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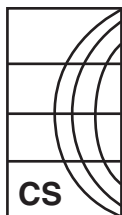
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The Environment and Carbon Dependence

Landscapes of Sustainability and Materiality

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abstract: Sustainability has been the subject of considerable attention from the natural and social sciences and, during the last two decades, the discursive aspects of the way we construct nature and sustainability have opened up new terrain. These debates have been given urgency by the growing awareness of global climate change, and the need to formulate policy responses. On the one hand, the attention to policy has led to the belief, among many environmental economists, that climate change can be characterized as a 'market failure'. From a quite different perspective, some recent work has provided critiques of the way nature is being transformed by capital, and sustainability is viewed in terms of changing materialities and poststructuralist understanding of the role of ideology. The article reviews these positions on the environment and carbon 'dependence' and argues that sociology has a real contribution to make to the analysis of future 'post-carbon' societies, drawing on its roots in critique and the elaboration of alternative, utopian, futures.

keywords: carbon dependence ♦ materiality ♦ nature ♦ sustainability

Introduction

The environment poses real problems for the social sciences, especially the growing sense of urgency surrounding climate change (Altvater, 2007; Brunnengraber, 2007; Cock and Hopwood, 1996; Dyson, 2005; Lever-Tracy, 2008; Rayner and Malone, 1998). This is partly because some disciplines, among them sociology, have long-standing difficulties with policy agendas (with which they often co-evolved historically, and to which they usually offered a critique). In the case of sociology, the difficulties were

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also compounded by the question of naturalism, and the unwillingness to accept what have often seemed facile or insufficient 'biological' explanations of human behaviour (Benton, 1994). Other disciplines, notably human geography, have given much more attention to the environmental terrain including climate change, and located it firmly within their domain of interest, in this case the growing field of political ecology (Biersack and Greenberg, 2006; Bryant and Bailey, 1997; Keil et al., 1998).

The way in which the social sciences respond to the climate change agenda is likely to assume more importance in a world where, in principle at least, ways need to be found out of the dependence on carbon, and the search for alternatives. In particular, it means revisiting what 'we know', and subjecting environmental knowledges to new and unfamiliar investigations. It means investigating future alternatives to the 'hydrocarbon' societies with which we are most familiar, rather as Max Weber investigated unfamiliar 'whole societies' in Antiquity (Weber, 1991).

In many ways, it can be argued, this quest for an analysis of transitions out of carbon dependency (including more understanding of their ideological and political dimensions) is one that should be heartening for sociologists. The discipline has long been interested in the way in which everyday behaviour is institutionalized and naturalized. In addition, sociology has proved an acute lens through which to explore alternative ways of living and imaginaries, and the way they correspond to and connect with, wider human purposes (Abrams and McCulloch, 1976; Green, 1988; Kumar, 1978, 1987). Sociology, and particularly environmental sociology, should be well placed to analyse the social dimensions of carbon 'capture': the processes through which economically developed societies have grown more dependent on carbon and the possible routes out of this dependence. It may be, of course, that to develop this new landscape of sustainability we need to be more familiar with work in other contiguous social science disciplines. This article begins by reviewing the major differences and divisions that have come to characterize the discussion of the environment and nature in the social sciences, distinguishing between critical realism and social constructivism, goes on to review the main intellectual challenges to both positions, and finally argues for a sociological perspective on 'decarbonization' that takes us beyond the current impasse and suggests some areas for theoretical development.

Sustainable Development: Bringing up an Oxymoron

The recent history of sociological concern with the environment begins with the discussion of 'sustainability' and 'sustainable development' in the 1980s. In the wake of the Brundtland Commission report (WCED, 1987) it was argued in some quarters that economic development ought

to be able to accommodate 'sustainability' thinking (Norgaard, 1988; Pearce, 1991). The discussion of development needed to be enlarged and a 'long view' taken of environment–economy relations, which acknowledged a bigger role for future generations and the market (Murphy and Bendell, 1997; Welford and Starkey, 1996). Other critics maintained a more sceptical position towards the easy elision of markets and nature (Adams, 2001; McAfee, 1999; Owens, 1994; Redclift, 1987).

