'Science, Culture and the Environment'

Research Report 1995

Centre for the Study of Environmental Change
Lonsdale College, Lancaster University,
Lancaster, LA1 4YN
Tel No. +44(0)1524 592658
Fax No. +44(0)1524 846339
e-mail: csec@lancaster.ac.uk

Introduction

This document reflects work in progress at the Centre for the Study of Environmental Change (CSEC)[1], Lancaster University. It summarises developments during the first three years of CSEC's multi-disciplinary research programme, 'Science, Culture and the Environment', funded by the Economic and Social Research Council (ESRC).

We are circulating the document in this form because it seems to us our findings may already be of significance, for the temper and future direction of UK environmental research policy - indeed for environmental policy itself.

There is a summary of key findings in section 1, and fuller accounts in section 2 and annex A.

The document takes the form of an initial three-year 'end-of-award' report to ESRC, reflecting a research programme now well into its second phase. We are grateful for the continuing support of ESRC's 'Global Environmental Change' programme, for what is necessarily an extended overall research enterprise.

We are grateful also to colleagues within CSEC, and to collaborators from a number of disciplines within Lancaster University and in a variety of other universities and public agencies. All have made valuable contributions towards helping nourish what appears to us a significant new perspective on issues of mounting public importance.

Robin Grove-White[2]
Brian Wynne[3]

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1 Details of CSEC are set out in Annex D

2 Director, CSEC, Lancaster University. Forestry Commissioner. Board member, Greenpeace, Green Alliance, et al.

3 Research Director, CSEC. Professor of Science Studies, and Director, Centre for Science Studies and Science Policy, Lancaster University. Board member, European Environment Agency. Member, DOE Environmental Statistics Advisory Group.

-Summary of Main Research Results-

1. SUMMARY OF MAIN RESEARCH RESULTS

This multi-disciplinary programme has rested on intellectual interactions across the social sciences, natural sciences and humanities. It has involved extensive contact with policy world bodies such as the European Environment Agency, Lancashire and Cumbria County Councils, Greenpeace UK, World-Wide Fund for Nature, the Hadley Centre, the Forestry Commission, and the Department of the Environment.

The key results have flowed from the interpretation and testing of *over-arching* findings from the six discrete but interacting studies within the programme, specifically on Global Climate Modelling, EU Environmental Data Bases, Environmental Risk Perceptions, Green Consumerism, Environmental Valuation, and Religious/Philosophical Dimensions of Environmental Understanding. Summaries and particular findings from each of these individual studies - a number of direct relevance to current policy development - are set out in Annex A.

These six studies have led us to the *overall* finding that methodologies and policy approaches resting on the tacit assumption that 'environmental' issues and problems lend themselves to definition in exclusively physical 'natural' terms are misleading analytically, and are likely to prove increasingly ineffective in the circumstances of 'real world' policy initiatives. We have identified a recurrent tendency in dominant UK policy and media *environmental knowledge cultures* towards relatively uncritical reliance on reductionist scientific framings and representations of such problems, as providing the 'real' accounts of what is at stake. By contrast, we have established that, in reality, a range of human, social and institutional factors exert decisive determining influences on the shape and character of the prior underlying definitions and categories which govern formal knowledge in each domain. The particular commitments we have identified in currently dominant environmental knowledge cultures appear to be failing systematically to recognise and give weight to dimensions which we have found to be crucial in animating wider cultural responses and behaviours. This has important potential implications for the design and credibility of future official environmental policy endeavours, as well as for the more general understanding of 'environmental' concern as a social and cultural phenomenon of central contemporary significance.

anthropological insights concerning the cultural grounding of modern science and its institutional framings, current 'crises' of modernity, and contemporary cultural processes of 'globalisation'. It highlights the mounting social, political, and epistemological significance in the environmental domain of 'human' issues such as *trust, the status of expert knowledge, indeterminacy, reciprocity,* and *agency.*

Our findings have been tested through continuing interactions with a number of public agencies, NGOs, and industrial actors, as well as with cognate research groups in the UK, EU, US, and Australasia. A range of ancillary reports, adapting particular findings to the concerns of such bodies as Lancashire County Council, the Cabinet Office, CPRE, the European Environment Agency and others, have reinforced confidence in their robustness. The parallel personal involvements of both of the principal researchers in senior executive/advisory roles for a range of such bodies nationally and internationally, and in several EU-US project networks on social science/ environment issues, have provided similar confirmation. A range of journal articles, book chapters, conference papers (in the UK and abroad), and other outputs have been published. Two books based on the programme will be published, by Sage and Routledge, in 1996, and further books are now planned. A number of our outputs have already attracted positive academic and policy world responses.

Recent visitors to Lancaster to discuss aspects of the programme include the Secretary of State for the Environment (on a private seminar visit), senior DOE officials, senior advisors and consultants to a range of public agencies and local authorities, and academic colleagues from many parts of the globe. We have also published joint articles with natural scientists, and have interacted with ESRC, NERC and BBSRC on natural science/social science collaborations, an area in which we believe the programme has made especially significant advances, both practical and theoretical.

The programme has involved significant methodological developments, particularly in the use of qualitative focus group techniques for allowing actors' own categories of meaning (scientists, officials, industrialists, NGOs, public) to be identified. This and other methodological innovations have led to wider exchanges (workshops etc) with academic colleagues from other UK universities. With colleagues within the Centre for the Study of Environmental Change, we are also now offering MA teaching modules on 'Environment and Culture', based on our GEC-funded research approach. These are already proving succesful with post-graduates from the natural sciences, social sciences and humanities.

-Full Report of Research Activities-

2. FULL REPORT OF RESEARCH ACTIVITIES AND RESULTS

The 'Science, Culture and Environment' programme was conceived from the outset as the first stage in a wider body of research, aimed at making conceptual and theoretical advances *of practical public policy significance* in the field of environmental knowledge and understanding.

We believe that the findings from Phase 1 of the programme (1991-1994) - the subject of this report - *are of significance, both for the temper of current UK environmental research culture and for desirable future directions in environmental research policy.* There appears to us now to be a need to develop them further (as we have begun to do in Phase 2), and to assist their further constructive integration into the approaches of the academic and 'policy' worlds.

BACKGROUND

The programme arose from previously established collaboration between the two principals, Professor Brian Wynne (hereafter, BW) and Mr Robin Grove-White (hereafter, RGW). *Ad hoc* interactions between the two over several years had led to a convergence, from complementary experiences of the academic research and environmental policy worlds, on a set of concerns about the relationship between the limited effectiveness of accepted approaches to environmental policy questions, and possible inadequacies in the structures of 'knowledge', natural and social scientific, commanding dominant intellectual authority in the field. Against this background, in 1990 BW and RGW proposed to ESRC a programme of research aimed at elucidating these concerns and advancing understanding of their implications for both academic and public policy worlds.

Initially an application for a designated ESRC Research Centre (in May 1990), the proposal in its agreed modified form was granted an ESRC Research Programme award, and work commenced in April 1991, within the newly established Centre for the Study of Environmental Change (CSEC). In the developments that ensued, the collaboration and collegiality within CSEC, and indeed within Lancaster University as a whole, have been of central and continuing importance (as we explain further below).

The overall hypothesis of the research programme was that, increasingly, key problems in the global and local environmental policy arenas were reflecting limitations in the forms of institutionalised natural and social scientific knowledge which were dominant in framing public debates, problem definitions, and possible policy

conceptual and interpretative. This has shaped not only the data-generation methods employed but also the chosen analytical approach and the forms of validation and testing of provisional findings. Although much of the intellectual orientation has been 'social contructivist', the principals do not fulfill nor accept the usual association of this outlook with a relativist-critical ambition of simply deconstructing existing knowledges and authority. Instead, the approach has been used in a concerted attempt to generate new forms of *intelligence* about features of the deeper structure and dynamics of contemporary environmental knowledge, and about the *meanings* of current political, social and cultural developments in the 'environmental' domain.

Data Generation

Several of our specific empirical studies (see Annex A) have used qualitative social science methods, which have allowed actors' own categories of meaning (scientists, policymakers, officials, industrialists, NGOs, public) as far as possible to be identified. Where feasible we have used sustained ethnographic or participant observation methods, structured by prior systematic preparation (and regular review and amendment) of a research analytical agenda, and by keeping a diary of observations. This has been the case, for example, with the climate modelling project 1(a), with the generous help of the Hadley Centre (four months' participant observation followed up with seminar and repeated interviews and informal conversations, e-mail exchanges, etc, as well as access to IPCC Working Group 1 meetings).

In other cases, structured interviews have been the preferred method for gathering information about, for example, critical loads science and policy, and environmental databases (eg 1(b)). However, here again participant observation has been exploited in user agencies such as the UK Forestry Commission and the European Environment Agency, where the principals' personal high-level involvement has allowed sustained research observation and informal discussion with participants of provisional insights. Diary records and memoranda of developing analytical issues have helped to clarify agendas and share issues within the programme. In addition a variety of workshops with scientists and policy advisors have been conducted where appropriate (for example in the critical loads and environmental economics (2b) studies) as means for developing shared understandings across disciplinary and institutional boundaries.

In relation to more public groups, for example the 'green consumer' study (2a) and the 'risk perceptions' studies for Lancashire and Cumbria County Councils (1c), we employed focus groups, designed not as

This has provided some useful advances, though we have also identified problems (relating to less actively espoused elements of attitudes than positive claims about something, the focus of Toulmin's model) which we are in process of discussing with Bradbury.

Interactive Forms of Validation

As explained under Results below, interaction with policy actors has been seen as central to our programme from the outset. There have been several reasons for this, one of them methodological. Since much of our conceptual contribution derives from interpretative analysis of culturally embedded assumptions framing existing explicit knowledges and methods, it has been important methodologically to include an element of feedback to respondents of our interpretative conclusions, in order to see whether those actors (scientists, policymakers, NGOs, industrialists, and public groups if possible) recognise and accept our analysis of their worlds of practice. Of course such processes are not definitive, nor have we treated the responses as sovereign; but they have constituted an important further resource in helping correct and refine provisional findings, as well as in helping to frame further empirical and analytical questions.

RESULTS

As anticipated in the original (May 1990) Rationale for the programme, we have made a range of findings about limitations and tensions within the dominant intellectual approaches and knowledge 'tools' evident in environmental policy and wider political discourses. *These appear to us to have significant potential implications, both theoretically, and for the research and policy worlds.* We have also begun to develop fresh approaches aimed at addressing and, if possible, overcoming these limitations.

The findings are best considered at three levels -

I Findings from Individual Component Studies

II *Cumulative* Theoretical and Other Findings

III Overall 'Philosophical' Observations for the Environmental Problematique and Public Policy

prior underlying definitions and categories which govern formal knowledge in each domain.

