

Environmental History and the Challenges of Interdisciplinarity: An Antipodean Perspective

ERIC PAWSON

*Department of Geography
University of Canterbury
Private Bag 4800, Christchurch, New Zealand.
Email: eric.pawson@canterbury.ac.nz*

STEPHEN DOVERS

*Centre for Resource and Environmental Studies
Australian National University
Canberra 0200, Australia
Email: dovers@cres.anu.edu.au*

ABSTRACT

The environment has attracted more 'integrative' or 'interdisciplinary' efforts than any other substantive focus, one of which is the diverse and evolving field of environmental history. However, the theory and practice of interdisciplinarity, in environmental history and elsewhere, is unclear and contested ground. In this paper, we explore the nature of interdisciplinary work in environmental history. Drawing on three brief project narratives from environmental history, the paper discusses issues and problems, both intellectual and practical, that face those who seek to move across disciplinary boundaries in environmental history (as most of us do, wittingly or not). We then propose and discuss four 'intersections' that we believe have potential as loci of interdisciplinary engagement: mutual understanding; spatial scale and locale; time and change; and the environment and agency.

KEY WORDS

Interdisciplinarity, narratives, issues, problems, intersections

1. INTRODUCTION

'In undertaking [interdisciplinary] research ... we could do worse than regard our partners as dancing partners, when we take to the floor together. How do we learn to dance with each other? That is the sixty-four-thousand-dollar question.'¹

Is environmental history a sub-discipline of history as often seems to be assumed? Is it a discipline in its own right, as some have asserted? Or is it an interdisciplinary activity, as is increasingly urged in the literature?² The answer may vary between and even within places. In North America, the leading practitioners are often but not exclusively academic historians. For a long time historical geographers and landscape historians held sway in the British version of environmental history. In South Africa historians established and have dominated the field, but the potential for a more diverse participation is becoming apparent. In Australia, by contrast, many prominent writers of environmental histories are not mainstream historians at all, but geographers, ecologists, foresters, farmer-poets and historians of science. In New Zealand, the field was tilled by geographers, but now fruitful collaborations are emerging amongst a much wider range of participants, including historians, anthropologists and archaeologists, as well as Maori scholars.³

As writers and organisers of environmental histories, neither of us has a disciplinary allegiance with academic history. One has previously described himself as 'a lapsed ecologist-turned-public policy analyst';⁴ the other is an historical geographer with some doctoral training in economic history. We both however have long experience of interdisciplinary teaching and research, and have both assumed prominent roles in environmental history projects in the last decade. These include editing or co-editing collections of essays on the environmental histories of southern hemisphere lands; drawing on environmental history in public policy analysis for sustainability and a seven year term as contributing editor to, and chair of the advisory committee of, the *New Zealand Historical Atlas*.⁵

Our experiences in such projects have led us to the view that to practice environmental history in these ways inevitably makes it an interdisciplinary activity because 'no one discipline – history or any other – can make much sense of the subject on its own'.⁶ To adopt such a position is to open oneself up to the excitement of engaging with other disciplines, whilst at the same time bringing to the table a distinct view of the insights that one's own disciplinary perspective can offer. But beyond such pleasantries, what does it actually mean to practice 'interdisciplinarity'? How can the disciplines interact and what are the points of intersection? Unless these questions are posed, there is a danger that the end result will be 'a diverse soup of very loosely related scholarship', lacking coherence or audience.⁷ On the other hand, too much theoretical and methodological convergence may stifle the insights that can emerge with disparate approaches.⁸ In other interdisciplinary initiatives concerning the environment,

THE CHALLENGES OF INTERDISCIPLINARITY

such as ecological economics and environmental politics, a desire for grand syntheses of theory and methods can at times be discerned, although not often as yet in environmental history (with the possible exception of the Americans Crosby, Cronon and Worster). Diversity and fluidity are necessary, but so are some reasonably solid intersections around which that diversity can produce more than smooth platitudes.

There are therefore significant intellectual challenges and, as we shall see, not insignificant practical ones in pursuing interdisciplinarity. This article is an attempt to explore these issues and identify some intersections, driven partly by our own frustrations that they are often not brought sufficiently into the open. It is too easy to assume that interdisciplinarity will emerge when representatives of different disciplines get together. But our experience of interdisciplinary teaching, research and writing, and of institutions dedicated to these purposes, tells us that this is not so. Interdisciplinarity has to be worked at, because members of different disciplinary cultures use particular discursive practices. They adopt different languages and types of evidence, and they think about and understand the world in culturally distinct ways.⁹

We begin with three short narratives, because narratives of interdisciplinary research experience are 'rare in the literature'.¹⁰ The purpose of this section of the paper is to contextualise our questions about interdisciplinarity. We provide brief biographies of projects in, or related to, environmental history, from which we identify some of the benefits and difficulties of interdisciplinarity as a working process. In the next section of the paper, we draw from these biographies a clearer specification of the practical and intellectual challenges to be faced if interdisciplinarity is to be advanced. In the last section, we explore ways of resolving such issues by examining four potential points of intersection between practitioners from different disciplines involved in environmental histories. These are: seeking to understand each other (clearing the ground); spatial scale and locale; time and change; and environment, agency and process. The paper therefore develops as a logical sequence, in which we seek to move beyond a portrayal of the pros and cons of working in interdisciplinary projects, through a clear specification of the challenges, towards ways in which we might learn more about how 'to dance with each other'.

2. PROJECT BIOGRAPHIES

The potential for intersection of historical and environmental discourses and modes of analysis has been increasing in recent years for a number of reasons. An obvious one is the manner in which the media focuses on global climate change, so bringing anxieties about sustainability to the fore. In its turn, this has been a factor encouraging students to seek out teaching and research supervision that can provide explanations more convincing, or at least more enticing and

proactive, than those of single disciplines. At the same time, there is a demand for public policy formulation in respect of environmental change that contextualises present problems in terms of past processes. In Australia and New Zealand, there have also recently been a number of national and regional anniversaries of key dates in European settlement, for which publications have been produced that have had to face up to these new expectations. Simultaneously, the 'new museology'¹¹ has been used to remake national and regional museums, offering explanations taking account of the destabilising narratives of postmodernism, sometimes with an overt focus on the relations between peoples and their environments.

We have drawn three biographies from this overall context. The first concerns the reconstruction of national museums in New Zealand and Australia in the last decade. The second focuses on national and regional projects producing text to mark significant anniversaries. The third biography is of an institution dedicated, for nearly 30 years, to interdisciplinary environmental work.

National museums

In his critical analysis of heritage, the geographer Lowenthal identifies the traditional purpose of museums as to generate '*Pride* – tribal, local or national'.¹² Such comfortable assumptions are now being undermined by the adoption of the new museology, a central characteristic of which is 'A challenging of the standard narrative of national history, and especially of its imperialistic and racist components'.¹³ The standard narrative sees triumph over nature and native in the appropriation of the land as essentially unproblematic. As Hicks observes, 'curiously to this day [the Smithsonian Museum of Natural History] displays the native American Indian as just another species of animal to be presented in dioramas along with the great plains buffalo!'¹⁴ Environmental context, let alone the environmental transformation associated with European colonisation, disappears from the narrative thereafter, assumed merely to be the stage upon which new heroes wage successful battle.

