

Notes

1 Origins of Environmental Anxieties

1. C. R. Markham, 'On the Effects of the Destruction of Forests in the Western Ghats of India on the Water-Supply', *Journal of the Royal Geographical Society of London*, 36 (1866): 180.
2. C. A. Bayly, *The Birth of the Modern World, 1780–1914: Global Connections and Comparisons* (Malden, MA; Oxford: Blackwell, 2004), 199–283.
3. Tony Ballantyne, *Orientalism and Race: Aryanism in the British Empire* (London: Palgrave Macmillan, 2001), 13–17; Ballantyne, 'Race and the Webs of Empire: Aryanism from India to the Pacific', *Journal of Colonialism and Colonial History* 2, 3 (2001): 1–25.
4. Thomas R. Metcalf, *Imperial Connections: India in the Indian Ocean Arena, 1860–1920* (Berkeley and London: University of California Press, 2007), 1. The idea of a Pacific Ocean world also picks up on the work of Tony Ballantyne on racial ideas: *Orientalism and Race: Aryanism in the British Empire* (London: Palgrave Macmillan, 2001). One could also extend the examination of India as a sub-imperial hub in the Pacific beyond environmental and health connections to examine Indian indentured labour.
5. Ian Tyrrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860–1930* (Los Angeles and London: University of California Press, 1999). See also, Alan H. Grey, 'North American influences in the development of New Zealand's landscape, 1800–1935', *New Zealand Geography*, 40, 2 (1984): 66–77; K. Brown, 'The Conservation and Utilization of the Natural World: Silviculture in the Cape Colony circa 1902–10', *Environment and History*, 7, 4 (November, 2001): 427–47. I thank the book's reader for alerting me to this study. William Beinart and Peter Coates, *Environment and History: The Taming of Nature in the United States and South Africa* (London: Routledge, 1995).
6. Gregg Mitman, 'In Search of Health: Landscape and Disease in American Environmental History', *Environmental History*, 10 (April, 2005): 185. Exceptions include Arnold, *The Problem of Nature: Environment, Culture and European Expansion* (Oxford; Cambridge, MA: Blackwell, 1996); Linda Nash, *Inescapable Ecologies: A History of Environment, Disease and Knowledge* (Berkeley: University of California Press, 2006).
7. Warwick Anderson, 'Postcolonial Histories of Medicine', in Frank Huisman and John Harley Warner, eds, *Locating Medical History: The Stories and their Meanings* (Baltimore and London: Johns Hopkins University Press, 2004), 287. Thanks to Cathy Coleborne for alerting me to this chapter.
8. Eric Pawson, 'On the Edge: Making Urban Places', in *Environmental Histories*, 200–13; Andrea Gaynor, *Harvest of The Suburbs: An Environmental History of Growing Food in Australian Cities* (Perth: University of Western Australia Press, 2006), 4. The relationship between urban and rural environmental history in North America is expertly explored by William Cronon, *Nature's Metropolis: Chicago and*

- the Great West* (New York: W. W. Norton, 1991); On India, see Michael Mann and Samiksha Sehrawat, 'A City with a View: The Afforestation of the Delhi Ridge, 1883–1913', *Modern Asian Studies*, 43, 2 (2009): 543–70.
9. For an introduction, see Mahesh Rangarajan, 'Environmental Histories of India: Of States, Landscapes, and Ecologies', in Edmund Burke III and Kenneth Pomeranz, eds, *The Environment and World History* (Los Angeles; Berkeley; London, University of California Press, 2009), 229–54; Tom Griffiths and Libby Robin, eds, *Ecology and Empire: Environmental History of Settler Societies* (Edinburgh: Keele University Press, 1997); Richard H. Grove, Vinita Damodaran and Satpal Sangwan, eds, *Nature and the Orient: The Environmental History of South and South East Asia* (Delhi: Oxford University Press, 1998); James Beattie, 'Seeing the Wood for the Trees: Empire, Nation-making and Forest Management', *New Zealand Journal of Asian Studies*, 10, 2 (December, 2008): 111–20.
 10. William Beinart and Lotte Hughes, *Environment and Empire* (Oxford: Oxford University Press, 2007), 1.
 11. Gregory Barton, *Empire Forestry and the Origins of Environmentalism* (Cambridge: Cambridge University Press, 2002); Bennett "'Sisters of the South": Australian-South African botanic exchange and the rise comparative climatic forestry in South Africa 1881–1994' (Ph.D. diss.: University of Texas, 2010), Beattie, 'Tropical Asia and Temperate New Zealand: Health and Conservation Connections, 1840–1920', in Brian Moloughney and Henry Johnson, eds, *Asia in Making of New Zealand* (Auckland: Auckland University Press, 2007), 36–57.
 12. A concise summary of these ideas is Deepak Kumar, *Science and the Raj: A Study of British India*, Second Edition (New Delhi: Oxford University Press, 2006), 1–31.
 13. Zaheer Baber, *The Science of Empire: Scientific Knowledge, Civilisation, and Colonial Rule in India* (Delhi: Oxford University Press, 1998), 200.
 14. Beverley Kingston, 'The Taste of India', *Australian Cultural History*, 9 (1990): 36. Note also Ballantyne, 'Empire, Knowledge and Culture: From Proto-Globalization to Modern Globalization', in A. G. Hopkins, ed., *Globalization in World History* (London: Pimlico, 2002), 115–40; C. A. Bayly, *Birth of the Modern World: Global Connections and Comparisons 1780–1914* (Malden, MA; Oxford: Blackwell, 2004).
 15. On detailed studies of Indian-European relationships, see Richard Harry Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven: Yale University Press, 2000); Kapil Raj, *Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650–1900* (Houndmills and New York: Palgrave Macmillan, 2007). For exceptions on Indian-colonial connections, see David Gilmartin, 'Imperial Rivers: Irrigation and British Visions of Empire', in Druba Ghosh and Dane Kennedy, eds, *Decentering Empire: Britain, India and the Transcolonial World* (New Delhi: Orient Longman, 2006), 76–103; Christopher V. Hill, *South Asia: An Environmental History* (Santa Barbara: ABC-Clio, 2008).
 16. Libby Robin and Tom Griffiths, 'Environmental History in Australasia', *Environment and History*, 10, 4 (November, 2004): 440.
 17. Thomas R. Dunlap, *Nature and the English Diaspora: Environment and History in the United States, Canada, Australia, and New Zealand* (Cambridge: Cambridge University Press, 1999); Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986);

- Don Garden, *Australia, New Zealand, and the Pacific: An Environmental History* (Santa Barbara: ABC-Clio, 2005); Timothy Fridtjof Flannery, *The Future Eaters: An Ecological History of the Australasian Lands and People* (London: Secker & Warburg, reprint, 1996).
18. John M. MacKenzie, 'Empire and the Ecological Apocalypse: The Historiography of the Imperial Environment', in *Ecology and Empire*, 216.
 19. Simon Schama, *Landscape and Memory* (London: Harper Collins, 1995), 13.
 20. Note, William Lines, *Taming the Great South Land: A History of the Conquest of Nature in Australia* (North Sydney: Allen & Unwin, 1991) or Ramachandra Guha and Madhav Guha, *This Fissured Land: An Ecological History of India* (Delhi: Oxford University Press, 2003).
 21. Ranajit Guha, 'Not at Home in Empire', *Critical Inquiry*, 23, 3 (Spring, 1997): 483. I am indebted to Tony Ballantyne for sending me this article.
 22. Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (Cambridge and New York: Cambridge University Press, 1995); Grove, *Climate and Empire: Colonialism and Global Environmental History, 1400–1940* (Cambridge: Cambridge University Press, 1997). The idea of forest conservation as a form of development in India, for instance, picks up the work of scholars such as Richard Drayton (*Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* [New Haven: Yale University Press, 2000]) and S. Ravi Rajan (*Modernizing Nature: Forestry and Imperial Eco-Development 1800–1930* [Oxford: Oxford University Press, 2006]).
 23. Some notable exceptions, of course, remain: Sujit Sivasundaram, *Nature and the Godly Empire: Science and Evangelical Mission in the Pacific, 1795–1850* (Cambridge: Cambridge University Press, 2005).
 24. Beattie and John Stenhouse, 'Empire, Environment and Religion: God and Nature in nineteenth-century New Zealand', *Environment and History*, 13, 4 (November, 2007): 413–46.
 25. Drayton, *Nature's Government*, xvii.
 26. Clarence J. Glacken, *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient times to the end of the Eighteenth Century* (Berkeley: University of California Press, 1967); Raymond Williams, *The Country and the City* (London: Penguin, 1975); Mark Elvin and Liu Ts'ui-jung, eds, *Sediments of Time: Environment and Society in Chinese History* (Cambridge: Cambridge University Press, 1998); Grove, Vinita Damodaran, and Satpal Sangwan, eds, *Nature and the Orient: The Environmental History of South and Southeast Asia* (Delhi: Oxford University Press, 1998).
 27. For a succinct overview of debates about 'the rise of the West', see Robert B. Marks, *Origins of the Modern World: A Global and Ecological Narrative* (Lanham: Rowman & Littlefield, 2002).
 28. On railways and industrialisation, note W. G. Hoskins, *The Making of the English Landscape* (London: Book Club, reprint, 1981), 211–32, 254–69. In an equally brilliant book, James Winter, *Secure from Rash Assault: Sustaining the Victorian Environment* (Berkeley; London: University of California Press, 1999) shows the limits of steam power in agriculture, which for instance, only could operate on large, flat fields.
 29. See, Winter, *Secure from Rash Assault*.
 30. Hoskins, *Making*, 211–32 (quote 256).

31. There is a vast literature on this topic, on which almost any general text on this period will also focus. Note, Oliver MacDonagh, *Early Victorian Government 1830–70* (London: Weidenfeld and Nicolson, 1977); Anthony S. Wohl, *Endangered Lives: Public Health in Victorian Britain* (London: Harvard University Press, 1983).
32. Harold Perkin, *The Origins of Modern English Society, 1780–1880* (London: Routledge; Toronto: University of Toronto Press, 1969), 134–75.
33. Williams, *Country and the City*.
34. Martin J. Wiener, *English Culture and the Decline of the Industrial Spirit, 1850–1980* (Cambridge; New York: Cambridge University Press, 1981).
35. Keith Thomas, *Man and the Natural World: Changing Attitudes in England, 1500–1800* (New York and Oxford: Oxford University Press, reprint, 1996), 190.
36. Thomas, *Man and the Natural World*; James Serpell, *In the Company of Animals: A Study of Human-Animal Relationships* (Cambridge: Cambridge University Press, reprint, 1996); D. G. Charlton, *New Images of the Natural in France: A Cultural History 1750–1800* (Cambridge: Cambridge University Press, 1984), 199–204.
37. Thomas, *Man and the Natural World*, 221–2.
38. David Elliston Allen, *The Naturalist in Britain: A Social History* (Princeton: Princeton University Press, reprint, 1994).
39. Boris Ford, ed., *The Cambridge Cultural History of Britain: The Romantic Age in Britain* (Cambridge: Cambridge University Press, 1992).
40. Peter Gay, *Pleasure Wars: The Bourgeois Experience from Victoria to Freud*, Volume 5 (London: Harper Collins, reprint, 1998), 11.
41. Gay, *Pleasure Wars*; Gay, *The Naked Heart: The Bourgeois Experience, Victoria to Freud*, Volume 4 (London: Harper Collins, reprint, 1998).
42. A vast literature exists on Victorian passions and prejudices, fears and foibles. For an excellent survey of the way material improvement and industrialisation, as well as developments in geology, history and Darwinian theory contributed to fears about progress, see James Joll, *Europe since 1870: An International History*, fourth edition (London: Penguin, 1990), especially 78–112, 143–68.
43. Energised by evangelical fervour spreading through Britain, the Humanitarian movement of the 1830s sought to protect colonised subjects from the excesses of empire by introducing them to the Good Book and to the umbrella of empire. Denoon, Mein-Smith, Wyndham, 72–94.
44. Sally Mitchell, ed., *Victorian Britain: An Encyclopedia* (New York and London: Garland, 1988), 262.
45. Denoon and Mein-Smith, 87–8.
46. *Tasman Relations: New Zealand and Australia, 1788–1988*, ed. by Keith Sinclair (Auckland: Auckland University Press, 1987); Mein-Smith, Peter Hempenstall and Shaun Goldfinch, with Stuart McMillan and Rosemary Baird, *Remaking The Tasman World* (Christchurch: Canterbury University Press, 2008).
47. Denis McLean, *The Prickly Pair: Making Nationalism in Australia and New Zealand* (Dunedin: Otago University Press, 2003).
48. R. L. Heathcote, 'Images of a Desert? Perceptions of Arid Australia', *Australian Geographical Studies*, 25, 1 (April, 1987): 3–25.
49. J. M. Powell, 'Patrimony of the People: The Role of Government in Land Settlement', in Heathcote, ed., *The Australian Experience: Essays in Australian*

- Land Settlement and Resource Management* (Melbourne: Longman Cheshire, 1988), 14–24; Brooking, 'Economic Transformation', in Geoffrey W. Rice, ed., *The Oxford History of New Zealand*, Second Edition (Auckland: Oxford University Press, 1997), 230–84.
50. R. Wright, *The Bureaucrats' Domain: Space and the Public Interest in Victoria, 1836–84* (Melbourne: Oxford University Press, 1989).
 51. Denoon and Mein-Smith; Denoon, *Settler Capitalism: The Dynamics of Dependent Development in the Southern Hemisphere* (Oxford: Clarendon Press, 1983).
 52. M. S. Randhawa, *A History of Agriculture in India, 1757–1947*, vol. 3 (New Delhi: Indian Council of Agricultural Research, 1983).
 53. Note, for instance, Arnold, 'Agriculture and "Improvement" in Early Colonial India: A Pre-History of Development', *Journal of Agrarian Change*, 5, 4 (October, 2005): 505–25.
 54. William Barrett Marshall, *A Personal Narrative of Two Visits to New Zealand in Her Majesty's Ship Alligator, A. D. 1834* (London: James Nisbet and Co., 1836), 73.
 55. Grove, *Green Imperialism*, 168–308; M. Mufakharul Islam, *Irrigation, Agriculture and the Raj: Punjab, 1887–1947* (New Delhi: Manohar, 1997); J. M. Powell, *An Historical Geography of Modern Australia: The Restive Fringe* (Cambridge: Cambridge University Press, 1988).
 56. Elliott, 20 February 1851, 639.
 57. B. Ribbentrop, *Forestry in British India* (Calcutta: Government Printing, India, 1900), 39.
 58. *Otago Daily Times* (ODT), 13 September 1869, 3.
 59. Grove, *Green Imperialism*.
 60. Grove, 'Conserving Eden: The (European) East India Companies and Their Environmental Policies on St. Helena, Mauritius and in Western India, 1660 to 1854', *Comparative Studies in Society and History*, 35, 2 (April, 1993): 318–51.
 61. Metcalf, *Ideologies of the Raj* (Cambridge: Cambridge University Press, 1994).
 62. Garden, *Australia, New Zealand*; Pawson and Brooking, *Environmental Histories of New Zealand*; Guha and Gadgil, *This Fissured Land*.
 63. Beinart and Hughes, *Environment and Empire*.
 64. Crosby, *Ecological Imperialism*; Garden, *Australia, New Zealand*.
 65. Mike Davis, *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (London and New York: Verso, 2001).
 66. From 'Table 9.2: Estimates of Railway Sleepers used and Resultant Area of Forest Cleared in Australia, 1855–1950', from Michael Williams, 'The Clearing of the Woods', in Heathcote, ed., *The Australian Experience*: 124.
 67. Michael Roche, 'The State as Conservationist', in Pawson and Brooking, eds, *Environmental Histories of New Zealand* (Melbourne: Oxford University Press, 2002), 185.
 68. For an intelligent and succinct discussion note, Richard P. Tucker, 'The Depletion of India's Forests under British Imperialism: Planters, Foresters, and Peasants in Assam and Kerala', in Donald Worster, ed., *The Ends of the Earth: Perspectives on Modern Environmental History* (Cambridge and New York: Cambridge University Press, 1989), 118–40. For greater detail note, Tucker

- and J. F. Richards, eds., *Global Deforestation and the Nineteenth-Century World Economy* (Durham, N. C.: Duke Press Policy Studies, 1983); Richards, James R. Hagen and Edward S. Haynes, 'Changing Land Use in Bihar, Punjab and Haryana, 1850–1970', *Modern Asian Studies*, 19, 3 (1985): 699–732; Mann, 'Ecological Change in North India: Deforestation and Agrarian Distress in the Ganga-Jamna Doab 1800–1850', *Environment and History*, 1, 1 (1995): 201–20. Figure from E. P. Stebbing, *The Forests of India*, Volume Two (London: John Lane, 1923), 257.
69. Baber, 185–6.
 70. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India, 1780–1870* (New York: Cambridge University Press, 2000).
 71. MacLeod, 'Scientific Advice for British India: Imperial Perceptions and Administrative Goals, 1898–1923', *Modern Asian Studies*, 9, 3 (1975): 344.
 72. For a summary see, MacLeod, 'Scientific Advice'; Arnold, *Science, Technology and Medicine in Colonial India* (Cambridge: Cambridge University Press, 2000).
 73. Baber, 207–12.
 74. Dionne and MacLeod, 172–9. India closed its Department of Agriculture in 1879. In 1880 each province had its own department, but owing to low funding and a lack of specialised staff most simply collected data and directed famine relief. See Deepak Kumar, 'Science in Agriculture: A Study in Victorian India', *Asian Agri-History*, 1, 2 (1997): 77–103.
 75. MacLeod, 'Scientific Advice', 345.
 76. Russell Dionne and Roy MacLeod, 'Science and Policy in British India, 1858–1914: Perspectives on a Persisting Belief', in S. Irfan Habib and Dhruv Raina, eds, *Social History of Science in Colonial India* (New Delhi: Oxford University Press, 2007), 166.
 77. Vasant Saberwal, 'Science and the Dissicationist Discourse of the 20th Century', *Environment and History*, 3 (1997): 309–43 (quote, 310).
 78. The phrase 'centers of calculation' comes from Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987), esp 215–57.
 79. Peter Vandergeest and Nancy Lee Peluso, 'Empires of Forestry: Professional Forestry and State Power in Southeast Asia, Part 1', *Environment and History*, 12 (2006): 35 (quote, 36).
 80. Andrea Scott Inglis, *Summer in the Hills: The Nineteenth Century Mountain Resort in Australia* (Melbourne: Australian Scholarly Publishing, 2007); David Walker, *Anxious Nation: Australia and the Rise of Asia 1850–1939* (University of Queensland Press, St. Lucia, 1999).
 81. MacKenzie, *Museums and Empire: Natural History, Human Cultures and Colonial Identities* (Manchester: Manchester University Press, 2009); Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia* (Cambridge: Cambridge University Press, 1996); Michael E. Hoare, *Reform in New Zealand Science, 1880–1926* (Melbourne: Hawthorn Press, 1976).
 82. Frank M. Turner, *Contesting Cultural Authority: Essays in Victorian Intellectual Life* (Cambridge: Cambridge University Press, 1993); Thomas F. Gieryn, *Cultural Boundaries of Science: Credibility on the Line* (Chicago and London: University of Chicago Press, 1999).
 83. Bennett, 'Rethinking State and Professional Forestry in British India' (unpublished MS), 11. As Benjamin Weil notes, from the 1920s the IFS became

- increasingly more technocratic and bureaucratic at the same time as it emphasised profit rather than protection. Benjamin Weil, 'Conservation, Exploitation, and Cultural Change in the Indian Forest Service, 1875–1927', *Environmental History*, 11 (April, 2006): 319–43.
84. Michael Roche and John Dargavel, 'Imperial Ethos, Dominions Reality: Forestry Education in New Zealand and Australia, 1910–1965', *Environment and History*, 14, 4 (November, 2008): 523–43; Brett Bennett, 'An Imperial, National and State Debate: The Rise and Near Fall of the Australian Forestry School, 1927–1945', *Environment and History*, 14, 1 (April, 2009): 217–44.
 85. Wright, 183.
 86. Caroline Jordan, *Picturesque Pursuits: Colonial Women Artists and The Amateur Tradition* (Carlton: Melbourne University Press, 2005), 169.
 87. David Lambert and Alan Lester, 'Introduction: Imperial Spaces, Imperial Subjects', in Lambert and Lester, eds, *Colonial Lives Across the British Empire: Imperial Careering in the Long Nineteenth Century* (Cambridge: Cambridge University Press, 2006), 2.
 88. Beattie and Star, 'Global Influences and Local Environments: Forestry and Forest Conservation in New Zealand, 1850s–1925', *British Scholar*, 3, 2 (September, 2010), 191–218.
 89. Adas, '*High* Imperialism'; Denoon, *Settler Capitalism*; Jürgen Osterhammel, *Colonialism*, translated by Shelley Frisch, Second Edition (Princeton: Markus Wiener, 2005).
 90. Great complexity within and between colonised societies existed. Race, class, gender, religion and in India caste, cut across colonised peoples. Note: Henry Reynolds, *The Law of the Land* (Ringwood: Penguin, 1987); Jenifer Curnow, Ngapare Hopa, and Jane McRae, eds, *Rere atu, taku manu! Discovering History, Language and Politics in Maori-Language Newspapers* (Auckland: Auckland University Press, 2002). On India, note the *Subaltern Studies* series.
 91. Durba Ghosh, 'Terrorism in Bengal: Political Violence in the Interwar Years', in Durba Ghosh and Dane Kennedy, eds, *Decentring Empire: Britain, India and the Transcolonial World* (New Delhi: Orient Longman, 2006), 270–92.
 92. Raymond L. Bryant, 'Shifting the Cultivator: The Politics of Teak Regeneration in Colonial Burma', *Modern Asian Studies*, 28, 2 (May, 1994): 225–50.
 93. On a classic Subaltern Studies text, see Ramachandra Guha, *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* (Delhi: Oxford University Press, 1991). A revision of the subaltern's ideas is provided in Beinart and Hughes, *Environment and Empire*, 269–88.
 94. Guha and Gadgil, 'Forestry and Social Conflict in British India: A Study of the Ecological Bases of Peasant Protest', *Past and Present*, 123 (1989): 141–77.
 95. Brooking, *Lands for the People? The Highland Clearances and the Colonisation of New Zealand: A Biography of John McKenzie* (Dunedin: Otago University Press, 1996), 131–56, 175–82; Ross Galbreath, 'Displacement, Conservation and Customary Use of Native Plants and Animals in New Zealand', *New Zealand Journal of History*, 36, 1 (2002): 36–50; Brad Coombes, 'The Historicity of Institutional Trust and the Alienation of Maori Land for Catchment Control at Mangatu, New Zealand', *Environment and History*, 9, 3 (2003): 333–59.
 96. *Te Wananga* 2, 5 (12 March, 1875): 47. See, also, the address of Renata Kawepo and 16 others against the damage done to streams on Maori land

- through water dams and logging. 'Petition Relative to the Timber Floating Bill', *Journals and Appendix to the Journals of the Legislative Council of New Zealand*, No. 8, 1873, no page.
97. Star and Lynne Lochhead, 'Children of the Burnt Bush: New Zealanders and the Indigenous Remnant, 1880–1930', in *Environmental Histories of New Zealand*, 133.
 98. Ballantyne, 'Archives, Empires and Histories of Colonialism', *Archifacts: The Journal of the Archives and Records Association of New Zealand*, no vol. or no. (2004): 21–36.
 99. Garden, *Australia, New Zealand*.
 100. Elliott Campbell, 'Scottish Identity in Dunedin and Christchurch to c.1920: An Application of the New "British history" to New Zealand' (M. A. thesis, University of Canterbury, 2001), 3–45 (quote, 17).
 101. J. G. A. Pocock, 'British History: A Plea for a New Subject', *New Zealand Journal of History (NZJH)*, 8, 1 (April, 1974): 3–21; Laurence Brockliss and David Eastwood, eds, *A Union of Multiple Identities: The British Isles, c.1750–c.1850* (Manchester and New York: Manchester University Press, 1997).
 102. David Livingstone, *Putting Science in Its Place: Geographies of Scientific Knowledge* (Chicago and London: University of Chicago Press, 2003), 45.
 103. Pawson and Stephen Dovers, 'Environmental History and the Challenge of Interdisciplinarity: An Antipodean Perspective', *Environment and History*, 9, 1 (2003): 65.
 104. Livingstone, *Putting Science*, 12.
 105. Sir Henry Elliot (Secretary to the Government of India) to The Board of Administration for the affairs of the Punjab, handwritten, 20 February 1851, Camp Vah: IOR/H/M/761/645 (quote). For tree planting suggestions, see Sir Henry Elliot (Secretary to the Government of India) to The Board of Administration for the affairs of the Punjab, handwritten, 20 February 1851, Camp Vah: IOR/H/M/761/645. The latter was reproduced as 'Minute by the Most Noble the Marquis of Dalhousie, K. G. Governor General of India', 20 February 1851, read on 12 August 1851 and reprinted in *Select Papers of the Agri-Horticultural Society of the Punjab, from its commencement to 1862* (Lahore: Lahore Chronicle Press, 1868), 1–5.
 106. Beattie, and Star, 'Global Influences and Local Environments', 191–218.
 107. K. Sivaramakrishnan, 'A Limited Forest Conservancy in Southwest Bengal, 1864–1912', *Journal of Asian Studies*, 56, 1 (February, 1997): 75–112.
 108. R. Wright, *The Bureaucrats' Domain: Space and the Public Interest in Victoria, 1836–84* (Melbourne: Oxford University Press, 1989), 149.
 109. Neil Clayton, 'Settlers, Politicians and Scientists: Environmental Anxiety in a New Zealand Colony (Post-graduate Diploma in Arts [History] Dissertation: University of Otago, 1998).
 110. Note, for instance, Graeme Wynn, 'Pioneers, Politicians and the Conservation of Forests in Early New Zealand', *Journal of Historical Geography*, 5, 2 (1979): 171–88; Michael Williams, *Deforesting the Earth: From Prehistory to Global Crisis, An Abridgment* (Chicago: University of Chicago Press, 2006), 263–394.
 111. David Arnold, *The Tropics and the Travelling Gaze: India, Landscape, and Science, 1800–56* (Delhi: Permanent Black, 2005).
 112. H. Cleghorn, F. Royle, R. Baird-Smith and R. Strachey, 'Report of the Committee appointed by the British Association to consider the probable

- effects in an economic and physical point of view of the destruction of tropical forests', *Report of the Proceedings of the British Association for the Advancement of Science* (London: John Murray, 1852), 79.
113. Hill, *South Asia: An Environmental History* (Santa Barbara: ABC–Clio, 2008), 1–11.
 114. Garden, *Australia, New Zealand, and the Pacific*, 234 (quote); Gerald A. Meehl and Julie M. Arblaster, 'The Asian–Australian Monsoon and El Niño–Southern Oscillation in the NCAR Climate System Model', *Journal of Climate*, 11 (1997): 1356–85.
 115. Grove and John Chappell, eds, *El Niño – History and Crisis: Studies from the Asia-Pacific Region* (Cambridge: Cambridge University Press, 2000).
 116. The great complexity of climatic circulations means that apparently related events, such as the simultaneous occurrence of El Niño and crop failure in Europe, need not be immediately connected. Volcanic eruptions, for instance, can disrupt climatic patterns. *El Niño – History and Crisis*. In New Zealand, for instance, major weather systems, such as anti-cyclones and depressions, affect New Zealand, accounting for the predominantly westerly winds which buffer its coasts and which through orographic effect bring higher rainfall to the west coast than the east.
 117. Grove, *Climate and Empire: Colonialism and Global Environmental History, 1400–1940* (Cambridge: Cambridge University Press, 1997). Mike Davis presents a more trenchant criticism of colonial responses to El Niño-induced drought. *Late Victorian Holocausts: El Niño Famines and the Making of the Third World* (London and New York: Verso, 2001). For Australasia, note Garden, *Droughts, Floods and Cyclones: El Niños that Shaped Our Colonial Past* (Melbourne: Australian Scholarly Publishing, 2009); Beattie, 'Environmental Anxiety in New Zealand, 1850–1920: Settlers, Climate, Conservation, Health, Environment' (Ph.D. dissertation: University of Otago, 2005).
 118. Mike Letnic, 'Dispossession, Degradation and Extinction: Environmental History in Arid Australia', *Biodiversity and Conservation*, 9 (2000): 296.
 119. Williams, 'The Clearing of the Woods', in R. L. Heathcote, ed., *The Australian Experience: Essays in Australian Land Settlement and Resource Management* (Melbourne: Longman Cheshire, 1988), 115–16.
 120. Charles Dilke, *Travellers' Tales of Early Australia & New Zealand: Greater Britain, Charles Dilke visits her new lands, 1866 & 1867*, ed. Geoffrey Blainey (North Ryde [N. S. W.]: Methuen Haynes, 1985 [1868]), 86.

