

Introduction

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A PRELIMINARY NOTE ON CONTENT AND OBJECTIVES

The International Handbook of Environmental Sociology brings together the work of more than 30 scholars from some 10 countries and a range of sociological traditions. It is still, however, a far from exhaustive coverage of either regionally or epistemologically distinctive contributions to the sub-discipline, partly because of the inevitable limitations of space, but also because environmental sociology is still very much in its infancy. Nevertheless, it does provide the reader with some background on the origins and development of the field, a flavour of the variety of ways in which sociologists engage with the environment and some examples of the analyses that may result from these different approaches. As a result, it demonstrates not only the sociological interest in global environmental issues, but also the global importance of environmental issues in general.

Beyond the similarities of format demanded by 'house style', no attempt has been made to impose an editorial style on the different contributions. What has always been intended by this project is a collection of works which expresses both the similarities and the differences in the attempts of social scientists to come to terms with the increasing number of environmental issues which exercise the minds of politicians, entrepreneurs and citizens in general at the end of the twentieth century.

SOCIOLOGY AND THE ENVIRONMENT

As we have noted elsewhere (Redclift and Woodgate, 1993, 1994, 1995), sociology has not embraced 'the environment' with ease, an inheritance that derives from its rejection of simple empiricism on the one hand and evolutionary, biologically deterministic models of social change on the other. Sociology's insistence on human distinctiveness, what Catton and Dunlap (1978) have called the 'human exemptionalism paradigm' (HEP), has tended to distance it from the material or physical aspects of environment which both influence and are influenced by human behaviour. Where sociology has taken up the environmental gauntlet, it has tended to focus on the way in which environmental issues are problematized and the social authority of different claims about the environment. 'In this regard,' suggests Hannigan (1995:2) 'environmental problems are not very different from other social problems such as child abuse, homelessness ... or AIDS.' In this sense it is perhaps more accurate to speak of the 'sociology of the environment': the investigation of societal interest in the environment.

Such an approach (which we can loosely refer to as interpretive, humanist, constructivist, relativist or phenomenological) seems to suggest that practical action can only follow, and is

therefore determined by, cognitive constructions of the environment; it is a model of cultural determinism, which has developed largely as a response to the 'unacceptable moral and political implications of biological determinism' (Redclift and Benton, 1994: 3). In contrast, the earliest exponents of environmental sociology as a distinct sub-discipline were adamant that, in distancing itself from the environment and environmental influences on human behaviour, sociology necessarily limits its explanatory power. Indeed, Catton and Dunlap (1978) were so sure of this that they promoted the adoption of their 'new ecological paradigm' (NEP) within mainstream sociology. The relativism of constructionist sociology¹ needed to be balanced by a strong dose of realism, which accepted humans as just one species among many and whose actions have both intended and unintended consequences for the whole of nature, where nature is characterized as imposing finite biophysical limits on economic growth.

Partly in recognition of his important contribution to the development of environmental sociology, we have chosen to include Riley Dunlap's chapter at the beginning of this volume. Dunlap takes us on a journey through the 20 years that have elapsed since the initial institutionalization of environmental sociology within the American Sociological Association, linking the fortunes of the sub-discipline in the USA to the waxing and waning of public interest in environmental issues, which, in turn, he relates to economic and political change. Dunlap's contribution is followed immediately by Fred Buttel's chapter, which considers the relationships which exist between social institutions and environmental change in the late twentieth century. Buttel has also been a key player in the development of environmental sociology in the USA, where he has argued convincingly for the retention of the constructivist approach. As he noted in a recent paper, 'That environmental knowledge is not simply a mirror of the natural world is an important sociological observation' (1994: 5) which demands analysis of the ways in which environmental knowledge is constructed and deployed by different stakeholders in environmental debates.

In his contribution to the present volume, Buttel identifies three major issues that continue to dominate research in environmental sociology: the environmental implications of our political and economic institutions; whether growth is primarily an antecedent of, or solution to, environmental problems; and the origins and significance of environmentalism. In one way or another, these are the issues which exercise the minds of almost all of the contributors to this volume and, while Buttel's acknowledgement that the debate between biological and cultural determinism is also reflected in the coming chapters, so too is his suggestion that 'rather than these two views being irreconcilably contradictory, there are some important opportunities for cross-fertilization'.

Perhaps Buttel's best known contribution to the formation of the field comes with his new agenda for environmental sociology published in 1987. In 'New Directions in Environmental Sociology' Buttel distinguished five important areas for the sub-discipline to consider: (1) its theoretical core, (2) environmental values, attitudes and behaviour, (3) environmental movements, (4) investigation of technological risk and its assessment, and (5) political economy of the environment and environmental politics. As Glaeser (1995) notes, however, while Buttel (1987) acknowledged the achievement that environmental sociology had made in developing into an internationally recognized sub-discipline with a solid body of empirical work and a number of useful theoretical insights, it had not succeeded in terms of Catton and Dunlap's objective of redirecting the theoretical approach of mainstream sociology.

Buttel's agenda clearly encompasses both radical environmental sociology (the first three items) as well as the more familiar territory of the sociology of the environment (the last two points). All of these areas are brought together in this book under the title of environmental sociology. This is not simply for the sake of convenience, however, but in recognition of the fact that, while in the spirit of relativism we need to acknowledge the provisional nature of all models and be prepared to accept that they may not provide a good reflection of what 'reality' is actually like (Simmons, 1993), we must nonetheless engage with the material conditions of our existence if we are to assess human impact on biophysical environments and the way in which environments and environmental change condition the structure and development of society.