However, the implications of such a reality continue to be largely unacknowledged in either the methodologies used for environmental appraisal and regulation in the public policy world, or within most of the key social and natural scientific disciplines favoured currently in the field. We have found that the technical methods and forms of knowledge taken for granted as sovereign by policy institutions tend subtly to reinforce institutional structures which are less than progressive, despite the positive commitments of their representatives. In each of the cases studied, empirical investigation from within a sociology of knowledge perspective has helped illuminate tacit social and institutional dynamics shaping the dominant descriptions of the issue domain in question. This has helped clarify some of the otherwise unseen problems faced by these dominant discourses in contributing to the development of *effective* (which is also to say, *credible*) policy. This in turn appears to us to have begun to shed explanatory light on increasingly evident gaps between policy-operational realities (such as the evident fragility of public identification with, and the still limited wider public credibility of national environmental policy commitments) and currently dominant intellectual and methodological approaches in each of the issue domains. It may also prove useful in helping clarify the nature of the unease now experienced increasingly by actors in scientific-technical research spheres as they are forced to wrestle with the implications of inflated policy-world expectations of their outputs, expectations which appear to have been shaped by increasingly-outdated assumptions about the public authority of such knowledges. The implications of this finding for UK environmental research cultures and associated future research policies appear to us to be potentially far-reaching, in ways meriting further analysis.

More specific findings from each of the individual studies are set out in Annex A. We invite the reader to examine these in parallel with consideration of the more overarching findings summarised below.

I I Cumulative Theoretical and Other Findings

In this section, we outline certain key findings from reflection on the empirical studies *cumulatively*.. We also show how we have sought to *test* and *verify* such overarching conclusions (a process which is now continuing in Phase 2).

1.Intellectual Syndromes We have identified a number of recurrent intellectual syndromes common to the very different environmental

study period- as, so to speak, a direct part of the research dissemination process - has underlined for us precisely these tendencies within media culture, with their distorting public representations of key issues).

(b)Associated with finding 1(a), we have found that *the same knowledge cultures tend intellectually to reduce indeterminacies inherent in the social and cultural underpinnings of environmental knowledge to forms of more deterministic, and hence apparently in principle more 'soluble' or tractable, uncertainty.* Thus *contingency* is systematically under-recognised in public policy knowledge. In a number of environmental risk fields, this has led to inadequate official recognition and treatment of elements of risk which are real and legitimate foci of public concern.

A related finding has been that, when problems arise with respect to the public authority of expert knowledge in particular 'environmental' fields, this same (largely unacknowledged) reductionist tendency has the effect of reinforcing the political assumption that such problems are due to *incompleteness* of public understanding, and hence that steps to generate and promulgate fuller or more precise knowledge on the same lines are the most appropriate response. Such an assumption conflicts with empirical findings from a significant body of published sociological research (some of it by ourselves). The tendencies in question are pervasive, though in the context of this particular research programme we have found them to be especially striking in the climate modelling (1a), risk perception (1c), and environmental economics (2b) spheres. Such tendencies, it seems to us, may well be contributing to the currently evident fragility of public identification with avowedly 'rational' official approaches to environmental policy in important domains. These limitations of understanding have been under-acknowledged in official (and most academic) discussion of 'precaution' and the 'precautionary principle'. Our findings on this issue are consistent with a body of recent understanding in the sociology of scientific knowledge field (to which we and CSEC colleagues have continued to contribute, through journal articles, book chapters, etc, in parallel with our work on the present research programme), and have been helped by continuing innovative interaction over the study period with collaborators in Lancaster's Institute for Environmental and Biological Sciences (in studies1a & 1b) and other (NERC, Hadley Centre, etc) scientists, for example through the 1994 CSEC/NERC symposium on 'Uncertainty, Environmental Science and the Making of Environmental Policy'. It should be stressed that some of our work in this sphere has involved close collaboration and joint publication with world-leading natural scientists on 'state-of-the-art' uncertainty treatment in environmental modelling. Our findings have also benefited from

risks. Such limitations of institutional understanding, reflected in a range of methodological approaches in the domains investigated, are probably being reinforced by the epistemological commitments already described above. They also appear to us likely to be contributing to the fragility of current policy initiatives (eg under Agenda 21) in *engaging* active public identification with policies which in other respects may be felt to be benign. CSEC's published work in this field has already been acknowledged as significant for the policy world (eg by local authorities within Agenda 21, and within DOE - see Annex B). CSEC (especially through BW) has also led in developing the intellectual connections between this concrete domain and the wider fields of social science research on public understanding of science (as reflected in a forthcoming edited volume by CUP 'Misunderstanding Science', eds Irwin A & Wynne B).

2.Towards an 'Alternative' Model We have found it useful to characterise the above syndromes cumulatively as reflecting *inadequate implicit models of the human and cultural in established public/political environmental definitions, methods and knowledge.* Given mounting official recognition of the importance of widespread public-behavioural (ie '*cultural*') changes if global/local environmental concerns are to be addressed effectively (*vide* the expectations of the EU's Fifth Environmental Action Programme, Agenda 21, recent speeches by the Secretary of State for the Environment *et al*), such deficiencies are now of potentially far-reaching policy significance, and may even be beginning to constitute a bottleneck, impeding further advance.

In collaboration with CSEC and other colleagues, we have found that our investigations are beginning to suggest the outlines of an alternative, potentially richer human/cultural model of environmental knowledge and policy development, which, with further development, could start to help address deficiencies of the kinds highlighted in 1.(a)-(d) above. Aspects of this 'alternative', as well as explanation of its concrete political and institutional implications, has begun to be developed within the programme, in various articles, book chapters and conference papers (see Annex A), as well as in more targeted case study reports arising out of the ESRC-funded core activity (see 3. below).

Thus our model aspires to locate the environmental 'problematique' within recent wider socio-cultural and political developments, drawing on significant sociological and anthropological insights on the cultural grounding of modern science and its institutional framings, social scientific debates about current 'crises' of modernity, and analyses of trends in economic and cultural processes of 'globalisation'. Overall, our approach seeks to reflect an understanding of environmental issues not only as reflections of manifest *physical* problems, but also as

further 'test' and seek to refine the findings. Equally valuable opportunities have arisen through intellectually-animated visits to the Centre by senior DOE officials (July 1993), the Secretary of State for the Environment (May 1995), and a range of other academic and other policy world visitors from the UK, US, EU and Asia and Australasia; through public speeches and debates (Royal Society of the Arts, Green Alliance, National Trust,etc); in national media debates (including BBC's Newsnight, Horizon, Costing the Earth, etc); and, for example, the unprecedentedly vigorous 'New Scientist' debate/newsletter triggered by BW's joint article with Dr Sue Mayer (Director of Science at Greenpeace UK and in 1993-1995 a Visiting Research Fellow at CSEC), *How Science Fails the Environment*, in June 1993.

A significant finding from all of these interactions has been that our perspective on deficiencies in the currently dominant environmental knowledge cultures has been confirmed to have substantial resonance with a range of actors in the public domain *in those particular cases where we have sought to elaborate that perspective in relation to policy fields already acknowledged by such actors as problematic.* We suggest that this is confirmed by sample *encomia* of the kind attached as Annex B.

4.Policy World 'Blocks' However, despite such positive reactions, suggesting that fundamental insights emerging from the research programme may now be increasingly relevant to a groundswell of emerging official and unofficial concerns, we have encountered a further striking finding. Thus, notwithstanding the impressive degree of commitment now prevailing within government (and particularly at senior levels in the Department of the Environment) towards innovative and far-reaching policy approaches, there continues to be pervasive and acute difficulty for the actors/institutions in question to commit resources (whether cognitive, institutional or financial) to the systematic further exploration and *digestion* of the implications of such insights for environmental policy debate and practice.

It should be noted that this state of affairs is thoroughly consistent with the stated expectations of our original centre bid to ESRC in May 1990. We argued there:

'...Social tensions over how environmental problems, and their supposed solutions, are to be framed will sharpen, rather than recede, as new technical methods for addressing these problems are advanced by governments....(T)he recognition by governments of the central importance of environmental policy, and their anxiety in the 1990s to react constructively, is likely to bring to the surface well-grounded cultural tensions.. These will challenge the social authority of the

Cumbria' (1993), and for Lancashire County Council, on 'Public Perceptions and Sustainability in Lancashire' (1995) - both of which rest intellectually on insights crystallised within study 1c - provide disturbing empirical grounds for suggesting a possibly close relationship. Similarly, an important further research issue thrown up by the findings concerns the possibility that new patterns of public identification with environmental direct actions (local roads protests, veal crate demonstrations, Brent Spar occupation, etc) may reflect the latters' role as 'condensed' challenges to the increasingly inflexible official reification of issues more appropriately rendered in the cultural-political terms suggested by our emerging 'alternative' model, referred to above.

5.Thus our findings on the cumulative theoretical and other issues from the programme reflect (a) fine-grained analysis of, and a measure of *continuing participation* in, particular environmental policy arenas and scientific knowledge debates; (b) methodological innovation (particularly *vis a vis* qualitative approaches to the understanding of 'expert' and 'public' representations of environmental issues); and (c) an on-going attempt to crystallise a potentially richer model of environmental knowledge and policy development, consistent with social scientific insights on relevant cultural, political and epistemological issues.

III Overall 'Philosophical' Observations for the Environmental Problematique

Three final general findings should be highlighted.

First, our research within the programme has identified challenges *to the social sciences themselves,* arising from political recognition of the social and cultural changes now needed if mounting global environmental problems are to be addressed. We have found that, recurrently, prescriptions flowing from single discipline approaches to such issues, in the social as much as in the natural sciences, tend to run up against their own reductionist tendencies and against the limited reflexive awareness of their own restrictive assumptions (most strikingly concerning the nature of *the human subject*). During the course of the programme, therefore, we have found it vital to help foster the continuing development at Lancaster of an intellectual environment (within CSEC, and between CSEC personnel and colleagues elsewhere in the university) in which cross-disciplinary interactions - including, most crucially, reciprocal exploration of epistemological perspectives - can flourish. This has been a demanding (but rewarding) process, involving the nurturing and maintenance of new patterns of intellectual partnership, based on trust and mutual respect. It has been

appear to us to be consistent with more widely observed tensions surrounding the cultural erosion of limited 'modernist' notions of the human individual, and of the brittleness of arguably hubristic 'enlightenment' ideas about the power and purchase of human instrumental knowledge. This in turn lends weight to speculation that what may now be at stake in the environmental arena - and particularly within 'sustainable development' in its many manifestations - are arguments about the incremental redrawing of long-established 'natural' boundaries in Western thought and practice, between nature and culture, object and subject.

Such developments may have far-reaching implications for political processes, for example in the nascent reconceptualisations of democracy that appear to be implicit in competing conceptions of sustainable development, Agenda 21, and the like. We believe that CSEC's programme is building intellectual resources which may contribute to such constructive tendencies. The relevance of such considerations to the day-to-day conduct of environmental policy may appear remote to hard-pressed officials, political actors, industrialists, and indeed many accomplished researchers in the field. But our programme, based on initial examination and interpretation of a variety of key areas of policy praxis, suggests strongly that closer attention to these dimensions could prove productive for society as a whole. We are grateful to ESRC, and more specifically to the GEC programme, for having enabled us to begin building foundations for the more systematic exploration of such important matters and of their implications for the public world.