Recent scholarship in environmental histories as well as of indigenous-coloniser relations undermines this simplistic view. Europeans in the antipodes did not enter empty lands even if their legal fictions encouraged them to think so: Aboriginal and Maori occupants had transformed their territories, imaginatively and materially. The new arrivals in turn generated further transformations, imaginative and material. It is these transformations that should be the very stuff of local, regional and national stories. The National Museum of Australia in Canberra (opened in 2001) embraces this challenge. Its stunning building, in changing hues of bush green and earthy red, wraps around the Garden of Australian Dreams in which the markers of Aboriginal and European upon the land are portrayed. Inside, the opening gallery, '*Tangled Destinies*', explores

THE CHALLENGES OF INTERDISCIPLINARITY

relations between people and land using a range of disciplines and forms of representation, seeking to portray environmental attitudes and reactions as they have been understood through time, rather than in what have been described as 'apocalyptic' or 'progressive' ways.¹⁵

By contrast, Te Papa Tongarewa in Wellington, New Zealand's national museum (opened in 1998), which has done much to re-invent the idea of the national museum in other ways, has ducked this challenge. Built around a level two floor on natural environment themes and a level four floor on cultural heritage, the original idea of using the intervening level to explore the meeting of culture and nature, people and place, was abandoned. Echoing Lowenthal's characterisation above, 'There was a view at the time, openly endorsed by Te Papa, that opening day exhibitions should be celebratory of our culture and our natural environment'.¹⁶ For political reasons but also, we suspect, a failure of imagination on the part of 'concept leaders' expert in natural history and history, the means of grasping an interdisciplinary opportunity was found wanting. Only in the Mana Whenua displays can one 'learn how important the land and the natural environment are for Maori'.¹⁷

National and regional projects

The effect of the Te Papa failure is to lend credence to the view that indigenous peoples are 'of' or 'in' nature, but that any such ecological interconnectivity does not apply to colonial European settlers. This is a common enough omission amongst historians as well. A recent example is Belich's acclaimed *Making Peoples: A History of the New Zealanders*. He is detailed and illuminating on the environmental learning and adaptation of Maori colonisers but ignores the theme when the narrative moves past 1840 (the date of the signing of the Treaty of Waitangi, which in its English language version ceded sovereignty over Maori territories to the British Crown). A similar sleight of hand is evident in the three volume *Historical Atlas of Canada*, which purports to reflect a country that has worked to develop native Canadian policy in the last three decades, the period over which the Atlas was in production. Nonetheless, native Canadians are to be found mainly in volume 1, isolated from contemporary stories as mere historical figures.¹⁸

This contrasts with the *New Zealand Historical Atlas*, initiated as a 1990 project to mark 150 years of the signing of the Treaty of Waitangi. There was therefore an academic and political imperative to tell the stories of Maori relationships with land and territory, as well as with Pakeha, or Europeans. A project with such a brief required careful interdisciplinary planning. The historian editor selected two deputies, one a geographer-cartographer, the other a professional cartographer. They worked with an advisory committee chaired by a geographer, with membership drawn also from history, economic history, archaeology and ecology. An early decision was made to represent pre-contact

Maori stories using parallel discourses, those of archaeology and those of oral tradition. The 'iwi maps', visually appealing and technically sophisticated bird's-eye views of tribal territories and nets of names across the land, set a standard for portrayal of people-environment relations elsewhere in the Atlas.

Consequently it was necessary to ensure that subsequent chronological sections explored Maori and Maori-Pakeha cultural relations, inevitably often through the prism of land. From this it was a short step to representation of transfers of land to Pakeha and its subsequent transformation. Although the transformation theme was not part of the initial editorial plan, it was included following the urging of the advisory committee. Regular meetings of this committee ensured that the various disciplinary perspectives were heard; at an early stage in the development of the Atlas, some meetings of representatives of specific disciplines were also held. A Maori advisory committee met with less frequency, but had some cross membership of the main committee. Through the opportunities thereby created for interdisciplinary dialogue, a reasonably consistent coverage of environmental histories was achieved through the Atlas, with this being represented at a range of spatial scales appropriate to the stories being told.¹⁹

Regular meetings and debate can encourage interdisciplinary working, although this is perhaps more practical in smaller places such as New Zealand rather than larger ones like Canada. Regional projects offer even more opportunity for such interaction, although it is unlikely to occur without conscious effort. An example is the Christchurch 2000 project, organised by university historians to focus historical research in the years leading up to the sesquicentennial of the province of Canterbury, New Zealand. One outcome was a book of city essays, drawing on representatives from a number of humanities disciplines. Interdisciplinary interaction was aided by a lengthy lead-in time (as for the Atlas project), by monthly meetings of contributors, and by a large public forum. This was held two years before publication and provided invaluable feedback on the ways in which (for instance) a chapter on urban environmental themes by a geographer might extend the expectations of a local readership schooled in more conventional forms of history.²⁰

The Centre for Resource and Environmental Studies

In our third biography, such practical dimensions also emerge, but in an organisational rather than project context. The Centre for Resource and Environmental Studies (CRES) was established at the Australian National University in 1973 as a policy-oriented, interdisciplinary research and postgraduate training centre. While no longer unique, it remains one of the longest-standing and substantial foci for broad environmental research and training, with some eighty scholars and support staff centred around fourteen core-funded academics.²¹ In

THE CHALLENGES OF INTERDISCIPLINARITY

broad terms, the CRES experience can speak to the challenges of historically informed, interdisciplinary environmental research and training elsewhere.

The establishment of CRES reflected the rise of the environment as an intellectual and political issue, and an early recognition of the need to respond from not only single disciplinary perspectives. CRES has therefore housed a wide range of disciplines, including ecology, earth sciences, sociology, anthropology, public policy, information sciences, economics, political science and mathematics. This mix, and the constellations in which they connect in research, has altered as people move in and out. In addition, individuals have also shifted focus, travelling across or bridging disciplinary divides. The construction of environmental problems has also changed since 1973, particularly with the emergence of the policy and research agenda of sustainability. This has increased the need to integrate environmental imperatives with social and economic ones.²²

The long term nature of sustainability issues demands a forward view of environmental processes, and there is the obvious corollary for a longer view back. CRES has from inception had a time depth to its work, especially in the form of 'biohistory' and integrative scholarship in human ecology as developed by Boyden and colleagues. Similarly, a focus on indigenous issues demands cognisance of human histories (and, inevitably, climatic and landscape histories) of +60,000 years. More recently, an explicit focus on environmental history has strengthened this temporal propensity. It has also led to a particular concern with the connections between environmental history and current policy questions.²³

In postgraduate research, a number of issues have been identified. Mandatory multi-member supervisory teams and regular whole-of-team contact have assisted interdisciplinary efforts, but finding suitable examiners has been a constant challenge. However, the art and craft of multiple and interdisciplinary supervision is a poorly developed area of professional practice. The increasing availability of prestige PhD scholarships from R&D agencies which place a premium on integrative research, and rising demand from prospective students, indicates a critical area of intellectual activity and hence of necessary skills development. These remarks apply not just to environmental fields, but it is often the case that doctoral researchers in sustainability – and perhaps environmental history – are not simply using new, innovative synthetic approaches, but are at the forefront of their development.