As human beings we are 'unavoidably organically embodied and ecologically embedded' (Benton, in Redclift and Benton, 1994: 41) in such a way that our intellectual needs coevolve with our physical needs. At the same time, however, we are uniquely equipped to regulate and refashion the environment in ways that make it more suited to our requirements. Thus there is no single way in which we, as human beings, relate to external nature. Acceptance of the very complex and interactive way in which social and environmental change are constituted and proceed suggests that simple distinctions between 'social' and 'natural' soon become untenable. This is an idea which receives attention from a number of the contributors to this book and one which represents a distinctive philosophical position, a position which seems to be becoming a hallmark of environmental sociology, clearly distinguishing it from the great majority of modern, scientific disciplines. This characteristic of environmental sociology is attracting attention and 'followers' who want to maintain critical distance (sociology), while engaging in the real world of ever-encroaching environmental problems. In this sense environmental sociology might represent a 'reflexive environmentalism'.

STRUCTURE AND CONTENT

The structure of *The International Handbook of Environmental Sociology* leads from the general to the particular, from philosophical, theoretical and conceptual pieces to empirical analyses of specific issues and regions. We certainly would not suggest that readers need to start from the beginning and work their way methodically through to the end. On the contrary, this is a publication that can be referred to in an ad hoc way, each chapter being entirely self-contained. What provides the consistency between chapters is the obvious desire of each contributor to elucidate their own particular approach to the intellectual challenges posed by increasingly frequent and pervasive environmental problems.

While it is inevitable that many contributions contain both theoretical and empirical elements, those with a central focus upon theoretical and conceptual issues are located in Part I of the Handbook. Included here are contributions from Michael Redclift and Graham Woodgate, Wolfgang Sachs, Eduardo Sevilla-Guzmán and Graham Woodgate, Bernhard Glaeser, Marina Fischer-Kowalski, Arthur Mol, Matthew Gandy, Richard Norgaard, Barbara Adam and Peter Dickens, as well as those we have already mentioned from Riley Dunlap and Fred Buttel.

Part II provides insights into a number of substantive issues of concern to environmental sociologists. Here we find articles by Mary Mellor, Karl-Werner Brand, Alan Irwin, Steven

Yearley, Simon Shackley, Elizabeth Shove, Hans Opschoor, Tim Gray and Iñaki Barcena Hinojal, Pedro Ibarra Güell and Mario Zubiaga Garate. Finally, while many of the papers have implicit regional foci, Part III groups together contributions which provide explicit analyses of specific countries and regions. Chapters by Chris Rootes, Bernd Baumgartl, Susan Baker, Tim Allmark, José Padua, Steve Lonergan, Satyajit Singh, Hisayoshi Mitsuda, Mahamudu Seidu and Terry Marsden, Jonathan Murdoch and Simone Abram look at the relationships between environment and society and the environmentally oriented institutions which have arisen in places as diverse as Japan and Latin America, India and Eastern Europe, and England and the Middle East.

As we have already spent some time discussing the contributions of Dunlap and Catton and of Buttel to the development of environmental sociology, and mindful of the restrictions of length that we tried to impose upon contributors, we now consider some of the other contributions to the conceptual and theoretical bases of the discipline, relating these to some of the specific issues and regions that are tackled by contributors to Part II of the *Handbook*.

SUSTAINABLE DEVELOPMENT

Michael Redclift and Graham Woodgate's chapter looks at the relationship between sustainability and social construction, suggesting that the limits of our capacity to move towards more sustainable modes of living are set by our sociological models, as well as by 'the real world'. Consequently, they argue, it is in our models, as well as in our policies, that we must make decisive changes. In his contribution on the concept of 'sustainable development', Wolfgang Sachs examines its lineage from the first World Conservation Strategy in 1980 to the present day, during which time, he suggests, it has become an 'inherently self-referential' concept, which seems to mean all things to all people. The link between what Redclift and Woodgate have to say on sustainability and Sachs' contribution to the volume comes with Sachs' typology of the discourses that different groups have constructed in pursuit of sustainability.

These discourses, he suggests, differ in terms of 'their assessment of development and in the way they relate ecology to justice'. He labels the first of these the *contest* perspective. This discourse represents a realist position, which constructs the environmental predicament as a problem of inefficient resource allocation. It suggests that natural resources are grossly undervalued and therefore wastefully allocated, while human resources and technology are underutilized. Thus sustainable development can be achieved through the commoditization of natural resources and their replacement by appropriate human and industrial capital. Sachs notes that the contest perspective views the growth of civilization and its further diffusion through 'free trade' as unquestionable in terms of time, 'while its limitations in geographical space are secretly accepted'.

In many ways the contest perspective bears comparison with the ecological modernization school, various aspects of which are discussed by Arthur Mol in his contribution to this volume and, later, by Tim Gray in his consideration of 'Politics and the Environment'. Ecological modernization (EM) has, to date, focused its attention on the industrial sectors of highly industrialized nations. Gray characterizes it as a right-wing and reformist political ideology, whilst Arthur Mol is at pains to point out that we must distinguish between EM as a normative and prescriptive, political programme for change and its status as a theory of social change.