During the last two decades, the formulation that sees no inherent contradiction between sustainability and development has increasingly been called into question. Some critics of 'sustainable development' from the Right have argued that it is an oxymoron, and that economic development cannot accommodate sustainability (Beckerman, 1994; Milbrath, 1994; North, 1995). Others have argued that the concept of sustainable development occludes as much as it reveals, and has served to marginalize distributional issues, poverty and justice (Langhelle, 2000; Martinez Alier, 1995; Page, 2006; Redclift, 1993).

More recent contributions to the debate have argued that both the scientific evidence for global environmental change *and* increasing globalization (both economic and cultural) suggest that it is possible to 're-tune' development along lines that are less energy and material intensive (Lovins and Hunter, 2000). The emphasis on material throughput and 'dematerialization' has also attracted attention (Fischer-Kowalski, 1999). These positions on the compatibility – or lack of it – between the economy and the environment were influenced by several processes:

1. Warnings of accelerated ecological losses and degradation at a global scale (the Earth Summits of 1992 and 2002, but also the Millennium Ecosystem Assessment 2005 and the first and second World Conservation Strategies 1983 and 1991). Awareness of existing, and impending, ecological problems stiffened the resolve of some critics to give higher priority to a 'biosphere politics' (Rifkin, 1992).
2. Neoliberal and structural adjustment policies pursued after the debt crisis (the so-called 'Washington Consensus') effectively marginalized Keynesian economics, which had seen increased public expenditure as a way of managing environmental, as well as social, problems (Lal, 1985; Mawdsley and Rigg, 2003; Onis and Senses, 2005). It had been assumed under neo-Keynesian orthodoxy, that increased environmental problems would be matched by increased abatement expenditure.
3. Climate change politics: the Framework Convention on Climate Change (1992) and the Kyoto Protocol (1997). The growing consensus, which some have labelled 'post-political' (Swyngedouw, 2007), that anthropogenic global warming could galvanize world opinion behind a common policy position.

4. The development of 'Ecological Modernization' policies, especially in the developed world, which enable business to benefit from an internalization of environmental externalities (Mol, 2001).

Despite their obvious resonance, many of these 'real world' processes have failed to influence academic disciplines, including sociology. For example, the political and social implications of employing the idea of 'sustainability' much more widely than in its original conception have rarely been thought through (Redclift, 2005). It has been noted, in this journal, how little sociologists have contributed to rethinking the new parameters of climate change (Lever-Tracy, 2008). Similarly, little attention has been given to the implications of rethinking sustainability for governance, security or ideas of justice (Harvey, 1996; Low and Gleeson, 1997, 1998; Swyngedouw and Heynen, 2003). The reasons for this are informative. During the 1970s and 1980s, environmental policy and regulation identified *external* risks (wildlife, effluents, etc.) that could be contained or repaired. These risks were seen as *controllable* (Brunnengraber, 2007). There was a strong modernist, Promethean impulse at work in delineating human responsibilities to nature.

Since 1992, however, this confident, regulatory impulse has been undermined, particularly as the evidence of climate change has increased, and it is clear that the era of cheap oil has ended. Floods, storms, habitat loss and droughts can be seen as immanent to the system (especially the climate system). They are *internal risks*. They were also risks apparently bound up with human profligacy rather than 'natural' limits, with excessive consumption rather than 'carrying capacity' (Redclift, 1996).

