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# False Antitheses? Marxism, Nature and Actor-Networks

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This paper stages an encounter between two critical approaches that have been central to the recent “greening” of left geography. The theoretical and normative claims of the first approach, eco-Marxism, have been subject to sometimes biting criticism from advocates of the second approach, actor-network theory (ANT). Taking a non-orthodox Marxist perspective, I argue that the ANT critique of political economy approaches to nature is overstated and only partly defensible. By distinguishing between different modalities of eco-Marxism and ANT, I show the seeming standoff between the two approaches to society-nature relations to be false. Splitting the difference between a weak version of ANT and a relational version of eco-Marxism yields a political economy approach to sconature that arguably avoids the excesses of strong modalities of ANT and dualistic forms of eco-Marxism. By seeking to bridge the apparent gap between Marxism and ANT, the paper avoids reducing either approach to society–nature relations to one fixed position or theoretical-normative “essence”. Instead, a particular modality of ANT is used to address the weaknesses of certain extant versions of eco-Marxism. The resulting synthesis offers conceptual tools with which Marxists can still critique a pervasive mode of human relationality to nature—namely, capitalist—while multiplying the actors and complicating the politics involved in approaching the society-environment nexus.

## Greening the Geographical Left

In little more than a decade, the geographical left’s “peculiar silence on the question of ... nature” (Fitzsimmons 1989a:106) has been decisively rectified. When Margaret Fitzsimmons (1989b:1) complained that left geography had fixated on the political economy of space at the expense of the “relation between society and its material environment”, she could scarcely have anticipated the cacophony of voices that, not ten years later, would vie “to bring nature ‘back in’ to ... [critical human geography] by contesting its abstraction from society” (Fitzsimmons and Goodman 1998:194). Indeed, such is the number and vibrancy of these voices today that it may be no exaggeration to talk of a fully-fledged “green left” within Anglophone human geography.<sup>1</sup> Where, a decade ago, Marxism seemed the most obvious vehicle for making left geography greener (despite its former silence on nature), today it is merely one of several sometimes complementary,

sometimes incommensurable approaches to the society–nature interface. In seeking to go beyond political economy, these new approaches look to everything from poststructuralism (eg Willems-Braun 1997) to Beck's “risk society” thesis (eg Eden 1999) to sociology of scientific knowledge (eg Demeritt 1996) to “actor-network” thinking (eg Whatmore 1999) for theoretical inspiration. Thematically, they also go beyond Marxism's preoccupation with the economic in order to scrutinise putatively noneconomic dimensions of social-natural articulation, such as those surrounding science (eg Demeritt 1998), gender (eg Seager 1993) and culture (eg Luke 1998). In turn, all this has fed into more sophisticated conceptions of nature politics in which attention to the multiple bases for activism (eg Cutter 1995) and the rights of “nonhuman others” (eg Wolch and Emel 1998) have challenged and complicated traditional Marxian concerns with class. In short, geography's green left is in rude good health.<sup>2</sup> Within a few short years, the intellectual silence on the question of nature has been replaced by an almost deafening noise.

This greening of the geographical left could hardly have come at a better time. In the context of proliferating environmental problems, new interventions in “nonhuman” nature and new issues surrounding our own bodily natures, it has offered rich theoretical, empirical and normative resources with which to work on two fronts simultaneously. On the one side, the geographical left now has a considerable intellectual weaponry with which to contest hegemonic understandings of nature within business, government, academia and civil society. It is a sad fact of turn-of-the-millennium life that the question of nature is predominantly phrased—and answered—in neoliberal terms (Athanasios 1998). In a stunning act of ideological appropriation, states and corporations worldwide have drawn the sting of the environmentalists' critique that erupted on the scene during the early 1970s and have made nature a part of their own agendas. As Neil Smith (1998:272) puts it, “we're all environmentalists now ... The radical genie of the environmentalist challenge to late capitalist nature destruction has been stuffed back into the bottle of institutional normality just in time to calm millennial jitters about nature”. This, then, is a world where the irretrievable loss of species and ecosystems, the unpredictable consequences of genetic engineering and the routine coincidence of environmental and social injustice can, so ordinary people are told, be addressed by the logics of “free market environmentalism” (which sees them as “inefficiencies”) or, failing this, the less instrumental discourses of “sustainable development” and “ecological modernisation”.

On the other side, if the arguments of geography's green left can be ranged against the neoliberal assumptions that today dominate debates on nature, they can also be ranged against a diverse body of

thought and practice with which they might otherwise be thought to resonate. Despite having had some of its thunder stolen by corporate and governmental elites, radical ecocentrism is still alive and well some two decades after organisations like Earth First! and the Sea Shepherds gave it a contemporary colouration.<sup>3</sup> From extreme animal rights groups to Gaians to the UK's recent antiroad tunnelers, the urge to "get back to nature" (or at least respect "nature for itself") remains central to environmental thinking outside the political mainstream. At one level, much of the current left geographical research on nature is sympathetic to the radical ecocentric agenda, not least because of a common determination to expose the inadequacies of status quo environmentalism. However, left geography has never been attracted to deep green thinking in the way that other disciplines, such as philosophy, have in recent years. Accordingly, geography's green leftists are generally suspicious of the well-meaning but fuzzy logics of back-to-nature thinking, seeing them as ontologically essentialist, morally romantic and politically naive.

In sum, today's green geographical left is emerging as a vibrant force able to negotiate the polar alternatives of a hegemonic technocratic-managerial environmentalism on the one hand and an oppositional ecocentric radicalism on the other. This is, of course, all to the good. However, it is arguable that—notwithstanding the green left's current vitality—something has been lost in the decade since Fitzsimmons first challenged human geographers to redress their nature-blindness. That something, I submit, is a recognition that Marxian political economy (or, more precisely, particular versions of it) still has a great deal to offer leftist geographers with an interest in green issues. In other words, though the theoretical, thematic and normative diversity of geography's green left is to be applauded, it seems to have coincided with an indifference to, even hostility towards, attempts to fashion a more "verdant" Marxism.

Lest this claim sound overblown, it should be immediately qualified. Firstly, I am not for a minute suggesting that Marxian work on nature is either nonexistent in geography or on the wane. On the contrary, the subject of nature seems to have captured the imagination of those (few) human geographers who still advocate "full-blooded" versions of historical materialism, as the recent work of David Harvey (1996) and Erik Swyngedouw (1999) indicates only too clearly. Consequently, geography is now one of several disciplines—economics (eg Burkett 1999) and sociology (eg Benton 1999) being two notable others—in which the ecological and bodily consequences of capitalism are being theorised from a Marxian perspective. Secondly, it would also be wrong to say that Marxism has not been integrated into more syncretic, meso- and microlevel studies of human–environment relations, which are now as numerous within left geography as they are insightful. One

only has to look at new work on “race”, class and environmental justice (eg Heiman 1996), resource industries (eg Bridge 2000), agrarian political economy (eg Buttel 1991) or “second generation” studies in Third World political ecology (eg Peet and Watts 1996) to see how Marxian insights have been usefully synthesised with issues of culture, politics, gender and ethnicity.

So, if Marxism is not exactly a dead dog within left geographical debates on the society-nature nexus, what are the grounds for a complaint that the current vibrancy of the green left has coincided with a certain ennui regarding attempts to render Marxism less red? They are three-fold. First, there is a generational issue. Though older geographers like Harvey are seeking to keep the Marxist flag flying, newer members of the discipline’s green left fraternity seem more captivated by names like Beck and Latour than they do by Marx.

Second, there is a macrotheoretical issue. Though the plethora of midrange and empirical work now being published by left geographers on everything from hazards (eg Blaikie, Davis and Wisner 1994) to forestry (eg Fairhead and Leach 1995) to mining (eg Bridge 2000) is important and necessary, it should not proceed at the expense of broader anatomisations of society-environment relations. Both within geography (eg Harvey 1996) and without (eg Altvater 1993), green Marxists have done much to map the ecological and corporeal consequences of capitalism as a global mode of production. However, at this more general level of analysis, it also seems to me that Beck’s “risk society” thesis and “actor-network theory”—coming in the wake of a mid-90s infatuation with environmental discourse analysis (eg Myerson and Rydin 1996)—are currently squeezing out Marxian political economy. They are, if you like, the paradigmatic flavour of the month among geography’s green leftists.

Finally, there is an interpretive issue. Among many younger green leftists in geography, Marxism is arguably understood in a very particular—and debilitating—way: it is routinely regarded as irredeemably totalising and rigid in its theoretical architecture. At one level this is, of course, perfectly legitimate, since many modalities of Marxism have been and remain insufficiently “modest”. However, this interpretation of Marxian work should not be accepted as the only or “correct” one. In other words, it is possible to read Marxian political economy in a less pejorative and more productive way.

With these introductory comments in mind, this essay seeks to convene a conversation between human geography’s “green Marxists” and those on the discipline’s green left who remain suspicious of the green Marxian desire to offer a “grand theory” of nature-society relations. My broad intention is to defend eco-Marxism from its detractors in a way that concedes a number of their valid criticisms. More specifically, I seek to stage an encounter between recent

Marxian theorisations of the capitalism-nature nexus and “actor-network theory” (hereafter ANT).

I focus on ANT for several good reasons. First, as noted, it is one of the newest and most influential paradigms of nature-society relations to be embraced by left-leaning geographers. Though its nominal founders—notably Bruno Latour, Michel Callon and John Law—deny that it is a theory in the conventional (ie, “meta” or explanatory-systematic) sense, ANT concepts are nonetheless being promoted in left geography as wholesale alternatives to existing critical theorisations of nature. Second, while attempts have been made to bring other major new nature-society paradigms into dialogue with Marxism (notably the risk society and discourse analysis approaches; see Benton 1997 and Castree and Braun 1998), ANT has thus far escaped any positive and sustained engagement with political economy (though see Busch and Juska 1997, Gouveia 1997 and McManus 2001). Finally, this lack of dialogue is partly due to the fact that exponents of what I will call the “strong” version of ANT in geography, such as Sarah Whatmore, have explicitly *counterposed* ANT and Marxism. As Whatmore (1999:25) puts it in a recent manifesto for the investigation of “hybrid geographies”, “recourse to variants of dialectical [read Marxian] reasoning centred on the ways in which nature and society interact [does not] provide a radical enough basis for critical enquiry.” Yet, strangely, this plenary claim is not based on any in-depth analysis of Marxian theorisations of the nature-society interface. Though Whatmore (writing with Thorne 1997) has elsewhere subjected Marxism to ANT critique in the area of agro-food studies, the Marxian “foe” is represented in hazy and one-dimensional terms. In keeping with the broader after-Marxist sensibilities of left geography, it is simply *assumed* that Marxism is too old-hat to either learn from or contribute to the newest theoretical kid on the nature-society block: ANT.