Mol perceives four central characteristics of EM as a theory of social change. First, it recognizes modern science and technology as important institutions in ecological reform rather than the culprits of social and ecological disruption. Next, he points out that it stresses the importance of market dynamics and innovative actors in ecological reform. Third, while critical of central bureaucratic states, EM theory accepts the need for state regulation in the pursuit of preventive environmental management. This should be sought, however, through decentralized, participatory policy making. Finally, suggests Mol, EM sees a changing role for social movements as they shift from critical commentators to critical participants in the movement towards ecological transformation. Mol takes the example of transformations within the chemical industry in order to illustrate the power of EM in analysing processes of environmental reform.

Bernd Baumgartl's contribution in Part III tends to support the ecological modernization thesis by looking for signs of EM in Central and Eastern European countries, through an analysis of the roles of four main groups of social actors. He suggests that EM has been limited since the collapse of communism because: for non-governmental organizations (NGOs), the environment was simply seen as a useful vehicle for mobilizing against communist rule (a claim supported by Chris Rootes' analysis of environmental movements and green parties); post-transitional governments were busy dealing with other issues; the international community had its own internal problems to deal with; and, thus, private companies have had to rely on their own efforts because of the lack of a coherent framework for environmental performance. The possibility for processes of EM to develop is clear, claims Baumgartl, but the non-contemporaneous and temporary timeframes in which different environmental actors have been relevant tend to have weakened their impact.

The second construction of sustainable development that Sachs distinguishes, in Chapter 4, he calls the *astronaut* perspective. Here 'spaceship earth' is seen as being sustained by biogeochemical processes rather than a collection of states and cultures. It is an object to be managed and new sciences and technologies have emerged which allow for (or create the illusion of the possibility of) its management. From the astronaut perspective, the North becomes responsible for the entire globe. Those who adhere to this position are the global ecologists and their work is represented by scholars such as Marina Fischer-Kowalski, with her work on the concept of 'metabolism'. This idea has recently received renewed attention from both the natural and the social sciences, with considerable research into the industrial metabolism (IM) of high-income economies (see, for example, Ayers and Simonis, 1994).

The more inclusive term, 'societal metabolism', which can be applied to any society regardless of its degree of industrialization, is preferred by Fischer-Kowalski, who illuminates the origins and development of the concept of metabolism from its roots in biology and ecology to its adoption and colonization by sociology. She questions its suitability as a core concept of an environmental sociology that moves beyond the human exemptionalism criticized by the work of Catton and Dunlap (1978) to a position that accepts humans as just one element of nature's complexity and, as a central focus, studies the interactions of societies with their environments. For metabolism to be a useful concept, suggests Fischer-Kowalski, it should be specifiable in a consistent manner across different social systems independently of scale; have consistent equations in both material and energetic terms, linking inputs, outputs and change in resource stocks; and be intelligible in terms of social meaning and activity, while remaining sufficiently abstract to apply to different social systems across time and space.

Hans Opschoor picks up the IM model and uses it in a critique of one of the basic concepts of the ecological modernization model, namely the idea that economic growth can be delinked from environmental impact. Having guided us through some mathematical models of IM, he notes that in theory the environment can be managed at different levels of sustainable supply of various environmental services. If population and welfare are to grow, however, the algorithms suggest that further deleterious environmental impacts can only be avoided by enhancing metabolic efficiency through the medium of increased throughput efficiency, that is, delinking economic growth from environmental impact. Economists who suggest that delinking may be endogenous to economic growth have a clear affinity with the EM school but, asks Opschoor, can the empirical trends which suggest that delinking is endogenous be extrapolated to satisfy all the demands for welfare of present and future global populations? Or are there upper limits to production and consumption even after delinking? Opschoor's own analyses of available data suggest that periods in which economic growth is successfully delinked from environmental impact may be followed by further periods of relinking. He concludes that 'sustained growth is not necessarily ecologically sustainable'. For this to happen would require both a tremendous amount of eco-efficiency innovation and a shift to less environmentally demanding lifestyles and consumption patterns.

Consideration of the prospects for a movement towards 'greener' lifestyles is the subject of Chapter 14. Karl-Werner Brand's contribution to this volume introduces us to recent debate in Germany in relation to new patterns of social integration and draws upon the concepts of individualization, lifestyles and milieu in order to address the question: to what extent can 'lifestyles' be understood as the structuring principle of 'environment-related attitudes and behaviour'? Answering this question is becoming increasingly difficult, suggests Brand, because, in contrast to early work which was able to distinguish core groups of ecologically conscious and engaged citizens, the institutionalization of the environment theme has resulted in the spread of ecological orientations across all social groups in German society. Although he is careful to point out that his findings should not be generalized, they do point towards links between lifestyle and environmental behaviour.

In summary, Brand suggests that, while ecology can serve as a thematic focus for lifestyles, this rarely leads to a systematic realignment of everyday life in accordance with ecological criteria. He also notes that everyday ways of dealing with environmental problems can cut across existing social milieux and that everyday representations of environmental problems are inseparable from individual and collective responsibility, scope and potential for action. These points lead him to propose a more context-related, cultural analysis of environmental consciousness and behaviour. This model suggests that structural and cultural context and related public environmental discourse and milieu-specific life-worlds generate specific, environment-related mentalities which structure people's approach to typical opportunities for, and obstacles to, environmentally friendly behaviour. As a result, he suggests that policies which aim to promote 'sustainable lifestyles' without recognizing the context-specific, symbolic resonances of such policies and concepts are likely to generate defensive action.