2 Imperial Health Anxieties

1. Arthur S. Thomson, *New Zealand Government Gazette (Province of Nelson)*, 2, 9 (16 June, 1854): 48.
2. D. Brandis, 'On the Distribution of Forests in India', *IF*, 9, 5 (May, 1883): 224.
3. I am indebted to Ondine Godtschalk for this observation.
4. Warwick Anderson, *The Cultivation of Whiteness: Science, Health and Racial Destiny in Australia* (Carlton South: Melbourne University Press, 2002); Mark Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India, 1600–1850* (New Delhi: Oxford University Press, 1999); David Arnold, *The Tropics and the Travelling Gaze: India, Landscape, and Science, 1800–1856* (Delhi: Permanent Black, 2005); Arnold, ed., *Warm Climates and*

- Western Medicine: The Emergence of Tropical Medicine, 1500–1900* (Amsterdam: Rodopi, 1996); Roy MacLeod and Milton Lewis, eds, *Disease, Medicine and Empire: Perspectives on Western Medicine and the Experience of European Expansion* (London and New York: Routledge, 1988); Philip D. Curtin, *Death by Migration: Europe's Encounter with the Tropical World in the Nineteenth Century* (Cambridge and New York: Cambridge University Press, 1989).
5. Note: Harrison, *Climates and Constitutions*; Arnold, *The Tropics and the Travelling Gaze*.
 6. An exception is Anderson, *Cultivation of Whiteness*.
 7. Kenneth Thompson, 'Trees as a Theme in Medical Geography and Public Health', *Bulletin of the New York Academy of Medicine*, 54 3 (1975): 518–23 (quotation 521).
 8. Note, for instance, Alison Bashford, 'Medicine, Gender, and Empire', in Philippa Levine, ed. *Gender and Empire* (New York: Oxford University Press, 2004), 77–111.
 9. Alan Bewell, *Romanticism and Colonial Disease* (Baltimore and London: Johns Hopkins University Press, 1997), 22.
 10. Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986); Jared Diamond, *Guns, Germs and Steel: A Short History of Everybody over the last 13,000 years* (London: Vintage, 1998).
 11. Margaret Pelling, 'Contagion/Germ Theory/ Specificity', in W. F. Bynum and Roy Porter, eds, *Companion Encyclopedia of the History of Medicine Volume 1* (London and New York: Routledge, 1993), 309–34.
 12. See, Conevery Bolton Valencius, 'Histories of Medical Geography', in Nicolaas A. Rupke, ed., *Medical Geography in Historical Perspective* (London: Wellcome Trust Centre for the History of Medicine at UCL, 2000), 3–28.
 13. Ideas in this paragraph are based on: G. E. R. Lloyd, 'Introduction', *Hippocratic Writings*, in G. E. R. Lloyd, ed., trans by J. Chadwick and W. N. Mann (New York and London: Penguin and Harmondsworth, 1983, [1950]), 9–61; Clarence J. Glacken, *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient times to the end of the Eighteenth Century* (Berkeley: University of California Press, 1990, [1967]); Caroline Hannaway, 'Environment and Miasmata', in W. F. Bynum and Roy Porter, eds., *Companion Encyclopedia of the History of Medicine Volume 1* (London and New York: Routledge, 1993), 292–308.
 14. 'Malaria and the value of the Eucalyptus', *IF*, 7, 4 (April, 1882): 336.
 15. James Preece, 'Missionary Papers. Documents which relate to James Preece, lay missionary in New Zealand' (Place of publication unknown: unpublished MS: July 1999 and January 2000), 22. Thanks to Dr Marjan Lousburg for bringing this to my attention.
 16. Linda Nash, 'Finishing Nature: Harmonizing Bodies and Environments in Late-Nineteenth Century California', *Environmental History*, 8, 1 (January, 2003): 36 (quotation); Mary Dobson, "'Marsh Fever" – the geography of malaria in England', *Journal of Historical Geography*, 6, 4 (1980): 357–89; Alain Corbin, *Le Miasme et la Jonquille: L'odorat et l'imaginaire social XVIIIe-XIXe siècles* (Manchecourt: Maury Eurolivres, 2000, [1986]); Valencius, *The Health of the Country: How American Settlers Understood Themselves and their Land* (New York: Basic Books, 2002).
 17. Harrison, *Climates and Constitutions*, 11–18.

18. Harrison, *Public Health in British India: Anglo-Indian Preventive Medicine, 1859–1914* (Cambridge, Cambridge University Press, 1994), 61, 49.
19. Sir Henry Rawlinson, *Hansard*, 26 February 1867, vol. 185: 1049. He also pointed out that Indian troops would not have expected to serve overseas. Indian troops had already served in China among other places.
20. In contrast to Mark Harrison, David Arnold dates the development of this fear to the eighteenth century. Arnold, 'Introduction: Tropical Medicine before Manson', in *Warm Climates*, 1–19.
21. Arnold, *Colonizing the Body: State Medicine and Epidemic Disease in Nineteenth-Century India* (Berkeley: University of California Press, 1993); Arnold, *Tropics*; Donald Denoon, 'Temperate Medicine and Settler Capitalism: On the Reception of Western Medical Ideas', in *Disease, Medicine and Empire*, 121–38.
22. Nancy Leys Stepan, *Picturing Tropical Nature* (London: Reaktion Books, 2001); Michael R. Dove, "'Jungle" in Nature and Culture', in Ramachandra Guha, ed., *Social Ecology* (Delhi: Oxford University Press, 1998), 90–115.
23. Robert Wyatt Meadows, 'A Short History of My Life', MS Papers 1700, 9 (Wellington: Alexander Turnbull Library).
24. J. Stirling, *Observations on the Climate and Geographical Position of Western Australia, and on its Adaptation to the Purposes of a Sanatorium for the Indian Army in a Letter Addressed to J. R. Martin, Esq* (London: J. C. Bridgewater, 1859), 3.
25. 'Malaria and the value of the Eucalyptus': 337.
26. Anderson, *Cultivation of Whiteness*, 76.
27. Charles Dilke, *Travellers' Tales of Early Australia & New Zealand: Greater Britain, Charles Dilke visits her new lands, 1866 & 1867*, ed. Geoffrey Blainey (North Ryde [NSW]: Methuen Haynes, 1985 [1868]), 90.
28. Anderson, *Cultivation*, 77; for an alternative reading, see H. R. Woolcock, "'Our Salubrious Climate": Attitudes to Health in Colonial Queensland', in *Disease, Medicine and Empire*, 176–93.
29. Anderson, *Cultivation*, 83–4.
30. Harrison, *Climates and Constitutions*, 142–3; for the later nineteenth century, see Arnold, *Colonizing the Body*, 254–60.
31. Over 62,000 Melanesians from the 1860s worked as indentured labour on plantations in Queensland. Kay Saunders, 'The Workers' Paradox: Indentured Labour in the Queensland Sugar Industry to 1920', in Kay Saunders, ed., *Indentured Labour in the British Empire, 1834–1920* (Beckenham: Croom Helm, 1984), 213–59 (figure from 'Appendix 1', 246); Harrison, "'The Tender Frame of Man": Disease, Climate, and Racial Difference in India and the West Indies, 1760–1860', *Bulletin of the History of Medicine*, 70, 1 (1996): 68–93; J. M. Powell, 'Medical Promotion and the Consumptive Immigrant to Australia', *Geographical Review*, 63, 4 (October, 1973): 449–76; Stefan Petrow, *Sanatorium of the South?: Public Health and Politics in Hobart and Launceston, 1875–1914* (Hobart: Tasmanian Historical Research Association, 1995); Curtin, *Death by Migration*.
32. *Hansard*, 14 July 1863, vol 172, c 776.
33. 'Arboriculture in its relation to Climate', *IF*, 1, 2 (October, 1875): 153–4.
34. Radhika Ramasubban, 'Imperial Health in British India, 1857–1900', in *Disease, Medicine and Empire*, 38–40.

35. Harrison, *Public Health*; Arnold, *Tropics and the Travelling Gaze*; Arnold, *Science, Technology and Medicine*, 76–81.
36. Harrison, *Public Health*, 97.
37. Harrison, *Public Health*; Ramasubban, 'Imperial Health', 38–60; Kaushik Roy, 'Managing the Environment: Disease, Sanitation and the Army in British-India, 1859–1913', in Ranjan Chakrabarti, ed. *Situating Environmental History* (New Delhi: Manohar, 2007), 187–219.
38. Dane Kennedy, *The Magic Mountains: Hill Stations and the British Raj* (Berkeley and Los Angeles: University of California Press, 1996); Curtin, *Death by Migration*.
39. Queeny Pradhan, 'Empire in the Hills: The Making of Hill Stations in Colonial India', *Studies in History*, 23 (2007): 34–55.
40. Judith T. Kenny, 'Climate, Race, and Imperial Authority: The Symbolic Landscape of the British Hill Station in India', *Annals of the Association of American Geographers*, 85: 4 (December, 1995): 699, 702.
41. Dilke, 182.
42. Kennedy, 'Diagnosing the Colonial Dilemma: Tropical Neurasthenia and the Alienated Briton', in Durba Ghosh and Dane Kennedy, eds, *Decentring Empire: Britain, India and the Transcolonial World* (New Delhi: Orient Longman, 2006), 157–81; also Anderson, *Cultivation*, 120–4.
43. Arnold, *Tropics and the Travelling Gaze*; Douglas M. Peers, "'There is Nothing More Poetical than War": Romanticism, Orientalism and Militarism in J. W. Kaye's Narratives of the Conquest of India', in Julie F. Codell, ed., *Imperial Co-Histories: National Identity and the British and Colonial Press* (London; Cranbury, NJ; Mississauga, Ontario: Associated University Presses, 2003), 273–99; Nigel Leask, *British Romantic Writers and the East, Anxieties of Empire* (Cambridge: Cambridge University Press, 1992); Bewell, *Romanticism and Colonial Disease*.
44. Mrs Muter, *Travels and Adventures of An Officer's Wife in India, China, and New Zealand*, Volume 1 (London: Hurst and Blackett, 1864), 125–6.
45. Muter, *Travels*, 134.
46. Macpherson quoted in Hugh Cleghorn, *The Forests and Gardens of South India* (London: W. H. Allen & Co., 1861), 298.
47. Dhruv Kumar Singh, "'Clouds of Cholera": and Clouds Around Cholera, 1817–70', in Deepak Kumar, ed., *Disease and Medicine in India: A Historical Overview* (New Delhi: Tulika Books, 2001), 144–65; Ian Catanach, 'Plague and the Tensions of Empire: India, 1896–1918', in Arnold, ed., *Imperial Medicine and Indigenous Societies* (Manchester: Manchester University Press, 1988), 149–71.
48. Kenny, 706.
49. Pradhan, 55.
50. Pradhan, 49.
51. Kenny, 706–8. On cholera, note: Arnold, 'Cholera and Colonialism in British India', *Past and Present*, 113 (1986): 118–51.
52. Muter, vol 1, 131, 133–5.
53. Meadows, 16.
54. 'Malaria and the value of the Eucalyptus', *IF*, 7, 4 (April, 1882): 336.
55. Desmond, *European Discovery*, 258–85 (quote, 277).
56. Dove, "'Jungle" in Nature and Culture'.
57. D. Brandis, 'On the cultivation of the different species of Eucalyptus in Northern India', *IF*, 2, 2 (October, 1876): 141–4.

58. Cleghorn to Secretary of Government, 17 August 1859, no 755, in Cleghorn, 'Correspondence Regarding Kumari Cultivation', H. Cleghorn, 'Third Report on Forest Operations', 31 August 1860, in Cleghorn, *Forests*, 139.
59. Brandis, 'On the cultivation': 143.
60. R.W. Doughty, *The Eucalyptus: A Natural and Commercial History of the Gum Tree* (Baltimore: Johns Hopkins, 2000) 128.
61. On which see Grove, 'Conserving Eden: The (European) East India Companies and their Environmental Policies on St. Helena, Mauritius, and in Western India, from 1660 to 1854', *Comparative Studies in Society and History*, 35, 2 (April, 1993): 318–51.
62. For an entertaining chapter on the Baron, see Hay, *Gum*, 71–103. On its anti-malarial properties note especially, Hay, *Gum*, 88–90, and Thompson, 'Trees as a Theme in Medical Geography and Public Health', *Bulletin of the New York Academy of Medicine*, 54, 3 (1975): 518–23.
63. Ian Tyrrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860–1930* (Berkeley, California: University of California Press, 1999), endnote 18 from page 23, referenced on 69–70; see also Thompson, 'Trees as a Theme': 524. Its anti-malarial properties generally went unchallenged until the late 1890s, when the importance of the host, the *Anopheles* mosquito, in transferring malaria was discovered. Michael Warboys, 'Germs, Malaria and the Invention of Mansonial Tropical Medicine: From 'Diseases in the Tropics' to 'Tropical Diseases'', in David Arnold, ed., *Warm Climates and Western Medicine: The Emergence of Tropical Medicine, 1500–1900* (Amsterdam: Rodopi, 1996), 186–98.
64. 'Arboriculture in its relation to Climate': 151.
65. J. L. Laird, 'The Eucalyptus Globulus: From a botanical, economical and medical point of view, translated from the French by J. E. Planchon, Professeur à la Faculté de Montpellier', *IF*, 1, 2 (October, 1875): 175–7.
66. J. E. O'Connor, 'The Cultivation of "Eucalyptus Globulus" and other Australian Gums in India', *IF*, 2, 2 (October, 1876): 120–35.
67. 'Malaria and the value of the Eucalyptus', *IF*, 7, 4 (April, 1882): 339, 337.
68. Laird, 157.
69. Dr. J. Maitland cited in 'Plantation of Australian Trees, Nilgiri Hills', in Cleghorn, pp. 180–1.
70. Reproduced in 'Arboriculture in its relation to Climate': 142–4.
71. O'Connor: 124.
72. Cleghorn to Secretary to Government, R.D., Utakamand, 8 November 1859, No 836, 'Firewood of the Nilgiri Hills', in Cleghorn, 160.
73. 'South Australian Eucalyptus', *IF*, 3, 4 (April, 1878): 317–19.
74. Cleghorn, 'Memorandum: Fuel and Firewood Jungles', Madras, 5 April 1859, H. Cleghorn to Secretary of Government, 17 August 1859, no 755, in Cleghorn, *Forests*, 149–57.
75. Cleghorn, 42–3, 171–91.
76. Cleghorn, 'Third Report on Forest Operations', 31 August 1860, in Cleghorn, *Forests*, 63.
77. Brandis to Editor Ootacamund, 7 April 1882, 'The Forests of South India', *IF*, 7, 4 (April, 1882): 366.
78. Brandis, 'On the Distribution of Forests in India', *IF*, 9, 5 (May, 1883): 224; O'Connor, 'Cultivation of "Eucalyptus Globulus"': 120.

79. Conservator of Forests, Mysore and Coorg, to the Secretary to the Chief Commissioner of Mysore, 29 October 1877, Bangalore [sic], No. 1688, 'Report on the Exotic Trees in the fuel Plantations of the Nundidroog Division, Mysore', IF, 3, 4 (April, 1878): 357–9.
80. Cleghorn, 'Third Report on Forest Operations', 31 August 1860, in Cleghorn, *Forests*, 82.
81. O'Connor: 128.
82. O'Connor, 'Cultivation of "Eucalyptus Globulus"': 120–35.
83. Brandis, 'On the Cultivation of the different species', 137–8.
84. Brandis, 'On the Cultivation of the different species', 141.
85. Paucity of Records: R. N. Parker, 'Eucalyptus in North-West India', IF, 39, 2 (February, 1913): 81–6. Difficulty of identification: Brandis, 'On the Cultivation of the different species', 140.
86. On fungus and white ants: J. C. McDonnell to Editor, IF, 6, 4 (April, 1881): 335; 'Decay of Eucalyptus at Changa Manga', IF, 7, 1 (July, 1881): 98–100. On soil and water: H. L. Wright, 'Eucalyptus Experiments in the Simla Hills', IF, 40, 7 (July, 1914): 360–5.
87. Note, for instance, 'South Australian Eucalyptus', IF, 3, 4 (April, 1878): 317–19; Laird, 'Eucalyptus Globulus': 156–79; 'Decay of Eucalyptus at Changa Manga', IF, 7, 1 (July 1881): 98–100; 'Mueller's Eucalyptographia', IF, 11, 5 (May, 1885): 237; 'The Timber Trees of New South Wales', IF, 11, 6 (June, 1885): 272–8.
88. Cleghorn, 339; G. Foster, 'Plantation of Eucalypti', IF, 2, 3 (January, 1877): 324.
89. Doughy, 129.
90. Cleghorn, 339; O'Connor, 131 complained at the 'heavy charges' incurred from importing Australian seeds.
91. Laird, for instance, recounted examples of successful drainage and health improvements in Algeria and southern France. Laird: 166–8.
92. Brandis to Editor, Ootacamund, 7 April 1882, 'The Forests of South India': 365–6.
93. Lucille Brockway, *Science and Colonial Expansion: The Role of the British Royal Botanic Gardens* (New Haven and London: Yale University Press, 2002), 103–39.
94. 'Arboriculture in its relation to Climate', IF, 1, 2 (October, 1875): 142–55.
95. Captain Hall, Royal Engineers, 'Sub-surface Moisture in connection with the question of the deterioration of Culturable Soil ...', IF, 7, 2 (October, 1881): 131–50.
96. Elizabeth Whitcombe, 'The Environmental Costs of Irrigation in British India: Waterlogging, Salinity and Malaria', in David Arnold and Ramachandra Guha, eds, *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia* (Delhi: Oxford University Press, 1996), 237–59.
97. 'Arboriculture': 150.
98. Thomas R. Metcalf, *Ideologies of the Raj* (Cambridge: Cambridge University Press, 1994).
99. Morag Bell, "'The Pestilence That Walketh in Darkness": Imperial Health, Gender and Images of South Africa, c. 1880–1910', *Transactions of the Institute of British Geographers*, New Series, 18, 3 (1993): 327–41.
100. Muter, vol. 1, 165; 135.

101. Thousands of Europeans similarly migrated from Britain to North America, South Africa and Australasia in the belief that this would improve their health. Note: Curtin, *Death by Migration*.
102. F. Napier Broome to Viceroy of India, Government House, Perth, 11 December, 1885, *Despatches on the subject of a Sanitarium in Western Australia for the British Troops Serving in India*, no. 22, presented to the Legislative Council by His Excellency's Command (Perth: Government Printer, 1886), 4.
103. F. K. Crowley, 'Broome, Sir Frederick Napier (1842–1896)', *Australian Dictionary of Biography*, Volume 3 (Melbourne: Melbourne University Press, 1969), 248–50.
104. J. Stirling, *Observations on the Climate and Geographical Position of Western Australia, and on its adaptation to the purposes of a Sanatorium for the Indian Army in a Letter Addressed to J. R. Martin, Esq* (London: J. C. Bridgewater, 1859). Many ex-EIC officers appear to have migrated to Western Australia. On which, see H. Compton to Secretary of State for India, 5 June 1883, Adelaide, British Library, India Office, IOR/L/PJ/6/102/ 1176.
105. Also note: *Military Sanatarium [sic]. Report of the Board of Commissioners*, 7 September 1858 (Tasmania: no publisher, 1858).
106. For exceptions note, Linda Bryder, "'A Health Resort for Consumptives': Tuberculosis and Immigration to New Zealand, 1880–1914", *Medical History*, 40 (1996): 459–64; Curtin, *Death By Migration*; Diana Dyason, 'The Medical Profession in Colonial Victoria, 1834–1901', *Disease, Medicine and Empire*, 194–216; L. K. Gluckman, *Tangiwai – A Medical History of New Zealand prior to 1860* (Auckland: L. K. Gluckman, 1976), 57–61; Warwick Anderson, 'Postcolonial Histories of Medicine', in Frank Huisman and John Harley Warner, eds, *Locating Medical History: The Stories and their Meanings* (Baltimore and London: Johns Hopkins University Press, 2004), 285–306.
107. Stirling, 4.
108. On the promotion of New Zealand, see Miles Fairburn, *The Ideal Society and Its Enemies: The Foundations of Modern New Zealand Society, 1850–1900* (Auckland: Auckland University Press, 1989); Ian D. Pool, 'Is New Zealand a Healthy Country?' *New Zealand Population Review*, 8, 2 (July, 1982): 2–27.
109. Michael Belgrave, 'Thomson, Arthur Saunders', *Dictionary of New Zealand Biography: Volume one, 1769–1869* (Wellington: Allen & Unwin and Dept. of Internal Affairs, 1990), 534. Henceforth DNZB. On the travels of Thomson's regiment, the Seventeenth, or the Leicestershire Regiment of Foot, see Richard Cannon, *Historical Record of the Seventeenth, or the Leicestershire Regiment of Foot* (London: Silvester & Co., 1847), 39–45.
110. David N. Livingstone, 'Human Acclimatization: Perspectives on a Contested Field of Enquiry in Science, Medicine and Geography', *History of Science*, 25 (1987): 369–70; Curtin, *Death by Migration*, 44–5.
111. A. S. Thomson, 'Climate of New Zealand', Enclosure No. 35 16 October 1850, in 'Papers relating to native inhabitants; the New Zealand Company and other affairs of the colony', *British Parliamentary Papers*, 1851 (114), 50–5.
112. All quotes in this paragraph from Thomson, 'Climate of New Zealand', 55.
113. Thomson, *New Zealand Government Gazette (Province of Nelson)*, 2, 9 (16 June, 1854): 47–53; Thomson, 'Reports on the Health of the Troops Stationed in New Zealand. No. 1', *Supplementary New Zealand Government*

- Gazette. (Province of Wellington)*, 5, 38 (Monday, 27 December 1858): i–vii; Thomson, *The Story of New Zealand: Past and Present – Savage and Civilized*, Two Volumes (London: John Murray, 1859). On Thomson’s argument of New Zealand’s healthiness for European vitality see *Story of New Zealand*, Volume 1, 45–8.
114. All quotes from Thomson, *New Zealand Government Gazette*, 52.
 115. Thomson, *New Zealand Government Gazette*, 48–9.
 116. Thomson, *New Zealand Government Gazette*, 52–3. Thomson’s studies into bodily measurements of Maori revealed that Maori were not as physically strong as Europeans. Damon Salesa, ‘“The Power of the Physician”: Doctors and the Dying Maori in Early Colonial New Zealand’, *Health and History*, 3, 1 (2001): 31–2.
 117. *New Zealand Journal*, 26 November 1842, 279.
 118. Ernst Dieffenbach, *Travels in New Zealand*, 2 Volumes (Christchurch: Capper Press, 1974), 183.
 119. *Lyttleton Times*, 29 April 1854, 7.
 120. See Despatch Number 69 mentioned in ‘Government Gazette, Province of Taranaki’, *New Plymouth Provincial Gazette* 7, no. 10 (25 May, 1859), 40. Henry John Tancred to His Honour, The Superintendent, Napier, Colonial Secretaries’ Office, 29 March 1859, Auckland, HB, 3 1, 1859/ Letter No. 5, General Government Letters, National Archives (NA), Wellington.
 121. *Appendices to the Journal of the House of Representatives* (AJHR), 22 July 1868, 24.
 122. The files often provide only minimal information, meaning it is likely that many who served in India did not mention it. Returns filed by surviving servicemen or their wives provide an indicative figure of some of the Indian servicemen who took advantage of this. Of 18 who applied in Nelson Province, six had served in India; in Canterbury, the figure was six out of 29. Military Land Claims, Nelson, 1259–75: LS 66, Record 15, NA, Wellington; Military Land Claims, Canterbury, 1285A–94B: LS 66, Record 17, NA, Wellington.
 123. This figure is drawn from James Belich, *The New Zealand Wars and the Victorian Interpretation of Racial Conflict* (Auckland: Penguin, 1986), 59.
 124. See, W. F. Keane, ‘Duty Bound: A Biography of Sir J. L. C. Richardson, 1810–78’ (BA Hons. dissertation: University of Otago, 1988); ‘John Larkins Cheese Richardson’, ‘Biography Files from India and Colonial Office’, British Library, London, CS N/1/39 f.3.
 125. John Larkins Cheese Richardson, *A Summer’s Excursion in New Zealand: with Gleanings from Other Writers* (London: Kerby and Sons; Exeter: William Roberts, 1854); Sir John Cracroft Wilson, Transcript of Diary/Recollections, 1854, of Canterbury, typed transcript by Ron Chapman, 1989, Canterbury Museum, ARC1989.80.
 126. On nearing Calcutta, Muter noted that: ‘From the yellow grass of the Canterbury plains the change for a time is charming; but the clear bracing atmosphere of New Zealand, its snow-covered mountains and blue streams, are soon missed.’ Muter, *Travels and Adventures of an Officer’s Wife in New Zealand* (Christchurch: Kiwi Publishers, 1997 [1864]), 313.
 127. Andrew Sinclair, Letters and Journals, March 1860, MS 1947, ATL.