The rising demand for interdisciplinary work at CRES and other such agencies has come from outside the academy (R&D and policy agencies, the private and community sectors) at least as often as from within. Accrued experience has confirmed both the difficulties associated with it, and the validity of multiple approaches. These may be additive (essentially multi-disciplinary) or more integrated (interdisciplinary), and practised as longer-term research themes or as discrete projects, and by individuals, small collaborations and large,

multi-member teams. Experience has also emphasised the practical as well as intellectual difficulties of interdisciplinarity: leadership, funding, career development, the attrition of effort in preliminary work, and team management.

3. ISSUES AND PROBLEMS

These project biographies are neither representative nor definitive, but the issues and problems that run through them are illustrative. We identify and focus on four at this point, prior to discussing, in the next section, ways in which they might be resolved. First, as practised in these biographies, environmental history emerges not a discipline in its own right; nor as a sub-discipline of history. Rather it is an interdisciplinary pursuit carried out within and between a wide range of disciplines, its participants seeking to identify complementary ways of thinking about questions that span shared interests. The 'new museology' draws on more than the traditional curatorial disciplines of archaeology, anthropology, history and natural history, adding art history, geography and history of science. Innovative atlases are the product of partnerships between not just historians and cartographers but also engage the spatial imaginations of geographers and owners of indigenous territorial knowledges. Institutions with broad environmental mandates, such as CRES, bring together environmental historians with environmental modellers, human ecologists, ecological economists and policy analysts.

Secondly, what drives interdisciplinarity between sometimes unlikely bed-fellows? Institutionally, interdisciplinarity has become an unquestionably 'good thing', as the growth of 'interdisciplines' in the environmental field – and the journals they have spawned – confirms.²⁴ The range of disciplines, approaches and configurations involved, evidenced in our project biographies, are matched by a variety and interaction of drivers. An obvious impetus is scholarly interest, stemming from disciplines facing their limits and responding to the issues of the time. But the wisdom of scholars is not the clear driver, as it rarely would be in any new societal development. In an era of environmental concern, there is a political drive for new knowledges, and in a market-defined world, scholars follow funding. At more specific levels, resource and environmental managers are increasingly engaging with the past for quite practical reasons, whilst museums and other institutions seek historians and others who can place environment in temporal context. There is a wider public interest in environmental histories, evidenced in a stream of books that appeal well beyond the academy.²⁵

These various drivers do not operate in isolation. Scholarly interest is fed by political interest in an issue, even from the margins, as is interest in policy and management circles likewise. This in turn is reflected in the growing demand for

THE CHALLENGES OF INTERDISCIPLINARITY

postgraduate training. The museum situation is illustrative. Museum professionals and the disciplines they belong to undergo change and alter their interpretations, museums as businesses chase consumers of entertainment and spectacle, and the public seek more than things in glass cases. In the process of interaction, the relation of subject and object blur and the positions of narrative and narrator shift from established museum traditions.²⁶ So, interdisciplinary activity is the product of variable patterns of engagement of many disciplines for a variety of reasons. What are the challenges of focus and coherence, both practical and intellectual, that are encountered?

The practical problems are our third issue. These are to be expected in new interdisciplinary enterprises, and the project biographies above mentioned several. Interdisciplinarity typically involves collaboration, often with unfamiliar partners (but, many of these problems also strike the rare, yet possible and entirely necessary, individual interdisciplinarian). The usual problems of team work are present and often sharpened: leadership, assigning roles and functions, establishment of research directions, publishing options and thus career opportunities, institutional support, cost allocation, and distance. Distance can be a particular issue when collaborators are sought outside familiar grounds. (Or, are propinquity and chance meetings most often the determinants of interdisciplinary partnerships?) If the building of mutual understanding of key conceptual intersections is of prime importance, as we argue in the next section, then practical difficulties that constrain sustained, real-time human interaction should not be underestimated.

Time too is an issue. Commonly preliminary collaborative moves and opening research expeditions are as crucial to later productivity as the 'substantive' research activity. Early and joint problem definition in particular lengthens the opening phase. While research funding possibilities have improved to some extent, those that are defined by disciplinary boundaries may be difficult to access for interdisciplinary projects. These considerations can be easily transferred to what is perhaps (given the price of failure or the benefits of success) the most crucial of all interdisciplinary team projects. This is the doctoral research team including student, supervisors and very often also adjunct advisers and collaborators. If doctoral research is to be an active location for the human, time and financial resources of interdisciplinary environmental history, bringing on stream the next generation of scholars, then professional development of the supervisory capacity (both practical and intellectual) represents a key forefront.²⁷

Fourthly, what of the intellectual problems of coherence? Given the lack of discussion, in usual circumstances, between members of disciplines that construct knowledge in quite different ways, and which value quite different kinds of evidence, it has been suggested that these problems constitute a 'black box'.²⁸ Part of the dilemma is to define what depth or extent of convergence constitutes

'interdisciplinarity'. How close do we need to get? We can consider two different pathways. The first admits that considerable epistemological differences exist between the disciplines that contribute to environmental history, or to any other interdisciplinary field, and seeks only a superficial measure of connection between them. This view anticipates that each disciplinary perspective will bring specific insights to a research problem, but no particular effort is made to meld these together. The narratives in other words are multiple, and the insights additive: they depend on the reader, with perhaps some assistance from an editorial voice. Many edited collections in environmental history are of this nature.

The second path puts the onus for collective insight on the researcher and writer as much as the reader and is 'driven by people who realise that they cannot answer their own questions without engaging in some deep way with another discipline and its culture'.²⁹ This 'deeper' form of interdisciplinarity presupposes an attempt to intersect constructively with other disciplinary epistemologies. This implies a willingness to see why others ask different questions, the ways in which they construct and interpret evidence, and how they represent their findings. The map for instance is not just a simple indicator of place location, but a spatial language for analysis and representation of processes and events. These issues arise particularly between humanities and science disciplines; as Worster quaintly puts it: 'undoubtedly the most outlandish language that must be learned is the natural scientist's'. In this regard, dialogue might begin 'by clearing the ground of any obstructive misconceptions or prejudices about each other'.³⁰

4. INTERSECTIONS

Such requirements may seem so forbidding as to suggest that the attempt is not worth the effort. Simpler forms of working – the first of the above means – are appropriate depending on the task at hand, and as long as the limits are recognised. But for that recognition of limits, and certainly for deeper engagement, some foci for increased understanding are needed. Otherwise, those of us who contribute to environmental history from different disciplinary bases talk past each other and miss the real gains to be made from greater co-operation. To assist the process, we propose that a good start can be made by identifying four potential points of intersection through which interdisciplinary working might occur: clearing the ground; spatial scale and locale; time and change; and environment, agency and process.