Brand's conclusions take us on to Sachs' third and final epistemic community, which finds its ontological security in what he calls the *home* perspective, where sustainable development is all about local livelihoods. Such a perspective resonates with the work of Bernhard Glaeser and Sevilla-Guzmán and Woodgate, whose environmental bent stems from their

interest in rural development. Sevilla-Guzmán and Woodgate provide us with an analysis of the origins and evolution of the notion of 'sustainable rural development'. They are highly critical of what they call the 'official, ecotechnocratic' version of sustainable development, whose roots they trace back to the community development project of the 'American Rural Life School' and which, as Sachs suggests, they view as some sort of oxymoron. Nevertheless, they also identify alternative discourses surrounding rural development. Beginning with the Russian Narodniki of the last century, they follow these alternative perspectives on rural development through to the neopopulist theoretical orientation of the Hispano-American school of agroecology.

Glaeser introduces the concept of 'autonomous development', which he contrasts with development that integrates largely agrarian social formations into the international market system. The key to sustainable autonomous development is 'environmental institutions building that promotes the involvement of social groups, structures and systems in research', with the aim of developing target groups' capacity to make and implement decisions. In concluding his contribution, Glaeser offers readers a five-point critical framework encompassing the problematization of modernity and conventional development theory and practice, as a starting point for the reconstruction of 'sustainability'.

ALTERNATIVE THEORETICAL ORIENTATIONS

Other theoretical work has concentrated on the interdependence of social and ecological systems. Richard Norgaard's work on coevolution takes this interdependence as its central theme. Chapter 10 provides us with some insights into the thoughts of one of the key contributors (Norgaard, 1987, 1994) to the agroecological theoretical orientation that we have just mentioned. Having introduced the concept of 'coevolution' into his work in the late 1970s and early 1980s (Norgaard, 1984), Norgaard has recently produced an entire volume in which he sets out his coevolutionary perspective. His contribution to this publication consists in providing a critique of modernity, reflecting on the reasons for mainstream sociology's apparent unease with the environmental issues, and outlining the central tenets of a coevolutionary approach to environmental sociology. For Norgaard, the 'environment crisis is not simply a flaw ... of modernity but rather something that starts early in modernity's history and now runs broadly through it'. Coevolutionary environmental sociology, he suggests, can provide 'an explanation of how people affect their environments and environments affect people'; it helps us to see that debates concerning cultural versus biological determinism are fruitless. Furthermore, by characterizing knowledge as just another coevolutionary variable, the realist/relativist debate becomes irrelevant and the notion of objectivity is challenged.

Theoretical innovation is also to be found in Barbara Adam's chapter on 'Time and the Environment'. In a most original contribution, she demonstrates the ways in which our approach to time is involved in the social construction of environmental hazards. She illustrates this by reference to what she calls the complexity and interpenetration of cosmic, natural and cultural rhythms; the imposition of industrial time on ecosystems; and our emphasis on material things and quantity. She talks of a 'timescapes' perspective which views the environment as 'a record of reality-creating activity' and allows for the 'recombination of phenomena and their creative processes, theory and practice, nature and culture.

present action and future implications'. Her challenge to conventional science is based on the mechanistic notion that time is reversible. Recognition that it is not, and that all actions are irreversible and thus constitutive of new and irreducibly different states, she argues, is 'an important precondition to environmentally cautious and precautionous action'.

The 'radical epistemological doubt' about the philosophical and ethical bases of scientific knowledge that are evident in many of the contributions to Part I of this book is a central feature of the postmodernism debate and also of constructivist analyses of contributors such as Alan Irwin, Simon Shackley and Elizabeth Shove. It is Matthew Gandy, however, who tackles the subject of postmodernism head on, in his analysis of the relationship between environmental and postmodern discourses. Gandy cuts quickly to the chase and points out that, from the most radical postmodern (or constructivist) perspective, the 'environmental crisis' is not a revelation of objective science, but 'a complex outcome of inherent uncertainty in combination with social and political influences'. This idea is clearly demonstrated in Alan Irwin's analysis of the BSE or 'mad cow' crisis, but as Steven Yearley points out, science has actually alerted us to the majority of environmental problems and, as Gandy is quick to acknowledge, such an extreme position risks divorcing social discourse from physical reality and thus denying the independent agency of nature.

The promise of the constructivist approach to environmental problems is convincingly portrayed by Irwin in Chapter 15. He starts out to explain the importance of relativism for environmental sociology by directing us to the work of Ulrich Beck (1992, 1995) and other theorists who see nature and society as the same thing and are therefore able to construct the argument that, in our current 'risk society', being 'at risk' is as much to do with the way we now live as it is with any external 'environmental crisis'. Alienated from the environment and cosseted by the paraphernalia of modernity, yet also at risk and unable to 'manage' it, we have lost faith in 'science, truth and progress'. Thus, suggests Irwin, 'the "environmental crisis" is in essence a social crisis for our institutions and for our own existential beliefs'.

Irwin claims that environmental knowledge unavoidably draws on social, natural and scientific elements, so that any attempt to categorize environmental issues as either natural or social is an essentially social construction. Therefore, he suggests, environmental sociology might consider the various rhetorical and tactical moves through which social actors attempt to recruit such categories ('natural' and 'social') to their defence. He counters criticisms of constructivist sociology's inability to engage with (and in) environmental action by suggesting that, in positing environmental knowledge as a matter of social construction, we open the way to a sustainability based upon an agenda that moves beyond scientific and naturalistic claims, to an environmental movement in which central questions of 'values and futures' are specifically addressed, thus moving beyond a 'case by case' treatment of issues and implying the need for positive engagement with environmental action and recognition and inclusion of knowledge from outside science. Therefore, he concludes, a critical environmental sociology can suggest new forms of engagement that challenge existing intellectual and epistemological assumptions, so that environmental sociology represents much more than just another interesting area of 'applied sociology'.