At the same time, sustainability has become treated discursively, and its claims subjected to textual deconstruction like any other social proposition or premise. Just as some advocates of sustainability, influenced by neoliberal policies and the hegemony of the market, sought to incorporate the environment into business and corporate planning, so sceptics of a postmodern or poststructuralist persuasion have treated the environment primarily as discursive terrain. Furthermore, doubts about the ability to control the effects of public policy choices have extended to new areas, notably genetics, where 'internal' (biological) nature has found a new footing in the social sciences, and one which parts company with the social sciences' historical ambivalence towards biology (Finkler, 2000; Redclift, 2005).

A Post-Carbon Politics?

The transition to a low-carbon economy will bring challenges for competitiveness but also opportunities for growth. . . .

Reducing the expected adverse impacts of climate change is therefore both highly desirable and feasible. (Stern, 2007: xvi)

This quotation from the highly influential report by Lord Stern, illustrates the way in which what had previously been viewed as a 'threat' could quickly become an 'opportunity'. The immediate responses to Stern (and the IPCC Fourth Assessment of 2007) were effusive and optimistic in tone. One commentator on business and the environment wrote that:

People would pay a little more for carbon-intensive goods, but our economies could continue to grow strongly. . . . The shift to a low-carbon economy will also bring huge opportunities. . . . Climate change is the greatest market failure the world has seen. (Welford, 2006: 261)

The characterization of climate change as a 'market failure' immediately offers economists and business a lifeline. There is a strong teleological drive to much of the work on climate in environmental economics illustrated by these brief quotes.

But there were also voices that dissented from this rather sanguine account of the converging interest of business and the environment:

The fundamental victory of late-twentieth century environmental politics was precisely to highlight and isolate environmental destruction as the integral result of capitalist patterns of production and consumption. If still incompletely, the market has now retaken and recolonised environmental practices. . . . The extensive production of nature that has characterized capitalism since its infancy has, since the 1970s, been challenged and increasingly superseded by an intensive production of nature. (Smith, 2007: 26)

As Neil Smith and others have argued, environmental concerns represent not just an opportunity for policy, but an opportunity for capital to employ new technologies in the search for profit. Their critique of capital and nature takes us below the surface of a society unable to manage the deepest contradiction to which it is exposed: relinquishing its dependence on carbon.

'Discourse Sustainability'

Radical critiques of the role of 'environmental' capital were only one of several responses to the challenges ahead. The discussion of sustainability had already developed a momentum of its own and, from a sociological perspective, benefited from being grounded in the more familiar terrain of social theory. These discursive accounts I term 'post-sustainability', not because they post-date the achievement of sustainability (a modest goal, indeed) but because, like other 'post-isms', sustainability has travelled a long way since its theoretical conception (Redclift, 2005). The

discussion of sustainability is increasingly polarized between those who take an approach grounded in the achievements of science, a broadly critical realist position, and those who approach the environment from the perspective of social constructivism, who locate themselves within a more hermeneutic tradition.

Both positions are sceptical of policy 'agendas'. From a critical realist perspective, we need to begin by identifying the structural conditions responsible for particular environmental problems. While offering advice on these problems is properly the business of the social sciences, most critical realists would deny that their own disciplinary knowledge afforded advantages over that of others – they deny the *primacy* of specialist or 'expert' witness. For this reason, in their enquiry critical realists may be reluctant to suggest solutions to problems because they fear that specific policy solutions ignore important larger truths (Proctor, 1998).

The approach of social constructivists is rather different. Like critical realists, their approach does not deny the materiality of non-human entities ('nature') but argues that we cannot separate their material existence from our knowledge of them/it. There is no Olympian point from which we gain value-free objective knowledge of the existence of nature, and we never cease to view nature through a social lens.

This approach has been primarily directed towards identifying the ways in which discourses on nature create their own truths (Castree, 2001; Castree and Braun, 2001; Demeritt, 2001). These socially constructed truths help legitimize and facilitate the transformative power with which societies socialize and alter nature. The insights of the 'socionature' thesis rest squarely on post-structuralist thought, especially Derrida (Braun and Wainwright, 2001), but defenders have emphasized that this does not necessarily point towards pointless, postmodernist relativism (Demeritt, 2003). The argument is that the social construction of nature thesis emphasizes the discursive aspect of human–nature relations, in the process destabilizing the classic enlightenment dualisms of nature/society and culture/environment (Proctor, 1998).

