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Crumbling land: the postmodernity debate and the analysis of environmental problems

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I Introduction

The primary aim of this article is to clarify the contemporary tensions between postmodern and environmental thought and, in so doing, to facilitate a better understanding of environmental problems and of the inter-relationships between science, society and nature. I should state at the outset that I am concerned here primarily with academic discourses surrounding postmodernism and environmentalism, though the issues raised have wider significance for environmental policy and action. I suggest here that the linkage of postmodernism with environmentalism advanced in some of the literature is misplaced and is far more problematic than is widely acknowledged. I argue that there are difficulties in using poststructuralist epistemologies for the analysis of environmental problems which reveal important weaknesses in the conceptual strength and analytical clarity of contemporary postmodern thought.¹ While postmodern and environmental ideas share certain concerns such as the ecological critique of modernity and the erosion of scientific authority, the postmodern environmentalist literature frequently draws on simplistic distinctions between modernism and postmodernism. At the epistemological level, I identify difficulties with the treatment of the agency of nature in poststructuralist thought, where the drift towards relativism may lead to an over-reliance on the role of language in environmental explanation. I conclude my discussion by showing how ideas drawn from critical realism can help us recognize where ontological and epistemological issues have become blurred, giving rise to the 'epistemic fallacy', which undermines the possibilities for normative scientific discourse.²

The early 1990s have seen a growing awareness in geography of the engagement between postmodern ideas and environmental issues (see, for example, Cosgrove, 1990; Matless, 1991; Relph, 1991; Bell, 1992; Lewis, 1992; Bordessa, 1993; Cronon, 1992; 1994; Dear, 1994; Demeritt, 1994a; 1994b; Symanski, 1994a; 1994b; Williams, 1994). An important theme in this emerging literature is the extent to which postmodernism embodies the emergence of a new social and political paradigm more conducive to

environmental sustainability and whether postmodern philosophies of science hold out the hope for more ecologically sensitive scientific epistemologies. A central element in this discussion, therefore, is the degree to which the emergence of postmodernism and environmentalism can be read as synonymous and complementary developments. Until recently, the postmodernity debate has paid little attention to the problematic relationship between nature and modernity and has tended to focus on the postmodern aesthetic and the emergence of poststructuralist epistemologies within the humanities and social sciences (examples include Huyssen, 1984; Lyotard, 1984; Foster, 1985; Jameson, 1985; Appignanensi and Bennington, 1986; Hassan, 1987; Nairne, 1987; Hutcheon, 1989; and more recently, Crook, 1991; Bauman, 1992; Pefanis, 1992). This pattern has been mirrored within geography, where the focus has been primarily on the inter-relationship between economic and cultural change (Knox, 1987; Harvey, 1989; Soja, 1989; Davis, 1990); the need for greater sensitivity to social and spatial difference (Bondi and Domosh, 1992; Smith, 1992; Gregory, 1989; 1993; Warf, 1993; Doel, 1993; 1994); and the delineation of the boundaries between modernist and postmodernist thought (Curry, 1991; Berg, 1993). In contrast, the exploration of the inter-relationship between postmodernism and environmental geography through a renewed examination of the relations between nature and culture remains at a rudimentary stage.

Before beginning the main body of this article, it is necessary first to define what I mean by the term postmodernism, which in its increasing ubiquity engenders ever more possible meanings. Dick Hebdige, for example, lists over 30 different contemporary uses of the term, ranging from the 'décor of a room' to an 'anti-teleological tendency within epistemology' (Hebdige, 1987: 4). For the purposes of this discussion I want to divide the literature on postmodernism into three often overlapping categories: first, the use of postmodernism in an aesthetic sense to refer to developments in architecture, art and related fields; secondly, the idea of a contemporary shift towards a distinctively post-modern epoch or condition; and, thirdly, the emergence of postmodernism as a particular mode of thought or academic inquiry. In Table 1, I present a summary of some of the main elements in the postmodernity debate alongside areas where postmodern and environmental discourses intersect in order to clarify the scope of my inquiry.

A recurring theme in the literature is the extent to which postmodernism has transformed or transcended the modern period. In this article I shall use the word modernity to refer to the sweeping changes which began in Europe in the sixteenth century (Williams, 1989) and then spread throughout the world binding disparate peoples and societies in a 'paradoxical unity of disunity' under the global market economy (Berman, 1982: 15). The use of the word modernism should be qualified, however, since it contains diverse elements, including the 'scientific revolution' and the emergence of empiricist and positivist scientific methodologies; faith in the role of science and technology in the progressive development of human societies; and in the aesthetic sphere, a movement culminating in the twentieth century with the international style in architecture and minimalism and abstract expressionism in the visual arts. A closer examination of western modernism reveals that almost all the main aspects had a contradictory dimension: the Rousseauian faith in the 'noble savage' must be set against the Hobbesian notion of a natural state of violence and disorder; the main pillars of modernist science, that of positivism and Marxism, stand diametrically opposed in their epistemological approach to knowledge, the celebration of technological change and the rise of great industrial cities contrasts with the romanticization of a bucolic past, contained within the vision of the garden-city movement and the emergence of the suburbs as an escape from urban life; the