Peter Dickens has contributed to this volume with a trenchant defence of the explanatory power of historical materialism. In his provocatively entitled 'Beyond Sociology: Marxism and the Environment', Dickens makes the case for a Marxist analysis, because it looks at the way in which social justice, or the lack of it, can precipitate environmental problems as the underprivileged have recourse to the environment for their survival and

because environmental degradation clearly has a more forceful impact on some groups than on others.

Dickens takes us beyond these more obvious reasons, however, suggesting that, if it is developed and adapted to the features of modern society, Marxism can offer profound insights into the way in which societies relate to the environment. His contribution brings out the realism of Marx's analysis, while demonstrating the basic premise that the expression of real, underlying processes and tendencies is contingent on the circumstances of time and space. The piece is divided into three sections. The first deals with Marx's and Engels' perspective on nature–society relationships; the second moves on to contemporary debates within the 'red–green' tradition; the final section offers suggestions about the most important themes for contemporary environmental politics.

This review and development of Marxist thinking addresses a number of the central themes of this publication. The mind/matter, culture/nature dualism is contested, noting that, if humans depend upon nature for their reproduction, yet transform nature in the course of that reproduction, then the possibility exists that they also transform themselves. The rejection of this dualism is also noted in Marx's and Engels' approach to knowledge: Marx foresaw the inevitable union of the social and natural sciences into one science; Engels tried to map out this one science in his uncompleted work, *The Dialectics of Nature* (1959). There is also a distinctly coevolutionary flavour to this understanding of the world which is clearly exposed when Dickens cites Engels' assertion that each 'victory [over nature] takes its revenge on us ... [reminding us] that we ... belong to nature, and exist in its midst'. The message with which Dickens leaves us is a clarion call to strive to bring the material back into our analyses and to end the divisions between the sciences and other disciplines.

GENDER, SCIENCE AND POLITICS: IMPORTANT ISSUES FOR ENVIRONMENTAL SOCIOLOGY

The field of gender studies has arisen largely as a response to criticisms of naturalistic explanations of women's role and status in society. Nevertheless, as appreciation of the impact of male-dominated, industrial society on the environment has grown, the links between gender and nature have once again become the subject of critical attention. Mary Mellor's chapter on 'Gender and the Environment' makes the point that a gender analysis is indispensable if ecological problems are to be addressed successfully. According to Mellor, there are two central and closely related aspects to the gender dimension of environmental issues. First, women and men have different relationships with their environments: the environment is a gendered issue; most environmental decision making is a male domain and the impacts of those decisions fall on women. Second, she notes that women and men respond differently to environmental issues, and especially that women are more responsive to nature. Mellor illustrates these two linked claims through recourse to examples from both North and South, demonstrating that, while basically sound, both may be obfuscated by other structures such as class and race. The relevance of the feminist critique of modern, industrial society is that the spread of this model on a global basis has been responsible for the greater part of global environmental degradation. The basis of modernity, according to the ecofeminist critique, rests on the domination of women by men and nature by culture. Both women and nature have been viewed as economic externalities.

Mellor then asks whether this means that women are in an epistemologically privileged position in terms of environmental questions: are they more responsive to nature? It is not, suggests Mellor, that women are essentially closer to nature, but that men are distanced from their natural environment in dualist structures. 'In particular they are distanced from the ecological consequences of their actions and the biological needs and limitations of their embodied existence.'

The ecofeminist critique of modern society places particular emphasis on Western science, which receives detailed attention in Chapters 16 and 17. Yearley begins his contribution to our understanding of the relationship between science and the environment by reviewing the main arguments both for and against science as a reliable source of information. The first point of criticism relates to Cartesian dualism, discussion of which features in many of the contributions to this book. Second, he notes that the practical project of science is all about exploiting the natural world, rather than learning about it for its own sake. And, finally, he points out that a lack of science is also often cited as a reason for not stopping some activity or other which appears to be harming the environment. Climate change is a good example and one which is developed further in Shackley's chapter on models, as is the BSE or 'mad cow' crisis, which is mentioned by more than one contributor to this volume and receives detailed attention from Alan Irwin in Chapter 15.

In defence of science, Yearley makes the point, as we have already mentioned, that it is science which has actually alerted us to the majority of environmental problems. He also notes that many people claim that scientists are needed to take a dispassionate view of the environment, which citizens cannot, because of their involvement in environmental conflicts. At the same time, however, scientists care passionately about their specialist subjects and have actually been key players in preservation and conservation movements. Finally, he observes the oft made claim that, if science is inappropriate, it can be reformed.

Rather than trying to pass judgement on science, however, Yearley examines the ways in which these arguments have been played out in three specific contexts: the national environmental policy bodies in the USA, environmental NGOs in the UK and global environmental problems. In each context Yearley's arguments suggest that science is 'an indispensable yet far from straightforward friend of environmental reform'. Thus he concludes that 'the future prospects are for continuing tension as well as interdependence between environmentalists and the institutions of science'.