The juxtaposition of these two heuristic tendencies, which are different rather than 'opposed', does present some important sociological questions: notably, should we focus on the social processes through which we understand the environment and nature, or should we (as Lever-Tracy [2008] seems to argue) concentrate on, 'listen(ing) to what scientists say about nature' (Lever-Tracy, 2008: 459)? In addition, appreciating the strength of both critical realist and constructivist positions leaves us with another important task. Just as socially constructed truths help legitimize and facilitate the transformative power with which societies view nature, so changes in materialities alter the way in which we view societies' constructed truths. For instance, the availability of cheap oil fosters myths of unlimited material abundance and growth.

This is to identify the social and cultural implications of changes in materiality, while at the same time examining the effects *on* materiality of changes in the way it is constructed socially.

The Continuing Influence of Natural Science Paradigms: Complexity Theory and 'Emergent Structures'

There is other sociological work in complexity theory, undertaken by John Urry (2000) and Manuel Castells (1996), that emphasizes the importance of natural sciences thinking about 'flows' for the social sciences, and argues for the changing character and role of (transnational) state power in a network society of flows, fluids and scapes (Spaargaren et al., 2006). Although influential within the discipline, this work does not really help us resolve the problem this article has set itself, to chart a role for sociology in a 'post-carbon' world. It does not recognize a specific need to address environmental issues as urgent for human survival, or identify the heavy dependence on hydrocarbons as a distinguishing feature of advanced industrial societies.

From a sociological standpoint, there are also important implications in the way that different 'environmental knowledges' are being put to use – for example, in predicting extreme weather events, in Green labelling of consumer products, in the ethical responsibilities of tourism and consumption generally (Bryant et al., 2008). This renewed use of distinct 'environmental knowledges' is also being deployed in explanation for rising energy and water bills. These examples, often drawn from 'everyday life', benefit from being considered within an interpretive sociological context (Berger and Luckmann, 1966) and the discussion of *doxa* in the work of Pierre Bourdieu (1998). Environmental knowledges, in other words, are increasingly used by 'lay' as well as 'expert' opinion, and in support of different groups, against a background of social assumptions and contested claims on society (Yearley, 1996).

These examples illustrate the differences between 'lay' and 'expert' knowledges, but they cannot help us resolve differences about the utility of these knowledges. As 'elite science', environmental knowledge is part of a specialized, esoteric knowledge that can assist, among other things, in offering judgements about the probable consequences of global climate change. However, as science critique, environmental knowledge is employed by NGOs, social scientists and others to critique science itself. It is reflexive, and is taken as evidence of the fact that we cannot remove ourselves from the consequences of our own social constructions. The recognition of environmental issues, on this reading, is a socially determined event. Sustainability and environmental discourses thus provide illustrations of

the deeply political nature of climate policy and science and need not be subsumed into the 'post-political' policy consensus represented by Stern (Swyngedouw, 2007).

Awareness of our increasing dependence on carbon, and the difficult choices it implies for society, suggests that we are confronted by a challenge in social learning, as much as in policy responsiveness. As we become more dependent on prediction in areas such as climate change, so prediction is increasingly difficult and uncertain: the past is an unreliable guide to the future. The conditions of the natural world are changing so fast that the lessons we learn from 'nature' need to be constantly revisited. In the domain of environmental policy, established markers for the future based on the past are increasingly unworkable. They are historicist, in that future acquisitions of knowledge cannot be predicted from past experiences (Popper, 1957). We are travelling in new and hitherto unexplored territory when we grapple with climate change and other areas like the new genetics (Finkler, 2000).