Table 1 Environmental dimensions to the postmodern condition

| Characteristics of the postmodern condition | Areas of intersection between postmodern and environmental discourses |
|--|---|
| <i>Historical sphere</i> | |
| <ul style="list-style-type: none"> • Space-time compression and the rise of 'flexible accumulation' in western economies since the early 1970s • Rise of the new social movements since the 1960s • Emancipatory postmodernism founded on greater sensitivity to difference through recognition of cultural and social otherness | <ul style="list-style-type: none"> • Accelerated commodification of nature identified in neo-Marxist analysis of postmodernism as distinctive epoch associated with capitalist restructuring • Linkages between the postindustrial thesis and ecological sustainability • Debate over the degree to which the environmental crisis is an outcome of the modernity project • Green consumerism as elite market niche in response to the diversification of consumption patterns |
| <i>Aesthetic sphere</i> | |
| <ul style="list-style-type: none"> • Eclecticism, pluralism and 'double coding' to public and professional audiences • Focus on democratization of culture and celebration of pluralism • Renewed interest in the aesthetic sublime and irrationalist thought | <ul style="list-style-type: none"> • New approaches to urban planning and architectural design based on principles of diversity, pluralism and ecological sustainability • Quasi-religious pantheistic role of sublime nature in environmental ethics and concern with wilderness areas • Renewed interest in romanticism and the legacy of <i>fin de siècle</i> European thought drawn from the critique of urban industrial societies |
| <i>Epistemological sphere</i> | |
| <ul style="list-style-type: none"> • Poststructuralist primacy of the signifier over the signified and radical indeterminacy of meaning • Universal political goals and ethics replaced by micropolitical 'language games' and the search for context-specific consensus • Incredulity towards 'grand narratives' and resistance to 'terroristic reason' • Post-Newtonian conceptions of the universe as spontaneously self-ordering and nonteleological | <ul style="list-style-type: none"> • Social constructivist views of nature and greater recognition of uncertainty and unpredictability in the analysis of environmental systems • Critical realist concerns with the 'epistemic fallacy' and the basis of normative science • Search for place-bound values as forms of bioregionalist 'local knowledge' • Tension between essentialist and nonessentialist strands of ecofeminism • Rejection of Cartesian dualism and debates over the role of modernist science in environmental destruction • Suspicion towards technology and universalist forms of rationality • Influence of new scientific ideas such as anti-chaos and post-Darwinian evolution on the Gaia hypothesis and postmodern scientific formulations |

Sources: The characteristics of the postmodern condition are collated from various sources including Nairne (1987), Harvey (1989) and Crook *et al.* (1993).

belief in the innate rationality of the whole enlightenment project sits uneasily with the more nihilistic and existential aspects of *fin de siècle* European thought; and within the arts, the separation of cultural and everyday life through high modernism was in the twentieth century directly challenged by the artistic avant-garde as the movement passed through Paris, Moscow, Berlin and finally culminated in the postwar New York art scene.

II The ecological critique of modernity

I want to begin by exploring how the contemporary environmental crisis has been linked with the ideas, institutions and processes of modernity. The emergence of the environmentalist movement since the 1960s has been widely interpreted as part of a broader political reaction against the technical rationality and instrumentalist attitudes to nature underpinning western modernization and the industrial transformation of 'natural' environments. Such sentiments are not new: indeed, one of the most powerful early expositions on this theme is Horkheimer and Adorno's *Dialectic of Enlightenment*, first published in 1947. The contemporary ecological critique of modernity contains a series of diverse elements: the questioning of Cartesian dualism underpinning human intervention in and disruption of the biosphere (Wilkstrom, 1987; Atkinson, 1991; Bordessa, 1993; Hutcheon, 1994); challenges to systems of domination such as patriarchy, where these are seen as synonymous with the subordination of nature (Merchant, 1989; Warren, 1990); concern with the simplification and destruction of sustainable nature-culture relations by capitalist modernization and the misapplication of scientific knowledge (Norgaard, 1994); emphasis on the contradiction between enlightenment rationality and the irrationality of the environmental crisis (Beck, 1992; Eckersley, 1992; Wright, 1992); and resistance to the erosion of pantheistic spirituality and the destruction of wilderness areas (Oelschlaeger, 1991). It is the idea of environmental crisis as 'enlightenment gone wrong' which has encouraged the view that postmodernism represents a solution to the environmental crisis through a rejection of the modernist project. However, the linkage of environmentalism and postmodernism is more problematic than it may at first appear. I want now to explore the debate in greater detail by focusing on four specific aspects: the tension between environmentalist diversity and postmodern pluralism; the influence of romanticism on contemporary perceptions of nature; teleological debates about postindustrialism and environmental sustainability; and the problematic relationship between ecofeminist thought and foundationalist discourses of gender.

