
'HUNGRY DRAGONS':¹ EXPANDING THE HORIZONS OF CHINESE ENVIRONMENTAL HISTORY—CANTONESE GOLD-MINERS IN COLONIAL NEW ZEALAND, 1860S-1920S

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Abstract

Tens of thousands of Chinese seized on the opportunities presented by British imperialism to take advantage of resource frontiers opening up in places like Canada, Australia, and New Zealand. Utilising British legal apparatuses and financial systems, Chinese migrants grafted them, in varying ways, onto their own networks of expertise and environmental knowledge drawn from China and elsewhere.

This article brings to light neglected aspects of global, British imperial, and Chinese environmental histories. Just as Chinese environmental historians have overlooked the environmental history of overseas Chinese, so environmental historians of British settler colonies have likewise ignored Chinese. The article fills these historiographical gaps by examining the environmental impacts of Cantonese gold-miners in New Zealand, who adapted water technology from their homeland of Guangdong Province and from elsewhere, such as in California and Victoria, Australia. In New Zealand, Cantonese mining caused soil erosion, reduced timber supplies, displaced vegetation, and used up scant water resources, in addition to establishing environmental exchanges between parts of New Zealand and southern China. The article also argues that studying the environmental impacts of overseas Chinese can present new research on both Chinese environmental history and comparative global environmental history.

Keywords: Chinese environmental history, global environmental history, imperialism, British Empire, Cantonese, South China, New Zealand, gold-mining, environmental impacts, migration.

1 *Tuapeka Times*, 8 September 1906, 3.

Introduction

This article illustrates how the environmental history of overseas Chinese might help correct an ethnocentric bias in environmental historiography of the British Empire, especially of its settler colonies. With the exception of studies of Chinese in tropical colonies in activities such as tin-mining or agriculture,² environmental historians of British settler societies have largely ignored Chinese as agents of environmental change.³ Instead, they have focused on how European labour and capital, supported by colonial states and their legal, bureaucratic, and military machinery, facilitated large-scale environmental transformation. This characterisation applies to scholarship right from the seminal work of Alfred Crosby, down to Thomas Dunlap and other more recent historians of empire—myself included.⁴ It also applies to scholarship on New Zealand, case studies from which this article examines.⁵

Below, I argue for the need to acknowledge the role of Chinese finance and workers in New Zealand's environmental transformation, especially in Otago. Examining the environmental history of Chinese considerably enlarges our picture of environmental ideas, connections, and changes in New Zealand, by adding another group's views to those of European colonists and Māori. While some white colonists criticised Chinese miners and resented their presence on the gold-fields, this article shows that many others admired the specialised skills they offered, especially in building water-races, a task on which many dozens of Chinese were employed by Europeans. Some colonists also went into business partnerships with Chinese, engaging in enterprises that connected the environments of southern New Zealand and south China and which triggered environmental change in both locales.

2 Corey Ross, 'The Tin Frontier: Mining, Empire, and Environment in Southeast Asia, 1870s–1930s', *Environmental History* 19 (2014): 454–79; Jeyamalar Kathirithamby-Wells, *Nature and Nation: Forests and Development in Peninsular Malaysia* (Singapore: Singapore University Press, 2005).

3 For English-language works, see: Mark Elvin, *The Retreat of the Elephants: An Environmental History of China* (New Haven: Yale University Press, 2004); Mark Elvin and Ts'ui-jung Liu, eds., *Sediments of Time: Environment and Society in Chinese History* (Cambridge: Cambridge University Press, 1998); Robert B. Marks, *Tigers, Rice, Silk, & Silt: Environment and Economy in Late Imperial South China* (New York: Cambridge University Press, 1998); Ts'ui-jung Liu (ed.), *Environmental History in East Asia: Interdisciplinary Perspectives* (London and New York: Routledge, 2014).

4 Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 1986); 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); James Beattie, *Empire and Environmental Anxiety: Health, Science, Art and Conservation in South Asia and Australasia, 1800–1920* (Basingstoke: Palgrave Macmillan, 2011).

5 See *Environmental Histories of New Zealand*, ed. Pawson and Brooking, 1st ed. (Auckland: Oxford University Press, 2002); David Young, *Our Islands, Ourselves: A History of Conservation in New Zealand* (Dunedin: Otago University Press, 2004); Peter Holland, *Home in the Howling Wilderness: Settlers and the Environment in Southern New Zealand* (Auckland: Auckland University Press, 2013); Paul Star, 'New Zealand's Biota Barons: Ecological Transformation in Colonial New Zealand', *ENNZ: Environment and Nature in New Zealand* 6 (2011): 1–12.

Highlighting these stories invites environmental historians of China to examine the environmental impacts of Chinese overseas. As a way of accomplishing this, the article suggests that 'eco-cultural networks' might provide a useful framework for considering the human, material, and environmental connections initiated by Chinese mining. Eco-cultural networks 'refers to interlinked cultural formulations, material exchanges and ecological processes' stimulated by the search for new resources, such as gold, and recognises the 'simultaneous production of knowledge about environments with their exploitation under imperial regimes'. It shows how '[t]he exploitation of new resources' reconfigured human–nature relations, led to the mobilisation of new labour regimes, encouraged the development of facilities enabling overseas capital investment, and expanded communication networks and resulting knowledge exchanges, developments which connected different places, peoples, and environments.⁶

This article begins with an overview of the environmental history of New Zealand, then examines Chinese gold-miners and their environmental actions, views, and impacts in Otago, southern New Zealand. Next, it focuses on resource exchanges, mainly between southern New Zealand and south China, and touches on the environmental impacts of Chinese gold-miners from New Zealand returning to China. Finally, the work reflects on how an examination of the environmental history of overseas Chinese might help reconfigure China's environmental history. Given the author's existing work and the limitations of space, the present study only briefly discusses Chinese commercial market gardening, Chinese landscape views, and the impacts of returning Chinese in the Pearl River region.⁷

New Zealand environmental transformation, 1300–1920s

New Zealand formally became part of the British Empire in 1840 after the Treaty of Waitangi was signed by many Māori chiefs and the British Crown. This treaty followed several decades of interaction among Māori, Europeans, and other groups. Beginning in the late eighteenth century, New Zealand, its resources, and wider environment gradually become incorporated into world markets. Vessels sought New Zealand spars, sealskins, and later whale products

6 Beattie, Melillo, and O'Gorman, 'Eco-Cultural Networks and the British Empire', in *Eco-Cultural Networks and the British Empire*, 8–9. See, also: Beattie, O'Gorman, and Melillo, 'Rethinking the British Empire through Eco-Cultural Networks: Materialist-Cultural Environmental History, Relational Connections and Agency', *Environment & History* 20 (2014): 561–75.

