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Colonial Geographies of Settlement: Vegetation, Towns, Disease and Well-Being in Aotearoa/New Zealand, 1830s–1930s¹

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ABSTRACT

A fruitful new area of environmental history research can be undertaken on the relationship between plants and health in colonial societies. By using New Zealand as a case study, I demonstrate the strength of settler beliefs in the connections between existing environments, environmental transformation, and their own health. I attempt to reconnect the historiographies of medical and environmental history by arguing that urban settlements – as much as rural areas – were important sites for debates about environmental change and human health. I adopt a broad perspective in order to sketch out the contours of a new field, demonstrating the complicated connections between health, aesthetic appreciation, medicine and garden history. Furthermore, I argue that many environmental-health ideas associated with miasmatic theories became incorporated into the microbial ‘revolution’ taking place from the late nineteenth century. Finally, I note that a close study of settler environmental-health ideas reveals a far more ambiguous – a far more anxious – history of European engagement with temperate colonies than the existing historiography on the topic posits. Rather than wholly confident and arrogant agents of environmental exploitation, it reveals that great anxieties about health existed side-by-side with confidence in the environmentally transformative potential of colonisation.

KEYWORDS

Environment, health, colonisation, New Zealand, miasma, urban history

The life of human beings is connected intimately ... with the vegetable productions of the globe, not only as regards the materials for their food, but also in reference to the air which they breathe. (J.B. Armstrong, 1880)²

In nineteenth-century settler culture, landscape and vegetation figured as more than simply backdrops to human affairs. In a society lacking effective medical intervention, environment assumed a power that we can today only imagine. Environment affected life and death, sickness and health. The rhythms of daily life moved in time with the patterns of seasonal disease. At certain times of the year agues, remittent fevers, malarias and other diseases affected people's lives, restricting their activities and putting those with susceptible constitutions into bed. Therefore, divining 'healthy' from 'unhealthy' areas took on great importance for Europeans encountering new lands. Settling on the edge of New Zealand's broad Hauraki Plains³ in the early 1830s, James Preece, Church Missionary Society Catechist, fretted that the area 'has every sign of an unhealthy place. The land is very low and entirely surrounded by swamp, which extends for miles, and comes close to the settlement.' Already, he observed, '[t]he vapour which arises there from during the whole of the summer' had caused the death of three children. In response to these fears, in 1835 the Mission Station relocated from that 'unhealthy place' to a site 'higher up and washed by the sea'.⁴

Using New Zealand as a case study, in this article I attempt to reconnect the vital relationship believed by nineteenth-century settlers to exist between plants and health, which has received scant attention from New Zealand's medical and environmental historians. This is unfortunate since, as Gregg Mitman notes, 'conceptions of health have been integral to [human] environmental experience and understanding'.⁵ In reconnecting these important historiographies, I examine some of the complexity and contradiction hitherto ignored by literature on settler environmental and medical ideas. Significant connections, I demonstrate, existed in settler attitudes and actions regarding health, aesthetics, tree-planting, plant acclimatisation and conservation. Most of all, I mark out new areas for scholarly research, showcasing the centrality of environmental-health ideas to the process of colonisation and focusing equally on rural and (under-researched) urban areas in the hope of stimulating more fine-grained studies in this new field.

MEDICAL AND ENVIRONMENTAL HISTORIOGRAPHY

Excepting Pamela Wood's fascinating interpretation of settler medical ideas in nineteenth-century Dunedin and other selected studies, New Zealand's otherwise rich medical historiography has not foregrounded the role of environment-health ideas in *settler* colonisation.⁶ Unsurprisingly, scholarship has accorded significance to state intervention in health care through regional or national studies of medical institutions, and to the development of professional organisations, like those for dentistry, pharmacy, doctoring and nursing. New Zealand is also

particularly rich in the historiography of mental health.⁷ Taking a cue from Michel Foucault, its medical historians have read archives of mental health care ‘against the grain’ to reveal hidden experiences of institutional care, particularly for women, and have charted the complexities and competing factions of mental health care organisation.⁸ Where medical historiography engages with colonisation in great detail, it is generally through the lens of state interventions in Maori health care, studies of Darwinian ideas, and investigations of colonial medical science and racial policies.⁹ This scholarship can be enriched through studies that foreground settler ideas and experiences of health as central not just to medical historiography but also to the settler histories of Aotearoa/New Zealand.¹⁰

An equally rich vein of scholarship defines New Zealand’s environmental history, particularly of the colonial period where environmental change was astonishingly rapid and widespread.¹¹ In this period, New Zealand is excellently served by studies of plant and animal introductions into the island country, in addition to a burgeoning scholarship on its forest and conservation histories. A resounding silence falls, however, in studies of the colonial period which incorporate medical or health ideas with resource use, conservation or aesthetics.¹² This silence, I think, reflects the overwhelming particularisation of knowledge both within our present society and within disciplines. Increasingly since the early twentieth century western society has set up ‘boundary markers’ between different bodies of knowledge, such that we now think of religion, science, health, conservation as separate fields, where once they were thought to be closely related.¹³ Since our own societal values inform our assumptions about the past, historians have considered health and conservation literature as separate fields, one belonging to the realm of the medical historian, the other to the environmental historian. Thus, understandings of urban conservation, plant acclimatisation, public garden making and forest conservation cannot be adequately understood in isolation from the medical ideas which informed settler activities. They are perhaps particularly important for an additional reason. By the early twentieth century New Zealand was one of the most urbanised countries in the world, and it was in urban areas that often fierce debates took place over the relationship between health, tree planting, park provision and conservation, yet paradoxically it is in these areas that New Zealand’s environmental history is weakest.¹⁴

Investigating the complex and often contrary interpretations of colonial health ideas can present unsettling narratives at odds with portrayals of European settlers as arrogant and confident agents of colonisation, intent on building an acquisitive, materialistic society in which the ‘promise of profit provided sufficient moral warrant in an atmosphere where human self-interest determined morality and the natural physical order was not seen as deserving any necessary respect’.¹⁵ Settler acknowledgement of the limitations and lack of control over environments and their own health were as central to colonisation as its ‘textual appropriation’ of peoples and lands or the massive and rapid landscape changes

ushered in by colonisation.¹⁶ Anxiety and confidence were interwoven into the very fabric of colonial engagement with landscape.

While I particularly focus on settler ideas about health and plants, I also touch upon conservation, climate-health debates, environmental determinism, urban design and racial ideas. First examined are settler ideas of disease and the relationship perceived to exist between plants and health; second, assessments of the benefits of plants; third, ambiguities in attitudes to vegetation; and fourth, changing attitudes towards environment and vegetation in the twentieth century, with the aim of stimulating future research.

SETTLER IDEAS OF HEALTH AND ENVIRONMENT

As today, popular and elite medical opinion in the nineteenth century encompassed a spectrum of different beliefs concerning the efficacy of different cures and the mechanisms explaining the spread of disease. New Zealand's first medical publication, *The Homeopathic Echo* (1855–6), testifies to the importance of popular remedies for illness, as do the widespread advertisement of herbal remedies in newspapers throughout the nineteenth and twentieth centuries and parliamentary attempts to legislate against 'quackery' within settler society and to restrict Maori healing options.¹⁷ *Materia medica* explicitly stated the connection between health and plants, but these relationships also extended to education and taxonomic interest in plants. The original purpose of botanical gardens was to furnish medicinal plants, a function that was still critical to the medical education of many of New Zealand's doctors, particularly those trained in Scotland who also received a thorough training in botany and natural history.¹⁸

At a more popular level, doctors, charlatans, quacks and chemists plied a wide variety of remedies derived from plant products on the general public. The ubiquitous eucalypt, for instance, found its way into many tinctures, potions and remedies in New Zealand.¹⁹ Many were also derived from this country's native plants, often by drawing extensively on Maori knowledge systems.²⁰ These examples evince the plurality of medical thought and the breadth of healing options sought by settlers, but they also testify to the strength of alternative medicines and a relative lack of confidence in the efficacy of the medical profession.²¹ The plurality of medical options available to settlers was reflected by the similar breadth of theories about the spread of disease. Certain diseases like smallpox were widely recognised to be communicable while others, like typhus or malaria, were thought to reflect the interaction of environments and people's constitutions.²² Whether they liked it or not, a person's susceptibility to a particular disease was thought to reflect his or her own constitution and the way it responded to the environmental influences – temperatures, winds, humidity, rot, sunshine, smell and so on – that were believed to cause or influence a particular disease.²³

Descriptions of a person's constitution and its interaction with environment reflected the renewed popularity of humoral theories of health alongside the emergence of more refined ways of measuring air and the development of medical geography.²⁴ In nineteenth-century New Zealand, unfavourable ideas about environment and health found widespread expression in the term miasma, which loosely referred to 'a quality of particular environments'.²⁵ Throughout much of the nineteenth century miasma was popularly and scientifically held responsible for a variety of diseases like malaria, typhoid, dysentery and diphtheria. Frequently used as a shorthand for poisoned or impure air, people believed that the 'decay and putrefaction of plants and animals, especially in marshy places, increases the mortality in the neighbouring country'.²⁶ Fogs, bad smells and moist low-lying ground also added to ill-health.²⁷ In addition to wider climatic factors such as heat, humidity and sunshine, as either producers of ozone or as sources of pollution, certain vegetation could boost or hinder health. Favourable assessments of vegetation regarded particular trees as curative agents, useful in purifying stale city air, helpful in draining unhealthy areas, and efficacious in purifying water supplies. Conversely, rotting or green vegetation was thought to endanger healthiness through the generation of miasma. Hence, settlers sought to either remove or avoid vegetation associated with swamp land and in various states of decay or youth.

