Empire and Environmental Anxiety

Health, Science, Art and Conservation in South Asia and Australasia, 1800–1920

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Introduction

Many of us live in societies forged by the experience of empire. Its legacies are manifold: in the political, educational and other institutional systems that shape and regulate our societies; in the beliefs and values we espouse; in the language we speak; not least, in the pressing inequalities which still affect certain groups.

Scholars hotly debate imperialism’s ambiguities and legacies. Several historians have examined the environmental impacts of the British Empire. Most present European expansion as reckless, confident and profligate, especially in an environmental sense. Imperialism destroyed forests, uprooted native populations, polluted rivers, decimated wildlife and left in its wake degraded ecologies. Notwithstanding the very real social and environmental impacts of imperialism, this study presents a picture of greater complexity.

This book examines the interlinked processes of imperialism and environmental change through the concept of environmental anxiety and environmental anxiety refers to concerns generated when environments did not conform to European preconceptions about their natural productivity or when colonisation set in motion a series of unintended environmental consequences that threatened everything from European health and military power, to agricultural development and social relations. Encountering unhealthy climates or infertile land prompted anxieties that motivated a series of remedial measures designed to ensure resources were neither despoiled nor wasted and that environments did not adversely affect European health or aesthetic sensibilities. A range of responses ensued. Environmental modification resulted, as did the development of bureaucratic and legislative solutions to health and environmental problems. Geographical relocation and the production of artwork also took place.
This book examines a series of interrelated environmental anxieties, specifically, those about health, aesthetics, climate, timber supply, hydrology and desertification in relation to European perceptions of existing environments and environmental modification. It reveals that anxieties about human-induced climate change, soil erosion and a looming timber famine caused by large-scale deforestation occupied the minds of colonial planners throughout Australasia and Asia. It demonstrates colonial fears about the power of environments – and environmental change – to affect health. It illuminates concerns at the ugliness of urban environments and attempts to improve their appearance. But it also argues that some of the conservation policies and bureaucracies that resulted from such expressions of environmental anxiety represented a form of imperial control designed to generate revenue and to enable the more efficient exploitation of resources.

In other words, this book does not deny the centrality of improvement – and especially of agricultural improvement – to imperialism, but argues that environmental anxieties in some cases moderated such policies through the creation, for instance, of forest bureaucracies, urban improvement societies and medical bureaucracies and conservation. In some cases even, concerns about resource waste led to more efficient practices of forest management which often took on a spatial dimension as conserved forests in the uplands protected the agricultural lowlands from drought, soil erosion and flooding.

The search for solutions to similar environmental problems fused together different parts of the British Empire in different ways that changed over time. This study examines the similarities and differences in the environmental anxieties and solutions articulated in South Asia (primarily India) and the Australasian colonies from 1800 to 1920. It investigates the manner in which a colony’s locality – its particular environmental, political and economic circumstances – moderated the impact of empire-wide anxieties and solutions as well as the exchanges that developed between different colonies. In examining South Asian-Australasian environmental anxieties and responses, it challenges the traditional distinction between colonies of extraction and colonies of settlement that has meant scholars seldom study the two regions together. This book reveals that the distinctions between colonies of extraction and settlement belied the interactions – in the exchange of people, environmental ideas and, to a lesser extent, organisms – between these areas. And, it demonstrates the way in which perceptions of India’s unsuitability for permanent European migration impacted in hitherto unacknowledged ways on Australasian settlement.
1 Origins of Environmental Anxieties

Human action has produced great changes in the physical condition of the earth's surface. Vast tracts of swampy wilderness have been converted into fresh pastures or cultivated fields, and barren uplands have been covered with stately trees. On the other hand, many regions, in all parts of the world, which were once clothed with verdure are now treecless and arid wastes. All these changes are the work of man ... the best methods of counteracting evils which may be caused by these extensive clearances is one of the most important questions that occupy the attention of physical geographers.¹

C. R. Markham, 1866

Behind Victorian confidence, even arrogance, in the power of science and technology to bring constant material improvement and to aid in conquering ever more parts of the globe, lurked complex and sometimes contradictory environmental anxieties. C. R. Markham's statement captures the ambivalence surrounding development and its environmental impacts. Through their experience of industrialisation, Europeans brought to colonies concerns about both the pace and direction of urban, social and environmental change. Across Australasia and South Asia, the rapid transformation of unfamiliar environments also fed new kinds of anxiety, creating unintended problems that threatened agricultural improvement and human health. Problems demanded new solutions or the adaptation of existing scientific, bureaucratic models and policies to local colonial circumstances. These shared experiences of rapid environmental change propelled exchanges of anxiety and solutions between Australasia and India, Europe and North America, the nature and extent of which is the subject of this study.

This chapter provides an introduction to environmental anxiety, and to the geographical, environmental, political and social scope of the book. It begins by framing the book within imperial environmental historiography before examining the origins, attitudes and exchanges of colonial anxieties, emphasizing in particular the importance of locality in modifying general environmental anxieties and in encouraging exchanges between different places. For the first time in a monograph-length study, Empire and Environmental Anxiety examines the parallel, and at times intertwined, environmental histories of Australia, New Zealand and India from the early 1800s to the close of the First World War, the end of which marked a period of increased nationalism and heightened moves towards scientific professionalism across Australasia and India.² Through responses to local particularities of place, environment, culture and politics, this work examines interactions but also attempts to explain dissimilarities, why, in other words, similar patterns did not emerge in one place as they did in another.

Perspectives and frames

To capture the way environmental anxieties promoted the movement of ideas and people between different parts of Australasia and South Asia, I draw on Tony Ballantyne's concept of 'webs of empire'. Ballantyne's model acknowledges the emergence of imperial connections. Like a spider's web, these connections were constantly being broken and re-formed in new ways. And, also like a spider's web, each point of intersection connected up with many other such nodes.³ Employing Ballantyne's model, Empire and Environmental Anxiety evaluates environmental connections and interactions between India and Australasia while at the same time examining the influence of other regions and models, notably the role of German- and Scottish-educated scientists, and conservation ideas from North America and France. Much in the same way that Thomas R. Metzalf has identified India as 'a nodal point from which peoples, ideas, goods and institutions ... radiated outwards' within the Indian Ocean world, so might this book contribute to the idea of India as a sub-imperial hub for the dissemination of environmental and health ideas in the southern Pacific Ocean through its influence on Australia and New Zealand at different points in the nineteenth century.⁴ Of course, in this period other connections existed, not least among the Australian colonies, some of which I explore in
more detail in this book. As well as highlighting regional connections, this study also argues that anxieties were moderated by particular local, colonial, environmental, political and cultural situations. It also asks, in regard to educational and political, social and environmental circumstances, why certain groups in one area were more prominent in expressing concerns than elsewhere.