7 Beattie, 'Eco-cultural networks'.

for international markets.⁸ China was New Zealand's first major export market, and remained significant for over 30 years. Sealskins collected from southern New Zealand were commonly sent via ports in Australia to Canton, where they were in high demand for the making of fur coats for officials. For instance, in 1792 a small vessel visiting New Zealand sent 4,500 skins to China—this only hinted at the much larger volume of traffic that was to follow, a traffic largely controlled by Americans and carried by their vessels. By the 1830s, however, not only were most sealing colonies in precipitous decline, but also oversupply led to a massive drop in profits—factors which contributed to its end.⁹ The gradual incorporation into world markets evidenced by the sealskin trade accelerated markedly with colonisation, and was participated in by Māori as well as European.¹⁰

New Zealand's formal colonisation signalled a shift from temporary European residence—often solely for purposes of resource extraction—to permanent European settlement. From 1861 to 1900, New Zealand received 223,000 migrants.¹¹ Colonists' ongoing desire for land, coupled with their seemingly limitless numbers, caused major ecological impacts in New Zealand, and had devastating cultural and health effects on Māori. Although for a time Māori also participated successfully in an overseas export economy, they endured major land losses from the 1850s. Environmental change accelerated as the shadow of the land passed from Māori to colonisers.¹²

8 Jim McAloon, 'Resource frontiers, settler capitalism and environmental change 1770–1860', in *Environmental Histories of New Zealand*, 1st ed., 52–68; C. J. Elder and M. F. Green, 'New Zealand and China', in *New Zealand and China: the papers of the twenty-first Foreign Policy School 1986*, ed. Ann Trotter (Dunedin: University of Otago, 1986), 16–63.

9 William Tai Yuen, *The Origins of China's Awareness of New Zealand, 1674–1911* (Auckland: New Zealand Asia Institute, The University of Auckland, 2005), 93–109; Ian W. G. Smith, *The New Zealand Sealing Industry* (Wellington: Department of Conservation, 2002).

10 McAloon, 'Resource frontiers'; Beattie, 'Plants, Animals and Environmental Transformation: Indian / New Zealand biological and landscape connections, 1830s–1890s', in *East India Companies and the Natural World 1600–1850*, ed. Vinita Damoradaran and Anna Winterbottom (Basingstoke: Palgrave Macmillan, 2014), 219–248; Beattie, 'Thomas McDonnell's Opium: Circulating Plants, Patronage and Power in Britain, China and New Zealand, 1830s–1850s', in *The Botany of Empire in the Long Eighteenth Century* (Dumbarton Oaks, forthcoming).

11 Donald Denoon and Philippa Mein-Smith with Marivic Wyndham, *A History of Australia, New Zealand and the Pacific* (Oxford and Malden: Blackwell, 2000), 87–88.

12 Richard Boast, *Buying the land, selling the land: governments and Māori land in the North Island* (Wellington: Victoria University Press, 2008); David V. Williams, *'Te kooti tango whenua': The Native Land Court 1864–1909* (Wellington: Huia, 1999); Harry C. Evison, *The Long Dispute: Maori Land Rights and European Colonisation in Southern New Zealand* (Christchurch: Canterbury University Press, 1998).

The particular nature and extent of that passing reflected not just the colonising ideals of incoming Europeans, but also New Zealand's very particular ecology. On their arrival around 1300 CE, Polynesians found the three large islands teeming with birds and insects, but virtually no mammals. They named it Aotearoa, meaning 'Land of the Long White Cloud'. Māori introduced a handful of animals and tropical staples they brought from Polynesia. Thanks to their horticultural skills, they were able to grow several tropical varieties in the cooler and more temperate climate of New Zealand, but even their skills were unable to successfully nurture a great range of introduced Polynesian food crops in Murihuku, southern New Zealand. Māori also had a significant environmental impact on the plant and bird life of Aotearoa, driving some species to extinction and deforesting large swathes of the main islands' eastern coasts.¹³