Surviving settler reminiscences, diaries, commissions of enquiry, newspaper columns, artwork and letters communicate a complex lexicon of health ideas based on the interaction of environments and constitutions.²⁸ Unable to identify the unseen enemy of disease, settlers focused their attention on identifying its purported sources, placing particular importance on the appearance of areas, their attractiveness and smell. Sight as well as smell guided settlers to healthy areas or warned them about the possibility of disease. In interviews conducted by Nelson's 1867 public health commission, respondents repeatedly connected bad smell with ill health, one respondent stating that 'the sewer from the Trafalgar [street in Nelson] occasions a bad smell: several people have been sick'.²⁹

In settler ideas of health, miasma cast a long, if ironically unseen, shadow on constitutions and colonisation. Its explanatory power appealed because miasma was a common-sense concept that could be easily grasped by settlers and used to explain their bodies' responses to new and unknown environments. Colonists believed that atmospheric pollution emanated from natural and human sources such as rotting vegetable or animal matter, as well as stagnant, standing water and even the breath of sick persons. Fundamental to settler ideas of health was recognition that just as naturally unhealthy places existed so there were also naturally healthy sites. Dry mountain air, seaside locations and spas enjoyed great popularity as invigorating agents of health, and settlers eagerly sought these out, but the impact of humans on environments could also resound in significant ways on bodies.³⁰ Humans could make naturally unhealthy sites such as swamps even more dangerous through pollution but, conversely, their tree planting and

drainage could also 'improve' them – redemption was possible. In assessing the likely healthiness of new sites, then, settlers investigated their topographical location, proximity to water and the healthiness of existing inhabitants. They studied existing vegetation to indicate the salubrity of a district and its climate whilst considering the transformative properties of trees and their potential to render uninhabitable land habitable and, according to some, change local and even sometimes regional climatic patterns.

HEALTH, ENVIRONMENT AND VEGETATION

European settlers to New Zealand read the environment both as an economic resource and a barometer of their own health: changes in one effected changes in the other. Luxuriant vegetation indicated not only a moist and fecund climate but also the existence of rich soils and a healthy atmosphere.³¹ Popular tracts and medical works on New Zealand played on this theme, emphasising the country's healthiness and suitability to the 'English constitution' as well as its picturesque qualities and economic potential. Propaganda plumped up vast swathes of ample, flat and fertile land just waiting 'for the reception of man'.³² Strong associations in settler culture brought together appreciation of certain landscapes, ideas of healthiness and economic potential (as indicated by rich soils). Settler landscape conventions expressed ideals thought to favour both economics and health. The picturesque fashion favoured flat or gently undulating agricultural land which displayed 'the pursuits of rural husbandry' and the establishment of 'happy smiling cottages by the way side or nestling among the trees in some "bosky deiyle" or sylvan dell', powerfully transformative landscape notions expressing the cultural origins of most of New Zealand's nineteenth-century European migrants.³³ Importantly, the kinds of environment celebrated by the picturesque were neither harmful swamplands nor rank and unkempt vegetation, doubly useless – at the same time dangerous to health and economically marginal in their 'natural' state. As celebrated through the aesthetic of the Sublime, even mountain areas, although economically useless, were thought to at least provide health benefits.³⁴

These aesthetic and health conventions came to the fore as migrant destinations jostled for the settlers spilling out of Europe. In appealing for migrants, rival destinations exaggerated their own qualities and mercilessly belittled their rivals. Following Wellington's two earthquakes within ten years, overseas journals presented New Zealand as the 'shaky isles', a wobbly landmass likely to slip into the ocean at any moment. New Zealand boosters hit back, enthusiastically proclaiming that New Zealand's climate was like Britain's, only better, cursed neither with its biting winter cold nor its wan summers. New Zealand also competed well with other settlement societies, they claimed, exhibiting neither Australia's extraordinarily hot and parched landscapes nor Canada's numbing

coldness. Testaments like that provided by Frederick Carrington (1808?–1901), extolling New Zealand’s climate as ‘so healthy that you can undergo wettings, and great exposures, without suffering any injurious consequences’, abounded in settlement handbooks.³⁵ Authors confidently predicted that Europeans would acclimatise as successfully, and as swiftly, as had their flourishing plants at the expense of New Zealand organisms.³⁶ English tourist Charles Dilke spoke for many when he wrote that ‘the English fauna and flora are peculiarly well fitted to succeed at our antipodes, because the climates of Great Britain and New Zealand are almost the same, and our men, flies, and plants – the “pick” of the whole world – have not even to encounter the difficulties of acclimatization in their struggle against the weaker growths indigenous to the soil’.³⁷

The connection between vegetation and health was often explicit. According to John Ward’s 1839 migrant handbook, New Zealand’s climate ‘is unquestionably very congenial to the European constitution. This refreshing moisture, combined with the influence of the sea-breezes, renders the climate very favourable to the health, and development, of the human frame. And vegetation is, from the same cause, highly luxuriant, and the verdure almost perpetual’.³⁸ Others echoed these sentiments.³⁹ Vegetation, then, indicated a climate suitable to the English constitution. While the ‘puffery of settlement’ is relatively easy to mock, climate–health ideas had a strong standing. Many migrants, including a significant number of doctors, came to New Zealand convinced that the country possessed curative properties that better suited their constitution than damp Britain or tropical Asia.⁴⁰ It is not entirely uncommon to find references in settler diaries and letters to individuals like Mr Chapman, described by Dr Andrew Sinclair in 1860 as ‘a tall, thin, broken down man in constitution from the Indian military service, who snivelled in his speech from hare lip and was now endeavouring to patch up and make the best of his shattered constitution in a mild climate’.⁴¹ The remarkable extent of this form of promotion emphasises the significance that settlers placed upon health and environment when determining a migration destination.

Aside from indicating a climate suitable to the English constitution, by the nineteenth century trees were also thought to possess health-giving power in and of their own right when it came to altering local environments. This applied especially to areas regarded as both naturally unhealthy, like swamps, and to sites of human-created unhealthiness like towns and cities. Popular opinion, reinforced by medical research, supported the idea of the unhealthiness of towns vis-à-vis the countryside, a stark fact reflecting the explosion of urban growth that had taken place throughout Britain.⁴² After the first few decades of New Zealand’s colonisation a number of authors also discerned unacceptably high rates of disease and death in the colony’s settlements. Significantly, their points of reference were Britain and comparative rates of morbidity and mortality in the countryside and towns.⁴³ Towns were generally regarded as unhealthiest because they harboured greater concentrations of putrefying animal and vegeta-

ble matter than the countryside. Dangerous concentrations of miasma in towns, settlers believed, effectively removed important elements from the air, particularly ozone.⁴⁴ Ozone was particularly valued as ‘the great natural disinfectant or purifier of the atmosphere. Wherever it encounters decaying organic matter it tends to combine with and quietly burn up the bad-smelling gases which are evolved therefrom.’⁴⁵

In order to restore nature’s balance sheet, settlers believed ozone should be brought to towns. In areas located near the coast, the action of wind over waves was thought to produce ozone and thus be salubrious to inhabitants.⁴⁶ Similarly, highland areas near spas also signified a healthy site. But, regardless of whether an area was considered to be naturally healthy, settlers maintained that tree-planting could enhance its salubrity. Most plants, they thought, ‘throw off ozone largely on exposure to the sun’s rays’ thereby acting as a ‘powerful ... atmospheric purifier’.⁴⁷ Given that settlers could only identify the conditions that promoted healthiness, great emphasis fell on bringing ‘the town nearer the country in appearance and healthiness’ through activities like tree planting.⁴⁸

Eucalypts were widely acknowledged not only to filter miasma from the air but also to produce ozone in abundance and have a general sanitary effect on air.⁴⁹ Popularised by the Australian scientist Ferdinand von Mueller (1825–1896) – ‘Baron Blue Gum’ to his supporters – word of its beneficial properties rapidly spread throughout the world, peaking in the 1870s.⁵⁰ According to the Baron, eucalypts could successfully combat malaria in southern Europe, render habitable uninhabitable areas in California, even redeem vast wastes of malaria-poisoned land in North Africa. In Mueller’s hands, there seemed no end to its usefulness; parts of it could be rubbed on the body, taken internally, even sniffed.⁵¹ Eucalypts proved especially popular in New Zealand from the 1860s, where they were favoured for their quick growth, utility for firewood, and health-giving properties.

In his 1880 article ‘Planting in Towns’, J.B. Armstrong demanded that carbon-absorbing plants be introduced into New Zealand’s towns for health reasons. Highlighting the qualities of ‘the Blue Gum’ as ‘the most active absorber of carbon known’, he also listed a number of other Australian and European species and two from New Zealand.⁵² Another author elaborated on the process that made trees so salubrious. ‘[T]he tree’, he wrote, ‘operates as a sponge. It sucks up all this unwholesome saturation, distils it, and exhales a part of it, purified, into the atmosphere.’ Thus, he enthusiastically continued, ‘the more good, wholesome trees there are about a homestead the better, provided they do not shut out the sun too much.’ His recommendations also endorsed ‘gum trees’ as well as ‘weeping willows or other ornamental trees’.⁵³

Aside from tree planting along avenues, it was strongly believed that parks improved health. They supported the growth of plants that purified stale city air, and enabled, as one contemporary put it, ‘the lover of flowers’ to ‘enjoy himself, and also [provided a space] where the invalid can breathe a little fresh

air, mingled with the perfume of the surrounding flowers'.⁵⁴ Aromatic and attractive flowers were particularly prized for their ability to 'redeem' areas from the deadly grip of miasma.⁵⁵ The provision of city parks, trees and open spaces together with sanitation, town planning and other public works furnished important weapons in the fight against disease in European cities.⁵⁶ In this sense, towns resembled human bodies – for both, adjustments were required to achieve the correct balance between inputs and outputs that best promoted health. Parks and tree planting further appealed to the spirit of the age – Romanticism – whose followers worshipped the spiritually and physically regenerative qualities of nature⁵⁷ and fervently believed that bringing trees and parks into cities would counter their artificiality and their inhabitants' poor health.⁵⁸ Belief in the restorative properties of nature also merged with environmental determinism⁵⁹ which continued despite the emergence by the mid-nineteenth century of racial ideas based on biological difference.⁶⁰ Similarly, as the nineteenth century lengthened, environments became symbols of the nation.⁶¹

Given the importance of parks in Europe, and driven by fears of replicating many of Europe's urban problems, even before organised European colonisation began in the late 1830s the New Zealand Company (NZC) laid out public parks and green spaces in its town plans.⁶² Indeed, most newly established towns in New Zealand soon had land reserved for either a public park or domain, while urban gardens, aside from their value as food producers, grew ozone-producing plants.⁶³ For some, public spaces were crucial to the colony's future.