1 Environmentalist diversity and postmodern pluralism

A first objection to any simplistic linkage of postmodernism and environmentalism stems from the treatment of environmentalist thought as a coherent entity, when in reality it contains a diverse spectrum of views ranging from anarchocommunalism to 'green capitalism', as shown in Table 2. The number of environmental writers who explicitly identify themselves as postmodern is in fact rather small, and is drawn predominantly from the fields of deep ecology, ecofeminism, and environmental planning and architecture. In some cases, the diversity of environmentalist thought is itself seen as indicative of postmodern pluralism (see Relph, 1991; Jencks, 1992; Lewis, 1992) but this perspective fails to distinguish adequately between the relative merits of these different environmentalist positions – in the case of Lewis (1992), falling back on the weak dualism between

Table 2 A typology of postwar environmentalist thought

| School of thought | Central tenets | Key proponents |
|--|--|---|
| Cornucopians | No major problems perceived. Easily solved by human ingenuity and the market economy | Julian Simon Herman Kahn |
| Market-based approaches | Emphasis on the use of MBIs (market-based instruments) to internalize environmental externalities and tackle sources of 'market failure' | William Baumol Anil Markandya David Pearce Robert Repetto |
| Managerialists and technical fixers | Reliance on organizational or technical solutions | Arnold Gehlen Wolf Häfele |
| Institutional reform school | Promotion of sustainable development by better integration of environmental policy with economic development. Focus on N-S dimension and the need for change in global monetary and trade policy | Gro Harlem Brundtland Al Gore Udo Simonis |
| Postindustrialists and liberal pluralists | Ideology of industrialism seen as underlying problem. Focus on need to change individual attitudes | Fritof Capra Jonathan Porritt Charlene Spretnak |
| The limits to growth school | The promotion of scientifically based public policy and the need for the control of both population and economic growth | Donella Meadows Norman Myers |
| Sociobiology and authoritarian ecology | The promotion of neo-Malthusian ideas and social Darwinism in public policy. Links with far-right ideologies | Anna Bramwell Paul Colivaux |
| Deep ecology | Preservation of wilderness and public policy based on intrinsic values in nature. Strong links to romanticism in European thought | William Devall Warwick Fox Arne Naess |
| Gaia hypothesis and anti-chaos theory | The promotion of homeostatic and sustainable policies | James Lovelock |
| Utopianism and anarchism | The transformation of society into numerous decentralized and largely self-sufficient communities. The promotion of 'soft' technologies | Rudolf Bahro Ivan Illich Amory Lovins |
| Orthodox Marxism | Environmental degradation as result of contradictions in capitalist production | William Kapp Francis Sandbach |
| Ecofeminism | Domination and destruction of nature seen as a corollary of women's oppression under patriarchy. School split between essentialist and nonessentialist readings of gender | Carolyn Merchant Val Plumwood Ariel Salleh Vandana Shiva Kate Soper |
| Post-Marxist structuralists | Environmental problems seen as stemming from structural features in the economy and society identifiable through historically based analysis | Elmar Altvater Murray Bookchin Susannah Hecht Alain Lipietz |
| Environmental planning and ecoarchitecture | Behaviouralist concerns with the design of the human environment and the beautification of cities and landscapes. Links with critiques of both cultural modernism and technocratic Fordist models of public policy | Adrian Atkinson Peter Calthorpe Charles Jencks |
| Reflexive modernization thesis | The relationship between self, society and nature has become fundamentally altered under late modernity | Ulrich Beck |

'acardian' and 'promethean' environmentalism, predicated on the green capitalist discourse of ecological modernization and providing little advance on the distinction between technocentrism and ecocentrism developed in the literature of the 1980s.

2 The legacy of romanticism

A further objection to postmodern environmentalism, as a new and distinctive contribution to the environmental debate, is the lack of distinctiveness of various strands of postmodernism in relation to established aspects of modernist thought. A number of those elements of postmodernism which could be most closely identified with environmentalist thought are not distinctively different to counter currents established within the overall development of modernity. Examples of the selective appropriation of modernism within postmodernism include romanticist anti-urban sentiment; the reaction against the alienation of work in industrial societies; and the Kantian search for intrinsic values in nature. Ronald Bordessa (1993: 149), for example, suggests that the postmodern rejection of philosophical foundationalism will '... throw us into the mystery of existence', but such sentiment is well established within the European romantic tradition and is allied to an ambiguous and aestheticized political vision (see Callinicos, 1989; Eagleton, 1990). Bordessa (1993: 152) specifically rules out enlightenment values as '... a thin disguise for the granting of a free hand to science' and ignores the long-standing critical engagement between Marxism and positivism in the social sciences. Indeed, much of the postmodernist critique of modernist science elides positivist and Marxist epistemologies within a single category of universalist foundationalism implicated in the alienation of self and society from nature.

The romantic strands of postmodern environmentalism rest on an obscuring of the inter-relationship between social organization and the social construction of nature: many bioregionalist and deep ecological formulations attempt to transcend the 'artificiality' of modernity by appeal to an imagined reconciliation between nature and culture. Bordessa (1993: 150) sees a new set of moral values as arising out of our closer union with nature, through our recognition of '... a human being as a centred self *and* as a mere component of a greater whole that allows us to conceptualize nature in the same way', drawing on sentiments little different from the eighteenth-century romanticist cosmos, and the yearning for transcendence through nature (see Livingstone, 1992). Yet this reconciliation of nature and culture is nonsensical, since in reality they have always been closely entwined, in the creation of both urban and rural landscapes, as Cronon demonstrates in his historical treatment of the relationship between Chicago and the great west (Cronon, 1991). The linkage of environmental destruction specifically with modernity also ignores the scale of environmental change predating the modern capitalist world economy and reveals how simplistic postmodernist formulations neglect to examine the actual processes by which the relationship between society and nature has changed over time.