128. E. W. Payton, *Round about New Zealand: Being Notes from A Journal of Three Years' Wanderings in the Antipodes* (London: Chapman & Hall, 1888), 171. Thanks to Tony Ballantyne for alerting me to this.
129. 'Timber in New Zealand', *IF*, 12, 6 (June, 1886): 284.
130. Andrea Scott Inglis, *Summer in the Hills: The Nineteenth-Century Mountain Resort in Australia* (Melbourne: Australian Scholarly Publishing, 2007), 45–64.
131. William Coleman, *Yellow Fever in the North: The Methods of Epidemiology (Wisconsin Publications in the History of Science and Medicine)* (Madison and London: University of Wisconsin Press, 1987), 5, xiv.
132. 'Report of the Hokitika Hospital': 77.
133. Anderson, *Cultivation*, 11.
134. *Edinburgh Review* (January 1828): 94–7 quoted in Frank Crowley, ed., *A Documentary History of Australia. Volume 1: Colonial Australia, 1788–1840* (West Melbourne: Thomas Nelson, 1980), 367.
135. John Turnbull, *A Voyage Round the World, in the years 1800, 1801, 1802, 1803, and 1804; in which the author visited the principal islands in the Pacific Ocean, and the English settlements of Port Jackson and Norfolk Island*, Volume 1 (London: A. Maxwell, 1805), 44–8 quoted in *A Documentary History of Australia*, 133.
136. Dilke, 87.
137. Anderson, *Cultivation*, 22.
138. Anderson, *Cultivation*, 20 (figures), 35–8.
139. William Howitt, *Land, Labour and God; or Two Years in Victoria* (London: Longmans, 1855), quoted in Anderson, *Cultivation*, 127.
140. Wilson, *Diary/Recollections*, 6.
141. Mrs Charles [Elizabeth] Meredith, *Notes and Sketches of New South Wales, During A Residence in that Colony from 1839 to 1844* (London: John Murray, 1844), 85.
142. *West Australian* (WA), 19 October 1885: 3.
143. Rolf Boldrewood, *Old Melbourne Memories* (1884) quoted in Paul Fox, 'The Simla of the South', *The Changing Landscape: The Garden in the Landscape: Proceedings of the Australian Garden History Fifteenth Annual National Conference*, 21–3 October 1994 (Ballarat: Australian Garden History Society, 1994), 10 (Boldrewood), 11.
144. Fox, 'The Simla', 11.
145. Alfred Deakin, 'Diary, Indian 1890–91', Deakin Papers, National Library of Australia, quoted in Fox, 'The Simla', 13.
146. Inglis, *Summer in the Hills*.
147. Anthony S. Wohl, *Endangered Lives: Public Health in Victorian Britain* (Cambridge, MA: Harvard University Press, 1983); T. Stevenson, 'Miasmas, Morbidity and Mileu: Mortality in Victorian South Australia', *Proceedings of the Royal Geographical Society (S. A. Branch)*, 81 (1980): 40–85; Alan Mayne, "'The dreadful scrouge": Responses to Smallpox in Sydney and Melbourne, 1881–2', in Roy MacLeod and Milton Lewis, eds, *Disease, Medicine and Empire: Perspectives on Western Medicine and the Experience of European Expansion* (London and New York: Routledge, 1988), 219–41; Milton Lewis and MacLeod, 'A Workingman's Paradise? Reflections on Urban Mortality in Colonial Australia 1860–1900', *Medical History*, 31 (1987): 387–402; Geoffrey W. Rice, 'Public Health in Christchurch, 1875–1910: Mortality

- and Sanitation', in Linda Bryder, ed., *A Healthy Country: Essays on the Social History of Medicine in New Zealand* (Wellington: B. Williams Books, 1991), 85–108; Pamela J. Wood, *Dirt: Filth and Decay in a New World Arcadia* (Auckland: Auckland University Press, 2005); Derek A. Dow, *Safeguarding the Public Health: A History of the New Zealand Department of Health* (Wellington: Victoria University Press; Ministry of Health; Historical Branch, Department of Internal Affairs, 1995).
148. A. K. Newman, 'Speculations on the Physiological Changes Obtaining in the English Race when Transplanted to New Zealand', *TPNZI*, 9 (1876): 44. See also John Stenhouse, "'A disappearing race before we came here": Doctor Alfred Kingcome Newman, The Dying Maori, and Victorian Scientific Racism', *NZJH*, 20, 2 (October, 1996): 128–9.
 149. 'Is New Zealand a Healthy Country?' *TPNZI*, 15 (1883): 493–510.
 150. W. D. Campbell, 'On the Draining of Towns', *TPNZI*, 9 (1876): 29–37. See also, Edward Dobson, 'Notes on the Best Method of Meeting the Sanitary Requirements of Colonial Towns', *TPNZI*, 13 (1880): 84–91; J. Turnbull Thomson, 'On the Cleansing of Towns', *TPNZI*, 11 (1878): 38–69; W. R. E. Brown, 'Draining of Towns: Results of having Outfall Drains within Sydney Harbour', *TPNZI*, 9 (1876): 260–3; J. C. Crawford, 'On Thorough Drainage', *TPNZI*, 2 (1869): 211–19; Edward Withy, 'Sanitation and Ventilation as required in a Modern House', *TPNZI*, 25 (1892): 459–78; John Goodall, 'On the Probability of a Water Supply being obtained for the City of Auckland from Mount Eden', *TPNZI*, 6 (1873): 35–40; James Stewart, 'Notes on the Proposition to Supply Auckland with Water from Mount Eden', *TPNZI*, 6 (1873): 40–2.
 151. 'The Sanitary Condition of New Zealand', *Intercolonial Medical Congress of Australasia* (Melbourne: Stilwell, 1889), 446.
 152. Anderson, *Cultivation of Whiteness*; Lewis, *The People's Health: Public Health in Australia, 1788–1950* (Westport: Praeger, 2003), 41–116; J. Ashburton Thompson, 'A Record of the Present Sanitary State of New South Wales', *Intercolonial Medical Congress*, 442–3.
 153. 'Our Science Page: Decay of Plants and Animals (from the "Chemistry of Common Things")', *New Zealand Country Journal* (NZCJ), 7, 6 (1 November 1883): 494.
 154. *New Zealand Government Gazette* (Province of Nelson), 15, 26 (9 July, 1867): 102.
 155. 15, 26 (9 July, 1867): 103–4.
 156. 'Such draining, covering, filling-up, or cleaning from vegetable growth', it noted, would 'be at the expense of, or recoverable from, the landowner or his agent.' 15, 26 (9 July, 1867): 104–7.
 157. 'Province of Nelson: Waterworks Act', *Nelson Provincial Council Votes and Proceedings*, Session 10, No.1 (1863): 7; Thompson, 'A Record of the Present Sanitary State of New South Wales', 434–47; and reference 146.
 158. Believing that ozone formed closest to the surface, health seekers maximised their exposure to it by staying as close to the surface of the sea as possible. Lena Lencek and Gideon Bosker, *The Beach: The History of Paradise on Earth* (London: Secker & Warburg, 1999), 113–38; Wood, *Dirt*; Petrow, *Sanatorium of the South?*
 159. *NZCJ*, 1, 2 (2 April 1877): 82. For similar arguments, see also, 'Sanitary Influence of Trees', *North New Zealand Settler*, 1, 4 (November, 1882): 69;

- R. Aherne, 'Utilization of Sandhills Reserve', NZCJ, 6, 6 (1 November 1882): 406; 'Beneficial Effects of Forests', NZCJ, 14, 6 (November, 1890): 520; R. McNab, 'Forestry in Its Relation to the Farm', *New Zealand Farmer* (hereafter, NZF), 24, 10 (November, 1903): 788.
160. J. B. Armstrong, 'Planting in Towns', NZCJ, 4, 1 (January, 1880): 53.
161. Charlie Challenger, 'Pioneer Nurserymen of Canterbury, New Zealand (1850–65)', *Garden History*, 7, 1 (Spring, 1979): 25–64.
162. Note, for instance, Superintendent General, Inwards Correspondence 1861–77, Otago Provincial Government, Series 7, Roll 43, Micro 414/67, HL, file 9967; Thomas Kirk to Ferdinand von Mueller, 14 June, 1886, 'Official Correspondence of Thomas Kirk, Chief Conservator of Forests 1885–8', qMS-1469–70, ATL, Wellington.
163. These included 'the various varieties of Poplar, the Maples, Planes, Elms, &c', the Tasmanian Wattle, Stringy-bark gum and 'the Willow-leaved gum and the Peppermint gum', but also included native beeches and Ribbonwoods. Armstrong, 'Planting': 50–3.
164. John Dixon Marmaduke, Personal Correspondence, 1886–1900, Box 3, Folder 16, item 97, no date, Canterbury Museum.
165. 'Sanitary Influence of Trees', NNZS, 1, 4 (November, 1882): 69.
166. NZCJ, 1, 2 (2 April 1877): 82. See also, 'Sanitary Influence of Trees': 69; R. Aherne, 'Utilization of Sandhills Reserve', NZCJ, 6, 6 (1 November 1882): 406; 'Beneficial Effects of Forests' NZCJ, 14, 6 (November, 1890): 520; R. McNab, 'Forestry in Its Relation to the Farm', NZF, 24, 10 (November, 1903): 788.
167. On this note, for instance, H. E. Meller, *Leisure and the Changing City, 1870–1914* (London; Boston: Routledge & Paul, 1976), 109–17; M. Billinge, 'A Time and Place for Everything: An Essay on Recreation, Re-Creation and the Victorians', *Journal of Historical Geography*, 22, 4 (1996): 443–59; Caroline Daley, 'A Gendered Domain: Leisure in Auckland 1890–1940' in Caroline Daley and Deborah Montgomerie, eds, *The Gendered Kiwi* (Auckland: Auckland University Press, 1999), 87–111.
168. For this theme, note, Fairburn, *Ideal Society*; Julian Kuzma, 'Landscape, Literature and Identity: New Zealand Late Colonial Literature as Environmental Text, 1890–1921' (Ph.D. diss: University of Otago, 2003).
169. Grahame Anderson, 'Wakefield Towns', in *Edward Gibbon Wakefield and the Colonial Dream: A Reconsideration* (Wellington: Friends of the Alexander Turnbull Library, 1997), 143–58; Katie Holmes, Susan K. Martin and Kylie Mirmohamadi, *Reading the Garden: The Settlement of Australia* (Melbourne: Melbourne University Press, 2008), 57–73; Michael Williams, 'The Parkland Towns of Australia and New Zealand', *Geographical Review*, 56, 1 (January, 1966): 67–89.
170. 8, 4 (July, 1884): (first quotation 281; second quotation 278); on progressive ideals, note Erik Olssen, *Building the New World: Work, Politics and Society in Caversham, 1880s–1920s* (Auckland: Auckland University Press, 1995).
171. Stephen Hamnett and Robert Freestone, eds, *The Australian Metropolis: A Planning History* (St Leonards: Allen & Unwin, 1999); Thelma Strongman, *City Beautiful: The First 100 Years of the Christchurch Beautifying Association* (Christchurch: Clerestory Press, 1999).

172. D. McArthur, 'On the Importance of Forestry', TPNZI, 15 (1882): 461–3.
173. See, for instance, D. Tannock, 'Dunedin City Corporation: Reserves Department Annual Report, 1910–11', in *City of Dunedin Departmental Reports, 1910–11* (Dunedin: no publisher, 1911), 1–11. In 1924, Tannock observed with satisfaction that during periods of heavy downpour, trees had prevented serious erosion and, moreover, purified water flowing into the catchment. Tannock, *Report 1923–24* (Dunedin: no publisher, 1924).
174. Peter S. Evans, 'The Great Wall of China: Catchment Policy and Forests Beyond the Yarra Watershed 1850–1950', in Michael Calver et al., eds, *Proceedings of the 6th National Conference of the Australian Forest History Society Inc.* (Rotterdam: Millpress Science Publishers, 2005), 613–22; R. W. Richards, *Report, 1907–08* (Dunedin: no publisher, 1908), 27.
175. Armstrong, 50.
176. Anderson, *Cultivation*, 33–4.
177. Both typhus and typhoid were commonly associated with swamps and cities. Typhus 'occurred irregularly in great epidemics', sweeping aside great swathes of the urban population whereas typhoid often broke out sporadically but with some regularity mostly in late summer and autumn. The variable prevalence and occurrence of typhus, most physicians held, broke out because of 'the prevailing epidemic constitution of the atmosphere'. Wilson, 'Fevers', 400–6 (quotation, 400). Most physicians also believed, as Hokitika's Surgeon Superintendent did, that it was 'a fever generated and propagated by poverty, filth, and over-crowding'. 'Report of the Hokitika Hospital, by the Surgeon Superintendent for the 12 months ending 30th April, 1869', *County of Westland Gazette*, 13 (7 June 1869): 77.
178. Wilson, 18 June 1860: 20.
179. Note, for instance, the prevalence of miasmatic ideas popularly adopted during the 1918 Influenza Epidemic. On which, see Rice, *Black November: The 1918 Influenza Pandemic in New Zealand*, Second Edition (Christchurch: Canterbury University Press, 2005); Edna Beattie, op. cit., 2007.
180. Warboys, 'Germs, Malaria and the Invention', 181–207; Anderson, *Cultivation*.
181. Melbourne University's medical researchers engaged in laboratory research and favoured germ theory. Anderson, *Cultivation*.
182. Linda Bryder notes, for example, that Australia and New Zealand public health care went through four distinctive phases, with national power only really coming into play after World War II. Linda Bryder, 'A New World? Two Hundred Years of Public Health in Australia and New Zealand', in Dorothy Porter, ed., *The History of Public Health and the Modern State* (Atlanta: Rodopi, 1994), 313–34.
183. Dow, *Safeguarding*, 42–8.
184. Bryder, 'A New World?' 313–34.
185. Harrison, *Public Health*, 139–226; Arnold, 'Crisis and Contradiction in India's Public Health', in *History of Public Health*, 335–55.
186. Alison Bashford, 'Epidemic and Governmentality: Smallpox in Sydney, 1881', *Critical Public Health*, 9, 4 (1999): 301–16. Brian Moloughney, Tony Ballantyne and David Hood, 'After Gold: Reconstructing Chinese Communities, 1896–1913', in Henry Johnson and Moloughney, eds, *Asia In the Making of New Zealand* (Auckland: Auckland University Press, 2007), 72.

187. Prashant Kidambi, *The Making of an Indian Metropolis: Colonial Governance and Public Culture in Bombay, 1890–1920* (Aldershot: Ashgate, 2007); Arnold, *Colonizing the Body*, 200–39.
188. Note, for instance, Ramasubban, 'Imperial Health'; Roy, 'Managing the Environment', 187–219.
189. Saunders, 'The Workers' Paradox', 213–59.
190. Mayne, 'Smallpox', 229.
191. Bashford, *Imperial Hygiene: A Critical History of Colonialism, Nationalism and Public Health* (Houndsmills: Palgrave Macmillan, 2004).
192. Bashford and Claire Hooker, eds, *Contagion: Epidemics, History and Culture from Smallpox to Anthrax* (London and New York: Routledge, 2001); Moloughney et al., 'After Gold', 72–5.
193. Anderson, *Cultivation of Whiteness*, 93–126.
194. Bashford, "'Is White Australia possible?'"
195. 'Malaria and the value of the Eucalyptus': 337.
196. James Bonwick, *Climate and Health in Australasia ...* (London, Street & Co., 1886), 42.
197. This interpretation is based on Arnold, *Science, Technology and Medicine in Colonial India* (Cambridge: Cambridge University Press, 2000), 198–9.
198. Guy Woods, '1901: A Socio-Economic Profile of Australia at Federation', *Parliament of Australia: Parliamentary Library*, 2001, <http://www.aph.gov.au/library/pubs/rn/2000-01/01RN23.htm> (accessed 2 December 2008); Keith Hackson and Alan McRobie, eds, *Historical Dictionary of New Zealand* (Auckland: Longman, 1996), 309.
199. In response to its semi-tropical climate Brisbane's wealthy lived on hills while the poor below received the sewage from the wealthier. Lewis and MacLeod, 'A Workingman's Paradise?' 394–5.
200. Philippa Mein Smith, 'Infant Welfare Services and Infant Mortality: A Historian's View', *Australian Economic Review*, 24, 1 (January, 1991): 22–34; David Walker, *Anxious Nation: Australia and the Rise of Asia 1850–1939* (St. Lucia: University of Queensland Press, 1999).
201. J. Macmillan Brown: 'The East and the West', *The Press*, 24 May 1913, no page.
202. Lynda Bryder, *A Voice for Mothers: The Plunket Society and Infant Welfare, 1907–2000* (Auckland: Auckland University Press, 2003), 1; Margaret Tennant, *Children's Health, The Nation's Wealth: A History of Children's Health Camps* (Wellington: Bridget Williams Books and Historical Branch, Department of Internal Affairs, 1994), 23. On the wider context, see Bryder, *Below the Magic Mountain: A Social History of Tuberculosis in Britain* (Oxford: Oxford University Press, 1988).
203. Lewis, *People's Health*, 142–78; Denoon and Mein-Smith, *History of Australia*, 256–62.
204. Dow, *Maori Health and Government Policy, 1840–1940* (Wellington: Victoria University Press, 1999); Raeburn Lange, *May the People Live: A History of Maori Health Development, 1900–20* (Auckland: Auckland University Press, 1999); Russell McGregor, *Imagined Destinies: Aboriginal Australians and the Doomed Race Theory, 1880–1939* (Carlton: Melbourne University Press, 1997).
205. Arnold, "'An ancient race outworn:" Malaria and Race in Colonial India, 1860–1930', in Waltraud Ernst and Bernard Harris, eds, *Race, Science and Medicine, 1700–1900* (London and New York: Routledge, 1999), 123–43.

206. R. H. Makgill, 'Nature's Efforts at Sanitation', TPNZI, 35 (1902): 139.
207. In 1888, for instance, H. P. Higginson still upheld miasma as the cause of Wellington's high death rate. According to him, Wellington's 'sewage-mud festered' foreshore 'generates foul gases, which force their way upwards through the drains to the higher levels of the city'. Higginson, 'Sanitary Sewerage', TPNZI, 22 (1889): 369–78 (quotation, 369–70).
208. See, for instance, Tennant, *Children's Health*, 33–7; Kirstie Ross, "'Schooled by Nature": Pakeha Tramping between the Wars', *NZJH*, 36, 1 (April, 2001): 51–61; *Sunlight League of New Zealand: Sun and Sea Bathing, Teeth and Nutrition, Mental Health* (Christchurch: no publisher, n. d. [1930s?]).
209. Margaret Pelling, 'Contagion/Germ Theory/Specificity', in *Companion Encyclopedia of the History of Medicine*, 323–5; Wood, 'Constructing Colonial Dirt: A Cultural History of Dirt in the Nineteenth Century Settlement of Dunedin, New Zealand' (Ph.D. thesis, University of Otago, 1997), 14–16.
210. Anderson, *Cultivation Whiteness*, 55.
211. Lange, *May the People Live*.

3 Colonial Aesthetic Anxieties

1. 'Spare the Mount', *New Zealand Herald* (NZH), 28 March 1877, 3.
2. David Lambert and Alan Lester, 'Imperial Spaces, Imperial Subjects', in Lambert and Lester, eds, *Colonial Lives Across the British Empire: Imperial Careering in the Long Nineteenth Century* (Cambridge: Cambridge University Press, 2006), 2.
3. The paradox, between wanting to have 'wilderness' and prevent its destruction, becomes a common theme in nineteenth-century scenic conservation. See, Geoff Park, *Theatre Country: Essays on Landscape and Whenua* (Wellington: Victoria University Press, 2006).
4. *The Cambridge Cultural History: Volume 6: The Romantic Age in Britain*, ed. by Boris Ford (Cambridge: Cambridge University Press, 1992).
5. Tim Bonyhady, *The Colonial Earth* (Carlton South: Melbourne University Press, 2001); Caroline Jordan, 'Progress versus the Picturesque: White Women and the Aesthetics of Environmentalism in Colonial Australia, 1820–1860', *Art History*, 25, 3 (September, 2002): 341–57; Beattie, 'Wilderness: The Sublime and Picturesque in New Zealand, 1830s–2000s', in Richard Reeve and Mick Field, eds, *Wilderness in New Zealand* (Nelson: Craig Potton, forthcoming).
6. For exceptions, see footnote 5; Hermione de Almeida and George H. Gilpin, *Indian Renaissance: British Romantic Art and the Prospect of India* (Aldershot: Ashgate, 2005); Nigel Leask, *British Romantic Writers and the East, Anxieties of Empire* (Cambridge: Cambridge University Press, 1992); Michael Franklin, ed., *Romantic Representations of British India* (London and New York: Routledge, 2006); John M. MacKenzie, *Orientalism: History, Theory and the Arts* (Manchester; New York: Manchester University Press, 1995).
7. David Arnold, *The Tropics and the Travelling Gaze: India, Landscape, and Science, 1800–56* (Delhi: Permanent Black, 2005).
8. Don Garden, *Australia, New Zealand and the Pacific: An Environmental History* (Santa Barbara: ABC-Clio, 2005), 91.

9. Thomas Dunlap, *Nature and the English Diaspora: Environment and History in the United States, Canada, Australia, and New Zealand* (New York: Cambridge University Press, 1999), 97–127; Paul Star, 'Native Forest and the Rise of Preservation in New Zealand (1903–1913)', *Environment and History*, 8 (2002): 275–94.
10. Alan Grey, *Aotearoa and New Zealand: A Historical Geography* (Christchurch: Canterbury University Press, 1994), 19.
11. Paul Shepard, *English Reaction to the NZ Landscape Before 1850 Pacific Viewpoint Monograph No 4* (Wellington: Victoria University of Wellington Department of Geography, 1969), 3.
12. Katherine Raine, '1815–40s: The First European Gardens', in Matthew Bradbury, ed., *A History of the Garden in New Zealand* (Auckland: Viking, 1995), 60.
13. De Almeida and Gilpin, *Indian Renaissance*.
14. Ray Desmond, *The European Discovery of the Indian Flora* (Oxford; New York: Royal Botanic Gardens; Oxford University Press, 1992), 258–308.
15. Eric Pawson, 'Confronting Nature', in John Cookson and Graeme Dunstall, eds, *Southern Capital Christchurch: Towards a City Biography 1850–2000* (Christchurch: Canterbury University Press, 2000), 60–84; Andrea Gaynor, *Harvest of The Suburbs: An Environmental History of Growing Food in Australian Cities* (Perth: University of Western Australia Press, 2006), 4; Michael Mann and Samiksha Sehrawat, 'A City with a View: The Afforestation of the Delhi Ridge, 1883–1913', *Modern Asian Studies*, 43, 2 (2009): 543–70. I thank Kate Hunter for alerting me to the last reference.
16. On New Zealand, see L. E. Lochhead, 'Preserving the Brownie's Portion: A History of Voluntary Native Conservation in New Zealand, 1888–1935' (Ph.D. thesis: Lincoln University, 1997); Martin Mulligan and Stuart Hill, *Ecological Pioneers: A Social History of Australian Ecological Thought and Action* (Cambridge: Cambridge University Press, 2001); Jodi Frawley, 'Campaigning for Street Trees, Sydney Botanic Gardens, 1890s–1920s', *Environment and History*, 15 (2009): 303–22. A welcome exception is Bonyhady, *Colonial Earth*.
17. Giselle Byrnes, *Boundary Markers: Land Surveying and the Colonisation of New Zealand* (Wellington: Bridget Williams Books, 2001); Paul Carter, *Lie of the Land* (London; Boston: Faber and Faber, 1996).
18. Arnold, *Tropics*, 75; 32 (quote).
19. Quoted in Leonard Huxley, ed., *Life and Letters of Sir Joseph Dalton Hooker*, Volume 1 (New York: Arno Press, 1978), 258.
20. Arnold, *Tropics*, 212.
21. Hooker to Elizabeth, Darjeeling, 9 August 1848, quoted in Huxley, *Life and Letters*, 260–1.
22. John Turnbull Thomson, 'Extracts of a Journal kept during Reconnaissance Survey of the Southern Districts', *Journal of the Royal Geographical Society*, 28 (1858), 299–300.
23. Mulligan and Hill, *Ecological Pioneers*, 43–4. Unlike Mulligan and Hill, I argue that colonial artists did not simply use the picturesque as a means of presenting the kind of landscape into which they wanted the environment transformed. On the picturesque, see also Gina Crandell, *Nature Pictorialized: 'The View' in Landscape History* (Baltimore and London: Johns Hopkins University Press, 1993), 109–60.