Village greens in New Zealand, declared F. E. Wright in 1873, 'would have a beneficial influence on the character and stamina of the future inhabitants of the colony', and 'should be left in a state of nature, except that the village club might level a place for their games'.⁶⁴ In the 1880s, conservationist and politician Thomas Potts (1824–1888) argued along similar lines, recommending the setting aside of 'open spaces of land, conveniently situated, open for all, for sanitary and recreative purposes'. Indeed, park planting and its health-giving properties enshrined the ideals of a progressive New Zealand society intent on maximising its resources and improving both its nature and people. 'Folks sought these shores to better themselves', explained a journalist in 1884, not 'merely [through] the acquisition of wealth; [but also through] the happiness of freedom and health for themselves and their children'. '[A]n adequate open space or lung for the well-being of future inhabitants should be dedicated for public use', declared the writer, and should form an important part 'of rational and social progress' in the country.⁶⁵ The author believed that environmental reform should improve the human condition, and shared with many others the aims of New Zealand's social reformers who proudly regarded the colony as in the vanguard of 'rational' and social progress.⁶⁶

While recognising the need to remove trees to make way for cultivation in rural areas, when parks and trees in urban areas were threatened with destruction, some settlers objected. In 1866, Dunedin lawyer Francis Dillon Bell (1822–1898)

reacted angrily to council plans to lease out portions of Dunedin's Town Belt, originally gazetted in the 1840s before formal settlement commenced. As he explained in a letter to the local newspaper, its 'scenery ... is unsurpassed for beauty; the ground offers rare facilities for laying out with taste; and the health of the City would be immensely improved by proper use being made of these great natural advantages, and by rigidly preserving the land for the single object it was set apart for.'⁶⁷ Bell maintained that the leasing of the Town Belt should be prohibited on the grounds of aesthetics, health and the principles of democracy wherein a minority should not unfairly control the resources of a majority. In 1877, the eccentric artist Alfred Sharpe (1836–1908) argued that Mt Eden in Auckland city 'could be made far more beautiful by making serpentine walks, interspersed with trees and shrubs, and a favourite place of resort to all holiday makers'. Sharpe played up its closeness to the city and its 'salubrious air'.⁶⁸ In 1880, Armstrong also made this connection, but in more general terms. 'It is to the young and vigorous trees', he declared, 'that we must look ... for health-giving properties, and fortunately these are the most beautiful.'⁶⁹ Aware that many had criticised the appearance of the eucalyptus, Armstrong argued that 'we can find beauty of a very fair class even in the Gum tribe', particularly when it was so healthy.⁷⁰ The ideas presented in these three examples exemplify the complexity of settler attitudes to tree planting and the provision of parks in cities.

Settlers appreciated wild nature while rejoicing in its domestication. In 1880, for instance, Sharpe implored the Auckland Domain Board to leave 'a little bit of wild and natural woodland here and there, so as to form a contrast with the docked, cauliflowered, and artificial trees of the more open parts'.⁷¹ A little bit of 'wildness' provided a necessary antidote to the trappings of 'civilisation' and the effects of landscape alteration. In parks and towns, settlers introduced a mixture of exotic and native plants, favouring introduced trees for street planting. These selections were based on the appearance of trees and their suitability for planting, rather than the later European identification of New Zealand's indigenous species as a native and national nature.⁷² A commonly heard refrain in the nineteenth century was the connection between beauty, morality and spiritual health, which many settlers expressed in terms of the regenerative qualities of the bush. As William Swainson observed, 'health ... as well as amusement, is gained by a journey in the bush'. After 'a stint in the bush' the traveller 'returns from his journey a stronger and a better man'.⁷³ Such enthusiasm for the natural world was commonplace, revealing not only a gendered reading of the New Zealand environment and its relationship to masculinity, but also the actuality that New Zealand's European colonisation commenced just when romanticism was at its most popular.⁷⁴ Expressing similar sentiments to Swainson, one time New Zealand Minister of Lands, Robert McNab, speculated that the 'purity of ... atmosphere, humidity' and temperature regularity of forestlands 'may be what makes employment in the forest so healthy an occupation'.⁷⁵ For the Presbyterian *Christian Outlook* magazine, Arbor Day 'is a force that makes for

Christianity', developing and culturing children's 'finer tastes' better 'than the dry curriculum of books and standards'.⁷⁶ What connected these ideas was not only a firm belief in the therapeutics of landscape and trees but also a belief that open-air exercise and work were morally and spiritually uplifting as well as physically healthy.⁷⁷

Conservation of existing bush areas, the creation of parks, and the activity of tree planting demonstrate the significant role thought to be played by trees in influencing local health and the character of settlers. Some authors went even further, holding that tree-planting if undertaken over a large enough area could act as an atmospheric purifier on a regional scale and influence regional climatic patterns. In 1886, William Wells echoed the arguments of a number of other authors regarding the influence of forests. Reading a paper before the Nelson Philosophical Society, he stated that tree-planting around Nelson would, first, increase rainfall, thereby enhancing the region's fertility by expanding the area of agricultural production; second, improve the region's healthiness by sucking impurities from the air and regulating water supplies within the Nelson water catchment; and third, provide a profitable source of wood if sustainably managed according to the practices of scientific forestry.⁷⁸ Wells upheld what Richard Grove has termed a dessiccationist discourse, the identification of the moral and ecological importance of forest conservation and tree planting to human health and society.⁷⁹ According to this argument, which garnered strong support in nineteenth-century New Zealand conservation circles, proponents expressed anxieties about the frightening effects of deforestation in accelerating climate change and sand drift, in hastening soil erosion and flooding, and, not least, in precipitating a disastrous timber famine that threatened to choke colonial development. As part of this sophisticated argument, proponents drew attention to the significance of forests in maintaining agriculture – believed to be the bedrock upon which commerce and other institutions rested – and furnished examples drawn from the Biblical lands and more recent colonial history of deforestation causing the collapse of civilisations.⁸⁰ Images of a fertile, well-watered land and a healthy environment came together in this potent landscape vision.

Tree planting in rural areas could certainly help drain unhealthy areas.⁸¹ In towns they also provided valuable storehouses of water, 'help[ing] to regulate the water supply, produce a more sustained feeding of springs' and lower the risk of flooding and land slips.⁸² David Tannock (1873–1952), Dunedin's Superintendent of Reserves, actively promoted tree planting throughout that city's watersheds for exactly those reasons, directing tree planting 'at the rate of 40 to 50 acres per annum' in 1908.⁸³

VEGETATION AS AN AMBIGUOUS MARKER OF HEALTH

Just as certain species – like pines and eucalypts – attracted praise for their remarkable health-giving properties, so others – like the swamp plant, raupo, or

trees which flourished in too great a profusion – marked an unhealthy site. This fearful stance towards vegetation reflected longer-standing attitudes towards trees and health. Kenneth Thompson has dated these pessimistic attitudes to the seventeenth and eighteenth centuries. In this period, European and North American thinkers believed that trees, by impeding the free passage of air, kept air stagnant and therefore endangered public health, and that deforestation also released long-dormant miasma. According to Thompson, European and American attitudes began to change in the late eighteenth century and into the next, whereby the therapeutic and prophylactic value of trees ‘was firmly implanted in both lay and medical opinion.’⁸⁴ Yet evidence in New Zealand, Australia and tropical colonies suggests that attitudes towards trees were far more complex than Thompson implies, and that much overlap and some dispute existed regarding the qualities of particular trees.

Unsurprisingly, old vegetation elicited fears of decomposition and poison associated with the production of miasma. Older plants ‘lose their carbon-absorbing properties when old and decaying’, noted Armstrong, ‘and consequently all town trees should be removed as soon as they show signs of decay’.⁸⁵ Younger trees, because of their greater carbon absorbing power, figured as the most recommended plantings, yet if too young or located in too great a profusion, they too could be dangerous. This attitude is exemplified by New Plymouth’s Colonial Surgeon, Peter Wilson, who believed that young green timber along with a poorly chosen site caused what he diagnosed in 1847 to be typhoid fever.⁸⁶ By 1860, Wilson had changed his diagnosis to typhus fever, but not his belief in its source. According to him, this originated in ‘a *malaria* proceeding, I believe, from the moist rotting, or dry decaying of the timbers of dwellings ... and not improbably strengthened in the degree of its poisoning influence by the oozing of indoor soil emanations also’.⁸⁷

The profusion and appearance of living trees and vegetation also elicited anxiety. Europeans living in tropical places knew from experience and medical advice that heat endangered health. It disrupted constitutions, induced lethargy and generated sickness. According to a ‘discourse of tropicality’ that developed in the nineteenth century, moisture and heat formed a deadly combination, accelerating the decomposition of vegetable and animal matter, and rendering it immensely dangerous for Europeans inhabiting humid forested and swampy areas. Jungles – with such disorder and profusion, vibrancy and colour – not only threatened the ideals of civilisation but also the health of any inhabitant foolhardy enough to live there.⁸⁸ A European surgeon typified such ambiguity, describing Trincomalee (in present-day Sri Lanka) as ‘a beautiful place, like flowers on one[’]s coffin’.⁸⁹ Any environment resembling tropical nature could therefore prove dangerous, even if it was located in a largely temperate country such as New Zealand.