3 Diverging perspectives on postindustrialism

The debate over the nature and extent of the 'postmodern condition' has also been extended to the theme of environmental sustainability, particularly where this has become linked to the postindustrialism thesis and the promotion of ecological modernization through technical modifications to the production process. We can find parallels here between contemporary postmodern accounts of the shift towards pluralist postindustrial

societies and the recycling of late 1950s' 'end of ideology' sentiment associated with the ideas of Daniel Bell. The postmodern utopians point to new patterns of industry which facilitate greater freedom and flexibility for the workforce and a reduced environmental impact through the application of new post-Fordist production systems able to utilize the most advanced clean technologies and eco-audited management systems (see Atkinson, 1991; Orr, 1992; Jencks, 1992; 1993). Yet even if we were able to accept that a process of deindustrialization has taken place in some developed economies, the idea of a 'post-industrial society' rests on its scale of application. At a global level, it is difficult to argue that the postwar period has seen a shift to postindustrialism; indeed, the aspects of industrial society most criticized by environmentalists are increasingly located outside developed economies to less regulated environments, as in northern Mexico and eastern Europe.

Postindustrial and pluralist conceptions of society also lie close to the neoliberal sentiments which have conceived environmental problems to be largely the outcome of various forms of market failure. An ahistorical and individualistic basis to environmental analysis leads towards the promotion of new environmental values and policies such as 'green consumerism' which cannot address structural features of the economy and society that contribute towards environmental degradation. Similarly, the shift away from any universal conceptual categories under poststructuralism undermines efforts to establish causal linkages through space and time involved in the transformation of nature: the destruction of tropical rain forests for the western consumption of timber and other commodities demands an analysis of the global economy and the power of money as a universal form of value underpinning the commodification and exchange of nature. In this respect the poststructuralist aversion to Marxism has important implications for the development of a political economy of environmental change (Peet, 1992). The debate over postindustrialism also exposes a tension between negative views of contemporary socioeconomic restructuring where global processes of ecological degradation are emphasized (see Altvater, 1993) and a narrower view of socioeconomic change focused on technomanagerial flexibilization of the production process as a path towards ecological modernization (see Dietz *et al.*, 1992).

4 Ecofeminism and the critique of foundationalism

If we extend our discussion to the analysis of the inter-relationship between patriarchy and environmental degradation, the linkages between postmodernism and environmental politics become further complicated. For example, the linkage of women to nature on the basis of biological differences between men and women has met with disquiet (Fuss, 1989; Nesmith and Radcliffe, 1994; New, 1994; Jackson, 1995), yet these foundationalist sentiments are firmly rooted in much ecofeminist environmentalist thought and serve to weaken any clear connection between poststructuralist anti-foundationalism and radical environmentalist thought. On the other hand, feminist critiques of western science inspired by postmodernist ideas have recently begun to unravel important interconnections between the practices and goals of androcentric science and the negative impacts of scientific knowledge. For Sandra Harding, this ambiguity in the relationship between feminism and postmodernism is '... creating in feminist thought a necessary ambivalence toward the Enlightenment and toward the beliefs and politics of Postmodernists' (Harding, 1991: 184). Postmodern attention to gender and social and cultural otherness has the potential to sensitize environmental discourses to the differential impact and

perception of environmental crisis. Yet if ecofeminist thought becomes completely disengaged from any kind of realist or rationalist conceptions of knowledge there is a danger of drifting into the normatively futile realm of relativism. This is a problem I explore in the second part of the article in order to develop a clearer exposition of how we can apprehend the dynamic articulation between cultural and biophysical systems.

In summary, I wish to argue that the ecological critique of modernity reveals that there is a tension between the ideas and institutions of modernity and environmental crisis but there is a need to resist a polarized and ultimately unhelpful distinction between modernism and postmodernism since the underlying tension between ecology and modernity must be resolved at the epistemological level through an evaluation of competing conceptions of the cause of environmental crisis. The more simplistic postmodern positions are ultimately extended towards a complete rejection of the Enlightenment project combined with assumptions that postmodernism represents a new kind of relationship between nature and culture mediated through new technological advances and more pluralistic forms of social organization. Yet I argue in this article that we can articulate an ecological critique of modernity and instrumental reason without abandoning either rational scientific discourse or a coherent analysis of structural determinants of environmental degradation such as the commodification of nature.

III The agency of nature in scientific explanation

I want now to consider the epistemological dimensions to the debate in greater detail by exploring the agency of nature in scientific explanation. By the agency of nature I mean the realm of biophysical processes lying outside social discourse. I argue here for a need to handle the tension between physical reality and the social construction of knowledge without becoming trapped between the competing poles of relativism and rationalism. In particular, I wish to stress how poststructuralist epistemologies are peculiarly unsuited to environmental research. I develop my argument in four stages: the relationship between postmodernism and the environmental sciences; the limits to social constructivism; the problem of environmental ethics and values drawn from nature; and an evaluation of the role of critical realism in the development of normative environmental science.

