falsifying and confused. It presumes an ontological separation that animates historical narratives in which relations between human (“social” relations) are theoretically independent of relations between humans and the rest of nature. The binary, moreover, confuses particular natures that are objects of capitalist development with nature as the matrix within which capitalism develops. Nature/Society forms a binary of violent abstractions in Sayer’s sense of the term⁴¹—removing constitutive relations from the historical phenomena under investigation. One can no more extract “nature” from the constitution of capitalism than one could remove law, class struggle, the modern state, science, or culture.

On the other hand, a binary that is empirically falsifying does not deprive it of real historical force. Here the Cartesian binary is an “abstraction not as a mere mask, fantasy, or diversion, but as a force operative in the world.”⁴² The Cartesian binary is a curious sort of real abstraction, created out of the dialectic of value formation as abstract social labor and abstract social nature. It is an abstraction born of—and immanent to—capitalist development, with deep roots in early modern materialist and scientific revolutions, even as the “household concepts” of society, economy, and ecology assumed familiar form only after the nineteenth-century triumph of British capitalism.⁴³ Thus, an unorthodox value-relational approach regards the modernist cognition of the world—which I shorthand as the Cartesian binary—as constitutive of the bizarre disciplines and environment-making patterns inherent in regimes of abstract social labor. Cognition, too, must be grasped as a “material force” under conditions of bourgeois hegemony. Such a value approach does not dissolve the differences between symbolic and material, human and extra-human re/production—nor between the “economic” moment of abstract social labor and the “symbolic” moment of abstract social nature. Instead, I take such cohered differences as my starting point, without however collapsing the tension between the abstract and the concrete in human environment-making.

WORLD-ECOLOGY: WHAT’S IN A NAME?

If, as Marx proposes, humans are themselves “natural forces” and “natural beings”; if humans linked to nature as “nature is linked to itself”; if humans, in our life-activity, transform “external nature” through work, in so doing transform our “own nature” ... If all these hold, *philosophically*, then they ought to hold theoretically and methodologically. If they are plausible, the relations of humanity-in-nature ought to be fundamental to the stories we tell about our past, and about our possible futures. To follow through on Marx’s philosophy of internal relations is to grasp historical change as co-produced by humans and the rest of

nature—but not as two interacting boxes, or even overlapping circles in the well-worn style of a Venn Diagram. The dialectical thrust of Marx’s philosophy is to see humanity/nature as a flow of flows: as humans internalizing the whole of nature, and the whole of nature internalizing humanity’s mosaic of difference and coherence.

This is a challenge to the conceit of Cartesian dualism.

This conceit does not hold up well under close examination. Do a Google search. Get on an airplane. Shop for groceries. Pick up your child from school. Everything humans do, in our everyday lives, and in the major political, economic, and cultural events of our times, is bound up with the earth. Everything that we “do” is bound up with our ideas of this relation. “Nature” and “Society” were useful, for a time, in producing a rough-and-ready picture of global nature and humanity’s place within it. We may be One with nature, but the web of life is also extraordinarily diverse, and diversifying. Distinctions are clearly necessary.

If new distinctions are needed—and they clearly are—they cannot be made in the old ways. *A new mode of distinguishing* is necessary. And this is not easy, because etched in our socio-cultural DNA is a pre-conceptualization of what is and what is not Nature; what is and what is not Society. Worse, Cartesian dualism as a mode of distinguishing confuses the difference between ontological dualism and analytical distinction within evolving wholes. Our scholarly vocabularies, even after four decades of Green Thought, are still contained within—and constrained by—an essentially Cartesian notion of nature-society interaction. Nature goes into one box; Society goes into another. The two interact and shape each other, but the messily bundled and interpenetrating relations of manifold human and extra-human natures are abstracted from the movements of the parts, and the constitution of the Whole. The dualist construction of Nature and Society—Green Arithmetic—poses a question it cannot answer: the question of the Whole. Why? Because Nature plus Society does not add up. Something is missing.

Just what that *something* is can be summed up in two words: vocabulary and method. It is on this basis that I ask the reader to evaluate *Capitalism in the Web of Life*. The origins of this book can be located in two series of discussions that bookended the first decade of the twenty-first century. In one, at the turn of the new millennium, my fellow graduate students in the Department of Geography at UC Berkeley made our way towards a powerful conclusion: “physical” and “social” geography were in fact one, and ought to be brought together in a new synthesis.⁴⁴ A second series of conversations took shape with a wonderful group of graduate students at Lund University in 2009. In these conversations, we posed a question that was hardly new, but seemed to assume a new urgency after the near-meltdown of the world-economy in 2008. To what degree do we need, and to what degree is it possible, to construct a unified vocabulary that joins humanity-in-nature and nature-in-humanity? The call for such a unified vocabulary had been sounded many times before. Birch and Cobb had done so in their magnificent *Liberation of Life*.⁴⁵ Harvey did the same in his seminal essay on “The Nature of Environment.”⁴⁶ But to no avail. Such calls found some resonance in theory, and even here the most famous metaphors—Haraway’s cyborgs, Actor-Network Theory’s hybrids—found little resonance in the theory of historical change.

New conceptual languages cannot be invented; they can only emerge. Such emergence, in turn, can only be facilitated or obstructed. It has been one thing to call for a conceptual vocabulary that unifies the apparently independent ontological domains of the natural and the social. It is quite a different task to collaboratively develop such a conceptual language in a way that can be, first, legible, and second, readily put to work.

The barrier, it turned out, was methodological: not in terms of accumulating data, but in the ways that we go about bounding, or configuring, human and extra-human natures. The objects Nature/Society were so useful because they were pre-fabricated, legible, and fit easily with a popular imagination of Nature as “out there.” The bounding of time, space, and nature

was already done. Sophisticated analyses taking shape out of political ecology and critical geography problematized this, but almost without exception they did so on a regional-scale. In so doing, they reproduced another dualism: of regional change as “real” and global change as “theoretical.”⁴⁷ A method that unfolded the world-historical implications of both political ecology and critical geography awaited, one that would comprehend social relations as spatial relations as relations within the web of life.

To make this argument “work”—to practice what one preaches—is disorienting. Why? Because we are asked to give up the sacred distinction of Nature/Society, and to reconstruct historical objects—such as neoliberalism or Fordism or capitalism—as co-produced by human and extra-human natures. This challenge is all the more vexing because it entails new narrative strategies that go beyond the commonplace invocation of local-global connections and the theoretical assertion of capitalist dynamics in general. Such narrative strategies must transcend regionalism *and* globalism in order to see that capitalism, too, is a real *place*—every bit as much as Paris or the American Midwest or the Punjab. And it requires an approach that is willing to “tack” back and forth in an ongoing way—between the apparently “social” and the apparently “ecological” in search of the durable relations that co-produce wealth, power, and re/production across successive historical natures.⁴⁸

Forging a new synthesis that crystallizes our two levels of abstraction—humanity-in-nature, capitalism-in-nature—has so far eluded critical scholars. But the elements of such a synthesis are not lacking. Since the 1970s, we have frequently glimpsed the outlines of a unified theory of capital accumulation in its double internality: as capital’s internalization of nature, and as nature’s internalization of capital. Its philosophical basis is found in the relational holism implicit—however unevenly practiced—in both Red and Green Thought.⁴⁹ By the 1980s, the philosophical perspective joined—again, unevenly and implicitly—with a conceptualization of capitalism as *already* a relation of humans with the rest of nature.⁵⁰

However frequently we have glimpsed the possibilities, there has been too little movement in translating the philosophical position (humanity-in-nature) into historical method (capitalism-in-nature). There are many good—and some bad—reasons for the slow pace of transition from philosophy to method. Chief among the good reasons is this: it was, practically speaking, impossible to construct methods and narratives of historical change as co-produced when most nature was invisible—as was the case in world social science until the 1990s. In other words, the accumulation of knowledge about humanity *and* nature had to reach critical mass. Until it did—and it *has*—it was impractical to develop modes of analysis that pivoted, ontologically *and* methodologically, on the *oikeios*. For this reason, philosophy and meta-theory were ahead of their times. These contributions, especially those unfolding across the long 1970s, were deeply prefigurative, and often celebrated.⁵¹ But they were rarely embraced in the study of historical change. Historical change remained *social* change. Environmental consequences were added. Green Arithmetic thrived.

