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Environmental History in Australasia

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ABSTRACT

Australia and New Zealand share a southern, settler society history and cultural solidarity as British colonies and dominions. Their early unity as 'Australasia' is where this paper begins, focusing on the strong role of science in shaping environmental history and policy in both countries. Agricultural science was crucial to environmental policy and has given a distinctive quality to the practice of environmental history in Australasia. But the long-term influences of very different physical environments and Indigenous inheritances, ultimately define Australian and New Zealand environmental historiography as more contrastive than similar, and promise to drive these countries in divergent directions.

KEYWORDS

Australasia, ecological invasion, agricultural science, settler society, forest history, Indigenous history

Australia and New Zealand share a southern, settler society history and an affectionate and competitive cultural solidarity. Their social and political affinity as British colonies and dominions, and the early unity they felt as regions of 'Australasia', justifies a joint assessment of their environmental history and

historiography. This essay begins with an exploration of their common experience as lands and nations and focuses on the strong role of science in shaping environmental history and policy in both countries. We argue that this privileging of science (especially agricultural science) in environmental policy – itself a legacy of British imperialism – has given a distinctive quality to the practice of environmental history in Australasia. But the common, imported settler experience of these two countries has increasingly found itself exposed to the long-term influences of very different physical environments and indigenous inheritances. We will outline the character of these local cultural and natural determinants because they ultimately define Australian and New Zealand environmental historiography as more contrastive than similar, and promise to drive their countries in divergent directions.

One of the virtues of environmental history is that it has often demanded categories of analysis other than the nation, so we will begin this article by comparing the histories of Australia and New Zealand and by scrutinising the concept of ‘Australasia’.

A SHORT HISTORY OF ‘AUSTRALASIA’

At times the Tasman Sea seems the widest body of water in the world. In the long, sustained history of human migration around the globe, the Tasman emerges as a major barrier. Over tens of thousands of years, humans made their way through South-east Asia to Australia and then later swept out across the Pacific in a great clockwise arc. That circle was not closed until the modern era of European settlement and intensive trans-Tasman exchange. Consequently, the brief to speak for both sides of the ditch (as the Tasman is affectionately called Down Under) is not as easy as it may appear from ‘up over’. ‘Australasia’ does not have a strong sense of itself as a coherent region. Apart from character-building competition between Australia and New Zealand in cricket and wool marketing, there is a deeper, fiercer nationalist separatism in the identities of what Denis McLean dubs ‘The Prickly Pair’.¹ Australia and New Zealand, writes historian Philippa Mein Smith, ‘often look like neighbours squabbling over the back fence’.² The two countries are very unevenly matched – Australia’s land mass (comparable in size with the mainland United States) is some thirty times larger than New Zealand’s (though New Zealand is bigger than the United Kingdom). Australia’s 20 million population is five times New Zealand’s. New Zealand is inevitably more conscious of Australia than the reverse. Each has traditionally looked to Britain for trade markets and regal authority and ceremony, but with their backs to the ditch. Even in the modern era of global travel, the Tasman is still broad enough to ensure that Australians fly to Britain over Asia (and formerly voyaged the Suez Canal) while New Zealanders more often fly over the United States (and their ships sailed the Panama).

The British colonised Australia from 1788 and New Zealand officially from 1840, but both countries were brought decisively into the realm of European trade and strategy in the late eighteenth century by the first voyage of Captain James Cook in the *Endeavour* (1768–71). Both nations own this particular imperial origin story, although Australians rarely acknowledge that it was New Zealand rather than New Holland that captivated Cook. The two lands came to share an oceanic economy, and it was this Pacific orientation, the assertion of British science and sovereignty, and a relatively similar settler heritage that united them. Australians have mostly forgotten this early economic and political dominance of the sea. Their ‘island continent’ was invaded by a naval power, its first colonial culture of authority was maritime, whaling and sealing were the colony’s earliest productive industries, and it took settlers a quarter of a century to cross the first land barrier, the Blue Mountains that hemmed in Sydney. Colonial settlements hugged the coast and were connected to one another by the ocean rather than the land, like islands in an archipelago. Britain established these ‘limpet ports’ more to control the sea and its trade routes than the land itself; they were founded as outposts of international maritime strategy rather than as beachheads from which to penetrate the continental interior.³

In that first century of European settlement, the eastern colonies of Australia often looked east across the Tasman. In a recent essay in *Australian Historical Studies*, Donald Denoon reminds us that ‘Australasia’ was a significant political and cultural entity until the end of the nineteenth century, but was dismembered at the time of the federation of the Australian colonies in 1901. The new Commonwealth retreated to its definition as ‘a continent for a nation’, and Australia turned its back on the sea and found its national imaginings in its own interior. In Denoon’s memorable phrase, ‘Australasia became increasingly British, arid and historical, while Oceania has become increasingly wet, ethnographic and French.’ James Belich also reminds us of the very real imagined community that was once Australasia. He describes New Zealand’s non-federation with the Australian colonies – its departure from ‘its old, Tasman world’ – as, ‘by default, a declaration of independence, or at least a transfer of dependence’. ‘It also meant’, he continues, ‘that, on 1 January 1901, New Zealand suddenly became small.’ ‘New Zealand not only failed to join something new in 1901;’ writes Belich, ‘it abandoned something old – the Tasman world.’⁴

The twentieth century has seen a strengthening of differences between these two southern nations, in spite of the narrower political convergence of the ANZACs during and after World War One. ‘Australasia’ died as a term, at least partly because in New Zealand it invoked the very incorporation the country had rejected. Western Australia *did* join the Federation, belatedly, and its population increased fourfold in the 1890s due to gold rushes. The early parity and intimacy of the Tasman colonies was mostly forgotten throughout the twentieth century. Australia turned its back not only on the Pacific, but on its nineteenth-century multiculturalism. The two countries were and are driven in

different directions by contrasting Indigenous inheritances, as we discuss below. The Māori exemplar, which was at times strong in Australian Indigenous affairs in the nineteenth century, was increasingly replaced by American parallels in the twentieth century.⁵ The Māori political presence has always been stronger and more institutional than the Aboriginal. Linguistically, it is making an escalating impact on New Zealand culture. The language of English develops its local varieties wilfully and everywhere, but the scale of recent linguistic change in New Zealand 'seems to be going well beyond the Australian experience', in the opinion of George Seddon.⁶ Politically, the two countries have charted different courses in their relations with Britain and America, a divergence that has widened considerably in the last few years.⁷

As the British and Commonwealth comparative frameworks for Australian history weakened, Australian historiography became, in the words of Ann Curthoys, 'more national, critical, autonomous, and isolated'.⁸ But, since the 1980s other comparative frameworks have emerged that have revived the concept of Australasia. Donald Denoon and Phillipa Mein-Smith's recent history of *Australia, New Zealand and the Pacific* is a courageous and stimulating synthesis.⁹ Curthoys welcomes 'an international drift away from national and towards more transnational forms of history'.¹⁰ Transnational histories seek interactions between nations and not just comparisons between them, and environmental histories have contributed vigorously to this mapping of movements and influences, often across and at the edges of empires. Scholars such as J.M. Powell, Stephen Pyne, Tom Dunlap, Richard Grove and Ian Tyrrell have given new life to the historiography of Australasia with settler society parallels and global narratives of species, cultures and ideas.¹¹ Environmental historians also revive ancient physical and biological connections between lands and thereby help to bring Australasia back into intellectual play. Tim Flannery in *The Future Eaters: An Ecological History of the Australasian Lands and People* (1994), studied a 'family' of 'new lands': New Holland, New Zealand, New Guinea and New Caledonia.¹² The Royal Australasian Ornithologists' Union (RAOU) recently defined the region for its journal, *Emu*, as the Southern Hemisphere 'from the Indian Ocean to the mid-Pacific, including Antarctica, Indonesia, New Guinea, Polynesia, New Zealand and Australia'. This was more or less consistent with the original vision of the first *Emu* team in 1901, which defined Australasia as the lands east of Wallace's Line.¹³

Comparative environmental historians gazing both ways across the Tasman must relish the long-term experiment in the relations of history and ecology that their two countries furnish: here they are, side by side at the bottom of the world, with strikingly different geologies and ecologies, contrasting Indigenous inheritances, and modern, compressed settler histories which, although distinct, have overwhelming similarities. What happens to humans when they try to possess such different lands? How do social time and deep time infiltrate one another in these two countries? How do their histories interact with their ecolo-

gies? These are questions that are increasingly animating any consideration of environmental history in 'Australasia'.