Does the acknowledgement of this difference assist in making science and policy more accountable or does it leave us powerless to act? In the remaining sections of this article, a number of perspectives are examined that throw light on the shared ground of society and nature: environmental governance, Ecological Modernization and poststructuralist political ecology. The question, then, is to what extent these paradigmatic divisions can be surmounted or developed in charting 'post-carbon' sociology.

Contradictions between Changing Materiality and Changing Institutions: Environmental Governance

When developing forms of scientific cooperation between the natural and social sciences, the key tasks for the social sciences are to formulate forms of governance that trigger reflexivity by de-routinising social practices, activate human agency and outline possible choices in ways that fit the specific risks dynamic of second modernity. (Spaargaren et al., 2006: 24)

Much of the debate about sociology and nature has proceeded *as if* human institutions endure while the environment changes. But human institutions also change, although usually in ways which are not 'co-evolutionary' with the natural environment (Norgaard, 1988). For example, as societies change the problems of sustainability are frequently those of providing access to limited, 'positional goods' (Hirsch, 1976) – the countryside, clean coastlines and uncongested cities. However, as economies develop, these same 'positional goods', to which people expect greater access, either suffer from more scarcity or overcrowding. One of the challenges of reducing carbon dependence, then, is to understand the institutional complexes from which materialities gain their legitimacy.

The 'solution' to these problems of material and institutional 'dysfunction' is often described in terms of environmental *governance*. This is usually invoked in terms of 'improving' governance – either promoting more ethically informed governance or proposing new institutions to do the governing. At present, governance frameworks have co-evolved under the assumption of an unlimited, cheap and centralized energy source. Even if alternative cheap sources are found, they might be decentralized. This would have unprecedented consequences in terms of governance and social relations, including energetic security and geopolitical changes.

Interestingly, new environmental regimes, such as the Millennium Ecosystem Assessment (MEA), which was undertaken in 2005, do not provide any insights into how in a 'post-carbon' world governance might change. In place of new ideas about how environmental issues might alter governance, they offer information about the framework of planning, of institutional 'value added', of promises to govern nature. This is another illustration of how thinking on environmental governance has failed to stir sociology or inform policy (Schlosberg, 2004).

It also reveals something of significance about the sociology of environmental 'crises'. The principal innovations in conceptual thinking about the environment and society have arisen because of the scale of likely damage caused by climate change. They examine institutional reforms within the context of material changes. For example, note the way in which disaster studies considers 'emergent structures' within societies in the period just after major disasters, and illuminates the contradictions between disaster and risk 'management' and the trajectories of economic development policy (Pelling, 2003). These are situations in which 'normal' or pre-existing structures of governance are often challenged, and provide another example of the way in which changes in materiality can lead to new political and democratic openings.

Ecological Modernization

The process through which large-scale capital has incorporated and internalized Green policy, in an attempt to widen its market and its appeal, is often referred to as 'Ecological Modernization' (Janicke, 1991; Mol, 2001). The concern of advocates of this position is that a self-consciously 'successful' development model, that of northern capitalism, can and should accommodate to the environmental costs that were ignored when the model was first conceived. For some writers there was no inherent problem in pursuing sustainable development within the logic of the market economy. Green capitalism was a possibility en route to a reality (Welford and Starkey, 1996). Indeed, for some representatives of corporate business, sustainable development was a necessary further stage in the development of capitalism, to be embraced rather than denied.

One of the principal features of Agenda 21, the framework for action proposed at the Earth Summit in Rio de Janeiro of 1992, was the call for partnerships between business and environmental groups. The Business Council for Sustainable Development, as well as the International Chamber of Commerce, represented the perspectives of global business at Rio. However, the 'official' corporate response to the Rio conference, representing the views of over 100 international companies, was contained in a publication that was stimulated by the Earth Summit itself. *Changing Course* helped conceptualize the phases through which corporate involvement in the environment had passed: the prevention of pollution in the 1970s, measures to encourage self-regulation in the 1980s and a concern to incorporate sustainability into business practices in the 1990s (Murphy and Bendell, 1997). The 1990s and the period post-Rio was seen as a turning point in the relation between corporate business and the environment, in which environmental concerns (at least in the case of the largest global players) needed to be internalized, and made a central part of corporate governance.