In light of all this, I aim to achieve three things in the pages that follow. The first is to explore the ways in which ANT problematises recent Marxian theorisations of nature within geography and cognate disciplines. In other words, I want to do in practice what geographical advocates of ANT have thus far only done rhetorically or superficially.<sup>4</sup> By asking what is left of green Marxian theorisations once they have been subject to an ANT critique, I hope to show that they have much to learn from actor-network insights. Secondly, though, I also want to explore how recent Marxian theorisations of nature, with their insistence that we keep capitalism’s creative destruction clearly in view, problematise ANT. Is the ANT critique of green Marxism so devastating that any dialogue is one-sided, if not impossible? Or can a particular kind of Marxism speak productively to ANT on the key issues of nature-society relations? By answering the latter question in the affirmative, I show that “strong” versions of ANT go too far in

undermining the still powerful insights of Marxian political economy. Third, in light of all this I aim to show that Whatmore sets up a false antithesis between the two bodies of thinking.<sup>5</sup> For my argument will be that it is possible to “split the difference” between ANT and green Marxism in a way that shows the latter can be strengthened—rather than undermined—by drawing on the insights of a “weak” version of the former (cf Couzens-Hoy 1989).<sup>6</sup>

## The Allure of ANT

Currently, ANT seems to be the brightest star in geography’s green left firmament. So arresting are many of its key tenets that it has rapidly attracted a number of left geographical devotees. Indeed, one might say that ANT is today vying for paradigmatic status in the greening of left geography. There is an irony in this, since one of the points of ANT is to renounce many of the privileges typically associated with “theory”. As Ward and Almas (1997:626) put it, “network analysis can be seen as an attempt to infuse *modesty* into … [geographical] inquiry”. However, the irony is easily explained, for so fundamental and wide-ranging is the ANT critique of social theory’s typical “immodesty” that ANT advocates, despite themselves, find it hard to resist recommending ANT as a panacea (Lee and Brown 1994). Consequently, geographical popularisers of ANT have not only put it forward as a new approach to human-environment relations (eg Murdoch 1997a, 1997b; Whatmore 1999), but have also advocated it as an alternative approach in economic geography (eg Murdoch 1995) and agricultural geography (eg Goodman 1999; Lowe and Ward 1997) and, more generally, as an exciting new framework for rethinking such key geographical concerns as the nature of geopolitics, globalisation, representation, space and scale (see Davies 2000; Murdoch 1998; Ó Tuathail 1998; Thrift 1995; Whatmore and Thorne 1997). At the same time, ANT concepts are being operationalised in a new outpouring of empirical work by geographers (see eg Eden, Tunstall and Tapstell 2000). Notwithstanding the disclaimers, then, geography’s ANT protagonists are nothing if not ambitious in their agenda.<sup>7</sup>

In relation to the nature–society question—the focus of this essay—what is so disconcerting about ANT is that it stands as a challenge not only to the disciplinary right (those technocrats enamoured with environmental management and environmental economics) but also to geography’s recently greened left. For, perverse as it may seem, the implication of ANT is that there is a fundamental commonality between geography’s left and right on the nature question. For all the differences between, say, cost-benefit analyses and critiques of the value assumptions built into those analyses (see, for example, Foster 1997) both share a crucial and problematic something from an ANT perspective: namely, a set of unexamined assumptions that organise

and, importantly, *circumscribe* the field of analysis. I will list these assumptions shortly.

For now, though, it is enough to note that ANT takes no prisoners. Though most of geography's ANT advocates are broadly of the left and sympathetic to the project of greening critical geography, they identify fundamental problems with the way this greening has been achieved. This is precisely why ANT is now being proposed by some as a way forward for geography's green left. By dissenting from—indeed, literally breaking with—past intellectual-political habits, it offers to bring nature “back in” by way of a new set of precepts.

Since the tenets of ANT have been discussed at length elsewhere—notably in a string of lucid essays by Jonathan Murdoch (1995, 1997a, 1997b, 1998)—I need only summarise them here.<sup>8</sup> ANT consists of a set of overlapping propositions intended to guide thinking and research about human-nature relations (what Latour [with Crawford 1993:250] calls an “infralanguage”). For its geographical advocates, the problems with most past and present disciplinary work on nature—on both the right *and* the left—are five-fold, revolving around binarism (in two main ways), asymmetry, an impoverished conception of actors/action and a “centred” understanding of power. Below, I will take each in turn and show how ANT seems to pose a stern challenge to the otherwise commendable efforts currently afoot to green left geography.

### *The Social–Natural Dichotomy*

Binarism refers to the habit of understanding the world in terms of conceptual dichotomies, such as human–environment (which I will look at in this subsection) and local–global (which I will examine in the next subsection). These dichotomies are not just convenient habits of mind. Rather, they are written into the very constitution of geography as a modern academic subject. Thus, the so-called “human–physical divide” not only organises research and teaching in the discipline but also provides the terms of reference for ongoing attempts to “bridge the gap” between geography’s two “sides” (Massey 1999). Moreover, the society–nature distinction has underpinned some of geography’s most troublesome (and troubling) concepts, such as the now thankfully discredited notion of “environmental determinism”.

However, this said, the dichotomisation of the human and the natural is not wholly pernicious. On the contrary, it has been essential to the greening of left geography this last decade. I say this for two reasons. First, by insisting on the irreducibility of the social and natural domains, left geographers “have been able to resist the hegemonic [positivist] tendencies of the natural sciences” (Murdoch 1997b:732). Secondly, policing the human–nature divide has also allowed them to reverse the causal arrows against versions of “natural realism” in

favour of notions of “social constructionism” (Whatmore 1999:23). This has been immensely liberating, because it has made nature amenable to social analysis while calling into question courses of social action—be they technocratic or ecocentric—supposedly necessitated by the needs or limits of “nature-in-itself”.

Notwithstanding these facts, geographical exponents of ANT see this retention of the human–nature binary as immensely problematic and seek to supersede it. In the first place, it is seen as *ontologically incomplete*. By positing two different spheres of reality, it leads to a conception that entities are “essentially” either social *or* natural prior to their interaction with one another. Against this “modern” worldview (Latour 1993), ANT argues for an “amodern” ontology in which we recognise the “hybrids” or “quasiobjects” which litter the world we inhabit. This ontology of not quite natural, not quite social entities rejects the pure transcendences of binarist thinking and urges us to see them as *outcomes* that illicitly compartmentalise a messy, impure, heterogeneous world.

Secondly, this rejection of ontological binarism is intended as an encouragement to think *relationally*, in terms of associations rather than separations. Where conventional, nonrelational ontologies lead us to identify “ontological primitives” (Fuller 1994:746), ANT argues that things (including humans) are only definable *in relation to* other things. As Roberts (1995:673) puts it, in a world where pig livers are implanted in humans and plastic may soon grow on trees, “such hybrids are ubiquitous rather than rare—as [the] modern [worldview] ... would have us believe.”

This leads, thirdly, to the *network* as a favoured metaphor for conceptualising sconatural imbrications. Emerging from work by Latour and others on how scientific claims about nature are extended beyond the laboratory, the notion of networks points towards chains of connection between putatively “social” and “natural” entities. These networks are multiple and “relentlessly heterogenous” (Murdoch 1997b:745), typically involving the unique alignment of humans, machines, animals, inscription devices and other materials in relations that vary in stability, time-space extension and time-space form. For actor-network theorists, they describe a world far richer than the society-nature dichotomy can allow, because they stitch back together the sconatural imbroglios that that dichotomy has rent asunder.

In turn, this relational, network ontology yields a set of theoretical advantages—the fourth aspect of ANT’s rejection of the nature–society binarism. Where dichotomous thinking ultimately resorts to one pole or the other—society or nature—as explanatory, ANT refuses to look for causes lying *outside* sconatural networks (an “ostensive” approach; Latour 1986). Moreover, it refuses the presumption that

different networks are driven by the same general processes or factors, be they “capital” or “class interests”, for example. Instead, the processes determining the constituents, stability and reach of a particular network are deemed to be *internal* to it and, at some level, to involve all the network entities (a “performative” approach; Latour 1986). Far from appealing to causal forces separate from and prior to networks, which explain but do not themselves need explaining, it is only *after* each network has been carefully described that explanation can emerge. As Latour (1991:129) puts it, “the explanation emerges once the description is saturated.” Consequently, ANT is suspicious of general theories, supposedly applicable to many different situations, which offer systemic explanations grounded in ostensibly social or natural imperatives. The upshot, in a cheeky and subversive move, is that actor-network theorists see the society-nature dualism as a post hoc attempt by analysts to deny complexity by attributing responsibility for network construction to one or another set of entities.

### *The Local–Global Dichotomy*

The implications of the actor-network critique of the social–natural divide are clearly far-reaching. They are deepened and widened by the actor-network critique of a second “great divide”, that between the local and the global. According to ANT exponents in geography, this familiar dualism is deployed in categorical and explanatory ways that are highly problematic. Thus, green left geographers, like many environmental technocrats on the disciplinary right, frequently invoke the two terms as explanatory resources, as when “local” environmental problems—say, soil erosion in Burkina Faso—are attributed to the irresistible pressures placed on farmers by the “global market”. Against this, ANT urges us to dispense with this dualistic, *topographical* vocabulary and pursue the relational, *topological* vocabulary offered by network thinking.

This topological language entails seeing “the two extremes, the local and global, a[s] … much less interesting than the intermediary arrangements that we are calling networks” (Latour 1993:122). In understanding how seemingly global processes affect apparently local ecologies and bodies, “the key question becomes not that of scale, encoded in a categorical distinction … but of connectivity, marking lines of flow of varying length … which transgress these categories” (Whatmore and Thorne 1997:289–290). Accordingly, the local–global distinction, like the society–nature binarism, is seen as “a creation rather than a given” (Bingham 1996:641): that is, an unhelpful construct that needs to be explained, not simply accepted at face value. In its place, actor-network theorists urge us to focus on

multiple socionatural networks that are more or less strong and more or less long.

This, it is argued, yields two signal advantages. First, it brings the global “down to size” and “flattens” our view of the world in a way that is cognitively liberating and more analytically accurate. As Whatmore and Thorne (1997:291) put it, “the size, or scale, of an actor-network is a product of network lengthening, not of some special properties peculiar to the ‘global’”. Or, to cite Latour (1993:122) once more, “the words ‘local’ and ‘global’ offer points of view on networks that are by nature neither local nor global”. Secondly, this perspective has an explanatory pay-off: it implies that *all* parts of a network (be it long or short) are, at some level, causally important in ensuring that it holds together and endures. As Murdoch (1997a:331) puts it, “‘all for one and one for all’ in the construction of joint actions”. In explaining why some networks are longer and more durable than others, the key, as noted above, is to step *inside* them—not to look for external causes which are natural *or* social, global *or* local.