We have now reached a different moment. The proposition that historical change can be contained within the containers of “Nature” and “Society” is no longer tenable. The accumulation of knowledge about humanity and nature has reached critical mass. Our planetary knowledge continues to grow, and rapidly. At the same time, the growth of our understanding of how humans are made by the rest of nature, and of how nature is made by humanity has stalled. Nowhere is this clearer than in the popularity and influence of the dominant Anthropocene argument.⁵² In this framework, humans constitute a set of vectors—propelling the “Great Acceleration”⁵³—which threaten planetary crisis. Humans are placed in one category, Nature in another, and the feedbacks between them identified. The evidence amassed by the scholars working in the Anthropocene and cognate perspectives is indispensable. Such evidence helps us outline the problem, and descriptively answer the first key question, “What is occurring?” But such perspectives pose a deeper question they cannot

answer: *How do humans co-produce patterns and relations of power and production within nature?* The question cannot be answered in a dualist frame. And this dualist frame constrains our vision of the possible contours and deepening contradictions of the century ahead. For key to understanding the unfolding systemic crisis of the twenty-first century is a historical method—which implies a new radical *praxis*—in which human and extra-human natures co-produce historical change.

In the pursuit of such a method, Marx's philosophy of internal relations⁵⁴ guides us towards unifying humanity and nature not only epistemically, but ontologically; unified (if non-equivalent) on the terrain of modern world history. Here too, we find important prefigurative arguments that, like Green Thought, date from the 1970s. The translation of dialectics into historical method has always been fraught—everything is connected to everything, but always unevenly, always in motion, always with new points of fracture and new levers of change. It has been easier to assert a dialectical method than to practice it. The world-historical tradition learned this in the 1970s and '80s. The relationality of historical capitalism was celebrated, but developing world-historical narratives that revealed this relationality turned out to be exceedingly arduous.⁵⁵ In this, world-historical scholars discovered that it was one thing to pursue regional history imbricated in "world process"⁵⁶ and another thing entirely to relationally construct world-historical process as the object of investigation.

To treat the history of capitalism in and through a double internality that sees the ceaseless transformation of the earth in the endless accumulation of capital—and vice versa—was more vexing still. This was the project of integrating world accumulation with everyday life that Wallerstein and Arrighi⁵⁷ suggested, in distinct registers. Such a synthesis involves an ongoing movement between bodies and environment, production and reproduction, on the "ground floor" of everyday life and the dynamics of world accumulation, world power, and world knowledge. This means that capital and power do not act *upon* nature but develop *through* the web of life. They operate across geographical scales and they move in relation to the whole. That whole is neither world-scale process nor the aggregation of regional units but a dynamic totality with properties distinct from its scalar moments.

I have done my best to pursue this synthesis from the standpoint of work and the worker, though more expansively than conventional renderings of these terms. The transition from capitalism *and* nature to capitalism-*in*-nature asks us to place human bodies as sites of environmental history, as bodies engaged in producing "real" commodities and reproducing the "false" commodity, labor-power. From here, we can reconceptualize capitalism: as a system whose chief contradictions turn on the antagonism and interdependence of commodity-relations and the totality of the conditions of reproduction. The human body, in this frame, becomes a crucial site of the contradictions of world accumulation. Marx's great observation that capitalism "simultaneously undermine[s] ... the soil and the worker" applies well beyond the era of large-scale industry ... and well beyond the wage-worker.⁵⁸ The exploitation of labor-power and the appropriation of nature are interwoven in the system's drive towards endless commodification. From here, it follows that *all* relations between humans are always—already—relations at once "*of* nature" and "*to* the rest of nature." (There is a deep Cartesian bias to our conceptual language, such that we speak of humanity's relation *to* nature as if relations between humans were not, already, relations *of* nature.) To organize a historical analysis around such a relational and holistic perspective necessitates transcending an epistemic rift through which nature becomes Nature: a violent abstraction, an object, an ontologically separate "base" upon which the "superstructure" of Society develops.

At stake is an interpretation of global crisis appropriate to our times, and relevant to our era's movements for liberation. It is an open question as to whether we are facing a *developmental crisis* of capitalism—one open to resolution through new rounds of primitive accumulation and commodification—or an *epochal crisis*, one marked by an irreversible decline in capital's capacity to restructure its way out of great crises. From the twin crises of global urbanization and industrialization signified by “surplus humanity,” to the faltering productivist behemoth of industrial agriculture, to the seemingly endless commodity boom in food, metals, and energy, there are good reasons for considering that an epochal crisis may well be on the horizon.

This is a book about crisis, but not about “social” and “ecological” crisis as conventionally understood. As I will make clear, I do not believe “Society” and “Nature” exist, at least not in their dominant usage: humans without nature and nature without humans. Nor do I believe these are mere “social constructions.” They are, rather, abstractions at once violent and real. They are *violent*, in the sense that they abstract too much reality in the interests of conceptual clarity.⁵⁹ And they are *real*, in the sense that Society and Nature are in fact operative forces,⁶⁰ both in our knowledge structures and in capitalism's actually existing relations of power and production. Eschewing this, modernity's most sacred binary, I understand *all* forms of crisis—understood as turning points in the systemic organization of power and production—as bundles of human and extra-human nature. This is a big statement that implies manifold processes, the key point of which turns the conventional wisdom on its head: The crises of capitalism-in-nature are crises of what nature *does for* capitalism, rather more than what capitalism *does to* nature. This point of entry offers not only a fresh perspective—one that includes, centrally, the work of *human* natures—but also provides an opportunity for synthesizing two great streams of radical thought since the 1970s: the theory of accumulation crisis and the study of environmental crisis. For all the extraordinary work in both fields, the accounts of “how capitalism works” and “how capitalism creates planetary crisis” have not been synthesized, even by our most insightful theorists.⁶¹

Capitalism in the Web of Life is animated by the desire to translate the philosophy of humanity-in-nature into workable methodological frames, conceptual vocabularies, and narrative strategies for world-historical change. This is the core of the world-ecology perspective, which is just that—a *perspective*, not a theory. And certainly not a theory of everything. World-ecology is a *method* of bounding and bundling the human/extra-human/web of life relation—a manifold and multi-layered relation that encompasses everything from the micro-biome to the biosphere. And it is a *framework* for theorizing manifold forms of the human experience, past and present. No perspective can be the work of an individual; its development must be collective and cooperative. I encourage readers to consider this book not as a series of closed formulations—as is too often the case (for readers and authors like). Rather, I have written this book as a series of proposals and reflections on how to move beyond the Cartesian dualism that has so deeply fragmented our understanding of power, exploitation, work, and liberation. Some of these proposals will surely work better than others. As best I can, I have presented the historically grounded theorizations in this book—clustered around capital accumulation, global value-relations, and agro-ecological change—to demonstrate the kinds of questions that world-ecology can open up. To see “Wall Street as a way of organizing nature,” for instance, opens up questions that are prematurely—and unnecessarily—foreclosed by the dualisms of contemporary economic and ecological thought.

The argument can now be reprised. If humans are a part of nature, historical change—including the present as history—must be understood through dialectical movements of

humans making environments, and environments making humans. The two acting units—humanity/environments—are not independent but interpenetrated at every level, from the body to the biosphere. Perhaps most of all, it means that relations that seemingly occur purely between humans—say, culture, or political power—are already “natural” relations, and they are always *bundled* with the rest of nature, flowing inside, outside, and through human bodies and histories. And in this flow of flows, we are dealing with much more than microbes and metals and the rest of “material life”; we are dealing as well with ideas as material forces. In this, human history is understood as an “unbroken circle” of being, knowing, and doing.⁶²

Many environmental scholars worry that, in abandoning “the” environment as a singular rather than manifold object, we risk giving up the powerful insights of environmental studies. I think the opposite rings truer: the real relational movements of nature as a whole are obscured by the *a priori* fragmentation of Nature/Society. This breaks with the Green convention of tacking factors of an external Nature—what I will call “nature in general”—onto modern social relations. Nature is not a variable. Instead, we can begin by demonstrating that particular historical processes—in this book, world accumulation—are bundles of human and extra-human nature. These bundles are symbolically and materially enacted. And the limits that emerge are limits not of Nature or Society but limits of the *oikeios* in particular historical-geographical circumstances.

CONCLUSION

What if to say *historical* capitalism implies—*necessitates*—historical nature? And what if to say *historical nature*—since the long sixteenth century—implies and necessitates historical capitalism? These are the fundamental questions posed by the double internality. This line of questioning encourages, even compels, us to go beyond the now-commonplace and rarely specified invocation of Nature as one of several crises facing Humanity today. It asks us to examine how the web of life reshapes human organization—*as* a force of nature—and how civilizations forge power, production and reproduction as ways of organizing nature. It asks us to reflect upon our well-worn conceptualizations of capitalism: as economic system, as social system, as commodity system. For if the production of capital has been the strategic pivot of capitalism, to an even greater extent accumulation has unfolded through the appropriation of planetary work/energy. Such appropriation—of cheap resources, yes (“taps”), but also of cheap garbage (“sinks”)—does not produce capital as “value”; but it does produce the relations, spaces, and work/energy that make value possible. Capitalism *does* generalize commodity relations, but the actual extent of such generalization depends on an even greater generalization: the appropriation of unpaid work/energy.