SOUTHERN ECOLOGICAL EXPERIMENTS

As Eric Pawson and Tom Brooking explore in their *Environmental Histories of New Zealand*, their country has long attracted international historical and geographical attention as a kind of ecological and social laboratory. In 1941 the New Zealand geographer, Kenneth Cumberland, observed that 'What in Europe took 20 centuries and in North America four has been accomplished in New Zealand within a single century'.¹⁴ The Canadian historical geographer, Andrew Hill Clark, wrote about 'revolutionary change' in *The Invasion of New Zealand by People, Plants and Animals*. United States historian Alfred Crosby devoted the longest chapter in his *Ecological Imperialism* to a case study of New Zealand.¹⁵ New Zealand historian, James Belich, observed in *Paradise Reforged* that it is the speed, not the length, of New Zealand history that makes it remarkable – and hence traumatic. These southern settler societies share a place in European imperial history, as new territories incorporated into the capitalist world economy 'using the panoply of people, animals, plants, and, less intentionally, pathogens'.¹⁶

Australian and New Zealand histories are both like giant experiments in ecological crisis and management, sometimes a horrifying concentration of environmental damage and cultural loss, and sometimes a heartening parable of hope and learning. Such roller-coasters of environmental history make us more sensitive than the rest of the world to many ecological matters. In the Tasman worlds, we can never blithely assume the dominance of culture over nature, nor can we believe in the infinite resilience of the land. We are committed by history and circumstance to an intellectually bracing environmental enquiry.

The twin stories of acclimatisation and pests have dominated Australasian environmental history and have also generated attention to the history of extinctions. Since the European settlement of Australia, for example, eleven terrestrial mammals have become extinct, five have disappeared from the mainland and survive on offshore islands, and fifteen more have declined dramatically. Steve Morton has described the loss as 'catastrophic' and his role as a CSIRO ecologist working in Australia as akin to that of an ambulance driver arriving at the scene of a bad accident.¹⁷ The rate of mammal extinctions in the Australian rangelands is the highest in the world. In New Zealand in the same two centuries, there has been an 85% decline in wetlands. Europeans regarded as useless and primeval the very landscapes – the coastal lowland forests dominated by that great tree, the kahikatea – that Māori considered among their most productive.¹⁸ Australia and New Zealand share the doubtful reputation as the greatest users of 1080 poison in the world.¹⁹ British settlers wanted to transform these lands, tame them,

make them like 'home'. Historian W. K. Hancock observed that the word 'improvement' was an early immigrant to colonial Australia. In its usage, he wrote, 'we hear intonations of nostalgia: improvement of "the new country", it seems, means doing everything that a man can to make it look like "the old country"'.²⁰ 'Improvement' was nostalgic; it was dismissive of indigenous environmental systems; it was aggressive as well as progressive. This nostalgia also had social and moral dimensions: 'improvement' very often meant the settlement of an idealised yeomanry, of self-sufficient family freeholders. Colonists wanted to see small fields carefully tilled. And so 'improvement' especially meant clearing. One historian of New Zealand, writing in 1909, described the assault on the forests as a "pitiful war".²¹

Two landmark books, one from each side of the Tasman, illustrate the fascination that Australasian environmental history has with the moral and scientific dimensions of the ecology of invasion. *Tutira: The Story of a New Zealand Sheep Station* by Herbert Guthrie-Smith was first published in 1921, and most recently republished in the United States in 1999. It has introduced many distinguished outsiders (such as the American historians William Cronon and Richard White) to New Zealand and many New Zealanders to environmental history. It is also an enduring piece of nature writing that makes a southern geographic edge a moral and human centre.²² The book offers a record of environmental change 'noted on one sheep-station in one province'. It is self-consciously and bloodily-mindedly 'a microscopic canvas'. Every creature, every living thing animated by sap or blood or movement, is a character in the story and an agent in history. Animals are called 'pioneers', swine are surveyors, alien plants are 'self-invited strangers', sheep are the chief remodelers of the run, and weeds are wayfarers: Guthrie-Smith lovingly records about forty plants that determinedly made their way to his property, Tutira, by pedestrianism. These plants, he writes, have not been 'too proud to have accepted from time to time a short lift on a roadman's shovel, the warm shelter of a stomach, the grip of a mane or pastern, a brief trundle on the wheel of a dray or buggy, the hospitality of a friendly hoof or woolly shank, the assistance downhill of a brimming water-table'. His rampant and unapologetic anthropomorphism is balanced by his mischievous zoological eye on humanity. Guthrie-Smith explains that: 'The early failure of *homo sapiens* on Tutira, his ultimate acclimatisation, has been noted, as far as may be, in terms of the weasel or rabbit; he has been treated without fear or favour as a beast of the field.'²³

And so *Tutira* is a story of epic dimensions. The people appear alongside the other creatures, sometimes consciously in league with them, sometimes oblivious to the drama beneath their feet or in the grass and trees around them, the humans caught unawares in natural cycles and revolutions in which they are merely bit-players. It is this human struggle for environmental consciousness, for some understanding of the ecological context and consequences of their actions, that supplies the moral dimensions of the book. The author tells us

what he sees and what he has done, but he also tells us what, for a while, he did not know he was doing. No wonder that *Tutira* has been repeatedly seized by historians of settler societies as a parable: it exemplifies one of the great themes of imperial history. Guthrie-Smith dramatises the agency of what Crosby called 'the portmanteau biota'; he shows us the stealth and complicity of plants and animals, and their use of humans.

Sixty years after the publication of *Tutira*, an Australian farmer and writer, Eric Rolls, also wrote about the land he had worked and lived upon. It was during the late 1970s that Eric Rolls wrestled with words and weeds in order to produce his literary masterpiece, *A Million Wild Acres*, a book that deserves to be put on the shelf beside *Tutira*. *A Million Wild Acres* is the story of the land Rolls farmed in northern New South Wales, the Pilliga Scrub, and of the way – over the 200 years since European settlement – a dense, wild forest grew where once, in Aboriginal times, there had been open wooded country that attracted the pastoralist's eye. Like Guthrie-Smith, Rolls is both pastoralist and ecologist, producer and conservationist, improver and philosopher – and historian and farmer. '[O]ne nearly gets torn in halves sometimes trying to lead two lives', Eric Rolls exclaimed. But he also knew that 'Without the farm there would have been no book, even if it delayed publication.'²⁴ Guthrie-Smith would have said the same.

Eric Rolls is fascinated by the meaning of the word 'wild'. It is often used to describe nature that is seen to be untouched and pristine. But for Rolls, 'wild' nature is feral, mongrel, hybrid nature, nature stirred up, nature enlivened by human presence and intervention; it is dynamic, historical nature. So the new forest that he grows in the pages of his book – the forest that he recognises as a creation of European settlement – is 'concentrated' and volatile. Like Guthrie-Smith, Rolls is fascinated by the invaders, the cattle, rabbits, foxes, their adaptability and sheer vigour even as they wreak damage. In this way, Rolls's book challenges the traditional contrasts of European settler thinking about nature. It revolutionises those assumptions that disturbed nature is somehow always lesser nature. He wrote that: 'Because of the intensity of our modern forests they are more precious than remnants'. 'They do not display the past as it was, they have concentrated it'.²⁵ Such historical views can disturb aspects of the green movement. At the same time as recognising the fragility and integrity of native ecosystems Rolls wants to acknowledge the creative ecology of invasion. This relish for the fecundity of life and an irrepressible optimism also underpin Rolls's joint advocacy of the causes of nature conservation, on the one hand, and human immigration to Australia on the other.²⁶ He is determined to see the creativity of encounter, of humans as much as any species. History and ecology are irretrievably entwined in his politics.

Extermination of 'pests' and eradication of 'weeds' have been entrenched in the combative environmental discourses of both countries.²⁷ The American geographer, David Lowenthal, has questioned these doctrines of 'ecological

purity and environmental chauvinism', and sees them as an over-reaction against colonial Eurocentric preferences. 'But indigenous purity is neither possible nor desirable', he argues: 'Nature and culture alike generally benefit from creative intermingling.'²⁸ In a recent essay, visiting North American Thomas Isern has raised similar issues for New Zealand. He has reflected practically and philosophically on what the history of New Zealand's introduced pests and weeds tells us about future environmental management. Isern overturns the common expectation that land, if abandoned, will heal itself, and he brands this view as 'a passive-green approach to environmentalism'.²⁹ He warns against a 'bellicose, national-security rhetoric that pits virtuous natives in moral contest against an evil empire of alien invaders'. Isern argues instead for traditions of 'moderate, responsible human engagement with nature'.³⁰

One of the reasons why *Tutira* appears so nationally emblematic is that it was written at the end of those transformative decades in New Zealand environmental history – 1880 to 1920 – when 'the farm landscape was largely created'. By the 1920s and '30s, writes Michael Roche, the 'war against nature' initiated by the nineteenth-century improvers and clearers simply continued, only now it was a fight, literally, 'to hold the land', to possess it, but also to stop it from blowing away.³¹ The great New Zealand geographer, Kenneth Cumberland, found this watershed in his own memories – looking back from the late 1970s, he remembered a New Zealand of the late 1930s that was riding high on international economic indicators, yet which (to his newcomer's eye) proliferated with environmental problems. He could see that 'the fillip that refrigeration and a continually expanding British market had brought was running out'. During a tour in 1941 he met farmers who admitted 'serious losses of soil off the slopes' of their runs. One talked 'of daylight being shut out for hours on end by dust storms', of dust invading the homestead, of wind stripping the surfaces off the high terraces. He photographed a half-buried fence that had two others vertically below it, one on top of the other. He visited Ruatoria in the North Island, formerly Manutahi, a Māori town. 'Ruatoria has a dairy factory', he recorded in his diary in 1941, 'but production is sharply down. Some blame the new family benefits; others the Māori character. None think of soil erosion.'³²