Simon Shackley looks more deeply into a specific and recently revitalized area of environmental scientific endeavour, when he tackles the mediating and transformative role of computer models in environmental discourse. In an incisive analysis, Shackley demonstrates the power and value of constructivist approaches to environmental issues and at the same time demonstrates the fact that sociologists can and do engage with other scientific disciplines. He observes, however, that despite their apparent advantages, models have not achieved the same epistemological status as the controlled laboratory experiment, not because of theoretical objections, but because of a lack of trust in numerical models. This, he argues, is linked to the fact that the stability of models is not a result of their basis in natural laws, but a function of the fact that models can only function as machines, when they are provided with in-built stability. He also notes that, rather than being more holistic and therefore more realistic, large models are often cumbersome, lacking in transparency and less versatile for multiple uses than more simple models.

Nevertheless, models can be efficient ‘distillation devices’ or, drawing on Latour (1992) ‘centres of calculation’, which can integrate key insights from different disciplines and make knowledge useful to policy makers. But why should the policy makers require the integration and distillation of scientific knowledge? Because, suggests Shackley, shared knowledge in epistemic communities or discourse coalitions acts as a social glue holding together a range of actors with divergent goals and interests. Models are sufficiently general to allow for common agreement while simultaneously providing ground for more specific, individual interpretations of environmental phenomena. Shackley concludes his piece by arguing that the view of models as ‘truth machines’ is a more public and policy-oriented perception, while the model as ‘heuristic device’ is the privately held notion of most scientists. This ambiguity of models, suggests Shackley, is the cause of the relative nature of trust in models and the fluidity of their perceived trustworthiness for any given application and over time.

In Chapter 18, Elizabeth Shove also demonstrates the fact that sociologists are not averse to entering more technical fields of knowledge. In an investigation of the role of alternative sociologies in analysing the relationship between energy use and environmental impact, Shove reviews literature relating to two distinct tendencies in recent research. The first addresses the need to turn energy into a visible subject in its own right, identifying, in the process, social dimensions of energy use. This approach, which we can clearly associate with the industrial metabolism school of environmental sociology, has tended, however, to be tainted by association with asocial technical models. The second examines relationships between energy and the environment as they appear across existing sociological concerns such as social institutions, culture and consumption. This approach, which maintains the invisibility of energy and focuses, instead, on the definition and management of services and practices which involve energy consumption, provides more familiar territory for sociologists but proves difficult to translate into terms recognized and valued by energy decision makers.

In essence, then, Shove perceives the issue of energy in a similar light to that which Shackley sheds on scientific models in general, noting that the first approach risks losing sight of the social structuring of consumption, while the second risks being invisible to those making energy-related decisions. She concludes that those who wish to improve the visibility of energy have two choices: either they can work with existing constructions and seek to improve the ways in which ‘social’ factors are represented, or they may develop a critique of the modelling process and begin to define alternative ways of seeing energy consumption.

The penultimate chapter in Part II comes from Tim Gray, who provides us with an excellent introduction to the subject of politics and the environment, which links well with Chris Rootes’, Bernd Baumgartl’s and Susan Baker’s contributions to Part III. Gray addresses three central questions: is environmentalism a distinctive political ideology; why has the environment become such a salient political issue in recent years; and how have politicians responded to this increased salience of environmental issues? He answers that environmentalism is distinctive, that it has become important as the result of increased public awareness and the development of post-materialist culture, but that the political response may remain fragmented and pragmatic. In short, he suggests that in the near future we are unlikely to see ‘a significant diminution of this tendency to play politics with the environment’.

Gray’s assertion that environmentalism forms a distinctive political ideology is challenged by Iñaki Barcena Hinojal, Pedro Ibarra Güell and Mario Zubiaga Garate in the final

contribution to Part II, which casts light on the relationships that have evolved between environmentalism and nationalism. Studies of nationalism and environmentalism in Estonia and Euskadi lead the authors to identify the lack of democracy as the thread which links the two movements together. The resultant ideology, within which environmentalism and nationalism come together, they label 'ethnoecologism'.

INTERNATIONAL PERSPECTIVES ON SOCIETY AND ENVIRONMENT

As we have just noted, the first three chapters in the final section of *The International Handbook of Environmental Sociology* also deal with political issues. Chris Rootes looks at environmental and green movements in both western and eastern Europe and notes that, while environmental consciousness in Europe appears divided by axes running east–west and north–south, this is due to differences in the 'kinds of concern they voice, the priority they attach to environmental issues, and the forms of action they are prepared to take', rather than levels of environmental concern, which appears high for all European countries for which data exist.

He also highlights the structural conditions under which movements and parties have emerged, flourished and withered in a variety of eastern and western nations. In the west, where from the late 1970s to the early 1990s entry into party politics was the predominant direction of development for collective ecological action, there is now evidence, especially where opportunities to advance the cause by electoral means are most limited, that there has been a shift towards more direct forms of action. In the east he looks in detail at the very different cases of Russia and Hungary, pointing out that, to a large extent, differences between the fortunes of green movements in countries such as Russia and Hungary result from the very different political environments in which they operate. The variety of central and eastern European experience, he claims, 'clearly shows the impact of changing political structures, but also that the effects of such changes are still mediated by political conjunctures and the strategies of actors'.

Bernd Baumgartl's contribution to this book has already been mentioned in connection with the ecological modernization school of environmental sociology. In Chapter 24, Susan Baker focuses our attention on sustainable development policy within the European Union (EU) and its reception and impact within member-states. She begins by reminding us that the notion that sustainable development is a contested concept and then goes on to examine the rationale for the EU's commitment to promoting it through policy. As a result of her analysis, she is led to the conclusion that 'at both the EU and member-state levels, it would appear that the commitment to the promotion of sustainable development is weakened by both economic and political considerations'. This leaves Baker with the impression 'that the chances of the EU entering the next century firmly placed upon the path of sustainable development remain slim indeed'.