In 1869, Hokitika’s Surgeon Superintendent identified an outbreak of yellow fever, a disease often associated with tropical environments, on the South

Island's West Coast.⁹⁰ Its cause, he explained, was 'excessive moisture, swampy grounds, absence of cultivation and drainage, and a bush resembling the jungles of the tropics – [which existed] in greater abundance here than in any other part of New Zealand'.⁹¹ His discussion reveals the nexus thought to exist between tropical environments (swamps, moisture and bush), human action (draining and cultivation), and health.

Growing concerns were also being aired about the unhealthiness of New Zealand's towns.⁹² Based on interviews, and consultations of both text books and vital statistics, Nelson's 1867 commission concluded that pollution, over-flowing and soaking cesspools, dusty streets and naturally swampy land had conspired to create ill-health. In particular, it highlighted the 'so called "preventative diseases," being such as [caused] by decaying vegetable and animal matters, and the gases they give off polluting air and water'.⁹³ To improve this parlous situation, the Commission recommended a number of sanitary improvements, including the removal of dangerous vegetation, especially 'all long growth of shrubs, flax, raupo, bushes, tussock, or other rank vegetation'. The purpose of these measures was 'to lay the mud open to sun and air, and prevent it from being a source of damp exhalation'.⁹⁴ Penalties for pollution had also been tried earlier; legislation introduced in 1863, for instance, levied a penalty of £50 for anyone fouling or corrupting the waterways near the town, typical of such local measures enacted at this time, but not always successfully.⁹⁵

Ironically, European suspicion of swamps and their vegetation contrasted with Maori experience of these areas.⁹⁶ To Maori, swamps teemed with life and resources, providing sources of food and materials, besides serving as centres of communal activity. To many Europeans, in contrast, they harboured death and disease; they were sites that needed to be drained, sites that needed to be made useful and productive.⁹⁷ As Geoff Park explains, in the quest for flat agricultural land and for better routes of communication, the colonial transformation of New Zealand's environment exacted its heaviest toll on the lowlands.⁹⁸ Yet, Maori actions towards swamps were also changing in the nineteenth century. Drainage took place on Maori land due to marginalisation and indebtedness, but also sometimes through choice, while a number of Maori laboured draining other swamps.⁹⁹ More research is required into the extent and motivations of Maori swamp drainage and the role played by health ideas in effecting such changes.¹⁰⁰

GERM THEORY AND INSTITUTIONAL LANDSCAPES

By the twentieth century – in Australasian medical circles at least – ideas about disease transmission were gradually turning away from miasmatic models towards acceptance of microbial theories. 'Germ' theories acknowledged humans rather than environments as sources of disease.¹⁰¹ In popular circles, however, miasmatic

ideas persisted longer.¹⁰² But despite the gradual acceptance of germ theory in medical circles, environmental cures retained significance in medical care through their use in therapeutics, as clearly demonstrated in the areas of mental health care, sanatorium design and eugenics.¹⁰³

In the nineteenth century, the 'moral treatment' emerged as a possible means of effecting cure in the mentally ill. The moral treatment prescribed attractive environments, rest, work, exercise, good nutrition and recreational activities for the mentally ill, activities 'designed to promote self-healing by enhancing self-esteem and building moral values'.¹⁰⁴ Influential books like John Conolly's *The Construction and Government of Lunatic Asylums and Hospitals for the Insane* (1847) typified thinking about the importance of landscape in the mental health 'cure'. For asylums accepting 'patients of the educated classes', Conolly recommended that they should 'be situated amidst scenery calculated to give pleasure to such persons when of sane mind'. Although Conolly argued – in common with the time – that only the educated could appreciate and be moved by scenery, he recognised that: 'Even in the populous city, the pent-up artisan has a bird, to sing to him whilst he works, and a few flowers, which he cultivates with care'. Thus, he argued: 'We must not neglect such instincts and capacities if we profess to cure' the insane in asylums.¹⁰⁵ The popularity of such ideas continued. Later that century, Charles Mercier's *Lunatic Asylums: Their Organisation and Management* (1894) introduced the then-fashionable style of the picturesque pleasure garden into asylum landscape design. A ha-ha and low wall with plantings not only improved the appearance of such areas, asserted Mercier, but also 'take off from the contracted appearance of the court and diminish the suggestion of restraint that is offered by the wall'.¹⁰⁶

Considerations of pleasant, 'natural' surroundings, combined with the restorative properties of male manual labour, came to the fore in New Zealand through Frederick Truby King's (1858–1938) policies instituted at Seacliff Asylum, Otago, where he was appointed Superintendent in 1889. Reflecting the emerging emphasis on 'moral treatment' in mental health circles, King viewed open air exercise and pleasant garden landscape as crucial to the successful treatment of the mentally ill. Both, he argued, removed the feeling of restraint and provided a sense of purpose to the lives of inmates. Soon after his appointment, King employed a landscape gardener to re-design and beautify Seacliff's grounds (figure 1). He also engaged patients in work on the hospital's grounds and on its farm.¹⁰⁷ The latter provided an important source of fresh produce, another cornerstone of King's therapeutic programme, as well as enabling the institution to be effectively self-sufficient.¹⁰⁸ In the late nineteenth century, reports by the Inspector of Asylums, Duncan MacGregor, attested both to the success of King's schemes and to the ever-improving beauty of what King was increasingly referring to as 'the estate' on the health of its mental patients. MacGregor could not 'praise too highly the vigour which is manifest in laying out the grounds and developing the farm'. 'Every year', he continued, 'adds to the beauty and productiveness of

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Seacliff, and as a residence for the insane the position is admirable.¹⁰⁹ Beauty, productiveness and health thus formed a powerful triumvirate in the fight against ill health, and could redeem society's marginalised. Enthusiastic tree planter that King was, though, his thinking also reflected earlier notions that trees should not be too densely planted. As he explained, 'lofty evergreens are always out of place from the point of view of health, vitality and happiness of human beings, if they intercept seriously the free access of direct sunlight to the buildings and the adjoining paths, flower-borders and lawns.'¹¹⁰

By the early twentieth century, calls rang out for the state to establish another kind of institution – the tuberculosis sanatorium – and to prevent the entry to New Zealand of migrants suffering from this disease.¹¹¹ Fears about deadly migrants were not without foundation.¹¹² While immigration restrictions attempted to prevent the influx of consumptive patients into the colony, a similar kind of isolation was thought to check the spread of tuberculosis within New Zealand, having the added bonus of subjecting the patient to the benefits of New Zealand's climate and, to a lesser extent, healthy trees.

The colony's first sanatorium opened in 1899, at Flagstaff, near Dunedin. More soon followed.¹¹³ Like their counterparts overseas, sanatoria buildings in New Zealand had windows, vents and French doors that opened to let in as much fresh air and sunshine as possible. Of course, in winter they would allow



FIGURE 1. This image, probably taken in 1912, graphically illustrates the development of Seacliff Hospital into a landscape garden under Frederick Truby King's management and the connection between health and environment. 'Waikouaiti Co. Seacliff. Hospital', ca. 1912, from Miss J. Johnston Collection, F- 60807-1/2, PAColl-8769-02, Alexander Turnbull Library, Wellington, New Zealand.

in snow as well as sunshine, coldness as well as heat. Extensive gardens for food and decoration were also developed. In visiting such sites one is struck by the impressive stands of Eurasian species still growing there. In these plantations, pines seem to have proved especially popular because of their perceived role in purifying air and thereby in purifying diseased lungs.¹¹⁴ Site, though, was of greater importance than vegetation. Invariably sanatoria were located in high, dry, isolated, inland positions.¹¹⁵ Waipiata (established in 1924), on the Maniototo Plain, typified the ideal. Located at 1600 feet, it averaged less than 20 inches per year of rainfall and less than 70 per cent humidity.¹¹⁶ Although sanatoria combined good diet with graduated exercise, health education with occasional surgery and, finally from the late 1940s, vaccination with BCG (Bacillus Calmette-Guérin), climate determined their location, and environment in general played an important part in therapy until the 1940s and 1950s.¹¹⁷

By the early 1900s, New Zealand was one of the most urbanised countries in the world, and its settlers had realised that the old world serpents of urbanised industrial society – pollution, disease, overcrowding and filth – had followed them to paradise. What was more, urbanisation appeared to be affecting birth rates. Canterbury College Professor John Macmillan Brown typified such anxieties, drawing readers' attention to 'the appearance of slums and vice' in the colony and to the 'decadence' of the white race whose 'fountains of population and talent', he roared, were 'drying up'.¹¹⁸ In these anxious decades, state involvement in health grew through the establishment of the Public Health Department. Embracing germ theory, its medical experts also looked to nature as an inspiration and a source of healthiness. In 1902, medical doctor Robert Makgill (1870–1946) spoke for many when he wrote that 'Nature has framed certain sanitary laws more far-reaching than any by-laws [which] the most exemplary local body ever conceived'. In his views, these included elimination of the unfit, the removal of sanitary waste onto fields, knowledge about the microbe, and the sanitary powers of sunlight and fresh air.¹¹⁹ For Makgill, the discovery of the microbe did not diminish the role of environment in causing and explaining patterns of disease but rather modified it to one providing both therapeutic benefits and a model which 'modern' science could draw upon to fight ill health.¹²⁰