### *Asymmetry*

In light of this two-pronged critique of dualism, the actor-network principle of symmetry becomes easy to understand. As ANT advocates in geography rightly point out, binarist thinking ultimately forces the analyst to make a choice: to prioritise one or the other domain or actor on ontological, causal or normative grounds. As noted above, one of the hallmarks of the recent greening of left geography has been the attachment to versions of social constructionism, be they linguistic, technical or (as we will see in the case of Marxism) economic. Although, as I also noted, this has allowed left geographers to resist versions of natural realism (determinist or otherwise), it has inadvertently led to a certain asymmetry, in that the natural is seen as merely a construct of the social—“a substrate for the external imposition of arbitrary ... [social] form” (Ingold 1993:37). The corollary is an anthropocentrism in which, ultimately, nature can only be understood and valued in human (sic) terms. Against this, ANT proponents like Whatmore, Thorne and Murdoch argue for a more symmetrical greening of geography, in which nature is recognised, not on ecocentric grounds (since this is the mirror opposite of anthropocentrism and therefore also taken to be asymmetrical), but on a hybrid basis. That is, precisely because the social and the natural are *co-constitutive* within myriad networks, a symmetrical perspective is the only one that is viable. From this perspective, attending to the ontological, causal and moral particularities of natural entities is possible and necessary—*without* reverting to the notion that nature is, should or could be a/nonsocial (Whatmore 1997; Whatmore and Thorne 1998).

### *Impoverished Concepts of Actors and Action*

If ANT reveals the binarism and asymmetry undermining the otherwise progressive thrust of many left geographical approaches to nature, it also questions the notions of actors and action that, it claims, are built into most of these approaches. According to Bingham (1996:647) and Whatmore (1999), these approaches routinely make the following dubious assumptions: that actors' capacities to act are defined by their intrinsic powers and liabilities; that the significant actors are human; and that action is associated with intentionality and linguistic competence (logocentrism). Against these impoverished views of actors and action, ANT argues that "every actor is also a network" (Bingham 1996:647), that actors are social *and* natural (or, more properly, *sociornatural*) and that action—as Callon's (1986) oft-cited study of scallops in St. Brieuc Bay shows—does not necessarily require speech or intentionality as we normally understand it. As Laurier and Philo (1999:1060) put it, "The nonhumans are in effect 'levelled up' to the status of humans, and the humans are 'levelled down' to the status of nonhumans". Accordingly, ANT sometimes prefers the term "actant" to "actor". This evokes the idea that "agency is a relational effect generated by ... interacting components whose activity is constituted in the networks of which they form a part" (Whatmore 1999:28)—hence the couplet "actor-network". Moreover, it implies that the capacities of an actant will vary depending on its place within given networks. In short, geography's ANT advocates call for a conception of action and actors which is multiple, contingent and nonessentialist.

### *Power Geometries*

The final main challenge of ANT to existing left (and right) approaches to nature within geography relates to the question of *power*. Whatever their substantive differences, the various attempts to bring nature back into critical human geography are seen to have a conception of power which is anthropomorphic and overly centred. In other words, power is seen to be "held" and projected by particular social actors or to otherwise reside within a distinct social system (like "capitalism" or "patriarchy"). As a result, nature is all too easily reduced to an *effect* of power in recent green left writings in geography—or so Whatmore and others argue. In challenging this restrictive notion of power, in which the natural is discounted, the disciplinary champions of ANT insist that power is a *shared* capacity, involving myriad natural actants as much as social ones, which is thoroughly *decentred* in different networks. In Murdoch's (1995:748) words, "those who are powerful are not those who 'hold' power but ... those able to enrol, convince and enlist others on terms which allow the initial actors to 'represent' the others". According to ANT exponents, to see power as a wholly human attribute which is concentrated

rather than dispersed is, therefore, to be deceived. It is also to overstate the power of power. Once power is seen as a relational achievement—not a monopolisable capacity radiating from a single centre or social system—then it becomes possible to identify multiple points, neither social or natural but both simultaneously, at which network stability can be contested.<sup>9</sup>

To summarise, ANT seems to pose a major challenge to the ongoing attempts to green left geography.<sup>10</sup> By identifying a number of fundamental—rather than superficial—problems with these attempts, it shows them to be far less progressive than they seem at first sight. In light of this, the question arises of how geography's green leftists should respond. Should the ANT critique be accepted as a *fait accompli*? Should the green left ignore ANT and continue with “business as usual”? Or is there room for mutual accommodation, wherein the power of actor-network criticisms is conceded—but only up to a point?

In the remainder of this essay, I want to respond to these questions in relation to a specific—and, in my view, vitally important—body of green left thought. As noted earlier, some geographical exponents of ANT, such as Whatmore, have directed their animus against Marxism. To their credit, the recent attempts to fashion a Marxian theory of nature have retained a focus on political economy at a time when much green left scholarship is preoccupied with discourse, culture and the like.<sup>11</sup> However, as will be seen below, these attempts also appear to be “immodest” in the (pejorative) ANT sense. The implication—that green Marxism is guilty of the five “sins” discussed above—is an unsettling one, for it seems to render illegitimate the Marxian project of theorising capital–nature relations as global and systematically organised. Accordingly, ANT seems inimical to the greening of Marxism.

I say “seems” deliberately, because geography's ANT advocates have thus far failed to engage in any detailed way with green Marxisms. Moreover, they tend to imply that these Marxisms are all of a piece, and thus they fail to discriminate between different kinds of Marxian work on nature. Because of this, I want to do practically what geography's ANT popularisers have, for the most part, only done rhetorically. In the next section I will look at one well-known and influential body of green Marxist work, fashioned by sociologists and political economists, and show how it does indeed look frail when subject to an ANT critique. However, I will then go on to show that not all versions of green Marxism succumb so readily to actor-network criticisms. First, I look at the recent—and distinctive—work of Marxist geographers, which resonates in interesting, if ultimately divergent, ways with ANT. Then, I pinpoint problems with “strong” versions of ANT. This sets the scene for a value-theoretical reading of capital–nature

relations that “splits the difference” between ANT and green Marxism, showing that each has something important to say to the other. The result is a version of eco-Marxist theory more attuned than heretofore to socioecological difference and complexity.

## Eco-Marxism

Nature has become a major topic of concern among the shrinking minority of left academics still committed to Marxism. Where hoary questions to do with capital, the state and class were still top of the Marxist intellectual agenda as recently as a decade ago, today it is the greening of Marxism which seems to have captured the imaginations of younger and older scholars alike. This is not, of course, to say that Marxists ignored the nature question prior to the 1990s.<sup>12</sup> However, only in recent years has a truly concerted effort been made to render historical materialism less “red”. In just a few years, we have seen the publication of a number of major attempts to theorise the ecological dimensions of Marx’s political economy, including Altvater’s (1993) *The Future of the Market*, Benton’s (1994) *Natural Relations*, Burkett’s (1999) *Marx and Nature*, Grundmann’s (1991) *Marxism and Ecology*, Harvey’s (1996) *Justice, Nature and the Geography of Difference* and O’Connor’s (1998) *Natural Causes*.

This is hardly surprising. Like others on the left, Marxists have been unable to ignore the proliferating environmental and corporeal problems of the *fin-de-millennium* or the outpouring of public and governmental concern about them. More than this, the question of nature has presented Marxists with an opportunity to remind others on the left why political economy still matters. This has two dimensions. First, despite the relative unpopularity of Marxism among green leftists in human geography and related disciplines, it seems hard to deny that many important society–nature inner relations are distinctively capitalist. Accordingly, the recent attempts by Marxists to theorise the ecological implications of capitalism are, at least in principle, salutary. Among other things, they offer an important counterpoint to the right’s anaemic, status-quo vocabulary of “externalities” and “suboptimality” when analysing economy–nature imbrications (Eckersley 1993, 1996). Second, this greening of Marxism has also been aimed at intellectual and political bridge-building. One of the reasons many green leftists remain sceptical of Marxism is because of Marx’s supposed Promethean indifference to nature (Soper 1991). Against this, green Marxists have sought to show that this indifference is symptomatic of capitalism, not Marxism itself. From their perspective, then, Marrian concepts are *necessary*—if never sufficient—in any left endeavour to analyse nature today. In the green Marxist view, to scrutinise society–nature relations in abstraction from processes of capital accumulation is to miss a vital aspect of their logic and consequences.

Of course, this still begs the crucial question of how that logic and those consequences are to be understood. The new eco-Marxist scholarship has sought not merely to “add on” green issues, but to place them at the heart of Marx’s political economy. Outside geography, the result has been a series of plenary attempts to theorise what makes capital-nature relations so distinctive and consequential. I consider here just three examples of this new genre of eco-Marxist work outside geography.<sup>13</sup> I chose them because I think they are in many respects representative of the wider assumptions guiding the genre and because they are well known and influential.

### *Dualism and Ecological Marxism*

The work of the first eco-Marxist I consider, James O’Connor (1998), is varied in its details, but his basic thesis is well known. His intention has been to identify a second crisis theory in Marx to complement the orthodox model of the forces-relations of production dialectic. If the first contradiction issues in periodic crises of overproduction (excess capital, labour and commodities), the second contradiction, according to O’Connor, issues in progressive environmental crises that result from processes of *underproduction*. By the latter, O’Connor does not mean too few commodities and so on. Rather, he means that capitalism treats nature—upon which, he argues, it depends entirely for the production of material (as distinct from social) wealth—as if it were a free good. In other words, O’Connor detects a tendency inherent in capitalism to undervalue and thus, in his terms, “underproduce”—what he calls *the conditions of production*. Here, then, we are urged to see capitalism as a global system that contradicts a nature that is ontologically different from it. Because capitalism is organised according to an abstract logic of growth—measured in labour value terms—it is, for O’Connor (1998:4), “blind” to nature and ultimately therefore “antiecological”.

Elmar Altvater, who is the second eco-Marxist considered here, concurs with O’Connor’s intention to develop a Marxism that is as much a critique of political ecology as economy. However, his theory is somewhat different in its construction. First, Altvater works at a more concrete theoretical level. Second, he (1993:220) finds the concept of “underproduction” confusing, for “it implies what O’Connor himself rejects: namely, the reproducibility of the natural conditions of production.” In light of this, Altvater seeks to elucidate the ecological dimensions of core Marxian categories like use-value, exchange-value and value, and to adumbrate a green Marxism from first theoretical principles (as it were). The key to his approach is the argument that all Marx’s categories are of a “double-form”, describing both social and environmental processes, even though Marxists (including Marx himself) have routinely underplayed the latter. For instance, since labour-power is the site of both concrete and abstract labour, Altvater

(1993:188) is able to consider the commodity production process as fundamentally one of “dualisation”, entailing “*transformations of values* (value-formation and valorisation) and ... *transformations of materials and energy* ...” (emphasis in original). His tack is to see labour-power as the medium in and through which two “systems” with two rather different “ordering principles” (1993:204) interact and contradict. On the one side, there is the “capitalist world-system” (1993:222), which is growth-oriented, value-form-driven and indifferent to qualitative issues as to the origin, type and impacts of the use-values used in production. On the other side, Altvater argues, is nature, whose logics are described by the general laws of thermodynamics. Given, as he sees it, capitalism’s liability to destroy the environments upon which social (labour-value-defined) wealth is based, Altvater (1993:213, 230) argues that we should “build into the functioning of the economic system a series of imperatives which prevent ecological damage”—imperatives presumably dictated by “ecological constraints” in some postcapitalist future.