Chapter 25 provides another regional analysis. In a very wide-ranging contribution, which draws examples from the length and breadth of Latin America (although concentrating special attention on Chile), Tim Allmark highlights some general tendencies in the region's constantly coevolving socioenvironmental relations. Having characterized pre-Hispanic socioenvironmental relations as based on a 'pact with ecological fragility', he points out

that, during the twentieth century, this pact has been broken on a scale sufficiently widespread for environmental degradation to play a significant role in determining the structure of human settlement in the region and the quality of life of its inhabitants. This understanding seems to echo the analysis of change provided by the ecological modernization school, an observation which is reinforced by Allmark's conclusion that, against all odds, the environment in Latin America is being perceived, and fought for, as a human right whose attainment has become integral to the struggle for the democratic control of society.

José Padua maintains our attention on Latin America, but focuses on Brazil and the fate of its tropical forests and their inhabitants. Padua argues that, in order to produce effective policies and social practices for addressing the problem of tropical forest destruction, we need to design a broader and renewed conceptual framework for its understanding. The example that he provides is based on the ecological, historical and conjunctural dimensions of human occupation of tropical forests. While accepting that any synthetic perspective will necessarily be limited, he suggests that any attempt in this direction should be viewed 'as a work in progress that must be improved by intellectual and social dialogue'.

Chapter 27, by Steve Lonergan, investigates conflicts over water in the Jordan river basin, paying specific attention to the dynamic between Israel, the Occupied Territories and Jordan. This case illustrates how certain resources are linked to security and demonstrates different ways of looking at resources in the context of security. Israel is currently using water at the limits of renewability, 40 per cent of it derived from aquifers situated beneath the West Bank. This situation illustrates how global environmental problems are linked to those of peace and security. Because of Israel's water shortage, it is trapped in a 'hydraulic imperative' which prevents it from relinquishing control of the territory without facing immediate shortages and curtailment of economic development.

Water is also the central concern of Satyajit Singh's chapter on equity and sustainability in India. Taking a political economy approach to irrigation technology in the sub-continent, Singh traces the history of its development in the pre- and post-colonial eras of India's history, using a Marxist framework to examine the implications of statist intervention in irrigation development and ecological change. He concludes that there has been a continuity in the logic determining the choice of irrigation technology and highlights the differing reasons for investing in large-scale dams during both the colonial and independence eras.

Chapter 29, by Hisayoshi Mitsuda, takes us to Japan to investigate Japanese environmentalism. According to Mitsuda, increasing interest in environmental issues in Japan is largely due to two factors: first, the seriousness of environmental degradation stemming from rapid industrialization in the 1960s and 1970s and second, the emergence of post-materialist lifestyles following the economic miracle experienced following postwar reconstruction. Japanese environmentalism, then, is characterized by flourishing relationships between a wide range of environmental groups from all social classes. But, asks Mitsuda, do existing models of the development of environmentalism fit the Japanese experience? In conclusion he suggests a bipolar model of environmental concern in Japan, which distinguishes between grassroots campaigning in support of pollution victims or 'intrinsic environmentalism', and anti-development and ecological movements similar to the USA conservation movement, which he calls 'instrumental environmentalism'. One of the most serious problems faced by Japanese environmentalism today, however, is the elitism that pervades many of its organizations, such that we might characterize the Japanese public's perception of environmental issues as one of 'vast knowledge with low responsibility'.

Mahamudu Seidu offers a structural analysis, when he invites us to consider the impact of agricultural development policy on the environment of Ghana. Seidu reviews the history of official agricultural development strategies from the colonial period through to the present day, relating the central characteristics of policy to the general objectives of successive political regimes. His analysis of these policies evaluates the degree to which they achieved their objectives, while also focusing on their unintended consequences for local livelihoods and the environments upon which these depend for their continued reproduction.

The final contribution to this volume comes from Terry Marsden, Jonathan Murdoch and Simone Abram, who bring us back to the UK to look at the issue of rural sustainability in Britain. Marsden *et al.*'s chapter seems a most appropriate contribution with which to end this publication as it echoes most of the important themes that run through the entire volume. There are links to Norgaard's work on coevolution, Sachs' essay on environmental perspectives and Mol's work on ecological modernization. It also echoes Brand's call for policy makers and analysts to take account of different 'local and regional definition[s] of sustainability concerns in the context of social, economic and regulatory change', suggesting that 'sustainability needs to be constantly linked to the (socially active) policy-making and implementing process'.

In essence, Chapter 31 looks at the way in which the issue of sustainability has been incorporated into rural social science in Britain and at the prospects for realizing it. It also suggests a reorientation of the rural research agenda. The British countryside, the authors contend, can be divided into four ideal types – preserved countryside, contested countryside, paternalistic countryside, and clientelist countryside – each of which has 'arenas of representation' which link certain powerful actors to their changing contexts for action. Of particular importance for representation are the sustainability discourses which are developed among different networks of actors. For the idea of rural sustainability to be implemented, maintain Marsden *et al.*, the consciousness of these networks, their discourses, must be captured and incorporated. The implication of this is that the technological and organizational fixes implied in notions of ecological modernization are unlikely to be of much use for the differentiated countrysides of Britain.