24. *Environment and Empire* (Oxford: Oxford University Press, 2007), 88.
25. Beinart and Hughes, *Environment and Empire*, 78–85; Nancy Lee Stepan, *Picturing Tropical Nature* (London: Reaktion Books, 2002).
26. Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992).
27. A useful discussion is, Francis Pound, *Frames on the Land: Early Landscape Painting in New Zealand* (Auckland 1983), 19, 25. Even for landscapes that did not fit aesthetic conventions, connoisseurs could transform them through a Claude Glass, a device which, distorting an image through a series of mirrors, enabled virtually any scene to suddenly become painterly and picturesque. Park, *Theatre Country*, 114–17.
28. Jordan, *Picturesque Pursuits: Colonial Women Artists and The Amateur Tradition* (Carlton: Melbourne University Press, 2005), 169.
29. Mrs. Charles Meredith, *Notes and Sketches of New South Wales, during A Residence in that colony from 1839 to 1844* (London: John Murray, 1844), 56.
30. Jordan, *Picturesque*, 169–70 (on Meredith's views), 11–50 (on colonial women's artistic education).
31. On the gendered notions of science and botany, note Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England, 1760 to 1860* (Baltimore: Johns Hopkins University Press, 1996).
32. See, for example, George Chandler, *Liverpool* (London: B. T. Batsford and Liverpool City Council, 1957), 306–19, 407–18.
33. Roger Blackley, *The Art of Alfred Sharpe* (Auckland: Bateman and Auckland Art Gallery, 1992), 15–16.
34. Blackley, 16, 18.
35. See Allen Staley, *The Pre-Raphaelite Landscape* (Oxford: Clarendon Press, 1973), 1–14 (quote, 5).
36. Staley, *Pre-Raphaelite*, 138–49. As Blackley notes, Sharpe's artistic style – his concern with naturalism – owed much to this Pre-Raphaelite tradition. Blackley, 19.
37. For reasons of consistency, I spell his name with the 'e', even when Sharpe did not.
38. Blackley, 23–5.
39. Blackley, 53–6.
40. On varying interpretations of the environmental intent of artist John Kinder (c. 1834/8–1903) gleaned through studying his artwork, see Ron Brownson, 'John Kinder's Photographs', in Brownson, ed., *John Kinder's New Zealand* (Auckland: Auckland Art Gallery Toi o Tamaki and Godwit, 2004), 91; Michael Dunn, 'Frozen Flame and Slain Tree: The Dead Tree Theme in New Zealand Art of the Thirties and Forties', *Art New Zealand*, 13 (1979): 41.
41. For an excellent introduction to Ruskin's life and works, see Kenneth Clark, *Ruskin Today* (London: J. Murray, 1964). For a potted biography of Ruskin, see especially 3–14.
42. Clark, 85–90 (quote, 85).
43. Beattie and John Stenhouse, 'Empire, Environment and Religion: God and Nature in nineteenth-century New Zealand', *Environment and History*, 13, 4 (November, 2007): 413–46.
44. David Carroll, 'Pollution, defilement and the art of decomposition', in Michael Wheeler, ed., *Ruskin and the Environment: The Storm-Cloud of the*

- Nineteenth Century* (Manchester and New York: Manchester University Press, 1995), 58–75.
45. Wheeler, 'Introduction', in *Ruskin and the Environment*, 4.
 46. Gill Chitty, "'A great entail": The Historic Environment', in *Ruskin and the Environment*, 104.
 47. Quoted in Chitty, 105.
 48. 'Spare the Mount', NZH, 28 March 1877, 3.
 49. 'Circumspice', 'The Hills Around Auckland', NZH, 19 May 1877, 5.
 50. Ruskin, quoted in Malcolm Andrews, *Landscape and Western Art* (Oxford: Oxford University Press, 1999), 183.
 51. Quoted in Landow, 64.
 52. Wheeler, 'Introduction', 3. On collecting, see Tom Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia* (Cambridge: Cambridge University Press, 1996).
 53. The work first appeared as a series of articles in the *New Zealand Herald* and was later republished in 1890 in the *Newcastle Morning Herald and Miners' Advocate*. 'Hints for Landscape Students in Watercolour' is reprinted in full in Blackley, 131–41. Unless referred to otherwise, when I quote from 'Hints' I use the transcription found in the above pages. Quote from 'Hints', 141.
 54. Nicholas Thomas, *Possessions: Indigenous Art/Colonial Culture* (London: Thames and Hudson, 1999), 12.
 55. Rollo Arnold, 'Some Australasian Aspects of New Zealand Life, 1890–1913', *New Zealand Journal of History*, 4, 1 (April, 1970): 54–76 (quote, 54); also note, Thomas, *Possessions*.
 56. NZH, 26 April 1884, 6.
 57. 'Water Colours at the Exhibition', NZH, 21 April 1883, 6.
 58. Blackley, 68.
 59. Leonard Bell, *Colonial Constructs: European Images of Maori, 1840–1914* (Auckland: Auckland University Press, 1992).
 60. Thomas, 65 and Bell, *Colonial Constructs*.
 61. Sharpe exhibited *Burial Place of Hone Heke* alongside two other works in April 1883 at the Auckland Society of Arts: *Entrance to the Stalactite Caverns of Waiomio* and *View from Shoal Bay, Auckland*. See Blackley, 62–3.
 62. Quoted in Blackley, 116. This image is reproduced in Blackley's book on 107.
 63. Cattle, it should be noted, were a popular and common feature, both as staffage and symbols of the introduction of European 'civilisation' into wild lands.
 64. H. L. Gibbs to Keating, 5 February 1896 quoted in J. W. Turner, *Manufacturing in Newcastle, 1801–1900* (Newcastle: Newcastle Public Library, 1980), 88. For details of the plant, see 69–92.
 65. Sharpe, 'From Nature to Nature's God', *Newcastle Morning Herald and Miners' Advocate* (NMH), 12 June 1888, 2. For other works expressing a similar viewpoint note, 'Evening in the Forest', NMH, 12 January 1882, 2; 'Temples not Made with Hands', *Observer and Free Lance* (OFL), 6 March 1886, no page; 'A Day with Nature', NMH, 1 February 1888, 2.
 66. Sharpe, 'Earth is Fair', NMH, 20 February 1888, 2.
 67. 'Water Colours at the Exhibition', 6. On artistic criticism of Sharpe's style in *Burial Place* and other works, see Blackley, 57–64.
 68. On this note, Blackley, 89–93.

69. Blackley, 44.
70. Wheeler, 'Introduction', 3. For other artists who both painted in a naturalistic manner and advocated the necessity of knowing about the scientific forms of nature, see Andrews, 186–7.
71. See Jordan, *Picturesque Pursuits*; Bonyhady, *Colonial Earth*.
72. William Swainson to G. F. Swainson 20 July 1851, Ash Island, Hunter River, New South Wales, in *William Swainson, FRS, FLS, Naturalist and Artist: Family Letters and Diaries 1809–1855 Final Destiny New Zealand*, transcribed, edited and published by Geoffrey M. Swainson (Palmerston North: G. Swainson, 1992), 59.
73. For instance, in the version of 'Hints' published in Australia, he changed 'from a New Zealand standpoint' to 'from an Australasian standpoint'. 'Hints', NMH, 11 March 1890, 8.
74. 'Hints: General Notes', NMH, 8 April 1890, 6.
75. See, for instance, Mulligan and Hill, 53–71.
76. Sharpe, 'Hints: General Notes', NMH, 8 April 1890, 6.
77. Sharpe, 'Newcastle Resources', NMH, 21 March 1895, 3.
78. Jordan, 'Progress versus the Picturesque', 341–57.
79. De Almeida and Gilpin, *Indian Renaissance*.
80. Bonyhady, *Colonial Earth*, 191–217.
81. Blackley, 94.
82. Sharpe, 'Auckland', NZH, 9 August 1879, 3.
83. On Ruskin's abhorrence of ugliness, see Clark, *Ruskin Today*, 135.
84. Judith Roberts, 'English Gardens in India', *Garden History*, 26, 2 (Winter, 1998): 115–35.
85. Mann and Sehwat, 'A City with a View': 543–70.
86. NZH, 2 November 1880, 6.
87. Helen Leach, *Cultivating Myths: Fiction, Fact and Fashion in Garden History* (Auckland: Godwit, 2000), 97–100; Filippo Pizzoni, *The Garden: A History in Landscape and Art*, translated by Judith Landry (London: St. Martin's Press, 1997), 184–215.
88. James Winter, *Secure from Rash Assault: Sustaining the Victorian Environment* (Berkeley and Los Angeles, 1999), 189–208.
89. For perhaps the best overview of this movement, note Konrad Ott, Thomas Potthast, Martin Gorke and Patricia Never, 'Über die Anfänge des Naturschutzgedankens in Deutschland und den USA' [On the beginnings of the Concept of Nature Protection in Germany and the USA], in E. V. Heyen, ed., *Jahrbuch für Europäische Verwaltungsgeschichte. Naturnutzung und Naturschutz in der europäischen Rechts- und Verwaltungsgeschichte* [Yearbook for European Administrative History. Exploitation and Protection in the History of European Law and Administration] (Baden-Baden: Nomos, 1999), 1–55.
90. Bonyhady, *Colonial Earth*, 219–47.
91. Beattie, 'Colonial Geographies of Settlement: Vegetation, Towns, Disease and Well-Being in Aotearoa/New Zealand, 1830s–1930s', *Environment and History*, 14, 4 (November, 2008): 583–610.
92. Ott et al., 'Über die Anfänge', 48.
93. Paul Fox, *Clearings: Six Colonial Gardeners and their Landscapes* (Carlton: Miegunyah Press, 2004).
94. Star and Lochhead, 'Children of the Burnt Bush: New Zealanders and the Indigenous Remnant, 1880–1930', in Eric Pawson and Tom Brooking, eds,

- Environmental Histories of New Zealand* (Melbourne: Oxford University Press, 2002), 119–35; see also, Star's perceptive, 'Native Forest and the Rise of Preservation'.
95. Star, 'The Place of Native Forest in New Zealand's Mental Landscape', in John Dargavel and Brenda Libbis, eds, *Australia's Ever-Changing Forests IV: Proceedings of the Fourth National Conference on Australian Forest History* (Canberra: Centre for Resource and Environmental Studies; The Australian National University, 1999), 85–98.
 96. NZH, 1 June 1880, 6.
 97. NZH, 21 May 1880, 6.
 98. NZH, 2 August 1879, 5.
 99. George F. Chadwick, *The Works of Sir Joseph Paxton, 1803–1865* (Birkenhead: Architectural Press, 1961). On Birkenhead Park and Paxton, see also Barry Bergdoll, *European Architecture, 1750–1890* (Oxford: Thames and Hudson, 2000), 244–5.
 100. Sarah Faiks, Jarrett Kest, Amanda Szot and Molly Vendura, 'Revisiting Riverside: A Frederick Law Olmsted Community' (MA project: School of Natural Resources and Environment, University of Michigan, 2001), <www.sre.umich.edu/emi/pubs/riverside/Rschapter3.pdf>.
 101. Fox, *Clearings*, 100–43.
 102. 'The Hill Reserve', NMH, 27 August 1890, in 'King Edward Park: Photographs and Paper Clippings', Newcastle Region Public Library LHD 712.5/KIN.
 103. Craig Bagley and John Trigger, *Research Report No.39: The Future of an Historic Park: King Edward Park Management Strategy* (Newcastle: Newcastle Region Public Library, LHQ 339.49944/HUN/8/No.39, n. d.), 9–10.
 104. 'The Hill Reserve', NMH, 27 August 1890 in 'King Edward Park: Photographs and Paper Clippings', Newcastle.
 105. These included the addition of 49 acres to the reserve in 1894 and the erection of a band rotunda, built sometime between 1891 and 1897; in the 1920s, the draining of the gully and changes to the flower gardens at their top; in the 1930s, a re-design of the roads to incorporate the motor car; and, in 1978, the beginning of significant landscaping of its north-western section and widespread tree planting. See Bagley and Trigger, 9–15. Sharpe also designed other parks in the Newcastle area. See, Beattie, 'Environmental Anxiety in New Zealand, 1850–1920: Settlers, Climate, Conservation, Health, Environment' (Ph.D. diss. University of Otago, 2005), 139–43.
 106. NZH, 24 August 1876, 6.
 107. Simon Schama, *Landscape and Memory* (London: Harper Collins, 1996), 21–242; Stephen Daniels, 'The Political Iconography of Woodland in later Georgian England', in Denis Cosgrove and Daniels, eds, *The Iconography of Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments* (Cambridge: Cambridge University Press, 1988), 43–82. Of course, it is not just in Western culture that trees play an important symbolic role: Douglas Davies, 'The Evocative Symbolism of Trees', in *Iconography of Landscape*, 32–42.
 108. Sharpe's reference comes from John Keats' (1795–1821) unfinished poem, 'Hyperion', 1820.
 109. 'Trees in Streets', NZH, 29 August 1884, 3.

110. Martin took odds with Sharpe's emphasis on artistic naturalism and criticised him publicly for this. On this rather public and prolonged spat, see Blackley, 59–63.
111. 'The Poplars at St. Paul's', NZH, 23 February 1885, 3.
112. NZH, 28 February 1885, 6.
113. OFL, 2 January 1886, 11.
114. For instance, in the version of 'Hints' published in Australia, he changed 'from a New Zealand standpoint' to 'from an Australasian standpoint'. 'Hints', NMH, 11 March 1890, 8. 'Hints', 131.
115. Quoted in Blackley, 116.

4 Scottish-Trained Doctors, Environmental Anxieties and Imperial Development, 1780s–1870s

1. John Hutton Balfour, 'Remarks on the Teaching of Science in Universities', letter copy, Royal Botanic Garden, Edinburgh 30 March, 1869 in 'Papers of John Hutton Balfour, Dean of Faculty of Medicine', Da 43, Volume 3, Special Collections, University of Edinburgh Library.
2. Not all of graduates at Scottish institutions, of course, were Scottish-born, hence I distinguish Scottish-trained rather than Scottish-born unlike Richard Grove. See, T. S. Pensabene, *The Rise of the Medical Practitioner in Victoria* (Canberra: Australian National University Press and Health Research Project, 1980), 64.
3. Derek A. Dow, ed., *The Influence of Scottish Medicine: An Historical Assessment of Its International Impact* (Casterton Hall; New Jersey: Parthenon Publishing, 1988); in particular note, Warwick Brunton, "'To imitate if not to rival, in their arrangements, the asylums of the Home Country": The Scottish Influence on New Zealand Psychiatry before World War II' (Paper presented at New Zealand History Associate Conference, Dunedin, November 2003); John D. Hargreaves, *Academe and Empire: Some Overseas Connections of Aberdeen University, 1860–1970* (Aberdeen: Aberdeen University Press, 1994), especially 5–32, 54–5, 61–7; John M. MacKenzie, *Empires of Nature and the Nature of Empires: Imperialism, Scotland and the Environment: The Callander Lectures, delivered in the University of Aberdeen, 2–7 November 1995* (East Linton: Tuckwell Press, 1997); Kapil Raj, 'Colonial Encounters and the Forging of New Knowledge and National Identities: Great Britain and India, 1760–1850', *Osiris*, 2nd series, 15 (2000): 119–34; Jan Oosthoek, 'Worlds Apart? The Scottish Forestry Tradition and the Development of Forestry in India', *Journal of Irish and Scottish Studies*, 3, 1 (2010): 69–82.
4. Richard H. Grove, *Ecology, Climate and Empire: Colonialism and Global Environmental History, 1400–1940* (Cambridge: Cambridge University Press, 1997); Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (New York: Cambridge University Press, reprint, 1997), 380–473; Grove, 'Scottish Missionaries, Evangelical Discourses and the Origins of Conservation Thinking in Southern Africa 1820–1900', *Journal of Southern African Studies*, 15, 2 (January, 1989): 163–87; James Beattie, 'W. L. Lindsay, Scottish Environmentalism, and the "Improvement" of Nineteenth-Century New Zealand', in Tony Ballantyne and

- Judith A. Bennett, eds, *Landscape/Community: Perspectives from New Zealand History* (University of Otago Press: Dunedin, 2005), 43–56.
5. Grove, *Green Imperialism*, 11.
 6. Grove, *Green Imperialism*, 380–473.
 7. S. Ravi Rajan, *Modernizing Nature: Forestry and Imperial Eco-Development 1800–1930* (Oxford: Oxford University Press, 2006), Richard H. Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement of the World'* (New Haven: Yale University Press, 2000), 234–8.
 8. Roy M. MacLeod, 'Scientific Advice for British India: Imperial Perceptions and Administrative Goals, 1898–1923', *Modern Asian Studies*, 9, 3 (1975): 347.
 9. Charles Newman, *The Evolution of Medical Education in the Nineteenth Century* (London: Oxford University Press, 1957), 12–13.
 10. See, 'Medical Licences: Return to an Address of the Honourable The House of Commons dated 14 April 1856', printed 17 July 1856 in 'Papers of John Hutton Balfour, Dean of Faculty of Medicine', Da 43, Volume 1, Special Collections, University of Edinburgh Library.
 11. Newman, *The Evolution of Medical Education*, 109; Derek Dow and Michael Moss, 'The Medical Curriculum at Glasgow in the Early Nineteenth Century', *History of Universities*, 7 (1988): 227–57.
 12. Balfour, *Guide to the Royal Botanic Garden, Edinburgh* (Edinburgh: Edmonston & Douglas, no date [1850s or 1860s?]).
 13. Balfour, 'Notice of the Palm-House in the Royal Botanic Garden at Edinburgh', from the *Transactions of the Botanical Society of Edinburgh*, Volume 6, Session 1857–8 in H. Cleghorn, Attics 65.5.1, no. 11, Special Collections, University of Edinburgh Library.
 14. J. H. Balfour, 'Remarks on the Teaching of Science in Universities', letter copy, Royal Botanic Garden, Edinburgh 30 March, 1869 in 'Papers of John Hutton Balfour, Dean of Faculty of Medicine'.
 15. Grove, *Green Imperialism*, 11; Grove, *Ecology, Climate and Empire*, 67. See also, Pallavi Das, 'High Cleghorn and Forest Conservancy in India', *Environment and History*, 11, 1 (2005): 57.
 16. Satpal Sangwan, 'From Gentlemen Amateurs to Professionals: Reassessing the Natural Science Tradition in Colonial India, 1780–1840', in Grove, Vinita Damodaran, and Satpal Sangwan, eds, *Nature and the Orient: the Environmental History of South and South East Asia* (Delhi: Oxford University Press, 1998), 217.
 17. Newman, *Evolution of Medical Education*, 97; Sangwan, 'From Gentlemen Amateurs', 217. On botanical education in medicine, see Anand C. Chitnis, *The Scottish Enlightenment: A Social History* (London: Croom Helm, 1976), 177–84, especially 178–9; Lewis Pyenson and Susan Sheets-Pyenson, *Servants of Nature: A History of Scientific Institutions, Enterprises, and Sensibilities* (New York and London: W. W. Norton & Company, 2000), 152–4; Theodor Puschmann, *A History of Medical Education* (New York and London: Hafner Publishing Company, 1966 [1891]), 408–10. On the use of museums and botanical gardens in Edinburgh, see Chitnis, *The Scottish Enlightenment and Early Victorian English Society* (Beckenham, Kent: Croom Helm, 1986), 11.
 18. Hooker to Hector, 13 January 1866, Royal Botanical Gardens, Kew, in *My Dear Hector: Letters from Joseph Dalton Hooker to James Hector, 1862–1893*,

- edited by John Yaldwyn and Juliet Hobbs (Wellington: Museum of New Zealand Te Papa Tongarewa Technical Report 31, December 1998), 66.
19. See, *My Dear Hector*; D. J. Galloway, 'Joseph Hooker, Charles Knight, and the Commissioning of New Zealand's First Popular Flora: Hooker's *Handbook of the New Zealand Flora* (1864–1867)', *Tuhinga*, 10 (1998): 31–62.
 20. Mark W. Weatherall, *Gentlemen, Scientists and Doctors at Cambridge, 1800–1940* (Cambridge: Boydell Press, 2000), 33, 35–6, 110–41. On the more modest background, see Douglas M. Haynes, 'Victorian Imperialism in the British Medical Profession: An Argument', in Durba Ghosh and Dane Kennedy, eds, *Decentring Empire: Britain, India and the Transcolonial World* (New Delhi: Hyderabad, 2006), 138. Haynes' interpretation is contested by Anne Crowther and Marguerite Dupree, 'The Invisible General Practitioner: The Careers of Scottish Medical Students in the late Nineteenth Century', *Bulletin of the History of Medicine*, 70, 3 (1996): 397.
 21. The classic study remains, David Elliston Allen, *The Naturalist in Britain: A Social History* (Princeton: Princeton University Press, reprint, 1994). On colonial natural history note, Beattie and John Stenhouse, 'Empire, Environment and Religion: God and the Natural World in Nineteenth-Century New Zealand', *Environment and History*, 13, 4 (November, 2007): 413–46; MacKenzie, 'Missionaries, Science and the Environment in Nineteenth-Century Africa,' in Andrew Porter, ed., *The Imperial Horizons of Protestant Missions, 1880–1914* (Grand Rapids: Eerdmans, 2003), 106–30; Sujit Sivasundaram, 'Natural History Spiritualized: Civilizing Islanders, Cultivating Breadfruit, and Collecting Souls', *History of Science*, 39 (2001): 417–43; John Pearn, *A Doctor in the Garden: nomen medici in botanicis: Australian Flora and the World of Medicine* (Herston, Queensland: Amphion Press, 2001).
 22. See, 'Medical Licences: Return to an Address of the Honourable The House of Commons dated 14 April 1856', printed 17 July 1856 in 'Papers of John Hutton Balfour, Dean of Faculty of Medicine', 3–35.
 23. Mark Harrison, *Public Health in British India: Anglo-Indian Preventive Medicine, 1859–1914* (Cambridge: Cambridge University Press, 1994), 26.
 24. Michael Peter Belgrave, "'Medical men" and "lady doctors": The Making of a New Zealand Profession, 1867–1941' (Ph.D. diss.: Victoria University of Wellington 1985), Table 3.2, 100.
 25. Diana Dyason, 'The Medical Profession in Colonial Victoria, 1834–1901', in MacLeod and Milton Lewis, eds, *Disease, Medicine, and Empire: Perspectives on Western Medicine and the Experience of European Expansion* (London and New York: Routledge, 1988), Table 10.1 'Qualifications from British institutions held by doctors registered before 1901 in Victoria', 196.
 26. Pensabene, 57–81.
 27. See, Haynes, 130–56.
 28. Harrison, *Public Health in British India*.
 29. See endnote 4.
 30. Grove, *Green Imperialism*, 380–473; E. P. Stebbing, *The Forests of India*, Volume 1 (London: John Lane, 1922), 71–87; 231–51.
 31. Michael Mann, 'Ecological Change in North India: Deforestation and Agrarian Distress in the Ganga-Jamna Doab 1800–50', *Environment and History*, 1, 2 (1995): 201–20.

32. Calculated from Table 11.4, 'Estimate of sleepers (crossties) and acres of forest cleared, India, 1850–1940', in Michael Williams, *Deforesting the Earth: From Prehistory to Global Crisis, An Abridgment* (Chicago: University of Chicago Press, 2006), 359.
33. Calculated from Morris David Morris, 'The Population of All-India, 1800–1951', *Indian Economic and Social History Review*, 9 (1974): 311–12.
34. On agricultural expansion, see David Ludden, *An Agrarian History of South Asia: The New Cambridge History of India*, Volume 4 (Cambridge: Cambridge University Press, 1999), 131–140, 209–19.
35. C. R. Markham, 'On the Effects of the Destruction of Forests in the Western Ghauts [sic] of India on the Water-Supply', *Journal of the Royal Geographical Society of London*, 36 (1866): 188–9.
36. Grove, *Green Imperialism*, 399–407.
37. Grove, *Green Imperialism*.
38. Das, 57.
39. Das, 55–80; H. Cleghorn, F. Royle, R. Baird-Smith and R. Strachey, 'Report of the Committee appointed by the British Association to consider the probable effects in an economic and physical point of view of the destruction of tropical forests', *Report of the Proceedings of the British Association for the Advancement of Science* (London: John Murray, 1852).
40. Cleghorn, Memorandum, 5 April 1859 quoted in Stebbing, *Forests*, Volume 1, 315.
41. Note, for instance, Cleghorn, 'Third Report on Forest Operations', 31 August 1860, in Cleghorn, *The Forests and Gardens of South India* (London: W. H. Allen & Co., 1861), 59–125.
42. Cleghorn, 'Second Annual Report, 1858–9', 31 December 1859, in *Forests and Gardens*, 33.
43. Cleghorn to Government, 7 December 1858, in 'Correspondence regarding kumari cultivation', in *Forests and Gardens*, 126.
44. Cleghorn 'First Annual Report on Forest Operations in the Madras Presidency', 1 May 1858, in *Forests and Gardens*, 17.
45. See, 'Appendix (H): Rules for the Preservation of Jungles in the District of Coimbatore', in Cleghorn, 'Third Report on Forest Operations', 31 August 1860, in *Forests and Gardens*, 124–5.
46. Cleghorn 'First Annual Report on Forest Operations in the Madras Presidency', 1 May 1858, in *Forests and Gardens*, 17.
47. Cleghorn, *Report Upon the Forests of the Punjab and the Western Himalaya* (Roorkee: Thomason Civil Engineering College, 1864), ii–iii.
48. Cleghorn, *Report Upon the Forests of the Punjab*, 192–4.
49. Cleghorn, *Report Upon the Forests of the Punjab*, 196–8; 237–43.
50. Stebbing, *Forests of India*, Volume 1, 213.
51. Stebbing, *Forests of India*, Volume 1, 111–14.
52. Grove, *Green Imperialism*, 428–36.
53. Gibson, 'Report on Deforestation in South Conkan', *Transactions of the Medical and Physical Society of Bombay* (1846): 37–41.
54. Grove, *Green Imperialism*, 428–36.
55. On which, see Raymond L. Bryant, 'Forest Problems in Colonial Burma: Historical Variations on Contemporary Themes', *Global Ecology and Biogeography Letters*, 3, 4 (1993): 123–4.