This even greater generalization has today reached a boiling point. For the appropriation of Cheap Nature has not only compelled capital to seek out new sources of cheap labor-power, food, energy, and raw materials, but to enclose the atmosphere as a gigantic dumping ground for greenhouse gases. This enclosure—a relation of capital-in-nature—is today generating barriers to capital accumulation that are unprecedented, especially in agriculture. And at the risk of putting too fine a point on matters, this enclosure of the atmosphere is a *class* relation: not only as cause-effect sequence (“the capitalists did it!”) but as a necessary condition of world class relations over the past two centuries.

This way of thinking through the relations of capital-in-nature gives us an alternative to the “nature as external limit” model that dominates Red and Green thinking about ecological crisis, and about climate change in particular. The problem with such thinking is that it has closed down, rather than opened up, the big questions about the geographical flexibility and historical evolution of capitalism as world-ecology. The limits are real enough. But what is the best way to identify, to narrate, and to explain the emergence of these limits?

The choice is between a Cartesian paradigm that locates capitalism outside of nature, acting upon it, and a way of seeing capitalism as project and process within the web of life. If the destructive character of capitalism's world-ecological revolutions has widely registered—the “what” and the “why” of capitalism-in-nature—there has been far too little investigation of *how* humans have made modernity through successive, radical reconfigurations of all nature. *How* capitalism has worked *through*, rather than *upon* nature, makes all the difference. We have, I believe, arrived at a powerful educative moment. It is one that allows us to erase old boundaries and open new vistas, one where we can reconstitute each of these processes on the basis of the historically evolving *oikeios*. It allows for an understanding of modernity's historically specific natures as webs of liberation and limitation for the accumulation of capital, itself a way of organizing nature. The point can scarcely be overemphasized if we are to take seriously the idea that all limits to capital emerge historically, out of the relations of humans with the rest of nature. And in equal measure, so do all projects for the liberation of humanity and our neighbors on planet earth.

-
- 1 J. Rockström et al., “Planetary Boundaries,” *Ecology and Society* 14, no. 2 (2009).
 - 2 Cf. S. George, “Converging Crises,” *Globalizations* 7, no. 1–2 (2010): 17–22; J.B. Foster, “Marx and the Rift in the Universal Metabolism of Nature,” *Monthly Review* 65, no. 7 (2013): 1–19.
 - 3 P. McMichael, “The Land Grab and Corporate Food Regime Restructuring,” *Journal of Peasant Studies* 39, nos. 3–4 (2012): 681–701.
 - 4 Cf. D. Harvey, “The Nature of Environment,” in *Socialist Register 1993*, (1993), 1–51; F. Capra, *The Turning Point* (New York: Bantam, 1982); C. Merchant, *The Death of Nature* (New York: Harper & Row, 1980).
 - 5 F. Capra, *The Web of Life* (New York: Anchor, 1996), 4.
 - 6 K. Marx, *Critique of Hegel's 'Philosophy of Right'* (Cambridge, UK: Cambridge University Press, 1970 [1843]), 137.
 - 7 J.B. Foster, B. Clark, and R. York, *The Ecological Rift* (New York: Monthly Review Press, 2010).
 - 8 Cf. J. Diamond, *Collapse* (New York: Viking, 2004).
 - 9 Cf. W. Steffen, P.J. Crutzen and J.R. McNeill, “The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?” *Ambio* 36, no. 8 (2007): 614–21.
 - 10 We may “distinguish between ‘sociality’ and ‘society’. The latter, as contrasted with the ‘sensuous’ (sensible) immediateness of the particular individuals, is an abstraction: to grasp it one must transcend this immediateness of the individuals. ‘Sociality’, however, is actually inherent in every single individual. This is why a society may never be justifiably called ‘natural’, whereas sociality is rightly defined as man’s second nature.’ (I. Mészáros, *Marx's Theory of Alienation* [London: Merlin Press, 1970], 175).
 - 11 M. Tegmark, “Consciousness as a State of Matter,” *arXiv* 1401, no. 1219v2 (2014).
 - 12 J. Wright and C. Jones, “The Concept of Organisms as Ecosystem Engineers Ten Years On,” *BioScience* 56, no. 3 (2006): 203–9.
 - 13 C. Birch, and J.B. Cobb, *The Liberation of Life* (Cambridge: Cambridge University Press, 1981).
 - 14 R.E. Ley et al., “Worlds within Worlds: Evolution of the Vertebrate Gut Microbiota,” *Nature Reviews Microbiology* 6, no.10 (2008): 776–88.
 - 15 The original formulation of capitalism as world-ecology dates back more than a decade (Moore, “Capitalism as World-Ecology,” 2003), but the present argument is possible only because the world-ecology perspective has taken on a life of its own. The contributions of this book have been facilitated by a community of world-ecology scholars whose distinctive elaborations, powerful insights, and comradely encouragements have given this book a richness that would have been otherwise impossible: G. Avallone, “Tra finanziarizzazione e processi ecologici,” *Sociologia Urbana*

e Rurale, no. 101 (2013): 85–99; S. Deckard, “Mapping the World-Ecology,” *Ecologies Technics and Civilizations*, (forthcoming); M. Niblett, “World-Economy, World-Ecology, World Literature,” *Green Letters*, 16, no. 1 (2012): 15–30; C.R. Cox, *Synthesizing the Vertical and the Horizontal: A World-Ecological Analysis of ‘the’ Industrial Revolution* (M.Sc. thesis, Portland State University, 2014); A.G. Jakes, *State of the Field: Agrarian Transformation, Colonial Rule, and the Politics of Material Wealth in Egypt, 1882–1914* (PhD Diss., New York University, 2015); B. Marley, “The Coal Crisis in Appalachia: Agrarian Transformation, Commodity Frontiers, and the Geographies of Capital,” *Journal of Agrarian Change* (2015, early view); Roberto José Ortiz, “Latin American Agro-Industrialization, Petrodollar Recycling, and the Transformation of World Capitalism in the Long 1970s,” *Critical Sociology* (2014) online first; C. Parenti, “Environment Making State,” *Antipode* (early view); Tony Weis, *The Ecological Hoofprint: The Global Burden of Industrial Livestock* (London: Zed, 2013).

16 Cf. B. Ollman, *Alienation* (Cambridge: Cambridge University Press, 1971); R. Levins and R. Lewontin, *The Dialectical Biologist* (Cambridge, MA: Harvard University Press, 1985).

17 Cf. Merchant, *The Death of Nature* (1980).

18 Moore, “Ecology and the Rise of Capitalism,” Ph.D. dissertation (Department of Geography, University of California, Berkeley, 2007).

19 I. Wallerstein, *The Modern World-System I* (New York: Academic Press, 1974), 3.

20 K. Marx, *Grundrisse: Introduction to the Critique of Political Economy*, trans. M. Nicolaus (New York: Vintage, 1973), 424.

21 H. Lefebvre, *The Production of Space*, trans. D. Nicholson-Smith (Oxford: Blackwell, 1991).

22 D. Harvey, *The Limits to Capital* (Chicago: University of Chicago Press, 1982); M. Storper and R. Walker, *The Capitalist Imperative* (New York: Basil Blackwell, 1989); N. Smith, *Uneven Development* (Oxford: Basil Blackwell, 1984); E. Soja, *Postmodern Geographies* (London: Verso, 1989).

23 Following Marx and Engels; *The German Ideology* (New York: International Publishers, 1970), 41.

24 The origins of this concept and its typography—work/energy—come from Caffentzis, who situates the “energy” and “work” crises of the 1970s within a unified field. Caffentzis’ insight was to link “capital’s control over work across the planet ... [to] how energy commodities were ... used to impose once again the control that capital once had over the work process” (G. Caffentzis, *In Letters of Blood and Fire* [Oakland: PM Press, 2013], 2–3). This points strongly in the right direction. My use of work/energy extends it to capitalism’s unified logic of appropriating human and extra-human “work” that is transformed into value.

25 R. White, *The Organic Machine* (New York: Hill & Wang), 6.

26 We are justifiably cautious in defining the proletarian relation too narrowly. Modern slavery, for instance, was a form that entwined relations of exploitation and appropriation (S. Mintz, “Was the Plantation Slave a Proletarian?” *Review* 2, no. 1 [1978]: 81–98).

27 Cf. I. Bakker and S. Gill, eds., *Power, Production, and Social Reproduction* (New York: Palgrave Macmillan, 2003).

28 Merchant, *The Death of Nature* (1980).

29 B. Tierney, *The Idea of Natural Rights* (Atlanta: Scholars Press, 1997).

30 Stavig, “Ambiguous Visions,” *Hispanic American Historical Review* 80, no. 1 (2000): 77–111.

31 P. O’Brien, “Historical Foundations for a Global Perspective on the Emergence of a Western European Regime for the Discovery, Development and Diffusion of Useful and Reliable Knowledge,” *Journal of Global History* 8, no. 1 (2013): 15. Emphasis added.