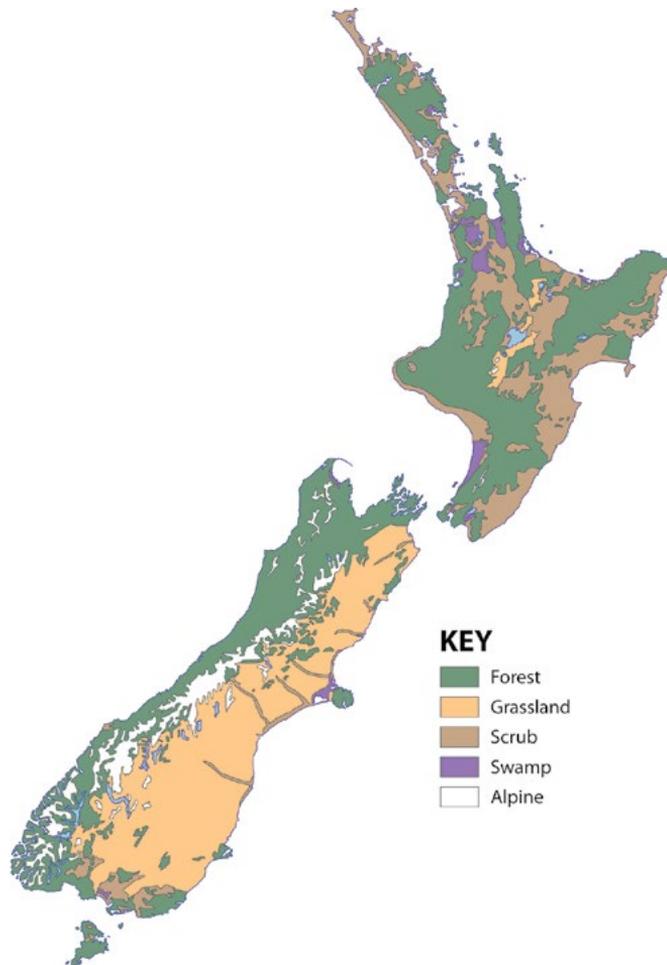
New Zealand's environmental transformation stepped up several gears following British colonisation, through introductions of more people, technology, and by opening it up to global markets. Māori also participated in aspects of this transformation. An estimated 30,000 species of introduced plants came following colonisation. Included among them were many undesirable introductions, whose ecological consequences were unanticipated and sometimes devastating. Following colonisation, introduced pasture replaced forests and swamps. And hoofed animals—sheep, horses, and cattle—were introduced into the islands for the first time, in addition to a host of other animals, and birds.¹⁴ The area of native forest fell from around 80 per cent of the land-mass when Polynesians first arrived, to 50 per cent on the eve of European colonisation. By 1900, it was 25 per cent (Map 1 and Map 2).¹⁵ The extent of pastureland increased markedly (Figure 1) along with numbers of domestic livestock. Following colonisation, New Zealand lost approximately 85 to 90 per cent of its wetlands. In places, native plants and bird life declined precipitously, some to the point of extinction.¹⁶

13 Matt McGlone, 'The Polynesian Settlement of New Zealand in Relation to Environmental and Biotic Changes', *New Zealand Journal of Ecology* 12 (1989): 115–29; *Te Taiao Māori and the Natural World* [ed. Jennifer Garlick, Basil Keane, and Tracey Borgfeldt] (Auckland: David Bateman, 2010).

14 Tom Brooking and Eric Pawson, *Seeds of Empire: The Environmental Transformation of New Zealand* (London: I. B. Tauris, 2010).

15 Michael Roche, 'The State as Conservationist', in *Environmental Histories of New Zealand*, 1st ed., 185.

16 For an overview of these changes, see *Making a New Land*, ed. Pawson and Brooking. Figure of loss of wetlands from: Geoff Park, 'Swamps which might doubtless easily be drained: swamp drainage and its impact on the indigenous', in *Environmental Histories of New Zealand*, 1st ed., 150.

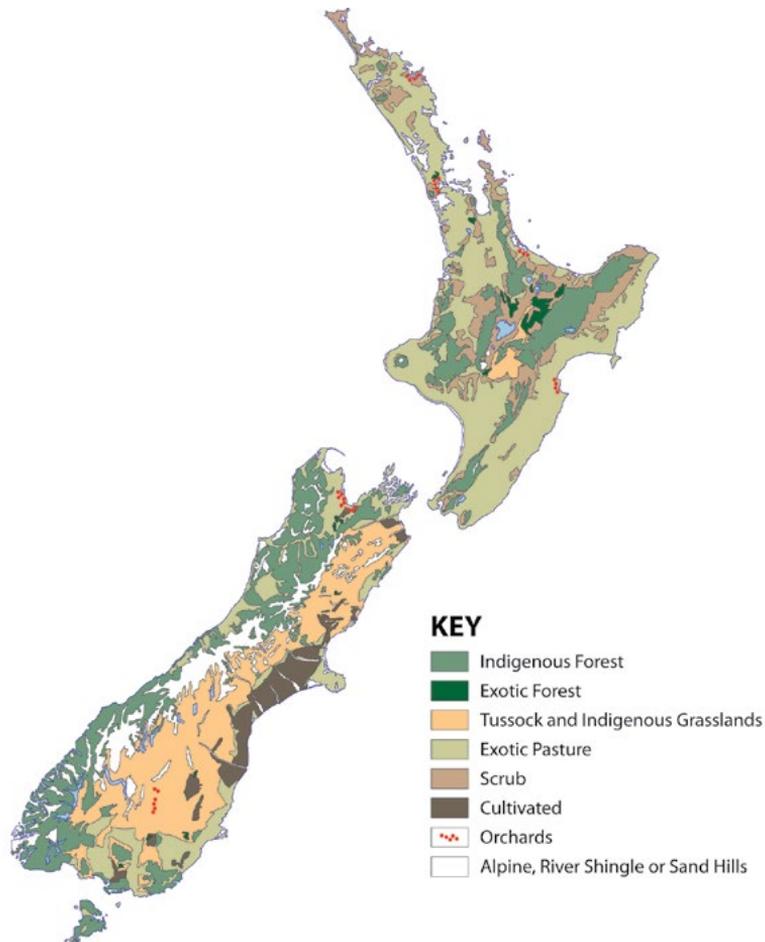


Map 1: New Zealand vegetation and land use, 1840.

Source: Based on: Kenneth B. Cumberland, 'A Century's Change: Natural to Cultural Vegetation in New Zealand', *Geographical Review* 31, no. 4 (October 1941): n. p.

Cycles of boom and bust dominated the colonial economy. Primary products sustained booming economies for a time, only to slump when overseas demand slackened off, or when a resource faced exhaustion. Wool production, and by the end of the nineteenth century, frozen meat and dairy products, drove environmental transformation and oiled the workings of colonial economies. This was accompanied by other forms of resource exploitation, including of timber, kauri gum, and gold.¹⁷

¹⁷ See *Seeds of Empire*; McAloon, 'Resource Frontiers'.



Map 2: New Zealand vegetation and land use, 1940.