The present work examines the concerns generated when environments did not conform to European preconceptions about their natural productivity or when colonisation set in train unintended environmental consequences that endangered everything from European health and military power to agricultural development and social relations. Encountering unhealthy climates or infertile land prompted anxieties that motivated a series of remedial measures designed to ensure resources were not wasted and that environments did not adversely affect European health or afford aesthetic sensibilities. Different responses followed. Environmental modification resulted, as did the development of bureaucratic and legislative solutions to particular health and environmental problems. Geographical relocation and the production of artwork also took place.

Empire and Environmental Anxiety fundamentally examines the connections individuals made between different concepts (health, forest conservation, aesthetics, sand-drift) and regions (Australia and South Asia, urban and rural, and a variety of other localities). Commonly historians have studied these regions and concepts in isolation. Instead, this work looks at, but also beyond, national boundaries, to examine both the porousity of ideas moving around and beyond empire and the way environmental anxiety created links between seemingly discrete scientific and cultural concepts. For instance, as Gregg Mitman notes, 'conceptions of health have been integral to environmental experience and understanding' but historians have mostly ignored them. Despite notes Warwick Anderson, 'It seems that nature and politics, regardless of historiographic trends, are continually plotting to reassert the importance of geography, of spatial patterning, in the understanding of disease and health care.' The book also examines the interconnections between rural and urban environments, a relatively underdeveloped aspect of Indian and Australian urban environmental history notwithstanding Australia's high rates of urbanisation. Examining a variety of anxieties, this study attempts to recover the complexity of contemporary understandings of environment, health and aesthetics in different places. The next section considers the contribution of this work to imperial historiography in general, before examining the origins, spread and development of imperial environmental anxieties.

Imperial environmental history

Imperial environmental history is a growing area of study, pioneered by John M. MacKenzie, among others. Historians have since examined everything from colonial resistance and botanical exchange to early pollution legislation and the relationship between the ecological sciences and empire. Of recent works in this field, William Reinart and Lotte Hughes' study, Environment and Empire, presents a masterly and compelling narrative of colonial attempts introduced to regulate and commodity nature through a thematic focus on different aspects of environmental history of the British Empire. If that work examined some important national and trans-national themes of imperial environmental historiography, this study provides a regional perspective of the interconnections between Australasia and India through the commodification and management of nature at one level and its limitations, as well as the intersections between health, conservation and aesthetics. A regional perspective is particularly important because, with the exception of some work on forestry by Greg Barton, Brett Bennett and myself, historians have largely overlooked the environmental and health connections between Britain's colonies in South Asia and Australasia. South Asian-Australasian connections, both in their magnitude and importance, reveal a hitherto ignored aspect of environmental exchange. At the same time, they raise important questions and add to existing scholarly debates on the relative role of European-to-colonial and colonial-to-colonial models in shaping environmental and health policy. Initial models of scientific transfer favoured the diffusion of scientific ideas from Europe to its colonies, with later ones acknowledging the different phases of colonial scientific development; the particular examples (in forestry science, sand-drift, aesthetics and health) examined in this book instead reveal the continuous linkages between, and beyond, colonies.

As Zafereh Azer notes, India 'was never perceived to be a "colony" as Canada and Australia were'. The British never migrated to India as millions did to the Australasian colonies. Yet, despite differences, as Beverley Kingston notes, [a] vast network of imperial connections in government, administration, the army, the church, the law, education, and enterprise,
extended from India to the Australian colonies. Most families engaged in imperial business, whether officially or privately, knew someone in India.

These networks, she observes, reached from the nineteenth century into the early-twentieth century, and resulted from India's position on [sic] the crossroads of the world. Few environmental historians have been attuned to these connections. For those environmental historians who look beyond the nation state, imperial environmental historiography largely follows the old divisions between extractive and settler colonies, yet, the colonies of Australasia, it should be recalled, were also largely extractive, primary producers, as they remain to this day.

Characterized in particular by studies of its pre-colonial, colonial and post-colonial environmental histories, scholars of India have only recently begun to situate Indian environmental history in relation to Europe, occasionally South Asia and only gradually other colonial regions. Despite Libby Robin and Tom Griffiths' observation that Australians and New Zealanders have tended to keep their backs turned to the Tasman Sea and to foster relations with other areas rather than with each other, several major studies pursue Australasian environmental history comparisons. Thomas R. Dunlap's pioneering study, *Nature and the English Diaspora: Environment and History in the United States, Canada, Australia, and New Zealand*, explored the settlement by the 'English Diaspora' of the 'neo-Europeans' of North America and Australasia, rather awkwardly at times fitting New Zealand and Australia into broader North American patterns. His employment of the term 'neo-Europeans' itself drew upon Alfred Crosby's innovative work on European imperialism, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900*. For Crosby, the plants, animals and pathogens Europeans brought to 'neo-Europeans' such as Australia, New Zealand, the Americas and South Africa ushered in an ecological revolution, facilitating imperialism as much as, if not more than, imperialists' military might and technical know-how. More recently, Don Garden's *Australia, New Zealand, and the Pacific: An Environmental History* has firmly situated Australasia in the wider Pacific region, while Tim Flannery's earlier *The Future Eaters: An Ecological History of the Australasian Lands and People* took a much longer-term view of the region's pre-human and human environmental history. This book examines for the first time the parallel and intertwined histories of colonial South Asia and Australasia, in turn contributing to the field of comparative and trans-national environmental history.

One dominant theme of imperial environmental history is the expansion of the colonial state, its increasing hegemony over nature and ensuing environmental destruction. This vision of the environmentally destructive colonial state juggernaut is not without substance, but it is an example of a particularly strong declensionist narrative common to imperial environmental history, as John M. Mackenzie has observed. This particular narrative, Simon Schama has explained, relates a story of land taken, exploited, exhausted, of traditional cultures said to have lived in a relation of sacred reverence with the soil displaced by the reckless individualist, the capitalist aggressor. For instance, some scholarship maintains that colonialism unleashed one series of environmental disasters after another. The popularity of this declensionist narrative among imperial environmental historians upholds Ranajit Guha's observation of the dominance of what he terms 'the triumphalist and progressive moments of imperialism' evident in imperial historiography: 'Can we, he asks, 'afford to leave anxiety out of the story of empire'? By acknowledging the environmental, political and social limitations to colonial power as well as the nuances and anxieties at the heart of imperial environmental history, this book at once responds to Guha's still largely unheeded challenge and questions the dominant interpretation of environmental history as a strongly declensionist narrative. Where it goes beyond existing studies of environmental anxiety and conservation – most notably Richard Grove's elegant study of deforestation on tropical islands – is in arguing that, far from Grove's assertion of anxiety presenting a radical critique of colonialism, anxiety actually impelled efforts towards the more efficient exploitation of resources, particularly in India, and to a lesser extent, Australasia.