There is much to commend in both of these eco-Marxist contributions. In rather different ways, O’Connor and Altvater each rise to the environmental challenge of the century ahead. Moreover, each provides a valuable corrective to a good deal of the technocentric and the ecocentric thinking that currently animates the environmental debate. Against the former, O’Connor and Altvater question whether environmental problems can be dealt with simply by “correcting” the market, and argue instead for a wider, ecologically charged critique of capitalism. At the same time, both authors take the ecocentric concern with nature seriously, but do not lapse into any straightforward celebration of nature *tout court*.

However, all this said, the “epic” account of capital–nature relations that O’Connor and Altvater present seems remarkably vulnerable to the criticisms of ANT. In the first place, a nature–society dualism is clearly central to both authors’ arguments. This is most obvious in O’Connor’s work, where he (1998:181) talks of two domains “organized on very different principles”. However, even Altvater, who talks of the duality of capital–nature ties (rather than a rigid dualism), ultimately succumbs to binarist thinking. Thus, when he (1993:198) refers to the “contradictions between the capital-valorization dynamic (the side of form) and naturally given economic conditions of production and reproduction (the side of nature)”, it is hard to resist the imagery of two great and distinct “spheres” clashing with one another. More particularly, both authors resort to versions of natural realism to ground and give normative force to their arguments. To be sure, neither of them do so by invoking a nonhistorical or absolutist notion of “natural limits”—after all, Marxists have long (and rightly) been critical of such Malthusian thinking.<sup>14</sup> Nonetheless, both ultimately make reference

to the finiteness or distinctive “rationality” of nature when decrying capitalism’s ecodestructiveness.

This links to a second problem with the work of O’Connor and Altvater from an ANT perspective: the descriptive and explanatory invocation of the “local–global” binary. In O’Connor’s (1998:169) work, this takes the form of frequent (and ultimately rhetorical and rather empty) declamations of “modern world capitalism”. Altvater is more explicit and subtle. On the one hand, he insists that capitalism be theorised as a global system of production, distribution, exchange and consumption. On the other, he tries not to set up a local-global hierarchy, since he declares an awareness that what makes capitalism “global” is precisely the ties forged between myriad “local” production complexes and ecosystems. Nonetheless, because for Altvater these ties appear to be abstract, translocal forces, he is still ultimately able to resort to the problematic imagery of local ecologies and bodies being “at the mercy” of world economic forces.

The upshot of all this is an uneasy asymmetry in the work of both authors—uneasy because both O’Connor and Altvater arguably seesaw between the polar positions of naturalism and constructionism without ever transcending them. First, global capitalism is granted immense power to “do things to” nature. As Altvater (1993:209) symptomatically puts it, “the ordering principle of economics takes nature in its grip and imposes the logic of profit . . . ” At the same time, though, both writers ultimately give the “brute realities” of nature a key role insofar as environmental problems come back to haunt the capitalism that supposedly caused them. This vacillation does at least grant some agency to nature, but it is very much a *reactive* form of agency, rather than the livelier *proactive* agency ANT locates in every-day actor-networks. Consequently, in both O’Connor’s and Altvater’s works, the real (sic) power in society-nature relations seems to lie with capitalism and the (unequal) human actors who hold it together as a system. In short, their brand of eco-Marxism seems to confirm Whatmore’s ANT-inspired judgement that dialectical reasoning is not nearly as progressive as it seems in the greening left scholarship.

### *Benton: A Limit Case of Dualistic Eco-Marxism?*

Or does it? Ted Benton, another eco-Marxist working outside geography, has arguably sought to undo the binary suppositions structuring eco-Marxism. Like O’Connor and Altvater, he (1989, 1991a, 1992) argues that capitalism has a specific liability to generate environmental problems on both the input (resource) and the output (pollution) side. However, unlike them, he (1991b:25) argues that “the . . . ‘dualist’ oppositions in our intellectual legacy now constitute . . . obstacles to the formation of viable research programmes”. In the context of the present essay, this is an interesting position to adopt. On the one

hand, Benton presents a very strong case against what he (1989:52) calls “natural limits conservatism” in the Malthusian and neo-Malthusian mould. To this extent, he is careful to abjure a naturalism based on a supposedly fixed, unhistorical, undifferentiated nature that ineluctably places constraints on capitalist society at some given point. On the other hand, however, Benton also argues that a full-blown Marxian constructionism—in which capitalism can treat nature as a tabula rasa—is both naive and theoretically dangerous. Indeed, he regards it as a utopian overreaction to natural limits conservatism, which, while understandable, goes too far in the other direction.

If, then, neither naturalism nor constructionism will do, Benton’s alternative is to fashion a “both/and” position, which, he claims, resorts to *neither* side of the nature–society dialectic: “What is required is the recognition that each form of social/economic life has *its own* specific mode and dynamic of interrelation with *its own* specific contextual conditions, resource materials, energy sources[,] ... naturally mediated unintended consequences ... [and] ecological problems ...” (1989:77; emphasis added). For Benton (1989:78), this position permits a *relativisation* of both the social and the natural that usefully “... avoids both the Scylla of epistemic conservatism and the Charybdis of ‘social constructionist’ utopianism”, and is best encapsulated in the motif of “articulation”. This middle position between the antinomies of naturalism and constructionism is persuasive and intellectually appealing (see also Benton 1994). It suggests a way for Marxists to think past dualisms and to show, symmetrically, that agency and power are relational achievements, not the preserve of “global” capital.

But alas, it is suggestive only. For Benton’s approach, while it takes us quite far, does not take us far enough: his argument, one can suggest, still operates within the parameters set by the nature–society/global–local dualisms and their associated baggage. Although it represents a particularly subtle attempt to subvert these dualisms by resorting to the metaphor of “articulation”, it nonetheless still instantiates the image of two “systems”, one economic and global, the other ecological and locally variable, which interact, albeit now in historically specific and relative ways. Symptomatically, the inspiration for Benton’s “third way” solution for Marxian investigations of nature is the transcendental realism of Roy Bhaskar and others. I say symptomatically, because Bhaskar holds to a naturalism—to be sure, a highly qualified one—in which a depth model is employed to argue that basic chemical and physical laws and processes always underpin the social. At the same time, he also distinguishes the social and the natural at the ontological level (see Collier 1994:part 1). For these reasons, it seems to me that Benton’s position on nature is a *limit case* of dualistic thinking when seen from an ANT perspective. Put differently, while its nondualistic intentions are sound and to be

commended, in practice it nonetheless feigns to overcome binarism, asymmetry and so on without ever quite doing so (see Figure 1).

## The Nature of Relational Marxism

This brings us to a second genre of Marxian work on nature. If the eco-Marxism of O'Connor, Altvater and Benton succumbs all too easily to the criticisms of ANT, that of Marxist geographers provides a more complex case. In recent years, David Harvey, Neil Smith and Erik Swyngedouw have fashioned a very distinctive modality of green Marxism.<sup>15</sup> Inspired by the relational reading of Marx proposed by Bertell Ollman (1971, 1993) and—in Swyngedouw's case—by the insights of Latour, their work resonates in interesting ways with ANT.

To begin, all three authors are highly critical of dualistic approaches to the society–nature nexus, Marxist or otherwise. Thus, Harvey (1996: 140) argues that “separating out ‘nature’ and ‘society’ as coherent entities … precludes[s] radical critique”, while Swyngedouw (1999:446) insists “on the inseparability of society and nature.” Furthermore, Smith (1984:26), in a sideswipe at nonrelational forms of Marxism, implies that the notions of dualism (O'Connor), duality (Altvater) and even articulation (Benton) are unable to represent the “dialectical unity” that Swyngedouw (1999:446) terms “socionature”. So how is this “unity” of socionature conceived? Harvey provides an ontological answer in his chapter on dialectics in *Justice, Nature and the Geography of Difference* (1996). For him, categories like “social” and “natural”, “local” and “global” imply already-existing domains of reality that are externally related. Against this, he (1996:49) insists “that elements, things, structures and systems do not exist outside of or prior to the processes, flows and relations that create, sustain or undermine them.” Here, then, the social and the natural, the local and the global are internally related as particular “moments” within processes that dissolve ontological divides.

Smith (1984, 1996, 1998) has translated this ontological position into a theory of nature–capitalism relations. His well-known thesis about the “production of nature” is that processes of capitalist accumulation have brought otherwise distinct ecologies and bodies within the same universe. This universe is that of labour value, in which myriad “natural” entities are related to all manner of peoples, machines and technologies as either use-values or “unvalued” inputs/outputs of the production process. Here, production clearly involves far more than is implied in the narrow empiricist notion of it as that which occurs in the workplace (Smith 1998:277–278). Rather, following Marx's more expansive definition in the *Grundrisse* (1973), Smith understands production as a ramified geotemporal process of the making, distribution, exchange and consumption of commodities.

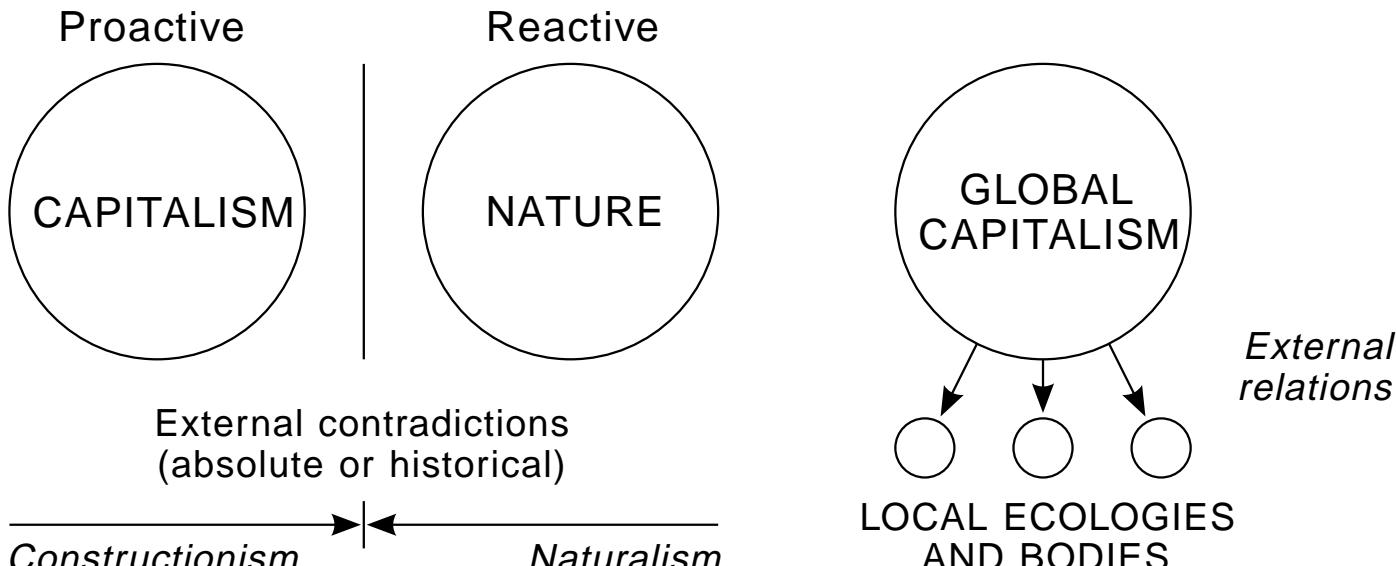


Figure 1: Dualistic eco-Marxism (Ataver, Benton, O'Connor)