In Australia the 1930s were a time of reckoning, too. There were great changes in attitudes to Aboriginal people: entrenched racism was challenged by Aboriginal activists, white humanitarians and anthropologists, Aboriginal art and material culture gained in value; and Aborigines, it was realised almost with a shock, had 'survived', or at least could be 'preserved' if proper action were taken by white Australians. The long reality of Aboriginal antiquity began to dawn on white scientists. And, after a century of white settlement, the very land itself seemed to be biting back. Dust storms engulfed eastern Australia, and Australian soil famously bridged the Tasman, painting New Zealand's snowfields pink. Thus the Gondwanan earth of Australia and New Zealand met again in the stratosphere when the two lands shared the global erosion crisis of the 'dirty

thirties'. Two dramatic events each side of the Tasman encapsulated the crisis. In 1938 disastrous floods and soil erosion engulfed the Esk Valley on the North Island's east coast, and in 1939 the Black Friday fires bared soil and killed trees and people across 1.4 million hectares of south-eastern Australia. The European settlers of both countries wondered what their own imported civilisation had unwittingly unleashed.

This was the context into which several editions of *Tutira* were released, and it is the series of prefaces written by Guthrie-Smith – in 1921, 1926 and 1940 – that chart the evolving sensibilities of the author. *Tutira* superbly exemplifies the opening phase of the grasslands revolution, the transformation of the island 'from mostly rainforest to mostly grass', a revolution that entered a new, chemical phase with increasing scientific management.³³ As a pioneer pastoralist, Guthrie-Smith had happily imagined the building of the wool-shed with its backdrop 'smoothed in green grass, lawned like Arcadia'.³⁴ By 1940, sobered by the passing of years and the poverty of grass, he offered in his new preface to *Tutira* 'the melancholy musings that perplex a sheep-farmer in concern for his soul'. The question he tortured himself with was: 'Have I then for sixty years desecrated God's earth and dubbed it improvement?'³⁵ In a later book he confessed that although he sometimes plumed himself as a superpatriot because he had made a 'thousand blades of grass' grow where less than none had been before, he mostly felt that the same achievement deemed him 'unfit to live'.³⁶ Guthrie-Smith's tone is apocalyptic – to use John MacKenzie's descriptive term for much environmental history.³⁷ *Tutira* makes a resonant parable of ecological imperialism because of its author's emotional ambivalence. He writes, for instance, that 'In the landing of Cook ... were contained the seeds of death' – but he also anguishes over personal responsibility.³⁸ In his affectionate attention to his tract of country and his respect for Māori lore, Guthrie-Smith wants to understand the land even as he transforms it. This is the emotional angst of the pioneer and the irony of settlement. 'A settler', Guthrie-Smith tells us, 'gives his best love not to his parents, not to his wife, not to his little ones, but to his land.' And this love changes him. He reflects that in youth 'a man may possess land, in later life the land may possess him'.³⁹ His relationship to his farm was not just economic and literary: he acknowledged *Tutira*'s 'full incorporation of him, body and soul'. Yet these words were written by a man who still called Britain 'home'.

COLONIAL SCIENCE AND STRANGE ENVIRONMENTS

The histories of science and environment are entwined closely in Australasia. In 1788, the year Arthur Phillip hoisted the British flag in Sydney Cove, the London scientific elite launched the Linnean society. The Australasian colonies were the first major 'post-Linnean' settlements, and they were deemed 'curious'

places.⁴⁰ International natural history looked with interest on the strange lands in the Australasian colonies. Much biological and geological material was sent back to London and other great European centres to be classified and accommodated into pre-existing European classification systems. During the nineteenth century, scientific centres and societies were established in the colonies, beginning precariously with Sydney's first botanic garden in 1816, followed by a Philosophical Society (1821) and a museum (1827). 'Scientific authority over Australian and New Zealand materials', as Rod Home has commented however, 'remained firmly based in Europe'.⁴¹ Eurocentrism in understanding nature has continued well beyond the colonial era, as George Seddon has argued persuasively.⁴²

Gold rush fever broke out in eastern Australia in 1851, spreading to New Zealand and finally to Western Australia in the 1890s. The news of gold brought a massive influx of population, including educated arrivals who actively promoted local science for colonial prosperity, including botanic gardens, natural history museums and astronomical observatories. Mining was seen as a key to development in both Australia and New Zealand. Alfred Selwyn (from the Geological Survey of Great Britain) undertook the Geological Survey of Victoria from 1852–1868, and trained many of the government geologists for other colonies. In New Zealand, Julius Haast was geologist in Canterbury and James Hector in Otago, before Hector transferred to Wellington to direct the Geological Survey of New Zealand in 1865.⁴³ By the 1860s, scientific societies were flourishing in all colonial centres promoting the application of science to local environmental issues, some of them arising from mining operations. The protection of Melbourne's water catchments was debated at length by the experts of the Philosophical (later Royal) Society of Victoria in the 1850s and 1860s. Colonial botanical gardens were experimental places for acclimatisation in all settler societies, and Australasian ones especially.⁴⁴ These early scientists were often called on to have a great breadth of knowledge, which was ideal for considering environments from many perspectives. Hector, to take an extreme example, was not only director of the Geological Survey in Wellington, but also the Colonial Museum and Colonial Laboratory. He later took responsibility for the Meteorological Department, the Colonial Observatory, the Wellington Botanic Garden and the Patent Office Library!⁴⁵ Such appointments set an early pattern on both sides of the Tasman for close relations between science and government, something that continued for most of the twentieth century.

The 1880s saw an expansion in colonial universities and government scientific institutions that attracted more professional scientists. The Australasian Association for the Advancement of Science (AAAS) was established in 1888 as a major intercolonial scientific initiative, modelled on the British Association for the Advancement of Science. AAAS (later titled ANZAAS from 1930 until its abolition in 1997) provided an annual opportunity for senior members of the scientific community in Australia and New Zealand to meet and discuss issues of mutual interest. As well as acting as a showcase for new scientific ideas, its

meetings were actively concerned with the place of science in 'new lands', including the protection of the flora, fauna and avifauna of the region. From the start AAAS exercised its position and good media coverage to draw public attention to the poor state of biological knowledge in the region and the rapid depletion of its biological resources, including plants, animals and birds.⁴⁶

SCIENCE FOR SETTLING

While settler-farmers battled with the lands of southern latitudes, their governments struggled to find ways to show support for the yeoman farmer ideals brought from elsewhere, and largely unquestioned as the way to tame and settle these 'strange' places. By the twentieth century, the mission of government science had changed to 'improving' the country, especially the pastures and stock, and solving the emerging environmental problems of settlement. William Farrer was keen to enthuse the new Commonwealth government about supporting the sort of experimental work he had been doing on his own property at Lambrigg for agricultural improvements. In 1902, in a strategic stroke, he named his new 'rust resistant' wheat variety 'Federation' to cement its relevance to the emerging nation.

At the same time in New Zealand, Leonard Cockayne was advocating government-backed experimental plant research stations for New Zealand, using his own experimental garden Tarata, established near Christchurch in 1892, as an exemplar. Although his early activism was as an acclimatiser and horticulturist, Cockayne quickly gained authority as an expert on the native vegetation of New Zealand.⁴⁷ Cockayne's local and international standing made him a strong local voice for both science and the environment in New Zealand.⁴⁸ In his 1908 report on Tongariro National Park, he defined 'scenery' to depend not just on the reservation of volcanic landscapes but on the protection of 'the combinations of plants which form the garment', noting that 'in New Zealand ...the vegetation is unique'.⁴⁹ In the 1920s he was a strong supporter of the new national government science organisation, the Department of Scientific and Industrial Research (DSIR). He also advocated a Native Plant Museum in Wellington.⁵⁰

Australia and New Zealand both established large and prominent government scientific organisations in 1926. Government science was critical to shaping understandings of environments in both places, and the expenditure was explicitly justified on these grounds. A flagship division of Australia's Council for Scientific and Industrial Research (CSIR, since 1949, the Commonwealth Scientific and Industrial Research Organization or CSIRO) was Economic Entomology. The study of insects (pests and friends) emerged as an important new area for government science in the wake of Australia's most politically successful 'applied biology' story, about the biological control of the weed, common prickly pear *Opuntia stricta* var. *stricta*. A stem-boring moth *Cactoblastus cactorum* intro-

duced from Argentina to consume the unwanted prickly pear plants led to the recovery of between 10 and 25 million hectares of brigalow (*Acacia harpophylla*) country in New South Wales and Queensland. The moth ate through something like 10,000 tonnes of prickly pear in the four years between 1926 and 1930.⁵¹ Governments wanted to be part of such stories.