32 Ibid.

33 Marx, *Grundrisse* (1973), 85.

34 Cf. R. Costanza et al, “Sustainability or Collapse,” *Ambio* 36, no. 7 (2007): 522–7.

35 M.J. Watts, “Nature: Culture,” in *Spaces of Geographical Thought*, eds. P. Cloke and R. Johnston (London, Sage, 2005), 150–1.

36 C. Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967), 427.

- 37 Marx, *Capital*, Vol. I, trans. B. Fowkes (New York: Vintage, 1977), 916; J. W. Moore, “‘Amsterdam Is Standing on Norway’ Part II: The Global North Atlantic in the Ecological Revolution of the Long Seventeenth Century,” *Journal of Agrarian Change* 10, no. 2 (2010).
- 38 W.J. Bouwsma, *A Usable Past* (Berkeley: University of California Press, 1990), 123.
- 39 Marx, *Capital*, Vol. I (1977), 763–4.
- 40 R. Descartes, *A Discourse on the Method of Correctly Conducting One’s Reason and Seeking Truth in the Sciences* (Oxford: Oxford University Press, 2006 [1637 orig.]), 51.
- 41 D. Sayer, *The Violence of Abstraction* (Oxford: Blackwell, 1987).
- 42 A. Toscano, “The Open Secret of Real Abstraction,” *Rethinking Marxism* 20, no. 2 (2008): 274.
- 43 Cf. E. Wolf, “Inventing Society,” *American Ethnologist* 15, no. 4 (1988): 752–761; T. Mitchell, *Rule of Experts* (Berkeley: University of California Press, 2002); J.B. Foster and B. Clark, “The Sociology of Ecology,” *Organization and Environment* 21, no.3 (2008): 311–352.
- 44 See especially R. Lave, et al., “Intervention: Critical Physical Geography,” *The Canadian Geographer* 58, no. 1 (2014): 1–10.
- 45 Birch and Cobb, *The Liberation of Life* (1981).
- 46 Harvey, “The Nature of Environment.”
- 47 R. Peet, et al., eds., *Global Political Ecology* (London: Routledge, 2011).
- 48 Geographical scale as co-produced by human and extra-human natures is provocatively explored by N. Sayre in “Ecological and Geographical Scale,” *Progress in Human Geography* 29, no. 3 (2005): 276–90.
- 49 Cf. B. Ollmann, *Alienation* (1971); R. Williams, “Ideas of Nature,” in *Ecology*, ed. J. Benthall (1972); D. Harvey, “Population, Resources, and the Ideology of Science,” *Economic Geography* 50, no. 3 (1974); A. Naess, “The shallow and the deep, long-range ecology movement,” *Inquiry* 16, no. 1 (1973): 95–100.
- 50 N. Smith, *Uneven Development* (1984); J. O’Connor, *Natural Causes* (New York: Guilford Press, 1998); J.B. Foster, *Marx’s Ecology* (New York: Monthly Review Press, 2000); P. Burkett, *Marx and Nature* (New York: St. Martin’s Press, 1999).
- 51 Cf. Smith, *Uneven Development* (1984).
- 52 Cf. W. Steffen et al., “The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?” (2007); “The Anthropocene: Conceptual and Historical Perspectives,” (2011); “The Anthropocene: From Global Change to Planetary Stewardship,” (2011).
- 53 Costanza et al., “Sustainability or Collapse” (2007).
- 54 Ollman, *Alienation* (1971); K. Kosík, *Dialectics of the Concrete* (Boston: D. Reidel Publishing, 1976).
- 55 See T. Hopkins, “World-Systems Analysis,” in *World-Systems Analysis*, ed. T.K. Hopkins, et al. (Beverly Hills: Sage, 1982), 145–58; Wallerstein, *The Modern World-System I* (1974); P. McMichael, “Incorporating Comparison Within a World-Historical Perspective,” *American Sociological Review* 55, no. 2 (1990): 385–97.
- 56 D. Tomich, *Slavery in the Circuit of Sugar* (Baltimore: Johns Hopkins University Press, 1990).
- 57 Wallerstein, *The Modern World-System I* (1974); G. Arrighi, *The Long Twentieth Century* (London: Verso, 1994).
- 58 Marx, *Capital*, Vol. I (1977), 638.
- 59 Sayer, *The Violence of Abstraction* (1987).
- 60 Toscano, “The Open Secret of Real Abstraction” (2008).
- 61 J.B. Foster et al., *The Ecological Rift* (2010).
- 62 H. Maturana and F. Varela, *The Tree of Knowledge* (Berkeley: Shambhala, 1987).
-

Part I

FROM DUALISM TO DIALECTICS: CAPITALISM AS WORLD-ECOLOGY

CHAPTER 1

From Object to *Oikeios*: Environment-Making in the Capitalist World-Ecology

Words are like empty balloons, inviting us to fill them up with associations. As they fill they begin to gain intrinsic force and at last to shape our perceptions and expectations. So with the word “ecology”...

(Worster, 1994)

For nearly half a century, Green Thought has wrestled with a double question. Is nature exogenous to the essential relations of human history, for the most part playing roles as tap (raw materials) and sink (pollution)? Or is nature a web of life encompassing all of human activity, comprising taps and sinks, but also much beyond? Is nature, in other words, a set of objects that humans act upon, or is it a web of life that human relations develop *through*?

The vast Green literatures that have emerged since the 1970s—political ecology, environmental history and environmental sociology, ecological economics, systems ecology, and many more—have developed by answering “yes” (in one form or another) to both questions. On the one hand, most scholars agree that humanity is indeed part of nature. They reject the Cartesian dualism that puts Society (without natures) in one box and Nature (without humans) in another. On the other hand, the conceptual vocabularies and analytical frameworks that govern our empirical investigations remain firmly entrenched in the *interaction* of these two basic, impenetrable units—Nature and Society. This “double yes” poses a real puzzle: How do we translate a materialist, dialectical, and holistic philosophy of humans-*in-nature* into workable (and *working*) conceptual vocabularies and analytical frameworks?

The arithmetic of Nature plus Society has been the bread and butter of environmental studies since the 1970s. The arithmetic bears distinctive linguistic inflections across the historical social sciences, and across the Two Cultures. Earth-system scientists talk about “coupled human-natural systems”;¹ Marxist ecologists speak of the “nature-society dialectic”;² cultural studies highlights hybrids, assemblages, and networks.³ Establishing this arithmetic as a legitimate domain of scholarly activity has been Green Thought’s greatest contribution. The environmental humanities and social sciences brought to light the other, previously forgotten or marginalized, side of the Cartesian binary: the world of environmental impacts. No small accomplishment, this. “The environment” is now firmly established as a legitimate and relevant object of analysis.

About this signal accomplishment, I would make two observations. First, the work of bringing nature as factor into the study of global change is now largely complete. It is

increasingly difficult to address core issues in social theory and social change without *some* reference to environmental change. There remains considerable unevenness, across the historical social sciences, in how environmentally oriented research is valorized (or not). But the core project of Green Thought, from the time it gathered steam in the 1970s, has been successful: the legitimacy and relevance of environmental research is no longer in question. This project was always infused with a dialectical sensibility.⁴ But its operationalization turned on an affirmation of the first question we posed at the outset—environment as object—rather than nature as the web of life. This prioritization—could it have been otherwise?—resulted in the disjuncture we encounter today: between humanity-in-nature (as philosophical proposition) and humanity *and* nature (as analytical procedure). This disjuncture lies at the core of the impasse in environmental studies today: an impasse characterized by a flood of empirical research and an unwillingness to move beyond environment as object. Nature with a capital “N” has been prized over the web of life. This impasse may be understood in terms of a generalized reluctance to refigure modernity as producer and product of the web of life.

My second observation therefore turns on the exhaustion of the Cartesian binary to deepen our understanding of capitalism, historically and in the present crisis. Today, that binary obscures, more than it illuminates, humanity’s place in the web of life. “Nature plus Society” appears especially unsuited to dealing with today’s proliferating crises—not least those linked to climate change and financialization—and also with the origins and development of these crisis tendencies over the broad sweep of modern world history.

Is it now necessary to move beyond the environment as object? Can the project of writing environmental histories *of* social processes adequately capture the manifold ways in which these processes are not only producers of environments, but also products of them? The idea that social organization carries with it environmental consequences has taken us far, but it is unclear just how much farther Green Arithmetic can take us.

But if Green Arithmetic cannot get us to where we need to go today, what can?

My response begins with a simple proposal. Needed, and I think implied by an important layer of Green Thought, is a concept that moves from the *interaction* of independent units—Nature and Society—to the dialectics of humans in the web of life. Such a concept would focus our attention on the concrete dialectics of the messily bundled, interpenetrating, and interdependent relations of human and extra-human natures. Needed, in other words, is a concept that allows a proliferating vocabulary of humanity-in-nature, rather than one premised on humanity *and* nature.