1 Postmodernism and the environmental sciences

A central theme in the postmodern literature is the eschewing of any form of scientific explanation which rests on the privileged significance of one or more 'essentialized' causal factors. There is a rejection of so-called 'metatheories' which attempt to simplify reality into any form of universal explanation (examples include Lyotard, 1984; Toulmin, 1990; Bauman, 1992). Although the two most influential systems of scientific thought underpinning modernist science are positivism and Marxism, the anti-essentialist arguments have been mainly directed at Marxist thought. This reflects the anti-structuralist backlash in the humanities and the social sciences pioneered by Baudrillard, Derrida, Foucault and other poststructuralist thinkers and now adopted self-consciously within a variety of postmodern environmentalist formulations (see Warren, 1990; Bordessa, 1993; Jencks, 1992; 1993; Cheney, 1989; 1990; 1994; Gare, 1995). Though some commentators on the postmodernism debate have sought to identify a comparable set of anti-essentialist developments in the natural sciences, it is extremely problematic to argue that we are

witnessing a shift towards postmodernity within science as a whole. Both Jencks and Dear, for example, cite Lovelock's Gaia hypothesis as indicative of an overall shift towards postmodern science (Jencks, 1992; Dear, 1994), yet even in biology, as Symanski points out, the majority of scientists are 'hardcore materialists, positivists or realists' (Symanski, 1994b: 301). A range of key disciplines which informs environmental policy-making such as civil engineering, biology and environmental economics has scarcely engaged with the critique of positivist science in the 1970s let alone responded to the poststructuralist epistemological challenges to the creation of knowledge. The most significant developments in the natural sciences have centred around themes such as modifications to realist thought in the physical sciences (Harré, 1986; Honner, 1987; Bhaskar, 1989) and post-Darwinian approaches to evolution (Sheldrake, 1981; Levins and Lewontin, 1985; Gould, 1989; Gonzales, 1992; Goodwin, 1994) rather than on the poststructuralist concern with the inter-relationship between language, metaphor and meaning. This uneven impact of postmodernist thought across different disciplines involved in environmental research begins to illuminate what the postmodernity debate is fundamentally about: the decline of western structuralist and Marxist traditions in the humanities and the social sciences.

2 Relativism, social constructivism and environmental discourse

If we examine the postmodern challenge to existing scientific epistemologies we find a particular emphasis on the role of language. Knowledge is portrayed as a social product dependent on the social practice of language to produce meaning. The poststructuralist epistemologies break off any link with an external reality or 'foundation' to which human knowledge can be based. For the poststructuralists, scientific knowledge about nature is not therefore a representation of something which exists outside society, but rather, a number of relative truths 'governed by a particular scientific paradigm' (Bird, 1987: 255). The production of any knowledge of generalizable applicability is also rejected: there is a questioning of any scientific enterprise which seeks to produce grand theory capable of shifting science into a higher plane '... in which nature and ethics conform to abstract, timeless, general and universal theories' (Toulmin, 1990: 35). There is no Kantian view from nowhere from which we may gain an overview of human society. Indeed, attempts to do so are chastized as '... the visions of subjects driven by the desire to disavow their own partial and fragmented condition through the refusal of difference' (Deutsche, 1991: 5). This radical doubt about the possibility of establishing foundations to scientific enterprise is equally challenging to positivist, Marxist and historicist forms of explanation (Cosgrove, 1990: 344), yet the contemporary debate has become entrenched in a dichotomy between relativism and rationalism which has obscured the substance of these epistemological disputes for environmental research. The central elements of relevance to this discussion are a reappraisal of the relative merits of universal and local or traditional (especially nonwestern) forms of knowledge, and a complexification of the relationship between nature and society in the production of knowledge (Haraway, 1989; 1991; Latour, 1993; Murdoch and Clark, 1994).

In the 1970s, Paul Feyerabend sought to show that modernist standards for the creation of meaningful knowledge had been set so high as to make the attainment of knowledge impossible (and in the process raised issues about truth and objectivity before their popularization through poststructuralist thinkers in the 1980s). In this context we can draw on the work of Ross (1991) and Wynne (1992; 1994) in order to expose the degree of uncertainty over what constitutes 'truth' or 'facts' in the environmental sciences (see also

Bennett and Chaloupka, 1993). Indeed, natural scientists have often broken their own rules in their pursuit of knowledge (and personal ambition) and this led Feyerabend to advocate an 'epistemological anarchy' to undermine the truth claims inherent within science, and also to allow respect for other forms of knowledge produced by cultures outside the western tradition:

These cultures have important achievements in what is today called sociology, psychology, medicine, they express ideals of life and possibilities of human existence. Yet *they were never examined with the respect they deserved* except by a small number of outsiders; they were ridiculed and replaced as a matter of course first by the religion of brotherly love and then by the religion of science or else they were defused by a variety of 'interpretations' (Feyerabend, 1993: 264, emphasis in original).