The public stand taken by some large corporations in the 1990s was more visible than previously, and designed to open up new markets, rather than defend existing ones. One example, cited by Adams (2001) in his review of the Rio process, is that of B&Q, the British hardware chain, which in the mid-1990s argued that the environment was of central concern to shareholders, staff and customers alike. It began to be recognized that the products customers bought were looked upon as part of the natural environment, as well as the built environment, and a corporate response needed to fully acknowledge this fact. At one level, this might lead corporations towards forms of 'Green consumerism', which pointed consumers to the environmental standards met by different products, and persuaded companies of the public relations benefits of a 'Green' image. At another level, were more fundamental questions about the material nature of products and services themselves, and the extent to which 'necessary' environmental costs could be internalized (Ayres and Simonis, 1995).

In some cases, large companies sought to establish themselves beyond the boundaries of 'domestic' environmental regulation and stringent controls. Garcia Johnson (2000) shows how some transnational corporations, stimulated by their experiences on the home market, have even sought to 'export' higher environmental standards:

If multilateral corporations can establish the kinds of rules that favour the technologies and management approaches that they have developed through years of struggle in the United States, they will have an advantage over their competitors from developing countries. (Garcia Johnson, 2000: 1)

Taking as his example that of the US-based chemical industry, Garcia Johnson demonstrates how some companies actively encourage corporate

voluntarism, in Brazil and Mexico. He argues that spreading good practice in environmental governance is linked with the disadvantaging of Third World companies on global markets.

Critics of corporate 'Greening' have sought to distinguish between the rhetoric of corporate environmentalism and the reality. Stephen Bunker (1996), for example, has criticized the so-called 'Green Kuznets curve', the view that as economies develop they become more sustainable and produce less waste. Bunker argues that 'dematerialization', as seen from the vantage point of industrial ecology, is a much more limited process than its advocates acknowledge, suggesting that materially 'lighter' products often have a greater proportional impact on the environment. Cleaner industry in one location can also mean the redistribution of environmental risks to other locations, and the process of 'Greening' industry is neither as transparent nor as disinterested as many corporations avow.

Nature as Accumulation Strategy

In some respects, the willingness to think in terms of categories like 'natural capital' itself constitutes a problem for radical approaches to the environment. The logic and disciplines of the market are a source of potential conflict for Habermas (1981) and other radical social scientists precisely because they appeared to devalue the intrinsic qualities of nature – which placed it apart from market capitalism (Altvater, 1993). On this reading, sustainability could not be accommodated to market forces; the circle could not be 'squared'. However, this is precisely what carbon markets, and carbon traders, propose to do. For them, there is no reason why we should not create markets in carbon, simply because it is part of 'nature'.

Other approaches also re-examine Marxist theory and argue for a more pro-ecology interpretation that focuses on different stages in Marx's own intellectual development, and seeks to elaborate on a Marxist position (Bellamy Foster, 1998, 1999). In another approach, the 'successes' and claims of Ecological Modernization are addressed squarely, and found wanting (Schnaiberg et al., 2002).

Among the most persuasive Marxist critics of corporate green policy is Neil Smith (2007). Smith argues that, beginning in the 1980s and 1990s, an extraordinary range of new 'ecological commodities' came on line. Ironically, they owe their existence, first and foremost, to the success of the environmental movement in the 1960s and 1970s (Smith, 2007).

Neil Smith sees Ecological Modernization as 'nothing less than a major strategy for ecological commoditisation, marketisation and financialisation which radically *intensifies* and deepens the penetration of nature by capital' (Smith, 2007: 17). He quotes the example of 'wetland credits' in

California, which in the 1990s in the US prompted a 'wetland mitigation banking' system.