56. Hugh Falconer, *Report on the Teak Forests of the Tenasserim Provinces* (Calcutta: F. Carbery, Military Orphan Press, 1852), 25.
57. Falconer, *Report*, 26.
58. Falconer, *Report*, 12.
59. Falconer, *Report*, 29–34.
60. Stebbing, *Forests of India*, Volume 1, 231–55.
61. See, Grove, *Green Imperialism*, 460–2; Stebbing, *Forests of India*, Volume 1, 206–7 (quote 206).
62. Stebbing, *Forests of India*, Volume 1, 219.
63. Rex Wright-St Clair, *Thoroughly A Man of the World: A Biography of Sir David Monro* (Christchurch: Whitcome and Tombs, 1971), 27–8.
64. Wright-St Clair, *Thoroughly A Man of the World*, 48, 71–7, 260–1. Monro supported tree-planting measures in parliament. On Scottish graduates as pastoralists, see Dow, 'Counting Sheep Pleasant for Scot Doctors', *New Zealand Doctor*, 31 March 1999: 41.
65. Monro, 'On the Leading Features of the Geographical Botany of the Provinces of Nelson and Marlborough, New Zealand', *TPNZI*, 1 (1868): 8.
66. Wright-St Clair, *Thoroughly A Man*, 13, 156.
67. Belgrave, "'Medical Men" and "Lady Doctors"', 143–4.
68. Brian P. J. Molloy, 'Sinclair, Andrew', *DNZB* (updated 16 December 2003), <www.dnzb.govt.nz> (accessed October 2009).
69. Dyason, 'Medical Profession', 195, 196.
70. Pearn, *Doctor in the Garden*, 382–3.
71. Pearn, *Doctor in the Garden*, 124–5.
72. Dyason, 'Medical Profession', 197.
73. Stephen Legg, op. cit.
74. Rollo Arnold, 'The Virgin Forest Harvest and the Development of Colonial New Zealand', *New Zealand Geographer*, 32 (1976): 105–26; Williams, 'The Clearing of the Woods', in R. L. Heathcote, ed., *The Australian Experience: Essays in Australian Land Management and Resource Management* (Melbourne: Longman Cheshire Pty Ltd, 1988), 115–26.
75. Francis Robert Moulds, *The Dynamic Forest: A History of Forestry and Forest Resources in Victoria* (Richmond, Victoria: Lynedoch Publications, 1991), 13–28; S. M. Legg, 'Debating Forestry: An Historical Geography of Forest Policy in Victoria and South Australia, 1870 to 1939' (Ph.D. diss.: Department of Geography and Environmental Science, Monash University, 1995).
76. M. M. Roche, *Forest Policy in New Zealand: An Historical Geography 1840–1919* (Palmerston North: Dunmore Press, 1987).
77. Beattie and Paul Star, 'Global Influences and Local Environments: Forestry and Forest Conservation in New Zealand, 1850s–1920s', *British Scholar*, 3, 1 & 2 (September, 2010): 191–218.
78. David Arnold, *The Tropics and the Travelling Gaze: India, Landscape, and Science, 1800–1856* (Delhi: Permanent Black, 2005), 193–4; Galloway, 'Joseph Hooker'.
79. Hooker to Sir H. Barklay, 6 July 1868, no place, quoted in Leonard Huxley, ed., *Life and Letters of Sir Joseph Dalton Hooker*, Volume 2 (New York: Arno Press, 1978), 7. I am indebted to Professor Eric Godley for alerting me to this. On Hooker's uncertainty about the forests–rainfall connection, see Bonham

- C. Richardson, *Igniting the Caribbean's Past: Fire in British West Indian History* (no place: University of North Carolina Press, 2004), 85.
80. Emphasis in original. *The Place and Power of Natural History in Colonization; with Special Reference to Otago; Being Portions of a Lecture Prepared for, and at the Request of the 'Young Men's Christian Association' of Dunedin* (Dunedin: John Dick, 1862), 5, 7.
 81. *Otago Colonist* (OC), 24 January 1862, 4.
 82. *Place and Power*, 18–23, 25–7.
 83. Donal P. McCracken, *Gardens of Empire: Botanical Institutions of the Victorian British Empire* (London: Leicester University Press, 1997), 132–81; Drayton, *Nature's Government*, 170–220; Lucile H. Brockway, *Science and Colonial Expansion: The Role of the British Royal Botanic Gardens* (London: Academic Press, 1979), 77–102. By the late-nineteenth century, the role of botanical gardens shifted from classification, collecting and transferring to the improvement of species.
 84. See, Warwick Brunton, 'Our Endeavours have ever come too short of our desires' (unpublished, draft MS). I thank the author for sharing his research on Lindsay.
 85. Frederic Boase, *Modern English Biography Containing Many Thousand Concise Memoirs of Persons who have Died Since the Year 1850, with an Index of the Most Interesting Matter*, Volume II I–Q (Truro: Netherton and Worth, 1897), 438.
 86. *Testimonials in Favour of William Lauder Lindsay, MD ... As a Candidate for the Office of Conservator of the Museum of the Royal College of Surgeons* (Edinburgh: Murray & Gibb, 1853), 10.
 87. Pearn, 'Courage and Curiosity: Surgeon-Explorers in Australia and New Zealand. Part I. Discovery and Bridgehead', *Australian New Zealand Journal of Surgery*, 62 (1992), 228; W. D. Swinton, 'Physicians as Explorers: Joseph Hooker: Botanical Journeys in Antarctica and India', *Canadian Medical Association Journal*, 117 (8 October, 1977): 824–8; J. Burton, 'The Naturalist in Medicine with particular reference to Australia', *Medical Journal of Australia*, 1, 17 (29 April 1950): 449–563.
 88. Lindsay stated that he arrived in Dunedin on 7 October 1861. Lindsay, *Contributions to New Zealand Botany* (London: Williams & Norgate, 1868), 10–11. However, the *Otago Witness* (OW) records 'W. L. Lindsay' as being a steerage passengers aboard the *Robert Henderson*. OW, 12 October 1861, 3.
 89. Brunton, 'Our Endeavours have ever come too short of our desires'.
 90. Lindsay, *Contributions to New Zealand Botany*, 10–11.
 91. Lindsay, *Place and Power*, 26, 28.
 92. See Beattie, 'Looking for a Lost Arcadia: European Environmental Perception in the Dunedin area, 1840–1860', in Tom Brooking and Neil Clayton, eds, title not yet confirmed (Dunedin: University of Otago Press, forthcoming).
 93. *Contributions*, 28.
 94. 'On the Conservation of Forests in New Zealand', *Journal of Botany British and Foreign*, 6 (1868): 40–42, 39, 45.
 95. Displacement theory originated in the work of J. D. Hooker, Charles Darwin and A. R. Wallace. To these naturalists, and many others around the world, the displacement of native plants, animals and humans by European ones seemed common sense and inevitable. See, for instance, Paul Star, 'From Acclimatisation to Preservation: Colonists and the Natural World in

- Southern New Zealand, 1860–1894' (Ph.D. diss.: University of Otago, 1997), 115–25; Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986).
96. Beattie and Star, 'State Forest Conservation and the New Zealand Landscape: Origins and Influences, 1850–1914', in Tony Ballantyne and Judith Bennett, eds, *Landscape/Community: Perspectives from New Zealand History* (Dunedin: Otago University Press, 2005), 43–56.
 97. Earlier, forestry departments had been created in 1874 and 1885, only for each to be disestablished after two years or less. See Roche, *Forest Policy in New Zealand: An Historical Geography 1840–1919* (Palmerston North: Dunmore Press, 1987), 67–121.
 98. Lindsay, *Place and Power*, 6.
 99. Wright, *Bureaucrats' Domain*.
 100. Michael E. Hoare, *Reform in New Zealand Science, 1880–1926* (Melbourne: Hawthorn Press, 1976).
 101. Winsome Shepherd and Walter Cook, *The Botanic Garden Wellington: A New Zealand History, 1840–1987* (Wellington: Millwood Press, 1988), especially 33–43.
 102. On the NZI, see C. A. Fleming, *Science, Settlers and Scholars: The Centennial History of the Royal Society in New Zealand* (Wellington: Royal Society of New Zealand, 1987), 11–43. See also R. K. Dell, 'Hector, James', *Dictionary of New Zealand Biography, vol. 1, 1769–1869 (DNZB)* (Auckland: Auckland University Press, reprint, 1988), 183–4.
 103. For background, see Beattie and Star, 'State Forest Conservation', 17–29.
 104. 'II. – Recommendations of Committees', *Appendices to the Journal of the House of Representatives* (AJHR), H-5, 1874, 13.
 105. Dr A. Wjeikof, 'The Results of the Destruction of Forests upon the River Wolga at Astracan', *Transactions and Proceedings of the New Zealand Institute* (TPNZI), 4 (1871): 374–6.
 106. 'Enclosure 2 in No. 1: Extract from Dr Hector's Memorandum, 18th November, 1868', in AJHR, D22, 3. See also Roche, *Forest Policy in New Zealand*, 87–8.
 107. 'Papers relating to state forests, their conservation, planting, management, &c.', in AJHR, H5, 35–6.
 108. 34 out of a total of 78 members spoke. Roche, *History of Forestry*, 86.
 109. Roche, *History of Forestry*, 86.
 110. Calculated from NZPD, 14 July 1874, 79–94; 31 July, 350–81; 4 August, 399–426. See Graeme Wynn, 'Conservation and Society in Late Nineteenth-Century New Zealand', *New Zealand Journal of History*, 11, 2 (October, 1977): 130–4. As Bryce put it succinctly, 'I said we should let the people alone.' NZPD, 31 July 1874, 367.
 111. See, for instance, Rolleston, NZPD, 4 August 1874, 404–5.
 112. Roche, *History of Forests*, 87.
 113. Belgrave, "'Medical Men" and "Lady Doctors"', 144–151; Belgrave, 'Medicine and the Rise of Health Professionals in New Zealand, 1860–1939', in Linda Bryder, ed., *A Healthy Country: Essays on the Social History of Medicine in New Zealand* (Wellington: Bridget Williams Books, 1991), 7–24. On similar processes happening in other medical fields in New Zealand, see Tom Brooking, *A History of Dentistry in New Zealand* (Dunedin: Otago

University Press, 1980). In England, note Joan Lane, *A Social History of Medicine: Health, Healing and Disease in England, 1750–1950* (London and New York: Routledge, 2001), 11–31. Dow, *Safeguarding the Public Health: A History of the New Zealand Department of Health* (Wellington: New Zealand Historical Branch, 1995); Dow, *Maori Health and Government Policy, 1840–1940* (Wellington: Victoria University Press in association with the Historical Branch, Dept. of Internal Affairs, 1999). For New Zealand, these societal and cultural changes are expertly summarised in Erik Olssen, 'Towards a New Society', in Geoffrey Rice, ed., *Oxford History of New Zealand* (Auckland: Oxford University Press, 1992), 254–84; R. J. Polaschek, *Government Administration in New Zealand* (Wellington: New Zealand Institute of Public Administration; London: Oxford University Press; London, 1958), 3–55, 93–111. On Australasia, see Donald Denoon, *Settler Capitalism: The Dynamics of Dependent Development in the Southern Hemisphere* (Oxford: Clarendon Press, 1983), 150–4, Denoon, Philippa Mein-Smith with Marivic Wyndham, *A History of Australia, New Zealand and the Pacific* (Oxford: Blackwell, 2000), 218–47.

5 German Science and Imperial Forestry, 1840s–1900s

1. J. D. Hooker to James Hector, 9 August 1879, no place, in John Yaldwyn and Juliet Hobbs, eds, and Juliet Hobbs, transcriber, *My Dear Hector: Letters from Joseph Dalton Hooker to James Hector, 1862–1893* (Wellington: Museum of New Zealand/Te Papa Tongarewa Technical Report 31, December 1998), 138.
2. Hooker to T. H. Huxley, 12 September 1854, no place, in Leonard Huxley, ed., *Life and Letters of Sir Joseph Dalton Hooker, O. M., G. C. S. I.: Based on Materials Collected by Lady Hooker*, Volume 1 (London: John Murray, 1918), 426.
3. Thanks to Brett Bennett for this observation.
4. Peter Vandergeest and Nancy Lee Peluso, 'Empires of Forestry: Professional Forestry and State Power in Southeast Asia, Part 2', *Environment and History*, 12 (2006): 384; Gregory Barton, *Empire Forestry and the Origins of Environmentalism* (Cambridge: Cambridge University Press, 2002); S. Ravi Rajan, *Modernizing Nature: Forestry and Imperial Eco-Development 1800–1930* (Oxford: Oxford University Press, 2006).
5. For sake of simplicity I refer throughout this period to Germany. Notwithstanding loose confederations of German states, which dated from 1815, most states only unified in 1871.
6. The meaning of *Naturwissenschaft* varied depending on the context of its use. In the sense described above, it would be useful to translate it as natural science. Thanks to James Braund for his comments on meaning. On the wider context of professionalisation, see Charles E. McClelland, *The German Experience of Professionalization: Modern Learned Professions and their Organization from the Early Nineteenth Century to the Hitler Era* (New York: Cambridge University Press, 1991), 34–5.
7. James Albisetti, Charles E. McClelland and R. Stephen Turner, 'Science in Germany', *Osiris: 2nd Series*, 5 (1989): 291.
8. See, McClelland, *German Experience of Professionalization*.

9. On Bildung and the *Bildungsbürgertum*, see W. H. Bruford, *The German Tradition of Self-Cultivation: 'Bildung' from Humboldt to Thomas Mann* (London: Cambridge, 1975); Peter Gay, *The Bourgeois Experience, Victoria to Freud*, Volumes 1–5 (Glasgow: Harper Collins, 1984–98).
10. McClelland, *State, Society, and University in Germany 1700–1914* (New York: Cambridge University Press, 1980).
11. Lewis Pyenson and Susan Sheets-Pyenson, *Servants of Nature: A History of Scientific Institutions, Enterprises, and Sensibilities* (London & New York: W. W. Norton & Co., 2000), 57–8. Quote from Andreas W. Daum, 'Science, Politics and Religion: Humboldtian Thinking and the Transformations of Civil Society in Germany, 1830–1870', *Osiris: 2nd Series*, 17 (2002): 115.
12. McClelland, *State, Society, and University*, 153–4; Pyenson and Sheets-Pyenson, *Servants of Nature*, 57–60. I am also indebted to James Braund for helping draw the fine distinctions in meaning and translation of these educational options.
13. Pyenson and Sheets-Pyenson, *Servants of Nature*, 57–8.
14. Joachim Radkau, 'Holzverknappung und Krisenbewusstsein im 18. Jahrhundert', *Geschichte und Gesellschaft*, 9 (1983): 513–43.
15. Henry E. Lowood, 'The Calculating Forester: Quantification, Cameral Science, and the Emergence of Scientific Forestry Management in Germany', in Tore Frängsmyr, J. L. Heilbron, and Robin E. Rider, eds, *The Quantifying Spirit of the 18th Century* (Berkeley: University of California Press), 1990, 315–42; Jan Oosthoek, 'Themes in European Woodland History', in John Dargavel, Denise Gaughwin and Brenda Libbis, eds, *Australia's Ever-Changing Forests V: Proceedings of the Fifth National Conference on Australian Forest History* (Canberra: Centre for Resource and Environmental Studies, The Australian National University, 2002), 34–6.
16. For a sophisticated overview of the development and principles of *Forstwirtschaft*, see Rajan, *Modernizing Nature*, 35–44.
17. See, Ulrike Kirchberger, 'German Scientists in the Indian Forest Service: A German Contribution to the Raj?' *Journal of Imperial and Commonwealth History*, 29, 2 (May, 2001): 6.
18. J. C. Brown, *Schools of Forestry in Germany, with Addenda Relative to a Desiderated British National School of Forestry* (Edinburgh: Oliver and Boyd, 1887).
19. *Österreichs Wald: Vom Urwald zur Waldwirtschaft* (Vienna: Druckhaus Grasl, 1994).
20. Kirchberger, 'German Scientists'; Oosthoek, 'Themes'; Rajan, *Modernizing Nature*.
21. Rajan, *Modernizing Nature*; Oosthoek, 'Themes', 35.
22. Brandis, 'Progress of Forestry in India', *IF*, 10, 10 (October, 1884): 455.
23. See the essays in Andrew Cunningham and Nicholas Jardine, eds, *Romanticism and the Sciences* (Cambridge: Cambridge University Press, 1990); for an excellent study on science and arts and the view of nature in early German romanticism, see Joan Steigerwald, 'The Cultural Enframing of Nature: Environmental Ethics during the early German Romantic Period', *Environment and History*, 6, 4 (2000): 451–96.
24. Steigerwald, 'Cultural Enframing of Nature', 472–81; Malcolm Nicholson, 'Alexander von Humboldt and the Geography of Vegetation', in *Romanticism and the Sciences*, 169–185; Alexander von Humboldt, *Personal Narrative of a*

- Journey to the Equinoctial Regions of the New Continent*, abridged and translated by Jason Wilson (London: Penguin, 1995).
25. Humboldt, *Personal Narrative*, 150–1.
 26. In India in the 1830s, discussion of the geographical theory of plant distribution was dominated by the ideas of Humboldt and Joachim von Schouw (1789–1852), Professor of Botany at the University of Copenhagen and Director of the Royal Danish Botanic Garden at Copenhagen. Sangwan, 'From Gentlemen Amateurs to Professionals: Reassessing the natural science tradition in colonial India, 1780–1840', in Richard H. Grove, Vinita Damodaran and Satpal Sangwan, eds *Nature and the Orient: The Environmental History of South and South East Asia* (Delhi: Oxford University Press, 1998), 221. Some inspired by Humboldt to follow his botanical and geographical path include several who visited Australasia and/or India: J. D. Hooker, Ernst Dieffenbach, Ferdinand von Mueller, Richard Schomburgk and Ferdinand von Hochstetter.
 27. Note, Stephen Jeffries, 'Alexander von Humboldt and Ferdinand von Mueller's Argument for the Scientific Botanic Garden', *Historical Records of Australian Science*, 11, 3 (June, 1997): 301–10; Nicholson, 'Alexander von Humboldt'; Grove, *Green Imperialism*. By the 1840s and 1850s, taxonomy in German plant science had given way to an inductive approach. Faced with criticism, this in turn developed into an emphasis on plant physiology and hence adaptation. See Eugene Cittadino, *Nature as the Laboratory: Darwinian Plant Ecology in the German Empire, 1880–1900* (Cambridge: Cambridge University Press, 1990).
 28. Even after the reforms of the later nineteenth century, English scientists still acknowledged German scientific institutions and education as superior. George Haines IV, *Essays on German Influence upon English Education and Science, 1850–1919* (Hamden, Connecticut: Connecticut College & Archon Books, 1969), 47–87. For the contribution to botanical sciences in the colonies, note Sophie C. Ducker, 'Australian Phycology: The German Influence', in D. J. and S. G. M. Carr, eds, *People and Plants in Australia* (Academic Press Australia: Sydney, 1981), 116–38; Thomas George Vallance, 'Early German Connexions [*sic*] with natural history, geology and mining in New South Wales and Queensland', in Johannes H. Voigt, ed., *New Beginnings: Germans in New South Wales: A Commemorative Volume/Neuanfänge: Deutsche in New South Wales und Queensland: Eine Festschrift* (Stuttgart: Institute for Foreign Cultural Relations, 1983), 269–78; Kirchberger, 'German Scientists'.
 29. See Cittadino, *Nature as Laboratory*, 144; McClelland, *German Experience of Professionalization*, 37; McClelland, *State, Society, and University*, 155.
 30. I. M. Salanha, 'Colonialism and Professionalism: The German Forester in India', *Environment and History*, 2 (1996): 195–219.
 31. Kirchberger, 'German Scientists', 14.
 32. Kirchberger, 'German Scientists'.
 33. B. Ribbentrop, *Forestry in British India* (Calcutta: Government Printing, India, 1900), 239, 233.
 34. W. Schlich, 'Review of the Forest Administration in British India', *IF*, 10, 8 (August, 1884): 374.
 35. Ribbentrop, *Forestry*, 233.

36. Brandis, 'Progress of Forestry in India', *IF*, 10, 10 (October 1884): 465; Satpal Sangwan, 'Making of a Popular Debate: The Indian Forester and the Emerging Agenda of State Forestry in India, 1875–1904', *Indian Economic and Social History Review*, 36, 2 (1999): 187–237.
37. Note, for instance, 'Mr. Brandis' Work in the NW Provinces and Oudh', *IF*, 11, 4 (April, 1885): 147–58; 'Dietrich Brandis: The Founder of Forestry in India', *IF*, 10, 8 (August, 1884): 342–57.
38. Ribbentrop, *Forestry*, 79–81, 85, 93.
39. Salanha, 'Colonialism and Professionalism': 201.
40. Brandis, *Indian Forestry* (Woking: Oriental University Institute, 1897), 33–4.
41. Brandis, 'Progress of Forestry in India', *IF*, 10, 10 (October, 1884): 458. This article appeared over several issues.
42. Brandis, 'Progress of Forestry in India', *IF*, 10, 11 (November, 1884): 503.
43. Brandis, 'Progress', *IF*, 10, 10 (October, 1884): 460–1.
44. Brandis, 'Progress of Forestry in India', *IF*, 10, 11 (November, 1884): 502.
45. Dietrich Brandis, 'The Influence of Forests on Rainfall', translated by B. H. Baden Powell, *IF*, 14, 1 (January, 1888): 10–19 (quote, 18).
46. Brandis, 'Progress of Forestry in India', *IF*, 10, 11 (November, 1884): 505.
47. Ribbentrop, *Forestry*, 108–11.
48. Ribbentrop, *Forestry*, 114–15.
49. Bennett, 'Rethinking State and Professional Forestry in British India'; Richard Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven and London: Orient Longman, 2000), 229–38. In India, conflict developed between Forestry Department officials and local communities over access to forests by the latter. Conflict varied with the nature of control enjoyed by the Department, but generally increased after 1878 with the passing of amendments to the Act of 1865.
50. K. Sivaramakrishnan, 'A Limited Forest Conservancy in Southwest Bengal, 1864–1912', *Journal of Asian Studies*, 56, 1 (February, 1997): 75–112; Sivaramakrishnan, *Modern Forests: Statemaking and Environmental Change in Colonial Eastern India* (New Delhi: Oxford University Press, 1999).
51. Atluri Murali, 'Whose Trees? Forest Practices and Local Communities in Andhra, 1600–1922', in David Arnold and Ramachandra Guha, eds, *Nature, Culture and Imperialism: Essays on the Environmental History of South Asia* (Delhi: Oxford University Press, reprint, 1996), 86–122; Jacques Pouchepadass, 'British Attitudes Towards Shifting Cultivation in Colonial South India: A Case Study of South Canara District, 1800–1920', *Nature, Culture and Imperialism*, 123–51; Ramachandra Guha, *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* (Delhi: Oxford University Press, 1991); Guha and Madhav Gadgil, 'Forestry and Social Conflict in British India: A Study of the Ecological Bases of Peasant Protest', *Past and Present*, 123 (1989): 141–77.
52. Bennett, 'Rethinking State and Professional Forestry in British India', 11; Benjamin Weil, 'Conservation, Exploitation, and Cultural Change in the Indian Forest Service, 1875–1927', *Environmental History*, 11 (April, 2006): 319–43.
53. Ramachandra Guha and Madhav Gadgil, *This Fissured Land: An Ecological History of India* (Delhi: Oxford University Press, 2003).
54. Ribbentrop, *Forestry*, 106.