Since Smith pays them little attention (Castree 1995:20), Harvey has sought to describe the “natural” moments of this socionatural production process. Perhaps conscious of the “asymmetry” connoted by Smith’s notion of nature’s production, Harvey prefers the less loaded concept of “created ecosystems” which, following Lewontin (1982:162) “are not simply *objects* … but active *subjects*”. Accordingly, these ecosystems “tend to both instantiate and reflect … the [capitalist] … systems that gave rise to them, though they do not do so in noncontradictory ways” (Harvey 1996:185). These internal contradictions, Harvey argues, arise from the fact that “natural” entities take on agency relative to the demands or effects of capital accumulation. For instance, while genetically modified foods might be the profit-led product of transnationals like Monsanto, those foods and their ecosystemic outcomes can take on a very powerful, unpredictable and lively agency with real consequences. In Smith’s terms, “produced nature” has a materiality that escapes social control and whose unanticipated effects are internal to—and, indeed, alter—the capital-nature nexus.

From an ANT perspective, the relational eco-Marxism of Harvey et al can be seen as a distinct advance over the work of Altvater et al. In Harvey there are glimpses of capitalism not as a discrete, global metasystem that “does things to” a separate nature, but as a plethora of otherwise qualitatively distinct econonatural networks that have a common processual form or logic. Here, then, what we call “capitalism” cannot precede or stand outside the myriad commodity networks that constitute it and give it a structured coherence. In Harvey’s (1996:51) words, any given “‘thing’ is … [not] a passive product of external processes.”

This relates to a useful refusal to specify even historically specific “natural limits” or “constraints” on capitalism. This is not to say that Harvey et al believe there are no environmental problems arising from capitalist development—on the contrary. It is to say that, because no two econonatural networks are ever quite the same, it is hard to make *general* assessments about the effects of capital-nature entwinements in different times, places and contexts. As Harvey (1996:183) puts it, “the category ‘nature’ … should be regarded as intensely internally variegated—an unparalleled field of difference.” Consequently, he (1996:185–186) is able to make such arresting and useful statements as the following: “there is nothing *unnatural* about New York City … Such [a] constructed ecosystem … cannot be allowed to collapse without courting ecological disaster not only for the social order that produced it, but for all species and forms that have become dependent on it”.

The multiple “natural” entities which are internally related to “social” entities within capitalism are also suggestive of a broad conception of agency in Harvey et al’s work. Though this is weakly developed in Smith’s more theoretical writings, Swyngedouw’s (1997,

1999) empirical researches on water in Spain and Ecuador suggest a socionatural process in which all manner of hydrological actants decisively—rather than incidentally—shape the course of political economic change in both countries. Also, Swyngedouw—perhaps because, unlike Harvey and Smith, he draws explicitly on Latour—hints in his work at a nonanthropomorphic concept of power. Again, his inquiry into hydrological modernisation in Spain and Ecuador shows how what seem to be powers intrinsic to “economic” actors and forces are in fact shared capacities which are “captured” from rivers, streams and other “natural” catchment agents.

So far, so good. In relational green Marxism, we seem to have a body of thinking which bucks the dim ANT assessment of dialectical approaches to society–nature linkages. However, on closer inspection, ANT exponents might point to a number of problems with Harvey, Smith and Swyngedouw’s works. These problems suggest—so devotees of ANT would no doubt argue—that even relational green Marxism is unable to resist the “sins” of binarism, asymmetry and skewed concepts of agency and power. Let me explain.

Though the argument that natural entities are increasingly internal to capitalism seems to overcome the society–nature dualism, it could be argued that in fact it *reinstates* it at another, less obvious level. Smith is the easiest target here because the production of nature thesis seems, in its very wording, to imply a *hyperconstructionism* in which capital “in search of profit … stalks the whole earth” (Smith 1984:56). Thus, ANT advocates might argue that Smith gives us an explanatory monism, which, far from *resolving* the problems of dualism, gives capitalism all the power in the society–nature relation and therefore *erases* nature altogether in the guise of making nondualistic theoretical space for it. That is, in Smith, the capital “side” of the relation with nature seems to swallow up the latter altogether. Indeed, from an ANT perspective, even Harvey and Swyngedouw can be seen as ultimately resorting to asymmetrical language in which “capitalism” is used as an explanatory resource. Thus Harvey (1996:222) avers that “[i]f things seem to have a life of their own, then it is only because [they] … internalise … political economic power”, while Swyngedouw (1999:446), despite his fondness for Latour’s work, concludes ultimately that “social relations produce nature ....”

Similar problems arise—or so an actor-network critic might argue—in relation to the local-global dialectic. I say dialectic, rather than dualism, because Harvey et al argue that the “global” and the “local” are merely different windows through which to view what is a continuous (if complex) process of socionatural change within capitalist societies. However, all three authors—particularly Smith—insist on talking about capitalism as a “totality” (Swyngedouw 1999:445) or “structured system” (Harvey 1996:50). Of course, there is nothing

necessarily wrong with such language, except that it suggests a “global whole” greater than the sum of its many local parts, which then stands as force over and against place-specific environments. For actor-networks theorists, then, there may be reason to doubt whether Harvey et al successfully collapse a hierarchical local–global binary. In turn, all this might suggest that Harvey and Swyngedouw’s attempts to decentre agency and power are more rhetorical than actual. Ultimately, it is capitalism that appears, in true asymmetric fashion, to have all the moves. Finally, an ANT critic might complain that for all Harvey et al’s concern about the treatment of nature in a capitalist world, their politics is ultimately anthropocentric in general and class-based in particular, because of their ultimate inability to escape dualistic thinking (see Figure 2).<sup>16</sup>

## From Antithesis to Engagement

At this stage in the argument we have, it seems, only managed to confirm what geography’s ANT advocates are saying: that Marxism and ANT are antithetical because the latter exposes serious problems with the ontological, explanatory and normative precepts of the former. Even though I have criticised commentators like Whatmore for failing to distinguish different modalities of green Marxism, this has not, apparently, done anything to alter the fundamental fact that ANT is inimical to the immodest aspirations of these Marxisms. The encounter between ANT and green Marxism is evidently one-way and deconstructive.

We are, it appears, left in a difficult position. On the one hand, many actor-network criticisms seem difficult to refute. Moreover, they illuminate an important new intellectual-political terrain, which green Marxisms have thus far consigned to darkness. On the other hand, however, many on the geographical left—even those who distance themselves from Marxian work—would not want to give up on the metatheoretical project of making visible capitalist processes and relations. Yet this is the upshot of the ANT critique of green Marxism, for the idea that many contemporary and important sconatural entanglements might be capitalist, global and structured is given little credence. In short, we are given an either/or choice: *either* remain wedded to a Marxism whose totalising fantasies obscure more than they reveal, *or* accept the liberating insights of ANT.

Or are we? Are there still other ways to green Marxism than those already discussed? And is it possible to work with a less exacting version of ANT? These questions are worth asking, because it is arguable that the antagonism between the two bodies of thought only arises when we adhere to “strong” versions of one or both. This explains the hostility of geographers like Whatmore and Thorne towards Marxism: they seem unable or unwilling to work with a less strict form of ANT.

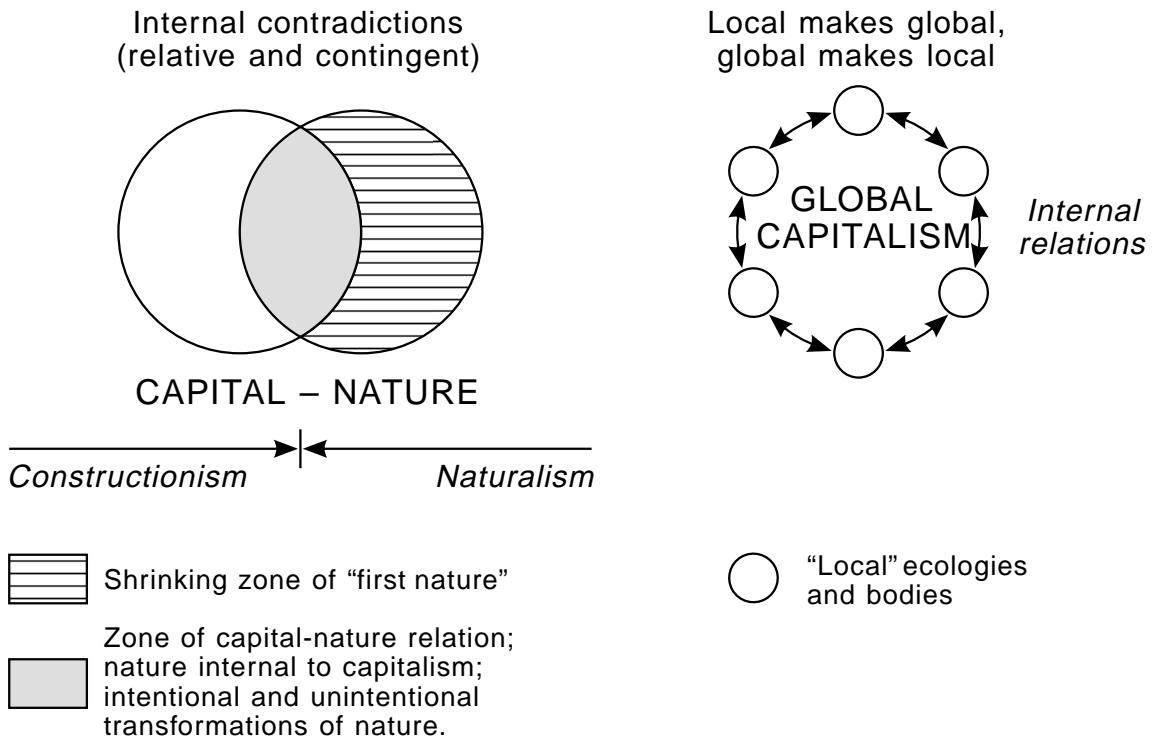


Figure 2: Relational eco-Marxism (Harvey, Smith, Swyngedouw)

Likewise, my own attempt to subject green Marxisms to an ANT critique has, thus far, conceded no ground whatsoever to the former: the encounter has been thoroughly one-way. What, though, if ANT could learn something from Marxism? What if “strong” versions of ANT throw out the proverbial bathwater and the baby in their attempts to free human–environment studies of “bad” intellectual-political habits? In the next section I will propose a Marxian reading of capital–nature relations that splits the difference between strict versions of ANT and “immodest” modalities of green Marxism (dualistic or relational). The remainder of this section sets the scene by explaining why a “weaker” reading of ANT is preferable to the strong reading proposed by the likes of Whatmore and Thorne. This weaker reading shows that ANT might, after all, have something important to learn from green Marxism.<sup>17</sup>

The case against the strong version of ANT has been prosecuted, not only by critics—such as Dick Walker (1997), Elaine Hartwick (2000:1180–1182) and Ray Hudson (2001:33–35)—but also by erstwhile sympathisers such as Murdoch (1997a, 1997b) and Laurier and Philo (1999). It goes something like this. First, ontologically there is “the problem of installing a great *indifference* between the countless things of world ... which arises when they end up being portrayed as potentially *all the same*” (Laurier and Philo 1999:1016). In other words, “the flattening process [of ANT] leads to an obscuring of *differences* between different ... ‘noun chunks’ of reality.”