ACTIVITIES
OUTPUTS
IMPACTS
FUTURE RESEARCH PRIORITIES

.....Issues relevant to these headings are summarised within the accounts of the specific studies in Annex A.

-Annex A-

ANNEX A

FINDINGS FROM SPECIFIC COMPONENT STUDIES

This Annex reports on key findings from the six individual component studies of the 1991-1994 Research Programme, 'Science, Culture and the Environment' (Phase 1). It should be read alongside the main report summarising the *cumulative* findings from the programme as a whole.

(1a) FORMAL MODELS AND THE HYBRID CONCEPT OF CRITICAL LOADS

Research Approach

The principal focus of this study (1a) was on the social and institutional dimensions of global climate models, particularly the ways in which important determining features of the now dominant General Circulation Models (GCM) are negotiated and handled by scientists and political and administrative actors in environmental policy communities. The study (Research Fellow: Dr Simon Shackley) involved innovative collaboration and ethnographic interaction with the Hadley Centre, the UK's leading climate change research organisation, at the Met Office, jointly with senior environmental modelling colleagues (particularly Professor Peter Young) at Lancaster's Institute for Environmental and Biological Sciences. It also involved visits to, and seminars and interviews with principals in key US climate modelling centres and cognate EU actors and institutions, as well as personal direct observation of the work and *modus operandi* of Working Group 1 of the Inter-Governmental Panel on Climate Change (IPCC). There were also strong links with study 1b, which provided the principal focus for consideration of related critical loads issues.

Key Findings

* Climate modelling involves numerous tacit, informal judgments, hitherto poorly articulated in the published literature. We have found its practices to underline the importance of informal judgments and negotiation in the production of scientific facts, consistent with insights from the sociology of scientific knowledge rather than with more rationalistic accounts of such knowledge. Such *indeterminacies* and *approximations* are, if anything, more evident in modelling than in more empirical sciences. We have found this to be a consequence of the very ambitious aims of global climate modelling, which consequently require many educated guesses and trade-offs as to how

physical processes should be represented; and of the sparse and incomplete nature of the data-sets, which make model confirmation close to impossible.

* We have found that informally, modellers are often ready to acknowledge the indeterminacies in GCMs and other climate models. However, when the same work is represented to outside audiences this is not always conveyed. This appears to reflect (a) the judgments made by scientists concerning what different audiences want and need; and (b) the 'gate-keeping' which takes place between scientific (sub) disciplines and between scientists and policy makers. Our empirical research has suggested that the judgments in (a) are frequently questionably grounded. For example, the certainty which policy-makers desire is qualitatively different from that revealed by the conventional scientific analysis of uncertainty. 'Gate-keeping' facilitates communication between different communities, but may limit the exposure of the founding assumptions of one field to those of another, again because of the assumptions made about what others need to know. Our observation is that this tends to increase the vulnerability of other disciplinary communities to unexpected changes in thought and practice in the communicating field.

* The above issue of *the representation of scientific knowledge* is a key empirical and theoretical topic in the sociology of science, as well as having practical policy implications. Thus, our observations in the course of the study have suggested that, in interactions with policy makers, 'gate-keepers' tend to translate *indeterminacies* in the science into *uncertainties* which are apparently amenable to reduction by normal 'problem-solving', despite the fact that this may beg the question of whether such paradigmatic-framing would be able to address those deeper 'uncertainties'. We have also found that apparent faith (by both scientists and officials) in the potential *future* resolution of scientific and technical problems is key to institutional, financial and programmatic commitments made and resources allocated in the *present*. Sometimes within the climate modelling community,the representation by scientists and research managers of the proposed solutions to those problems tended to suggest that they had already been solved, or that the means to their solution were already at hand, whereas the reality was frequently more indeterminate.

* We have found there to be an important and recurrent ambiguity in the supposed identity of GCMs, as articulated by key policy and scientific actors. This concerns whether such models are properly to be understood as *predictive* truth-generating machines (their main policy and funding identity), or as more modest *heuristic* devices for aiding research. (The ambiguity applies to climate models themselves, and also when climate model outputs are used to drive other models. Thus it applies especially to the now increasingly significant Integrated Assessment Models). The claim of present full validation tends to accompany the 'truth-machine' identity, but in more sceptical contexts validation recedes into the future and the heuristic identity tends instead to predominate. We have found that such prospective future validation, when seen in the context of its role in helping shape present policy commitments, problematises the dominant belief in objective validation of

scientific knowledge before policy use. It also makes it extremely difficult to identify the extent to which the presently under-determined or not-fully validated model is a tacit social heuristic which in shaping the policy world - under the 'pretence' of being already fully validated - at least partly brings about the conditions of its own 'validation' from the external context.

* Significant findings have also emerged with respect to the role of policy considerations in the negotiation of scientific knowledge in the climate modelling field. Specific model outputs appear to be less significant in government policy circles than the informal opinions and judgments of climate modellers to which policy makers have access through the funding of the research. For example, during our empirical research at the Hadley Centre, DoE officials several times requested modellers to provide advice on reports in newspapers which had suggested that 'the greenhouse effect' was 'disproven', discredited or at least more uncertain than previously thought. The interpretation by experienced climatologists of the new research findings on which these reports were generally founded appeared to be an important way in which the credibility of 'greenhouse' science was being validated for policy purposes. Our ownresearch findings therefore lend support to criticisms of overly-'decisionist' models of policy-making, both in this field and more generally. Inconsistency (eg between rhetoric, decisions and actions) and conflict over problem and solution definitions may be functional to, and symptomatic of, an issue which organisations currently deal with in terms of political legitimation more than specific policy actions. Nevertheless, whilst we found evidence of a social learning process at work in these interactions, we also encountered the danger that inconsistency and conflict may be being restrained unintentionally within the 'policy community' in this sphere, and hence within wider political debate more generally. Such tendencies appear to reflect the fact that active and influential engagement in the scientific and policy issues is limited in practice to a relatively small number of institutions using particular methodologies and problem/solution articulations.

* The study has allowed us to further refine theoretical insights about the dynamics of 'mutual construction' of science and policy, at both national and international levels. A particularly important case of mutual construction was found to concern the generation and maintenance of scientific consensus. The apparently solid scientific consensus within the Intergovernmental Panel on Climate Change (IPCC) is held, by many of its participants, to be of critical importance to its success, because (we argue) the impression of solid consensus has come to symbolise the wider authority (ie. scientific credentials) and authenticity (ie. representativeness) of the IPCC (and hence of the global climate change issue itself). We have found consensus to have been achieved, however, through more than simply an objective scientific vetting process; a complex set of negotiations have been taking place between scientists, government scientists and representatives of other groups. We have found this to have been taking account *inter alia* of the effects of representing uncertainty in particular ways and of how the boundary between science and policy is felt to be perceived by policy makers. We have concluded tentatively that, counter-intuitively, achieving scientific

consensus at the *international* level of the IPCC may have been easier than at the *national* level in many countries, in part because of the greater ease with which international fora are able to manage and define the terms of involvement, hence producing a minimum of overt divergence or significant dissent.

* A particular difficulty with this study should be noted. It concerns the researchers' relationships with DOE, and their own 'positioning' with regard to the issue of global climate change itself. Necessarily, the research required us to adopt, heuristically, a critical ethnographic approach towards behaviour and practices within the climate modelling and related official communities. Whilst we enjoyed consistently good *personal* relations with senior DOE officials in the relevant spheres, it nevertheless proved difficult for them to grant full cooperation for a continuing research presence within the Department equivalent to that we achieved at the Hadley Centre. Whilst understandable logistical pressures may have helped in part to explain this reluctance, we sense there may also have been continuing sensitivity about allowing access within government to sociological researchers in such a politically sensitive area of research policy. We are now in discussion with the Department about the issue in relation to Phase 2 of the programme. Given the issues this particular study has highlighted (see above), it seems important, for political as well as for academic reasons, that fuller and freer access should be negotiated. Both 'sides' can learn from this, with benefits for better overall intelligence about the intellectual dynamics of this policy domain.

Selected Dissemination

Articles/Book Chapters

Shackley, S., Wynne, B. 'Climatic Reductionism: The British Character and the Greenhouse Effect', Weather, Vol. 49, No.3, March 1994.

Wynne, B., Shackley, S. 'Environmental Models: Truth Machines of Social Heuristics?', The Globe, Issue 21, September 1994.

Shackley, S. et al. 'Designating the Spokespersons for Science and its Social Standing', Technoscience, February 1995.

Shackley, S., Wynne, B. 'Integrating Knowledges for Climate Change: Pyramids, Nets and Uncertainties', Global Environmental Change, May 1995, 5(2)

Shackley, S. 'Mission to Model Earth', in Sue Elworthy et al. (eds.), Perspectives on the Environment 2, (Avebury, Aldershot). 1995

Shackley, S., Wynne, B. 'Global Climate Change: The Mutual Construction of an Emergent Science-Policy Domain', Science and Public Policy, August 1995.

Shackley, S., Skodvin, T. 'IPCC Gazing and the Interpretative Social Sciences', Global Environmental Change, September 1995.

Shackley, S. and Wynne, B. 'Representing Uncertainty in Global Climate Change Science and Policy: Boundary Ordering Devices and Authority', Science, Technology & Human Values, to appear in the summer 1996.

Shackley, S. 'Global Climate Change and Modes of International Science and Policy', in A. Elzinga & K. Langstrom (eds.), Internationalism in Science, (Taylor & Francis, London, 1995 or 1996).

Shackley, S. Essay review of 'Responding to Global Warming: The Technology, Economics and Politics of Sustainable Development' by Peter Read, Industrial & Environment Crisis Quarterly, 1995 or 1996.

Shackley, S, Parkinson, S, Young, P & Wynne, B. 'Uncertainty, Complexity and Concepts of 'Good Science' in Climate Change Modelling: Are GCMs the Best Models?', submitted to Climatic Change, June 1995

Van der Sluijs, J, Van Eijndhoven, J, Wynne, B, Shackely, S, 'Anchoring Devices in Science for Policy: The Case of Consensus Around Climate Sensitivity', submitted to Social Studies of Science, August 1995.

Wynne, B, Shackley, S, Waterton,C, 'Imagine Complexity! The Past, Present and Future Potential of Complex Thinking', submitted to Futures, September 1995

Papers

A range of conference papers and invited seminar papers on the project have also been given, at inter alia: the Hadley Centre (UK Met Office); the Geographical Fluid Dynamics Laboratory (Princeton, US); Max-Planck Institute for Meteorologie (Hamburg, Germany); Conference of the Society for Social Studies of Science (New Orleans, US); CNRS (Chantilly, France); PNL (Washington, US); and the Universities of Cambridge, Edinburgh, Manchester (PREST), Sussex, Keele, Sheffield, Brunel, Gothenburg (Sweden), Bielefeld (Germany), Cornell (US) and Budapest (US).