55. Ribbentrop, *Forestry*, 94–120.
56. Ribbentrop, *Forestry*, 96, 91 (quote).
57. Ribbentrop, *Forestry*, 99.
58. Ribbentrop, *Forestry*, especially 1–32, 169–218.
59. Ribbentrop, *Forestry*, 57–8, 60 (quote).
60. Ribbentrop, *Forestry*, 50–3, 52 (quote).
61. Ribbentrop, *Forestry*, 49. On Fa, see James Legge, *A Record of Buddhistic Kingdoms: Being An Account by the Chinese Monk Fa-Hien of his Travels in India and Ceylon (A. D. 399–414) in Search of the Buddhist Books of Discipline* (New York: Paragon Book Reprint Co., 1965).
62. Vasant K. Saberwal, 'Science and the Desiccationist Discourse of the 20th Century', *Environment and History*, 3 (1997): 337.
63. Barton and Bennett, 'Environmental Conservation and Deforestation in British India, 1855–1947', *Itinerario*, 32 (2008): 83–104.
64. From 'Table 9.2: Estimates of Railway Sleepers used and Resultant Area of Forest Cleared in Australia, 1855–1950', in Williams, 'Clearing of the Woods', 124.
65. Brett J. Stubbs, 'Forest Conservation and the Reciprocal Timber Trade between New Zealand and New South Wales, 1880s–1920s', *Environment and History*, 14, 4 (November, 2008): 497–522 (percentages from Figure 1, 506). For other Australian colonies, see John Dargavel, *Fashioning Australia's Forests* (Melbourne: Oxford University Press, 1995), 28–31. Tony Dingle, *The Victorians: Settling* (McMahons Point, NSW: Fairfax, Syme and Weldon Associates, 1984), 134, 104–8.
66. On the general influence of German-speaking scientists, note James Braund, 'German-speaking Scientists in New Zealand 1773–1951: Research Past, Present and Future', in Bernadette Luciano and David G. Mayes, eds, *European Studies: An Interdisciplinary Series in European Culture, History and Politics* (Amsterdam; New York: Rodopi, 2005), 173–287.
67. D. J. and S. G. M. Carr, 'Karl Goebel in Australia and New Zealand', *People and Plants in Australia*, 167–79; Sophie C. Ducker, 'Australian Phycology: the German Influence', *People and Plants in Australia*, 116–38; Ann Moyal, 'Collectors and Illustrators: Women botanists of the nineteenth century', *People and Plants in Australia*, 333–56; Robert A. Stafford, 'A Far Frontier: British Geological Research in Australia during the nineteenth century', in R. W. Home and Sally Gregory Kohlstedt, eds, *International Science and National Scientific Identity: Australia between Britain and America* (Dordrecht, Boston, London: Kluwer Academic Publishers, 1991), 75–96.
68. James N. Bade, ed., *Eine Welt für sich: Deutschsprachige Siedler und Reisende in Neuseeland im 19. Jahrhundert* (Bremen: Edition Temmen, 1998); Joseph Vondra, *German-Speaking Settlers in Australia* (Melbourne: Cavalier Press, 1981).
69. Rod Home, 'Science as a German Export to Nineteenth Century Australia', in Tom Griffiths and David Lowe, eds, *Working Papers in Australian Studies No. 104* (London: Sir Robert Menzies Centre for Australian Studies; Institute of Commonwealth Studies University of London, no date): 5.
70. See also, Thomas A. Darragh, 'Ludwig Becker, a Scientific Dilettante: His Correspondence with J. J. Kaup and Others', *Historical Records of Australian Science*, 11, 4 (December, 1997): 501–22; Gabrielle L. McMullen, "'An Able Practical and Scientific Man": Gustav Adolph Hugo Thureau, German-trained

- Mining Geologist', *Historical Records of Australian Science*, 11, 2 (December, 1996): 149–77.
71. Charles Daley, 'Baron Sir Ferdinand Von Mueller, KCMG, MD, FRS, Botanist, Explorer, and Geographer', *The Victorian Historical Magazine*, 10 (1924–25): 23–32, 34–75; 'Introduction', in Home, A. M. Lucas, Sara Maroske, D. M. Sinkora and J. H. Voigt, eds, *Regardfully Yours: Selected Correspondence of Ferdinand von Mueller, Volume I: 1840–1859*, Volume 1 (Bern: Peter Lang, 1998), 9–49.
 72. I use the Anglicised spelling of Müller's name, which Mueller later adopted in Australia.
 73. Ferdinand von Mueller, *Forest Culture in its relation to industrial pursuits. A lecture, delivered by Baron Ferd. von Mueller ... on 22nd June, 1871* (Melbourne, Mason, Firth, and McCutcheon, 1871), 3.
 74. Mueller, *Forest culture*, 4 (first quote), 6 (second quote).
 75. Jeffries argues that Mueller's unsuccessful defence of the scientific purpose of the Melbourne Botanic Gardens centred on misunderstandings between the Australian public and Mueller's vision for the gardens. Jeffries, 'Alexander von Humboldt'.
 76. 'Forest Preservation', *NZF*, 10, 1 (January, 1890): 5.
 77. Mueller, *Forest Culture*, 6.
 78. H. W. Nunn, 'Hodgkinson, Clement (1818–1893)', *Australian Dictionary of Biography*, Volume 4 (Melbourne: Melbourne University Publishing, 1972), 403–4.
 79. R. Wright, *The Bureaucrats' Domain: Space and the Public Interest in Victoria, 1836–84* (Melbourne: Oxford University Press, 1989), 183.
 80. Mueller, *General Information Respecting the Present Condition of the Forests and Timber Trade of the Southern Part of the Colony* (Perth: Government Printer, 1882).
 81. S. M. Legg, 'Debating Forestry: An Historical Geography of Forest Policy in Victoria and South Australia, 1870 to 1939' (Ph.D. diss.: Department of Geography and Environmental Science, Monash University, 1995), 123–70.
 82. Mueller, in *Royal Commission on Vegetable Products: Fourth Progress Report* (Melbourne: Government Printer, 1887), 210–21 (quote 218).
 83. Legg, 'Debating Forestry', 123.
 84. M. Calver, 'Forestry Papers in Victoria', Melbourne University, 33.
 85. K. F. Wells, N. H. Wood and P. Laut, 'Loss of Forests and Woodlands in Australia: A Summary by State, based on Rural Local Government Areas' (Canberra: CSIRO Institute of Biological Resources, Division of Water and Land Resources, 1984), no page (statistic gleaned from table appended to map).
 86. Schomburgk, *Influence of Forests on Climate* (Adelaide: Government Printer, 1873), 4–5. This paper was originally read before the Philosophical Society on 9 August 1870.
 87. Schomburgk, *Influence of Forests*, 4.
 88. A useful summary of Schomburgk's ideas appears in *Royal Commission on Vegetable Products*, 1887, 186–200.
 89. Pauline Payne, "'Science at the Periphery": Dr Schomburgk's Garden', in Roy MacLeod and Philip F. Rehbock, eds, *Darwin's Laboratory: Evolutionary Theory and Natural History in the Pacific* (Honolulu: University of Hawai'i Press, 1994), 245; Payne, *The Diplomatic Gardener: Richard Schomburgk, Explorer and*

- Botanic Garden Director* (North Adelaide: Jeffcott Press, 2008); Schomburgk, *Wattle Farming* (Adelaide: Government Printer, 1884).
90. Mueller, in *Royal Commission on Vegetable Products*, 1887, 216.
 91. Legg, 'Debating Forestry', 99–103.
 92. Legg, 'Debating Forestry', 121. For his biography, note Sally O'Neill, 'Krichauff, Friedrich Eduard Heinrich Wulf (1824–1904)', *Australian Dictionary of Biography*, Volume 5 (Melbourne: Melbourne University Press, 1974), 44.
 93. Ernst Dieffenbach, *Travels in New Zealand with Contributions to the Geography, Geology, Botany, and Natural History of That Country*, Volume 1 (Christchurch: Capper Press, reprint, 1976 [1843]), 367–8.
 94. Vaughan Wood, 'Appraising Soil Fertility in Early Colonial New Zealand: The "Biometric Fallacy" and Beyond', *Environment and History*, 9, 4 (2003): 393–405.
 95. Gerda Bell, 'Ernst Dieffenbach', in *Eine Welt für Sich*, 181–94. For a useful biography of Dieffenbach see Bell, *Ernest Dieffenbach* (Palmerston North: Dunmore, 1976).
 96. On this connection, note: Dieffenbach to uncle, Berlin, 13 June, 1843, in MS-1564, Alexander Turnbull Library, Wellington, copy from City Archive Friedberg, Hessen.
 97. Johann Spitzka, *Übersichtliche Darstellung der unter dem Titel: 'Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter den Befehlen des Commodore B. von Wüllerstorff-Urbair' erschienenen Publicationen* (Vienna: Hof- und Staatsdruckerei, 1877), ii.
 98. Gerhard Holzer, 'Ferdinand von Hochstetter, insbesondere als Neuseelandforscher' ['Ferdinand von Hochstetter, in particular as New Zealand Researcher'] (Diplomarbeit in Geschichte: University of Vienna, 1984), 8–9.
 99. Les Kermode, 'Ferdinand von Hochstetter', in *Eine Welt für sich*: 203–14.
 100. Ferdinand von Hochstetter, *New Zealand: Its Physical Geography, Geology and Natural History with special reference to the results of Government Expeditions in the Provinces of Auckland and Nelson*, trans. by Edward Sauter (Stuttgart: J. G. Cotta, 1867), 254. This was originally published as *Neu-Seeland* (Stuttgart: J. G. Cotta, 1863).
 101. Hochstetter, *New Zealand*, 255.
 102. Hochstetter, *New Zealand*, 142.
 103. Hochstetter, *New Zealand*, 142.
 104. On this, note for instance, Michael R. Dove, "'Jungle" in Nature and Culture', in *Social Ecology*, 90–115; Ajay Skaria, *Hybrid Histories: Forests, Frontiers and Wildness in Western India* (Delhi: Oxford University Press, 1999).
 105. T. H. Potts, NZPD, 7 October 1868: 188; Charles O'Neill, NZPD, 1 October 1873: 1545; 'The Forests of the Colony [from Hansard 7th October, 1868]', in 'Papers relating to state forests, their conservation, planting, management, &c.', AJHR, H-5, Vol. 2, 1874: 1; Wood, NZPD, 31 July, 1874, 380–1.
 106. Humboldt's observations appeared when O'Neill introduced his Conservation of Forests Bill of 1873. Similarly, Walker used Humboldt's example of Lake Valencia in 1877; as did Frederick S. Peppercorne and Charles O'Neill. O'Neill, NZPD, 1 October 1873: 1545–6; Peppercorne, *On*

- the Influence of Forests on Climate and Rainfall* (Napier: R. Coupland Harding, 1880), 4; Walker, 'Report of the Conservator of State Forests', C3, vol. 1, AJHR, 1877, 47; *Nelson Examiner and New Zealand Chronicle*, 24 February 1872, 7.
107. Walker spent four and a half months in Germany, visiting the forest academies of Tharandt (Saxony), Aschaffenburg (Bavaria), Neustadt-Egerswalde (Prussia), and Mariabrunn (Austria). Walker, 'Report on State Forests and Forest Management in Germany and Austria', Staff Corps, Deputy Conservator of Forests, Madras, 1 October 1872, in 'Part III: Various Reports on State Forests', H5B, AJHR, Vol. 2, 1874, 1–26. George Ross, 'An account of the laws and regulations relating to the management of village and ecclesiastical forests in the province of Hanover', May 1872, in 'Part III: Various Reports on State Forests', H5B, AJHR, Vol. 2, 1874, 56–8.
 108. J. R. Hacket, 'Forest Culture in Germany with suggestions for the future cultivation of Forests in New Zealand', Read 14 December 1883, Nelson Philosophical Society, MU156, R-1M03-131D, Te Papa Tongarewa/The Museum of New Zealand, 8.
 109. Hacket, 'Forest Culture'.
 110. Among many other examples, Grossmann quoted from Professor Schwappach's text *Forestry* to highlight the value of forests. J. P. Grossmann, *The Evils of Deforestation* (Auckland: Brett Printing and Publishing Co., 1909), 6.
 111. Postcards from the Königliche Forst-Akademie (Royal Forest Academy) at Tharandt, indicate earlier correspondence with German foresters or visits to this institution. Diplomatic and Consular Reports, No. 596 Miscellaneous Series, Foreign Office, September 1903. These references to previous Consular Reports on German include: Misc Series nos. 540, 561, 566, 572, 573, 591, 594, 595. McNab also possessed a copy of Dr Frederick Rose's (His Majesty's Consul at Stuttgart) 'Report on Instruction in Forestry and the Present Condition of Forest Economy in Germany'. The first postcard, one showing building of forest academy at Tharandt, Saxony, is dated 28 Sept. 1903; another of photograph of small town with labels pointing out buildings, including that of the Forst Akademie, dates from 1 Dec. 1903. A third, also dated 1 Dec. 1903, is from a trout hatchery from Saxony. All references are in McNab Papers, in Robert McNab: Papers relating to afforestation in New Zealand 1895–1908, HL, MS 0608.
 112. 'Practical Forestry: Schoolboys at Knapdale', 20 August 1903, *The Ensign*: no page, in McNab Papers.
 113. Paul Star, 'Ecology, A Science of Nation?: The Utilization of Plant Ecology in New Zealand, 1896–1930', *Historical Records of Australian Science*, 17, 2 (December, 2006), 197–207. On Cockayne, see also A. D. Thomson, 'Leonard Cockayne', NZDB, 3, 1901–20, 107–9; Thomson, 'Annotated summaries of letters to colleagues by the New Zealand Botanist Leonard Cockayne – 1', *New Zealand Journal of Botany*, 17, 3 (1979): 389–403. On the importance of ecology and the significance of Cockayne, see Thomas R. Dunlap, *Nature and the English Diaspora: Environment and History in the United States, Canada, Australia, and New Zealand* (Cambridge: Cambridge University Press, 1999), 139–63.
 114. For instance, for the production of his 1909 *Report on the Sand Dunes of New Zealand* (Wellington: Department of Lands, 1909), Cockayne acknowledged

- the special overseas help he received from three colleagues in the United States and Professor L. Diels at the University of Marburg (2).
115. Beattie and Paul Star, 'State Forest Conservation and the New Zealand Landscape: Origins and Influences, 1850–1914', in Tony Ballantyne and Judith Bennett, eds, *Landscape/Community: Perspectives from New Zealand History* (Dunedin: Otago University Press, 2005), 43–56.
 116. Libby Robin, 'Ecology: A Science of Empire?' in Tom Griffiths and Libby Robin, eds, *Ecology and Empire: Environmental History of Settler Societies* (Seattle: University of Washington Press; Edinburgh: Keele University Press, 1997), 64–75.
 117. On the general influence of German-speaking scientists, note Braund, 'German-speaking scientists in New Zealand'.

6 South Asian and Australasian Forestry Anxieties and Exchanges, 1870s–1920s

1. F. S. Peppercorne, *On the Influence of Forests on Climate and Rainfall* (Napier: R. Coupland Harding, 1880), 3.
2. Campbell Walker, 'Report of the Conservator of State Forests', *Appendices to the Journal of the House of Representatives* (AJHR), C3, vol. 1, 1877, 48.
3. Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens, and the Origins of Environmentalism, 1600–1860* (New York: Cambridge University Press, 1995).
4. David Livingstone, *Putting Science in Its Place: Geographies of Scientific Knowledge* (Chicago and London: University of Chicago Press), 138.
5. Tony Ballantyne, *Orientalism and Race: Aryanism in the British Empire* (Houndmills; New York: Palgrave Macmillan, 2002).
6. Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge, MA: Harvard University Press, 1987), esp. 215–57.
7. Ian Tyrrell's fascinating work, for instance, examines Californian-Australian connections. Ian Tyrrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860–1930* (Los Angeles and London: University of California Press, 1999); Alan Grey, 'North American Influences on the Development of New Zealand Landscapes, 1800–1935', *New Zealand Geographer*, 40 (1984): 66–77.
8. Satpal Sangwan, 'Making of a Popular Debate: *The Indian Forester* and the Emerging Agenda of State Forestry in India, 1875–1904', *Indian Economic and Social History Review*, 36, 2 (1999): 187–237; S. Ravi Rajan, *Modernizing Nature: Forestry and Imperial Eco-Development 1800–1930* (Oxford: Oxford University Press, 2006).
9. On the background, note Paul Star, 'The Place of Native Forest in New Zealand's Mental Landscape', in John Dargavel and Brenda Libbis, eds, *Australia's Ever-Changing Forests IV: Proceedings of the Fourth National Conference on Australian Forest History* (Canberra: Centre for Resource and Environmental Studies; The Australian National University, 1999), 85–98.
10. Tessa Kristiansen, 'Wilson, John Cracroft 1808–1881', *Dictionary of New Zealand Biography*, updated 16 December 2003, <<http://www.dnzb.govt.nz>> (1 March 2005).
11. On his career in India, note 'Biography Files from India and Colonial Office, "India Office Records"', British Library, Dec. 2004, OIR 354.54; 'Papers of

- Sir John Cracroft Wilson (1808–81)', Canterbury Museum, ARC1990. 7, Box 1, Folder 1.
12. Wilson, *New Zealand Parliamentary Debates* (henceforth NZPD), 31 July 1874, 361.
 13. Grove, *Green Imperialism*, 168–263.
 14. Earl of Kimberley to Governor the Right Hon. W. H. Gregory, Downing street, 13 June 1873, in 'II. Victoria, South Australia, Ceylon', AJHR, H-5A, vol. 2, 1874, 7.
 15. Peppercorne's articles appeared in the *Transactions and Proceedings of the New Zealand Institute* (TPNZI) in 1879 and as a separate pamphlet the following year. Peppercorne, 'Influence of Forests on Climate and Rainfall', TPNZI, 12 (1879): 24–32; Peppercorne, *On the Influence of Forests*.
 16. Dr Meldrum, 'On Weather, Health, and Forests in Mauritius', TPNZI, 15 (1882): 524.
 17. Wilson: 361.
 18. In 1873, for instance, he introduced the Grasslands and Fires Prevention Bill modelled on legislation in the Australian colony of Victoria. Wilson, NZPD: 468.
 19. Wilson, NZPD, 1874: 362.
 20. John Douglas to the Government Agent, Central Province, Colombo, 3 July 1873, in 'II. Victoria, South Australia, Ceylon', AJHR, H-5A, vol. 2, 1874, 12–13.
 21. OW, 22 November 1873, 2.
 22. 'Biographical File 15: East India Company/India Office and British Government of India', Oriental and India Office Collections (OIOC), 920.054, British Library.
 23. Bernard John Foster, 'FERGUSON, Right Hon. Sir James', in A. H. McLintock ed., *An Encyclopaedia of New Zealand* (Wellington: G.P. Print, 1966) in Te Ara <<http://www.teara.govt.nz/1966/F/FergusonRightHonSirJamesKcmg/FergusonRightHonSirJamesKcmg/en>> (1 March 2005). Fergusson returned to India the next decade, serving as Governor of Bombay (28 April 1880–27 March 1885). For details of Fergusson's influence on Vogel, see Michael Roche, *History of Forestry* (Wellington: GP Print, 1990), 85, 88.
 24. E. P. Stebbing, *The Forests of India*, Volume 3 (London: John Lane, 1923), figure on 475. Other estimates put it at 20 per cent. See, Saint-Hill Eardley-Wilmot, 'Indian State Forestry', *Transactions of the Royal Scottish Arboricultural Society*, 23 (1910): 217–18.
 25. Inches Campbell Walker to H. M. Brewer, Wellington, 16 August 1876 'Official Correspondence of I. Campbell-Walker, 1876–7', Alexander Turnbull Library, qMS-1468. Note, in these files, Campbell Walker's first initial is incorrectly referred to as 'J'. not 'I'.
 26. Walker, 'Report of the Conservator of State Forests', 12–49; Walker, 'State Forestry: Its aim and object', TPNZI, 9 (1876): 187–203; Walker, 'The Climatic and Financial Aspect of Forest Conservancy as applicable to New Zealand', TPNZI, 9 (1876): xxvii–xlix.
 27. See 'Climatic and Financial Aspect'.
 28. Walker, 'Report of the Conservator of State Forests', 48.
 29. Preceding quotes all from Walker, 'Climatic and Financial Aspect', xxviii–xxxix.

30. Walker, 'Climatic and Financial Aspect', xxviii-xxix.
31. Walker, 'Report', 49.
32. Sangwan, 'Making of a Popular Debate': 198-9; James Beattie, 'Climate Change, Forest Conservation and Science: A Case Study of New Zealand, 1840-1920', *History of Meteorology*, 5 (2009): 1-18.
33. Figure from Roche, *History of Forestry*, 93.
34. Walker, 'Report of the Conservator of State Forests', 47. Walker also later corresponded with Croumbie Brown. John Croumbie Brown, *Schools of Forestry in Germany, with Addenda Relative to a Desiderated British National School of Forestry* (Edinburgh: Oliver and Boyd; London: Simpkin, Marshall and Co., 1887), 16.
35. Indeed, five of the 1874 forestry papers that appeared in the AJHR originated in the research of Indian foresters on forest practices outside South Asia, such as Germany and Scotland. J. P. Grossmann, *The Evils of Deforestation* (Auckland: Brett Printing and Publishing Co., 1909), 5-6. Other published sources also referred to his work, illustrating his on-going significance for conservation. See, for instance, H. J. Matthews, *Tree Culture in New Zealand* (Wellington: Govt. Printer, 1905), 1; 'The Passing of the Forest', NZF, 26 September 1905: 770.
36. Outward Letterbook (Forests) December 1885-May 1889, LS 53, Box 17, National Archives (NZ), Wellington.
37. H. Calthrap to Minister of Crown Lands, Punjab, India, 25 July 1885, LS 53, Box 1 1881/15, NA.
38. After serving in New Zealand, he became Deputy, then, Conservator of Forests, Madras. In 1888, he was responsible for a forest area of some 6872.71 square miles (17,800 square km). Walker, 'Progress Report of Forest Administration in the Southern Circle, Madras, for the year 1886-87', in *Annual Administration Reports of the Forest Department (Southern and Northern Circles), Madras Presidency, for the Official year 1886-87* (Madras: Government Press, Madras, 1888). Figure from 2.
39. 'Timber in New Zealand', IF, 12 (June 1886): 281-4.
40. See, W. Edgar Spooner, *Report on the Working and Condition of the Punjab Agri-Horticultural Society's Gardens, Lahore, for the year 1881-82* (Lahore: Abya Press, 1882).
41. T. H. Kirk to Commissioner of State Forests, 3 June 1887, 'Telegrams of State Forest and Agriculture Department, 1886-1889', qMS-1470, ATL.
42. T. Kirk to Edgar Spooner, Wellington, 25 June 1887, LS 53, Box 15, NA.
43. Spooner, 'Government Aid to Agriculture, Horticulture, and Forestry in India', NZF, 9, 9 (September, 1889): 383; 'Tree Planting in South Australia', NZF, 8, 9 (August, 1889): 285; 'Growth of Eucalyptus Trees', NZF, 8, 9 (August, 1889): 290; 'The Carob Tree', NZF, 7, 9 (July, 1889): 246.
44. Sir John Cracroft Wilson, 'Transcript of Diary/Recollections, 1854, of Canterbury', typed transcript by Ron Chapman, 1989, Canterbury Museum, ARC1989.80, 24. For later official introductions, note G. Bidie, Honorary Secretary to the Agri-Horticultural Society, to the Acting Secretary to the Board of Revenue, 18 August 1868, in File 7071930: Internal Affairs 1 1870/1930, NA.
45. The article was only signed 'Tau-Tha' but was clearly written by someone at Dehra Dun (since his journey started from here on 5 July 1886). The author arrived in Auckland on 10 August 1886 and made his way to Wellington (22 August) via the Central North Island. He then departed for Christchurch

- (23 August) and travelled to Dunedin, before leaving from Bluff on 27 August. 'Three Months' Privilege Leave to New Zealand', IF 12 (December, 1886): 546.
46. Quotes from 'Tau-Tha': 554, 557, 560.
 47. 'Condition of Forestry in New Zealand', IF, 18 (November, 1892): 416.
 48. OW, 6 August 1886, 9.
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 52. Note: *Argus*, 14 June 1876, 7; A. G. L. Shaw, 'Loch, Henry Brougham [Baron Loch] (1827–1900)', *Australian Dictionary of Biography*, vol. 5 (Melbourne: Melbourne University Press, 1974), 98–9.
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 66. Peppercorne, *On Irrigation and Canalisation Works (Ancient and Modern)* (Napier: R. Coupland Harding, 1879).
 67. Peppercorne, *Australian Meteorology and Hydrology* (Napier: R. Coupland Harding, 1879).
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76. J. M. Powell, 'Enterprise and Dependency: Water Management in Australia', in Tom Griffiths and Libby Robin, eds, *Ecology and Empire: Environmental History of Settler Societies* (Edinburgh: Edinburgh University Press, 1997), 107.
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83. Wakefield, NZPD, 7 July 1885, 449–50.
84. 'Arbour Days', NZF, 9, 8 (August, 1889): 298–9.
85. Legg, 'Debating Forestry', 86–91.
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87. *Debates in the Houses of Legislature during the Second Session of the Seventh Parliament of South Australia, 25 July to 18 December 1873* (Adelaide: Government Printer, 1873), 1316.
88. *Debates in the Houses of Legislature*, 15 July 1874, 936–7; 26 August 1874, 1446.
89. *Debates in the Houses of Legislature*, 9 September 1874, 597.
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104. Rajan, *Modernizing Nature*.
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108. Bennett, 'An Imperial, National and State Debate': 217–244 (quote 220).
109. Roche and Dargavel, 'Imperial Ethos': 523–43 (quote 527).
110. Roche and Dargavel, 'Imperial Ethos': 530.
111. Bennett, 'An Imperial, National and State Debate': 233.
112. The Commission travelled to Wellington, Invercargill, Tapanui, Dunedin, Fairlie, Hokitika, Greymouth, Nelson, Blenheim, Wellington, Napier, New Plymouth and Dargaville between 26 February and 30 May 1913. See 'Minutes of Evidence' in 'Report of the Royal Commission on Forestry', *AJHR*, C12, 1913, 1–87.
113. 'Report of the Royal Commission on Forestry', *AJHR*, 1913, xv.
114. 'Report of the Royal Commission on Forestry', *AJHR*, 1913, xv–xvi. On Cockayne, see *Protection Forests*. Others also highlighted this concern earlier. See, for instance, Walsh, who in 1896 published an article in which he argued that cattle, fire, and deforestation represented the principal causes of deforestation. Philip Walsh, 'On the Disappearance of the New Zealand Bush', *TPNZI*, 29 (1896): 490–6.
115. See Appendix 1 in 'Report of the Royal Commission on Forestry', *AJHR*.