Source: Based on: Kenneth B. Cumberland, 'A Century's Change: Natural to Cultural Vegetation in New Zealand', *Geographical Review* 31, no. 4 (October 1941): n. p.

Traditionally this rapid and remarkably widespread environmental transformation has been depicted as something undertaken largely by white settlers, mostly from Britain—scholars are yet to adequately assess the impacts undertaken by Māori following colonisation. Yet, as this article demonstrates, from the 1860s Chinese also were responsible for considerable environmental changes in the islands, particularly in southern New Zealand. Chinese gold-miners diverted rivers, washed away hillsides, and, through their actions, caused deforestation and soil erosion. Chinese market gardeners introduced new plants into New Zealand, converted barren into productive land, and eventually supplied most settler towns with the bulk of their vegetables by the late nineteenth century. Chinese farm workers aided in the introduction of European pastures and animals and, as railway labourers, helped to develop

new bridgeheads of resource extraction. Through their access to capital, a few high earners who invested their profits in New Zealand—such as the merchants Choie Sew Hoy, Chew Chong, Chin Moon-Ting (James Chin Ting), and Chan Dah Chee—also helped to develop new industries or introduce new technologies that opened up new frontiers of resource exploitation with often significant environmental impacts.

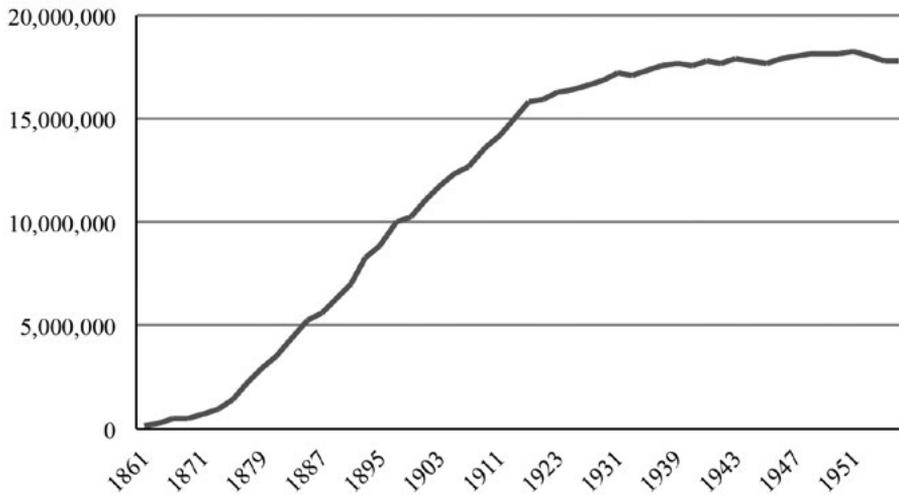


Figure 1: Thousands of acres of sown grass by year.

Source: 'Sown Grass', in *Agricultural and Pastoral Statistics of New Zealand: 1861–1954*, compiled by B. L. Evans (Wellington: Department of Statistics, 1956), A25.

Chinese come to New Zealand: Gold-mining

From 1852 to 1876, New Zealand's semi-federalist provincial system of government gave provinces considerable powers and responsibilities, including over migration, for developing transport networks, and the like. In 1865, with men drifting away from the Otago gold-fields (opened in 1861), concerned provincial authorities invited Cantonese gold-miners in Australia to Otago (Map 3). Most settlers initially welcomed Chinese as hard-working men able to keep out of trouble and likely to return to China once they had made their money. Figure 2 summarises the patterns of Chinese immigration.



Map 3: Map of Otago Gold-fields.

Source: Henry Aitken Wise, 'Wise's new map of Otago: corrected from official surveys January, 1875' (Dunedin: H. Wise & Co., 1875), in Sir George Grey Special Collections, Auckland Libraries, NZ Map 6533.

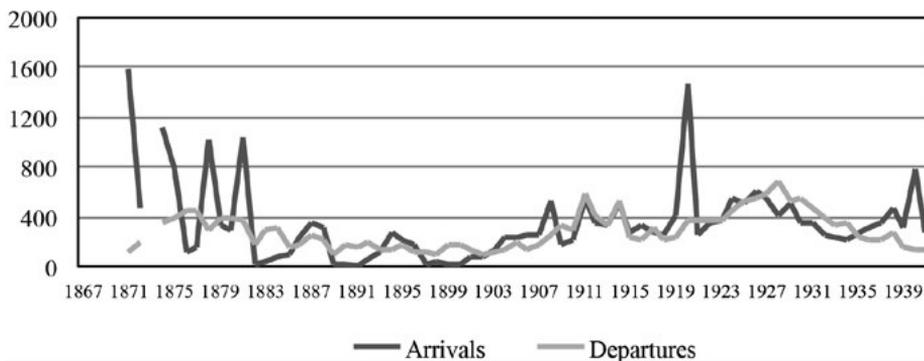


Figure 2: Chinese arrivals into, and Departures from, New Zealand, 1867–1941.

The gaps in the graph indicate gaps in sources. The table shows a stream of departures, which is typical of Cantonese sojournerism, but also points to a practice of chain migration that was not anticipated in the invitations to the Chinese to come, and which enabled the Cantonese to continue accruing capital to take home.

Source: Drawn from information supplied in 'Table 6—Chinese Departures and Arrivals in Otago', in James Ng, *Windows on a Chinese Past ...*, vol. 1 (Dunedin: Otago Heritage Books, 1993), 348.