CSIR and New Zealand's Department of Scientific and Industrial Research (DSIR) also both took advantage of what Michael Worboys called the 'defensive imperialism' of interwar Britain, when the Empire was evolving into the Commonwealth. Britain linked Commonwealth economics and trade to developing biological sciences in and for the dominions. Sciences that would build primary industry were actively sponsored through the activities of the Empire Marketing Board.⁵² Within both Australia and New Zealand political leaders were convinced that science could render valuable service in developing their economies, and the 'matching funds' offered by Britain created an opportunity not to be missed.⁵³ CSIR and DSIR both studied some indigenous flora and fauna, but the overwhelming drive for usefulness to agriculture was such that the species chosen were (and to some extent still are) 'pests and weeds' to development rather than indigenous plants in undisturbed habitats. Relevance to economic imperatives was a necessary precondition for government support.

New Zealand's extraordinary 'grasslands revolution' was led by determined science (agrostology) that turned a mountainous, forested land into pasture suitable for wool-growing and dairying. As Peter Holland, Kevin O'Connor and Alexander Wearing argue, grass was at the heart of New Zealand's scientific and technological effort, shaping a new society.⁵⁴ This legacy continued for most of the twentieth century. Tom Brooking, Robin Hodge and Vaughan Wood noted that as late as the 1980s, the political preference for agricultural grasslands was overpowering, despite the fact that 51% grasslands was well above the world average of 37%.⁵⁵ The land's ecological needs were simply overwhelmed by the mutually supportive elements of the ethic of industrial agriculture and the cultural practices of government science for the nation.

Pests and weeds interfered with the grand agricultural project and became central to science on both sides of the Tasman. The topsoil was vulnerable, and being lost dramatically from the denuded semi-arid lands put to pastoral service in Australia. The mid-1930s saw soil erosion crises in Australia and the United States, the famous Dust Bowl of the American Midwest. While Americans called on a distinguished local ecologist, Frederic Clements, from the Carnegie Institution to lead a well-funded investigation into the problem, Australians gave the task to a relatively junior British applied biologist, Francis Ratcliffe, an employee of the Empire Marketing Board. The young animal ecologist had no particular expertise in soils or plants, and only a brief experience of Australia itself, through his CSIR work on fruit bats in Queensland. But soil erosion could not be handled like a 'pest'. It demanded more than just ecology, although the rabbit pest certainly contributed to erosion on both sides of the Tasman. Rat-

cliffe, a good listener and a gifted writer, went beyond science and sociology, and provided Australia with some uncomfortable truths. Not only did he provide advice to government, but wrote his report as a popular biological 'adventure story', *Flying Fox and Drifting Sand*, which was prescribed reading in Australian high schools. In it he declared: 'The fodder reserve of the semi-desert country is nowhere sufficient to stand up indefinitely to the strain that must be placed on it by pastoral settlement'.⁵⁶ The problem was pastoral settlement itself and its mismatch with the local ecology.

Flying Fox and Drifting Sand inspired some important government-backed soil science. Vegetation mapping in key watershed areas, part of the soil surveying methods, raised controversial issues about protecting vulnerable indigenous grasslands.⁵⁷ The issue of rabbits (and government anxiety about them) frustrated Ratcliffe personally, when he became officer-in-charge of the CSIRO Wildlife Section in 1949, and he found he had hardly any resources for work on any animals apart from rabbits, but the nation badly needed a full biological survey.⁵⁸ In the DSIR in New Zealand too, 'work on rabbits was the bread and butter of the Ecology Division in the 1950s'.⁵⁹

So much government science focused on development yet, paradoxically, many champions for the environment were government scientists. Ratcliffe and Cockayne were not alone in exhorting restraint, and both used their considerable writing skills to this end. Cockayne's *The Vegetation of New Zealand* concluded with an impassioned plea for sanctuaries where 'plants, the survivors of that bitter strife with Nature, that commenced millions of years ago can still pursue their destinies if unmolested by their human enemies and the horde of foreign plants and animals he has let loose'.⁶⁰ Scientific leaders continued to claim government funding on the basis of science's role in developing both nations, so calls for environmental restraint were unpopular. Dead rabbits were clear signs of 'progress', value for expenditure by tax-payers on science, but when science suggested giving up pastoral possibilities or valuable land for the sake of plants, whether they be saltbush or beech forest, it appeared to be reaching beyond its brief.⁶¹ Governments welcomed clear scientific definitions of problems and instant solutions. They were less comfortable with scientists who called for social and environmental balances, for longer-term planning and incremental solutions in the interests of non-human species. Right up to the present, Australasian science contributes so significantly to how we know environments – both in terms of development and restraint – that it is often natural scientists that have encouraged the interdisciplinary and social logic of sustainability. Science is not just the subject of much environmental history, in Australasia it is often scientists who are writing it, because they perceive its potential to contribute to sustainability.⁶²

ENVIRONMENTAL HISTORY AND SUSTAINABILITY

In the first issue of *Environment and History*, Michael Redclift argued that 'the view we take of the environment is closely bound up with the view we take of science'.⁶³ But ecological sustainability, he commented, also needs social sustainability, so the sustainability of the environment should not be regarded as a 'scientific problem ... amenable to [a] scientific answer', but rather something that demands consideration of human purpose. A 'pragmatic' environmental history that advances the cause of sustainability has been regularly advocated in the Australian context, most prominently by Stephen Dovers.⁶⁴ Dovers sees 'the potential of environmental history to inform contemporary challenges of sustainability and resource and environmental management', as something that can add value to 'policy and institutional tasks and problems', and that this potential may also be essential to the 'vibrancy of environmental history' itself.⁶⁵

This argument, while having independent merit, in fact reflects the historical origins of environmental history in Australia. Far from needing to add 'relevance' to existing historical scholarship, much Australasian work emerged out of a need for scholarship in sustainability, and only later found its way towards history, or at least historical science. Like Australasian science, arguments for environmental history are frequently based on the need for relevance to government-driven initiatives and policies. For example, the search for baseline vegetation communities that could inform debates about regrowth and fire, or stream-gauge measurements that benchmarked changes in river flows encouraged biologists and hydrologists to try their hand at history. Soil erosion and its historical origins drew geomorphologists into the realm of historical documents.⁶⁶ Much of the environmental history literature of the past couple of decades has come from outside history. Despite the fact that the large continent of Australia has vastly more desert than forest cover, the strength of and enthusiasm for forest history has meant that the literature of forests has overshadowed all other environments. Forest history literature itself has focused overwhelmingly on the temperate forests of the south-eastern states.⁶⁷ And because most forests are State-owned, the policy and institutional dimensions of their management have been prominent. In the five published *Proceedings* of the Australian Forest History Society conferences, issued between 1988 and 2002, only eight of 152 contributors came from history departments in Australian universities, but over a third of contributors (52) came from government agencies or provided consultancy services to government.⁶⁸

The pattern of dominance by writers with an interest in historical policy, but no formal training in history or historical geography, is the same in the two Australian environmental history collections published by Oxford University Press and edited by Stephen Dovers in 1994 and 2000. Of 23 contributions, only two were written by people working in university history departments.⁶⁹ This contrasts sharply with Oxford's *Environmental Histories of New Zealand*

(edited by Eric Pawson and Tom Brooking in 2002). In the case of the New Zealanders, the subjects of study in environmental history were frequently scientific or technical, but the perspectives of the contributors more clearly historical or geographical (16 of the 21 contributors identified as academic historians or geographers.)

In ten years, *Environment and History* has published material on Australian environmental history in every volume, a total of 17 articles, including the special *Australia* issue, volume 4(2) in 1998, edited by John Dargavel.⁷⁰ Before Paul Star's 2002 paper on 'Native Forests and the Rise of Preservation in New Zealand (1903–1913)', New Zealand's environments were not touched on by *Environment and History*. It has made up rapidly since, with a total of 12 papers appearing by the end of 2003, including the special issue *New Zealand*, volume 9(4) edited by Tom Brooking and Eric Pawson.⁷¹ In addition, Otago-based historian, Judith Bennett contributed two pioneering papers on forest industries in Oceania (Solomon Islands and Fiji) in 2000 and 2001.⁷² The very strong new 'school' of environmental history at Otago University contributed more than half of the papers on New Zealand, many of them from early career researchers.