What is especially interesting about Feyerabend's work in this context is that in more recent writings (including the postscript to the third edition of his *Against method*) he has carefully qualified the promotion of relativism as an alternative to western notions of rationalism. He notes that '... relativism is as much a chimera as absolutism (the idea that there exists an absolute truth), its cantankerous twin' (Feyerabend, 1991: 515). The crucial point is that the relationship among the scientist, society and nature is more problematic than relativists (and positivists) will allow:

... all we apprehend when experimenting, or interfering in less systematic ways, or simply living as part of a well-developed culture is how what surrounds us responds to our actions (thoughts, observations, etc.); we do not apprehend these surroundings themselves: Culture and Nature (or Being, to use a more general term) are always entangled in a fashion that can be explored only by entering into further and even more complicated entanglements. What we find when living, experimenting, doing research is therefore not a single scenario called 'the world' or 'being' or 'reality' but a variety of responses, each of them constituting a special (and not always well-defined) reality for those who have called it forth. This is relativism because the type of reality encountered depends on the approach taken. However, it differs from the philosophical doctrine by admitting failure: not every approach succeeds (Feyerabend, 1993: 270).

If we examine how these debates over the relative merits of rationalism and relativism have influenced environmental discourse, we find that the tension between these forms of knowledge is extremely complex. For Elizabeth Bird, every aspect of scientific theory and practice '... expresses socio-political interest, cultural themes and metaphors, personal interactions, and professional negotiations for the power to name the world', but relativism cannot adequately account for both the impact of science on nature and the relationship between scientific inquiry and nature (Bird, 1987: 256). Bird (1987: 258) develops her critique of relativism by showing how the logical outcome of a socially constructed view of nature is that '... one may be left with the impression that the reality may not exist at all except by way of its inscription and the subsequent negotiated interpretation'. She illustrates this problem with reference to the work of Bruno Latour on the relationship between science and microbiological organisms, where microbes themselves have had an active role in the history of medicine (see Latour and Woolgar, 1986; Latour 1983; 1988). Similarly, she notes the importance of a distinction between experimental research such as plant breeding, where nature is involved in the construction of a new reality, and branches of science such as natural history where knowledge is produced more as the outcome of a contemplative negotiation of images and theoretical expectations (Bird, 1987: 259).

The significance of the recognition of the independent agency of nature is that there is something 'outside the text', thereby weakening epistemologies founded on the linguistic construction of reality (Frodeman, 1992: 310). However, in the last instance, Bird still clings to a relativist position, claiming that the extent to which science-based technologies function outside the laboratory cannot be marshalled as evidence that the knowledge base is about nature, but is '... evidence that the controlled conditions of the laboratory can be

sufficiently reproduced in the field to achieve comparable results' (Bird, 1987: 260). For Bird, the recognition that environmental problems are socially constructed does not undermine '... the grounds of our legitimate political claims' but releases a variety of different interests ranging from aesthetics to health and economics, encompassing '... inter-subjective, socially negotiated moral truths achieved in the interests of (environmental) justice' (1987: 261). But are these different perspectives equally significant? How can we determine which interpretations of environmental problems are more cogent and which political responses will allow a greater degree of social justice? Bird (1987: 261) relies on the need to recognize environmental problems as the result of '... morally and politically mis/taken social practices', yet her attachment to relativist ethics renders this statement nonsensical. Crucially, she tries to argue that the scientific paradigm we employ for environmental research is a political rather than an epistemological issue, yet politics is inseparable from epistemology, contradicting her insistence that the scientific production of knowledge is a labour process like any other under capitalism.

The connections between environmentalism and postmodernism are further complicated by the difficulties in extending the 'linguistic turn' to practical policy-making. Robert Frodeman, for example, scorns the supposed anti-essentialism of postmodern thought, since '... every conceptual scheme structures and hierarchizes its material, as part of the tension intrinsic to the move from a particular to a general concept encompassing the particular' (Frodeman, 1992: 313). Equally, the poststructuralist treatment of difference and value does not adequately handle the relationship between power and knowledge because '... values are intrinsically hierarchical: every affirmation implies a negation; to highlight a given object is to cast the others in shadow' (Frodeman, 1992: 314). Frodeman (1992: 314) shows that the failure to distinguish which differences make a difference is predicated on '... a breakdown of community and the divorce of private and public realms in contemporary society', thereby linking the weaknesses of postmodernist thought with the fragmentary nature of contemporary social and political life in western societies.

Frodeman suggests that there is an incoherence within postmodern thought in evaluating the relative merits of different epistemological and ontological positions for the practical needs of public policy. He describes how '... the failure to distinguish which differences make a difference not only vitiates postmodernist thought, but also runs up against some of the fundamental assumptions of radical environmentalism' (1992: 309). Frodeman takes issue with attempts by postmodern thinkers such as Karen Warren and Jim Cheney to define where the exercise of power or hierarchical thinking is necessary, shown by their failure to move beyond superficially nonideological examples such as plant taxonomies to the more significant issue of whether '... the expression of one person's nature within a community could entail the suppression of another, forcing the community to define a hierarchy of values' (Frodeman, 1992: 311; see also Harvey, 1993b).