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123. Appendix C No. 2 C.A. Cotton, 'Remarks on Erosion of Slopes in New Zealand', in 'Report of the Royal Commission on Forestry', lii–liii.
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126. Chilton, Fairlie, 15 March 1913, No. 21, in 'Report of the Royal Commission on Forestry', 17–18.
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7 Thwarting Imperial Agricultural Development: The Spectre of Drifting Sands, 1800s–1920s

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32. 'The Geraldton Sand-Hills Planting Act 1872', 36 Vic, 10.
33. PGWAT, 10 April 1868, 3.
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52. WA, 9 August 1894, 3.
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57. K. C. McDonald, *City of Dunedin: A Century of Civic Enterprise* (Dunedin: Dunedin City Corporation, 1965), 200–1.
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60. Allen, 28 September 1903, *New Zealand Parliamentary Debates* (NZPD), 7.
61. The voluntary nature of the committee is emphasised by the words of Tame Parata, who related how we 'formed ourselves into an improvement society'. Parata, 28 September 1903, NZPD, 13.
62. Parata, 28 September 1903, NZPD, 13.
63. WA, 11 September 1888, 4.
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66. Note: *Western Australia Parliamentary Debates*, Session 10 October 1888–7 December 1888, vol. 14, 30 November 1888, 411–12; 3 December 1888, 431–4.
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70. WA, 24 June 1891, 3.
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74. 25 August 1890, 140; 5 October 1891, 'Newcastle City Minute Book', 5 May 1890–30 November 1891, AB 756, Newcastle Region Library, 509.
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79. Carroll, 4.
80. Field, 28 September 1903, NZPD, 11.
81. Fraser, 28 September 1903, NZPD, 6.
82. For instance, Fraser, 28 September 1903, NZPD, 6; Allen, 28 September 1903, NZPD, 7; Mander, 28 September 1903, NZPD, 8.
83. Steward, 28 September 1903, NZPD, 8; Houston, 28 September 1903, NZPD, 6; Field, 28 September 1903, NZPD, 10. Of the 14 MHRs who spoke during the debate, only the Caversham MHR, T. K. Sidey supported the Bill outright. Sidey, 28 September 1903, NZPD, 12.
84. McNab, 28 September 1903, NZPD, 8. Both Houston and F. Mander (Marsden) actually doubted whether the drift could be stopped at all. Houston, 28 September 1903, NZPD, 6; Mander, 28 September 1903, NZPD, 8.
85. Carncross, 20 October 1903, NZPD, 590.
86. Willis, 28 September 1903, NZPD, 12.
87. Willis, 28 September 1903, NZPD, 11.
88. Vile, 28 September 1903, NZPD, 13; Buchanan, 28 September 1903, NZPD, 10.
89. 22 October NZPD, 713.
90. *Statutes of New Zealand* (Wellington: Government Printer, 1903), 57–8.
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93. Tom Griffiths, 'Deep Time and Australian History', *History Today*, 51, 11 (November, 2001): 2–7.
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97. Town Clerk to Minister for Public Works, Cromwell, 5 July 1915, in 'Sand Dunes – Cromwell'.
98. See 'Sand-Drift at Cromwell; 19 December 1916', Memo 25 April 1917, in 'Sand Dunes – Cromwell'.
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274 *Notes*

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Index

- Aboriginal Australians, 15, 30–1, 69, 71, 179
acclimatisation, 22, 27, 42–4, 51–8, 64, 68, 70–1, 79, 91, 118–19, 140, 158
acts, *see* legislation
Adelaide, 65, 141, 169
Adelaide Hills, 62
aesthetics, 6–7, 10, 17, 28–9, 48, 52, 72–99, 127, 139, 170, 200, 215
afforestation, *see* tree-planting
Afghanistan, 57, 113, 134
Africa, 41, 52, 58, 207–8
 see also individual countries
Agra, 202
 see also United Provinces
Agricultural Journal (Cape Town), 207
agriculture, 1–2, 4, 6, 10–11, 13, 15–18, 22, 26, 30, 33, 37, 55, 57, 84, 86, 100, 107–9, 119, 124–5, 135–8, 141–3, 146, 148, 150–1, 155, 158, 163–6, 178–81, 185–9, 193–5, 198–200, 202, 205–6, 212, 215
agriculture departments, 191
 New Zealand, 168, 198–9
 United Provinces, 202, 204–5
 United States, 147
Ajmer, 130–1, 133–4
Akyab, 50–1
Albany, 192
Allenbagh, 205
America, 8, 60, 91, 147–8, 152–3, 159, 164, 169–70, 174–5, 201, 205
 see also North America; South America; individual countries and localities
Anamalia Hills, 48
Anderson, Warwick, 6, 60–1, 70
animals, 8, 11–12, 18, 51, 84, 86, 89, 116, 118, 144, 146, 179, 183, 186, 192–3, 195, 200–1, 205–7, 209
Antarctica, 76
Appendices of the Journal of the House of Representatives, 155
Arbor Day, 166, 190, 199–200
Arizona, 207
Armstrong, J. B., 64–5
Arnold, David, 44, 73–6
Arnold, Rollo, 82
art and artists, 12, 29, 47, 72–99, 215
Assam, 62, 131, 134
Ata, 202
Attaran, 110
Auckland, 58, 72, 77, 79–81, 89, 91–5, 97–8, 119–20, 144–5, 169–70
Australasia, 2, 4–10, 13, 15–18, 26–9, 32, 35, 37–42, 50–1, 54, 56, 60–7, 69–76, 78, 82, 84–6, 89–91, 97–101, 114–16, 118, 120, 122–4, 127, 137–43, 147–81, 184, 187–8, 190, 201, 203–5, 212–16
 see also Australia; New Zealand
Australia, 5, 7–8, 10, 13, 15–18, 26, 31, 33, 35–7, 39–42, 44–5, 47, 53–4, 56, 60–4, 66–72, 75–7, 84, 89–94, 97–8, 104, 113–14, 118, 127–8, 137–41, 143, 147–8, 152, 159–70, 174–6, 179–81, 183, 189, 191, 193–4, 205–9, 212–13
 see also individual states and localities
Australian Agricultural Company, 193
Australian Alps, 141
Australian Forestry, 170
Austria, 138, 144
Austro-Hungarian Empire, 126
Baber, Zaheer, 7, 21–2
Baden Powell, B. H., 174, 186, 200
Balfour, Edward, 106
Balfour, J. H., 100, 102
Ballantyne, Tony, 5
Baltic, 106
Bandhur Bazurg, 202
Banks, Joseph, 181

- Barton, Gregory, 7, 136, 175
 Bathurst, 61
 Bavaria, 175
 Bay of Islands, 83, 113, 194
 beaches, 62, 94, 179, 189, 190, 193, 200
 Beinart, William, 7, 77
 Beluchistan, 133–4
 Benbow, C. A., 206–8
 Bengal, 22, 30, 32, 46, 55, 57, 69, 91,
 106, 131, 133–4, 154
 Bennett, Brett, 7, 133, 136, 169–70, 175
 Benskin, E., 201–2, 205, 213
 Bentham, Jeremy, 22
 Berar, 131, 133–4
 Bewell, Alan, 41
 Bhareh, 202
 bible, 16, 165, 184, 187–9, 215
 bills, *see* legislation
 birds, 18, 74, 171
 Birkenhead, 78–9, 94
 Blackley, Roger, 79, 86, 89
 Blanford, H. F., 174
 Blue Mountains, 62, 89
 Boldrewood, Rolf, 61–2
 Bombay, 50, 107, 109–10, 131, 133
 Bonn, 130
 Bonwick, James, 68
 Bonyhady, Tim, 90
 botanic gardens, 22, 50, 65, 102
 Adelaide, 65, 141
 Bombay (Victoria Gardens), 50
 Calcutta, 50
 Edinburgh, 102–3
 Kew, 55, 103, 112–13, 115
 Lahore, 158
 Melbourne, 93, 138
 Sydney, 54, 65, 93, 182–3
 Wellington, 119
 see also parks
 botany and botanists, 22, 51, 56, 76,
 89, 101–3, 108, 112–13, 115–19,
 128–30, 138–9, 41, 143, 157, 166,
 199, 215
 Bowman, I., 173
 Brandis, Dietrich, 39, 50–1, 53–4, 127,
 129–30, 132–3, 172, 174, 201–2
 Branfill, B. R., 187
 Brémontier, N. T., 187
 Brisbane, 68–9
 Britain, 7, 11–13, 18, 31, 39, 43,
 45–6, 48, 50, 56–8, 60, 63, 69, 75,
 105–6, 108, 115, 128, 137, 163,
 168–9, 187–8
 see also British Empire; individual
 countries and localities
 British Association for the
 Advancement of Science (BAAS),
 33, 108
 British Empire, 1–2, 7, 10–13, 18,
 38–40, 56, 59, 77, 104, 121, 124,
 126–8, 156, 160, 215
 British Guiana, 143
 British in India/British Raj, 15, 17–18,
 21–2, 26, 30, 33, 55, 67, 90–2,
 106–7, 130, 133, 135, 160, 179–81,
 184–6, 200, 213
 Broome, Frederick Napier, 56, 60
 Brown, Croumbie, 157
 Browne, Thomas Alexander, *see*
 Boldrewood, Rolf
 Brown, John Ednie, 143, 165–6
 Brown, John Macmillan, 69
 Brunton, Warwick, 117
 Buchanan, W. C., 196
 Buckland, William, 174
 Bulwara, 50
 Bundaleer, 166
 Bundelkhand, 202
 bureaucracies, 1–2, 4, 6, 10, 18, 21–2,
 26, 30–1, 100–2, 116, 123–5, 178,
 184, 216
 health, 2, 21–2, 26, 28, 40, 46,
 66–70, 101, 105, 122
 forest, 2, 18, 21–2, 27–8, 30, 38,
 101, 122–4, 130–43, 148, 151,
 153, 168–71, 176–7
 science, 15, 22, 27–8, 32, 105, 121,
 128–9, 148, 196–7
 see also agriculture departments;
 forest departments; health
 departments
 Burma, 30, 32, 106–7, 130–5, 162
 Buvelot, Louis, 77
 Byrnes, Giselle, 75, 77
 Cabul, 58
 Calcutta, 46–7, 50, 68
 California, 52

- Calthrap, H., 158
 cameral sciences, 125–7
 Campbell, Elliott, 31
 Campbell, W. D., 63
 Canada, 7, 58, 171
 canal building, 18, 22, 55, 163, 180, 185
 Canara, 108
 Canberra, 176
 Canterbury, 31, 59, 64, 69, 115, 117, 120, 167, 169–70, 173, 176
 Cape Colony, 56, 157
 Carncross, W. C. F., 195
 Carroll, James, 193–4
 Carter, Paul, 75
 cash crops, 16, 18, 107, 180–1, 184
 Cawnpore, 205
 Central America, 207
 Central Asia, 194
 Central Otago, 17, 117, 167
 Central Provinces, 131, 133–4
 Ceylon, 44, 48, 58, 154–5, 158
 Changa Manga, 51
 Chapman, 59
 Chatham Islands, 147, 190
 children, 28, 43, 45, 58–60, 62, 69–70, 81, 190, 199–200
 Chilton, Charles Andrew, 173
 China/Chinese, 11, 13, 15, 30, 45, 68
 Christchurch, 64, 155, 189, 211
 Christianity, *see* religion
 Christison, Robert, 112
 Clarke, W. B., 216
 Cleghorn, Hugh, 51, 53, 106–9, 111
 climate, 28, 33, 35–6, 39–63, 67–8, 70, 76, 101, 113, 127, 140–2, 147, 152, 158, 179, 200
 see also climate-forest theory;
 environmental anxiety
 climate-forest theory, 10, 17, 106–10, 115–17, 119–20, 130, 132, 135–6, 139–42, 146–7, 150–1, 153–7, 163–76, 182, 187, 196, 201, 205
 Clutha, 197
 Cockayne, Leonard, 147–8, 173, 199, 208, 210–11, 213
 Codrington-Ball, F., 177, 188
 Coimbatore, 48, 109
 Colenso, William, 113
 colleges, *see* universities and colleges
 Colombo, 155
 colonialism/imperialism, 1–2, 6–11, 13, 15–18, 21–2, 26, 28–31, 37–43, 45–8, 51, 55, 57–8, 62, 65, 68, 73–5, 78, 90, 100–1, 103–6, 111, 115–18, 120, 128, 132–3, 136, 139, 150–3, 168–71, 176, 179, 181, 196, 214–16
 Conkan, 110
 Coningham, William, 45
 conservation, *see* forest conservation
 Cook, James, 181
 Coonoor, 53
 Coorg, 53, 131, 133–4
 Copenhagen, 130, 173
 Corfu, 58
 Coromandel, 84, 89
 Cotton, C. A., 172–3
 Cotton, William, 74
 Council of Scientific and Industrial Research (CSIR), 208
 Cromwell, 196–8, 212
 Crosby, Alfred, 8, 42
 Curdie, Daniel, 113
 Dalhousie, Marquis of, 16–17, 22, 107, 111, 130
 Dargavel, John, 170
 Darjeeling, 46, 62, 76
 Darwin, Charles, 113
 Deakin, Alfred, 62, 164
 Deccan plateau, 33, 110, 135
 deforestation, 1–2, 9, 17–18, 26, 29, 35, 100, 126–7, 150–5, 159, 163, 175–7, 179, 194, 196
 Australia, 18, 78, 86, 98, 114–15, 137, 139–42, 160–4, 174
 India, 18, 33, 50–1, 54, 100–1, 106–11, 115, 130, 135–6, 175, 181, 185–6, 200–1
 New Zealand, 18, 37, 84, 98, 106, 112, 115, 117–20, 143–7, 156–8, 168, 171–3, 179, 181
 degeneration, racial, 12–13, 39, 44–5, 58, 60, 63, 66, 69–71
 Dehra Dun, 129, 156, 158
 Denison, William Thomas, 54
 Denmark, 143, 147–8, 166, 187–8

- Department of Scientific and Industrial Research (DSIR), 199, 208
 desertification, *see* sand drift
 Desmond, Ray, 50
 Dieffenbach, Ernst, 59, 143–4, 146, 181
 Dilke, Charles, 36, 44, 47, 60
 Dionne, Russell, 26
 disease, 6, 9–12, 18, 22, 31, 40–51,
 55, 58, 60–1, 63–4, 66–71, 76, 90,
 101–3, 122, 125, 140, 208
 ague, 52, 58
 cholera, 46, 48, 50
 colonial fever, 61
 consumption/tuberculosis, 58–9, 70
 Delhi sore, 53
 diphtheria, 43
 dysentery, 43, 61
 fever, 39, 43, 50–2, 58, 60, 64, 72
 influenza, 67
 malaria, 18, 43–4, 51–2, 55, 68–9,
 107
 plague, 46, 48, 66–7, 71
 smallpox, 68–9
 typhoid, 43, 66
 typhus, 58, 66
 yellow fever, 43, 60
 doctors, 29, 31, 52–3, 56, 60–2, 66,
 69–70
 German-trained, 26, 59, 104
 Scottish-trained, 26, 28, 38, 100–24,
 137, 148, 215–16
 see also education, medical
 Douglas, John, 155
 Dovers, Stephen, 31
 drainage, 37, 40, 43, 48, 50, 52–3, 55,
 58, 60–3, 65, 69–70, 72, 117, 135,
 187, 215
 see also swamps
 Drayton, Richard, 10, 101, 116
 drought, 2, 9, 26, 33, 100, 107, 119,
 130, 139, 141–2, 150, 154–5, 157,
 159, 163, 165–6, 174, 180–1, 185,
 194, 206–7, 209, 215
 Dunedin, 59, 69, 92, 117, 147, 189–90
 Dunlap, Thomas R., 8
 Dyson, Diana, 113

 earthquakes, 36, 57
 Eastern Gippsland, 141
 East India Company (EIC), 22, 46,
 59–60, 101, 106, 108, 129, 154,
 180
 East Indies, 58
 Ebermayer, Ferdinand, 175
 ecology, 1, 7–8, 18, 32, 42, 74, 128,
 133, 138, 147–9, 159, 165–6, 170,
 172–3, 178, 185, 208, 210
 economy/economics, 2, 10, 13, 17–18,
 22, 29, 32, 38, 41, 66, 100–1,
 106–9, 116, 118, 120, 128, 137–8,
 142, 152–3, 155–7, 159, 162,
 171, 177, 181, 193–4, 198, 206,
 209–10, 213–16
Edinburgh Review, 60, 194
 education, 1, 6–7, 18, 27–31, 59,
 77–8, 81
 Australia, 169–70, 176
 England, 103–5, 129, 169
 forestry, 28, 126, 129, 156, 169–70
 France, 125, 129
 Germany, 123–9, 139, 144, 148, 152
 India, 129, 152, 156
 Ireland, 104
 medical, 102–5, 113, 116
 New Zealand, 169–70, 173
 science, 78, 100, 116, 124–8, 139,
 144, 152, 215
 Scotland, 100–5, 113, 152
 see also universities and colleges
 Egypt, 208
 Ellis, Leon McIntosh, 171
 El Niño Southern Oscillation (ENSO),
 33, 35, 164
 empire forestry movement, 153, 159,
 168–70, 175
 engineering/engineers, 22, 55, 77,
 101, 125, 138, 163, 171, 178,
 183, 187, 201
 England, 12, 47, 58, 63, 72, 76, 78,
 92, 94–5, 97, 103–5, 127, 129,
 144, 147, 160
 English East India Company, *see* East
 India Company
 environmental anxiety
 absence of, 112–14, 122
 aesthetic, 3, 10, 28, 29, 72–99, 170
 climatic, 1–2, 6, 10, 28–9, 101,
 106–10, 115–17, 119–20, 127,

- environmental anxiety – *continued*
 130, 132, 135–6, 139–42, 146–7,
 150–1, 153–7, 163–76, 182, 187,
 196, 201, 205
 definition of, 1
 desertification, 2, 10, 35, 54, 145,
 177–213
 expression of, 27–31
 health, 2–3, 10, 26–8, 39–72, 76,
 91–4, 98–9, 139, 214–16
 historiography of, 9
 hydrological, 2, 10, 108, 130, 132,
 135–6, 139, 141, 147–64, 170–6,
 187, 196, 205
 origins of, 4–7, 11–13, 16–18, 26,
 37–8
 religion and, 10, 16
 epidemics, 43, 67–8
see also disease
 erosion, 2, 9–10, 17–18, 92, 100–1,
 106–7, 110, 119–20, 130, 135–6,
 140, 142, 148–9, 151, 154, 156–7,
 164, 170–4, 176, 179, 184–5,
 200–3, 205, 208–9, 213
see also sand-drift
 Erson, Leger, 63
 Etawah, 202–4
 eucalyptus
 acclimatisation, 40, 42, 51–5, 64, 70
 and health, 40, 51–5, 64, 70
see also plant species
 eugenics, 70
see degeneration, racial
 Europe, 5, 7–8, 11, 13, 26, 37–8, 47–8,
 52, 56, 62–3, 75–6, 81, 89, 104,
 126–7, 134, 140, 144–5, 147, 153,
 156, 163–4, 174, 207, 212
see also individual countries and
 localities
 exchanges, colonial, 2, 4–5, 7, 10, 26,
 31–2, 38, 40–1, 54, 56, 60, 62, 73,
 103, 150–76, 215
 Falconer, Hugh, 106–7, 110–11
 famine
 food, 18, 22, 46, 101, 107, 118, 130,
 136, 159, 163, 181, 202
 timber, 2, 9, 29, 32, 101, 106, 119,
 130, 153, 157, 159, 215
 Fa Xian, 135
 Fergusson, James, 156
 Fernow, Bernhard, 173
 fever, *see* diseases
 Field Naturalists' Club (Auckland), 89
 Field, William, 194–5
 fire, 30, 37, 89, 109, 119, 146, 155,
 168, 200
 Fisher, J. S., 202
 FitzRoy, Robert, 113
 Flannery, Tim, 8
 floods, 2, 9–10, 29, 35, 65, 89, 100,
 106–7, 110, 119–20, 126, 130,
 135–7, 139, 141, 144, 148, 150–1,
 154, 156–7, 159, 164, 168, 171–4,
 182, 194, 197, 201, 203, 215
 forest-climate theory, *see* climate-
 forest theory
 forest conservation, 2, 6, 16–17, 26,
 65, 75, 101, 118, 123–4, 127,
 150–4, 162–3, 175, 177, 184, 215
 Australia, 32, 98, 112–13, 137–41,
 143, 159–66, 169, 176
 India, 101, 106–11, 118, 123, 130,
 132–6, 148, 152–3, 187, 202
 New Zealand, 30, 32, 91–2, 98, 112,
 115–18, 120–1, 137–8, 143, 146–7,
 154–9, 161, 164, 170–3, 176, 210
 forest departments, services and
 boards, 168–9, 191–2, 204–5
 Bombay, 110
 Indian Forest Service (IFS), 27, 30,
 55, 101–2, 121, 123–4, 128–30,
 133–7, 146, 153, 156–9, 161–2,
 175–6, 216
 Madras, 108,
 New South Wales, 208–9
 New Zealand, 102, 118, 121, 153,
 157–9, 166–8, 171, 175, 199–200,
 212
 Punjab, 158, 186–7, 201
 South Australia, 143, 153, 167–8
 United Provinces, 202
 United States, 171–2
 Victoria, 140–1, 160, 162
see also bureaucracies, forest
 foresters, 17, 21, 26, 28–9, 78, 100–1,
 106–213
see also forest departments

- forest-rainfall theory, *see* climate-forest theory
 forest reserves, *see* forest conservation
 forest resistance, 30, 124, 130, 133, 148, 153, 160–2
 forestry science, 7, 126–7, 146–7
 Fort Dundas, 44
 Fox, Paul, 62
 Foxton, 195
 France, 5, 12, 54–5, 124–7, 129, 140, 146, 150, 153–4, 156, 169, 178, 182, 187–8, 195–6, 207–8, 210, 212
 Frankfurt, 144
 Franklin, 174
 Fraser, William, 198
 Fremantle, 183, 188, 192
 fuel, 11, 17–18, 32, 51, 53, 70, 107–8, 115, 137, 153, 155, 160, 165, 167, 186, 202

 Gadgil, Madhav, 30
 Ganga-Jamna Doab, 107
 Garden, Don, 8, 74–5
 Garden of Eden, 17, 150, 177–8, 188, 215
 gardens, 16–17, 46, 50, 53, 65, 74–5, 86, 91–5, 99, 112–13, 135, 165, 167, 177–8, 187–8, 194, 211, 215
 see also botanical gardens, parks
 Gascony, 187–9
 Gay, Peter, 12
 gender
 and art, 28, 77–8
 and environment, 28, 31, 41
 see also women
 Geological Survey of Otago, 118–19
 geology and geologists, 26, 33, 35–7, 90, 116–19, 138, 144–5, 163–4, 172, 179
 Geraldton, 183–4, 188, 192–3
 Germany, 26, 32, 92, 125–9, 135, 140, 143, 146, 150, 152–4, 156, 169, 175, 210
 germ theory, 44, 69–70, 102
 Ghats, 33, 107, 110, 187
 Gibbs, H. L., 86
 Gibson, Alexander, 106–7, 109–10
 Gillies, John, 17, 167
 Gilpin, William, 77
 Glover, John, 77–8
 Godavari, 135
 Goethe, Johann Wolfgang von, 77
 goldfields, 13, 15, 32, 61, 115, 117–18, 138, 141, 160, 162
 Gondwanaland, 35–6
 Gosford, 193, 209
 Göttingen, 130
 government, 9–10, 15–16, 21, 26–9, 32, 38–40, 67, 69–70, 100, 116, 125–7, 137–8, 148, 150–1, 165, 168–72, 178–9, 184, 187–8, 212–13, 215–16
 Australia, 16, 31, 44, 61–2, 66–7, 71, 84, 140–1, 143, 159–62, 166–8, 174–5, 180, 182–4, 191–3, 208–9
 India, 16, 21–2, 26, 29, 40, 46–7, 55, 67, 100, 102, 106–7, 109–11, 121–3, 127–37, 162–4, 186–7, 200–5
 New Zealand, 16, 30–1, 59, 64, 66–7, 98, 112, 117–22, 144–7, 154–9, 166–8, 182, 189–90, 193–200, 210–12
 see also bureaucracies; legislation
 Goyder, George, 165–6
 Goyder's Line, 165–6
 Graham, Robert, 112
 grasslands and grass, 18, 33, 36–7, 62, 74, 84, 115, 145, 164, 195
 see also plant species
 Gray, H., 184
 Gregory, W. H., 154
 Grey, Alan, 74
 Griffiths, Tom, 8
 Grove, Richard, 9, 17, 35, 100–1, 103, 106, 109–11, 113, 118, 136, 150
 Guérard, Eugene von, 77–8, 90
 Guha, Ramachandra, 30
 Guha, Ranajit, 9
 Guilfoyle, William, 93
 Gundamuck Hill, 48

 Hackett, J. R., 146
 Hall, Captain, 55
 Hamburg, 138

- Hampden, Hobart, 202
 Handley, John, 188–9
 Harrison, Mark, 43, 104
 Hauraki Plains, 43
 Hawke's Bay, 167
 Hazara, 109, 133
 Hazara Forest Rules, 109, 134
 health, 1–7, 10, 13, 15, 17, 21, 26–9,
 38–72, 76, 91–4, 98–9, 102, 116,
 121, 139, 214–16
see also disease; epidemics;
 environmental anxiety, health
 health departments, 69
 Australia, 67–8
 India, 46, 100, 104–5, 108, 121–2
 New Zealand, 67, 122
 Heathcote, R. L., 180
 Hector, James, 103, 116, 118–20, 167
 Heke, Hone, 83
 Helensburgh, 76
 hill stations, 46–51, 53, 55, 57, 62, 64,
 66, 70, 76, 91, 109
 Himalayas, 33, 46–7, 53, 76, 109, 115,
 134, 155
 historiography
 environmental, 1, 6–10, 73–5, 93,
 98–9, 101, 124, 128, 135–6, 214
 environmental apocalypse/
 declensionist, 9
 health, 6, 40–2
 imperial environmental, 7–10
 urban environmental, 75, 98–9
 Hochstetter, Ferdinand von, 144–6
 Hodgkinson, Clement, 140
 Hokitika, 60
 Home, Rod, 138
 Hooker, Joseph, 76, 103, 108, 112–13,
 115–16, 120, 123–5, 128
 Hooker, William, 103, 112
 Hope, John, 103
 Hoshiarpur, 109, 186, 201
 Houston, Robert, 194
 Howitt, William, 61
 Hügel, Carl von, 138
 Hughes, Lotte, 7, 77
 Humboldt, Alexander von, 77, 115,
 127, 139, 143–4, 146, 157
 Hungary, 187
 Huxley, Thomas, 113
 hydrology, 35–6, 130, 132, 135–6,
 139, 148, 151, 153–4, 157, 159,
 164, 170–6, 196, 205
see also drought; environmental
 anxiety, hydrological; floods;
 irrigation
 immigration restriction, 12, 67–8
 imperialism, *see* colonialism/
 imperialism
 Imperial Royal Commission on
 Forestry, 147
 India, 2, 5–11, 13, 15–18, 21–30, 32–4,
 36–62, 64–76, 90–92, 99–102,
 104–116, 118–24, 127–38, 141–2,
 147–64, 168–70, 172, 174–6,
 178–81, 184–8, 200–5, 207, 212–13
see also individual provinces and
 localities
Indian Forester, 43–5, 52, 54–5, 68,
 129, 158–9, 174
 Indian Forest Service (IFS), *see* forest
 departments
 Indian Medical Service (IMS), *see*
 health departments
 Indians, 30, 45–7, 70–1, 90
 industrialisation, 4, 11–13, 15, 62,
 80, 105
 Inglis, Andrea, 62
 Institute of Foresters of Australia, 170
 Ireland, 104
 irrigation, 16, 22, 55, 62, 135, 163–4,
 180–1, 185
 Japan, 11
 Jordan, Caroline, 28, 78, 90
 Jumna, 201
 jungles, 44, 50–1, 60, 68, 108
 Kaghan, 109
 Kaitaia, 181
 Kalizoic Society, 92
 Kalpi, 202
 Kameralwissenschaften, *see* cameral
 sciences
 Kanara, 135
 Kangra, 109
 Kapiti Island, 147
 Karen, 30