Most arrivals in the 1860s came from the Australian colony of Victoria, mostly from Siyi (Four Districts, south-west of the city of Canton) and to a lesser extent Sanyi (Three Districts, closer to Canton). By the 1870s, miners came directly from China, especially from the Three Districts (mainly Panyu, north of Canton), and this group predominated among Chinese in New Zealand.¹⁸ The ongoing dominance of Panyu men in the Colony from the 1870s is shown in the following figures for 1896: in that year, 67 per cent of Chinese in New Zealand came from Panyu; 17 per cent, Siyi; 2.5 per cent, Zengcheng; 3.5 per cent, Zhongshan (then Huengshan); 2 per cent, Dungguan. Only one man came from Fujian Province.¹⁹

In reaching New Zealand—which Chinese called New Gold Mountain (*Sun Gum Shan* in Cantonese, *Xin jinshan* in Pinyin, 新金山) to distinguish it from North America (Gold Mountain, 金山)—and then in proceeding to the goldfields, the Cantonese drew from their own extensive migrant networks. In places like New Zealand, they also made extensive and effective use of colonial financial systems and legal structures, including government policies making available land and other resources. In New Zealand, as elsewhere, nineteenth-century Chinese migrants from the Pearl River Delta ‘actively pursued the opportunities offered by the ever-quickening spread of capitalism in the form of thickening webs of international trade, steadily improving transportation and communications technology, and the ... job opportunities in colonial economies throughout the world’.²⁰

Just as lineage networks tied together family and clan in China, so these structures—plus county groupings and native-place associations—operated beyond China’s territorial boundaries. These networks provided financial, organisational, and emotional support to overseas Chinese, facilitating everything from travel and accommodation to the carrying of letters and remittance money. Such associations shaped Cantonese work patterns and even movements in New Zealand.

Otago officials initially approached Victorian-based Chinese merchants—important interlocutors bridging the linguistic and cultural worlds of the Chinese and colonial—to see whether they would be interested in organising their kinsmen to work in Otago. As a result, mainly Siyi and Sanyi Chinese arrived. Siyi Chinese travelled inland on a route north of Dunedin, while Sanyi Cantonese travelled on a route south of Dunedin. Cantonese in New Zealand also worked mining claims along clan and county lines, just as they later operated market gardens and set up fruit and vegetable shops using these social

18 James Ng, *Windows on a Chinese Past: How the Cantonese goldseekers [sic] and their heirs settled in New Zealand*, vol. 1 (Dunedin: Otago Heritage Books, 1993).

19 Ng, *Windows*, 1:11.

20 Madeline Y. Hsu, *Dreaming of Gold, Dreaming of Home: Transnationalism and Migration between the United States and South China, 1882–1943* (Stanford: Stanford University Press, 2000), 2.

networks.²¹ For example, in the nineteenth century, miners mostly from Panyu worked the gold-field of Round Hill, Otago. As market gardeners, Panyu men also predominated in the smaller North Island centres of Palmerston North and Wanganui—and in the South Island, in the Dunedin suburb of Kaikorai Valley. In contrast, by the early 1900s, many of Dunedin's market gardeners—and most of Wellington's 140 fruit sellers—came from Zengcheng County.²² In environmental terms, these networks facilitated introductions into New Zealand of Chinese vegetables, flowers, and agricultural techniques, transfers kept up by ongoing exchanges of people and information.²³

The mobility of Chinese is illustrated in the biographies of the some 3,500 Chinese in Otago collected by the Reverend Alexander Don (1857–1934).²⁴ I use the term 'trans-local' to describe the connections Chinese migration established, because, rather than operating at a national level, they functioned at a fundamentally local level (Map 4). This is illustrated in the potted biography of an unnamed Cantonese gold-miner, recorded in 1882, who part-owned a large mine in Round Hill. After three years in Singapore, the miner spent a further 15 in Mauritius before moving to New Zealand. When Don caught up with him, 'he had been in New Zealand twelve years. He speaks a little French, picked up at Mauritius, but like the English spoken by Chinese, it is a "pidgin"'.²⁵

It was well known for Cantonese to travel from one Jin Shan country to another and among various centres of Chinese population in New Gold Mountain. Brothers or kin commonly joined family or friends in working mining claims, just as later they joined market-gardening or laundry businesses. Overseas Chinese tried to return home every few years for family reasons, including to get married, but only a very few brought Chinese women to New Zealand, while a handful married European women. Obviously, the ideal for the gold-miner would be to strike it lucky, and return home rich. But, for most, this never happened, and for those who struggled to make a living in New Gold Mountain, it appears that connections with their home gradually dissipated, owing to the

21 Ng, *Windows*, 1:11. On such migrant networks in a broader context, see Adam McKeown, *Chinese Migrant Networks and Cultural Change: Peru, Chicago, and Hawaii, 1900–1936*, 2nd ed. (Chicago: University of Chicago Press, 2001); McKeown, *Melancholy Order: Asian Migration and the Globalization of Borders* (New York: Columbia University Press, 2008); McKeown, 'Conceptualising Chinese Diasporas, 1842 to 1949', in *The Chinese Diaspora in the Pacific*, ed. Anthony Reid (Aldershot: Ashgate, 2008), 1–32.

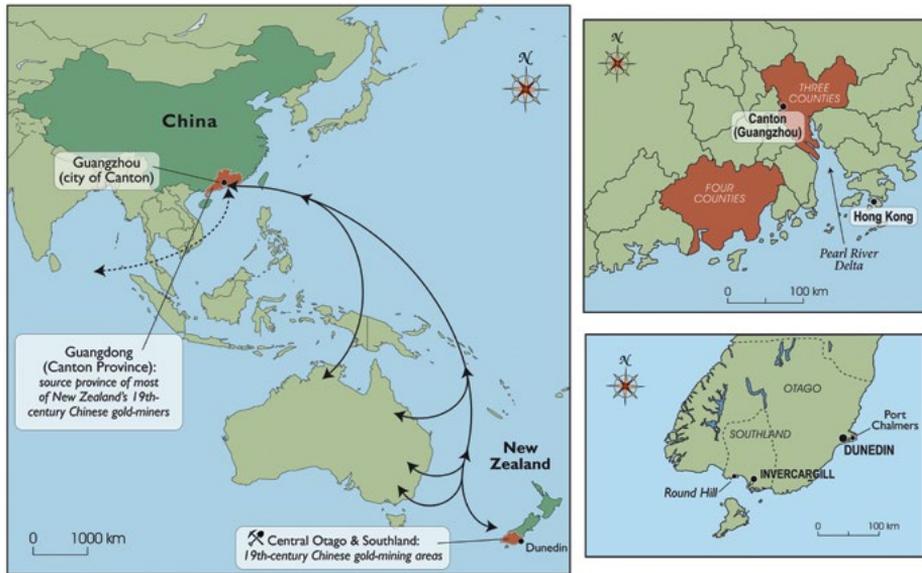
22 George McNeur, *Feeling the Way in the Canton Villages* (Dunedin: Otago Daily Times, 1902), 2.