THE OIKEIOS: INTERACTION, DIALECTICS, AND THE PROBLEM OF AGENCY

I propose that we begin with the *oikeios*.

Oikeios is a way of naming the creative, historical, and dialectical relation between, and also always within, human and extra-human natures. The *oikeios* is shorthand: for *oikeios topos*, or “favorable place,” a term coined by the Greek philosopher-botanist Theophrastus. For Theophrastus, the *oikeios topos* indicated “the *relationship* between a plant species and the environment.”⁵ Properly speaking, *oikeios* is an adjective. But in the long journey towards a vocabulary that transcends the Two Cultures (the physical and human sciences), I hope the reader might excuse a few liberties with the language.

Neologisms come a dime a dozen in Green Thought. We needn’t not look far for concepts aiming to fuse or combine the relations of human and extra-human nature.⁶ And yet, after decades of vigorous Green theorizing and analysis, we still lack an approach that puts the *oikeios* at the center. Such a perspective would situate the creative and generative relation of

species and environment as the ontological pivot—and *methodological premise*—of historical change. This reorientation opens up the question of nature—as matrix rather than resource or enabling condition—for historical analysis; it allows the reconstruction of humanity’s great movements, from warfare to literature to scientific-technological revolutions, as if nature matters to the whole of the historical process, not merely as its context, or its unsavory consequences.

This is the intended contribution of the *oikeios*. Naming the relation through which humans (and other species) create the conditions of life—“definite modes of life” in Marx and Engels’ nicely-turned phrase⁷—immediately directs our attention to the relations that activate definite configurations of acting units and acted-upon objects. The *oikeios* is a multi-layered dialectic, comprising flora and fauna, but also our planet’s manifold geological and biospheric configurations, cycles, and movements. Through the *oikeios* form and re-form the relations and conditions that create and destroy humanity’s mosaic of cooperation and conflict: what is typically called “social” organization. Nature-as-*oikeios* is, then, not offered as an additional *factor*, to be placed alongside culture or society or economy. Nature, instead, becomes the matrix within which human activity unfolds, and the field upon which historical agency operates. From such a vantage point, the problems of food, water, oil (and so much more!) become relational problems first, and object problems second; through the relations of specific civilizations, food, water, and oil become real historical actors.

From the perspective of the *oikeios*, civilizations (another shorthand) do not “interact” with nature as resource (or as garbage can); they develop *through* nature-as-matrix. Climate change is a good example. Civilizations develop by internalizing extant climate realities, favorable and unfavorable. “Climate” is not a historical agent *as such*; it is no more a historical agent, in itself, than empires or classes abstracted from the web of life. *Historical* agency is irreducibly bundled in and through the *oikeios*. To lean on Marx, a species (or biospheric process) that does not have its agency outside itself does not exist.⁸ Agency, in others words, is not a property of Nature and (or) Society—not even of humanity’s spectacular forms of sociality. Agency is, rather, an emergent property of definite configurations of human activity with the rest of life. And vice versa.

Agency is clearly a key question for left ecology. Here I take agency as the capacity to induce historical change (to produce ruptures), or to reproduce extant historical arrangements (to reproduce equilibrium). It is a crude but useful distinction. To say that nature is a “historical protagonist”⁹ sounds quite attractive. But what does it really mean? Are we simply adding nature to a long list of historical actors? Or does recognition of nature-as-*oikeios* imply a fundamental rethinking of agency itself? We can read many arguments that seek to elucidate nature’s agency.¹⁰ It is not, however, clear how nature’s agency—whether conceived in Cartesian or dialectical terms—might clarify the making of the modern world. Does nature, say climate, “have” agency in the same way that classes or empires “make” history?

Yes and no. Part of the problem is the temptation to assign agency to both sides of the Cartesian binary. Climate, weeds, disease, in such assignments, “have” agency in a manner analogous to classes, capital, and empire. There has been a certain arithmetic logic to these assignments: if humans have agency, can we not say the same thing about extra-human natures? That sounds right, but does not, I think, adequately capture how agency unfolds. For relations of class, capital, and empire are *already* bundled with extra-human natures; they are configurations of human and extra-human natures. From this it follows that *agency is a relational property* of specific bundles of human and extra-human nature. Class power (and not only the agency of classes) derives and unfolds through specific configurations of power and (re)production in the web of life.

If nature is indeed a historical protagonist, its agency can be comprehended adequately only by stepping out of the Cartesian binary. The issue is emphatically not one of the agency of Nature *and* the agency of Humans. These are unthinkable without each other. Rather, the issue is how human and extra-human natures get bundled. Yes, diseases make history, but only as epidemiological vectors bound to commerce and empire. This is, too often, left out of arguments of nature's agency: the capacity to make history turns on specific configurations of human and extra-human actors. Human agency is always within, and dialectically bound to, nature as a whole—which is to say, human agency is not purely human at all. It is bundled with the rest of nature.

The world-ecological alternative takes these bundles of human/extra-human activity as its starting point. Civilizations are big, expressive examples of this dialectical bundling. From the large-scale and long-run patterns of human-led environment-making, we can discern historical facts from the practical infinitude of basic facts. Climate change, in this scheme of things, becomes a vector of planetary change woven into the very fabric of civilizational power and production (class, empire, agriculture, etc.). Hardly a recent phenomenon, this socio-ecological fabric stretches back millennia.¹¹ This is the spirit, if not always the letter, of much climate historiography.¹² When climate changes, so too change the structures of power and production. However, this is not because climate *interacts* with civilizational structures, causing problems at some point in these structures' otherwise independent lives. We might do better to reorient our vision, to see climate conditions as present at, and implicated in, the birth of these structures. Civilizations are unthinkable in the absence of climate—itsself (yet another) shorthand for a diversity of atmospheric processes that co-produce relations of power and production. As such, climate is but one bundle of *determinations*—not *determinisms*—that push, pull, and transform the rich totalities of historical change. When climate has changed dramatically, the outcomes have often been dramatic and epochal. Consider, for example, the eclipse of Rome after the passing of the Roman Climatic Optimum around 300 C.E., or the breakdown of feudal civilization with the coming of the Little Ice Age a thousand years later.¹³ But consider also those climate shifts favorable to the ascent of Roman power (c. 300 B.C.E.) or the dawning of the Medieval Warm Period (c. 800–900) and the rapid multiplication of new “charter states” across Eurasia, from France to Cambodia.¹⁴

The point is not to argue against climate change as historical vector; it is, rather, to situate that vector within the *oikeios*, and its successive historical natures.

The ontological point calls for its epistemological corollary. If climate's agency is a bundle of human and extra-human natures, these bundles are unevenly refracted through particular historical-geographical formations. Climate change (and climate is always changing) is a fact. Climate change is not, in itself, a *historical* fact, any more than population and production data. It belongs to the category of *basic* facts; these are the raw materials of historical explanation.¹⁵ Basic facts become *historical* through our interpretive frames. These frames—whether Cartesian, world-ecological, or something else—offer a way of sorting out basic facts, and assigning them to one or another category. One quite fashionable approach is to evade the thorny issue of historical facts altogether and declare oneself in favor of a flat ontology in which nothing necessarily causes anything else.¹⁶

But this will hardly be satisfying for those seeking explanations of crisis and change in historical capitalism. This has been the strength of a Red-Green Cartesian approach to global capitalism and global environmental change.¹⁷ Not so long ago, virtually all narratives of human history were organized as if nature—even in a Cartesian sense!—did not matter. Today, this has changed. A broadly conceived environmental history perspective has triumphed. Here the accumulating impacts of biospheric change have met up with the accumulating accomplishments of Green politics and Green Thought to produce a vast but

weak hegemony in the world university system. It is no longer possible to ignore the status of “nature” in social theory, and it is increasingly difficult to ignore the problem of nature in the history of capitalism at any scale. This hegemony says, in effect, that any attempt to interpret the broad contours and contradictions of world history without due attention to environmental conditions and changes is inadequate.

This is a major accomplishment. It is also one that has occurred within a limited frame. Green Thought has rarely challenged the hegemony of the Cartesian binary over the core conceptual language of historical change. Transcending the Nature/Society binary has been one thing to do philosophically, theoretically¹⁸ and through regional- and national-scale history.¹⁹ It has been quite a different enterprise for world-historical change.²⁰ Environmental change has been added to the history of capitalism, but not synthesized.