Clearing the ground

The first intersection is recognition of the diversity of evidence, analysis and representation in the research approaches of other disciplines. This involves an

THE CHALLENGES OF INTERDISCIPLINARITY

honest attempt to understand their starting assumptions, or epistemological commitments, and to do this using a contemporary reading of how they construct knowledge. There is otherwise the danger that insights that come from other ways of knowing will be reinvented in bastardised form, misrepresented or simply misunderstood. Ecology and geography, two of the synthetic disciplines that have built long traditions of theorising and analysis of the integration of human and environmental processes, seem particularly prone to such misrepresentation. This most likely arises due to the lack of facility which many researchers trained in the humanities have with understanding of environmental processes *per se*. Geography for instance is frequently caricatured, or reduced to 'co-ordinates on the map', with any sense of its key research questions 'of how cultures and societies write themselves onto the earth', of how people make places and 'how both the environmental and the social are transformed in the process' being lost.³¹

A number of recent works, attempting to explain some of the bigger historical questions – why some places are rich, some poor – have rediscovered simplistic forms of environmental determinism, discredited amongst geographers for over fifty years. Examples include books by the economic historian Landes and the zoologist Diamond. Their histories annex geography as a series of variables, of climate and physical conditions, in which explanation is sought by eliding the complex stories of social relations in times and places that underlie the apparent simplicity of the patterns identified. Such environmental history can in turn amount to little more than an accumulation of pieces of information in which, ironically, both the historian's and the geographer's concern with human agency, and the skill of situating this within its historical and spatial contexts, has been lost. As Blaut says, 'it was environmental determinism that caused our science [geography] to fall on hard times. We should remind historians of that fact'.³²

Ecology is a crucial contributor to study of the environment and exemplifies the issues of understanding what another discipline says, and whether it is said in unison. Ecology is a word often misused, referring to some property of the natural or even cultural world rather than a discipline of science. It is appropriated to label intellectual and normative enterprises that might be unrecognisable or even disturbing to professional ecologists, such as political or social ecology. As a discipline, ecology is characterised by diversity and rapid theoretical and methodological development. With rising interest in environmental problems, words, concepts and even assumed laws leave the discipline and take on a new life in policy debates and in the thinking and writing of historians, and economists. The use and misuse of ecological concepts is an issue in contemporary environmental management debates and in fields such as environmental ethics, but has been little explored in environmental history.³³

What might be assumed as solid concepts from ecology may not be. A survey of more than six hundred British ecologists asked them to select ten out of fifty

listed ecological concepts and rank those ten in order of usefulness.³⁴ Only two – ‘the ecosystem’ and ‘succession’ – were selected by more than half the respondents. Concepts selected by less than a third of respondents included species diversity, carrying capacity and food webs, to name three that are freely used by other disciplines. And, while ‘succession’ was relatively popular in the survey, in the eyes of many ecologists it is dated and of questionable utility. What a discipline believes in changes rapidly and this demands that collaboration be based on an appreciation of recent developments within it rather than worn but handy slogans. So, while alluring, tractable and easily communicated concepts may or may not ring true to an ecologist.

Moreover, much depends on the ‘ecologist’ in question and the individual baggage of theory, method, data and problem definition. Population or behavioural ecologists and ecosystem theorists, for example, are quite different creatures. In interdisciplinary ventures, the choice of collaborator, book, journal or theoretical construct from another discipline is a key one to make, as the ‘sample’ of the discipline thus (probably unwittingly) selected will determine the course and fate of the venture. And not just in ecology: the differences between a black letter lawyer and a law-in-context practitioner or an evolutionary versus a neo-classical economist are significant but not often appreciated by those from outside. We acknowledge or even take for granted the richness and divisions within our own disciplines but may be blind to others, a reality confirmed by the oft-heard statement by interdisciplinary project designers that ‘we need an [insert discipline]’. That, however, is at least an improvement on ‘we need a social science perspective’, as scientists cast around for collaborators to satisfy grant application requirements. The recognition of intra-disciplinary variation is as important as that of inter-disciplinary diversity.

Spatial scale and locale

Antony | The obverse of the failure to represent other disciplines in their contemporary form is recognition of the insights to be gained from them. A second set of intersections can usefully occur around the spatial themes of scale and locale. Use of such concepts recognises that human activities and their effects are spatially constituted, affecting places large and small, and that in exploring human-environment interactions, a number of scales of analysis are important.

The common focus of academic history has been the nation-state, and Vincent has argued that little has occurred to undermine this privileging of one scale of analysis despite the proliferation of different types of history in recent decades. The point is debatable, given the absence of environmental history from Vincent’s discussion. Griffiths asserts that ‘environmental history often makes best sense on a regional and global scale, and rarely on a national one’.³⁵ But this

THE CHALLENGES OF INTERDISCIPLINARITY

is also too simple. The national scale may indeed be useful, as with island states such as Australia and New Zealand, or when a theme primarily determined by jurisdiction, such as trade, policy or law, is being pursued. Also, the global and regional are only a sample of scales relevant to environmental processes: the sub-national, catchment and local matter too.

Some of the best environmental history is about very small places. Guthrie-Smith's study of the changing landscape of his own Hawke's Bay, New Zealand sheep station, *Tutira*, first published in 1921, is a classic in the tradition of earlier natural histories such as Gilbert White's parish-focused *Selborne*. *Tutira* is an account of the effects of Guthrie-Smith's own land improvement activities on local habitats, bird populations and soils over a period of 40 years. It has been credited by William Cronon as the inspiration for the development of his own interest in environmental history.³⁶ Conversely, Crosby's bold focus in *Ecological Imperialism* has prompted adoption of this scale of analysis in environmental histories of the impacts of empire.³⁷ This is to recognise that some human-environmental impacts are the product of processes and flows expressed at broad scales, which in turn affect smaller scale localities.

Different disciplines have different spatial scales deeply embedded in their epistemological commitments. If many disciplines are necessary but not alone sufficient to the environmental history enterprise, so then are many scales. Economists focus on the nation state, the firm and the individual. Lawyers are concerned with the spatial extent of the legal jurisdiction, or on the flow of custom and preference in both time and space of a given legal tradition. Hydrologists like catchments and the streamlines that snake through them. Ecologists work with a variety of spatial scales, and are increasingly interested in the processes that link them (taxa, nutrient and energy fluxes, etc.). So too are geographers, whose concern with spatial divisions of labour is based on the interactions of processes characterising and in turn shaping localities constituted at differing scales.