Almost every Australian contributor came from an environmental management department, rather than history.⁷³ A significant number were based in a broad range of interdisciplinary departments of the Australian National University. Both Australian and New Zealand articles favoured forests over other environments. All but two of the Australian papers dealt with the eastern states.⁷⁴ Western Australia has recently redressed the geographical imbalance (which goes well beyond *Environment and History*) with *Country* an important collection of writings on Western Australian environmental history, edited by Andrea Gaynor, Mathew Trinca and Anna Haebich.⁷⁵ The desert is still a neglected theme.⁷⁶ *Environment and History* published no contributions from South Australia or the Northern Territory, which are the two states that identify most strongly with Australia's desert environments. Only Joanna Sassoon's paper on fish-eating birds in Perth and Katie Pickles' paper on urban wasteland near Christchurch dealt with cities.⁷⁷ Although the vast majority of papers was concerned in some way with the history of science and/or natural resource management only one paper on the driest inhabited continent dealt with river management.⁷⁸

The apparent neglect of the history of engineering and technology by both Australian and New Zealand environmental historians suggests a different trend from that in the United States. There, Jeffrey K. Stine and Joel A. Tarr advanced the view that environmental history and the history of technology were on strongly converging pathways. 'It can be difficult to write environmental history without paying at least passing attention to technology', they wrote of United States scholarship in December 2000.⁷⁹ They identified the areas of overlap in cities, public health and occupational health and safety, industry and manufacturing and natural resources (especially water engineering). Technology and environment remain as separate fields in Australia at least partly because environment

and natural resource management is constitutionally a primary responsibility of the states, whilst technology and science tend to be 'national'.⁸⁰

The historical geographer J. M. Powell is the exception in this story. He has made a significant and thorough study of water management and engineering over more than three decades, taking the issue of water on a state-by-state basis, and by undertaking work across a range of states, making it possible to comment on a national picture. In all his work he has taken science, technology and institutions as part of his environmental brief, integrating them into his analyses. But his focus on water projects has taken him to what he calls Australia's 'restive fringe' not its arid interior.⁸¹ The divide between 'the city and the bush' is a major theme in Australian history, and it shapes environmental historiography as well. Many important histories of cities include environmental dimensions. Graeme Davison's magisterial *The Rise and Fall of Marvellous Melbourne* and his more recent *Car Wars*; on early Sydney, Grace Karskens' *The Rocks* and *Inside The Rocks* and Alan Mayne's *Fever, Squalor and Vice*; and in Perth, Tom Stannage's *Lakeside City* and Geoffrey Bolton and Jenny Gregory's *Claremont* all figure as 'history', but somehow they are not considered 'environmental history'.⁸² Yet Bolton's other work, particularly his *Spoils and Spoilers*, is regarded as a classic in Australian environmental history.⁸³

The 'bush' is environment, but the city is not. Institutions that govern rural and wild country are generally politically and legally separate from the urban ones in Australia, and while there is much science for the bush, the city's wisdom comes from engineering and from architecture and planning, not ecology. Wilderness does not have the prominence in nationalistic thinking that it has in the United States, but there are a handful of studies of the greening of Australian political consciousness particularly in relation to national parks and bushwalking that have been influential.⁸⁴ Forests, mountains and rambling are the activist issues for New Zealand too, not cities.⁸⁵ Art history is generally not environmental either, though Tim Bonyhady's work, including his major book *The Colonial Earth*, is an exception to this.⁸⁶ The same 'outside the city' bias is evident in New Zealand's environmental histories, although Eric Pawson and Tom Brooking made a conscious effort to redress this with two urban chapters in their recent collection.⁸⁷ Some newer scholars in the field, such as Western Australian historian Andrea Gaynor are turning the city – particularly the issues surrounding an organic suburban garden – into a place for environmental history.⁸⁸ The green politics of the city are important in both Australia and New Zealand, who were the first countries in the world with successful green party candidates in the early 1980s, but this is still finding its way into historical discourse.⁸⁹

ENVIRONMENTAL AND INDIGENOUS INHERITANCES

We have been focusing on aspects of the shared environmental history of these two southern settler societies, but it is the differences in experience and historiography that are now increasingly emerging and these differences are often underpinned by scientific stories. Environmentally, Australia and New Zealand provide a dramatic contrast.⁹⁰ The wide, brown land, flat and worn, is a strange cousin to the green and black, high, steaming islands. Their shared Gondwanan history is ancient and overlaid. An ancestral continent that included New Zealand, the Chatham Islands, New Caledonia and the Lord Howe Rise broke away from the bigger Gondwanan continent in Jurassic time (205–135 million years ago), even before the separation between what later became India and Australia. Very different climates and geological histories have had more than one hundred million years to foster evolutionary divergence. Australia is an old, geologically quiescent land with poor soils, little relief and slow rivers, indeed none at all over large areas. About 70 percent of it is 'arid'. Arid and semi-arid lands have average annual rainfalls of about 250 mm in the south but up to 800 mm in the north and about 500 mm in the east. Evaporation and the unpredictability of rainfall are greater limiting factors than lack of rain *per se*. Averages are just statistics in Australia. They do not represent a reliable amount of rain on any sort of seasonal basis. An 'average annual fall' is usually the result of one major annual fall amidst many years of 'below average' falls. The arid zone is defined by what it cannot do: it is the 'rangelands, where rainfall is too low or unpredictable or where terrain is too inhospitable for sustainable cropping or timber harvesting'.⁹¹

By contrast New Zealand is a new land, straddling tectonic plates and covered with sharp mountains, fiords, glaciers and rushing rivers. Although it has some sedimentary rocks dating back 540 million years, most of its landscapes have emerged in relatively recent times. No present landscape is older than about one million years, because the land has been moving so rapidly (three to five centimetres per year).⁹² It had a more dynamic Pleistocene than Australia, and has fresh new soils, some still emerging.⁹³ Flat land is at a premium in the islands, and what exists has the benefit of nutrients scoured from the sharp terrain around it. There were no mammals in these islands, and all the major ecological niches they occupied elsewhere were in New Zealand taken up by birds. In this sense, writes scientist Tim Flannery, 'New Zealand is a completely different experiment in evolution to the rest of the world ... [showing] what the world might have looked like if mammals as well as dinosaurs had become extinct 65 million years ago, leaving birds to inherit the globe'.⁹⁴

The Indigenous peoples of Australia have long dwelled there: 55,000 years is the current conservative estimate. They have very distinctive language and cultural relations with the land, totally different from anywhere else in the world.⁹⁵ Before the European invasion in 1788, they had a largely hunter-gath-

erer economy, nomadic within deeply known country, and their major tool of landscape modification was fire. 'Firestick farming', as the archaeologist Rhys Jones called it, encouraged an open grassland understorey with scattered trees, ideal for hunting – and resembling, to European eyes, the gentleman's park so prized in England.⁹⁶ But the marsupial fauna, and the overwhelming dominance of the fire-loving *Eucalyptus* species (about 500 of them), made it a strange land to European eyes.

New Zealand's Indigenous peoples may have been in those islands as little as 600–800 years, and have strong language and cultural links with other Pacific islanders. Their settlements were shaped as much by wind as topography, with forts (pā) facing the wind (whence others might arrive by sea) and hunting sites (evidenced by bones of the now extinct moa) in the leeward portions.⁹⁷ New Zealand's first hunters ate birds and fish. They also developed fern-root collection and agriculture, especially in the humid north-west.

In both countries, settlers and their historians underestimated the extent to which Māori and Aboriginal people had changed the environment before European arrival. That revolution in understanding is still with us and constitutes one of the major themes of environmental history in settler societies today. Green and black politics both emerged strongly in the 1960s and helped provide much of the 'moral purpose' that Donald Worster discerned in the new field of environmental history.⁹⁸ Disentangling the independent (although often mutually supporting) historical strands of these two political commitments has been one of the preoccupations of environmental history in Australasia since the 1980s, and many of the people leading these debates have come from the natural sciences.

Australians demanded an historical critique of 'wilderness' and its Eurocentric character, and a belated recognition of Australia as an Aboriginal landscape, as well as more sophisticated accounts of Indigenous land management.⁹⁹ For example, just how much environmental change was wrought by Aboriginal use of fire? Did the firestick bring marked and widespread change to vegetation across the continent, or initiate a finer rearrangement of existing mosaics? This is a vital and fascinating enquiry, but intriguingly, some scholars still question whether Aboriginal burning had much impact at all.¹⁰⁰ The debate about the impact of Aboriginal landscape burning on the Australian biota was ably reviewed in 1998 by the ecologist, David Bowman. Bowman rightly regretted that 'The knowledge and opinions of Aborigines have been rarely heard or recorded in this debate' and drew attention to the promising work now emerging in this field.¹⁰¹ Australians are beginning to refine and develop Rhys Jones's poetic insight of firestick farming with a myriad of local ecological histories, and settlers are learning to listen to and observe Aboriginal people who have been managing their country continuously. Aboriginal peoples resist the distinction between nature and culture: 'country is a place that gives and receives life', as Deborah Rose puts it.¹⁰² Thus much Aboriginal history *is* environmental history, and vice versa.