This book argues that conservation represented a different – albeit complementary – form of colonial development, one in which, its proponents argued, the teeming colonial populations and smilling pastures on the lowlands would be protected from droughts and soil erosion, flooding and timber famine, sand-drift and disease through wise scientific management of resources, at the same time as otherwise agriculturally useless areas would be developed.

If one particular theme in the writing of imperial environmental history is the preponderance of a narrative of environmental apocalypse, another has been the relatively poor understanding some scholars have shown of the influence of Christianity in the shaping of environmental beliefs and actions. Environmental historians generally have presented religion either in overly simplistic terms, as an environmentally destructive ideology, or ignored it altogether. As a perceptive cultural force,
Christianity framed many settler environmental anxieties and responses, instilling belief in the natural productivity of all environments, sanctifying the improvement and thus restoration of unproductive environments through cultivation, and justifying, through legal systems and ‘waste-lands’ legislation, the moral right of settlers to take lands ‘unused’ by non-Europeans. As Richard Drayton has argued, ‘Christian assumptions about man’s place in nature played a central role in the making of imperial Britain well into the nineteenth century.’ Agriculture ‘as a way of using nature sanctified by the religious and economic assumptions of the West’, he notes, proved ‘crucial to the culture of British expansion’. For nineteenth-century Europeans, then, science promised to meet God’s injunction to subdue and make the earth plentiful, but maintaining that productivity also created anxieties.

When imperial environments failed to respond in ways Europeans anticipated, refused to meet normative expectations of natural productivity or deteriorated when intended improvements actually produced the opposite effects, significant anxiety resulted. This book examines five principal, and interrelated, concerns in colonial Australia, New Zealand and India. The first theme, explored in Chapters 2, 3 and 4, concerns colonial health. Health anxiety reflected the pervasive nineteenth-century belief in the environmental origins of disease and the potentially deadly impact of new environments – and particularly tropical climates – on European health. Settlers feared both the effects of unknown and unproven environments and the impact of human-created changes, such as water and air pollution or unsanitary and overcrowded urban dwellings. The second aesthetic anxiety (Chapters 5 and 6), denotes fears about the visual and health impacts of changed environments in urban and rural areas. Settlements, some colonists believed, required parks and urban planting both to combat the unintentional environmental and health impacts of development and to improve perceived unhealthy areas such as swamps and other ill-drained land. The third relates to forest anxieties (Chapters 4–6). Climatic anxiety refers to the popular scientific belief that tree cutting imperilled agriculture by diminishing rainfall and increasing temperatures, while hydrological anxiety signifies scientific concern about deforestation accelerating soil erosion and flooding. Finally, desertification (Chapter 7) refers to the swamping of fertile fields by spreading sands. The next sections of the present chapter examine the origins of environmental anxiety, its impacts on Australasia and India, as well as how, in relation to changing local environments and particular political and economic situations, anxieties were exchanged and helped to justify the expansion of state bureaucracies.

Origins of environmental anxiety

In the eighteenth and nineteenth centuries, humans, especially in Europe and China, began to change environments on a scale never before experienced. Agricultural improvement and empire-making from the late-eighteenth century helped to radically change Britain’s fortunes. Agricultural improvement swept many poor from the land, forcing them to the cities or to migrate further afield. By the nineteenth century, empire provided Britain with a ready market for its manufactured goods and access to India’s cheap labour and vast resources. Increasing agricultural production, coupled with readily available supplies of coal ushered in the fossil-fuel age, allowing Britain a brief comparative advantage over other areas by making it cheaper to produce food and manufactured products than countries reliant on animal and human labour.27 Fossil fuels enabled the nineteenth century’s industrial revolution and propelled Britain and later other countries (in Europe and North America, as well as Japan) to a brief greatness, reversing a centuries-long trend of Asian domination of manufacturing, principally by India and China.

In Britain, steam technology provided both the basis of industrial expansion and a source of employment to many. Sucking in workers from the surrounding countryside, it set in motion a vast drama of internal (urbanization) and external (overseas) migration, creating new forms of social organisation, living conditions and lifestyles.28 To those at the time, environmental, social and political change appeared as remorseless as the never-tiring arms of a steam engine’s flywheel. Although Britain exported some of its environmental problems to the colonies, progress still exacted an awfully high social, environmental and political price at home.29 Blighted landscapes of slag and spoils, cuttings and holes, exposed the bones of Britain’s landscape. That great symbol of Victorian progress - the railway - improved communications and facilitated travel, but ‘manipulated the landscape on a grand scale’. Pollution blackened Britain’s skies and soured its waters. With justification, its industrial revolution coined the term ‘slum’.29 Overcrowded tenements concentrated together poverty and filth, bringing disease and death, as infrastructure failed to cope with the teeming masses surging into the cities.

Responding to environmental anxiety: Protest, romanticism and migration

Across early-nineteenth-century Britain, rural and urban protesters targeted the de-humanising process of mechanisation and challenged...
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the abysmal conditions endured by factory workers. The upper echelons of society were also strongly affected. Artists and novelists searched out traces of pre-industrial Britain, some giving to the hard life of the labourer or weaver a rosy patina it had never had in real life. Even those English industrialists who benefited most from the new order quietly retreated to the countryside to live, removed from the environmental and social tumult to which they had contributed.

Environmental anxiety reflected growing disquiet in the high environmental and social price exacted for increased comfort and goods. According to many historians, new forms of living fostered new sensibilities. Aplastia abhored that in, collecting honey, they killed the bees. In England (1824) and France (1850), societies emerged to uphold animals' rights; others followed in the British Empire and elsewhere. Particularly sensitive souls even fretted that trees suffered pain when cut down. Study of nature and natural history societies flourished. In this time of bewildering change and amid the tumult of new emotions, romanticism emerged as a major late-eighteenth- and early-nineteenth-century cultural reaction to industrial and modern living. Romantic sensibility took different forms. Followers consistently opposed industrialisation and its social and environmental results, often harking back to a fictitious 'golden' pre-industrial age of solid community ties and rural society. As cultural historian Peter Gay notes of European culture during the Victorian period:

All change is traumatic, even change for the better. The very gratification of wishes generates dislocations: as Freud once pointed out, humans resist giving up a pleasure they have once enjoyed and dislike waiting for the dividends that later, greater pleasures might bring. Hence all nineteenth-century progress was pursued by anxiety at times repressed and only reluctantly recognized—some of it, of course, like worries over the social cost of urbanization, perfectly justified.