Hadley Centre Review

As a result of work on the study, Professor Wynne and Dr Shackley have recently been invited to be members of the team co-ordinated by Smith System Engineering Ltd, and including Sir John Houghton reviewing the Climate Prediction Programme at the Hadley Centre, for the Department of the Environment. With Professor Martin Parry, they will be the only social scientists on the team.

(1b) OFFICIAL DATA BASES: NEW POLITICAL AND SOCIAL IMPLICATIONS

Research Approach

This study (1b) has aimed to throw light on administrative, political and cultural processes shaping the data and classification systems now being used increasingly for environmental policy purposes. After a difficult start in 1991-92 (the originally anticipated Research Fellow,

Dr Andrew Taylor, left Lancaster for personal reasons before the study began, and no replacement was possible till 1993, since no ESRC provision for a directly-funded fellowship had been programmed), the study examined key social and institutional dynamics of 'critical loads' modelling for pollution control purposes, and EU-level processes of environmental data assembly. The case-study empirical focus was on the CORINE data-base of the European Commission - the social, institutional, and cultural dimensions of which were explored through an extensive range of interviews and empirical analyses in the UK and other EU member states, in close collaboration with the Director of Lancaster's nationally recognised Unit of Vegetation Science, Dr John Rodwell, and latterly Ms Claire Waterton as Research Fellow (with supplementary funding from the World-Wide Fund for Nature).

Findings

* The study has confirmed that the increasing political significance of the environment is heightening the perceived official need for 'neutral' 'objective' data bases of environmental phenomena, nationally and internationally. However, it has also highlighted the danger that such supposedly 'universal' scientific discourses are tending to lead, often deliberately, to the deletion of 'local' cultural variations and nuances in the data. This tendency is of major potential policy-world significance, because such 'local' cultural and institutional factors may frequently be central in the initial characterisations of emergent environmental problems, and hence subsequently of direct relevance for patterns of local public identification with associated policy responses (eg habitat protection policies).

* Within the UK, we have found that important but supposedly technical differences in data frameworks and in related methods for establishing critical loads (CL) for pollution control purposes reflect, in part, unacknowledged differences of institutional commitment or purpose on the part of the 'technical' bodies responsible for constructing them. The history and implicit roles envisaged for the data and models tend to play crucial formative roles in the shaping of the scientific descriptions used in such contexts. The study has found that this is true for CL modelling (manifested in the diversity of technical methods emphasised by different institutions in calculating CL values for policy purposes), and for environmental data bases more generally, particularly at EU level.

* These dynamics have been found to be illustrated graphically in the case of CORINE, the EU's single most substantial environmental information programme and data base. Detailed empirical research has identified a fundamental difficulty of the programme (largely unrecognised in the Commission's own 1991 internal review) as being chronic unresolved tensions between the necessarily idiosyncratic *local* cultural and institutional provenances of environmental data within individual member states, and the drive for EU-wide *standardisation* of such data. Such tensions help explain

why, while there is widespread commitment in the NGO and environmental policy world to the *idea* of pan-European environmental data assembly, there is little confidence amongst scientists or member state officials in the claimed scientific authority or practical policy utility of CORINE itself. This is evident, for example, in current difficulties *vis a vis* member state implementation of the Habitats Directive.

* CORINE purports to be both an *experimental* programme and a *tool* for assisting the effective development of EU policy instruments and other initiatives. We have found that much of the concern surrounding its use reflects problems arising from the interplay between these two sharply contrasting roles (*heuristic* or *descriptive* ?). There appear to be significant analogies in this respect with unresolved ambiguities in other officially favoured environmental policy knowledge tools - for example, the claimed roles of global climate models (!a above) and contingent valuation methodologies (2b below). We have begun to develop understanding of these shared features, in our regular interactions within the programme between the relevant projects.

* The fusion of political and institutional commitments with the scientific is of course not in itself a novel finding. However there are particular ways in which we have found such fusion processes to operate with respect to subsidiarity in the EU. Thus for example we have found that the European Commission allows each member state to submit environmental data within an ostensibly common frame, but gathered and organised according to assumptions and principles which reflect divergent 'local' factors. Accomodating national sensitivities over subsidiarity (as well as practical economy in the use of already-existing national data and methods), this national autonomy leaves local factors and their influence on the scientific data largely exempt from examination. We have found this in turn to leave the technical aggregation and harmonisation process vulnerable to inconsistencies which are not openly recognised, diagnosed, or debated as institutional and cultural factors. Thus although the tacit institutional shaping of science is not new, the ways in which particular political dimensions of the European environmental policy culture are affected by these unstated processes shaping the discourse of 'rational' policy have not been recognised previously. In non-environmental domains of European policy, others (Spinardi, Barry, Wynne) have found analogous processes of deletion of institutional and cultural difference in reference to universalistic knowledges operating as a standardising framework of thought, even when concrete technical and institutional problems of harmonisation between different countries become evident. Duncan and Bayliss have found a similar syndrome in respect of composite environmental quality indices.Thus we have begun to identify the broader significance of these processes for the European debate, and for the construction of a European political culture which might transcend the increasingly sterile polarisations which have been dominating political discussion in recent years.

* These findings about institutional shaping of scientific knowledge appear to us to be consistent withwith findings in other of the projects within the

present programme (eg 1(a), 1(c)), concerning the processes whereby particular scientific policy methodologies reflect tacit institutional commitments, and inadequately reflect wider social realities and responses. We have noted a common institutional tendency with respect to such methodologies: when a particular methodology falls short of contributing to policy cohesion, it tends then to be *elaborated* by its protagonists within a continuing uncritical commitment to the same institutional assumptions, thus perpetuating the lack of policy cohesion, which in turn may encourage pressures for yet further methodological elaboration. We have found that within these formal frameworks, it is the *informal* intelligence and flexibility of various dispersed actors, such as scientists and officials, which retrieves policy practicability. Again, the finding in itself about informal processes of negotiation and judgement suffusing formal frameworks is not new, but it is so in this kind of 'scientific' policy domain. However, the wider importance of these findings appears to us to lie more in the implications which we have begun to identify for the associated (lack of) public identification with such policy institutions and cultures, and the wider ramifications of these in such forms as the widespread popular ambivalence and disillusionment with the 'federalist' modernist vision of European union.

* As regards critical loads (CL), the new understanding developed within the study of the role of institutional contingencies in framing scientific representations of appropriate CL criteria has contributed directly to significant policy outcomes. For example RGW, in his role as a Forestry Commissioner, used insights developed within the study to help shape decisively the Commission's stance on (and research understanding of) key uncertainties in CL values and processes, through the landmark 1993 case of Halladale in the North of Scotland. In the face of serious challenge by a determined 'outside' policy opponent, such insights enabled the Foresty Commission (FC), through improved sensitivity to the implications of uncertainties surrounding key variables in its initial stance, to take stock and adopt an intellectualy, and politically more resilient policy posture. This contributed not only to significant positive developments in FC CL policy, but also to major consequential generic research advances in wider UK scientific understanding of CLs (as confirmed by senior government scientific advisers in this sphere).

Selected Dissemination

Report

Waterton, C., Grove-White, R., Rodwell, J., and Wynne, B. (1995) 'Corine: databases and nature conservation: the new politics of information in the European Union'. CSEC report for World Wide Fund for Nature (WWF UK).

Articles

Waterton,C. Wynne, B (forthcoming) 'Building the European Union: Science and the Cultural Dimensions of Environmental Policy' submitted to Journal of European Public Policy

Waterton,C 'European Environmental Information: Corine and the EEA - but where are the NGOs?'. Submitted to ECOS.

Waterton,C 'Corine: darling of conservation ?' ECOS, 16(2)

Other

The research findings - through the medium of the above report - have also been debated widely within UK and EU institutions, including the Scientific Committee of the European Environment Agency (EEA), ITE (co-ordinators of Corine Biotopes); the combined conservation agencies of the UK; and Wildlife Link. As the letter from Dr Wyatt of ITE (attached in Annex B) implies, the study is likely to have a significant influence on future EU environmental information developments.

The principal are participating by invitation in the current consultations by the EEA's Topic Centre on Nature Conservation, on revision of the Corine Biotopes Classification.

(1c) RISK PERCEPTION AND ENVIRONMENTAL KNOWLEDGE

Research Approach

This study (1c) has explored tensions between 'official' and 'lay' understandings of environmental risk, building on the principals' previous theoretical and empirical work in this domain in the UK and EU much of which is summarised in the Royal Society report, 'Risk: Analysis, Perception and Management' (1992). It has acted as something of an integrative framework for much of the work elsewhere in the programme. A particular focus has been on the ways in which public definitions of risk issues beome constituted interactively with experiences of quite 'separate' environmental issues (or indeed of issues apparently not 'environmental at all), in a fashion not obvious or 'natural' to experts used to operating in specialist sectors of risk-related knowledge, where definitions and analyses of such questions tend by contrast to require a *narrowing* of perspective. Theoretical insights developed in the first 18 months of the study were applied and further refined in subsequent major commissioned investigations of 'Public Perceptions of the Nuclear Industry in West Cumbria' (Research Fellow: Claire Waterton), for Cumbria County Council, and, more recently, 'Public Perceptions and Sustainability in Lancashire' (Research Fellow: Dr Phil Macnaghten), for Lancashire County Council. (The former has now led directly to a further three-year investigation with colleagues at Brunel and Staffordshire Universities, now under way, commissioned by the Health and Safety Executive (HSE)).

Findings

* Work within the framework of the study has underlined the importance of the tacit social framing of risk problems as an underlying dimension of the conflicts, or at least the lack of congruence, between the views of official experts and those of and different public groups about environmental risk issues. In several empirical studies of our own (see above) and in examination of collaborators' research (eg, Burgess, UCL; Bradbury, Battelle PNL; Beck, Munich; Jaeger, Zurich), we have found that official scientific definitions of risk as used prescriptively for policy, omit several legitimate risk-related concerns of public groups. This has confirmed, and extended in new directions previous Lancaster understanding of public risk perceptions from BW's work within the Centre for Science Studies and Science Policy.

* Our key finding is that expert scientific definitions of risk embody, and are shaped by, *social assumptions* just as much as are 'public' perspectives. The necessary properties of scientific precision and intellectual control mean that the complexity, multidimensionality and contingencies of real-world risk experiences are artificially reduced by scientific framing. For example, the isolation of a single chemical, or a single industrial plant, for risk assessment and regulatory purposes makes assumptions which include social and institutional commitments which may not be shared by other experts or by non-experts, but in which no-one can claim sovereign expertise. In imposing a framework of 'scientific factual analysis' versus 'unscientific, emotional perceptions', official institutions not only impose without recognition and debate, their own institutional assumptions, but they (innocently) act provocatively, by denigrating the legitimate lay concerns. For example, in the West Cumbria study we have found mothers around Sellafield to be angry at nuclear industry information practices which meant that incidents were never announced in public until they had been brought under control, thus disempowering mothers from deciding for themselves whether they should bring their children indoors, or make other responses. The reply of the industry that such an incident was *later* found to be trivial, obviating the need for off-site concern, ignored the reality that *at the time* when locals heard of the incident informally, noone may have known the incident's severity. Thus information practices more tailored, understandably perhaps, to national media and policy audiences, systematically disempowered and provoked local people. We have found such unrecognised institutional factors help generate public risk perceptions which reflect a broader framing of risk, including the social experience of dependency on such 'insensitive' controlling institutions.