In New Zealand, the effect of Māori hunting, fire and horticulture was widespread. Their fire practices alone were 'to virtually eliminate the forests of the eastern South Island in a fairly brief pulse of burning, AD 1300–1450'.¹⁰³ The environmental transformation wrought by Māori and Pākehā over just hundreds of years has been dramatic, and contradicts the nation's current tourist image as harmoniously 'clean and green'. It was this national historical amnesia about the timelessness of 'beautiful landscapes' that provoked one of the editors of the recent *Environmental Histories of New Zealand*, historian Tom Brooking, to gather research about how bush and scrub became farms, forests and gardens.¹⁰⁴ In that book, Atholl Anderson offers a masterly summary of the environmental effect of pre-European Māori since their colonisation of New Zealand in the twelfth or thirteenth century. Anderson describes the widespread vertebrate extinctions and deforestation promptly caused by human settlement, and the learning and adaptation that followed, and he also analyses the century-long debates about the environmental impact of these first settlers as well as the political uses of such arguments today. The scholarly consensus is now towards accepting more recent dates for first settlement (600–800 years ago rather than 2000 years ago as once thought) and a greater initial environmental impact than previously recognised.¹⁰⁵

While New Zealand's known human past – in chronological terms – has shortened in recent decades, Australia's has deepened immeasurably in the same period. The scientific discovery of human antiquity in Australia, always deeply known to Aborigines themselves, awaited the twin revolutions of professional archaeology and radiocarbon dating, both of which emerged in local practice in the 1950s and '60s. 'No segment of the history of *Homo sapiens*', writes archaeologist John Mulvaney, 'had been so escalated since Darwin took time off the Mosaic standard.'¹⁰⁶ This dating revolution not only linked Australia to a world Pleistocene past, it also began to sketch out an intriguing human history and enabled a distinctive regional interpretation of hunter-gatherer society. Different environmental pressures on the Australian continent led to a very different – and, to Europeans, an unrecognisable – type of farming. Aboriginal culture, it emerges, was innovative as well as ancient; no longer could it be simply characterised as 'the stone age' of humanity. In Australia were found the world's oldest cremation, perhaps the earliest human art, by far the earliest watercraft in the world, the first evidence of edge-ground axes, an early domesticated species in the dingo, millstones that predated agricultural revolutions elsewhere, and the most ancient evidence of modern humans. One glimpses a great, unfolding human drama in Ice Age Australia, as people occupied new land left by the retreating coastal seas and themselves retreated from the arid centre as cold droughts held sway. Thousands of years later, the sea regained land as one seventh of greater Australia was inundated, and rains made the central deserts accessible once more.¹⁰⁷

As John MacKenzie has observed, the most recent phase of imperial natural historical writing has tended to see the era of European imperialism as but a brief period in the history of human interactions with tropical and sub-tropical ecologies.¹⁰⁸ Such scholarship has revealed a much greater extent of environmental transformation by Indigenous peoples than we had imagined, and it has discovered much longer cycles of environmental ups and downs with which the colonial moment has sometimes unknowingly interacted.

EPILOGUE: ON FUTURE EATING

We will conclude by reflecting on some debates surrounding a book on the environmental history of Australasia that was published a decade ago, the year *Environment and History* was founded. We have mentioned the book already: Tim Flannery's *The Future Eaters*, which was sub-titled 'an ecological history of the Australasian lands and people'. A focus on this book is useful as it encapsulates several themes of this article. *The Future Eaters* explicitly revived Australasia as an essential comparative context; it generated heated popular debates that distilled many of the recent concerns of environmental history in this region; it made a narrative of recent discoveries in biological science, archaeology and anthropology; and it cast a zoological eye on humanity. Tim Flannery begins by noting how quickly knowledge changes: much of what he learned at school in the 1980s about Australian history and nature has been shown since to be misleading, partisan, or just plain wrong. He reveals this with both wonder and caution. He knows that changing insights and sensibilities will eventually leave his own book stranded; he shows, equally, how knowledge can be lost and obscured. It is the sense that Flannery rides a fast-moving, eddying stream that makes his book a great read as well as a fascinating and urgent intellectual journey.

Why has this book been controversial? The most obvious reason is that it applies the 'blitzkrieg hypothesis' to Australia and argues that Aboriginal people hunted the megafauna to extinction. This remains a scientifically unproven and contentious thesis, and a politically sensitive one. The book's environmental determinism has also attracted admiration and criticism.¹⁰⁹ Flannery explains better than anyone else why introduced species overwhelmed Australian natives, and he does so by reversing one of our cultural stereotypes, by depicting Europe as 'The Backwater Country'. Europe is the new land, more recently colonised by *Homo sapiens* than Australia, with a simplified biota that had to start again after the last Ice Age, and now populated by invasive, dominating weeds. *The Future Eaters* confronted Australians with truths about their land that they have not yet fully assimilated: that Australia has the poorest soils in the world, a stressful, unreliable climate, a fragile and heavily interdependent ecology, and great biodiversity. Published in the mid-1990s, it was the first popular history to use El Niño – which only gained scientific respectability at

the end of the 1980s – as an explanatory narrative tool.¹¹⁰ The shortage of nutrients and dominance of droughts shaped Australian life. Australians, he argues, need to learn to live by the country's ecological dictums, they need to find 'an environmentally-based Australian identity'.¹¹¹ Historians have been unsettled by his ecological democracy, his disciplinary disobedience and by the ease with which he sees us all as animals. 'Mateship' becomes an example of co-evolution, and nomadism a nutrient-deficient life strategy. Flannery the scientist finds the commonality of humans as a species and generalises Aborigines and Europeans as both future-eaters, both short-term, short-sighted exploiters of nature. Is the scientific habit of generalising across a species another form of western intellectual imperialism, one that dismisses powerful cultural differences with a crude biological and environmental determinism? Some critics have discerned a search for Anglo-Celtic legitimacy in a book that argues that Aborigines exterminated the megafauna and then questions, on ecological grounds, Australia's policies on population, immigration and multiculturalism.¹¹² The *Bulletin* dubbed Flannery as a 'scientist provocateur' and it is certainly part of his art and philosophy to use a palaeontologist's gaze to unsettle contemporary political complacencies.¹¹³ He does this also in his *The Eternal Frontier*, an ecological history of North America and its peoples, where he shows that for 33 million years it was Eurasia that was the world's sole ecological superpower, and that the present American dominance of global interests is out of step with its deep history.¹¹⁴

All of the debates generated by *The Future Eaters* are not just about the empirical reality of Australian life across deep time; they also concern the style, discipline and politics of environmental history, especially when it mischievously violates the science/humanities divide. For example, the Australian archaeologist, Jim Allen, warns against the power of narrative in speculative science. 'We anthropologise the distant and deep past more than we should; we make it up', he reflects: 'Some things are beyond our reach.' The attempt to write a smooth historical narrative, he continues, produces 'counterfeit history'. Allen sees narrative as too compelling, too powerful, to function as hypothesis. 'Archaeological data is not historical data', he concludes, 'and archaeology is not history'.¹¹⁵

Australasia itself is a creative and controversial category in *The Future Eaters*. New Guinea was the cradle of Flannery's science of society, as it was for the American physiologist and zoologist, Jared Diamond, whose *Guns, Germs and Steel* is an environmental history 'of everybody' over 13,000 years.¹¹⁶ Both benefited from formative fieldwork in New Guinea, where their zoology first became also anthropology. And the New Zealand experiment presents itself as a very influential model for Flannery's reading of Australian history. The Māori hunted the moa to extinction in a few hundred years, he explains, and so their fellow-humans across the Tasman, the Aboriginal people, most likely did the same to the Australian megafauna. With his ecologist's eye on the decline and fall of species, Flannery applies a Pacific island hypothesis to ancient Australia.¹¹⁷

Whether or not he is right, culture is here allowed little play. As in Diamond's magisterial analysis, Flannery's humans are in the grip of an environmental determinism, all children of the last Ice Age. The cultural and historical nuances are elided in the Australasian parallel: that Aboriginal people were hunters and gatherers and not agricultural in the manner of the Māori, that their encounter with the megafauna took place tens of thousands of years earlier, that they lived in a mammalian world rather than a bird-dominated ecology, that they inhabited a continent, not so much an island, that they developed different spiritualities: these exciting differences can be overwhelmed in the swarm of a single species. However useful a tool ecology may seem, historians ultimately have to resist its imperialism.

NOTES

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¹ McLean, 2003.

² Smith 2003.

³ Blainey 1966: 72.

⁴ Denoon 2003; Belich 2001.

⁵ McGregor 2003.

⁶ Seddon 2002.

⁷ For a summary of 'New Zealand-Australian Relations', see Olssen 1998.

⁸ Curthoys 2002: 142.

⁹ Denoon and Mein-Smith 2000.

¹⁰ Curthoys 2002: 140.