Smith suggests that, following Marxist theory, the process of marketization of labour produces scarcity where none existed before – restored wetlands provide exchange value 'under the new conditions of created scarcity'.

He goes on to criticize carbon credits for leaving the Costa Rican peasant without a livelihood enhancement:

... whereas the US corporate polluter buying credits contributes not only to continued pollution, but to an intensified accumulation of capital. . . . If one takes a wider geographical perspective on wetland mitigation, it is tempting to paraphrase Engel's assessment of 'the housing question': the bourgeoisie has no solution to the environmental problem, they simply move it around. (Smith, 2007: 20)

Taking issue with a constructivist perspective, Smith argues that their mantra 'nature is discursive all the way down' applies today in a more thorough way, to the *regulation and production of nature*. In his view, 'the market has now retaken and recolonised environmental practices'. The idea of choice and a broad social discussion has become subordinate to 'narrow class control orchestrated through the market' (Smith, 2007: 26).

Smith's essential point is that as nature becomes more subject to the market in 'invisible' forms, such as 'commodity futures, ecological credits, corporate stocks, (and) environmental derivatives' so the process becomes increasingly internalized:

The extensive production of nature that has characterised capitalism since its infancy has, since the 1970s, been challenged and increasingly superseded by an intensive production of nature . . . a new frontier in the production of nature has rapidly opened up, namely a vertical integration of nature into capital. This involves not just the production of nature 'all the way down', but its simultaneous financialisation 'all the way up'. (Smith, 2007: 31–3)

However, it is not clear that Smith's emphasis on the labour process as a framework for thinking about new venues for accumulation is sufficiently flexible to capture the complexities of 'poststructural political ecology' that are most interesting – for example, the mobility of materialities and new unfolding dimensions of environmental governance and injustice. Foremost among the writers within a 'post-structural political ecology' is undoubtedly Arturo Escobar (1996).

Poststructural Political Ecology?

Escobar's position is based on a more reflexive understanding of the conditions prevailing at the geographical 'margins' of global society, such as the Pacific coast of Colombia, where he has undertaken fieldwork. As an anthropologist, Escobar brings to our attention the more 'emic'

dimensions of behaviour – how people respond is linked to distinct cultural understandings, which should not be universalized. In his ethnographic work, Escobar seeks to combine the insights of political ecology with the more discursive approaches reviewed earlier in this article, suggesting both a concern with materiality combined with an interest in its discursive expression, as an instrument or response to the exercise of power.

The approach elaborated by Escobar begins with ‘the growing belief that nature is socially constructed’, and goes on to explore the discourses of ‘sustainable development’ and ‘biodiversity conservation’ in the belief that ‘language is not a reflection of reality but *constitutive of it*’. Space, poverty and nature are then seen through the lens of a discursive materialism, suggesting that local cultures ‘process the conditions of global capital and modernity’. Escobar argues, like Smith, that capital is entering an ‘ecological phase’, in which nature is no longer defined as an external, exploitable domain, in the classic Marxist tradition, but ostensible self-management and ‘conservation’. However, in his view, this is something of an illusion and one that is advanced for economic motives. Capital seeks to use conservationist tendencies to create profit, through genetic engineering for example, and to identify new areas of high profitability, like sourcing biomaterials for pharmaceuticals, which are often outside the traditional domain of finance capital.

This approach significantly qualifies views on the dialectic of nature and capital in several ways. First, the argument is that capitalist restructuring takes place at the expense of production conditions: nature, the body, space. Second, this can take the form of *both* outright exploitation of nature and *also* ‘the sustainable management of the system of capitalized nature’. Third, this, the ‘second contradiction’ of capitalism, entails deeper cultural domination – even the genes of living species are seen in terms of production and profitability. Fourth, the implication of this is that social movements and communities increasingly face the double task of building alternative productive rationalities while culturally resisting the inroads of new forms of capital into the fabric of nature and society. This ‘dual logic’ of ecological capital in the North and the South is increasingly complementary, and needs to be viewed as an historical conjunction. What remains to be discovered are the precise forms of political and social resistance that will come to characterize the withdrawal from carbon dependence.