* A variety of further institutional and technical factors excluded by official expert frameworks have been found to shape public concerns and perceptions. These are inadequately characterised as being non-material, 'merely' symbolic or emotional, just as scientific frameworks are inadequately characterised as being purely objectively factual. A further finding of our research in this domain is to have identified the extent to which this particular institutional discourse of risk (see for example the recent political and media treatment of the Brent Spar issue) is itself provocative of the very public sense of alienation and mistrust which underpins and energises public risk perceptions in the first place. Thus a

culture of 'institutional denial' exists which is similar to that we have found in respect of standardised environmental databases (study 1(b)), and the *indeterminacies* defined as deterministic *uncertainties* in environmental modelling (study 1(a)). An important general step forward in terms of policy effectiveness and public credibility would be to encourage greater institutional reflexivity within government and other policy actors about such commitments and their epistemological counterparts in dominant cultures of 'sound science' for policy. Through our own interactions with such bodies, we have sought to begin stimulating such processes.

* Extending the above, beneath the explicit public language of risk issues, we have found evidence of deeper and more pervasive factors relating to people's experience of dominant, increasingly 'expert' institutions. Thus whereas policy expert institutions assume that people will respond to risk and other information such as environmental indicators on the basis of trust and a sense of being able to act effectively on the world using such information, we have found (in for example both the Lancashire and Cumbria studies) a far more pervasive sense of public mistrust, alienation and lack of agency. This is rarely explicitly and directly articulated in political form, but acts way beneath the level of organised politics and policy debate even at local authority level. The contours of public identification and engagement are there, but they appear to be extremely localised, and extremely autonomous from official institutions, including local ones. This relates closely to projects in CSEC (within 2c and *in parallel with* the present programme) and elsewhere on new social movements and the environment, where conventional physical-realist assumptions (and positivistic social science approaches seeking for direct cause-effect relations) appear to be missing the potential environmental policy significance of cultural movements not ostensibly focussed on environmental problems.

* One corollary of the above findings - again indicating the inadvertent negative side-effects of existing policy cultural reflexes - is that, as we have found in both the Cumbria and the Lancashire studies, the framing of policy discourse about risk or about sustainable development in scientifically "realist" terms has been generating its own forms of public mistrust. Thus in the Lancashire case, official discourse which typically implies that experts know what Sustainable Development (SD) is (defined, it is implied, by scientific knowledge of nature), causes public mistrust: [to paraphrase public responses] if they know what it is, why do they not come up with clear accounts of what must be done to achieve it? Ironically therefore, we have found that the extensive and laudable policy efforts at public consultation over local Agenda 21 may so far have been self-defeating, to the extent that they reinforce this public sense of 'the experts' knowing, but not disclosing, what needs to be done. We have thus found an uneasy public sense of being manipulated by the experts, which is an unlikely basis on which to build policies which, it is acknowledged, depend crucially upon broad public identification and partnership.

* A further set of findings on public risk perceptions has methodological implications for social science research as well as institutional ones for policy. Consistent with the above findings about the importance of dependency upon

institutions with whom people have historically-rooted relationships, we have found evidence for the fundamentally *relational* quality of public perceptions of risk. For example, local West Cumbrian views of the risks from a nuclear waste repository were found to be shaped by perceptions that they had been targetted by the industry only as a "last resort" after many other communities in Britain (and indeed overseas) had successfully asserted themselves and fought off repository siting proposals. A sense of submissiveness and stigma in relation to elsewhere in modern society thus infused their risk-talk, and resonated with a highly articulate view of their community as neglected, marginalised and dependent. These deeply-rooted sentiments have practical political implications invisible to the conventional understanding of risk perceptions, because the possible eruption of active opposition could occur over unexpected issues where a (normally low) sense of agency may be seen to be open to reassertion, for example over the importation of foreign waste, or even over investment in local communications and transport infrastructure which would remedy the sense of marginalisation and impotence.

* Consistent with this fundamental relational and institutional dimension to risk debates and definitions, our qualitative methodological approach has been able to identify profound ambivalence on the part of various public groups with respect to risks and their policy management. People are evidently managing contradictory experiences and evaluations of technologies, risk policies and their managing institutions, which means that they hold tentative, conditional and contextualised views. These are not lapses from more definitive and unambiguous values of the kind assumed in most 'rational' decision analytic methodologies (and embedded in expert institutions), but reasonable responses to realities of lack of control and authentic dilemmas. Unfortunately, dominant methods, including those of social science research, are founded on the assumption of intrinsic individual values, which can thus be elicited objectively using the proper quantitative survey techniques. Our research indicates the intellectual and policy weaknesses of this pervasive commitment, and supports the view (eg Potter and Wetherall, Otway) of objective attitudes as constructs generated and validated partly by the very design of social science survey research on public attitudes, public perceptions and public understanding of science. If 'attitudes' are thus at least partly constructed in the specific context of their articulation, this places new dimensions of responsibility - and opportunity - on the design of constructive institutional relationships in policy, instead of further elaboration of methods, including those for eliciting public valuations.

* Thus again we have found unacknowledged, systematic problems in official institutionalised frameworks for risk management and environmental policy, as well as in public understandings and perceptions. Our developing perspective transcends existing polarisations not only in policy debate but as embedded in much research too. Alongside our ESRC-GEC funded programme we have latterly begun to develop a similar approach with respect to the risks and public debates about environmental releases of genetically manipulated organisms, involving industry, government, NGOs and scientists.

* A final observation from this study concerns the broader relations between expertise and political responsibility. When, in dissemination, we have pointed to dimensions of public risk experiences not recognised by scientific framings, many experts involved have recognised the relevance of these factors, but have then defined them as 'political', and therefore the responsibility not of expert bodies like HSE or advisory committees, but of policymakers and political representatives. We have observed several problems with this response, quite apart from the fact that it does not recognise that the scientific framing is itself shaped by institutional assumptions and commitments (see above), including ones about the policy world and its needs. This division of responsibility ignores the unrealism of assuming that political representative institutions like Parliament could ever deal in the level of context-specific detail and discrimination which our research reveals to be relevant. Furthermore when we have made the same observations about those omitted factors to policymakers, they have tended to express the belief that these factors as elements of 'risk' have been dealt with by the technical experts. Thus we have found that,by default of greater institutional reflexivity about the fundamental assumptions shaping the institutional distributions of responsibility, related methodologies and discourses, some of the most important dimensions of public and expert risk definitions are actually being omitted or marginalised from the relevant public policy processes.

* More generally in the risk perceptions field, in addition to conceptual advances to social science, and related policy contributions, we have made methodological contributions, towards understanding the limitations of quantitative survey methods, and to developing the use of qualitative interpretative research methods such as focus groups. The latter, like any method, require discriminating and careful use and interpretation, and we have systematically explored different methods not only for primary data generation, but also for analysis of such data as focus group transcripts. We have for example collaborated (Bradbury) in the exploration of Toulmin's argumentation structures to identify the intellectual and social architecture of expressed public perceptions, and we have involved expert colleagues from linguistics (Dr Greg Myers) to propose more refined methods of textual discourse analysis (see section on Methods).

* Overall, this study, as an integrative element in the overall programme, has not only drawn together and extracted conceptual and policy-relevant insights from specific commissioned reports (for Cumbria and Lancashire Ccs) and other studies within the programme (especially 1a, 1b, 2a and 2b); it has also integrated these with parallel externally-funded projects in which CSEC has been involved during the study period (for example projects funded by the Stockholm Environment Institute, the US Department of Energy, and the MacArthur Foundation) and with the closely associated work of the Lancaster Centre for Science Studies. Thus it has enabled us to develop productive wider connections between the rather esoteric field of science studies/ sociology of scientific knowledge (in which the UK is an acknowledged world-leader), and the environmental research and policy worlds.

Selected Dissemination

Book

Lash, S., Szerszynski, B., Wynne, B. (eds.) (1995 forthcoming). Risk, Environment and Modernity: Towards a New Ecology, London: Sage.

Articles/Book Chapters

Turner, G., & Wynne, B. (1992). Risk Communication: A Literature Review and Some Implications for Biotechnology. In J. Durant (Eds.), Biotechnology in Public: A Review of Recent Research, (pp. 109-141). London: Science Museum.

Lash, S., & Wynne, B. (1992). Introduction. In U. Beck, Risk Society: towards a new modernity, London: Sage.

Wynne, B. 'Uncertainty and Environmental Learning', Ciencia, Tecnologia y Sociedad: Una Introduccion al Estudio Social de la Ciencia y la Tecnologia, ed. M.G. Garcia, J.A.L. Cerezo and J.L.L. Lopez. Barcelona, Antropos, 1994.

Wynne, B. (1992a). Uncertainty and Environmental Learning: Reconceiving Science and Policy in the Preventative Paradigm. Global Environmental Change, 2(2),

Wynne, B. (1992c). Misunderstood Misunderstandings: Social Identities and Public Uptake of Science. Public Understanding of Science, 1(3)

Wynne, B. (1992g). Science and Social Responsibility. In J. Ansell & F. Wharton. (Eds.), Risks, Analysis, Assessment and Management, Chichester: Wiley & Sons.

Wynne, B. (1992h). Carving out Science (and Politics) in the Regulatory Jungle: An essay review of S. Jasanoff's 'The Fifth Branch: Science Advisors as Policymakers. Social Studies of Science, 22

Wynne, B. (1992j). Risk and Social Learning: Reification to Engagement. In S. Krimsky; & D. Golding. (Eds.), Social Theories of Risk, New York: Praeger.

Wynne, B. (1993a). Implementation of Greenhouse Gas Reductions in the European Community: Institutional and Cultural factors. Global Environmental Change, 3(1)

Wynne, B. (1993b) 'Scientific Knowledge and the Global Environment'. In M. Redclift & T. Benton (Eds.), Sociology and the Global Environment, London: Routledge.

Wynne, B. (1995 forthcoming) 'May the Sheep Safely Graze? A Reflexive View of the Expert-Lay Knowledge Divide' in Scott Lash, Bronislaw Szerszynski and Brian Wynne (eds.), Risk, Environment and Modernity: Towards a New Ecology, London: Sage.

Wynne, B., Waterton, C., Hughes, P. and Simmons, P. (1996) 'Institutional Cultures and the Management of Global Environmental Risks in the UK'. In W. Clark, J. Jaeger and J. van Eijndhoven (eds) 'Learning to Manage Global Environmental Risks' (forthcoming).

Reports

Macnaghten, P., Grove-White, R., Jacobs, M., Wynne, B. (1995). 'Public Perceptions and Sustainability in Lancashire: Indicators, Institutions, Participation'. Report to Lancashire County Council, Preston.

Wynne, B., & Crouch, D. (1992). Responsiveness of Science and Technology Institutions to Environmental Change - a UK Case Study. Report to OECD Committee on Science and Technology Policy.