¹¹ Powell 1977, 1988; Pyne 1991, 1997; Dunlap 1999; Grove 1997; Tyrrell 1999. Donald Meinig in 1961 was an early example of a scholar bringing a North American sensibility to the lands of South Australia, in his *Margins of the Good Earth*. Part of the novelty of his work was the fact that South Australia was (and perhaps still is) the state most overtly proud of its British heritage.

¹² Flannery 1994. New Guinea historiography is not (yet) represented in *Environment and History*. For some environmental history of the region with a military flavour, see Gammage 1998.

¹³ <http://www.publish.csiro.au/journals/emu/>. This definition comes from 2001, when they introduced the subtitle *Austral Ornithology* to the journal. Wallace's Line was drawn between Bali and Lombok by Alfred Russel Wallace in 1859 on the basis of the distinctive birds on either side. See Robin 2001, 18–19. For a study of the 'Asia' in 'Australasia', see Walker 1999.

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- ¹⁴ Cited by Brooking and Pawson 2003: 375.
- ¹⁵ Clark 1949. Crosby 1986.
- ¹⁶ Pawson and Brooking 2002. 'Introduction': 1. See also King 2003.
- ¹⁷ Morton 1994. The accident reference was made in his address to a workshop on 'Environmental History in the National Museum of Australia', jointly sponsored by the Museum and the History Program, Research School of Social Sciences, ANU, 14 April, 1999.
- ¹⁸ See Geoff Park's wonderful and sobering history of these forests: Park 1995, also Park 2002.
- ¹⁹ Other pesticides dominate the apple industry in New Zealand, as Roche 2003 notes.
- ²⁰ Hancock 1972: 72.
- ²¹ Wynn 2002: 100.
- ²² For a detailed assessment of *Tutira*, see Wynn 1997.
- ²³ Guthrie-Smith 1999: 278, xvii.
- ²⁴ Eric Rolls, Letters to Sue Ebury and Tim Curnow, 1976–80, Rolls Papers, National Library of Australia, MS 7027, Box 1, Folder 2.
- ²⁵ Rolls 1981: 399.
- ²⁶ Rolls 1997, 2000.
- ²⁷ The Vermin and Noxious Weeds Destruction Board operated in Victoria in the 1960s and 1970s, and most states have a Weed Society dating from this time. The first national conference on Australian Weeds was 1976, and they are still active groups. (See <http://home.vicnet.net.au/~weedsoc/history.html>, accessed 3 August 2004). Not all 'pests', of course, are aliens: see Frost 1998 on native animals in the South Gippsland forests. Some pests crossed the Tasman. The Brushtail Possum is an 'invasive menace' in New Zealand. See Clout and Sarre 1997. Acclimatised weeds and pests, especially rabbits have dominated the scientific and management discourses: see Rolls 1984, Coman 1999, Clayton 2003.
- ²⁸ Lowenthal 1997: 235.
- ²⁹ Isern 2002: 244.
- ³⁰ Isern 2002: 245, 240. For further explorations of the meaning of 'wild' in postcolonial Australia and New Zealand, see the chapters by Nigel Clark, John Morton and Nicholas Smith, and Geoff Park in Neumann, Thomas and Ericksen 1999. Two important books that analyse the environmental, psychological and biological dimensions of the White Australia policy are Walker 1999 and Warwick Anderson 2002.
- ³¹ Roche 1997: 450.
- ³² Cumberland [1977] 1980.
- ³³ Grey 1994.
- ³⁴ Guthrie-Smith [1921] 1999: 125–6.
- ³⁵ Guthrie-Smith [1940] 1999: xxiii.
- ³⁶ Guthrie-Smith 1936: 16.
- ³⁷ MacKenzie 1997: 218–20.
- ³⁸ Guthrie-Smith 1936: 16.
- ³⁹ Guthrie-Smith [1921] 1999: 309.

⁴⁰ The Swede, Carl von Linné introduced classification using binomial nomenclature in 1749.

⁴¹ Home forthcoming. Strahan 1979.

⁴² Seddon 1997, 73–82. He also made this argument in a scientific context in Seddon 1974.

⁴³ Despite this historically rich start, later goldfields histories have been rather more focused on social than environmental conditions. Mining history is surprisingly absent from the environmental literature in Australasia, something Pawson and Brooking (2002) tried to rectify with a chapter from Terry Hearn ‘Mining the Quarry’ (84–99). But mining history in Australia – where there is a much greater part of the economy dependent on income from this industry is relegated to a separate category, like cities. One early example of a fine mining history with environmental insight is Geoffrey Blainey’s 1954 history of copper mining in Tasmania, *The Peaks of Lyell*, which has been republished several times since. There has also been some discussion of uranium extraction in an historical context in Falk 1982.

⁴⁴ Studies of colonial botanical gardens and government botanists have been generally the province of historians of science rather than environment. One major international project on Ferdinand von Mueller, Victoria’s first Government Botanist, headed by Rod Home (Emeritus Professor of History and Philosophy of Science at the University of Melbourne), has been running since the 1980s. It has already yielded two massive edited volumes of letters, entitled *Regardfully Yours* (Bern: Peter Lang), with more imminent, and a biography expected to follow.

⁴⁵ Home, typescript, kindly provided by the author: 7.

⁴⁶ MacLeod 1988. (see especially Linden Gillbank’s chapter). The Australasian emphasis continues to the present in the history of science: the Australasian Association for the History, Philosophy and Social Studies of Science meets on both sides of the Tasman, and the journal *Historical Records of Australian Science* publishes and reviews works on the history of science in Australia, New Zealand and Oceania.

⁴⁷ Cockayne was awarded an honorary doctorate by the University of Munich in 1903, and was commissioned in 1904 by the famous international plant-geographer, Professor Dr A. Engler to contribute the New Zealand fascicle to his comprehensive *Vegetation der Erde*. Although this was much delayed by Cockayne’s ill-health and the intervention of the war, it eventually appeared as *The Vegetation of New Zealand* in 1921. Revised editions appeared in 1928 and subsequently, and it remained the standard work for some seven decades. (Cockayne 1958. Preface to the first edition (1921) and the second edition (1928), v–vii.) See also Thomson 1996. Thomson 1983.

⁴⁸ Cockayne was Fellow of the Linnean Society (1910) and of the Royal Society (1912). He received the Darwin Medal in 1928. Unlike the more famous New Zealand born Rutherford, the English-born Cockayne never left New Zealand after arriving in 1881 (from England via Australia.). His biographer, Thomson, called him ‘the founder of modern science in New Zealand’.

⁴⁹ Cockayne 1908. ‘Introduction’: 2

⁵⁰ The Otari Open Air Native Plant Museum, at Wilton Wellington, established in 1927, was a public botanical garden for the display of New Zealand plants. The decision to devote the Australian National Botanical Garden to showcasing Australian plants was

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not made until 1960, although Canberra's gardens began (just six years after the city itself) in 1933. See Robin 2003.

⁵¹ Figures adapted from Rolls 1984: 440–2. Brigalow is the open forest of drier south-eastern Queensland, dominated by *Acacia harpophylla*. On the Commonwealth Prickly Pear Board, see Schedvin 1987: 90–6.

⁵² See Robin 1997.

⁵³ Currie and Graham 1966: v. Galbreath 1998 cited Australia as a leading example in the arguments for DSIR, but Australia, which had had various struggling government institutions for science since 1916 would never have moved into the better funded CSIR model without outside incentives.

⁵⁴ Holland, O'Connor and Wearing 2002.

⁵⁵ Brooking, Hodge and Wood 2002: 171.

⁵⁶ Ratcliffe 1953: 322. The subtitle was '*The Adventures of a Biologist in Australia*'.

⁵⁷ The Soil Conservation Service of New South Wales (1938) and the Soil Conservation Authority in Victoria (1940) followed Ratcliffe's report to CSIR – although the concern about water quality in hydro-electric schemes was a key motivator for these as well. (No soil conservation service was established in South Australia, the state at the heart of his inquiry.) The commonwealth funded CSIRO Alpine Ecology Unit was also involved in soil and vegetation mapping in the 1950s. See Robin 1998a.

⁵⁸ Vegetation mapping in key watershed areas such as the Australian alps was among projects funded by state soil conservation authorities. See Robin 1998a; Main 1999. For more on Ratcliffe, see Dunlap 1997.

⁵⁹ John Gibb, a DSIR rabbit researcher, cited in Dunlap 1997: 81.

⁶⁰ Cockayne 1958: 426

⁶¹ More complex science also blurred the debates, and this did not always come from within Australasia. Cockayne found himself uncomfortably on the other side in the debate about deer described by Dunlap 1997, where US game manager Thane Riney recommended population management, rather than eradication of individual deer in an effort to save the forests that Cockayne prized. See also Galbreath 1993.

⁶² People trained in natural sciences also lead in the historiography of science in both Australia and New Zealand, but this is the case elsewhere in the world too.

⁶³ Redclift 1995: 121.

⁶⁴ Dovers 1994; Dovers 2000a, Dovers 2000b.