A renewed emphasis on environmental therapeutics also saw the development of new urban forms which complemented the many parks already established throughout New Zealand's cities. Foremost among these were the emergence of the Garden City movement and widespread projects of civic beautifying, typified by such groups as the Dunedin and Suburban Reserves Conservation Society established in 1888, New Zealand's first. In many respects, both represented a continuation of existing beliefs in gardens as sites of restoration and recuperation. The emergence of tramways in much of New Zealand's main cities before the First World War enabled many middle-class families to now live on the edge of the town in specially designed estates that incorporated aspects of gardens in their designs.¹²¹ Amenity improvements in towns involved a variety

of measures, from the development of more urban parks to the provision of children's playing grounds and the 'amenity' planting of decorative species.¹²²

In this period, anxieties about declining birth rates and even physical deterioration sparked the establishment of other types of programmes incorporating environmental therapeutics. Some of these involved children's and adults' organisations and government programmes that aimed to improve the healthiness of New Zealanders.¹²³ In state schools, experimental gardens and farms attempted to improve the morals and mould the psychological development of young New Zealanders, as well as engender notions of self-improvement, by getting them in touch with nature. School curricula during this period also came to emphasise the significant moral and health benefits of natural history collecting.¹²⁴ Indeed, even classroom architecture was opened up to embrace the qualities of sunshine and fresh air: at Waitaki Boys School in Oamaru, cold baths, swims and runs, and 'open-air dormitories with adjustable canvas flaps' allowing the ingress of fresh air, and even snow, typified the experience of many youngsters at school in this period and after.¹²⁵ By the 1930s children's health camps were receiving thousands of sickly children and exposing them to the therapeutics of good diet, fresh air, sunshine, regimen and exercise. The Sunlight League of New Zealand also emerged in this decade, exalting not only in the rehabilitative properties of outdoor exercise and climate, but also the creation of cleaner skies.¹²⁶

CONCLUSION

Charting the ambiguous history of settler attitudes to vegetation and health in nineteenth century Aotearoa underlines the complexity of colonists' engagement with new landscapes, of confidence mixed with anxiety, hope grafted onto despair. Nineteenth-century discussions about the colony's climatic suitability to the 'English constitution' relied on observations of existing and introduced vegetation to indicate the healthiness of a given area. As settlement progressed, the role of trees and parks in urban settings promised to enhance health by making urban places more like the healthier countryside – thanks, in part, to the supposed role of trees, as producers of ozone, in purifying stale city air. Yet, trees of different age and type could be ambiguous markers of health. Older trees were feared because of their association with the production of miasma, as were swamp plants, while young green timbers could, under certain environmental conditions, generate ill health. By the twentieth century, concepts of environmental therapeutics were generally subsumed within eugenic theories that also looked to the influence of hereditary factors on health, or to tuberculosis treatment in which climate and exercise formed one aspect of a wider programme of health. In this period, too, children's health camps, along with the burgeoning Garden City movement and civic beautifying societies, continued the emphasis on environmental therapeutics. By presenting a broad overview

of the vegetation-health nexus, I hope to stimulate more fine-grained studies that will suggest points of comparison between different colonies, investigate Maori-European knowledge transfers, and also pay closer attention to regional differences. Were treeless areas treated differently to forested regions? Was a coastal town thought to be healthier than one inland? Where they could, did the wealthy choose to live on hill sites rather than on the flat? Such studies will, I am sure, reveal both considerable confidence and anxiety about the role of environment in shaping colonial health.¹²⁷

NOTES

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² J. B. Armstrong, 'Planting in Towns', *New Zealand Country Journal* (hereinafter *NZCJ*) **4** (1 January 1880): 49.

³ The Hauraki Plains are located in Waikato, northern New Zealand. Much of the plains were swampland, which was subsequently drained after colonisation.

⁴ James Preece, 'Missionary Papers. Documents which relate to James Preece, lay missionary in New Zealand' (unpublished MS: July 1999 and January 2000), 22. Thanks to Dr. Marjan Lousburg for bringing this to my attention.

⁵ Gregg Mitman, 'In Search of Health: Landscape and Disease in American Environmental History', *Environmental History* **10** (2005): 185 (quotation). On overseas scholarship, note Richard White, 'From Wilderness to Hybrid Landscapes: The Cultural Turn in Environmental History', *The Historian* **66** (2004): 557–64, doi:10.1111/j.1540-6563.2004.00089.x; Nicholaas A. Rupke, ed., *Medical Geography in Historical Perspective* (London: Wellcome Trust Centre for the History of Medicine at UCL, 2000); Conevery Bolton Valencius, *The Health of the Country: How American Settlers Understood Themselves and Their Land* (New York: Basic Books, 2002); Hazel Conway, *People's Parks: The Design and Development of Victorian Parks in Britain* (Cambridge: Cambridge University Press, 1991); Mingzheng Shi, 'From Imperial Gardens to Public Parks: the Transformation of Urban Space in Early Twentieth-Century Beijing', *Modern China* **24**, 3 (1998): 219–54, doi:10.1177/009770049802400301; Caroline Daley, 'A Gendered Domain: Leisure in Auckland 1890–1940', in Caroline Daley and Deborah Montgomerie, ed., *The Gendered Kiwi* (Auckland: Auckland University Press, 1999), 87–111; Sarah Mirans, "'For their Moral Health": James Barrett, Urban Progressive Ideas and National Park Reservation in Victoria', *Australian Historical Studies* **120** (2000): 249–66; Terence Young, 'Social Reform Through Parks: The American Civic Association's Program for a Better America', *Journal of Historical Geography* **22**, 4 (1996): 460–72, doi:10.1006/jhge.1996.0032.

⁶ Pamela J. Wood, *Dirt: Filth and Decay in a New World Arcadia* (Auckland: Auckland University Press, 2005); Linda Bryder, "'A Health Resort for Consumptives": Tuberculosis and Immigration to New Zealand, 1880–1914', *Medical History* **40** (1996): 459–64.

⁷ F. S. Maclean, *Challenge for Health: A History of Public Health in New Zealand* (Wellington: Government Printer, 1964); 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); 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), 144–51; Belgrave, ‘Medicine and the Rise of Health Professionals in New Zealand, 1860–1939’, in *A Healthy Country: Essays on the Social History of Medicine in New Zealand*, ed. Linda Bryder (Wellington: Bridget Williams Books, 1991), 7–24; Tom Brooking, *A History of Dentistry in New Zealand* (Dunedin: New Zealand Dental Association, 1980).

⁸ Bronwyn Labrum, ‘Looking Beyond the Asylum: Gender and the Process of Committal in Auckland, 1870–1910’, *New Zealand Journal of History* 26 (1992): 125–44; Barbara Brookes, ‘Women and Madness: A Case-Study of the Seacliff Asylum, 1890–1920’, in Barbara Brookes, Charlotte Macdonald and Margaret Tennant, eds., *Women in History 2* (Wellington: Bridget William Books, 1992), 129–47; Barbara Brookes and Jane Thomson, ed., *‘Unfortunate Folk’: Essays on Mental Health Treatment, 1863–1992* (Otago: University of Otago Press, 2001). The Australasian context is also being brought to scholarly attention: Catharine Coleborne is working on a book, *Madness in the Family: The Australasian Colonial World, Insanity and Institutions, 1860s–1914*. On its institutional history, note: Warwick Anthony Brunton, “‘A Choice of Difficulties’: National Mental Health Policy in New Zealand, 1840–1947 (Ph.D. diss., University of Otago, 2001).

⁹ On race, note: John Stenhouse, “‘A Disappearing Race Before We Came Here’: Doctor Alfred Kingcome Newman, ‘The Dying Maori, and Victorian Scientific Racism’, *New Zealand Journal of History* 20, (1996): 124–40; Malcolm Nicolson, ‘Medicine and Racial Politics: Changing Images of the New Zealand Maori in the Nineteenth Century’, in David Arnold, ed., *Imperial Medicine and Indigenous Societies* (Manchester: Manchester University Press, 1988), 66–104; Toeolesulusulu Damon Salesa, “‘The Power of the Physician’: Doctors and the “Dying Maori” in early Colonial New Zealand’, *Health and History* 3 (2001): 13–40; Derek A. Dow, *Maori Health and Government Policy, 1840–1940* (Wellington: Victoria University Press; Historical Branch, Department of Internal Affairs, 1999); Raeburn Lange, *May the People Live: A History of Maori Health Development, 1900–1920* (Auckland: Auckland University Press, 1999).

¹⁰ With the exception of Philippa Mein Smith’s *Concise History of New Zealand* (Cambridge and New York: Cambridge University Press, 2005), most general histories of New Zealand either ignore health aspects of colonisation or relegate it to a peripheral role.

¹¹ While historical geographers such as Andrew Hill Clark and, later, Graeme Wynn, Mike Roche, Eric Pawson and Alan Grey have investigated New Zealand’s environmental past, the emergence of environmental history in New Zealand has been marked in recent years by the publication of three important works: Eric Pawson and Tom Brooking, ed., *Environmental Histories of New Zealand* (Melbourne: Oxford University Press, 2002); special issue of *Environment and History* 9, 4 (2003) on New Zealand; Tony Ballantyne and Judith Bennett, ed., *Landscape/Community: Perspectives from New Zealand History* (Dunedin: Otago University Press, 2005).