3 Ethics, values and place-bound knowledge

If we abandon enlightenment values as the postmodernists urge us, what kind of moral and ethical values are we left with in order to protect the environment? The discourses of deep ecology and ecologism look for intrinsic values in nature and the application of nonwestern and premodern value systems. In certain strands of postmodern environmentalism we can find attempts to apply these alternative value systems through the promotion of place-bound bioregionalist forms of knowledge. An emerging theme is the search for traditional or 'local knowledge' as an alternative to the universalist or reductionist characteristics of

western science (see Flora, 1992; Cheney, 1989; 1990; 1994). Jim Cheney urges intuitive or myth-based senses of appropriate behaviour drawing on the ideas of Alasdair MacIntyre and Aldo Leopold, but these contextualized moralities belie a hidden kind of foundationalist 'local knowledge' in the appropriation of values in nature as if these reside outside social relations. In other words, smaller-scale bioregionally rooted environmental ethics do not circumvent the weaknesses of rationalist and totalizing strands of environmental thought. In Cheney's postmodern bioregionalism we see an extension of poststructuralist ideas to North American indian myths, thereby eliding pre- and postmodern environmentalisms into one system of anti-modern environmentalism. The poststructuralist critique of modernity provides a parallel foundationalist status to the spurious objectivity of positivism and empiricism in environmental discourse. This can be illustrated with reference to the analysis of gender, where the linkage of modernity with the '... totalizing, essentializing discourse of patriarchal consciousness' (Cheney, 1989: 133) ignores the existence of violence against women under the local knowledges of premodern and nonwestern societies.

The overextension of postmodern ideas to incorporate other nonwestern traditions could also be characterized as a kind of cryptocolonial discourse effectively masking the commercial exploitation of knowledge, culture and biotic resources (Thomas, 1991; O'Hanlon and Washbrook, 1992; Holmberg *et al.*, 1993). In any case, intrinsic values to be found in nature are largely the reflection of our own belief systems, encompassing a whole variety of thought from sociobiology and social Darwinism to communitarian and co-operative models (Harvey, 1993a; Frenkel, 1994). This western cultural ambivalence towards nature is exemplified by the example of rain forests and tropical landscapes, which have variously symbolized 'lost edens' or threatening places within which there is a reversion to a primal state of violence, as depicted in the novels of Joseph Conrad, William Golding and Randolph Stow.

4 Normative science and critical realism

In this final section of the article I want to suggest that insights drawn from critical realism may have an important role to play in tackling the epistemological dimensions to environmental discourse. In particular, critical realism may lead to more appropriate ways of handling biophysical systems without denying their independent existence or forcing natural and social systems under the same scientific framework advocated under positivist epistemologies. If we examine the poststructuralist emphasis on the social construction of nature from the epistemological standpoint of critical realism, we find that the entrenched dialogue between rationalists and relativists is underlain by the problem of the 'epistemic fallacy' (Sayer, 1993; Collier, 1994a; Norris, 1995). If we accept the extreme position, epitomized by Woolgar (1988) and Tester (1991), that nature is a purely social construction at the ontological level we are left with the paradoxical outcome that changes in knowledge lead to changes in physical reality. The implications of ontological relativism for any normative discussion relating to the prevention of environmental pollution are exposed by Hans Radder in the case of ozone depletion:

Consider an environmental issue such as 'the hole in the ozone layer', and suppose that the claimed existence of this hole is, for some reason or other, seen as a problem. According to the ontological relativist point of view, this hole is identical to the discourse about it, and it cannot possibly have any independent reality. Consequently the hole would simply disappear at the very moment we stopped discoursing about it, *even if* – and this is the crucial point from a normative perspective – we continued employing present technologies, such as aerosols, in an unaltered way! (Radder, 1992: 156).

If we disentangle ontological and epistemological questions we can show that the world exists separately from us but our knowledge of it can only ever be partial and is mediated through social practice. In other words, it is possible to reject ontological relativism without endorsing a realist theory of conceptual representations in science, thereby allowing a form of 'referential realism' (Radder, 1992: 167). This approach is better suited to the analysis of phenomena which are neither purely object (nature) nor subject (social discourse), but the 'quasi-objects' described by Latour (1993) which lie between the opposite epistemological poles frozen into the dichotomy between the natural and social sciences. For Andrew Collier, the task of critical realist philosophy is to uncover an ethical ontology whereby our knowledge is predicated not so much on the discovery of new values as on the uncovering of transhistorical moral truths such as social justice and the preservation of biotic diversity. The support for political dissent as a harbinger of a new society is thus founded on the possibility for exposing causal inter-relationships between social values and underlying generative processes, rather than a relativist endorsement of difference in the absence of any theory of causality (Collier, 1994b). It can be concluded that we need a subtler appreciation of the inter-relationship between the ontological and epistemological basis of knowledge through a greater sensitivity to the agency of nature in social and scientific discourse. The realist exposure of the 'epistemic fallacy' can provide a useful means by which to avoid the political and philosophical quagmire of relativism in environmental research.