New modes of living created new diseases and magnified the effects of others. Self-doubt, nervous disorders, stress and money concerns assailed the confidence of an expanding bourgeois society while from the late-nineteenth-century Europeans worried about racial degeneration and the appearance of an apparently effete urban male population (Chapter 2). As well, by this date, they attempted to prevent unwanted non-European migrants. What applied individually also applied to the state. By the late nineteenth century, alongside Social Darwinism's
tent of thousands of other groups including, respectively, Australian Aborigines and Maori and Chinese. Thousands of people were constantly on the move. A massive influx of Australian gold-seekers travelled to New Zealand in the 1860s, including thousands from Australia to the West Coast Gold rush of 1863–1867. That reversed in the long-depression of the 1890s as people sought opportunities in Australia. By the early-twentieth century, Australasian society was one of the most urbanised in the world.46

Colonial environmental change and anxiety

Australasian settlers forged new lives and made homes by consciously rejecting mechanisation and industrialisation. Despite the reality of urbanisation and industrialisation by the late-nineteenth century, they continued to extol Arcadian images celebrating farming and rural life, images that contributed to growing settler nationalism by the century’s end.47 Australasian governments sought to make available as quickly as possible as much land as possible for settlement. From 1860 to 1900, almost all Australian colonial land legislators believed that most of Australia could be commercially used.48 Until the 1860s closer settlement occurred in coastal areas, with the pastoral frontier developing inland. This changed after the 1860s through an emphasis on the yeoman ideal of small family-owned, freehold farms: a similar pattern was evident in New Zealand.49 Although demonstrating a reluctance to intervene in society, a commitment to laissez-faire policies still required the colonial state to make available land for settlement, regulate markets and banking, develop infrastructure, and, as often as not, suppress local indigenous populations. Thus, limited settler bureaucracies developed, principally in the so-called field sciences, and principally to fuel settlers’ land hunger through land survey and sale.50 The history of that migration was written across the landscape of Australasia. Pastoralism initially dominated the eastern parts of New Zealand, and the coastal fringes of Australia, giving way to wheat growing (such as in South Australia and on the South Island’s east coast) and, later still, dairying from the late nineteenth century (notably, for instance, New Zealand’s North Island and sub-tropical coastal Queensland and NSW). From the 1890s, many Australasian colonies sought to parcel out some of the larger estates into smaller farms, and the use by government of science to boost agricultural production and improve health became increasingly acceptable under the tenets of state socialism.51 In India, the British, assuming the mantle of rule from the Mughals, also pushed agricultural improvement, but mainly relied on adapting indigenous systems and
using Indian labour. As tax farmers, they sought to maximise profits, though not always successfully. Over the nineteenth century, the role of the state also increased. Indian cotton manufacturing was replaced with plantation agriculture and cash crop production encouraged through investments in irrigation, transportation and plant improvements.16

Throughout the period discussed - from the early 1800s to the early 1920s - the role of the state also grew in Australasia. In part, as a consequence of increased communication networks and cultural changes which helped to foster settler nationalisms. In New Zealand, provincial government (1832-76) gave way to a centralised government and, in 1907, the country received Dominion status. In Australia, by contrast, the colonial system that persisted until federation in 1901 brought the colonies together as states within a federalist system. Democratically elected governments also emerged in Australasia over this period. Unlike Australasia, however, Indian governments had more power to act arbitrarily - without having to take the needs (and voting) of settlers into consideration - and, under the influence of the doctrine of utilitarianism from the 1850s developed a far more interventionist model of government. I explore more of the implications of these differences below.

While agricultural improvement drove imperial expansion in India and Australasia, it also carried expectations about environments which, if not met, generated anxiety. Colonisation, reliant upon successfully marshalling resources and increasing productivity, sometimes drove unrealistic environmental expectations and led to the introduction of agricultural practices unsuited to particular environments.20 Since for most Europeans a productive environment figured as the norm and since cultivation signified Christianity, its absence indicated landscapes lying in a state of sin, nature in desperate need of improvement. For William Marshall, an evangelical missionary in New Zealand, 'any place ... left desolate by man ... becomes ... a waste ... no longer a well watered garden, but a wild and weary wilderness', a wilderness that serves as a reminder of man's sin and 'to that grand catastrophe of which all the prophets witness, when earth's Creator ... cursed and quitted it'.21

Activities such as irrigation, tree planting and forest conservation promised to 'restore' fertility to previously desolate regions by returning them to their pre-Fall state and thereby meet biblical aims of using land wisely (Chapters 2 to 7).22 illustrating such a view on the Punjab plains, the Marqués of Dalhousie (1812-60), Governor General of India (1848-56), despaired of the absence of Tillage which is its natural agriment', determining to plant trees to improve climate and provide fuel to villagers.23 For forester Berthold Ribbenraad, 'Nature's unaided efforts' proves that the withdrawal of man's active interference would, under favourable circumstances, be sufficient in time to re-clothe the now denuded areas with forest vegetation'.24 In many arid parts of Australasia, such as South Australia and Central Otago, settlers entertained similar hopes. Tree planting, they fervently hoped, would bring wholesale climatic change. Deserts would bloom. Economies would boom. And settlers would become rich. In 1869, John Gillies claimed tree planting in Central Otago would encourage rainfall and 'convert that district into the garden of Otago'.25 The idea of a naturally productive environment extended to ideas of health. Settlers believed that unwholesome areas, such as swamps, as well as zones of illness created by humans, should be made productive and healthy. Notions of beauty and health thus coalesced; settler aesthetic conventions valued beautiful and healthy areas (Chapters 2 and 3).

Large-scale environmental change also released a set of often unintended environmental consequences that threatened colonial development and, with it, the whole colonial project, a problem seemingly accentuated on tropical islands, as Richard Grove has contended. For Grove, the smallness of tropical islands magnified the effects of environmental change, invoking in European minds images of an Eden despoiled.26 This is what almost happened on Mauritius in the mid-nineteenth century, Grove argues. Plantation agriculture led to deforestation and soil erosion (and perceived climate change) that threatened to undermine the economy. Only through tree planting and the conservation of existing forests, so proponents of conservation argued, was the productive (and economic) capacity of the island restored.27 With a process of industrialisation gathering pace in the early-twentieth century, British rule in India came to rest upon its shaky presentation as a civilising agent and an improver of both Indian agricultural productivity and morality.28 Sustained agricultural failure, conservation supporters stressed, threatened to bring economic decline and cause unrest. Although a region the size of the Indian subcontinent could still sustain serious losses of people and environments, it could not do so indefinitely.