- Keating, F. A., 86
 Keene, William, 182
 Kerr, Mark, 53
 Kilgour, 66
 Kimberley, Earl of, 154
 Kingston, Beverley, 7–8
 Kioreroa reserve, 158
 Kirchberger, Ulrike, 128
 Kirk, Thomas, 182, 188
 Kodagu, *see* Coorg
 Krichauff, Friedrich, 29, 143, 160–1, 166–7
 Krishna river, 135
 Kumaun, 54
 Kunehta, 202
- labour, 11–12, 16, 44–8, 61, 67–8, 117, 140, 209–10
 Lahore, 109, 158
 Laird, J. L., 52, 54
 laissez-faire ideology
 Australasia, 15, 29, 38, 116, 120–3, 148, 216
 India, 22, 29, 38
 Lambert, David, 28, 73
 land degradation, *see* environmental anxiety
 Lane Poole, C. E., 170
 Latour, Bruno, 152
 Legg, Stephen, 113, 141, 166
 legislation, 1, 3, 6–7, 10, 15, 29–32, 40, 46, 64, 68, 72, 109, 124, 130, 132–3, 143, 152, 159–63, 165–7, 176–8, 180, 182–4, 191–201, 205–6, 209, 212–13
 Bubonic Plague Prevention Act 1900 (New Zealand), 66–7
 Crown Land Act 1884 (NSW), 205–6
 Forest Act 1876 (Victoria), 140
 Forests Act 1874 (New Zealand), 120–1, 146, 154, 166–7, 173–4
 Forests Act 1907 (Victoria), 162
 Forest Board Act 1875 (South Australia), 143
 Forestry Act 1909 (NSW), 209
 Forest Trees Planting Encouragement Act 1872 (New Zealand), 167, 212
- Geraldton Sand-hills Planting Act 1872 (Western Australia), 183–4, 192
 Government of India Act 1919, 67
 Indian Forest Act 1865, 132
 Indian Forest Act 1878, 132–3, 202
 Land Act 1877 (New Zealand), 158
 Medical Act 1858 (England), 105
 Newcastle Sand-drift Reclamation Act 1886 (NSW), 193
 Pacific Island Labourers Act 1901 (Queensland), 67
 Planting of Forest Trees Ordinance 1858 (Canterbury), 167
 Punjab Land Preservation Act 1900 (India) 200–1
 Sand-Drift Act 1888 (Western Australia), 192
 Sand-Drift Act 1890 (Western Australia), 209
 Sand-Drift Act 1919 (Western Australia), 209
 Sand-drift Act 1903 (New Zealand), 193–9, 211–12
 Sand-Drift Act 1924 (South Australia), 209
 State Forests Act 1885 (New Zealand), 158
- Lendenfeld, Robert von, 164
 Les Landes, 187–8, 207
 Lester, Alan, 28, 73
 Lindsay, William Lauder, 103, 116–20
 Linnaeus, Carl, 103
 Liverpool, 79
 Livingstone, David, 31, 152
 Lochhead, Lynne, 93
 Loch, Henry, 61, 160
 Lutyens, Edwin, 91–2
 Lyttelton, 155
- Macfarlane, T., 59
 MacKenzie, John M., 7, 9
 MacLeod, Roy, 26, 102
 Macpherson, 48
 Madras, 22, 46, 53–4, 57, 106–9, 131–5, 156, 158, 160
 Maiden, J. H., 207–9
 Maitland, J., 53
 Makgill, R. H., 69–70

- Malabar, 106, 108, 110
Mallee, 179–80, 209, 213
Manawatu, 196
Manning, C. A., 184, 188
Mann, Michael, 107, 185
Maori, 15, 30–1, 37, 58, 68–71, 74,
82–4, 117–8, 145, 179, 182, 190,
195, 198
Markham, Clement, 4, 107
Marlborough, 112
Marmaduke, John Dixon, 64
Marshall, William, 16
Marsh, G. P., 182
Martin, Albin, 97
materia medica, *see* medicines
Mauritius, 17, 56–8, 115–6, 141, 154–5
Mayne, Alan, 68
McClelland, John, 111
McKenzie, John (Minister of Lands,
New Zealand), 198
McNab, Robert, 146–7, 195
Meadows, R. W., 44, 50
medicines, 61, 102, 112, 142
Melbourne, 54, 61, 69, 92–3, 105,
115, 137, 166
Meredith, Louisa Anne, 61, 78
Metcalf, Thomas R., 5
Mexico, 44
miasma, 42–3, 50–2, 63, 65–6, 68
microbiology, 40, 66–71, 102
migration, 2, 11–13, 15, 18, 27, 39–40,
46–7, 56–60, 62–3, 67–8, 70, 79,
105, 108, 119–21, 128, 137–8
military, 1, 6–8, 22, 26, 31, 39, 43–6,
48, 51, 53, 56–9, 67, 106, 108,
110–11, 125, 129, 162, 180, 202
mining, *see* goldfields
missionaries, 16, 43, 74, 113
Mitman, Gregg, 6
Monro, Alexander, 112
Monro, David, 112
Monro, Thomas, 106
monsoon, 33, 109, 134, 187, 200
Moore, Charles, 183
Moulmein, 110
Mount Abu, 48
Mount Eden, 81
Mount Hobson, 81
Mount Macedon, 61–2
Mueller, Ferdinand von, 52, 54, 64,
128, 138–43, 148, 166–8, 189
Mughals, 15, 30, 185
Murphy, M., 189
Murray Valley, 166, 213
Murree, 47–50, 76, 109
museums, 27, 116
British Museum, 112
Colonial Museum (Wellington), 119
Muter, Elizabeth, 47–8, 56, 58–9, 76
Muttra, 202
Mysore, 50–1, 53
nationalism, 5, 15–16, 66, 68, 71, 74,
82, 98, 147, 152–3, 168, 170, 178,
196, 207–8, 210, 212
natural history, 12, 26, 28, 81, 101–4,
108, 110–13, 115–17, 122, 128,
130, 144, 215
see also botany; geology
natural history societies, 12, 27, 81, 89
see also scientific societies
Nelson, 59, 63–4, 112
New Brighton, 189, 211
Newcastle, 77, 79–80, 86–92, 94–95,
98, 179, 181–3, 193, 209
New Delhi, 91–2
Newman, A. K., 63
New Plymouth, 66, 212
New South Wales (NSW), 13, 15, 61,
68–9, 78, 114, 160, 163–4, 169,
178–9, 182–4, 193, 205–6, 209,
213, 216
New York, 94
New Zealand, 5, 8, 10, 13, 15–16,
18–21, 26, 29–33, 35–37, 41–3,
56–61, 63–9, 71–7, 79, 81–2,
89–95, 97–8, 100–6, 111–13,
115–22, 127, 137–8, 142–8,
152–64, 166–76, 178–82, 184, 189,
193–9, 205, 208, 210–11, 213
see also Australasia; individual
provinces and localities
New Zealand Art Students'
Association, 82
New Zealand Company (NZC), 13, 65,
143–4
New Zealand Institute, 119
New Zealand Institute of Forestry, 170

- New Zealand Journal*, 58
New Zealand Journal of Forestry, 170
New Zealand Journal of Science, 147
 Nilgiris, 53–4
 North America, 5, 8, 11, 13, 26, 118, 138, 140, 146–8, 152–3, 156, 159, 164, 169–71, 173–5
 see also individual countries and localities
 North Island, 15, 37, 58, 115, 121, 145, 159, 163, 167, 171, 188, 212
 Northland, 37, 115, 119, 181
 North, Marianne, 77
 North-West Provinces, 131, 133–4, 158, 185
 nostalgia, 61, 80–1, 91

 O'Connor, J. E., 52–4
 Olmsted, Frederick Law, 94
 O'Neill, Charles, 146
 Ootacamund, 46–8, 50, 53
 Orientalism, 75, 90–1
 Orissa, 108
 Otago, 17, 31–2, 59, 64, 115–20, 138, 167, 176
 Otago Peninsula, 37, 189
Otago Witness, 155
 Otaki, 195
 Owen, Richard, 113
 ozone, 63–5

 Pacific, 5, 8, 33, 82, 94
 Pacific Islanders, 45, 67–8
 Paekakariki, 195
 Paharias, 30
 Pakistan, 201
 Parata, Tame, 190
 Paris, 112
 parks, 10, 40, 64–6, 72, 74–5, 84, 91–6, 98–9, 171, 184
 Albert (Auckland), 93
 Birkenhead (England), 94
 Central (New York), 94
 Empire (Newcastle), 193
 King Edward (Newcastle), 94–6
 Tongariro, 147
 Yellowstone, 98
 see also botanic gardens

 Partabnair, 202
 pastoralism, 15, 37, 61, 77, 113, 137, 163, 165, 168, 180, 186, 191, 205–6, 209
 Pawson, Eric, 31
 Paxton, Joseph, 94–5
 Payton, Edward, 59
 Pearn, John, 104, 113, 116–17
 Pegu, 111, 130
 Peppercorne, Frederick, 150, 154, 163–4
 Perrin, George, 141, 160, 168
 Persia, 208
 Perth (Australia), 183–4, 192
 Perth (Scotland), 116
 Phillips, Samuel, 183–4
 Phillips Turner, E., 212
 picturesque, 47–8, 62, 77–8, 82, 89–90, 95, 97
 Pinchot, Gifford, 172
 plant species
 Abies smithiana, 109
 acacia (*Acacia melanoxylon* and *Acacia dealbata*), 53–4, 118
 alpine ash (*Eucalyptus delegatensis*), 115
 babul (*Acacia Arabica*), 202
 bamboo (*Bambusa spp.*), 135
 birch (*Betula bhojpattra*), 134
 blue gum (*Eucalyptus globulus*), 52–4, 64, 115, 118
 blue pine (*Pinus wallichiana*), 134
 chil (*Pinus longifolia*), 109
 cinchona (*Cinchona spp.*), 54–5, 107
 coffee (*Cofea Arabica*), 48, 54, 107, 109
 cotton, 16
 couch grass (*Cynodon dactylon*), 183
 date palm (*Phoenix dactylifera*), 207
 deodar (*Cedrus deodara*), 62, 109, 134–5
 desert oak (*C. Decaisneana*), 207
 elm, 97
 eucalyptus, 36, 40, 42, 51–5, 64, 70, 90, 115, 139, 179; *see also* individual species
 fern (*Pteris esculenta*), 145
 flax (*Phormium tenax*), 64
 foxglove (*Digitalis*), 84
 Himalayan spruce (*Picea smithiana*), 62, 134

plant species – *continued*hops (*Humulus lupulus*), 142hottentot fig (*Mesembryanthemum*),
183jarrah (*Eucalyptus marginata*), 53kans grass (*Saccharum spontaneum*),
207karaka (*Corynocarpus laevigatus*),
95, 97kauri (*Agathis australis*), 37, 84, 98,
115, 119, 145, 148, 158khair (*Acacia catechu*), 201lucerne (*Medicago sativa*), 183lupin (*Lupinus spp.*), 189, 199

mangrove, 32–3, 108, 134

manuka (*Leptospermum scoparium*),
145maritime pine (*Pinus pinaster*), 207

marram grass, 189–90, 197–200, 212

mountain ash (*Eucalyptus regnans*),
115mudar (*Calotropis gigantea* or
Calotropis procera), 185mung grass (*Saccharum*
arundinaceum), 207native fig (*Ficus macrophylla*), 192needlewood (*Hakea leucoptera*), 207

New Zealand kumara, 142

nikau palm (*Rhopalostylis sapida*), 74nopal cactus (*Opuntia cochinellifera*),
207oak (*Quercus*), 95, 97, 109, 134olive (*Olea europaea*), 142peppermint gum (*Eucalyptus dives*),
115pigeon pea (*Cajanus indicus*), 143*Pinus excelsa*, 109*Pinus insignis*, 165*Pinus muricata*, 200*Pinus radiata*, 165pohutukawa (*Metrosideros excelsa*), 95poplar (*Populus spp.*), 97rapeseed (*Brassica napus*), 142raupo (*Typha orientalis*), 64red gum (*Eucalyptus rostrata*), 53–4,
115red mahogany (*Eucalyptus resinifera*),
54

rhododendron, 134

rhododendron Dalhousie, 62

running mesquite (*Bouteloua*
oligostachya), 207rye grass (*Lolium perenne*), 192St John's Wort (*Hypericum*
perforatum), 52sal (*Shorea robusta*), 110, 134, 155sea trailing joint grass [*sic*], 183sirkundah [*sic*], 185sissoo (*Dalbergia sissoo*), 51, 110, 201

spear-grass, 192

stone fruit, 142

swamp stringy bark (*Eucalyptus*
robusta), 53, 115tea (*Camellia sinensis*), 26, 46, 54,
62, 107teak (*Tectona grandis*), 33, 53, 106–7,
110–11, 130, 133, 135, 162tea tree (*Fabricia*), 183ti tree (*Melaleuca alternifolia*), 84–5, 98ti tree (*Cordyline australis*), 74toetoe (*Cortaderia* genus), 190

tree fern, 36, 74

tree-lupin, 212

tussock, 64

West Himalayan fir (*Abies pindrow*),
134wheat (*Triticum aestivum*), 15, 37,
142, 188–9

willow, 65

Pocock, John, 31

pollution, 1, 7, 10–11, 39–41, 63–4,
72, 80, 82, 86, 95, 142, 214population increase, 18, 53, 63, 69,
107, 137, 180, 185, 214

Potts, Thomas, 146, 199

Powell, J. M., 160, 169, 180

Pradhan, Queeny, 48

Pratt, Mary Louise, 77

Preece, James, 43

Prendergast, K. R., 57

Pre-Raphaelite Brotherhood (PRB),
79, 81

Price, Uvedale, 77

preservation, *see* forest conservationprofessionalisation, 5, 27–8, 105, 111,
119, 122–9, 133, 135–6, 148, 151,
153, 158–9, 168–71, 176, 199,
208–9, 216

- Prussia, 140, 161, 182, 187–8
Punjab, 16–17, 32, 47, 54, 109, 131, 134, 158, 181, 185–8, 200–1
Pyenson, Lewis, 126
Pyne, Stephen, 160
- quarantine, 67–8
Queensland, 13, 15, 44–5, 54, 62, 67–8, 71, 160, 206, 209
- race, 13, 43–4, 51, 58, 66–8, 71, 91, 113
see also degeneration, racial
railways, 11, 18, 22, 107–9, 111, 119–21, 137, 153, 202
rainfall-forest theory, *see* climate-forest theory
Raj, *see* British in India
Rajan, Ravi, 101, 124, 169
Rajasthan, 46
Rajmahal, 30
Rajputana, 134
Rangitata, 212
Ranikhet, 53–4
Ratcliffe, Francis, 209–10, 213
Rawlinson, Henry, 43
reclamation, 147, 177–8, 182, 184, 186–200, 202–5, 207–13
religion, 9–10, 31, 42, 69, 71, 73, 80–1, 86, 97, 128, 144, 165, 214
and improvement, 10, 16–17, 177, 184, 187–9, 215
and stewardship, 80–1
Repton, Humphrey, 94–5
reserves, *see* forest reserves
Ribbentrop, Berthold, 17, 129, 132–5, 161–2, 168, 175
Richardson, J. L. C., 59
Robin, Libby, 8, 208
Roche, Michael, 18, 170
romanticism, 12, 47, 73–7, 80–1, 86, 92, 95, 98, 115, 127–8
Roorkee, 22
Roxburgh, William, 106–7
Royal Commission on Forestry (New Zealand), 170–3
Royal Commission on Vegetable Products (Victoria), 140–1
Royal Commission on Western Lands (New South Wales), 206
- Royal Society of Edinburgh, 116
Royal Society of New Zealand, *see* New Zealand Institute
Ruskin, John, 72, 80–2, 86, 89, 91, 95, 97–8
Russia, 119, 187–8, 194
- Saberwal, Vasant, 136, 174, 187
salinisation, 18, 55, 107, 185
sand drift, 6–7, 9, 32, 147, 177–213
Sand-drift Commission (Fremantle), 192
Sand Drift Commission (NSW), 183
Sandy Point, 200
sanitation, 10, 12, 40–1, 45–6, 61, 63–7, 69–70
Santhals, 30
Scandinavia, 140
Schama, Simon, 9, 97
Schiff, Ashley L., 171–2
Schleswig, 138
Schlich, Wilhelm, 129, 159
Schomburgk, Richard, 54, 141–4
Schomburgk, Robert, 143
scientific societies, 27, 119, 143, 152
see also natural history societies
scientists, 26–8, 31, 47, 64, 76–7, 147, 160, 162, 171, 173, 179, 182, 197, 199, 208–10, 213, 215
continental-trained, 26, 38, 124, 141, 143, 148
German-trained, 5, 26, 28–9, 38, 52, 111, 121, 123–49, 156, 215–16
Scottish-trained, 5, 26, 100–22, 156
Scinde, 58
Scotland, 26, 103–5, 117, 127, 152, 160
Sharpe, Alfred, 29, 72–99, 142, 163, 215
Sharpe, William, 78–9
Sheets-Pyenson, Susan, 126
Shepard, Paul, 74
Shimla, *see* Simla
Siddapur range, 135
Simla, 46–8, 50, 62, 135
Sinclair, Andrew, 59, 112–13
Singapore, 77
Sirsi range, 135
Sivaramakrishnan, K., 133
Sivasundaram, Sujit, 104
Siwalik, 186, 200, 213

- Skinner, Thomas, 181
 Social Darwinism, 12–13
 soils, 33, 35–7, 48, 51–2, 54–5, 103,
 144–5, 150, 156–7, 165, 167, 174,
 179, 181, 192, 205, 207–8
 see also erosion
 soldiers, *see* military
 South Africa, 8, 18, 56, 137, 207, 212
 South America, 55, 127, 143, 207
 South Asia, 2, 4–8, 13, 17, 29, 35,
 37–8, 42, 54, 115, 123, 135, 150,
 153–5, 175, 177, 214–15
 see also individual countries and
 localities
 South Australia, 13, 17, 29, 31, 62,
 114, 120, 138, 141–3, 153, 159–61,
 164–70, 174, 176, 179, 206,
 208–9, 213
 Southern Alps, 157
 South Island, 15, 32, 37, 115, 117, 121,
 145, 157, 166, 168, 190, 194, 210
 Spooner, W. Edgar, 158
 Sri Lanka, *see* Ceylon
 Star, Paul, 93
 state forestry, *see* forest departments
 Stebbing, E. P., 111, 200
 Stenhouse, John, 104
 Steward, William, 194
 Stewart Island, 147, 190
 Stirling, James, 44, 56–8, 60
 Straits Settlement, 77
 Sturt, Charles, 177
 subaltern studies, 133
 sublime, 77–8, 81
 Sullivan, John, 46
 Sundarabans, 32
 surveying, 15, 22, 77, 101, 108–10,
 118–20, 125–7, 140, 145–7, 154,
 162–3, 201–2, 213
 Swainson, William, 89
 swamps, 4, 10, 17, 33, 37, 40, 42–4,
 50–2, 55, 60, 64, 70, 94, 117,
 178, 215
 see also drainage
 Sydney, 62–3, 69, 89, 93

 Taieri, 195
 Taranaki, 59, 178
 Tasmania, 76, 114
 Taumararui, 199
 Te Heuheu Tukino IV, 30
 Tenasserim, 110–11
 Texas, 207
 Thar Desert, 33, 134, 179
 Thengan-nyee-Nyoung, 110
 Thomas, 66
 Thomas, D. J., 61
 Thomas, Nicholas, 82, 84
 Thompson, Kenneth, 41
 Thomson, Arthur S., 39, 57–9, 113
 Thomson, G. M., 147
 Thomson, J. T., 77
 Thorn, John, 193
 timber industry, 32, 53, 86, 90, 100,
 106–12, 115, 120, 122, 126, 130,
 136, 139, 141–2, 154–5, 160,
 162, 166
 see also deforestation; famine, timber
 Tipu Sultan, 51
 Tirunelveli, 187
 Toowomba, 62
 Townsville, 68
*Transactions and Proceedings of the
 New Zealand Institute* (TPNZI),
 112, 119, 156, 182
*Transactions of the Bombay Medical and
 Physical Society*, 110
 Travers, W. T. L., 155, 182, 188
 tree planting, 16–17, 31–2, 40, 50–5,
 64–6, 70, 72, 74, 78, 91–5, 103,
 108–9, 111–13, 120, 127, 135,
 140–2, 147, 151, 154, 157, 165,
 163–8, 171, 176–8, 180, 184–5,
 187, 189–90, 200–2, 205, 207–10,
 212–13, 215
 trees, *see* plant species
 Tremehere, G. B., 185, 188
 Trincomalee, 43–4
 tropical medicine, 66, 68–9, 71
 tropics, 10, 17, 32–3, 39–45, 47–8,
 50–1, 54, 57–60, 68–71, 76–7, 130
 Turnbull, John, 60

 Udhagamandalam, *see* Ootacamund
 Umballa, 207
 United Provinces, 185, 201, 205, 213
 United States of America (US), 41, 98,
 106, 147, 151, 153, 170–6, 207–9

- universities and colleges
 - Adelaide University, 169
 - Auckland University College, 169–70
 - Australian Forestry School, 170, 176
 - Berlin University, 126, 143
 - Birkenhead School of Art, 79
 - Bonn University, 130
 - Calcutta School of Tropical Medicine, 68
 - Cambridge University, 103–4, 128
 - Canterbury University College, 69, 169–70, 173
 - Copenhagen University, 130, 173
 - Creswick School of Forestry, 169
 - Dehra Dun Forestry School, 129, 156, 158
 - Eberswalde Forestry College, 126
 - Edinburgh, 57, 100, 102–4, 106, 108, 112–13, 116, 118
 - Glasgow University, 103, 112
 - Giessen University, 144
 - Göttingen University, 130
 - Haileybury College, 102
 - Kiel University, 138, 143
 - London University, 104
 - Madras Medical College, 108
 - Melbourne University, 105
 - Narara Forestry School, 169
 - Oxford University, 104, 128–9, 169
 - Royal Bavarian Central Forest Teaching Academy, 175
 - Royal Indian Engineering College, 129, 169
 - Thomason Civil Engineering College, Roorkee, 22
 - Tübingen University, 144
 - Victoria University College, 172
- Upper Burma Forest Regulations, 162
- Upper Doab, 185
- Upper Mittigate, 110
- Upper Provinces, *see* United Provinces
- urban environment, 2, 6, 10–12, 15, 40–2, 48, 61–6, 69, 72–5, 86, 91–9, 171, 178, 190, 194, 215
- utilitarianism, 16, 22, 38, 102, 106, 111, 116, 121, 125, 127, 171, 204, 216
- Venezuela, 127
- Victoria, 13, 28, 32, 52, 61–2, 68–9, 100–2, 104–5, 111–15, 122, 137–41, 148, 153, 159–62, 164, 168–70, 175–6, 179, 189, 206, 208, 213
- Vile, Job, 196
- Vincent, Frederick A. D', 160–2
- Vogel, Julius, 29, 119–21, 146, 154, 156, 158, 161, 166–8, 174
- Waiheke Island, 84
- Waikouaiti, 190–1, 200
- Waimate North, 74
- Waipoua Forest, 147
- Wairarapa, 196
- Waitakere, 98
- Waitaki, 194
- Walker, Inches Campbell, 146, 150, 156–8, 161, 166, 168
- Wallace, A. R., 77
- Wallich, Nathaniel, 110
- Walling, William English, 172
- Wanganui, 195–6
- Warming, Eugenius, 147, 173
- webs of empire, 5, 152
 - see also* exchanges, colonial
- weeds, 18, 76, 142, 188
- Weil, Benjamin, 133
- Weinyo, 110
- Wellington (India), 53
- Wellington (New Zealand), 57, 119, 144, 182, 212
- Wellington Philosophical Institute, 119, 154, 178, 182
- West Australian*, 61, 192
- West Coast (New Zealand), 15, 60, 157
- Western Australia, 13, 44, 56–7, 68, 140, 160, 178, 183–4, 188, 191–2, 207, 209
- Western Cape, 115–16
- West Indies, 45, 57–8
- Whitcombe, C. D., 178, 182, 210
- Wilkie, David, 113
- Williams, G. W., 182

- Williams, Michael, 107
Willis, A. D., 195
Wilson, John Cracroft, 59, 61, 154–5,
158, 161
Wilson, Peter, 66
Wjeikof, A., 119–20
women, 27–9, 44–5, 78, 116
Wood, Vaughan, 144
Wright, J. A., 191–192
Wright, R., 28
Wynn, Graeme, 121
Yamuna-Ganga Doab, 185
Yan Yean reservoir, 164
Zimmé, 110