Wynne, B. Waterton, C. and Grove-White, R. (1993) 'Public Perceptions and the Nuclear Industry in West Cumbria'. Report to Cumbria County Council

Papers

A variety of conference and invited seminar papers on the project have also been given by Professor Wynne and /or Ms Waterton at, for example: the Royal Society/British Nuclear forum; the UK Biotechnology Advisory Board (Cheltenham); the European Association for Studies of Science and Technology (EASST, Vienna); the Society for Risk Analysis (Vienna); the British Association for the Advancement of Science; the American Association for the Advancement of Science (Washington, US); the ESRC Rural Economy and Society Study Group (London); the IBS Planning and Environment Study Group (Nottingham); and the Stockholm Environment Institute (Prague).

Invited presentations have included the Department of the Environment Radioactive Waste Management Advisory Group; and a subsequent (1995) programme of CSEC/Green Alliance London 'risk' workshops for policy-makers, industrialists and NGOs, 'Uncertainty, Precaution and Decision Making: The Release of Genetically Modified Organisms into the Environment'.

(2a) GREEN CONSUMPTION AND 'THE ENVIRONMENT' AS A NEW SOCIAL MOVEMENT

Research Approach

This study (2a) focussed on the 'social construction' of public concerns about environmental risks, as transmitted through the medium of the purchase and consumption of 'green' products in the market place. The initial plans for a comparative three-country EU study had to be modified in Year 2 when DGXII funding was not obtained, the project being adjusted as a UK-only study (Research Fellow: Peter Simmons). This examined the public dynamics of the emergence of the 'green consumer', as well as the private meanings of such practices for individuals. Qualitative focus groups, and interviews with industrial, official and NGO actors, supplemented analysis of conventional quantitative survey methods, to throw light on why public environmental concern had taken this particular form, and what

meanings such behavioural patterns might hold for particular 'green consumers'.

Findings

* The rise of green consumerism from 1988 onwards resulted from specific political, cultural and economic conditions. We found it to have arisen not simply from spontaneous consumer action, but also to have been publicly constructed and mediated by the organisational activity of 'green' entrepreneurs, NGOs, market researchers, mass media, manufacturers, retailers and government. Hence, whilst the phenomenon was represented initially by NGOs and the media as an arena within which individual agency vis a vis environmental concerns was being exercised, the field of action thus constituted was colonised rapidly by government and business, processes which served to reify and 'domesticate' the identity of the 'green consumer'.

* The reified identity of the green consumer was found in the research to have been reinforced particularly by the simplifying and repeatedly publicised assumptions and categories of conventional *quantitative* market survey research. However, our more fine-grained *qualitative* analyses have suggested a more complex picture. Consistent with the findings of project 1(c), most individuals were realistically ambivalent, in that they felt their green consumption choices to be attempted articulations of moral values and community, but compromised and diminished by considerable mistrust of business and government institutions, and by awareness of the manipulated and marginal nature of the actions being taken. This finding highlighted the inadequacy of currently prevailing political distinctions between individuals' public and private identities, as 'citizens' and as 'consumers'.

* Seen in the context of sociological debates surrounding the concept of 'reflexive modernisation', we have found that the moralisation of the market implied by green consumerism suggests the emergence of a hybrid identity of 'citizen-consumer', blurring current politically dominant conceptual distinctions between the public and the private, and pointing to tensions for individuals in their pursuit of political agency within the atomising, price-dominated and institutionally opaque context of the market. The resulting account of the green consumer, as reflexively constructed through discursive/textual representations, institutional relationships and organisational action, appears to point to a need for different public policy responses from those arising as a result of the more one-dimensional picture dominant in environmental policy circles (that a highly 'individualised' public is largely ignorant or confused about environmental issues, and thus can be expected to respond to unambiguous advice from experts - eg through eco-labelling schemes).

* The criteria of environmental soundness to which manufacturers and retailers of green products lay claim rely on artificially 'realist' conceptions of environmental risk. Examination of controversies surrounding the EU's Eco-Labelling Scheme, and more particularly the activities of the UK Eco-Labelling

Board, has confirmed the political brittleness of definitions of environmental goods which neglect the significance of the social contingencies and cultural negotiations which have produced such *apparently* unambiguous definitions. The Eco-Labelling Scheme's difficulties concerning animal testing as an 'environmental' issue, and those concerning hairspray eco-criteria, were found to provide particularly vivid illustrations. These cases, which crystallised politically during the course of the research, appear to vindicate the study's social 'constructionist' understanding of green products and their culturally embedded meanings.

* Methodologically, the study has vindicated the use of qualitative focus groups as a central tool - enabling a critique to be undertaken of the constitutive role of quantitative market survey methods themselves as contributors to the misleading reification of both the 'green consumer' and ' green products', by means of a contrast between the 'hard' categories produced and reinforced by such quantitative methods, and the 'softer' ambivalent positions experienced by individuals, and better captured by the less prescriptive, more open-ended qualitative methods employed in the study.

* Public policy implications of the findings have been discussed with specific Department of the Environment officials. These point in the direction of a need for revised institutional mechanisms to stabilise fresh patterns of social negotiation surrounding 'green product' criteria. In particular, definitive, 'final' claims for eco-status products and services are always likely to be conditional. This suggests that design of such policy instruments should also include a more procedural element which can accommodate social learning and thus policy progress through the enactment of existing policies and instruments. Neglect of such institutional reform appears now to be contributing to unilateral NGO-industry initiatives by-passing government and EU institutions - for example, the new 'sustainable forestry' labelling scheme of the NGO-led Forest Stewardship Council. Furthermore, EU policy actors hitherto responsible for 'specified' eco-labelling policies are now showing signs of belated recognition of the complexities, attempting to hive off the policy responsibility onto other agents (such as the new European Environment Agency).

* The research methods and culturalist perspectives on green consumerism refined during the course of the study have been further deployed by the Centre in two parallel specific commissioned reports - 'Leisure Landscapes: Leisure, Culture and the Countryside - Challenges and Conflicts' (1994) and 'Sustainability and the Countryside' (1993), published respectively by CPRE and the Countryside Commission. Both of these reports have since had an impact on public debates in their respective policy domains.

Selected Dissemination

Articles/Book Chapters

Grove-White, R., & Darrall, J. (1995). Leisure and Tourism: When Urban meets Rural. In T. Marsdon (Ed.), Servicing the City, (forthcoming): Hull.

Simmons, P. (1995) 'Constructions of the Green Consumer: Rhetoric and Organisation' (submitted for publication)

Simmons, P (1993) Liability for the Environment: Lessons from the development of civial liability in Europe. in Jackson, T and Wynne, B (eds) Clean Production Strategies: Developing Preventative Environmental Management in the Industrial Economy. Stockholm Environment Institute. London: Lewis.

Simmons, P. (1995) 'Eco-labelling and the Construction of Environmental Risks.' In J. Holmwood, H. Radner, G. Schultze and P. Sulkunen (Eds.) Constructing the New Consumer Society. London: Macmillan (in press).

Simmons, P. (1995) 'Green Consumerism: Blurring the Boundary Between Public and Private.' In S. Edgell, S. Walklate & G. Williams (Eds.) Debating the Future of the Public Sphere: Transforming the Public and Private Domains in Free Market Societies. Aldershot: Avebury, 1995.

Simmons, P (1996) Researching Green Consumerism: Hard Facts and Soft Identities (to be submitted to Environment and Planning).

Simmons, P (1994) 'Modernity and the Globalisation of Risk' Organization, Vol 1 No. 2

Reports

Grove-White, R., Darrall, J., Macnaghten, P.M., Clark, G., & Urry, J. (1994a) Leisure Landscapes (main report), CPRE, London.

Grove-White, R., Darrall, J., Macnaghten, P.M., Clark, G., & Urry, J. (1994b) Leisure Landscapes (background papers), CPRE, London.

Grove-White, R., Phillips, A., & Toogood, M. D. (1993). Sustainability and the English Countryside. Report to the Countryside Commission.

Conference papers

Simmons, P. (1994) 'Constructions of the Green Consumer: Rhetoric, Agency and Organisation'. Paper presented to the ESRC seminar Conceptualising Consumption Issues: The Social Construction of the Consumer, Lancaster University, 16th December 1994.

Simmons, P. (1994) 'Environmental Values and Market Choices: the Dilemmas of Green Consumerism'. Paper presented to the annual international conference of the Society for the Advancement of Socio-economics, (SASE), Paris, July 1994.

Simmons, P. (1993) 'Sustainable Consumerism: Values and Environment in the Marketplace'. Paper presented to the Values and Environment conference, Guildford, 23rd-24th September 1993.

Simmons, P. (1993) 'The Social Construction of Green Consumerism.' Paper presented to the Second Annual Conference of the Interdisciplinary Research Network for Environment and Society (IRNES), Sheffield, 14th-15th September 1993.

Simmons, P. (1993) 'Greening Consumers? EC Ecolabelling policy and the cultural construction of environmental problems.' Paper presented to the Fourth International Symposium on The Sociology of Consumption, Consumption: Risks, Pleasures and the State, Helsinki, 14th-19th June 1993.

Simmons, P. (1993) 'The Green Consumer: Challenging the Boundaries of the Political or Bolstering the Profits of the Commercial?' Paper presented to the international conference on The Public Sphere, Manchester, 8th-10th January 1993.

(2b) CONCEPTIONS OF VALUE AND HUMAN NATURE IN ENVIRONMENTAL ECONOMICS

Research Approach

This study (2b) has explored conceptual problems surrounding the representations of value and of human nature which are current in environmental economics, particularly within 'contingent valuation' and other surrogate valuation methods purporting to quantify unambiguously the 'value' of environmental goods. It was undertaken collaboratively with Lancaster's Philosophy Department (particularly Messrs Alan Holland, Jeremy Roxbee-Cox, (Professor) Russell Keat, and Dr John O'Neill), and proceeded through a series of working papers, seminars, and workshops, involving a network of 20 economists, philosophers and sociologists from universities including Cambridge, Edinburgh, Keele, Stirling, Sussex, UCL, and Lancaster, and with the Forestry Commission and the Countryside Council for Wales. The Research Fellow was John Foster, who has also interacted continuously with the Environmental Economics network coordinated from Newcastle University. There has also been fruitful interaction with Michael Jacobs, an environmental economist - initially a CSEC Honorary Research Fellow, latterly a GEC Research Fellow resident at CSEC - during the second half of the study period. Central concerns have included the nature of the tacit assumptions embodied in current theorising in the field concerning human agency and identity, and the gaps between these implicit representations and those in other, more generally accepted 'non-economic' accounts of the human person. Progress has also been made towards the development of a richer, more inclusive philosophical account of environmental value, and towards refinements of the dominant appraisal methods to address limitations uncovered during the course of the study. The methods in this study have involved conceptual analysis, in parallel with fieldwork using participant observation (Forestry Commission) and interviews in several government agencies. The findings are elaborated in a book, 'Environmental Economics: A

Critique of Orthodox Policy', to be published by Routledge in spring 1996.