23 On which, see Beattie, 'Empire of the Rhododendron'.

24 This is reproduced fully in James Ng, *Don's 'Roll of Chinese', Windows on a Chinese Past, vol. 4* (Dunedin: Otago Heritage Books, 1993).

25 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 July 1882, 7.

shame of not having earned enough to send money back to family in China or even to permit their return home.²⁶ A lack of understanding among families in Canton of the hardships faced by their kin compounded problems.²⁷



Map 4: The place of origin and rough route taken by Cantonese to southern New Zealand.

Source: Drawn from information supplied in primary source accounts of nineteenth-century Chinese migration.

Gold-mining: Moving mountains and rivers

In the nineteenth century, most Chinese coming to New Zealand first arrived in Otago, even if they later moved into other areas. Otago's Chinese population peaked in 1871, at 3,715,²⁸ while New Zealand's Chinese population reached an officially recorded highpoint of 5,004 in 1881—a figure only surpassed after the Second World War. Historian James Ng, however, believes that, due to permanent departures and deaths, more Chinese came to New Zealand than censuses recorded—in fact, he believes as many as 8,000 Chinese may well have passed through New Zealand.²⁹

26 See, for example, the following letter: Labelled in pencil, Chau Pak Ch'eu'ng to [unidentified], 29 July 1889 in GAO/14, Canton Villages Mission—Staff Files—Rev GH McNeur, 1916–1919, 1984/0018, Presbyterian Archives of Aotearoa New Zealand. Translated by Sylvia Yuan.

27 Ng, *Windows*, vols. 1–4.

28 Select Committee, 1871, *Appendices to the Journal of the House of Representatives (AJHR)*, 23.

29 Ng, 'The Sojourner Experience,' in *Unfolding History, Evolving Identity*, ed. Manying Ip (Auckland: Auckland University Press, 2003), 14.

The Chinese worked in all of Otago's gold-fields, often on second-quality claims. And although they were in a minority as a whole in Otago, they came to dominate some fields for a time, such as Round Hill. Figure 3 outlines the changing character of the Chinese and European mining population. In 1871, for instance, Chinese constituted 25 per cent of Tuapeka's mining population. Although European and Chinese miners sometimes worked together, this was generally the exception rather than the norm. Most Chinese worked small claims of around two-to-five acres (0.8 to 2 hectares) in extent, involving anything from three-to-eight individuals, usually operating in clan and county groups. On these, the Chinese earned a reputation for methodically reworking abandoned European claims. Not only did Europeans keep the better claims, but the price of licences for better gold-yielding land was beyond the means of most Chinese.³⁰ For this reason, nearly all the Chinese were alluvial miners. Otago quartz reefs were few and too costly to operate (Table 1).

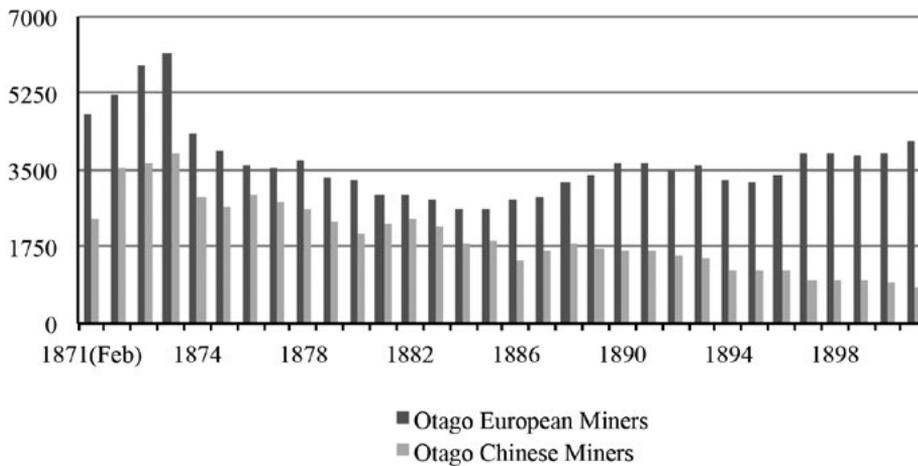


Figure 3: Otago's European and Chinese gold-mining population, 1871–1902.

Source: Drawn from information supplied in 'Table 1—Number of Chinese Goldminers in Otago', in Ng, *Windows*, 1:156.

Table 1: Numbers of Chinese and European miners involved in Alluvial and Quartz Mining in Otago, March 1877–March 1878.

Alluvial Miners		Quartz Miners	
European	Chinese	European	Chinese
3280	2585	435	35

Source: Table 9, *Appendices to the Journal of the House of Representatives* (AJHR), H4, 1878, 35.

³⁰ Neville Ritchie, 'Archaeology and History of the Chinese in Southern New Zealand During the Nineteenth Century: A Study of Acculturation, Adaptation and Change' (PhD diss., University of Otago, 1986), 53–56.

Harnessing water was essential to gold-mining, but this resource was in especially short supply in Central Otago, where in some areas rainfall averaged as little as 500 millimetres a year. In summer, streams frequently ran dry, while in winter, water was locked up as ice—added to which, in winter, it was usually too cold to mine in the higher country. Other challenges arose from the paucity of wood in the largely treeless Central Otago and the region's rugged topography of ranges and basins. Unsurprisingly, two constant refrains in the mining newspapers were a lack of water and climatic extremes slowing, or entirely halting, mining activities.