Some disciplines offer insights through scales of analysis that are at once spatially-defined and process-determined: the environmental history of the Australian domain defined by the plant species known as Brigalow (*Acacia harpophylla*), by ecological biogeographer Nix, evidences the potential for adoption of 'scales' that go beyond political or even cultural territories. Environmental histories shaped by natural system entities and processes – vegetation alliances, migratory species movements, nutrient cycles, soil types, and so on – rather than the more traditional scales, allow fresh excursions. The work of historical geographers on the European colonisation of South Australia is a good example of the ways in which Victorian understandings of natural systems were reproduced in political landscapes.³⁸ The simple question of 'what scale?' conceals either frightening complexity or a fascinating realm of possibilities.

2
The Global

Time and change

Just as disciplines have particular spatial scales and processes embedded deeply in the ways in which they explain the world, so they have temporal scales. Human-natural system interactions are characterised by variable and dynamic time frames, with different aspects of this dynamism being more or less explicable by different disciplines. Crucial to collaboration is the ability to explain change in different variables and influences over time and at particular times. For example, it is necessary to address tendencies either to assume an unchanging 'environment' as the stage on which human histories have been acted out, or to assume stasis in human aspirations, behaviour and institutions.

The pattern of vegetation at the time of European occupation of Australia and New Zealand has often been treated as a backdrop to recent history, rather than as a complex product of multiple forces such as past patterns of climate change and previous indigenous land management. To do so discounts the environmental learning and knowledge of indigenous peoples, reflected in their role as agents of extensive landscape change, as in the grasslands of eastern Australia and New Zealand. The creation of and extent of past use of particular environmental configurations also matters in current concerns, for instance land claims processes. In another specific example, the presumed extent of vegetation types in 1750 underpinned Australia's recent and substantial resource allocation process producing Regional Forest Agreements.³⁹

Environmental change also occurs independently of human intervention. Such dynamism is perhaps readily appreciated within geological frames of reference, but only in the last thirty years or so has the occurrence of climate change been explored systematically within human history.⁴⁰ Such change may be apparently cyclical, or sharply episodic. Abrupt changes may be more common than has been apparent due to the recording of past environmental conditions in historical accounts being 'notoriously light' and the preference for uniformitarian thinking over catastrophism.⁴¹ But even if new sources of evidence of environmental change, such as tree ring chronologies, are now becoming available, there are problems of causation as well as difficulties of 'reading off' historical events against environmental variations. 'We are dealing with a number of variables and hence a multitude of possible outcomes'⁴² in what is an inevitable interdisciplinary intersection.

So if one group of environmental historians can gain from awareness of natural variability, their counterparts trained in the natural sciences benefit from appreciation of the interplay of persistence and particularity in human affairs. Legal frameworks, for example, may appear to reflect contemporary circumstance, but enduring power relations and precedents often ensure that longstanding understandings of human relations with the natural world persist. Similarly, institutional histories reveal much about human-nature interactions, as suggested by Uekoetter in his 'organisational approach' for environmental history.

THE CHALLENGES OF INTERDISCIPLINARITY

To give an example, in the state of Victoria, for a quarter of a century from 1972, the internationally remarkable Land Conservation Council inquired into and deeply influenced land management and conservation policy. It left a persistent signature on the tenure and land use of the state. That it was established can be taken as unexplained event: it just was. But complex forces led to the creation of the institution, in particular the heated and significant Little Desert dispute of the late 1960s, where emerging ecological knowledge and community disquiet sank an agricultural development proposal and identified the need for new institutional arrangements.⁴³

Environment, agency, and process

If we classify those involved in writing environmental histories into people whose primary interest and skill concerns human society (social sciences, the humanities) and the non-human world (natural sciences), we can construct an equally simplistic division between those who focus on social constructions of environment, and on the environment as understood using scientific evidence. It is not the case that natural scientists unswervingly accept such evidence; indeed many understand its limitations all too well. But the fascination with newly discovered information from such sources may lure those from the humanities into abandoning caution, just as natural scientists can submit unthinkingly to entertaining but misleading accounts of human societies. The point is that in the continuum of explanation between complete social construction and environmental determinism lies a core intersection for environmental history – nature as dynamic, independent of humans, or nature as constructed, physically and mentally, by humans.

Given that environmental history by definition accounts for, and moreover is created by, an interest in natural-human system interaction, there should be willingness to engage at this intersection. There is a growing literature on environmental hazards that does so. Early geographical hazards research focused on human response to environmental shocks, such as floods, as if the interaction was straightforwardly linear. But people render themselves prone to flooding by placing their assets in the way, and by modifying hydrological behaviour through intervention in catchments. Subsequent work, following the call of Hewitt, has attempted to understand not only the extent to which particular political economies are more, or less, vulnerable to environmental shocks, but also to explore human appreciation of variability in environmental systems. Much settler colonisation proceeded on the assumption of uniformitarianism, and persisted with this, despite evidence to the contrary in the form of droughts, as well as floods and earthquakes.⁴⁴

The contemporary political economy of colonisation/industrialisation/modernisation generates far more encompassing hazards. Patterns of regional or global environmental change ('acid rain'; the enhanced greenhouse effect) are

the product of wastes generated by people at particular points, the effects of which are generalised by broader scale physical processes in the atmosphere. This however is an example of an insight commonplace if not universally accepted in physical science. There is a danger that the intersection is overlooked and evidence reported without the customary interpretive cautions of such disciplines. Some influential environmental historians and histories have come in for criticism for this very reason. Van Sittert takes Worster to task for calling upon scientists to recognise the social construction of nature embedded in their science, whilst also urging them to crusade against materialism and nature's destruction which is of course similarly constructed.⁴⁵

In another context, Young lambasts Lines, whose book *Taming the Great South Land* according to its dust jacket, 'combines environmental, social and political history to record 200 years of implacable exploitation of nature', for not assessing the evidence we have for environmental change with sufficient care.⁴⁶ She gives a number of examples to show how little is known of the scale of land degradation, deforestation and salinisation in Australia, and the ways in which map representation can generalise from very limited data to give the appearance of crisis. Sampling and classification procedures in the collection and display of such data require the same cautious interpretation and contextualising as historians allow for in use of traditional archival sources. In seeking shared – or at least mutually interpretable – explanations of environmental change and change in human-natural system interactions, questions of agency and process, if brought explicitly to the fore, constitute a potent interdisciplinary intersection combining elements of the three that we outlined earlier in this section.