¹² For exceptions, note James Beattie, ‘W.L. Lindsay, Scottish Environmentalism, Webs of Information, and the “Improvement” of nineteenth-century New Zealand’, in *Landscape/Community*, 43–56.

¹³ Thomas F. Gieryn, *Cultural Boundaries of Science: Credibility of the Line* (Chicago and London: University of Chicago Press, 1999). On the implications of boundary making between science, religion and environmental history, note James Beattie, 'Rethinking Science, Religion and Nature in Environmental History: Drought in Early Twentieth-Century New Zealand', *Historical Social Research/Historische Sozialforschung* **29**, 3 (2004): 82–103.

¹⁴ On which see, Eric Pawson, 'On the Edge: Making Urban Places', in *Environmental Histories*, 200–13; James Beattie, 'Alfred Sharpe, Australasia and Ruskin', *Journal of New Zealand Art History* **29** (2006): 38–56.

¹⁵ Alan Grey, *Aotearoa and New Zealand: A Historical Geography* (Christchurch: Canterbury University Press, 1994), 23.

¹⁶ On the former, see Peter Gibbons, 'The Far Side of the Search for Identity: Reconsidering New Zealand History', *New Zealand Journal of History* **37**, (2003): 38–47 and Giselle Byrnes, *Boundary Markers: Land Surveying and the Colonisation of New Zealand* (Wellington: Bridget Williams Books, 2001); on the latter, note Geoff Park, *Nga Uruora: The Groves of Life: History and Ecology* (Wellington: Victoria University Press, 1996); Pawson and Brooking, *Environmental Histories of New Zealand*.

¹⁷ The 'Homeopathic Echo: A Journal of Health and Disease', was edited by C.F. Fischer, and published in Auckland in the years 1855 and 1856; Jennifer M. Gray, 'Potions, Pills and Poisons: Quackery in New Zealand, circa 1900–1915' (B.A. Honours diss.: University of Otago, 1980); Derek Dow, "'Pruned of its dangers": The Tohunga Suppression Act 1907', *Health and History* **3** (2001): 41–64; John Adam and Louise Beaumont, 'Colonial Pharmacological [sic] Gardens: New Zealand's First Plant Collections. A Progress Report for The Stanley (UK) Horticultural Trust' (No place: unpublished report, 2007).

¹⁸ This relationship also goes some way towards explaining why so many leading naturalists of the eighteenth and nineteenth centuries were medically-trained doctors and why medical classificatory systems of disease were strongly influenced by botanical taxonomy. On which, see Beattie, 'W.L. Lindsay'.

¹⁹ See, Ashley Hay, *Gum: The Story of Eucalyptus and Their Champions* (Sydney: Duffy & Snellgrove, 2002); Ian Tyrrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860–1930* (Berkeley/Los Angeles/London: University of California Press, 1999), 69–70.

²⁰ The French-born nursing nun, Mother Mary Aubert enthusiastically explored the medical potential of New Zealand's plants by preparing and selling herbal remedies commercially (initially in conjunction with Kempthorne, Prosser and Co., Wanganui), and using them for the care of many Maori to whom she ministered. Robin Woodward, *Cultivating Paradise: Aspects of Napier's Botanical History* (Napier: Hawke's Bay Cultural Trust, 2002), 41–7; also, note, R.C. Cooper and R.C. Cambie, *New Zealand's Economic Native Plants* (Auckland; New York: Oxford University Press, 1991), 116–31.

²¹ As medical historian Michael Belgrave notes, only by the 1880s was public confidence increasing in 'professional' medicine to the extent that many doctors were now able to ply their trade. Prior to this decade demand for medical professionals was so low that many doctors were forced to seek alternative employment. Belgrave, "'Medical Men" and "Lady Doctors"', 145–6.

²² Colonial smallpox vaccination among Maori, for instance, prevented the disease having the same impact on Maori populations as it had on other indigenous peoples.

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²³ See, Valencius, 'Histories of Medical Geography', in *Medical Geography in Historical Perspective*, 3–28.

²⁴ Ideas in this paragraph are based on: G.E.R. Lloyd, 'Introduction', in *Hippocratic Writings*, ed. G.E.R. Lloyd, trans. J. Chadwick and W.N. Mann (New York and London: Penguin, 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, ed., *Companion Encyclopedia of the History of Medicine*, Volume 1 (London and New York: Routledge, 1993), 292–308.

²⁵ Linda Nash, 'Finishing Nature: Harmonizing Bodies and Environments in Late-Nineteenth Century California', *Environmental History* 8 (2003): 36, doi:10.2307/3985971.

²⁶ 'Our Science Page: Decay of Plants and Animals', *NZCJ* 7, 6 (1 November, 1883), p.491.

²⁷ Carlo M. Cipolla, *Miasmas and Disease: Public Health and the Environment in the Pre-Industrial Age*, trans. Elizabeth Potter (New Haven and London: Yale University Press, 1992); Mary Dobson, "'Marsh Fever" – the Geography of Malaria in England', *Journal of Historical Geography* 6 (1980): 357–89, doi:10.1016/0305-7488(80)90145-0.

²⁸ Conevery Bolton Valencius, *The Health of the Country: How American Settlers Understood Themselves and their Land* (New York: Basic Books, 2002).

²⁹ Webb, cited in *New Zealand Government Gazette* (Province of Nelson) 15, 26 (9 July 1867): 101. Many settlers connected bad smell with ill health; this was a common means of identifying unhealthy sites at that time. On this, see Alain Corbin's brilliant, *Le Miasme et la Jonquille: L'odorat et l'imaginaire social XVIIIe–XIXe siècles* (Manchecourt: Maury Eurolivres, 2000 [1986]).

³⁰ On the connection between health resorts and tourism, see Margaret McClure, *The Wonder Country: Making New Zealand Tourism* (Auckland: Auckland University Press, 2004).

³¹ On the mistaken idea that vegetation indicated productive soils see Vaughan Wood, 'Appraising Soil Fertility in Early Colonial New Zealand: The "Biometric Fallacy" and Beyond', *Environment and History* 9 (2003): 393–406, doi:10.3197/096734003129342890.

³² *Otago Journal* 5 (1848): 66.

³³ Reverend Thomas Burns to Captain William Cargill, Portobello, 6 February 1847. MS 0076, Dunedin: Hocken Library, New Zealand.

³⁴ On which, see Beattie, 'Alfred Sharpe, Australasia and Ruskin', 38–56; Beattie, 'Wilderness Found, Lost and Restored: The Sublime and Picturesque in New Zealand', in Richard Reeve and Nick Abbott, eds., *The Future of Wilderness in New Zealand*, forthcoming.

³⁵ Frederick Carrington, *Scheme of the Colony of the Free Church at Otago, New Zealand* (Glasgow: Scottish Guardian Office, 1845), 18–9.

³⁶ The great irony, of course, is that many of these 'European' plants in fact came from Asia and the Americas. On the promotion of New Zealand, see Marian Minson, 'Promotional Shots: the New Zealand Company's Paintings, Drawings and Prints of Wellington in the 1840s and Their Use in Selling a Colony', in *Edward Gibbon Wakefield and the Colonial Dream: A Reconsideration* (Wellington, 1997), 159–66; Judith Anne Johnston,

'Images and Appraisals of New Zealand, 1839–1855: A Cognitive-Behavioural Approach to Historical Geography' (Ph.D. diss.: University of Auckland, 1975); 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 (1982): 2–27; James Beattie, 'Lusting After a Lost Arcadia: European Environmental Perception in Otago, 1840–1860' (Post-Grad. diss., University of Otago, 1999), 100–13; 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: CRES, 1999), 85–98.

³⁷ 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]), 76–7.

³⁸ John Ward, *Information Relative to New-Zealand for the Use of Colonists* (London: John W. Parker, 1839), 10.

³⁹ For instance, *The Otago Journal* claimed that Otago had some 140 species of fern, so could be judged to possess a fecund and healthy climate that enjoyed 'equitable' year-round mildness, 'refreshing dews and rains, and ... temperate heat [which], fill the months with a living verdure', *Otago Journal* 5 (1848): 67.

⁴⁰ Beattie, 'Temperate New Zealand and Tropical Asia: Health and Conservation Connections, 1840–1920', in Henry Johnson and Brian Moloughney, eds., *Asia in the Making of New Zealand* (Auckland: Auckland University Press, 2007), 41–6; L.K. Gluckman, *Tangiwai – A Medical History of New Zealand Prior to 1860* (Auckland: L.K. Gluckman, 1976), 57, 61.

⁴¹ Andrew Sinclair, Letters and Journals, March 1860, no page. MS 1947. Wellington: Alexander Turnbull Library. New Zealand.

⁴² Of course, these perceptions had a strong basis in reality. See, Anthony S. Wohl, *Endangered Lives: Public Health in Victorian Britain* (Cambridge, Mass.: Harvard University Press, 1983).

⁴³ *New Zealand Government Gazette* (Province of Nelson) 15, 26 (9 July 1867): 102.

⁴⁴ 'Our Science Page: Decay of Plants and Animals (from the "Chemistry of Common Things")', *NZCJ* 7, 6 (1 November 1883): 494.

⁴⁵ *Ibid.*

⁴⁶ 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; Woods 'Constructing Colonial Dirt: A Cultural History of Dirt in the Nineteenth Century Settlement of Dunedin, New Zealand' (Ph.D. diss., University of Otago, 1997), 67–8.

⁴⁷ *NZCJ* 1, 2 (2 April 1877): 82. For similar arguments, see also, 'Sanitary Influence of Trees', *North New Zealand Settler* (hereinafter *NNZS*) 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* (hereinafter, *NZF*) 24, 10 (November 1903): 788.