Second, there is a further ontological problem arising from the assumption that each actor-network is unique and qualitatively distinct. Though actor-networks are unlikely ever to be similar in every detail, what if the processes constituted by and constituting otherwise different actor-networks happen to be the same? Does this possibility not create space for a theory that can abstract from differences in order to identify general processes of “socionature”? Or does inquiry into socionatural networks have to start afresh each and every time?

Third, there is a theoretical problem. In strong versions of ANT, there is arguably a potential underemphasis on the explanation of networks. As Murdoch (1997b:750) asks, “Can ... we ever do anything more than *describe*, in prosaic fashion, the dangerous imbroglios that enmesh us?” Furthermore, even when explanations are offered—once network description is complete—it is unclear what form it takes. Since full-blooded versions of ANT see networks as overdetermined (such that “determining” actors/processes and “determined” actors/processes cannot be readily distinguished) “one can justly ask whether such ... florescence obviates the need for any theoretical commitment at all, that is to say, the need for any weighting of social forces ... with systematic logic or causal processes” (Walker 1997:273).

Fourth, there is a normative problem. Though ANT offers a powerful critique of left intellectual work on nature—as we have seen in the case of Marxism—it threatens to remain strangely agnostic about the actor-networks it seeks to describe and explain. We should, as Murdoch (1997b:750) recommends, perhaps “ask whether a focus on the performative outcomes of network formation can be brought to bear on the [critical] … social scientific concerns of … equality and injustice, concerns which have normally been associated with the *responsibilities* of human institutions.” Though it may well be liberating to reveal the myriad “nonhuman” actants obscured by social constructionist versions of green left geography, it will count for little if those actants are merely described in their subjugation to others. That is, geographical advocates of a strong ANT agenda risk ignoring the possibility that some actants “marshal” the power of many others and, in so doing, limit the latter’s agency and circumscribe their existence.

In light of these several problems, it is possible to conceive of a weaker version of ANT that can learn something from critical approaches like green Marxism, even as it censures those approaches in the five ways discussed earlier in the chapter. This weaker version of ANT would thus remain critical of binarist thinking, of asymmetry, of limited conceptions of agency and of centred conceptions of power. However, at the same time, it would concede the following points: that many actor-networks are driven by similar processes, notwithstanding their other differences; that these processes might be “global” and systematic even as they are composed of nothing more than the ties between different “localities”; that these processes are social and natural but not in equal measure, since it is the “social” relations that are often disproportionately directive; that agents, while social, natural and relational, vary greatly in their powers to influence others; and that power, while dispersed, can be directed by some (namely, specific “social” actors) more than others.

Seen from the other side, this weaker version of ANT suggests a green Marxism more “modest” than those I have discussed so far in this essay, but one still able to talk about socionatural relations in our world as pervasively capitalist (but not exclusively so), as structured and enduring (but not in a reductionist or totalising way) and as disproportionately driven by “social” actions and relations (even as those actions and relations could not persist without “natural” agents and relations). Such a green Marxism would thus offer us a critical cognitive map that discloses capital–nature relations in all their generality and materiality. However, crucially, it would not theorise capital as an all-powerful global force standing outside, over or above ecologies and corporealities. As Latour (1993:121) puts it, in one of his more suggestive comments about Marxism, “The capitalism of Karl Marx … is not the total capitalism of the Marxists. It is a skein of somewhat

longer networks that rather inadequately embrace [the] ... world." Let me now flesh out, in a suggestive rather than exhaustive way, the theoretical content of such a "modest" green Marxism. My tack is to take the best insights of relational eco-Marxism but, by way of a return to Marx's value analysis, to concede rather more to ANT than do Harvey, Smith and Swyngedouw.

## Value, Networks and Nature

Let us begin with claim so basic and familiar as to seem utterly banal: namely, that capital is a *process* of a certain kind. This process takes the following standard form:

$$M \longrightarrow C \quad \left\{ \begin{array}{l} LP \\ MP \end{array} \right. \quad P \dots C' \longrightarrow M + \Delta \text{ etc.}$$

So accustomed have we become to this way of producing things worldwide that one forgets at one's peril just how distinctive—indeed, peculiar—it is. The process of capital circulation and accumulation is highly dynamic and unstable, involving class exploitation, social domination, technological innovation and intercapitalist competition predicated on the principle of "accumulation for accumulation's sake." In addition, it is a process where the production of things, rather than being an end in itself, is but a means of realising and expanding *value*. Value, as the labour time socially necessary to produce particular commodities, is the specific measure of wealth in capitalist societies. Capitalist wealth is not, therefore, measured in *material* terms—that is, as an accumulation of the qualitatively distinct properties of commodities as use values. Rather, it is measured in *social* terms—that is, as an accumulation of the qualitatively similar "substance" of commodities as exchange values. This, among other things, is what is so peculiar about capitalism. For value, though real, is strangely intangible and "phantom-like": it is a real abstraction that is qualitatively homogenous and quantitatively determinate but also imperceptible. Constituted out of the "blind" process whereby myriad commodities are exchanged on local, national and global markets, it cannot represent itself and can, therefore, only find expression in another form. That form is money (or, more accurately, national monies), which becomes the "universal" measure of value on the world market and the beginning and endpoint of capital circulation and accumulation.

Accordingly, that stunning diversity of local, national and global activities which together constitute "capitalism" are devoted, first and foremost, to capturing something real but immaterial. As Marx (1976:138) put it, "Not an atom of matter enters into the object-ness of commodities as values." In this topsy-turvy world, then, inordinate

amounts of time, energy and creativity are expended in pursuit of a thing—money—which is merely a representation of something else—value—which, in turn, is a particular form of wealth expressed as a social relation between commodity producers and a definite magnitude of social labour time. The quest for profit—measured in labour value terms—thus becomes the central rationale of the circuit of capital, rather than any other principle (eg the eradication of want or the conservation of resources). In other words, capitalism is inherently expansive and myopic. It is a mode of ordering economic activities in which all manner of otherwise different artefacts, bodies, ecologies and instruments are brought together in a chrematistic spiral of growth: they are but means to a singular end.

At first sight, all this sounds terribly—even painfully—orthodox and not at all promising for a green Marxism that can both draw from and inform ANT. However, it is a testament to the richness and enduring relevance of Marx's value categories that they can be interpreted in a way that evades the criticisms of ANT without succumbing to the weaknesses of its “stronger” versions. I can best justify this statement through a point-by-point elaboration of the specificity of social-nature relations within societies where labour value is the dominant measure of wealth:

- 1) In the first place, the description of capital offered above may seem binarist, in that it makes no mention whatsoever of nature. However, natural entities are in fact vital components of capitalist accumulation. As Marx (1966:3) put it, “Labour is not the source of all wealth. Nature is just as much the source of use values . . . .” The mention of use values is pivotal here. For though value is *different from* material wealth, it is also *dependent upon* it. This, perhaps, is what Marx (1967:188) meant when he declared what while “[v]alue is independent of the particular use value by which it is borne . . . it must [still] be embodied in a use value of some kind.”

Capital circulation and accumulation are not, therefore, imposed on a putatively separate domain of natural entities. Rather, they are necessarily embedded in a qualitatively diverse world of flora, fauna, minerals, bodies and ecologies. Without this material world of things, the generation of social wealth would be impossible and capitalism would, literally, be unthinkable. In Callard's (1998:396) felicitous words, capitalism is “an economy characterised by parasitic and vampiric relations: an economy in which it is no longer clear whose organs are whose, whose agency (animate or mechanical) drives what and whether organs should be understood as natural or mechanic entities . . . .”

- 2) Second, though society and nature are indissolubly linked within capitalist societies, the link is ordered in a very particular way. The crucial point to note is that while the material properties of natural artefacts—either modified or unmodified—necessarily enter into capital accumulation, they are not valued in their own right since *wealth is only measured in terms of labour value*. As Marx (1973:284) argued, “the nature of the use value ... is, as such, irrelevant to capital”, which proceeds *as if* wealth can be generated and accumulated without reference to the material properties and affordances of nature and environment. To put this another way, social-nature relations are paradoxical in capitalist societies, for, though thoroughly dependent on altered and unaltered natural entities, capital is also “blind” to them until problems associated with their appropriation make themselves felt as costs (or monetisable opportunities) within the economic system.
- 3) Third, all this allows us to identify some tendencies that arise from the specific form of capital-nature relations. These tendencies are *conditional* and will not apply always and everywhere. They do not arise from some “external” contradiction between capitalism and a nominally discrete nature and environment. Rather, they emerge because an irreducible and varied world of natural entities are linked together under the qualitatively homogenous and one-eyed imperatives of the peculiar process Marx calls capital. These tendencies are as follows:
  - Since values attach to individual commodities, there is a tendency within capitalist societies to remove entities from their ecosystemic context. This can occur on the input side of production (as when tropical hardwoods are harvested from rainforests), on the output side of production (as in the introduction of genetically modified organisms to environments where their wider ecological effects are unknown) or as an unintended side effect of production (as in the pollution effects of industries burning fossil fuels).
  - Since value is measured in terms of clock time (a social construction), the temporal horizons of capital circulation and accumulation are very particular, being linear, often short-term and strongly influenced by prevailing interest rates. This contrasts with the multiple, nonlinear times of many natural entities need to survive and reproduce (though today these entities might be materially engineered to operate at capitalist temporalities).
  - Since the production and realisation of value makes capitalism enormously dynamic and unstable, change—rather than stasis—is the norm for socionatural relations in today’s

world. The seeming solidity of nonsocial natures melts into the air of perpetual socionatural transformations.