In Australasia and South Asia existing populations had already made major modifications to environments, in some cases (in Australia and India) over tens of thousands of years, but the rapidity and extent of change accelerated with colonisation.29 Empire established resource extraction frontiers in one place to service the demands of another.30 Rabbit infestations, for instance, became a curse in many parts of
Australasia from the 1860s, competing with stock and causing soil erosion. Secondary introductions from the 1880s (designed to get rid of the now-unwanted introductions) made heavy and largely unanticipated depredations on local biolife and animals. Weeds, other animal pests and unwanted microorganisms also wreaked havoc on local ecologies and economies.44 In India, canal re-building and re-commissioning from the 1850s created massive problems of salination and also facilitating the spread of malaria. Crop failures – and the shift to cash, rather than food, crops which the British encouraged – led to devastating famines, followed by disease and death.45 Deforestation accelerated with colonisation and increased anxieties in some quarters, particularly among educated men and women. In Australia between 1871 and 1880, for instance, railways grew about 1288 km, leading to the estimated loss of over 12,100 acres (4900 ha) of forest. Destruction increased rapidly over the nineteenth century, climbing to almost 48,000 acres (19,400 ha) in the period from 1881 to 1890 and to over 90,000 acres (36,500 ha) in the last decade of the nineteenth century.46 Overseas railway building also impacted on Australian forest supplies, with Australian hardwoods meeting demand for railway sleepers from New Zealand, South Africa, Great Britain and even India. Deforestation soared in New Zealand over the nineteenth century, indicating the rapid development of its lowlands in particular (Figure 1.2) and their re-making with introduced grasslands. As forest historian Michael Roche notes: ‘In 1900 forest covered approximately 25 per cent of the country, a reduction from about a half in 1840, and perhaps 80 per cent when Polynesians first arrived’ (Figures 1.3, 1.4).47 In India, colonisation also increased deforestation rates, adding to existing pre-European timber losses. In the colonial period, a complex of factors including expanding agriculture, fuel needs, increased population pressure on resources, while from the mid-nineteenth century internal migration and railway building accounted for increased deforestation. Indeed, in the fledgling forest bureaucracies which developed, particular concerns revolved around supplying timber needs for anticipated railway development designed to improve communications, one of the problems identified with the violence of 1857. It was estimated, for instance, that 200 tons of timber was required for every 1.6 km of railway.48

Indian models

Environmental anxieties tied together different parts of the British Empire and elsewhere, enhancing the authority of certain bureaucracies,
especially health officials and foresters, who stressed the necessity of greater government involvement in environmental and health management. The success of their demands, in turn, reflected a colony's particular local, political, environmental and cultural circumstances. As Zalheer Baber notes, "British India proved to be a good testing
ground for a number of experiments in the application of science and technology by the colonial state. In the mid-nineteenth century, India possessed 'one of the largest state-sponsored scientific research and development activities undertaken in modern times.' Since its early victories over Bengal and Madras in the eighteenth century, the EIC (the English East India Company) had come to rely increasingly on accurate information – and bureaucracies to provide that information – to facilitate its shift from a trading role to an imperial power (Figures 1.5, 1.6, 1.7).28 Under the EIC, surveying and the natural sciences became effective 'instruments of social, political and economic progress.'29 They provided vital information about the resources of the new colony and were instrumental in military planning. Military expansion reinforced the need for an EIC medical bureaucracy to keep European and Indian troops fighting fit and to investigate and control new disease regimes while botanical knowledge supplied important information about potentially valuable local plants. Botanical gardens themselves furthered colonialism through acclimatising and improving crop varieties, thereby increasing agricultural production and state revenue. A developing bureaucracy, coupled with research and development located at botanical gardens, emerged in the late-eighteenth century. Although these imperial bureaucracies were certainly limited and rather more ad hoc than their somewhat grandiose names suggested, compared to other colonial possessions they were nevertheless significantly more advanced.30

Following a period of laissez-faire policies, justification for state activity increased with the popularity of utilitarianism from the mid-nineteenth century. The Marquis of Dalhousie, an ardent follower of utilitarian philosopher Jeremy Bentham (1748–1832), pushed for the development of railways and telegraphic and postal systems as a means of civilising Asias. In 1854, he established the Public Works Department to increase agricultural production. Ambitious programmes to revive canals and irrigation works resulted in an informal engineering college at Roorkee (later, the Thomason Civil Engineering College).31 Direct British control after 1858, following the uprising of the previous year, extended state intervention undertaken under Company rule. During the British Raj, the Indian civil service grew massively as did its military presence. Private irrigation schemes, attempted between 1858 and 1864, failed so the state took control, never again relinquishing their governance to private concerns. State railway development forged ahead from the 1860s and in response to persistent famines, government created a department of agriculture in 1871.32
By the beginning of the twentieth century, 'the British administration included men whose years of experience on the subcontinent had led them to acquire views of science and its social functions far different from those of their contemporaries in Whitehall and Burlington House.' 28 This included, as Russell Dionne and Roy MacLeod note, enthusiasm for natural history and geology and their pursuit by the state.29 Environmental anxieties played a key role in many of these developments. For instance, supporters of forest conservation, initially drawn from professionals in the medical service and later relying upon German-trained scientists and models, deployed highly alarmist and messianic language to emphasise the 'civilisation-threatening consequences of deforestation'. They did so deliberately, to further the bureaucratic interests which they represented. Advocates argued that, unless protected, deforestation would choke colonial development, bringing drought through lessened rainfall, washing away soils or deluging fields.31 The benefits of conservation to the state were stressed. Forest conservation, proponents argued, made best use of land unsuited to agriculture – thus furthering the aim of improvement by bringing into production marginal areas – and protected farming. In spatial terms, with the exception of tea growing, it largely led to the conservation and working of highlands forests and to the use of the lowlands for agriculture. In common with the times, doctors and naturalists trained in Scotland and northern Europe and Germany might attend to medical concerns but also provide expertise in the so-called field sciences described above.

Forest administrators from India acted as 'centers of calculation', compiling and exchanging information and testing models and techniques of forest management and environmental control from many parts of the world, including Australasia, India, Europe and North America.32 Their influence was extended in part because of the exchange of knowledge between different colonies facilitated through letter writing and reading. Exchanges of information enabled individuals to form 'empires of their own, both connected to and separate from the political intentions of ruling governments.'33 In other ways, it came to bear through the considerable numbers of European imperial soldiers, civil servants and opportunists who made their way from India to Australia and, from the mid-nineteenth century, to New Zealand (established as a colony in 1840).34 Several wealthier retirees were active in New Zealand colonial politics and lobbied for Indian models in the 1870s, while many Australasian colonies, land officials and scientists upheld the Indian model because the latter offered the only imperial model of forest conservation available. Indeed, developing fears of the pathological qualities of the Indian climate for Europeans gathered pace over the nineteenth century and impacted on Australasia. As the acclimatization of European people to India was now no longer seen as possible, it placed added pressure on finding places suitable for permanent European settlement. As a result, comparisons of Australasian and Indian healthiness abounded, as did schemes encouraging Europeans from India to migrate to Australasia, thereby further entrenching the sinews between the regions.