IV Conclusion

The dialogue between environmentalism and postmodernism leads us towards a number of pressing questions for environmental research. Do poststructuralist epistemologies enable us to gain a better understanding of environmental problems? To what extent are the ideas, institutions and processes of modernity implicated in the environmental crisis? To what extent is the 'postmodern condition' and its associated socioeconomic, political and philosophical characteristics antithetical or conducive to environmental sustainability? How useful are the analytical categories of modernity and postmodernity for our understanding of environmental problems? How far does the feminist critique of western science contribute to our understanding of the inter-relationship between patriarchy and environmental degradation? If these types of research questions are not tackled by geographers, they will be left to other disciplines: the renewed examination of nature-culture relations is now beginning to emerge as a critical research focus, the impetus stemming particularly from the sociology of science and related disciplines (see, for example, Haraway, 1991; Beck, 1992; Latour, 1993).

This survey of the interconnections between postmodernism and environmentalism has shown that there are six main areas where these debates intersect: the teleological arena of postindustrialism and ecological modernization; the pluralism inherent in the broad categories of environmentalist and postmodern thought; the greater recognition of scientific uncertainty and the limits to predictive models; the hyperindividualism and anti-state sentiments which find expression in western forms of environmentalism such as green consumerism and ecologism; the ecological critique of modernity; and the promotion of bioregionalist place-bound 'local knowledge'. The central flaws in the simplistic combination of environmentalism and postmodernism stem from a variety of sources: the caricature of the modernist project within a false dichotomy resting on the selective

appropriation of elements of modernist thought; the failure satisfactorily to resolve how values inherent in either nature or in forms of 'local knowledge' can be clearly evaluated; the problem of combining respect for difference with any hierarchy of values capable of underpinning any commitment to social justice; and the lack of recognition for the universality of capital and how the commodification of nature can be effectively contested. A postmodern environmentalism cannot challenge the environmental contradictions of capital and patriarchy, because relativist epistemologies delegitimize science by ushering in a 'hyper-reality' founded on the epistemic fallacy underpinning poststructuralist environmental discourse.

I have argued in this article that the difficulties in linking postmodernism and environmentalism stem primarily from the inadequacy of poststructuralist epistemologies for the analysis of environmental problems. This is not, however, to advocate a continuation of the rationalist and positivist approaches to science which have quite rightly been implicated in the perpetuation of destructive relations between society and nature. I wish to suggest instead that a critical realist approach lying between relativism and rationalism has the potential to allow for the progressive development of knowledge rooted in a combination of practical human achievements; the effective incorporation of the independent agency of nature into our analysis; and the possibility for a radical integration of social and natural science (which avoids the problems of environmental determinism and sociobiology). There is a danger within environmental geography of a lurch towards poststructuralism before realist and structuralist approaches have even been fully explored, as is happening in other disciplines such as music theory (see McClary, 1991).

The postmodernity debate is essentially about the failure of existing metatheories in both the natural and social sciences to provide as complete an explanation of natural and social phenomena which they claim. However, the impetus for poststructuralist epistemologies has come primarily from the humanities and the social sciences, which explains why the environmental sciences (and physical geography) have scarcely been affected by the debate since they never engaged that closely with structuralist and Marxist epistemologies in the first place. The reliance on the simplistic dichotomy between modernism and postmodernism obscures rather than clarifies the substance of these debates: perhaps the greatest benefit to geographical thought is the current reappraisal of the geography of modernity. In this context the ecological critique of modernity raises extremely important issues (the limits to Lockean political theory; the impact of instrumental reason and so on) but the linkage with poststructuralist epistemologies weakens rather than strengthens the analysis of the causes of environmental change by cutting off social discourse from physical reality, and thereby denying the independent agency of nature.

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Notes

1 The term poststructuralism (or neostructuralism) is used here to refer to the epistemological challenge to theories founded on an external reality lying outside linguistically mediated forms of meaning. The poststructuralists have identified the Enlightenment project and modernity as being closely entwined with universalizing and totalizing forms of knowledge whose claims for privileged access to truth must be challenged in the interests of democratizing academic discourse to social and cultural others outside the narrowly conceived western humanist tradition. I argue here, however, that the relativistic impulse behind poststructuralist thought renders its normative input into the environmental policy debate extremely problematic because the relations between nature and culture involve biophysical systems which are not reducible simply to culturally mediated meanings.

2 Critical realism refers to a body of ideas associated especially with the writings of Roy Bhaskar originating in the debate over positivism in the social sciences. Bhaskar's work on critical realism is both extremely important and very diverse – space has only permitted me to refer to certain aspects in this article. Of particular interest here is Bhaskar's criticism of the failure of the poststructuralists to distinguish adequately between the ontological and epistemological dimensions to knowledge. Bhaskar has also explored the possibilities of a unified analytical framework for both the natural and social sciences but has been careful to delineate differences between social and natural systems if they are to be handled under an integrated epistemology. For further reading see Bhaskar (1989; 1991; 1993) and the useful overviews provided by Outhwaite (1987) and Collier (1994a). For greater detail on critical realism within geography and the social sciences, see Haines-Young and Petch (1986); Sayer (1992); Pratt (1995). Considerations of the potential role of critical realism within environmental thought are contained in Bhaskar (1989); Dickens (1992); Hayward (1994); Millstone (1994).

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