Weiner is surely correct when he identifies the spirit of the environmental history project in the twenty-first century: “We are all poststructuralists now.”²¹ By this, he means that environmental historians have come to see nature as irreducibly intertwined with the fundamental relations of historical change.²² (Whether this relation is best described as *poststructuralist* is another question.) But this now-common political ecology perspective has been reluctant to challenge the Cartesian binary on the terrain of historical capitalism. *Accumulation* is reckoned as a social process with environmental consequences, rather than a way of bundling human and extra-human natures.²³ Global political ecology and environmental history has embraced an environmental perspective that emphasizes the environmental history *of* social relations (Nature-plus-Society), rather than modernity’s “social” relations *as* producers and products of the web of life (society-in-nature/nature-in-society). Are we all poststructuralists now? Perhaps. But when it comes to historical capitalism, dualism retains its hegemony.

This is perhaps most evident in the populist notion of “converging” crises as a way of articulating the global turbulence of the twenty-first century.²⁴ Insofar as this breaks with the crisis discourse of the 1970s—in which biophysical contradictions were hived off from the crises of capital and class²⁵—the language of converging crises is an important advance. In another sense, however, the radical critique of capitalism since 2008 has proceeded in terms entirely agreeable to the Cartesian sorting out of crisis tendencies. One can now add “climate” or “ecology” to the proliferating list of significant fractures in twenty-first century capitalism. “Nature plus Capitalism” is increasingly less productive, because the approach is *additive* rather than *synthetic*. The “red” critique is now closely paired with the “green” critique, but neither Greens nor Reds have moved towards a synthesis that demonstrates a *relational* reconceptualization of “economy-making” in light of “environment-making” and vice versa.²⁶

The synthesis that might unify the recognition of global capitalism as a “real” historical place and as a real bundle of human and extra-human natures has been slow to materialize. Cartesian thinking in global studies has been especially resilient. The key concepts of historical change remain embedded in an ontology that few of us, today, agree with: that notion that humans are independent of the rest of nature. The idea persists that conceptual renovation can occur through the promiscuous deployment of adjectives—environmental, ecological, and all manner of cognates—that assume precisely what needs to be explained. Thus we have environmental justice and social justice; ecological imperialism and economic imperialism; the exploitation of nature and the exploitation of labor; economic crisis and ecological crisis. The stylized list could be multiplied endlessly. The addition of ecological adjectives is surely an advance upon older, social reductionist historiographies and analytical frames for which nature—in any sense of the term—really did not matter.

Today, however, the model of Nature plus Society is increasingly self-limiting. We can add environmental factors and consequences indefinitely. But concrete historical wholes—

such as capitalism—cannot be constructed by “adding up” the Social and Environmental parts. Nor can capitalism be aggregated through regional case studies that theoretically (rather than historically) construct the modern world-system.

WORLD-ECOLOGICAL IMAGINATIONS: TOWARDS CAPITALISM-IN-NATURE

Although Theophrastus seems to have used the *oikeios topos* in a fairly conventional way, to signify what we would call an ecological niche, a dialectical alternative is suggested by nearly a century of holistic thought.²⁷ In this dialectical and holistic alternative, the *oikeios* informs a perspective on historical change in the web of life as simultaneously *enfolding* and *unfolding*.²⁸ This alternative is the world-ecology synthesis. Like many other Green perspectives, the world-ecology approach offers a philosophy of history premised on humanity-in-nature.²⁹ World-ecology’s distinctiveness lies in its attempt to translate the philosophical premise into world-historical method, emphasizing the bundling of human and extra-human natures through the *oikeios*. Such bundling necessarily carries us far beyond the (so-called) “environmental” *dimensions* of human activity. Our concern is human relations as always already interpenetrated with the rest of nature, and therefore always already both producers and products of change in the web of life.³⁰ The manifold projects and processes of humanity-in-nature—including imperialisms and anti-imperialism, class struggles from above and below, capital accumulation in its booms and crises—are always products of the *oikeios*, even as they create new relations of power and production within it.

World-ecology is, then, a framework for theorizing those strategic bundles of relations fundamental to capitalist civilization. These strategic relations—above all value/capital as abstract labor-in-nature—are typically viewed as social relations: as relations between humans first, and, only subsequently, as interactions with the rest of nature. Environmental history, from its origins, sought to resolve this social determinism in a new formulation. Four decades ago, Crosby argued that humans are biological entities first, before they are Catholics, capitalists, colonizers, or anything else.³¹ Alas, Crosby’s groundbreaking argument did not resolve the problem of social determinism so much as invert it. For humanity’s biological existence is collective and collaborative, turning on species-specific capacities for symbolic production and collective memory. Biology and sociality are not separate, and to suppose so is to opt for a Hobson’s choice of biological determinism or social reductionism. Happily, the *oikeios* gives us a real choice. Here we take “the first premise[s] of all human history” as producer/product relations in the web of life.³² Thus food-getting and family-making were (and are) affairs of culture/sociality as a ways of negotiating biological and geographical relations; they are ways of environment-making. They are not the “natural base[s]” in a mechanical base/superstructure model of historical change, but rather the constitutive relation “with the rest of nature” through which humans produce (and are products of) “definite mode[s] of life.”³³

The observation applies not only to the relations of everyday life but also to the large-scale patterns of power and production in the modern world-system. The idea that capitalism acts upon nature, rather than develops through the web of life, is prevalent in critical environmental studies today. It is the analytical practice of a broadly-defined global political ecology—even when the philosophical premise is explicitly relational.³⁴ We now have a robust political economy *of* the environment, but few reconstructions of capital accumulation *in* the web of life.³⁵

This has allowed for all manner of neo-Malthusian tendencies—as in the “fossil capitalism” argument³⁶—to creep into left ecology. They are neo-Malthusian because they reproduce Malthus’s original error, which was less about population than it was about taking the dynamics of nature out of history. In this scheme, limits are external—rather than co-

produced. As global political economy and political ecology developed, scholars tended to accept (implicitly) or reject (explicitly) this conception of limits. But there was little reconceptualization of capitalism's limits as produced through the *oikeios*.

The view that resources are things unto themselves—and that the limits of capitalism are external constraints rather than internal contradictions—is of course not new to our era. It was not new even in the 1970s. It is a view that locates the taproot of capitalism's limits not only outside of the strategic relations of capitalism, but importantly, outside of historical change. Social limits, in this scheme of things, are historical, flexible, open to revision; Natural limits are, effectively, outside of history. As with agency, we may ask: Is the best procedure for ascertaining civilizational limits one of assigning limiting power to one or the other side of the Cartesian binary? Among the consequences of such Nature/Society models is a pronounced tendency towards an “externalist” view of limits. The obverse of social reductionism in thinking capitalism's limits is biospheric determinism. Such has been the argument of left catastrophists, reintroducing biospheric determinism under the veil of climate change—whose trajectory is transforming the conditions of planetary life, but whose transformations cannot be explained by treating climate as external force.

The biosphere *is* a kind of limit. But it is a limit of what and not how. To say “limits” is to invoke the external but to implicate the *oikeios*. Historical limits can be explained only through *historical* abstractions, not general ones. And so “nature in general” is of little immediate use. The general abstraction—Nature—cannot take us to a deeper understanding of biospheric limits as products of the double internality: the internalization of biospheric relations within capitalist civilization, and the internalization of value-relations in biospheric reproduction.

Historical nature moves us from the commonplace view of nature as object to nature as matrix, the field within which capitalism unfolds. We are still interested in those objects—what we call resources. Building on Marx's relational ontology, we can see resources as relational and therefore historical.³⁷ Geology is real enough. But it becomes *geo-history* through definite relations of power and production in which geological dispositions are immanent. Geology cannot “directly determine” the organization of production,³⁸ precisely because production relations are co-produced. Articulations of production and reproduction are mediated through the *oikeios*, not least the dialectic of organic life and inorganic environments.³⁹ Geology, in other words, co-produces power and production as it bundles with historically specific human relations. These specific relations, including geology, undergo successive transformations. One epoch-shaping instance was the re-bundling of human activity in the nineteenth century North Atlantic as the energy regime shifted from charcoal and peat to coal. In this view, geology is at once subject and object. Civilizations move *through*, not around, the web of life.