⁴⁸ Armstrong, 'Planting in Towns': 53.

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⁴⁹ 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).

⁵⁰ For a lively chapter on the Baron, see Hay, *Gum*, 71–103. On its anti-malarial properties note especially, Hay, *Gum*, 88–90.

⁵¹ Tyrrell, *True Gardens of the Gods*, 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.

⁵² 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.

⁵³ 'Sanitary Influence of Trees', *NNZS* **1**, 4 (November 1882): 69.

⁵⁴ *New Zealand Herald (NZH)*, 21 May 1880, 6.

⁵⁵ *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.

⁵⁶ On this note, for instance, H.E. Meller, *Leisure and the Changing City, 1870–1914* (London/Boston: Routledge & Paul, 1976), 109–17. See also M. Billinge, 'A Time and Place for Everything: An Essay on Recreation, Re-Creation and the Victorians', *Journal of Historical Geography* **22** (1996): 443–59, doi:10.1006/jhge.1996.0031.

⁵⁷ On this vast literature note, for example, Simon Schama, *Landscape and Memory* (London: Harper Collins, 1996); Peter Gay, *The Naked Heart: The Bourgeois Experience, Victoria to Freud, Volume IV* (Glasgow: Harper Collins, 1998); H.G. Schenck, *The Mind of the European Romantic: An Essay in Cultural History* (London: Constable, 1966).

⁵⁸ For this theme, note, Fairburn, *Ideal Society*; Miles Fairburn, 'The Rural Myth and the New Urban Frontier: An Approach to New Zealand Social History, 1870–1940', *New Zealand Journal of History* **9** (1975): 3–21; James Belich, *Making Peoples: A History of the New Zealanders from Polynesian Settlement to the End of the Nineteenth Century* (Penguin: Auckland; Allen Lane: London, 1996); Julian Kuzma, 'Landscape, Literature and Identity: New Zealand Late Colonial Literature as Environmental Text, 1890–1921' (Ph.D. diss., University of Otago, 2003).

⁵⁹ See, for instance, Bernard Smith, *Imagining the Pacific in the Wake of the Cook Voyages* (Carlton, Victoria: Melbourne University Press at the Miegunyah Press, 1992).

⁶⁰ Previously it was thought that environment determined morals and character, and that over time this accounted for human difference. Still, the power of environments continued; the belief that races could never successfully adapt to environments different to their own meant that if they went to a different climate, they risked racial degeneracy. Mark Harrison, *Climates and Constitutions: Health, Race, Environment and British Imperialism in India, 1600–1850* (New Delhi: Oxford University Press, 1999). On the implication of these ideas in New Zealand, note Beattie, 'Temperate New Zealand and Tropical Asia'.

⁶¹ Joachim Wolschke-Bulmahn, 'All of Germany a Garden? Changing Ideas of Wilderness in German Garden Design and Landscape Architecture', in *Nature in German History*, ed. Christof Mauch (United States [no place]: Berghahn Books, 2004): 74–92; Geoff Watson, 'Siting the Stage: Representations of Central Asian Environments in British Literature, c. 1830–1914', *New Zealand Journal of Asian Studies* 9 (2007): 96–117.

⁶² For a list of these towns, see Grahame Anderson, 'Wakefield Towns', in *Edward Gibbon Wakefield and the Colonial Dream: A Reconsideration* (Wellington: Friends of the Alexander Turnbull Library, 1997), 143–58.

⁶³ Winsome Shepherd and Walter Cook, *The Botanic Garden Wellington: A New Zealand History, 1840–1987* (Wellington: Millwood Press, 1988); Eric Dunlop, *The Story of Dunedin Botanic Garden: New Zealand's First* (Dunedin: Friends of the Dunedin Botanic Garden Inc., 2002).

⁶⁴ F.E. Wright, 'On the Desirability of Dedicating to the People of New Zealand Small Areas of Ground, assimilating to the Village Greens of England', *TPNZI* 6, (1873): 416.

⁶⁵ T.H. Potts, 'Out in the Open: On Recreation Grounds – The village green or common', *NZCJ* 8, 4 (1 July 1884): 277–87; Potts, 'Out in the Open: A Countryman in Town', *NZCJ* 12, 1 (2 January 1888): 15–20. Quote from Potts, 'On Recreation Grounds', 287. Interestingly, neither of these authors emphasised the particularly masculinist aspects of the importance of games and struggles against nature that characterised much of this period, both in New Zealand and overseas.

⁶⁶ On these ideals, note Erik Olssen, *Building the New World: Work, Politics and Society in Caversham, 1880s–1920s* (Auckland: Auckland University Press, 1995).

⁶⁷ *Otago Daily Times*, 17 December 1866, 5.

⁶⁸ One Interested, 'Mount Eden', *NZH*, 19 March 1877, 3.

⁶⁹ Armstrong, 'Planting in Towns': 50.

⁷⁰ Armstrong, 'Planting in Towns': 52.

⁷¹ *NZH*, 2 November 1880, 6.

⁷² Beattie, 'Wilderness'.

⁷³ *Ruskin and the Environment: The Storm-Cloud of the Nineteenth Century*, ed. Michael Wheeler (Manchester/New York: Manchester University Press, 1995); Gay, *The Naked Heart*, 37–102; Malcolm Andrews, *Landscape and Western Art* (Oxford: Oxford University Press, 1999), especially 129–49; Schenck, *The Mind of the European Romantic*.

⁷⁴ William Swainson, *Auckland, the Capital of New Zealand, and the Country Adjacent: Including Some Account of the Gold Discovery in New Zealand* (London, 1853 [reprint 1970]), 122–3.

⁷⁵ On New Zealand, see John Stenhouse and James Beattie, 'Empire, Environment and Religion: God and the natural world in nineteenth-century New Zealand', *Environment and History* 13 (2007): 413–46, doi:10.3197/096734007X243159; James Beattie, 'Romanticism, Art and Conservation in Otago, 1840–1860', *Otago Settlers Newsletter* 92 (March 2007): 1–4.

⁷⁶ R. McNab, 'Forestry in Its Relation to the Farm', *NZF* 24 (November 1903): 88.

⁷⁷ *Presbyterian Outlook* 1 (1894): 289.

⁷⁸ A vast literature on this topic exists. Note, for instance, Lydia Wevers, 'The Pleasures of Walking', *New Zealand Journal of History* 38 (2004): 39–51; Margaret McClure, 'Body and Soul: Heroic Visions of Work in the Late Nineteenth Century', in Bronwyn

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Dalley and Bronwyn Labrum, eds., *Fragments: New Zealand Social and Cultural History* (Auckland: Auckland University Press, 2000), 97–117; Jock Phillips, *A Man's Country: The Image of the Pakeha Male: A History* (Hong Kong, 1987), 97–101; John M. MacKenzie, *The Empire of Nature: Hunting, Conservation and Imperialism* (Manchester: Manchester University Press, 1988).

⁷⁹ William Wells, 'Forestry and its uses', unpublished manuscript presented at the Nelson Philosophical Institute, 5 April 1886, located in MU 156/004/0003. Wellington: Te Papa Tongarewa Archives, New Zealand.

⁸⁰ Grove, *Green Imperialism*.

⁸¹ Beattie, 'Environmental Anxiety'.

⁸² D. McArthur, 'On the Importance of Forestry', *TPNZI* **15** (1882): 461–3.

⁸³ 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).

⁸⁴ R.W. Richards, Report, 1907–1908 (Dunedin: no publisher, 1908), 27.

⁸⁵ 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).

⁸⁶ Armstrong, 'Planting in Towns', 50.

⁸⁷ 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 twelve months ending 30th April, 1869', County of Westland Gazette **13**, (7 June 1869): 77.

⁸⁸ Wilson, 18 June 1860, 20.

⁸⁹ 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.

⁹⁰ Robert Wyatt Meadows, 'A Short History of My Life', MS Papers 1700, 11. Wellington: Alexander Turnbull Library, New Zealand.

⁹¹ 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.

⁹² 'Report of the Hokitika Hospital': 77. Malaria is actually not found in New Zealand.

⁹³ See, Wood, *Dirt: Filth and Decay*; Maclean, *Challenge for Health*, 60–90; Dow, *Safeguarding the Public Health*, 15–41; 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): 211–9; W.D. Campbell, ‘On the Draining of Towns’, *TPNZI* 9 (1876): 29–37; 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.

⁹⁴ *New Zealand Government Gazette* (Province of Nelson) 15, 26 (9 July 1867): 103–104.

⁹⁵ ‘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.’ *New Zealand Government Gazette* (Province of Nelson) 15, 26 (9 July 1867): 104–7.

⁹⁶ ‘Province of Nelson: Waterworks Act’, *Nelson Provincial Council Votes and Proceedings*, Session 10, No.1 (1863): 7.

⁹⁷ Not all Europeans, of course, feared swamps. ‘The swamp bounds my run on two sides for miles. They are useful as affording food for infinite numbers of pigs and being the hide out of wild pigs, upon which we partly depend for food at the station.’ James Edward FitzGerald to Lucius Henry FitzGerald, The Springs Station [Canterbury], 21 March 1853 in ‘Correspondence of James Edward FitzGerald, Prime Minister of New Zealand, 1854’, Mss Eur D1171/27, London, Oriental and India Office, British Library.