5. CONCLUSIONS

Disciplines are, by definition, strange and arcane to those without, and connections between them offer great possibilities along with pitfalls of misunderstanding. Carefully chosen intersections, pursued persistently, offer more potential than brief dalliances, or selective raids into foreign disciplinary literatures, or simply not keeping up. However, on occasion it may be that we will find that disciplines are more similar than we think. For instance, particular 'insights' of systems science and ecology – non-linearity, near-equilibrium dynamics, thresholds, path dependency, feedbacks – might be locations of interdisciplinary discourse if their meaning is deconstructed and it is realised that any (for example) historian or political scientist worth their salt understands such 'system properties' by other names, and in other methodological and theoretical ways. A central systems concept, feedback (positive or negative), is identified in the widest array of social and natural phenomena by Richardson,⁴⁷ but by ~~another~~ name – or indeed so commonly assumed and dealt with as to have no name at all – would be recognised by most environmental historians as core to understand-

THE CHALLENGES OF INTERDISCIPLINARITY

ing interdependent change in human societies and the natural world. Our intersections might offer unrealised commonalities as well as differences.

We suggest that the intersections discussed here have potential for furthering the collaborative imperative of environmental history, and moreover invite that collaboration to explicitly explore the praxis of interdisciplinarity, rather than merely assist discrete inquiries. At the very least, such exploration may prompt other suggestions for intersections between disciplines. Interdisciplinarity is an arena of scholarship in its own right as well as a means to the end of joint inquiry.⁴⁸ It is comforting that environmental history is not alone in this, even in the environmental arena. Ecological economics, environmental philosophy, political and social ecology, green social theory, institutional economics of sustainability, environmental politics, and so on – these are all to some degree interdisciplinary, some implicitly and others, like ecological economics, explicitly, at least in ambition. They overlap in focus, too, although their practitioners and theoretical and methodological developments often remain unconnected.

Of all substantive foci, past uses of environments and their future sustainability have generated greater quantity and diversity of interdisciplinary ventures than any other, and so offer a source of much needed project narratives, intersections and analyses of interdisciplinary engagement. With more elaborated engagement, environmental history, arguably the environmental ‘interdiscipline’ that attracts the greatest disciplinary variety, may not only improve its own explanations, but become the leading laboratory in the interdisciplinary experiment.

NOTES

The authors thank Libby Robin and Tom Brooking for their helpful comments on a draft of this paper, and acknowledge the University of Canterbury’s grant of a Visiting Erskine Fellowship to Stephen Dovers that enabled our collaboration.

¹ Redclift 1999, 273.

² Examples of those who assume environmental history is a sub-discipline of history include Carruthers 2002, MacKenzie 1997 and Worster 1988. Simmonds 2001 asserts that it is a discipline in its own right. Powell 1996 urges that it be considered an interdisciplinary activity.

³ The comment about environmental history in Britain is from Cioc et.al. 2000, but amongst well-known practitioners there are Oliver Rackham, a botanist, and T.C.Smout and Keith Thomas, both historians. Dovers et.al. 2002 is indicative of the growing diversity of environmental history in South Africa. For Australia, see Dovers 1994 and 2000; for New Zealand, Pawson and Brooking 2002.

⁴ Dovers 2001, 206.

⁵ For collective environmental histories of southern hemisphere lands, see Dovers 1994, 2000; Dovers et.al. 2002; Pawson and Brooking 2002; on links to public policy analysis: Dovers 2001; on the *New Zealand Historical Atlas*: Pawson, 1997.

⁶ Dovers 2001, 197.

- ⁷ Mabin, 2001.
- ⁸ Dovers 2002.
- ⁹ Schoenberger 2001.
- ¹⁰ Mobbs and Crabb 2002, 3.
- ¹¹ Poulot 1994.
- ¹² Lowenthal 1996, 160.
- ¹³ Davison 2001, 18.
- ¹⁴ Hicks, 2001, 184.
- ¹⁵ MacKenzie 1997.
- ¹⁶ Hicks 2001, 188.
- ¹⁷ Te Papa, visitors' brochure, no date.
- ¹⁸ Belich 1996; Harris 1987.
- ¹⁹ McKinnon, 1997; Pawson 1997.
- ²⁰ Cookson and Dunstall 2000; Pawson 2000.
- ²¹ Mobbs and Crabb 2002.
- ²² Cf. United Nations 1992.
- ²³ For CRES work on biohistory, see Boyden et.al. 1981, 1990; Boyden 1987; on indigenous issues: Ross et.al. 1994; Coombs et.al. 1983; on environmental history, see Dovers 1994; Dargavel 1995; Robin 1998; and on its links with policy questions: Dovers 2000, 2001; Robin 2001.
- ²⁴ Becker et.al. 1999.
- ²⁵ On environmental managers engaging with the past, see Wasson and Sidorchuk 2000; and Roberts 2000. McIntyre and Wehner 2001 discuss the search by museums for those who can place environment in temporal context. Examples of the public appeal of environmental histories include Flannery 1994; Diamond 1997; McNeill 2001.
- ²⁶ Lane 2000.
- ²⁷ Dovers 2002.
- ²⁸ Becker et.al. 1999.
- ²⁹ Schoenberger 2001, 373.
- ³⁰ Worster 1988, 294; Redclift 1999, 269.
- ³¹ Schoenberger 2001, 377.
- ³² Landes 1998; Diamond 1997; Blau 1999, 406
- ³³ On the diversity and rapid development of ecology, see Dovers et.al. 1996, Peters 1991 and Handmer et.al. 2001. Schrader-Frechette 1995 and Holland 1995 discuss the use and misuse of ecological concepts in environmental management and in environmental ethics respectively.
- ³⁴ Cherrett 1988.
- ³⁵ Vincent 1995; Griffiths 1997, 47.
- ³⁶ Cronon 1999, xi-xii.
- ³⁷ Crosby 1986; Griffiths and Robin 1997.
- ³⁸ Nix 1994 on Brigalow; Meinig 1962 and Williams 1974 are the historical geographers who have worked on South Australia.
- ³⁹ On the role of indigenous peoples as agents of landscape change, see Pawson and Cant 1992; Mobbs, in press, highlights the role of the presumed extent of vegetation types in 1750 in production of Regional Forest Agreements.
- ⁴⁰ Parry 1978; Lamb 1982.
- ⁴¹ Baillie 1999, 46.
- ⁴² Slack 1999, 4.

THE CHALLENGES OF INTERDISCIPLINARITY

- ⁴³ Wheen 2002 on legal frameworks; Uekoetter 1998 on the 'organisational approach'; Robin 1998 on the Little Desert dispute.
- ⁴⁴ Hewitt 1983; on droughts see Meinig 1962; on floods, Pawson 2000; and on earthquakes, Grapes 2000.
- ⁴⁵ See Dann 2002 for 'the contemporary political economy of colonisation/industrialisation/modernisation'; McNeill 2000 explores human induced patterns of environmental change; Van Sittert 2002.
- ⁴⁶ Young 2000 on Lines 1992.
- ⁴⁷ Richardson 1991.
- ⁴⁸ Gibbons et.al. 1994; Sommerville and Rapport 2000.