We can, through the *oikeios*, implicate the widest range of meta-processes in the modern world as socio-ecological, from family formation to racial orders to industrialization, imperialism, and proletarianization. From this perspective, capitalism does not develop upon global nature so much as it emerges through the messy and contingent relations of humans with the rest of nature. There is no question that, for most of us, these great processes of world history look like hybrids or fusions. These terms make sense, however, only if we presume an originary separation of Society and Nature. Once we start to look closely at these historical processes—energy regimes and agricultural revolutions, yes, but also nationalisms, developmentalist projects, national literatures, financializations—we begin to see just how deeply rooted in the *oikeios* they really are. Through this movement of *oikeios*-bundling, we may encompass the concerns of the environmental studies—writing environmental histories *of* social processes—while demonstrating that the social processes, too, are products of the web of life. This is the transition from environmental histories *of* modernity, to modernity *as*

environmental history. And to accomplish this involves a transition from seeing capitalism as a social system to seeing capitalism as *world-ecology*, joining capital, power and nature in a “rich totality of many determinations.”⁴⁰

FROM ENVIRONMENT TO ENVIRONMENT-MAKING

In this way of seeing, the “ecology” in world-ecology is not a noun modified by a geographical adjective, much less a synonym for interactions within extra-human natures. Rather, our ecology derives from the *oikeios*, within and through which species make—and always remake—multiple environments. Nature can neither be saved nor destroyed, only transformed. The *oikeios* represents a radical elaboration of the dialectical logic immanent in Marx’s concept of metabolism (*Stoffwechsel*).⁴¹ *Stoffwechsel* signifies “a metabolism of nature ... in which neither society nor nature can be stabilized with the fixity implied by their ideological separation.”⁴² In this dialectical elaboration, species and environments are at once making and unmaking each other, always and at every turn. All life makes environments. All environments make life.

This implies a shift from environment to environment-*making*: the ever-changing, interpenetrating, and interchanging dialectic of humans and environments in historical change. We are looking at the *relations* that guide environment-making, and also the processes that compel new rules of environment-making, as in the long transition from feudalism to capitalism.⁴³ And, at the risk of putting too fine a point on it, “environments” are not only fields and forests; they are homes, factories, office towers, airports, and all manner of built environments, rural and urban.

Capitalism takes shape through the co-production of nature, the pursuit of power, and the accumulation of capital. These are not, however, three independent blocks of relations that may then be interconnected through feedback links. Rather, these three moments interpenetrate each other in the making of historical capitalism—and in its unraveling today. We are charting the emergence of definite historical relations through the *oikeios* that bring together (bundle) definite human and extra-human activities and movements. When Marx observes that humans “act upon *external* nature, and in this way ... simultaneously changes [our] own nature,”⁴⁴ he is making a point about the centrality of the labor process as “bundled” in a world-ecological sense. “External nature” is not outside the labor process but constitutive of it. The pivotal relation, in turns liberating and limiting, is between human and extra-human natures. Environment-making is an activity of *all* life; and humans, too, inhabit and rework environments “made” by extra-human agencies.

To be sure, humans are unusually effective at environment-making: reconfiguring the web of life to accommodate, and to enable, definite relations of power and production. In world-ecological perspective, civilizations do not act *upon* nature but *develop through* the *oikeios*. Civilizations are bundles of relations between human and extra-human natures. These bundles are formed, stabilized, and periodically disrupted in and through the *oikeios*. Humans relate to nature as a whole from within, not from outside. Undoubtedly, humans are an especially powerful environment-making species. But this hardly exempts human activity from the rest of the nature. We are shaped by the environment-making activities of extra-human life, for whom humans (individually and collectively) are “environments” to be made, and also to be unmade.⁴⁵ “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.”⁴⁶

If all relations between humans, all human activity, unfold through the *oikeios* (which itself enfolds), it follows that these relations are always and everywhere a relation with the rest of nature. It is a dialectic that works simultaneously inside-out and outside-in: the earth is

an environment for humans, and humans are environments (and environment-makers) for the rest of life on planet earth. The usual approach to these questions is to view the dialectic of human and extra-human natures as one of interaction. But the interactionist model is premised on a grand—and I think unwarranted—reductionism. Humans, in themselves, are complex webs of biophysical determination: we are, among other things, an “environment” for the trillions of microbial symbionts (the micro-biome) that inhabit us, and that make our life-activity possible. We are dealing, in other words, with “worlds within worlds.”⁴⁷

The problem is more than reductionism, however. Dialectics is about more than interaction. The difference is one with major implications for how we see historical change. Even among radical critics, the Cartesian binary of Society (humans without nature) and Nature (environments without humans) holds sway.⁴⁸ From the perspective of the *oikeios*, the Cartesian view is theoretically arbitrary and empirically misleading. Try drawing a line around the “social” and the “natural” in the cultivation and consumption of food. In a rice paddy or a wheat field, in a cattle feedlot or on our dinner table, where does the natural process end, and the social process begin? The question itself speaks to the tenuous purchase of our Cartesian vocabulary on the everyday realities that we live, and seek to analyze. One can say that we are social and natural beings, but this merely begs the question: When are humans “social” beings, when are we “natural” creatures, and what are the relations that govern these shifting boundaries? When it comes to food (and not just food), every step in the process is bundled. The question becomes not one of “Is it social or natural?” but one of, “How do human and extra-human natures *fit together*?” Any adequate response to the question must flow through some form of dialectical-*oikeios* reasoning.

This reasoning leads us to see capitalism as a specific dialectic of *project* and *process*. On the one hand, the projects of capitalist agencies—capital and empires, to keep it simple—confront the rest of nature as external obstacles, and also as sources of wealth and power. On the other hand, these projects are also co-produced through processes, the unruly movements of bundled natures, through which civilizational projects discover spectacular contradictions: global warming in the twenty-first century, or the mid-fourteenth century confluence of agro-ecological exhaustion, disease, and (yet again) climate change. In this light, civilizations internalize the relations of nature in contingent, yet quasi-linear, fashion—and they do so within the processes and through the projects of (so-called) human history.

Highlighting this dialectic of project and process is a means of guarding against our tendency to accept capital’s ontology: the notion that humans (or human organization) act upon nature rather than enter a ceaseless cascade of mutual transformation within it. And, crucially, it is a means of highlighting the *real historical power* of ontological and epistemic dualisms. Nature may be a violent abstraction—a concept in which essential relations are abstracted from the reality in question⁴⁹—but it is also a *real* abstraction, an operative force in the world.⁵⁰ To be sure, Nature/Society is not the only dualism, but it is the originary dualism. The separation of the peasant from the land and the symbolic separation of Humans and Nature were a singular process. The emergence of Nature as a violent, but real, abstraction was fundamental to the cascading symbolic-material transformations of primitive accumulation in the rise of capitalism.

The capacity to make history is an expression not only of internally differentiated conditions and relations within human populations, but also of the differentiated conditions and relations of the biosphere. Humanity, too, is an object for the historical movements and fluxes of life and the geophysical movements of our planet. Thus, these capacities to make history may be turned outside-in *and* inside-out. (Our double internality.) Does anyone today seriously doubt that diseases, or climates, or plants make history as much as any empire? At the same time, is it possible to articulate the role of diseases, plants, or climate abstracted from accumulation, empire, or class? This line of questioning allows us to go beyond a view

of nature as a place where one leaves a footprint. It encourages a way of seeing nature as an active movement of the whole, one comprising deforestations and toxifications and all the rest but not reducible to these. It is through the *oikeios* that we can see—and reconstruct historically—nature as far more than an aggregate of *consequences* (deforestation, soil erosion, pollution, etc.). The movements and cycles of extra-human natures are producers/products of historical change, *internal to the movements of historical change*. Nature-as-matrix is cause, active condition, and constituting (bundled) agent in the history of civilizations.

It is already quite challenging to make these arguments on the terrain of philosophy and regional history. Constructing narratives of the *longue durée* as if nature matters—as producer no less than product—is more challenging still. This is the challenge that world-ecology meets head on. If nature matters ontologically in our philosophy of history, then we are led to engage analytically the human-biospheric double internality. Humans simultaneously create and destroy environments (as do all species), and our relations are therefore simultaneously—if differentially through time and across space—being created and destroyed with and by the rest of nature. Through this optic, nature’s status undergoes a radical shift: a transition from nature as resource to nature as matrix. Nature can be neither destroyed nor saved, only reconfigured in ways that are more or less emancipatory, more or less oppressive. But take note: our terms “emancipatory” and “oppressive” are offered not from the standpoint of humans narrowly, but through the *oikeios*, the pulsing and renewing dialectic of humans and the rest of nature. At stake now—perhaps in a more salient way than ever before in the history of our species—is exactly this: emancipation or oppression not from the standpoint of humanity *and* nature but from the perspective of humanity-*in*-nature ... and nature-*in*-humanity.

1 J. Liu, et al., “Coupled Human and Natural Systems,” *Ambio* 36, no. 8 (2007): 639–48.

2 B. Clark and R. York, “Carbon Metabolism,” *Theory and Society* 34 (2005): 391–428.

3 B. Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993); J. Bennett, “The Agency of Assemblages and the North American Blackout,” *Public Culture* 17, no. 3 (2005): 445–65.

4 Cf. R. Williams, “Ideas of Nature” (1972); D. Harvey, “Population, Resources, and the Ideology of Science” (1974); R. A. Walker, “Human-Environment Relations: Editor’s Introduction,” *Antipode* 11, no. 2 (1979): 1–16.

5 J. Donald Hughes, “Theophrastus as Ecologist,” *Environmental Review: ER* 9, no. 4 (1985): 296–306; *Pan’s Travail* (Baltimore: Johns Hopkins University Press, 1994), 4. Emphasis added.