- Since myriad natural entities are only valued in terms of a single homogenous measure, labour time, they experience often massive qualitative and quantitative dislocations in the name of profitability. In other words, the dominant modes of valuation in capitalist societies are *in and of themselves* indifferent to the propriety of, say, losing whole species or creating hazardous new ones.
- 4) Fourth, all this does *not* mean that natural entities are mere putty in the hands of capital. Rather, they are necessary and active moments in a continuous process of circulation and accumulation. To quote Marx (1991:146) once more, “use value, which originally appears to us only as the material substratum of the economic relations, itself intervenes to determine the economic category.” This intervention is both material and economic and will, of course, vary from case to case. For instance, when “bovine growth hormone” recently took on an unexpected agency in the US—namely, causing certain health problems in humans—it affected not only the technical organisation but also the profitability of the entire cattle industry. More generally, the materiality of natural entities in agriculture, forestry and fishing have posed serious historical barriers to capital accumulation, affecting both the technical and institutional organisation of major economic sectors (see eg Henderson 1998; Mann and Dickinson 1978; Prudham 2000). Accordingly, the material effects that “natural” entities have upon capital accumulation are variable and contingent, but rarely passive.
- 5) Fifth, notwithstanding the points made above, my arguments may seem guilty of a residual structuralism. In particular, my use of the terms “capital” and “capitalism” apparently implicate me in using as explanatory resources processes that themselves need to be explained (cf Gibson-Graham 1996). Moreover, the terms still connote the idea of self-sufficient “systems”, an idea of which actor-network theorists are highly critical. In response to these worries, there are three things to say:
- To begin, it is important not to conflate Marx’s value concepts with the things they name. These concepts are thought-abstractions and are not at all identical with the world they describe. Thus, for all the conceptual neatness of Marx’s value-circuit, it belies a world that is enormously messy. Categories like value thus deliberately abstract from this complexity to identify processes and relations which structure otherwise different socionatural entanglements. They

are what Wynne (1992:276) calls “first order approximations”—that is, “shorthand descriptions of the most significant relations and actions within the networks” (Murdoch 1997b:747).

- It follows that “capital” is not a self-sustaining process, but “a network which is stronger in some places than in others and which needs to be constantly worked at to remain coherent over time and through space” (Leyshon 1998:435). In other words, the “thing” we call capitalism is constituted by hundreds of thousands of commodity networks, which mix different people, machines, codes and artefacts in often unique ways, but (and this is the point) towards the same ends. As Murdoch (1998:363) aptly puts it, “despite the heterogeneity of the assembled entities, they work in unison.”
  - Furthermore (and thirdly), what links these various sconatural commodity-networks is not simply that they share the same rationale. More than this formal relation, they share a substantive relation in that value exists as a *real force* guiding commodity production, even as it is nothing more than the collective outcome of the activities of those commodity producers it stands over against. This is something that actor-network theorists, with their insistence that each imbroglio is different, seem unable to recognise.
- 6) Sixth, all this links to the issue of the local-global binary. Again, my use of a venerable Marxian vocabulary may seem to imply a global process in which local sconatural ties are “some pale spectre in the colossal landscape of ‘capital’” (Whatmore and Thorne 1997:302). However, this ignores the fact that, on the processual and relational reading of value I have put forward, sconatural commodity-networks can plausibly be seen as “multiply sited” (Whatmore and Thorne 1997:295). That is, they are local *and* global, involving extended chains of connection between all manner of actants in different places. Here, then, capital is a complex of commodity-networks that cannot be boxed into one or another geographical scale. Together, the networks both determine and are affected by the value dynamics that make capitalist sconatural ties so distinctive and dynamic.
- 7) Seventh, all of the above is consistent with a view of agency and power as, at one level, decentred. I say “at one level”, rather than “essentially”, for two reasons. First, because value relations are both internal and associative—involving the alignment of heterogeneous actants in multiple commodity-networks—agency and power can never be strictly human.

However, in the second place, it is hard to ignore the fact that some agents have far more capacity to direct the course of socionatural relations than do others. In turn, this capacity partly stems from their ability to “collect” power and condense it. In capitalist societies, a key source of power is the possession of money. Money is intriguing in that it is what actor-network theorists would call an “immutable mobile”. It is portable and quantifiable—in the forms of coins, paper currency and shares, say—but it represents something much bigger: namely, the collective actions of multifarious socionatural actants as they, together, constitute value. Accordingly, the owners of money have at their disposal a remarkable technology for capturing the agencies and powers of human and nonhuman others. In short, they can compel others to act as “intermediaries”.

- 8) Finally, the value-theoretic reading of capital–nature relations I have put forward leads one away from making plenary and one-sided judgements about the ecological effects of those relations. The “tendencies” identified above will obviously play out differently depending on the actants involved in particular commodity networks and the distinctive capacities of those actants. Thus, for example, it would be dogmatic to argue that capitalism is always “antiecological” because this supposes that “produced natures” or “created ecosystems” are, ipso facto, undesirable, when in fact they are more and more essential to the reproduction of contemporary socionatural life (Castree 2000:30). After all, capital is all about *creative* destruction, not simply ecological degradation. Additionally, the definition of what is “antiecological” varies according to specific (positive and normative) appraisals of environmental “goods” and “bads”. Accordingly, a politically responsible eco-Marxism would—pace ANT—have to judge different commodity networks in context using cognitive and moral discrimination.<sup>18</sup>

## Conclusion

In staging an encounter between ANT and eco-Marxism, I have tried to show why the latter still has something vital to offer to the ongoing project of greening left geography. ANT “force[s] us to zero in, with ‘high-resolution’ power, on the multiplicity of actors ... and their minute points of ... frictional connection along rather seamless global-local networks” (Gouveia 1997:306). However, like several other new approaches among geography’s green left constituency, it too readily gives up on the insights of Marxian political economy. If we relinquish the capacity to identify the structured and consequential modes by which multiple socionatural networks are ordered, how can we possibly

change the world in more ecologically and socially responsible ways? By splitting the difference between a certain kind of ANT and a certain kind of green Marxism, one can perhaps derive some of the conceptual tools necessary to make supple sense of the processes driving nature's accelerated creative destruction in the twenty first century.

This said, I am acutely aware that the concepts proffered in this essay are particularly abstract. As Marsden (2001) rightly argues, if the heights of theory are to connect with the earth of political practice, then we need to take debates about the political economy of environmental change forward onto a more meso- and microlevel. Otherwise, the geographical left risks buying theoretical sophistication at the expense of empirical-political relevance.

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## Endnotes

<sup>1</sup> In using this term, I am not implying that all the geographers it names are “pro-nature” in any straightforward sense. Rather, in this section I use the term “green” in a more agnostic way, to signify any left geographical work that addresses nature and environment as intellectual and/or normative *subjects of analysis*.

<sup>2</sup> And it is part of a wider “green turn” in the social sciences in general; see Redclift and Benton (1994).

<sup>3</sup> These organisations are, of course, only the latest in a long history of deep green or radical green thought and practice.

<sup>4</sup> The exception here is Murdoch's (1995) cogent ANT critique of “transition theories” in economic geography, such as those surrounding the supposed shift to a post-Fordist regime of accumulation. However, unlike the present essay, Murdoch's focuses on neo- or post-Marxist work and on mesolevel, rather than more abstract, political economy.

<sup>5</sup> I take the term “false antithesis” from Nancy Fraser (1997:207). I am not, I hasten to add, singling Whatmore out for special criticism. Her innovative work using ANT—partly undertaken with Lorraine Thorne—is part of a wider tendency to want to distance ANT from previous nature–society paradigms.

<sup>6</sup> During the period in which this essay awaited publication, Goodman (2001) and Marsden (2001) wrote two interesting papers that also reflect on the ANT-political economy relationship. My argument, though more abstract than Marsden's, resonates with that of both authors in several respects.

<sup>7</sup> In geography, ANT is arguably very much an obsession of a set of Bristol University geographers. One reviewer of this essay noted this fact disapprovingly. Yet is it not usually the case that new disciplinary developments emerge from one or a few sites of knowledge production from whence they spread (think, for example, of the departmental geography of spatial science's popularisers in the early 1960s)?

<sup>8</sup> ANT has its origins in sociology of science, cultural studies of science and science and technology studies. It is not, I should say, a wholly unified theoretical field. Rather, actor-network “theory” is a distillation of insights (or even axioms) drawn from the work

of Bruno Latour, Michel Callon and John Law (with Michel Serres a more indirect influence).

<sup>9</sup> One aspect of socionatural relations I do not consider in this paper is that concerning representation. This has been dealt with from the side of ANT by Bingham (1996) and from the side of Marxism by Castree (1995).

<sup>10</sup> One reviewer of this essay felt that ANT arguments were more rhetoric and rime than substance. This may be so, but I think that the questions ANT asks of mainstream and critical social theory are useful ones.

<sup>11</sup> The point, of course, is to link economy and culture more effectively in relation to nature, not to treat them as separate “boxes”.

<sup>12</sup> For more on the long history of Marxist attempts to theorise nature, see Barry (1999), Castree (2000) and Munck (1999:chapter 2).

<sup>13</sup> I do not, for example, consider the work of John Bellamy Foster. For a more comprehensive coverage, see the collections edited by Benton (1996) and Martin O'Connor (1994).

<sup>14</sup> This began with Marx's critique of Malthus's reasoning about natural “limits to growth”, since recapitulated and elaborated upon by David Harvey (1974) and Ted Benton (1989, 1991a).

<sup>15</sup> And George Henderson (1999) has brilliantly put some of Harvey's theoretical insights to work in his account of early-twentieth-century agriculture in California.

<sup>16</sup> A longer critical appreciation of both bodies of eco-Marxist work discussed so far in this essay can be found in Castree (2000).

<sup>17</sup> This distinction between “weak” and “strong” versions of ANT should not be confused with a distinction between “first-” and “second-”generation ANT (see Hetherington and Law [2000] for clarification).

<sup>18</sup> Notwithstanding these eight theoretical points suggestive of a Marxism–ANT *rapprochement*, it seems to me that the actor-network theoretical vocabulary is currently far richer and more discriminating than is the green Marxist one. This imbalance certainly needs addressing more closely than has been attempted in this essay.