**Expressing anxiety: Individuals and groups**

As a result in part of their education, certain individuals and groups advocated environmental anxieties, the impacts of which varied by time and place. Members of colonial scientific societies, bureaucracies and visiting men of science articulated early environmental concerns. Natural history societies, often associated with colonial museums, provided the structures and personnel for the examination of environmental processes and problems. Concerns and discussions of environmental change appeared in colonial scientific journals and newspapers, later extending to discussions in colonial parliaments and other published works.8 The nature of the anxiety in many senses dictated its mode of articulation. Scientific ideas were generally articulated by males, not females, a reflection of perceived differences in the sexes and their restricted educational opportunities, but artistic notions could be put forward by both men and women. An individual or a group's credibility rested on the accuracy of predicting and mitigating the impact of environmental change but also on claims to knowledge that reflected educational attainment, expertise and social standing. Over the nineteenth century, society gradually became more specialised. Professional organisations developed, making claims to knowledge based on the abilities of its practitioners. They also established journals, certification to control membership and ensure standards, clear career pathways and distinctions between reliable and unreliable forms of knowledge to enhance their authority. But professionalisation varied by region and over time, and did not necessarily occur in a neat, linear fashion. Even in India, widely lauded for its forest bureaucracy, professionalism, while ahead of Australasia, emerged gradually.89 In Australasia, for instance, only really in the twentieth century, for instance, did its forest bureaucracies evince more of the professionalism evident in the Indian forestry service in the previous century.88 By the late-nineteenth century, Australasian colonial governments supported
bigger bureaucracies, as science became an increasingly accepted form to manage resources and people. Increasing disciplinary divisions also marked out new bureaucracies. Medical expressions of climatic anxiety and involvement in forestry lessened throughout the nineteenth century due to pressing medical concerns and increasing specialisation. In India from the 1860s, professionally trained German foresters began to take over the articulation and responses to environmental anxieties previously undertaken by many Scottish-trained medics. This reflected, in part, doctors' increased opportunities to practice in their profession. Scientific specialisation also meant they no longer had the qualifications necessary to undertake forest management (Chapters 2–7). As J. R. Wright has demonstrated, from the 1870s, the conduct of environmental management in Victoria was increasingly to become a professional, scientific business.\(^{48}\) Despite centralisation and standardisation of bureaucracy, regional differences in management remained, owing in particular to the different terrain, forests and climate of regions.

For women, for example, contemporary societal norms directed them into the domestic sphere, seemingly away from many of the public scientific roles adopted by males. Outside the arena of amateur natural history and its writing for children, few if any women served as colonial scientists or as land administrators until the twentieth century. Women, as art historian Caroline Jordan notes, 'had the sanctioned roles of companion, of links to nature, of sensibility to feeling and beauty.'\(^{49}\) But in the nineteenth century, many women used these stereotypes to their advantage, to open up new opportunities for themselves. Justifying their actions as extensions of their 'natural' interest in art, women publicly expressed aesthetic anxiety about the ugliness of environmental change (Chapter 3). They expressed concern about the impact of certain climates on their health and that of their family. Gendered ideas about health also held that female bodies were particularly vulnerable to environmental change and offered a pertinent area of study for medical science (Chapter 2).\(^{50}\)

Biography is a particularly useful way to explore environmental anxiety and its responses. Chapters 3 and 4 examine in greater detail the impact of education on the articulation of environmental anxieties by, respectively, Scottish- and German-trained scientists. Biography is useful in revealing the complexity of colonial views and the connections between different people and places, but also, as David Lambert and Alan Lester observe, 'how ideas, practices and identities developed trans-imperially as they moved from one imperial site to another.'\(^{51}\)

In articulating concerns about the aesthetic appearance of towns and the ugliness of deforestation, individuals like Alfred Sharpe derived their authority from their status as an artist. Many middle- and upper-class women also qualified to declare on aesthetic matters and received an artistic education because contemporary society believed women were 'naturally' inclined to such pursuits (Chapter 3). Medical doctors' concerns about the health of places and environments too reflected sounder medical training and growing public confidence in medicine (Chapter 2). Authority also changed over time. In expressing anxiety about deforestation and in promoting scientific forestry, credibility in India rested with medical doctors in the early to mid-nineteenth century and German-trained foresters later in that century due to their specialised scientific and practical knowledge (Chapters 4 to 5).

Responses to environmental anxieties also echoed the enthusiasms of particular individuals and political cultures. In relatively small colonial societies, individuals may have had a greater impact on environmental decision-making than in larger societies.\(^{52}\) The New Zealand politician Julius Vogel (1835–99) twice (in 1874 and 1885) introduced conservation schemes to prevent timber felling, climate change and flooding, and twice witnessed the parliament revoke his legislation. Compared to other Australian colonies, South Australia's relatively developed forestry programme from the 1870s owed much to the efforts of one man, Friedrich Kirchau (1824–1904) (Chapter 5).