According to Marsden *et al.*, the ecological modernization discourse must be extended in two directions: first, towards the incorporation of regional and rural diversity into its debates and models and, second, towards the consideration of the social dynamic in creating progress in sustainability goals. Thus rural social scientists have much work to undertake in progressing notions of sustainable modernization in the rural context. They must provide a more sophisticated and comparative analysis of 'differentiating countrysides' in order to understand how combinations of external and internal networks of social action influence rural development and, then, how they can progress sustainability in specific developmental contexts. This in turn will necessitate conceptual and empirical engagement at the local and regional levels in order successfully to be able to investigate organization and participation in networks, possibilities for the definition of production and consumption links, and the existing and potential use of local resources, including local cultural identity.

The authors conclude that observing rural Britain in the late twentieth century suggests that 'sustainability is neither an absolute nor an objective phenomenon[, but] a stimulus for a more imaginative and critical debate about the comparative position of rurality in late-modern society'. This brings us to some overall conclusions concerning recent developments in, and future opportunities for, environmental sociology.

ENVIRONMENTAL SOCIOLOGY ON THE EVE OF THE TWENTY-FIRST CENTURY

This introduction has already broken the guidelines of length with which we saddled our colleagues at the outset of this project, so this final section is short and, it is hoped, more cogent as a consequence. Clearly, the current social conjuncture presents opportunities to be both pessimistic and optimistic. The world is at the beginning of a new millennium: obviously a very ethnocentric construction, but one that is 'of my culture' and which exercises a significant influence over my own thinking. It is wracked by the most appalling and widespread social deprivation and it is also not uncommon to link much of this suffering to environmental issues. Nevertheless, the essentially and perhaps uniquely reflexive nature of our species should provide us with grounds for optimism. I would even argue that the existence of this book is demonstrative of the potential for a more beneficial coevolution between society and nature, since environmental sociology results from societies' preoccupations with the environmental consequences of modern industrial lifestyles.

In the film, *Housesitter*, Goldie Hawn plays a semi-destitute young woman who walks into Steve Martin's life and home town, turning it completely upside-down by constructing a fantastic storyline composed of a tissue of lies. By using her delightful personality she manages to convince everyone of the story's veracity, to such an extent that each and every actor reacts to outrageous situations with improbable responses that ultimately result in the achievement of everyone's utopian dreams. So what? Well, as I was watching this film it occurred to me that here was an example of human agency at its most powerful, a celebration of our capacity to change the world, to construct reality both cognitively and physically.

In reality, we are no less powerful as a species; everybody can be or do anything; the catch is that we cannot all be exactly what we want to be at the same time and, in the short term, our options are constrained (as well as enabled) by structures both social and natural. Furthermore, our power to construct carries with it a destructive force. Thus there are clearly ethical decisions that we need to address relating to the distribution of access to satisfactory and fulfilling lives, both in the future and, eminently more importantly, today. Moral positions or ideologies are clearly implied in all sociological endeavours, otherwise why should we want to understand any particular aspect of society any better than we might were we only citizens rather than professional sociologists? We are all full-time students of life – we have to be, for all individuals continually reinterpret the world as their timescapes unfold around them.

Environmental sociology is so distinctive from those forms of sociology which maintain their insistence on the exceptional status of the human species that it has moved beyond the position of being just another sub-discipline. Rather, it represents a departure from conventional Cartesian science, similar to the departure from Newtonian mechanics experienced by theoretical physics, for example. The recurrent theme of the indivisibility of society and nature undermines, rather than underpins, the conventional disciplinary philosophies of positivism, structuralism and constructivism. In my view, the idea of coevolution reflects many of the characteristics of Giddens' (1984) notion of structuration and the ecological concept of evolution (see Woodgate and Redclift, 1998). All propose the duality of structure. Structure results from action and action is guided by structure; we make society and society makes us; a species defines its niche and the niche characterizes the species. We continually construct, deconstruct and reconstruct both nature and society and in so doing continually refashion ourselves.

In trying to understand this condition, as one might predict, there has arisen, or coevolved, a great diversity of approaches, each of which offers an alternative insight into our current predicament. It is hardly useful, then, to debate whether the environmental crises which we perceive are material facts or simply social constructions – they are clearly both, and we shall only be able to ameliorate such problems once we have properly understood them. Some of these knowledges or approaches will prove equal to the task, possibly in their current form but more likely in some future state after a further period of coevolution and time. We must also accept, however, that we shall never achieve sustainability, for sustainability is not a state but a process: we shall never reach a position of stasis that can be maintained ad infinitum. In the light of this fact, just as it has been suggested that environmental sociology might be understood as a kind of reflexive environmentalism, we should also consider whether we might not do better to promote the adoption of this, more ecological, notion rather than the contradictory, industrial concept of sustainable development. This would move us on from the loaded concept of ‘development’, with its connotations of continuous material growth, and place the emphasis clearly on our relationship with nature, which, as we have so painfully learnt, we neglect at our peril. What we need to ensure is that we maintain the space and time for diversity, because in chaotic, non-linear, systems such as those of nature, and the societies and cultures which emerge from it, the illusion of sustainability over time is a product of the underlying and continually changing diversity of component elements and processes. Like sustainability itself, environmental sociology is an expression of our commitments, as well as our knowledges and cultures.

NOTE

1. The terms ‘constructionist’ and ‘constructivist’ are used interchangeably in the Introduction and throughout this volume.

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