Water-races were thus vital to mining. Water permitted sluicing and the removal of mining sludge; served as a source of drinking water; and, later, provided irrigation for horticulture and agriculture. Cantonese came from a culture steeped in thousands of years of experience in controlling water, albeit in a sub-tropical environment.³¹ Despite climatic differences, the Chinese who came from Victoria to Otago, sometimes first via California, had become accustomed to building water-races in Gold Mountain and New Gold Mountain environments where water was scarce.³² Some, like Choie Sew Hoy, came to Victoria and Otago with prior experience of California's extensive waterworks, and transferred or adapted technology from one field to another (see below).³³ The technology brought by Chinese into New Zealand included, for example, the Californian Pump. According to Christopher Davey, this resembled the Chinese Pump, but instead of a belt had slats and pins.³⁴ New Zealand historian of mining technology Nic MacArthur, in contrast, states that the wooden-paddled chain-pump was known as the Chinese Pump in California, but the Californian Pump in Australia and New Zealand.³⁵

Whatever was the case, Chinese and Europeans made use of technology originating in California and Victoria—including hydraulic sluicing and hydraulic elevating. The latter—the process of forcing gold-bearing gravel upwards using high-pressure water—originated in California, and was extensively undertaken in New Zealand, including by Choie Sew Hoy and his son, Choie Kum Poy (see below).³⁶ In New Zealand, Cantonese miners, like their European counterparts, also utilised wing dams, either built of wood or stone,

31 Marks, *Tigers, Rice, Silk, & Silt*.

32 On Chinese miners in Australia, see: Sheng, 'Environmental Experiences', 115–19; Michael MacLellan Tracey, 'No Water—No Gold—Applied hydrology in nineteenth century gold mining', in *Proceedings of the Australian Mining History Association 1996 Conference*, ed. Ruth Kerr and Michael MacLellan Tracey (Canberra: Home Planet Design and Publishing, 1997), www.heritagearchaeology.com.au/Water.htm, accessed 21 February 2014.

33 For the biographies of other Cantonese who had been in California, see, for example: Alexander Don, *The Evangelist* 3, no. 9 (1 September 1871): 264; Alexander Don, *The Evangelist* 4, no. 9 (2 September 1872): 274.

34 Christopher Davey, 'The Origins of Victorian Mining Technology, 1851–1900', *The Artefact* 19 (1996): 54.

35 Nicol Allan MacArthur, 'Gold Rush and Gold Mining: A Technological Analysis of Gabriel's Gully and the Blue Spur, 1861–1891' (M.A. diss.: University of Otago, 2014), 39.

36 See, Andrew C. Isenberg, *Mining California: An Ecological History* (New York: Hill and Wang, 2005), 23–51.

or of both materials. Wing dams diverted 'a river's flow either against a bank so it could be broken down and worked', or dewatered 'one side of a creek bed so that the other side could be dry-worked'.³⁷ European and Chinese utilised the so-called Chinese Pump to accomplish this task as well. To my knowledge, no examples survive of this technology, save for a handful of images, including one of the first photographs of the Otago gold rush, of its use by Europeans, in Gabriel's Gully in 1862. The only one I am aware of depicting Cantonese in New Zealand using a Chinese Pump is Photo 1. In Nic MacArthur's opinion, 'the Chinese pump is the device in the far left centre of the image and we are looking at it end-on. It is being driven by a small waterwheel as shown by the small white race of water flowing from above it'.³⁸



Photo 1: A very rare photograph showing Cantonese miners utilising a Chinese Pump. This is on the far left, in the centre of the image and is being driven by a small waterwheel.

Source: From: Herbert Deveril, 1840–1911: *Chinese Gold Miners by the Side of the Tokomairiro River, Otago*. Ref: PA7-46-19. Reproduced with permission from the Alexander Turnbull Library, Wellington, New Zealand.

In addition to this technology, water-races were essential to sluicing, while the more complex forms of hydraulic sluicing required a significant head of water to operate. A measure of the tenacity and difficulty involved in constructing a water-race comes from a description in 1870, originally reported in the *Lake Wakatipu Mail*, of a party of some 20 to 30 Chinese 'endeavouring to bring

³⁷ Ritchie, 'Archaeology and History of the Chinese', 60.

³⁸ I am indebted to Nic MacArthur for this information. The first image of Gabriel's Gully can be found at: F. A. Coxhead, *Gabriel's Gully, 1862*, in Hocken Collections Te Uare Taoka Hākena, file name: 1309_01_014A, scan number: S07-242c S10-175a.

to light the hidden treasures of the Arrowtown Flat', on the Wakatipu gold-field. They 'deserve every credit for the enterprising manner in which they have again set in to work the ground', wrote the correspondent.

Undaunted by the complete destruction of all of their works, the party again tackled the undertaking, but on an entirely different principle. Instead of having an open tail-race, liable to be filled up by almost any fresh [rush of water] which may occur, they are now bringing in one which no flood can affect. As the race is being cut, they are covering it in with large slabs of stone[;] this is again laid over with layers of grass and fern, and finally a deep and firm coating of earth over all. As the race is being cut in the bed-rock, and is already some hundreds of feet long, an idea may be formed of the labour and perseverance necessary to complete the work[.]