6 Some of the most imaginative conceptualizations (cyborg, natureculture) have come from Haraway’s groundbreaking work, whose particularizing thrust ought not to distract us from their world-ecological implications. D. Haraway, *Simians, Cyborgs, and Women* (New York: Routledge, 1991); *When Species Meet* (Minneapolis: University of Minnesota Press, 2008).

7 F. Engels, “The Part Played by Labor in the Transition from Ape to Man,” in *The Origin of the Family, Private Property, and the State* (New York: International Publishers, 1970).

8 Marx, *Economic and Philosophical Manuscripts of 1844* (Mineola, NY: Dover Publications, 2007).

9 B. Campbell, “Nature as Historical Protagonist,” *Economic History Review* 63, no. 2 (2010): 281–314.

10 T. Steinberg, “Down to Earth,” *The American Historical Review* 107, no. 3 (2002): 798–820; J. Herron, “Because Antelope Can’t Talk,” *Historical Reflections* 36, no. 1 (2010): 33–52.

11 W. F. Ruddiman, *Plows, Plagues, and Petroleum* (Princeton: Princeton University Press, 2005).

12 Cf. M. Davis, *Late Victorian Holocausts* (London: Verso, 2001); B. Fagan, *The Great Warming* (New York: Bloomsbury Press, 2008); D. Chakrabarty, “The Climate of History,” *Critical Inquiry* 35 (2009): 197–222. Scholars addressing the contemporary dynamics of capitalism and climate have gone further, advancing distinctive world-ecology syntheses whose paradigmatic implications remain, at least for now, underappreciated. Here I am thinking, above all, of Larry Lohmann’s analyses of carbon markets and financialization and Christian Parenti’s interwoven narrative of climate, class, and conflict in the early twenty-first century. L. Lohmann, “Financialization, Commodification and Carbon: The Contradictions of Neoliberal Climate Policy,” in *Socialist Register 2012: The Crisis and the Left*, ed. L. Panitch, et al. (London: Merlin, 2012), 85–107; C. Parenti, *Tropic of Chaos* (New York: Nation Books, 2011).

13 C. Crumley, “The Ecology of Conquest,” in *Historical Ecology*, ed. C. Crumley (Santa Fe, NM: School of American Research Press, 1994), 183–201; J.W. Moore, *Ecology in the Making (and Unmaking) of Feudal Civilization* (Unpublished book manuscript, Department of Sociology, Binghamton University, 2013).

14 V. Lieberman, *Strange Parallels: Southeast Asia in Global Context, c. 800–1830*, Vol. 2 (Cambridge: Cambridge University Press, 2009).

15 E.H. Carr, *What is History?* (New York: Penguin, 1962); R.C. Lewontin, “Facts and the Factitious in Natural Sciences,” *Critical Inquiry* 18, no. 1 (1991): 140–53.

16 Latour, *We Have Never Been Modern* (1993); J. Bennett, “The Agency of Assemblages” (2005).

17 Foster, et al., *The Ecological Rift* (2010).

18 Cf. Smith, *Uneven Development* (1984); B. Braun and N. Castree, eds., *Remaking Reality* (New York: Routledge, 1998).

19 Cf. R. White, *The Organic Machine* (New York: Hill & Wang, 1996); J. Kosek, *Understories* (Durham: Duke University Press, 2006); J. Scott, *Seeing Like a State* (New Haven: Yale University Press, 1998).

20 See Moore, “Nature and the Transition from Feudalism to Capitalism,” *Review* 26, no. 2 (2003): 97–172.

21 D.R. Weiner, “A Death-Defying Attempt to Articulate a Coherent Definition of Environmental History,” *Environmental History* 10, no. 3 (2005): 404–20.

22 Cf. R. White, “‘Are you an Environmentalist or Do You Work for a Living?’” in *Uncommon Ground*, ed. W. Cronon (New York: W.W. Norton, 1995).

23 At its best, political ecology recognizes global political economy as co-constitutive, and poses the right questions: How are “specific environmental conditions” produced, and when, where, and how are these conditions “entangled [or not] with the tendencies of global capitalism ... : accumulation, growth, and crisis” (Peet, et al., eds. *Global Political Ecology*, (2011), 29)? But for all of political ecology’s incantations of the *global* (ibid.), the world-system remains a theoretical rather than historical construction, a generality relegated to the “context” of *specific* conditions—as if capitalism itself is not a specific place with its own specific conditions of production and power! (See especially Moore, “‘Amsterdam Is Standing on Norway’ Part I,” *Journal of Agrarian Change* 10, no. 1 (2010): 35–71). Contextualizing, rather than specifying, world-historical dynamics has left political ecology with a social-reductionist political economy rather than a set of propositions concerning capital accumulation as socio-ecological process.

24 Cf. S. George, “Converging Crises” (2010); P. McMichael, “The Land Grab” (2012).

25 Compare for example D.H. Meadows, et al., *The Limits to Growth* (New York: Signet/Mentor, 1972); with G. Arrighi, “Towards a Theory of Capitalist Crisis,” *New Left Review*, no. 111 (1978; 1972 original): 3–24.

26 But see Lohmann’s breathtaking analyses of carbon markets, climate change, and world accumulation: L. Lohmann, “When Markets are Poison: Learning about Climate Policy” (2009); “Financialization, Commodification and Carbon: The Contradictions of Neoliberal Climate Policy” (2012).

27 J.C. Smuts, *Holism and Evolution* (New York: Macmillan, 1926); Capra, *The Turning Point* (1982); J.B. Foster, *Marx’s Ecology* (2000); Harvey, “Population, Resources, and the Ideology of Science” (1974); Harvey, “The Nature of Environment” (1993); R. Levins and R. Lewontin, *The*

- Dialectical Biologist* (1985); E. Odum, "The Emergence of Ecology as a New Integrative Discipline," *Science* 195 (1977); B. Ollman, *Alienation* (1971).
- 28 D. Bohm, *The Essential David Bohm*, ed. L. Nichol (New York: Routledge, 2003).
- 29 Cf. Capra, *The Turning Point* (1982); C. Folke, et al. "Resilience Thinking," *Ecology and Society* 15, no. 4 (2010), <http://www.ecologyandsociety.org/vol15/iss4/art20/>.
- 30 Williams, "Ideas of Nature" (1972).
- 31 A.W. Crosby, Jr., *The Columbian Exchange* (Westport, CT: Greenwood Press, 1972).
- 32 Marx and Engels, *The German Ideology* (1970), 42.
- 33 Ibid.
- 34 Foster, et al., *The Ecological Rift* (2010); N. Heynen, et al., eds. *Neoliberal Environments* (New York: Routledge, 2007); Peet, et al., eds., *Global Political Ecology* (2011).
- 35 But cf. Burkett, *Marx and Nature* (1999).
- 36 A. Malm, "The Origins of Fossil Capital: From Water to Steam in the British Cotton Industry," *Historical Materialism* 21, no. 1 (2013): 15–68; E. Altvater, "The Social and Natural Environment of Fossil Capitalism," in *Coming to Terms with Nature: Socialist Register 2007*, ed. L. Panitch and C. Leys (London: Merlin Press, 2006).
- 37 Marx, *Capital*, Vol. I (1977); Ollmann, *Alienation* (1971); Harvey, "Population, Resources, and the Ideology of Science" (1974).
- 38 S.G. Bunker and P.S. Ciccantell, "Economic Ascent and the Global Environment," in *Ecology and the World-System*, ed. W.L. Goldfrank, et al. (Westport, CT: Greenwood Press, 1999), 25.
- 39 Birch and Cobb, *The Liberation of Life* (1981).
- 40 Marx, *Grundrisse* (1973), 100.
- 41 Marx, *Capital*, Vol. I (1977).
- 42 N. Smith, "Nature as Accumulation Strategy," in *Socialist Register 2007: Coming to Terms with Nature*, ed. L. Panitch and C. Leys (London: Merlin Press, 2006), xiv.
- 43 Moore, "The Modern World-System as Environmental History?," *Theory and Society* 32, no. 3 (2003): 307–77; "Ecology and the Rise of Capitalism" (2007); "'Amsterdam Is Standing on Norway' Part I" (2010); "'Amsterdam Is Standing on Norway' Part II" (2010).
- 44 Marx, *Capital*, Vol. I (1977), 283. Emphasis added.
- 45 Levins and Lewontin, *The Dialectical Biologist* (1985).
- 46 Marx, *Economic and Philosophical Manuscripts of 1844* (2007), 107.
- 47 Ley et al., "Worlds within Worlds" (2008).
- 48 Cf. Foster et al., *The Ecological Rift* (2010).
- 49 Sayer, *The Violence of Abstraction* (1987).
- 50 Toscano, "The Open Secret of Real Abstraction" (2008).
-