Finding the appropriate terminology to reflect the heterogeneity of imperialism—the people, ideas and processes involved—across Australasia and South Asia is challenging. Even the term 'colonialism' can accommodate different types of engagement and ideological commitments on the part of the historian. Settler colonialism clearly differed in its social and political characteristics from India. Whereas white rule in India tended to be more absolute and government intervention in society more widely accepted especially after the 1850s, in the settler colonies laissez-faire attitudes reigned longer. In the late-nineteenth century, democratic government emerged in many settler colonies and with it, gradual acceptance of state involvement in society. Where India's populace were mostly poor peasants, the white settlers of Australasia enjoyed greater economic prosperity in contrast also to its native peoples. Where many Europeans came to India to serve in an official capacity, in the settler colonies most came to settle.\(^{53}\) While giving due regard to these important differences, for the sake of simplicity I use terms such as settler, colonial and colonist interchangeably, as well as colonialised and coloniser, with the recognition of the complexity and diversity behind such labels.
Empire and Environmental Anxiety for the most part examines the concerns of colonisers rather than colonised. This reflects in part the difficulty of accessing non-English-language sources and the sheer heterogeneity of non-European groups and their experiences in Empire. Even the terms coloniser and colonised used in this book are only useful shorthand provided the differential and changing power relations within non-European societies are kept in mind. New Zealand Maori, Aboriginal Australians and Indians appear in the book through the eyes of colonists and occasionally in their own words too. While asymmetrical, the impacts of colonisation affected different non-European groups in contrasting ways, with some groups using it to their advantage. In India, the British took over the structures and bureaucracies of the Mughal Empire in the eighteenth century. The wheels of the empire were oiled by an educated local staff and kept in motion by non-European workers - Indians, Chinese and others. Bengalis later played a vital role as civil servants in the British Raj, but their literacy and connections also laid the foundation for a thriving resistance to imperial authority later in the nineteenth century. Indians staffed the lower bureaucracies of the Indian Forest Service (IF) in the nineteenth century. For instance, in Burma, foresters employed the Karen to find, fell and remove timber. Foresters met stiff resistance to the encroachment of forest laws and commodification from various hill tribes and other groups who engaged in incendiarism, non-violence and other forms of protest. And even among tribal groups affected by forest laws, significantly different experiences of colonisation resulted. As the work of Ramachandra Guha and Madhav Gadgil show, in the Rajmahal hills (north-eastern India), the Santhals adapted better to policies of sedentarisation than the Paharias, because the former were acquainted with settled cultivation while the latter, who practised slash-and-burn agriculture, were not.

The outcomes of forest policies also cut unevenly across New Zealand society, severely affecting Maori, whose access to lands and resources was removed or often severely restricted by forest reservation additional to the main causes of land loss: sale and confiscation. As a correspondent to the Maori-language newspaper Te Waireenga noted in 1874, some Maori feared that forestland in their hands would be lost to pay for the newly proposed state forests department. Others, such as Ngati Whakaue leader Te Heuheu Tukino IV, it is suggested, made use of preservation legislation to gift land to the Crown so that it might not, at least, fall into settler hands. Given their remarkably high literacy rates and ability to operate successfully in both their own and European worlds, Maori resorted to written and formal means of protest. Organised military campaigns (The New Zealand Wars), passive resistance and organised political movements also fought the encroachments of the colonial government while many Maori also engaged at various levels with aspects of European science and ideas, for instance training as doctors or serving as bureaucrats to improve their people's welfare (Chapter 2).

Colonialism also severely affected Australian Aboriginals through disease, landlessness, war and institutional racism. Colonial experiences of imperialism and environmental change, then, differed according to age, location, caste, background, education, religion and gender and for Europeans were also moderated by class. As Elliott Campbell declares, understanding 'the heterogeneity of Britain is vital before studying the heterogeneity of its white settler colonies'. This rings true both for that multi-national state, the United Kingdom, and for the plea intellectual historian John Pocock made to historians over 30 years ago of the need to recognise the plurality of British history. The background of Europeans before they arrived in the colonies is thus an important consideration when examining their environmental views, as is the differential experience of imperialism among colonised peoples.

Local environments, politics and professions

Environmental anxiety and its responses reflected the nexus between culture and nature, experienced at the local level. 'Local conditions', as historian of science David Livingstone has observed, 'pose local problems needing local solutions.' As Eric Pashon and Stephen Dovers note, for island landmasses such as New Zealand and Australia, national-scale enquiry 'may indeed be useful'. Colonial governments sometimes exchanged anxieties, as New Zealand and South Australia did over tree-planting legislation in the 1870s, but at other times they resulted from the advice of visiting experts or from local scientists adapting ideas from one place to another, above and beyond national boundaries. These examples uphold Livingstone's assertion that 'As ideas circulate, they undergo translation and transformation' in response to particular circumstances.

It made environmental sense, for instance, to introduce tree-planting legislation into the provinces of Otago and Canterbury and the colony of South Australia because of their scarcity of forests exacerbated by colonial development. Even when such legislation was introduced nationally in New Zealand, for obvious reasons settlers in heavily
forested areas did not make use of the act. In the Punjab, 'the almost total absence of forest trees and cover of forest trees and of bushes', noted an official in 1851, makes 'the whole territory one continuous stretch of unlevied plains' and invited tree-planting legislation. In other ways, rugged topography and geographical diversity prevented both the extraction of timber and the introduction of uniform forest management models. New Zealand's steep mountainsides thwarted successful attempts to remove and bring some timber to markets. Those and extremely heavy rainfall left large areas of the southwestern South Island untouched by timber cutters. Inaccessible mangrove forests, difficulties of access and sheer ecological diversity, not to mention tigers, restricted forest management in southwest Bengal in the Sundarbans. Forest policies in Burma, rather than those from elsewhere in India, were deemed by overseas experts as appropriate and useful models for colonial Victoria. Even then, Burma's forest model required adaptation to local circumstances (Chapter 6). For some individuals, slower growing rates in New Zealand's South Island warranted the following of what they identified as German models of forest conservation and the introduction of fast-growing exotics (Chapter 5). The behaviour of existing and changed environments impacted strongly upon environmental anxieties and the effectiveness of responses to them, as did existing political, geographical and economic conditions.

While hierarchies of political organisation ordered space across India and the Australasian colonies and levels of administration ranged from the municipal and provincial to the colonial and national, issues and measures came to a head at the local level. When shifting sands swept over fields and settlement, attempts to deal with the problem through raising taxes stumbled because of the low rating bases of affected areas (Chapter 7). Ignited by fears of an impending timber famine consequent upon mining, forest reservation took place in parts of colonial Victoria in the early 1860s to supply pit props and fuel for the industry. Similar fears over gold-mining and scarce timber resources gripped colonial Otago in the 1860s, leading to attempts to plant trees and reserve forest. Political responses to problems differed greatly within and across Australasia and India and help to explain why certain policies favouring state scientific bureaucracies stuttered in Australasia but went ahead in India. The sheer diversity of environments within empire posed particular problems to administration, and required different environmental management. Europeans tried, in vain, to define India as tropical.