REFERENCES

- Baillie, M.G.L. 1999. 'Putting Abrupt Environmental Change Back Into Human History'. In *Environments and Historical Change. The Linacre Lectures 1998*, ed. P. Slack. Oxford: Oxford University Press, 46–75.
- Becker, E., Jahn, T. and Stiess, I. 1999. 'Exploring Uncommon Ground: Sustainability and the Social Sciences'. In *Sustainability and the Social Sciences. A Cross-Disciplinary Approach to Integrating Environmental Considerations into Theoretical Reorientation*, eds E. Becker and T. Jahn. London: Zed Books, 1–22.
- Belich, J. 1996. *Making Peoples. A History of the New Zealanders. From Polynesian Settlement to the End of the Nineteenth Century*. Auckland: Penguin Books.
- Blaut, J. 1999. 'Environmentalism and Eurocentrism'. *Geographical Review* 89 (3): 391–408.
- Boyden, S. 1987. *Western Civilization in Biological Perspective: Patterns in Biohistory*. Oxford: Clarendon Press.
- Boyden, S., Millar, S., Newcombe, K. and O'Neill, B. 1981. *The Ecology of a City and Its People: The Case of Hong Kong*. Canberra: Australian National University Press.
- Boyden, S., Dovers, S. and Shirlow, M. 1990. *Our Biosphere Under Threat: Ecological Realities and Australia's Opportunities*. Melbourne: Oxford University Press.
- Carruthers, J. 2002. 'Environmental History in Southern Africa: An Overview'. In *South Africa's Environmental History: Cases and Comparisons*, eds S. Dovers, R. Edgecombe and B. Guests. Athens: Ohio University Press and Cape Town: David Phillip Publisher, 3–15.
- Cherrett, J.M. 1988. 'Ecological Concepts: A Survey of the Views of Members of the British Ecological Society'. *Biologist* 35: 64–6.
- Cioc, M., Linner, B.-Q. and Osborn, M. 2000. 'Environmental History Writing in Northern Europe'. *Environmental History* 5 (3): 396–406.
- Cookson, J. and Dunstall, G. eds. 2000. *Southern Capital: Christchurch. Towards A City Biography 1850–2000*. Christchurch: Canterbury University Press.
- Coombs, H.C., Brandel, M.M. and Snowden, W.E. 1983. *A Certain Heritage: Programs for and by Aboriginal Families in Australia*. Canberra: Centre for Resource and Environmental Studies, Australian National University.
- Cronon, W. 1999. 'Foreword'. In H. Guthrie-Smith, *Tutira. The Story of a New Zealand Sheep Station*, new edition. Auckland: Random House and Seattle: University of Washington Press, xi–xv.

- Crosby, A. 1986. *Ecological Imperialism. The Biological Expansion of Europe 900–1900*. Cambridge: Cambridge University Press.
- Dann, C. 2002. 'Losing Ground? Environmental Problems and Prospects at the Beginning of the Twenty-first Century'. In *Environmental Histories of New Zealand*, eds E. Pawson and T. Brooking. Melbourne: Oxford University Press, 275–87.
- Dargavel, J. 1995. *Fashioning Australia's Forests*. Melbourne: Oxford University Press.
- Davison, G. 2001. 'National Museums in a Global Age: Observations Abroad and Reflections at Home'. In *Negotiating Histories. National Museums Conference Proceedings*, eds D. McIntyre and K. Wehner. Canberra: National Museum of Australia, 12–28.
- Diamond, J. 1997. *Guns, Germs and Steel. The Fates of Human Societies*. New York: W.W.Norton.
- Dovers, S. ed. 1994. *Australian Environmental History: Essays and Cases*. Melbourne: Oxford University Press.
- Dovers, S. ed. 2000. *Environmental History and Policy: Still Settling Australia*. Melbourne: Oxford University Press.
- Dovers, S. 2001. 'Still Settling and Muddling Through: Policy, History and the Australian Environment'. In *Negotiating Histories. National Museums Conference Proceedings*, eds D. McIntyre and K. Wehner. Canberra: National Museum of Australia, 193–207.
- Dovers, S. 2002. 'Commonalities and Contrasts, Pasts and Presents: An Australian View'. In *South Africa's Environmental History: Cases and Comparisons*, eds S. Dovers, R. Edgecombe and B. Guest. Athens: Ohio University Press and Cape Town: David Philip Publisher, 229–241.
- Dovers, S., Edgecombe, R., and Guest, B., eds 2002. *South Africa's Environmental History: Cases and Comparisons*. Athens: Ohio University Press and Cape Town: David Philip Publisher.
- Dovers, S., Norton, T. and Handmer, J. 1996. 'Uncertainty, Ecology, Sustainability and Policy'. *Biodiversity and Conservation* 4: 1143–1167.
- Flannery, T. 1994. *The Future Eaters. An Ecological History of the Australasian Lands and People*. Sydney: Reed Books.
- Gibbons, M., Limoges, L., Nowotny, H., Schwartzman, S., Scott, P. and Trow, M. 1994. *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Society*. London: Sage.
- Grapes, R., 2000. *Magnitude Eight Plus. New Zealand's Biggest Earthquake*. Wellington: Victoria University Press.
- Griffiths, T. 1997. In: *Annual Report, Research School of Social Sciences*. Canberra: Australian National University.
- Griffiths, T. and Robin, L. eds 1996. *Ecology and Empire. Environmental History of Settler Societies*. Edinburgh: Keele University Press.
- Handmer, J., Norton, T. and Dovers, S. eds 2001. *Ecology, Uncertainty and Policy: Managing Ecosystems for Sustainability*. Harlow: Prentice-Hall.
- Harris, R.C. ed. 1987. *Historical Atlas of Canada. Volume 1: From the Beginning to 1800*. Toronto: University of Toronto Press.
- Hewitt, K. ed. 1983. *Interpretations of Calamity from the Viewpoint of Human Ecology*. Boston: Allen & Unwin.