⁹⁸ On this note, for instance, Atholl Anderson, *The Welcome of Strangers: An Ethnohistory of Southern Maori, A.D. 1650–1850* (Dunedin: Otago University Press, 1998), 131–6, 138–40, 152–5, 176–8; Geoff Park, ‘“Swamps which doubtless might Easily be drained”: Swamp drainage and its impact on the indigenous’, in *Environmental Histories of New Zealand*, 160–3; Park, *Nga Uruora: The Groves of Life: Ecology and History in a New Zealand* (Wellington: Victoria University Press, 1996), 49, 102–3, 176–7, 206.

⁹⁹ Park, *Nga Uruora*.

¹⁰⁰ On this, note especially *Waitangi Report, The Ngati Awa Raupatu Report* (Wellington: Waitangi Tribunal, 1999), 99–120.

¹⁰¹ In settlements like Parihaka (South Taranaki), the spiritual centre of the prophet leader Te Whiti o Rongomai (?–1907) and his followers, aspects of European designs, including close provision of drinking water and drainage, were introduced. On which, see Dick Scott, *Ask that Mountain: The Story of Parihaka* (Auckland: Reed/Southern Cross, reprint, 1991), 37–8; A.K. Newman, *New Zealand Times*, 7 October 1881 quoted in Scott, *Ask that Mountain*, 96.

¹⁰² For instance, William Farr’s (1807–1883) national classification of diseases brought together epidemic, contagious and endemic diseases under one banner, ‘zymotic’. Acknowledging the importance both of environment and humans as possible sources of pollution, it demonstrates that the acceptance of germ theory was not nearly so controversial as some have made out. Warboys, ‘Germs, Malaria and the Invention of Mansonial Tropical Medicine’. See Anderson’s fascinating study of these changing ideas: Anderson, *Cultivation of Whiteness*.

¹⁰³ Note, for instance, the prevalence of miasmatic ideas popularly adopted during the 1918 Influenza Epidemic. On which, see Geoffrey Rice, *Black November: The 1918 Influenza Pandemic in New Zealand* (Christchurch: Canterbury University Press, 2005).

¹⁰⁴ Margaret Pelling, ‘Contagion/Germ Theory/ Specificity’, in *Companion Encyclopedia of the History of Medicine*: 323–5; Woods, ‘Constructing Colonial Dirt’, 14–6.

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¹⁰⁵ Danielle Terbenche, “‘Curative’ and ‘Custodial’: benefits of patient treatment at the Asylum for the Insane, Kingston, 1878–1906”, *Canadian Historical Review* **86** (1 March 2005): 33, doi:10.1353/can.2005.0091. See also, David Livingstone, *Putting Science in its Place: Geographies of Scientific Knowledge* (London and Chicago: University of Chicago, 2003), 68–72; Cathy Coleborne, *Reading Madness: Gender and Difference in the Colonial Asylum in Victoria, Australia, 1848–1888* (Perth: Network Books, 2007), 81–104.

¹⁰⁶ John Conolly, *The Construction and Government of Lunatic Asylums and Hospitals for the Insane*, reprinted with an introduction by Richard Hunter (London: John Churchill, 1968 [1847]), 9.

¹⁰⁷ Charles Mercier, *Lunatic Asylums: Their Organisation and Management* (London: C. Girffin & Co. 1894), 58–9.

¹⁰⁸ Occasionally King also allegedly set patients to work on his own properties, much to the chagrin of officials!

¹⁰⁹ Cheryl Caldwell, ‘Truby King and Seacliff, 1889–1907’, in ‘Unfortunate Folk’, 42–3.

¹¹⁰ Duncan MacGregor, ‘Report on Lunatic Asylums of the Colony for 1897’, *Appendices to the Journal of the House of Representatives* (hereinafter *AJHR*), vol. 3, H-7, 1898: 7.

¹¹¹ Truby King to David Tannock, 14 April [1927][?], draft type-written letter, no place [Melrose]. Wellington, Royal New Zealand Plunket Society, Headquarters: Records, ‘Gardening, Melrose, etc.’, part one, MS-1783/083. HL.

¹¹² See, for instance, E. Robertson, ‘The State Prevention of Consumption’, *TPNZI* **30**, (1897): 66–79; John P. D. Leahy, ‘The Fight Against Tuberculosis in the Australian Colonies and New Zealand’, *TPNZI* **35**, (1902): 220–5. Robertson, for instance, charted the changing emphasis on tuberculosis etiology, from explanations based on impure air, to Koch’s breakthrough. Robertson, ‘State Prevention’: 67. For calls to prevent migrants with tuberculosis coming to New Zealand, see Bryder, “‘A Health Resort for Consumptives’”.

¹¹³ Consumptive migration was a real problem. According to Bryder, ‘[a] notable feature of the 3,500 or so deaths from tuberculosis in Auckland in the period 1880–1914 was indeed the number of recent immigrants.’ Bryder, “‘A Health Resort for Consumptives’”:
464. Although an Immigration Restriction Act was passed in 1903 to prevent sufferers entering New Zealand, because of the generally sympathetic response of doctors to sufferers of phthisis, it still took a number of years for the regulations to be properly enforced. Bryder, “‘A Health Resort for Consumptives’”:
461.

¹¹⁴ Kim Middleton, ‘The Establishment of Tuberculosis Sanatoria in Otago, 1899–1928’, P.G. Dip., University of Otago, 1998, 1–2; Bryder, ‘If preventable, why not prevented’: The New Zealand Response to Tuberculosis, 1901–1940’, in *A Healthy Country*, 109–27; Maclean, *Challenge for Health*, 360–82.

¹¹⁵ On architecture see, Bryder, *Below the Magic Mountain*, 49–53; Middleton, ‘Establishment of Tuberculosis’, 27–8, 46–7. Pine trees had originally been crucial to wilderness therapy, the forerunner of the sanatorium: on which, see Kenneth Thompson, ‘Wilderness and Health in the Nineteenth Century’, *Journal of Historical Geography* **2** (1976): 145–61, doi:10.1016/0305-7488(76)90253-X; Bryder, *Below the Magic Mountain*, 47.

¹¹⁶ See Middleton, ‘Establishment of Tuberculosis’; Bryder, ‘If preventable, why not prevented’. Climate also remained important in overseas tuberculosis treatment. See Bryder, *Below the Magic Mountain*, 46–9.

¹¹⁷ Middleton, 'Establishment of Tuberculosis', 30.

¹¹⁸ On changing therapies in New Zealand see Middleton, 'Establishment of Tuberculosis'. On changing therapies in Britain see Bryder, *Below the Magic Mountain*, 130–98; on BCG's introduction into New Zealand see Maclean, *Challenge for Health*, 375–7.

¹¹⁹ J. Macmillan Brown: 'The East and the West', *The Press*, 24 May 1913, no page.

¹²⁰ R.H. Makgill, 'Nature's Efforts at Sanitation', *TPNZI* **35** (1902): 139.

¹²¹ 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).

¹²² A useful summary appears in Eric Pawson, 'Making Urban Places', in *Environmental Histories of New Zealand*, 200–13; on the general background of colonial towns, see David Hamer, *New Towns in the New World: Images and Perceptions of the Nineteenth-century Urban Frontier* (New York: Columbia University Press, 1990). Note, too, Lynne Lochhead, 'Preserving the Brownie's Portion: A History of Voluntary Nature Conservation Organisations in New Zealand, 1888–1935' (Ph.D. diss.: Lincoln University, 1994); James Beattie, Jasper M. Heinzen and J.P. Adam, 'Japanese Gardens in New Zealand 1850–1950: Transculturation and Transmission', *Studies in the History of Gardens and Designed Landscapes* **28** (2008): 219–36, on the activities of such urban beautifying societies.

¹²³ See, for instance, David Tannock to Superintendent of Playgrounds, Philadelphia, 8 June 1914, Botanic Gardens, Dunedin, 'Superintendent of Reserves: Correspondence', Series 3/14, 1914–1925, 1927, 1933–1937, 1914, Dunedin City Council Archives, Dunedin.

¹²⁴ See, for instance, Tennant, *Children's Health*, 33–7; Kirstie Ross, "'Schooled by Nature": Pakeha Tramping between the wars', *New Zealand Journal of History* **36** (2001): 51–61; Caroline Daley, 'Selling Sandow: Modernity and Leisure in Early Twentieth-Century New Zealand', *New Zealand Journal of History* **34** (2000): 241–61. See also the pamphlet, *Sunlight League of New Zealand: Sun and Sea Bathing, Teeth and Nutrition, Mental Health* (Christchurch: no publisher, n.d. [1930s?]).

¹²⁵ Kirstie Ross, 'Knowing nature: New Zealand children and the natural world from the 1890s to World War One', Paper presented at Trans-Tasman Forest History: History, Culture and Management, Canterbury University, Christchurch, 29 January–3 February 2007; Colin McGeorge, 'The Presentation of the Natural World in New Zealand Primary Schools, 1880–1914', *History of Education Review* **23** (1994): 32–45.

¹²⁶ James McNeish, *Dance of the Peacocks: New Zealanders in Exile in the Time of Hitler and Mao Tse-Tung* (Auckland: Vintage, 2004), 33 (quotation).

¹²⁷ Eric Pawson, 'Confronting Nature', in John Cookson and Graeme Dunstall, ed., *Southern Capital Christchurch: Towards a City Biography, 1850–2000* (Christchurch: Canterbury University Press, 2000), 75–6. See also, Erik Olssen, 'Truby King and the Plunket Society: An Analysis of a Prescriptive Ideology', *New Zealand Journal of History* **15** (1981): 3–23.

¹²⁸ James Beattie, 'Environmental Anxiety in New Zealand, 1840–1941: Climate Change, Soil Erosion, Sand Drift, Flooding and Forest Conservation', *Environment and History* **9** (2003): 379–92, doi:10.3197/096734003129342881.