## References

- Altvater E (1993) *The Future of the Market*. Translated by P Camiller. London: Verso
- Antipode (1998) Review symposium on *Justice, Nature and the Geography of Difference*. Vol 30
- Athanasiou T (1998) *Slow Reckoning*. New York: Vintage
- Barry J (1999) Marxism and ecology. In A Gamble, D Marsh and T Tant (eds) *Marxism and Social Science* (pp 259–279). Basingstoke: Macmillan
- Benton T (1989) Marxism and natural limits. *New Left Review* 178:51–81
- Benton T (1991a) The Malthusian challenge. In P Osborne (ed) *Socialism and the Limits of Liberalism* (pp 241–269). Verso: London
- Benton T (1991b) Biology and social science. *Sociology* 25:1–29
- Benton T (1992) Ecology, socialism and the mastery of nature. *New Left Review* 194:55–72
- Benton T (1994) *Natural Relations*. London: Verso
- Benton T (1996) *The Greening of Marxism*. New York: Guilford
- Benton T (1997) Beyond Left and Right. In M Jacobs (ed) *Greening the Millennium* (pp 34–46). Oxford: Blackwell
- Benton T (1999) Sustainability, risk and nature. Paper presented at the Political Ecology of Water in Advanced Societies Conference, Oxford, 15–17 April
- Bingham N (1996) Objections: From technological determinism towards geographies of relations. *Environment and Planning D: Society and Space* 14:635–657
- Blaikie P, Davis I and Wisner B (1994) *At Risk*. London: Routledge

- Braun B (1999) A politics of possibility without the possibility of politics? *Annals of the Association of American Geographers* 88:712–718
- Bridge G (2000) The social regulation of resource access and environmental impact. *Geoforum* 31: 237–256
- Burkett P (1999) *Marxism and Nature*. Basingstoke: Macmillan
- Busch L and Juska A (1997) Beyond political economy: Actor networks and the globalization of agriculture. *Review of International Political Economy* 4:688–708
- Butler J (1998) Merely cultural. *New Left Review* 227:34
- Buttel F (1991) Some reflections on late twentieth-century agrarian political economy. *Sociologia Ruralis* 41:165–181
- Callard F (1998) The body in theory. *Environment and Planning D: Society and Space* 16:387–400
- Callon M (1986) Some elements in a sociology of translation. In J Law (ed) *Power, Action, Belief* (pp 19–34) London: Routledge
- Castree N (1995) The nature of produced nature. *Antipode* 27:12–48
- Castree N (2000) Marxism and the production of nature. *Capital and Class* 72:5–36
- Castree N and Braun B (1998) The construction of nature and the nature of construction. In B Braun and N Castree (eds) *Remaking Reality* (pp 3–41). London: Routledge
- Collier A (1994) *Critical Realism*. London: Verso
- Couzens-Hoy D (1989) Splitting the difference. *Praxis International* 8:447–464
- Cutter S (1995) Race, class and environmental justice. *Progress in Human Geography* 19:111–122
- Davies G (2000) Narrating the natural history unit. *Geoforum* 31:539–551
- Demeritt D (1996) Social theory and the reconstruction of science and geography. *Transactions of the Institute of British Geographers* 21:484–503
- Demeritt D (1998) Science, social constructivism and nature. In B Braun and N Castree (eds) *Remaking Reality* (pp 173–193). London: Routledge
- Eckersley R (1993) Free market environmentalism: Friend or foe? *Environmental Politics* 2:1–19
- Eckersley R (1996) *Markets, The State and the Environment*. Basingstoke: Macmillan
- Eden S (1999) We have the facts. *Environment and Planning A* 31:1295–1310
- Eden S, Tunstall S and Tapstell S (2000) Translating nature. *Environment and Planning D: Society and Space* 18:257–274
- Fairhead J and Leach M (1995) False forest history, complicit social analysis. *World Development* 23:1023–1035
- Fitzsimmons M (1989a) The matter of nature. *Antipode* 21:106–120
- Fitzsimmons M (1989b) Reconstructing nature. *Environment and Planning D: Society and Space* 7:1–3
- Fitzsimmons M and Goodman D (1998) Incorporating nature. In B Braun and N Castree (eds) *Remaking Reality* (pp 194–220). London: Routledge
- Foster J (ed) (1997) *Valuing Nature?* London: Routledge
- Fraser N (1997) *Justice Interruptus*. New York: Routledge
- Fuller S (1994) Making agency count. *American Behavioural Scientist* 37:741–753
- Gibson-Graham J-K (1996) *The End of Capitalism (As We Knew It)*. Oxford: Blackwell
- Goodman D (1999) Agro-food studies in the “Age of Ecology.” *Sociologia-Ruralis* 39: 17–38
- Goodman D (2001) Ontology matters. *Sociologia Ruralis* 41:182–200
- Gouveia L (1997) Reopening totalities. In D Goodman and M Watts (eds) *Globalising Food* (pp 305–323). London: Routledge
- Grundmann R (1991) *Marxism and Ecology*. Oxford: Oxford University Press
- Hartwick E (2000) Towards a geographical politics of consumption. *Environment and Planning A* 32:1177–1192

- Harvey D (1974) Population, resources and the ideology of science. *Economic Geography* 50:256–277
- Harvey D (1996) *Justice, Nature and the Geography of Difference*. Oxford: Blackwell
- Harvey D (1998) The body as an accumulation strategy. *Environment and Planning D: Society and Space* 16:401–421
- Heiman M (1996) Race, waste and class. *Antipode* 28:111–120
- Henderson G (1998) Nature and fictitious capital. *Antipode* 30:73–118
- Henderson G (1999) *California and the Fictions of Capital*. Oxford: Oxford University Press
- Hetherington K and Law J (2000) After networks. *Environment and Planning D: Society and Space* 18: 127–130
- Hinchcliffe S (1996) Technology, power and space. *Environment and Planning D: Society and Space* 14:659–682
- Hudson R (2001) *Producing Places*. New York: Guilford
- Ingold T (1993) Globes and spheres. In K Milton (ed) *Environmentalism: The View From Anthropology* (pp 31–42). London: Routledge
- Latour B (1986) Visualisation and cognition: Thinking with eyes and hands. In H Kuklick and E Long (eds) *Knowledge and Society* (pp 1–41). London: Jai Press
- Latour B (1991) Technology is society made durable. In J Law (ed) *A Sociology of Monsters* (pp 103–132). London: Routledge
- Latour B (1993) *We Have Never Been Modern*. Hemel Hempstead: Harvester Wheatsheaf
- Latour B. and Crawford T (1993) An interview with Latour. *Configurations* 2: 247–269
- Laurier E and Philo C (1999) X-morphising: A review essay of Aramis. *Environment and Planning A* 31:1047–1073
- Lee N and Brown S (1994) Otherness and the actor-network. *American Behavioural Scientist* 37:772–790
- Leyshon A (1998) Geographies of money and finance III. *Progress in Human Geography* 22:433–446
- Lewontin R (1982) Organism and environment. In H Plotkin (ed) *Learning, Development and Culture* (pp 55–72). Chichester: Wiley
- Lowe P and Ward N (1997) Field-level bureaucrats and the making of new moral discourses in agrienvironmental controversies. In D Goodman and M Watts (eds) *Globalising Food* (pp 256–272). London: Routledge
- Luke T (1998) *Ecocritique*. Minneapolis: University of Minnesota Press
- Mann S and Dickinson J (1978) Obstacles to the development of a capitalist agriculture. *Journal of Peasant Studies* 5:466–481
- Marsden T (2001) Food matters and the matter of food. *Sociologia Ruralis* 40:20–29
- Marx K (1966) *Critique of the Gotha Program*. New York: International Publishers
- Marx K (1967) *Capital*. Vol 1. New York: International Publishers
- Marx K (1973) *Grundrisse*. Translated by M Nicolaus. Harmondsworth: Penguin
- Marx K (1976) *Capital*. Vol 1. Translated by B Fowkes. Harmondsworth: Penguin
- Marx K (1991) Economic manuscript of 1861–63. In Marx-Engels *Collected Works*. Vol 33. New York: International Publishers
- Massey D (1999) Space-time, “science” and the relationship between physical and human geography. *Transactions of the Institute of British Geographers* 24:261–276
- McManus P (2001) Sustaining unsustainability: Sausages, actant networks and the Australian beef industry. In S Lockie and B Pritchard (eds) *Consuming Foods, Sustaining Environments* (pp 47–62). Rockhampton: Australian Academic Press
- Munck R (1999) *Marx@2000*. London: Macmillan
- Murdoch J (1995) Actor-networks and the evolution of economic forms. *Environment and Planning A* 27:731–757
- Murdoch J (1997a) Towards a geography of heterogeneous associations. *Progress in Human Geography* 21:321–337

- Murdoch J (1997b) Inhuman/nonhuman/human. *Environment and Planning D: Society and Space* 15:731–756
- Murdoch J (1998) The spaces of actor-network theory. *Geoforum* 29:357–374
- Myerson G and Rydin Y (1996) *The Language of Environment*. London: University College Press
- O'Connor J (1998) *Natural Causes*. New York: Guilford
- O'Connor M (1994) *Is Capitalism Sustainable?* New York: Guilford
- Ollman B (1971) *Alienation*. Cambridge: Cambridge University Press
- Ollman B (1993) *Dialectical Investigations*. New York: Routledge
- Ó Tuathail G (1998) Postmodern geopolitics? In G Ó Tuathail and S Dalby (eds) *Rethinking Geopolitics* (pp 16–38). London: Routledge
- Peet R and Watts M (eds) (1996) *Liberation Ecologies*. London: Routledge
- Prudham W S (2000) Knot's Landing: Production Subcontracting in the Oregon Logging Sector. Unpublished manuscript. Department of Geography, University of Toronto, Canada
- Redclift M and Benton T (eds) (1994) *Social Theory and the Global Environment*. London: Routledge
- Roberts R (1995) Taking nature-culture hybrids seriously. *Environment and Planning A* 27:673–682
- Seager J (1993) *Earth Follies*. New York: Routledge
- Soper K (1991) Greening Prometheus. In P Osborne (ed) *Socialism and the Limits of Liberalism* (pp 217–293). London: Verso
- Smith N (1984) *Uneven Development*. Oxford: Blackwell
- Smith N (1996) The production of nature. In J Bird, T Putman, G Robertson and L Tickner (eds) *Futurenatural* (pp 35–54). London: Routledge
- Smith N (1998) Nature at the millennium: Production and re-enchantment. In B Braun and N Castree (eds) *Remaking Reality* (pp 271–286). London: Routledge
- Swyngedouw E (1997) Power, nature and the city. *Environment and Planning A* 29: 311–332
- Swyngedouw E (1999) Modernity and hybridity. *Annals of the Association of American Geographers* 89:443–465
- Thrift N (1995) A hyperactive world. In R J Johnston, P Taylor and M Watts (eds) *Geographies of Global Change* (pp 18–35). Oxford: Blackwell
- Walker R (1997) Fields of dreams. In D Goodman and M Watts (eds) *Globalising Food* (pp 273–286). London: Routledge
- Ward N and Almas R (1997) Explaining change in the international agro-food system. *Review of International Political Economy* 4:611–629
- Whatmore S (1997) Dissecting the autonomous self. *Environment and Planning D: Society and Space* 15:37–53
- Whatmore S (1999) Hybrid geographies. In D Massey, J Allen and P Sarre (eds) *Human Geography Today* (pp 22–39). Cambridge: Polity Press
- Whatmore S and Thorne L (1997) Nourishing networks. In D Goodman and M Watts (eds) *Globalising Food* (pp 287–304). London: Routledge
- Whatmore S and Thorne L (1998) Wild(er)ness: Reconfiguring the geographies of wildlife. *Transactions of the Institute of British Geographers* 23:435–454
- Willems-Braun B (1997) Buried epistemologies. *Annals of the Association of American Geographers* 87:3–31
- Wolch J and Emel J (eds) (1998) *Animal Geographies*. London: Verso
- Wynne B (1992) Representing policy constructions and interests in SSK. *Social Studies of Science* 22:275–280.