Conclusion

As the quote from the Stern Report earlier in this article suggests, climate change is now regarded as a ‘given’, markets are now considered more relevant to policy solutions than ever before, and the reduced dependency on hydrocarbons is widely regarded as the single most urgent policy challenge

facing us. It is also widely assumed that evidence of an impending economic recession in the developed world will only serve to intensify this process, creating policy tensions but also opportunities.

This article has argued that the 'contradictions' of thinking about sustainability and development have merged into two policy discourses, both of which can be informed by the social sciences. A realist, science-driven policy agenda has been paralleled by a science-sceptical postmodern academic discourse. Neither position represents a threat to the other – since they inhabit quite different epistemological terrain and address different audiences. In the process, however, we have seen an enlarged academic debate, and one that closely examines the way environmental language is deployed, while at the same time recognizing that public policy discourses themselves carry weight – so-called 'Green consumerism' can reduce the politics of climate change to the size of a Green consumer product. The policy debate has proceeded through assumptions about 'choice' and 'alternatives', that have been largely devoid of any critical, structural analysis, and frequently narrow the field of opportunity, by assuming that people act primarily as consumers, rather than citizens (Redclift and Hinton, 2008). There is clearly room for more rigorous sociological analysis.

This article has argued that there are several areas of sociological work that can inform our analysis of the transition from carbon dependency towards more sustainable, lower energy intensity paths. One is the investigation of societies as 'whole societies', utopias and imaginaries, freed from the heavy burden of immediate 'real world' policy and practice. In reimagining a future free from carbon dependency, we will need to rethink physical and social infrastructures, and transport and energy production, from the 'supply' side, as well as consumer demand.

Similarly, sociology, by framing environmental policy problems within the context of the understood 'blind' commitments of everyday life, also has the potential to recognize those behavioural commitments, and to address how societies meet 'needs' as well as 'wants'. Rather than speak loftily of the need to 'transform' human behaviour, we could make a start by analysing how current behaviour is tied into patterns and cycles of carbon dependence. There are gains to be made in exploring why and how social and economic structures are *unsustainable*, including investigating the real costs of naturalizing social practices which carry important environmental consequences.

Finally, the 'post-carbon' dependent world will be one of increasingly mobile materialities, in which sustainability needs to be viewed within an increasingly global context. If societies are to manage the transition out of carbon dependence then the process of 'dematerialization' will have to be examined sociologically. We will need to know whether waste matter and

throughput is being reduced – or simply being dispersed to new spatial locations. We will need to grapple with scale, as well as materiality, with geography as well as sociology.

The consequences of this debate about the shift from carbon dependence have not benefited from much thoughtful sociological analysis, with a few notable exceptions. The difficulty in separating material evidence for climate change from its discussion has not only spawned ‘climate deniers’, on the one side, but a fear of democratic accountability and engagement, on the other. Perhaps, in the ‘post-political’ world ‘consensus’, democracy and governance need to be rethought, to take account of new forms of power, and the political economy of the withdrawal from carbon dependence needs to be analysed, rather than evangelized. What may be required is a long view of the society that lies beyond the ‘post-politics’ consensus, a task to which sociology is well suited, if unwilling, to carry out.

Note

In 2006, Michael Redclift was awarded the first Frederick H. Buttel Award for Distinguished Scholarship in Environmental Sociology. The award was for ‘outstanding contributions to the study of environment–society relations during the past four years’. The award was made by the Research Committee Environment and Society (RC24) of the International Sociological Association (ISA), chaired by Raymond Murphy.

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