Findings

* The models of 'value' and 'the human subject' embedded in currently dominant neo-classical economic approaches to cost-benefit analysis, contingent valuation and other surrogate valuation methods, have been found to be seriously defective. Our analysis suggests that they embody assumptions which neglect crucial constitutive relations between humankind and the value with which, through cultural processes, the natural world is invested. Particularly striking in this regard are the embedded assumptions of 'methodological individualism' (which implies in this context that communal values can be explained adequately in terms of aggregated individual 'preferences') and of the 'commodifiability' of environmental value (which is used to imply that such value is accessible to quantification in monetary terms through actual or hypothetical markets). Explored from philosophical and sociology-of-knowledge perspectives, both assumptions have been found to rely on arbitrary and inadequate readings of human experience and commitment. Thus, they are at best heuristics, as are any conclusions built on the resulting valuation processes. However, we have found that, for the most part, that is not how they are being regarded by their protagonists outside as well as inside official bodies. We have found significant parallels here with comparable social-intellectual dynamics in other environmental knowledge fields - for example, climate modelling (1a) and environmental data bases (1b).

* The valuation methods in question have been found to build their assessments uncritically on an overwhelmingly 'realist' understanding of the nature of environmental goods and concerns. This appears to be because those in the sub-disciplines (largely economic) responsible for such methods inadequately understand the nature of the uncertainties/indeterminacies in the scientific knowledge of environmental damage (see 1(a) and 1(b) above), and because they assume that an individual's attitudes and values towards specified aspects of 'the environment' can be treated as discrete personal characteristics existing prior to , and independently of, the valuation process, and are thus able to be 'revealed' objectively and relatively unambiguously, through the use of one-off questionnaire survey methods. We have found the apparent plausibility of the model to rely on the tendency of its practitioners either to select for valuation only goods unproblematically rendered in such 'realist' terms, or to redefine other such goods in terms which render them amenable to the valuation processes in question - in both cases, forms of procrustean positivism found to be questionable in terms of both logic and practical policy effectiveness.

* A corollary of this finding has been that the intensity of recurrent controversies surrounding the previous use of surrogate valuation methodologies in environmental contexts over the past twenty-five years (for example, in the 1970 Roskill Inquiry into the Third London Airport; in

motorway disputes surrounding the Department of the Environment's COBA methodology in the 1970s; and in land drainage and low-level radiation controversies in the 1980s) may be explicable, in part at least, as reflecting tacit conflicts between 'expert' and 'lay' attitudes to the acceptability of the above governing assumptions. (This finding appears to be confirmed by ongoing work of Dr Jacqui Burgess and colleagues at UCL, documenting the evident scepticism of individuals who have participated in CV surveys, about the value and/or appropriateness of the methods and resulting outputs to their actual concerns). However, we have found little recent interest, indeed little 'memory', amongst either economists or (most) government officials concerning the historically-observed consequences of political application of the methods in contentious previous cases, despite the structural similarities with present-day concerns. We have found this to be particularly surprising in view of the persistent authority accorded to COBA within the Department of Transport's motorway programme, now recognised politically as marred by a host of over-arching social and environmental 'externalities' which the surrogate valuation methods within the methodology were unable to capture or reflect. Thus we have found that the decision tools in question may have been acting in such cases as unacknowledged forms of institutional self-reference, obscuring from government the nature and extent of emergent public concerns about major policy commitments, until public credibility has been so damaged that a far greater problem of policy legitimisation has emerged.

* We have found that in general the response of environmental economists to recent criticisms of surrogate valuation techniques has been *further elaboration* of technical aspects of the methods, rather than reflection on the latters' epistemological foundations - hence for example, the elaboration of new forms of 'value' in CV, rather than attempts to develop new institutional frameworks aimed at improving sensitivity to the social relations which generate consensus about the significance of environmental 'goods'.

* Detailed scrutiny of the application and practical use of the methods by the Forestry Commission, *vis a vis* public recreation and biodiversity within the FC estate, has suggested the hypothesis (which we are now examining in Phase 2) that the continuing credibility of the methodologies and their outputs within government relates more to their utility as 'discourses' offering unified numerical frameworks for informal negotiation within Whitehall about otherwise under-represented public values, than as credible algorithmic representations of value *per se* (pace the formal claims of practicioners).

* A crucial philosophical issue to emerge from the analysis has concerned the character of the very notion of 'value', as itself necessarily the product of human social and linguistic creativity. In contrast to the implicit assumption of the neo-classical school that specific pre-existing levels of 'value' are 'revealed' in surrogate form in CV exercises, we have found that there are compelling *logical* reasons, intrinsic to the very nature of value, why such exercises themselves *shape and frame* the values in question, and moreover in a distorting and inadequate fashion (see above). This philosophical finding,

which is now being explored further in original work by the Research Fellow, John Foster, has suggested a potential practical corollary. Significantly improved 'value-articulation' methods are possible, albeit without the over-arching pretensions to objectivity claimed for the outputs of CV. Different, perhaps more imaginatively designed, institutional frameworks for the creative exploration and crystallisation of people's latent concerns would be likely to yield different outcomes, indeed different 'values'. Taken together, these findings have led us to examine more systematically the intellectual and policy tradition of institutional economics, and the institutional possibilities for more accomodating models of representative democracy (for 'value-articulation' purposes) with respect to the negotiations surrounding environmentally significant developments and economic activities. The GEC visiting fellowship at CSEC of the economist Michael Jacobs has been an especially productive one in this respect. Both he and John Foster, have now begun to publish on this issue.

Selected Dissemination

Book

Foster, J. (ed) (1996 (a)) 'Environmental Economics: A Critique of Orthodox Policy', London Routledge (forthcoming)

Articles/Book Chapters

Foster, J. 'Beyond Costs and Benefits: Weighing Environmental Goods', Analyse & Kritik, February 1994, pp. 133-149.

Foster, J. (forthcoming 1996 (b)) 'Environment and the Ground of Value', in Foster (1996(a)).

Foster, J. (forthcoming 1996(c)) 'Sustainability and Absurdity', in P. Lowe (ed.), Environmental Valuation and Policy Appraisal, (1996, forthcoming).

Grove-White, R. (1996 forthcoming) 'The Environmental Economics Controversy: Its History and Significance' in Foster J (ed) Environmental Economics: A Critique of Orthodox Policy', London: Routledge.

Keat R (1994) Citizens, Consumers and the Environment: Reflections on *The Economy of the Earth.* Environmental Values Vol 3:4

Special Issue of Environmental Values (1994) on Values and Performance in Environmental Economics, with contributions by Aldred J, O'Connor M, Vadrijal D, Keat R (above), Kretsch J, Norton B and Sagoff M. (Mr Allan Holland is Editor of Environmental Values, and RGW Associate Editor)

Jacobs, M. (1994). 'The Limits to Neoclassicism: Towards an Institutional Environmental Economics'. In M. Redclift and T. Benton (eds), Social Theory and the Global Environment, London: Routledge.

Jacobs, M. (1995). 'Sustainable Development, Capital Substitution and Economic Humility: A Response to Beckerman'. Environmental Values, 4(1)

Jacobs, M. (1995, forthcoming). 'Sustainability and "The Market": A Typology of Environmental Economics'. In R. Eckersley (ed), Markets, Bureaucracy and the Environment: New Directions in Environmental Governance, London and Melbourne: Macmillan.

Jacobs. M. and Foster, J. (1996, forthcoming). 'Nature and Economics: Towards a New Approach'. In J. Foster (ed), Environmental Economics - A Critique of Orthodox Policy, London: Routledge.

Papers

A range of conferences and seminar papers arising from the study have also been given at, for example: the Department of the Environmental Valuation Conference (Durham); Policy Studies Institute (London); Green College (Oxford); York University; and the Centre for Rural Economy (Newcastle).

(2c) RELIGIOUS AND PHILOSOPHICAL DIMENSIONS OF ENVIRONMENTAL UNDERSTANDING

Research Approach

Work on this study (2c) - for which there was no funded Research Fellow - has drawn together and sought to develop a range of insights from sociology, the history of ideas, and religious understanding, exploring the possible significance of environmental concern in modern societies as a social and moral phenomenon of deep cultural significance. The work has been coordinated by RGW and Dr Bronislaw Szerszynski, with particular contributions from Dr Paul Morris (Religious Studies), Alan Holland, Dr John MacNeil et al (Philosophy), Professors John Urry and Scott Lash (Sociology) and Dr Phil Macnaghten (CSEC). Attention has focussed especially on the hypothesis that environmental problems and anxieties, and the representations of them in particular cultural contexts, may have significance (over and above their 'physical' dimensions) as surrogates for wider human-relational concerns, reflecting tensions arising from limitations in western societies' public epistemological and ontological commitments. The study has progressed through a series of working papers, internal seminar programmes, workshops, and conferences, involving academics and social activists in a variety of relevant fields; this has resulted in a number of published outputs and further public presentations. It has interacted with all of the other individual studies within the programme.

Findings

* Close examination of recent official and NGO attempts to incorporate dimensions of 'values' and 'ethics' explicitly into environmental policy reflection and instruments has suggested important limitations in the approaches currently dominant. Through philosophical analysis, informed by insights from recent religious and sociological reflection, we have found that, whilst such attempts are a welcome corrective to the still-widespread tendency to picture environmental problems as capable of being discerned, diagnosed and alleviated in purely technical terms, they reflect excessively narrow conceptions of what 'ethics' and 'values' mean. Two recurrent contemporary tendencies have been identified and explored: *first*, a tendency to consider 'values' in overwhelmingly *sociological* terms, that is, as kinds of 'social lubricant' that are potentially manipulable, with a view to inducing people to behave in ways which have already been determined in largely technical terms as desirable for the environment (as implied for example in various research policy documents of the EU Commission); and *second*, an alternative tendency to consider values in predominantly *philosophical,* terms such that the natural sciences are seen as providing unambiguously authoritative descriptions of the world - telling us what *is* - with ethics applied subsequently as rational, philosophical reflection aimed at telling us what *ought* to be (as for example, in dominant strands of academic environmental ethics, and in recent NGO policy statements). The inadequacies of key assumptions underpinning such approaches (inadequacies which have been clarified by our other studies within the programme - particularly insights in 1c, 2a and 2b on the cultural embeddedness of both 'expert' and 'lay' conceptions of environmental risk; and in 1a, 1b, and 1c on the socially contingent character of scientific descriptions) point to an urgent need for more adequate conceptions of values and ethics in the 'environmental' domain, if these are to attract authentic social resonance. Such findings have led us to begin developing (and publishing on) an alternative approach, which points to a *merging* of the sociological and the philosophical dimensions of environmental-ethical discourse, encompassing the inseparability of description and evaluation, the hermeneutic 'depth' or 'interpretability' of ethical statements, and the context-boundedness of moral reasoning. This approach is converging with philosophical findings about value-as-social-creativity which have begun to crystallise from John Foster's work, as Research Fellow on the parallel examination of the conceptual underpinnings of environmental economics in study 2b.