THE CHALLENGES OF INTERDISCIPLINARITY

- Hicks, G. 2001. 'Natural History Museums in the Environmental Age'. In *Negotiating Histories. National Museums Conference Proceedings*, eds D. McIntyre and K. Wehner. Canberra: National Museum of Australia, 183–92.
- Holland, A. 1995. 'The Use and Abuse of Ecological Concepts in Environmental Ethics'. *Biodiversity and Conservation* 4: 812–26.
- Lamb, H.H. 1982. *Climate, History, and the Modern World*. London: Methuen.
- Landes, D. 1998. *The Wealth and Poverty of Nations*. Cambridge, MA: Harvard University Press.
- Lane, R. 2000. 'Environmental History in Museums: Objects, Subjects, and Narratives'. In *Environmental History and Policy: Still Settling Australia*, ed. S. Dovers. Melbourne: Oxford University Press, 192–209.
- Lines, W.J. 1992. *Taming the Great South Land*. St. Leonards: Allen and Unwin.
- Lowenthal, D. 1996. *Possessed by the Past. The Heritage Crusade and the Spoils of History*. New York: The Free Press.
- Mabin, M. 2001. Review of P. Slack (ed.), *Environments and Historical Change: The Linacre Lectures 1998*. Oxford: Oxford University Press, 1999. *New Zealand Geographer* 57 (2): 53.
- MacKenzie, J. 1997. 'Empire and the Ecological Apocalypse: the Historiography of the Imperial Environment'. In *Ecology and Empire. Environmental History of Settler Societies*, eds T. Griffiths and L. Robin. Edinburgh: Keele University Press, 215–28.
- McIntyre, D. and Wehner, K. eds 2001. *National Museums, Negotiating Histories: Conference Proceedings*. Canberra: National Museums of Australia.
- McKinnon, M. ed. 1997. *The New Zealand Historical Atlas*. Auckland: David Bateman, with Wellington: Department of Internal Affairs.
- McNeill, J. 2000. *Something New Under the Sun. An Environmental History of the Twentieth Century*. New York: W.W.Norton.
- Meinig, D. 1962. *On the Margins of the Good Earth. The South Australian Wheat Frontier 1869–1884*. Chicago: Rand McNally.
- Mobbs, C. (in press). 'National Forest Policy and Regional Forest Agreements'. In *Managing Australia's Environment*, eds S. Dovers and S. Wild River. Sydney: Federation Press.
- Mobbs, C., and Crabb, P. 2002. *Building Strengths in Interdisciplinary Research on Resource and Environmental Issues: An Appraisal of the CRES Experience 1973–2000*, Working Paper. Canberra: Centre for Resource and Environmental Studies, Australian National University.
- Nix, H. 1994. 'The Brigalow'. In *Australian Environmental History: Essays and Cases*, ed. S. Dovers. Melbourne: Oxford University Press, 198–234.
- Parry, M.L. 1978. *Climatic Change, Agriculture and Settlement*. Folkestone: Dawson.
- Pawson, E. 1997. 'The New Zealand Historical Atlas'. *Journal of Historical Geography* 23 (4): 496–99.
- Pawson, E. 2000. 'Confronting Nature'. In *Southern Capital: Christchurch. Towards A City Biography 1850–2000*, eds J. Cookson and G. Dunstall. Christchurch: Canterbury University Press, 60–84.
- Pawson, E. and Brooking, T. eds 2002. *Environmental Histories of New Zealand*. Melbourne: Oxford University Press.
- Pawson, E. and Cant, G. 1992. 'Land Rights in Historical and Contemporary Context'. *Applied Geography* 12 (2): 95–108.

- Peters, R.H. 1991. *A Critique for Ecology*. Cambridge: Cambridge University Press.
- Poulot, D. 1994. 'Identity as Self-discovery: the Ecomuseum in France'. In *Museum Culture. Histories, Discourses, Spectacles*, eds D.J. Sherman and I. Rogoff. Minneapolis: University of Minnesota Press, 66–84.
- Powell, J.M. 1996. 'Historical Geography and Environmental History: An Australian Interface'. *Journal of Historical Geography* 22 (3): 253–73.
- Redclift, M. 1999. 'Dance with Wolves? Sustainability and the Social Sciences'. In *Sustainability and the Social Sciences. A Cross-Disciplinary Approach to Integrating Environmental Considerations into Theoretical Reorientation*, eds E. Becker and T. Jahn. London: Zed Books, 267–73.
- Richardson, G.P. 1991. *Feedback Thought in Social Science and Systems Theory*. Philadelphia: University of Pennsylvania Press.
- Roberts, J. 2000. 'Oral History, Ecological Knowledge and River Management'. In *Environmental History and Policy: Still Settling Australia*, ed. S. Dovers. Melbourne: Oxford University Press, 118–44.
- Robin, L. 1998. *Defending the Little Desert: The Rise of Ecological Consciousness in Australia*. Melbourne: Melbourne University Press.
- Robin, L. 2001. 'Birds and Environmental Management in Australia, 1901–2001'. *Australian Journal of Environmental Management* 8: 105–113.
- Ross, H., Young, E. and Liddle, L. 1994. 'Mabo: An Inspiration for Australian Land Management'. *Australian Journal of Environmental Management* 1: 24–42.
- Schoenberger, E. 2001. 'Interdisciplinarity and Social Power'. *Progress in Human Geography* 25 (3): 365–82.
- Schrader-Frechette, K. 1995. 'Hard Ecology, Soft Ecology, and Ecosystem Integrity'. In *Perspectives on Ecosystem Integrity*, eds L. Westra and J. Lemons. Dordrecht: Kluwer, 125–145.
- Simmons, I.G. 2001. *An Environmental History of Great Britain. From 10,000 Years Ago to the Present*. Edinburgh: Edinburgh University Press.
- Slack, P. 1999. 'Introduction'. In *Environments and Historical Change. The Linacre Lectures 1998*, ed. P. Slack. Oxford: Oxford University Press, 1–9.
- Sommerville, M.A. and Rapport, D.J. eds 2000. *Transdisciplinarity: ReCreating Integrated Knowledge*. Oxford: Irwin McGraw Hill.
- Te Papa, n.d., *Te Papa Explorer*. Wellington.
- Uekoetter, F. 1998. 'Confronting the Pitfalls of Current Environmental History: An Argument for an Organisational Approach'. *Environment and History* 4: 31–52.
- United Nations, 1992. *Agenda 21: The UN Programme of Action from Rio*. New York: United Nations.
- Van Sittert, L. 2002. '"Our Irrepressible Fellow Colonist": The Biological Invasion of Prickly Pear (*Opuntia ficus-indica*) in the Eastern Cape, c.1890–c.1910'. In *South Africa's Environmental History: Cases and Comparisons*, eds S. Dovers, R. Edgecombe and W. Guest. Athens: Ohio University Press and Cape Town: David Philip Publisher, 139–159.
- Vincent, J. 1995. *An Intelligent Person's Guide to History*. London: Duckworth.
- Wasson, R. and Sidorchuk, A. 2000. 'History for Soil Conservation and Catchment Management' in *Environmental History and Policy: Still Settling Australia*, ed. S. Dovers. Melbourne: Oxford University Press, 97–117.

THE CHALLENGES OF INTERDISCIPLINARITY

- Wheen, N. 2002. 'A History of New Zealand Environmental Law'. In *Environmental Histories of New Zealand*, eds E. Pawson and T. Brooking. Melbourne: Oxford University Press, 261–74.
- Williams, M. 1974. *The Making of the South Australian Landscape. A Study in the Historical Geography of Australia*. London: Academic Press.
- Worster, D. 1988. 'Doing Environmental History'. In *The Ends of the Earth. Perspectives on Modern Environmental History*, ed. D. Worster. Cambridge: Cambridge University Press, 289–307.
- / Young, A. 2000. *Environmental Change in Australia since 1788*, second edition. Oxford University Press, Melbourne.