As the British Association for the Advancement of Science's Report of 1851 into the impact of tropical deforestation observed, British India is so extensive an empire, so diversified in soil and climate, as well as in natural and agricultural products, that it is impossible to predict anything respecting it generally; that which is descriptive of one part is not necessarily applicable to another. Thus some parts are covered with primeval forests ... while other parts are not only bare of trees, but even of vegetation of any kind, as the deserts which run parallel with the Indus, and stretch more or less into the interior of India. With desert to the northwest, the mountainous Himalaya range to the north and tropical regions to the south, India's vegetation and climate are heavily influenced by these geographical features as well as by underlying geology and the effects of the monsoon. Monsoon sweeps across India in late May or June from the Bay of Bengal and the Arabian Sea, retreating in September or October and bringing in turn a different monsoon cycle from the northeast. Precipitation rates vary accordingly. As well as the Himalaya, the Western Ghats run for almost 1600 km along western India. To the east lie the Eastern Ghats, and between both mountain ranges is the high Deccan plateau. To the north of the Deccan plateau are two mountain ranges which help to form the Deccan plateau into a triangle. Tropical forests (containing teak [Tectona grandis] and other commercially valuable trees) occur principally to the west and east, where there is less rainfall; of the Western Ghats as well as in the northeast of India (Figure 1.8). The latter includes a variety of moist deciduous monsoon forests, semi-evergreen and evergreen rain forests, swamps and grasslands. In the north, stretching from east to west, are the northern plains of India, dominated by the Indian deltaic systems. Often of very low relief (less than 300m in height), the river system contains agriculturally fertile soil in the north-east and sterile sands of the Thar Desert, to the west of northern India. Although Australia is known for 'the outback' and the monsoon, resulting in lush tropical rainforest and mangrove forest. Climatically, Australia, New Zealand and India are also affected by the El Niño Southern Oscillation (ENSO), a phenomenon resulting from complex changes in the currents and air pressure in the Pacific Ocean. Although ENSO is only one contributor to climatic variability, it has a significant worldwide impact. At different times and places, it causes drought and
flooding across Australasia and South Asia and, as Richard Grove and others suggest, heightened concern about the impact of deforestation on hydrology, rainfall and flooding (Figures 1.9, 1.10). 117

Although sharing a similar Gondwanaland heritage, Australia is geologically older than New Zealand. Its soils are ancient and consequently poorer; and it suffers from greater temperature extremes. Semi-arid and arid regions comprise some 70 per cent of Australia’s surface area and represent a diversity of environments characterised by a uniformly low rainfall. 118 Water is in great dearth in many areas and this has a major impact on forest distribution. Most of Australia’s trees are hardwoods and most grow on the northern, eastern and southwestern littoral in areas of greater than 500mm of rainfall per annum. Dense forest gives way to open forest the further inland one travels due to decreasing rainfall.
the summer heat is never great; the islands are always green. Australia
has for the most part flat, yellow, sunburnt shores; the soil may be
rich, the country good for wheat and sheep, but to the eye it is an arid
plain; the winters are pleasant, but in the hot weather the thermometer
rises higher than it does in India, and dust storms and hot winds
sweep the land from end to end.\(^{20}\)

Geologically, New Zealand is a long, thin island chain, broken down its
spine in the South Island by a mountain chain. The predominant westerly
trade winds produce heavy rain on its west coast and sometimes rainfall
decoeency on its east. While in the South it is temperate, subject to snow
in its higher country in winter, in the far north it is sub-tropical. On its
eastern coasts, particularly in the South Island, fire removed much of the
vegetation before European arrival and, under Maori management, a rich
monocultural horticulture and hunting developed. With colonisation the
grasland areas of its east coast became popular for the development of
pastoralism, as Australian settlers moved across to take advantage of the
availability of land in New Zealand. Along with the remaking of gras-
land, settlers also drained swamps and cut down trees, sometimes very
wastefully. Indeed, for decades the sound of axes and the smell of burning
signalled settlement. Depredations on the forests accelerated trends already
in evidence among Maori, resulting in the deforestation of Northland’s
famous kauri (Agathis australis) and the removal of forest on areas such as
Otago Peninsula in the south. In the late-nineteenth century, attention
shifted to the development of the North Island dairy industry. In complete
contrast to Australia, most of New Zealand’s forests are softwoods.

Important physical characteristics of the different parts of Australasia
and South Asia meant, first, that environments differed greatly from those
of Europe, requiring the introduction of different systems of environmental
management. Second, since many of these imperial environments were
so different from Europe, they often responded in unanticipated ways to
changes, leading in some cases to environmental anxieties. Those environ-
ments which looked the same as Europe, such as parts of New Zealand,
proved to be particularly perplexing as settlers expected them to behave as
they did in Europe. Third, in seeking solutions to environmental anxieties,
empire drew together geographically similar areas facing similar problems.

Conclusion

In the process of coming into contact with previously unknown or
little-known environments, imperialism unearthed similar anxieties to
Europe and the new one as settlers found that environments did not necessarily respond in ways they anticipated. Environmental anxiety tied together different parts of the British Empire and beyond, but particular political, economic, social and environmental situations modified concerns and responses. India's greater level of state resource management, thanks to the influence of utilitarianism, meant that for much of the nineteenth century those arguing for increased forest bureaucracies in the settler colonies of Australasia looked to India as well as others' forestry as a model for their own. Scottish-trained doctors and German and continental scientists likewise had lesser impact on conservation in Australasia than India because laissez-faire ideology pervaded governance longer in the settler colonies than in India. The present chapter has also argued for the need to consider the complexity of imperial environmental history, not least its enmeshing of ideas about health, conservation, landscape and science and the dynamic regional exchanges of ideas and policies between South Asia and Australasia in which these took place. Imperial environmental history, it shows, represents neither a story of despotic environmental destruction nor one of enlightened conservation, but instead a complex and fascinating fusion of competing and at times contradictory tendencies modulated by the particularities of place, people and environment. The next chapter examines fears about the impact of environments on health and the intellectual interconnections between European notions of aesthetics, health and productivity.

2

Imperial Health Anxieties

[A] country is of little importance for colonization, even if food grows fast, so long as the climate causes those who cultivate it to decay.¹

Arthur S. Thomson, 1854

Fever is the great scourge and calamity of India, for natives as well as Europeans.²

Dietrich Brandis, 1883

As these quotes demonstrate, the pervasiveness of nineteenth-century European belief in the power of environments to affect health meant that discerning and mitigating its adverse effects took on particular importance in empire. Contemporaries held that imperialism displaced European bodies, and sometimes even minds, by subjecting them to unknown environmental influences, the effects of which could have immediate and far-reaching impacts. Tropical climates sapped the fighting powers of British soldiers or prevented administrators from efficiently overseeing empire while by the early-twentieth century, the spectre of white degeneration in the settler colonies and in India haunted policymakers, leading to increased government intervention in society to alleviate its ill effects. To colonize, indeed, the very security of the British Empire seemed to hinge on the interaction of people and environments. Fears of tropical climates prevented permanent European migration to India and, at different times, to parts of tropical Australia, but made India's higher altitudes attractive, along with migration to temperate parts of Australasia. Europeans encountered existing unhealthy environments, but could also, through pollution, create equally dangerous places. As well as facilitating the migration of people