* In a related exercise, we have also made progress in developing fresh perspectives on contemporary social and cultural movements in Britain and elsewhere - perspectives which we have found to have important relevance for understanding the ways in which the 'ethical' dimensions outlined above are arising. These have emerged from, *inter alia*, CSEC's successful cross-disciplinary New Social Movements Study Group and Identity and Cultural Change workshop series (1992-1994) organised within the programme, as well as from two related CSEC international conferences - in 1992, jointly with the Sociology Department, on Risk, Modernity and the Environment

(featuring Ulrich Beck, Antony Giddens, Klaus Eder and others), and in mid-1994, jointly with Lancaster's Centre for the Study of Cultural Values, a three-day event on The Politics of Cultural Change (featuring David Marquand, Andrew Jamison, Helmuth Berking, Geoff Mulgan (Demos), Judith Squire and others), which attracted political scientists, sociologists, anthropologists, and activists from a diversity of contemporary social/cultural networks. We have found that sociological theories on 'new social movements', whilst helpful in illuminating the emergence of new forms of 'informal' political and cultural identity and practice in recent decades, have tended nevertheless to focus on more or less conventionally 'political' movements, perpetuating a neglect of important parallels between these and other social and cultural phenomena, such as youth movements, new religious networks/groups, and leisure practices. By bringing together researchers and practicioners within all of these fields and more, the study has helped us begin crystallising a more inclusive theoretical understanding of contemporary cultural movements. This endeavour has been lent greater significance by recent cultural changes, themselves confirmed empirically by other studies within our overall programme (for example, the Lancashire and Cumbria studies in 1c, and the Leisure Landscapes study and other work within 2a), concerning the decline of public identification with mainstream ideologies and institutions, such as Parliament, political parties, churches and trades unions, and the parallel proliferation of a wide range of new cultural networks around practices and issues ranging from health and therapy, through sport and leisure, to spirituality and symbolic local protest actions in contemporary Britain. Particularly relevant key findings from such investigations have concerned the ways in which such networks appear to be serving as conduits for the pursuit of aspects of human aspiration - such as relationality, transcendence, and the validity of *personal* experience - which are tending to be excluded from, or distorted by, mainstream political and social discourses (and indeed by the particular social science disciplines which may hitherto have been regarded as most relevant to official environmental priorities - eg economics, social statistics, law, physical geography and even, arguably, psychology). We are now exploring the relevance of these insights for more 'connected' public ethical discourses *vis a vis* the environment.

* Beyond this broad analysis, we have also sought to develop a more *discriminating* understanding of contemporary cultural 'networks', throwing light on the variety of *different* ways in which they may be providing individuals with the 'resources' to develop a richer sense of their own personal and social existences. We have found that an adequate understanding of such dimensions needs to acknowledge the significance of the broad post-war cultural shift known as 'expressivism'. This has involved the spread of a more 'romantic' conception of the self, whereby people have come to describe themselves in terms of an authentic, 'natural' self that is seen as existing prior to, and in some sense over against, the particular roles they play in society, and to see the expression and realisation of this 'authentic' self as a central goal of human existence. We argue that this 'expressive revolution' has been one of the driving forces behind the proliferation of social and cultural movements over the past two or three

decades, as people have sought and created opportunities for the articulation and enrichment of what they perceive as their authentic selves, albeit in interaction and collaboration with others. But the same phenomenon, we argue, has also propelled the development of social movements away from a concern for programmatic political change and towards the creation of enclaves of *meaning*, within which can be experienced richer ways of being a human person - processes which, arguably, may now be leading to the emergence of new and unfamiliar patterns of collectivity more consistent with the social and cultural circumstances of 'late modernity' than older, more modernist traditions of socialist thought. The potential implications of such findings for the framing of, for example, Sustainable Development initiatives within Agenda 21 are significant. We are now exploring and elaborating these within Phase 2, both conceptually and in forthcoming empirical interaction with Lancashire County Council and DOE's 'Going for Green' programme (following on from the previous Lancashire study - see 1c).

* As we have sought to convey in a number of publications listed below (particularly, our forthcoming book, Risk, Environment and Modernity: Towards a New Ecology), the above and related findings have tended to confirm our developing sense of the environmental 'phenomenon' of the past three decades as itself a reflection of mounting cultural tensions in western societies about limitations in 'modernist' notions of the human individual, and of naive and hubristic ideas about the power and purchase of human instrumental knowledge. Key findings in the various other individual studies (1a-2b) within the programme tend to confirm this provisional 'conclusion'. However, we have also established that, whilst the human impulses which have helped constitute environmentalism can be seen as in many respects a reaction against 'modernism', nevertheless the actual manifestations of the phenomenon (eg through NGO and media activities) have tended to be drawn back into inherently constrained modernist ways of thinking about, and articulating, concerns about ethics, knowledge and reality (observations which, again, have tended to be reinforced by key findings in the other individual studies within the programme). Such ways of thinking, we argue, may be tending to thwart the wider and deeper social purchase of environmental 'ethical' appeals, such as those now beginning to be promoted world-wide under the umbrella of 'sustainability'.

* We have also found that explicitly *religious* discourses on the environment are tending to reflect some of the same modernist conceptual limitations. In reports and journal articles exploring recent Christian theological orientations towards environmental matters, we have argued (from within perspectives informed by ontological commitments of our own) that the latters' implicit ontologies of 'the person' have failed largely to recognise the potential *theological* significance of new configurations of human interdependency and, as a corollary, human alienation, arising from the circumstances of late-modern society, and documented in a growing body of anthropological and religious studies thought.

* Finally, it is appropriate to note a recurrent difficulty we have encountered in catalysing fuller discussion of, and reflection on, matters of the kinds highlighted in this particular study, in the present circumstances of UK academic research culture. The findings emerging from within this facet of the programme point in directions which are arguably of social significance. They embrace, and seek to integrate (selectively), perspectives from a spectrum of disciplines across not only the natural and social sciences but also the humanities. What is more, the hermeneutic aspirations implicit in our inquiries pose epistemological challenges to all of these disciplines in their different ways. In addition to our own work within and outside the programme, our CSEC colleagues and collaborators have begun to explore some of the unsettling new implications of such 'culturalist' environmental understandings for particular specialist disciplines (for example Dr Macnaghten and Professor Urry in relation to sociology - see under Dissemination below). Parallel critiques could prove important in a range of fields.. We suggest that such developments may have potential implications for desirable future patterns of Research Council support and programming in the environmental domain, suggesting as they do that increasingly ambitious interpenetration and reciprocal understanding of epistemological perspectives is now desirable in the 'environmental' research world. This necessity arises, it appears to us, from the depth and urgency of the 'real world' need for new forms of understanding of the environmental 'phenomenon' for society as a whole. The findings in the present study (2c) appear to us to point unambiguously in such a direction.

Selected Dissemination

Articles/Book Chapters

Grove-White, R. (1991b). The Emerging Shape of Environmental Conflict in the 1990's. RSA Journal, 139(5419)

Grove-White, R. (1992a). Environmental Debate and Society - The Role of NGOs. Ecos, 13(1)

Grove-White, R. (1992b). 'The Christian Person' and Environmental Concern. Studies in Christian Ethics, 5(2).

Grove-White, R. (1992d). Human Identity and the Environmental Crisis. In I. Ball, M. Goodall, C. Palmer, & J. Reader (Eds.), The Earth Beneath: A Critique of Green Theology, London: SPCK.

Grove-White, R. (1993). Environmentalism: A New Moral Discourse for Technological Society? In K. Milton (Ed.), Environmentalism: The View from Anthropology, London: Routledge.

Grove-White, R. & Shiva, V. (1992). Public Awareness, Science and the Environment. In J. C. I. Dooge, J. W. M. I. Riviere, J. Marton-Lefevre, T. O'Riordan, & F. Praderie. (Eds.), An Agenda of Science for Environment and Development into the 21st Century, Cambridge: Cambridge University Press.

Grove-White, R., & Szerszynski, B. (1992). Getting Behind Environmental Ethics. Environmental Values, 1(4).

Grove-White, R (1995) Environment and Society: Some Reflections in Environmental Politics. (forthcoming)

Grove-White, R (1995) Environmental Knowledge and Public Policy Needs: On Humanising the Research Agenda, in Lash S, Szerszynski B, and Wynne B (eds), Risk, Environment and Modernity: Towards a New Ecology, London. Sage.

Macnaghten, P. M. (1995). 'Public attitudes towards the countryside: A case study on ambivalence'. Journal of Rural Studies, 11, (2).

Macnaghten, P. M. , & Urry, J. (1995). 'Towards a Sociology of Nature'. Sociology, 29, (2).

Macnaghten, P. M. (1994). 'Changing World Views of Students'. ECOS, 15, (2).

Szerszynski B (1993)
'The Metaphysics of Environmental Concern: A Critique of Ecotheological Anti-Dualism', Studies in Christian Ethics, Vol 6, No. 2, pp. 67-78.

Szerszynski B (1995)
'On Knowing What to Do: Environmentalism and the Modern Problematic', in Scott Lash, Bronislaw Szerszynski and Brian Wynne (eds.), Risk, Modernity and the Environment: Towards a New Ecology, (London: Sage).

Szerszynski, B, Lash S and Wynne B (1995)
'Introduction: Ecology, Realism and the Social Sciences, in Scott Lash, Bronislaw Szerszynski and Brian Wynne (eds.), Risk, Modernity and the Environment: Towards a New Ecology, (London: Sage).

Reports

Grove-White, R. (1991). The UK's Environmental Movement and UK Political Culture. Report to EURES - Institut für Regionale Studien Europa.

Grove-White, R., Morris, P., & Szerszynski, B. (1991). The Emerging Mood on Environmental Ethics in Britain. Report to World Wildlife Fund UK.

Szerszynski B (1992)
Religious Movements and the New Age: Their Relevance to the Environmental Movement in the 1990s, Report RT92.1, Lancaster: Centre for the Study of Environmental Change, Lancaster University, (commissioned by Greenpeace UK).

Szerszynski B (1995)
Environmental NGOs in Britain: Communications Activities and Institutional Change, Lancaster: Centre for the Study of Environmental Change, Lancaster University.

Szerszynski B (1995)
Political Actors and the Environment in Britain, Lancaster: Centre for the Study of Environmental Change, Lancaster University.

Conference report and papers (1994) on The Politics of Cultural Change (joint internationl conference at Lancaster by CSEC and the Centre for the Study of Cultural Values, July 1994)

Papers

A variety of conference and invited seminar papers arising from the study have also been given at, for example: the International Forum of Biophilosophy (Budapest); the Institute of British Geographers; Adlerian Society (Oxford); the Royal Society of Arts (London); Manchester Business School; Greenpeace UK; Maison Francaise (Oxford); the National Trust (London); the British Association for Nature Conservation (London); Natural Farmers Union (London); Christian Ecology Group (London); the US Society for Literature and Science (Boston, US); Theory, Culture and Society conference (Berlin); and the Universities of Surrey, East Anglia, West of England and London UCL.