⁶⁵ Dovers 2000b: 131.

⁶⁶ See for example, Wasson and Sidorchuk 2000.

⁶⁷ For analyses of trends see Dargavel 2002; McManus 1999. Major forest histories include Griffiths 2001 and Dargavel 1995. An important collection dealing with the previously neglected genus *Callitris* (native pine) is Dargavel, Hart and Libbis 2001.

⁶⁸ A further five historical articles were contributed by historians from United States, Scottish and New Zealand universities, and eleven of the consultants noted above identified themselves as public historians or experts in cultural heritage. The majority of government agencies were National Parks and Wildlife Services and Forestry Services. Some of these contributors had qualifications in history, geography or archaeology, but the majority were foresters or biologists. The *Proceedings* were Frawley and Semple 1989; Dargavel and Feary 1993; Dargavel 1997, Dargavel and Libbis 1999, and Dar-

gavel, Gaughwin and Libbis 2002. Another conference was held in September 2004 in Augusta, Western Australia.

⁶⁹ Bill Gammage (University of Adelaide) in Dovers 1994 and Ross Johnston (University of Queensland) in Dovers 2000a.

⁷⁰ In Volume 3, the only Australian contribution was an extended book review by J.M. Powell (Geography and Environmental Studies, Monash University).

⁷¹ Volume 9(4), 2003, with eight papers on New Zealand subjects.

⁷² Bennett 2000a, a taster for Bennett 2000b; See also Bennett 2001. Note that there was also one other paper on 'deep' environmental history in Oceania by Fijian geographers, Nunn and Britton 2001. This is all so far for the Oceanic region (beyond Australia and New Zealand) in *Environment and History*.

⁷³ The exceptions were A.R. Main, an honorary fellow in the Zoology department at the University of Western Australia, and Peter Herbst, an environmental activist for Friends of Mongarlowe.

⁷⁴ The two Western Australian contributions were Main 1996 about fire and vegetation (from a zoologist) and Sassoon 2003 on fish-eating birds and fisheries policies (from a cultural heritage specialist). In addition to the papers about particular places, there were survey articles (Dovers 2000b; Pawson and Dovers 2003), two editorial 'survey' papers accompanying the special issues (Dargavel 1998; Brooking and Pawson 2003) and comparative papers: (McManus 1999, Read and Wyndham 2001 and Pawson and Dovers 2003). The comparisons were between Australia and Canada – forests; Australia and Cuba – masculinity/landscapes; and Australia and New Zealand – environmental history writing.

⁷⁵ Gaynor, Trinca and Haebich 2002.

⁷⁶ Deserts are the theme of ongoing work at the National Museum of Australia (including a major exhibition in 2005) comparing Australian deserts and desert peoples with those in Namibia, Chile and Argentina.

⁷⁷ Sassoon 2003; Pickles 2003.

⁷⁸ Webster and Mullins 2003.

⁷⁹ Stine and Tarr 2000.

⁸⁰ This does not apply to New Zealand, of course.

⁸¹ His term 'restive fringe' also refers to Australia's predicament in global affairs. J. M. Powell has been a leader in many aspects of the historical geography of Australia, and its intersection with environmental history. See Powell 1995. Since 1976 Powell has concerned himself particularly with the science and institutions of natural resource management: Powell 1970; 1973; 1976; 1977; 1988. His water oeuvre includes: Powell 1989; 1991; 1993; 1998. He has also considered Australasian comparisons: Powell 1997.

⁸² Davison 1979, 2004; Karskens 1997, 1999; Mayne 1982; Stannage 1996; Bolton and Gregory 1999. There are many more, but these exemplify good histories of three cities in very different periods, from early nineteenth-century starts through to post-war suburban developments. Science and technology studies is another active area in Australia that seeks to combine technology and environment, especially in recent history. Sharon Beder's *Toxic Fish and Sewer Surfing* (1989) covers some recent history in a modern urban context. Geographers and urban planners such as Dan Coward (1988) have also studied urban water issues historically and to the present era. For a collection of essays about

urban history in both Australia and New Zealand, see 'Cities Down Under', a special issue edited by Graeme Davison of the *Journal of Urban History*, 22(1), November 1995.

⁸³ Bolton 1981; revised edn 1992.

⁸⁴ Bonyhady 1993; Robin 1998b; Hutton and Connors 1999; Crawford and Crawford 2003.

⁸⁵ Star 2002; Star and Lochhead 2002; Pawson 2002b; Park 1995; Park 2002.

⁸⁶ Bonyhady 2000. Interestingly much of Bonyhady's research was initially conceived while he was part of the Urban Research Program at the Australian National University, including his paper in the first volume of *Environment and History* (Bonyhady 1995). The Urban Research Program, established in 1966, was one of very few institutions in Australia that considered urban issues on a national and historical basis. It was controversially disbanded in 1999, and its former Director, Patrick Troy, is now based at the ANU's Centre for Resource and Environmental Studies.

⁸⁷ Pawson 2002a on making urban places and Leach 2002 on suburban gardens.

⁸⁸ Gaynor 1999.

⁸⁹ On the rise of green politics in Tasmania and elsewhere, Pybus and Flanagan 1990; Papadakis 1993. On New Zealand, see Dann 2002.

⁹⁰ Tom Brooking has reflected that one of the reasons for producing his and Eric Pawson's *Environmental Histories of New Zealand* (2002) was 'a determination to make clear to the rest of the world that there is no point in tacking New Zealand on to Australia in global studies because, in this regard as in so many others, our stories are spectacularly different': Brooking, 'Together Apart', Foreign Policy School Lecture, 2001.

⁹¹ 'What are the Arid Lands of Australia?' in website for CSIRO Sustainable Ecosystems: Centre for Arid Zone Research – Alice Springs, http://www.cazr.csiro.au/aridzone_introduction.htm.

⁹² Its most recent phase of mountain building began 25 million years ago, but the ongoing changes have been so fast that new landscapes are evolving constantly. See <http://www.otago.ac.nz/Geology>.

⁹³ Seddon 1997: 224.

⁹⁴ Flannery 1994: 55.

⁹⁵ Many Aboriginal languages are said to be 'ergonomic' – that is there is no distinction between the noun and the verb – the actor and the action are together as one.

⁹⁶ Jones 1969.

⁹⁷ The number of years Māori have been in New Zealand has been recently revised downwards, from about 2,000 years to 600–800. See Anderson 2002.

⁹⁸ Worster, 'Doing Environmental History', in Worster 1988, p. 290.

⁹⁹ Head 2000; Griffiths 1996; Griffiths 2002.

¹⁰⁰ See Horton 2000.

¹⁰¹ Bowman, 1998a: 386. He cites Lewis 1989; Latz 1995; Rose 1995, 1996; Russell-Smith *et al* 1997, and Langton 1998. Since Bowman's review article, Bill Gammage has begun a study of Aboriginal land management practices. See Gammage 2003 and his earlier *Narrandera Shire* (Gammage 1986), a local history with unusual environmental sensitivity.

¹⁰² Rose 1996: 7. See also Rose 1995, Rose 2000.

- ¹⁰³ Anderson 2002: 31.
- ¹⁰⁴ Pawson and Brooking 2002: xi-xii.
- ¹⁰⁵ Anderson 2002.
- ¹⁰⁶ Mulvaney 1986, Mulvaney and Kamminga 1999.
- ¹⁰⁷ Smith 1993, 2004.
- ¹⁰⁸ MacKenzie 1997.
- ¹⁰⁹ See for example Seddon 1995, Head 1995, Bowman 1998b. See also Paul Sheehan, 'The Crucifixion of St Timothy', *Spectrum, Sydney Morning Herald*, 5–6 June 2004, 4–5.
- ¹¹⁰ On the history of El Niño as a concept, see Nicholls 2004.
- ¹¹¹ This was the argument of Flannery's Australia Day address, Sydney, 2002. An edited version was published as 'Chance to shape the people of the future', *Australian*, 24 January 2002.
- ¹¹² For example, Jenny Lee in *Australian Book Review*, 168, Feb/Mar 1995, 15–16.
- ¹¹³ *The Bulletin*, 10 September 1996, 26–7.
- ¹¹⁴ Flannery 2001.
- ¹¹⁵ Jim Allen, Archaeology Seminar, Australian National University, 26 March 1999; also 'Hunter Gatherers as Colonisers: The First Humans East of the Wallace Line', The Mulvaney Lecture, Australian National University, 24 March 1999.
- ¹¹⁶ Diamond 1998.
- ¹¹⁷ Spriggs 2001; Vicki Lukere, 'Pacific History by Evolutionary Biologists', Paper presented to the Pacific History Association Conference, Canberra, 27 June 2000. Flannery's thesis is also contested in New Zealand: Jim Williams, 'E pākihi hakinga a kai', Paper presented to the Annual Conference of the New Zealand Historical Association, Dunedin, November 2003.

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