The writer ended by hoping 'their efforts will meet with the measure of success [which] they richly deserve'.³⁹

Another measure of European esteem for Chinese water management was European employment of Chinese labourers, usually under Chinese contractors, to build water-races. For example, many Chinese were employed in constructing the 108-kilometre-long Mt. Ida Water Race in Central Otago, on the Mt. Ida Gold Field.⁴⁰ Europeans and Chinese also sometimes went into business together, as on the Port Water Race, on Round Hill Gold Field. Chinese contractors under Wy Kee laboured 14 months on this 22 kilometre water-race that snaked its way from George Creek, Longwood, to Round Hill (Map 5). Operated by a partnership of Wy Kee and Henry H. Port, the race (Photo 2) passed 'through heavy bush, containing much rata or iron wood'. A 'considerable portion of' it traversed rocky ground, 'necessitating the use of dynamite'. On its completion in 1889, the race was the 'largest in this district, being nearly 4ft wide on top, 3ft at bottom, and 2ft. 8in deep'. At this, Wy Kee gave 'a banquet in honour of the event'. Some '250 persons, including Europeans, were present, and from the hearty manner in which they partook of the hospitable spread served with no stinted hand one was convinced that those present did not seem to hold any anti-Chinese feelings towards Mr Wy Kee'.⁴¹

This celebration is perhaps surprising, given the developing anti-Chinese sentiment evident on Round Hill. Part of the reason for such animosity was that, as a newspaper noted in 1900, 'things were entirely in the hands of the Chinese: stores, hotel, mission church, water races, claims, and mining rights being principally controlled by them'—although, it should be noted, too, that most of the key water rights still belonged to Europeans.⁴² In the decade between the

39 *Otago Witness*, 15 October 1870, 11.

40 Ng, *Windows*, 1:318.

41 *Otago Witness*, 18 April 1889, 12. Southland Province existed from 1861 until 1870, when, owing to financial difficulties, it once again became part of Otago Province.

42 *Otago Witness*, 31 May 1900, 20.



Photo 2: 'Port's Race' [Ourewera Goldmining Co. Ltd?].

Source: Round Hill, Goldmining, Hocken Library / Uare Taoko o Hākena, University of Otago, Dunedin, c/nE2086/29.

Moving Mountains and Rivers: Mining's environmental impacts, 1870s–1880s

I have deliberately characterised this section and period 'Moving mountains and rivers', because these landforms and waterways were moving in two senses of the word: Chinese miners were literally shifting mountains of earth and realigning waterways at the same time as such landscapes were moving some Chinese to debate the nature of the environmental changes they were making.

As adduced in the discussion of the construction of water-races, gold-mining had far-reaching environmental impacts—on soil, geology, water, and vegetation.⁴⁴ At Round Hill in 1882, Don 'was forcibly struck with the change which man brings about when he puts his hand on plastic Nature. Once, no doubt, the

44 Randall Rohe, 'Mining's Impact on the Land', in *Green Versus Gold: Sources in Californian environmental history*, ed. Carolyn Merchant (Washington, D.C.: Island Press, 1998), 125–35.

valley of Stony Creek was as beautiful as any of its neighbours with its mossy banks and graceful fern[-]trees; now it is a chaos of boulders, upturned trees, and sludge'.⁴⁵

Such a description is borne out by photographs of the area at the time. Photo 2, of Port's water-race, incidentally depicts the deforestation and sludge resulting from sluicing (in the background of the image is the aqueduct bringing water into the gold-field). Images of the town of 'Canton', at Round Hill (Photo 3) also illustrate sluicing's environmental effects, most notably in creating a large ridge, on which the Chinese settlement precariously sits.



Photo 3: 'Canton', Round Hill, 10 January 1903.

'The village consists of about thirty Chinese buildings,' including huts, 'stores and opium smoking and gambling-houses. The largest house, and the only two-storied one, is a tea shop or restaurant, and belongs to a Riverton firm'.⁴⁶

Source: 'Canton', 'Icabod', Round Hill Goldmining, 1903, Hocken Library / Uare Taoko o Hākena, University of Otago, Dunedin, c/nE2407/16.

Round Hill was an exception among Otago's gold-fields in having plentiful wood supplies, as a result of its location in Longwood Forest. Although the trees of Longwood Forest provided building material and fuel vital to the gold-mining industry, they also impeded mining, and threatened life and limb. The winning of gold necessitated deforestation to enable miners to get at the precious ore underneath, while the timber also provided fuel and building material. For example, in 1882, Don testily noted in his diary, Round Hill Chinese busy cutting timber on the Sabbath,⁴⁷ while the *Southland Times* in 1888 recorded Chinese employing Europeans to cut and sledge firewood.⁴⁸ But mining in such

45 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 July 1882, 6.

46 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 July 1882, 6.

47 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 October 1882, 67.

48 *Southland Times*, 26 July 1888, 3.

a forested area created its own hazards. On 1 December 1883, Don records a 17-year-old Chinese miner, killed ‘while felling a tree’—sadly only one of several such fatalities resulting from similar ventures.⁴⁹

The other gold-fields of Otago were characterised by a scarcity of a commodity vital to gold-mining, as an 1869 newspaper described:

In every branch of the pursuit [of gold-mining]—and there are many—timber is an essential requisite. Deep leads cannot be reached except by means of shafts and drives heavily slabbed [sic] with timber from the surface downwards; [gold] dredges are constructed of timber; the races which convey water for many miles are connected by means of fluming made of timber; quartz reefing could not be carried on, nor could bank sluicing, hill sluicing, or ground sluicing be made to pay, without the assistance of wooden appliances.⁵⁰

Firewood also warmed miners during Otago’s cold and long winters.⁵¹

On all of the gold-fields except for Round Hill, then, mining ran into problems because of Otago’s relatively scant timber resources.⁵² Centuries before European arrival, Māori had removed much of the forest of the east coast of the South Island (Map 1). This meant that miners in the Maniototo (Mt. Ida Gold Field) had to rely on timber milled at Hawkesbury Bush, north of Dunedin. ‘Miners in the valley of the Clutha, Manuherikia, and the Dunstan, have to depend upon the supply brought from Tapanui’, while those ‘in the upper valley of the Clutha, at Cromwell, Nevis, Arrow, and the Shotover, have to depend upon the Earnsclough bush at the very head of Lake Wakatipu.’⁵³ Baltic, North American, and Australian timbers were also imported for mining, and this trade is representative of how Chinese miners, like their European counterparts, contributed to creating timber demand in other parts of Otago—and the rest of the world—through gold-mining.

If forests and vegetation were removed for mining, then sluicing itself altered watercourses and polluted waterways. As on other gold-fields around the world, hydraulic sluicing in New Zealand considerably accelerated environmental change by enabling ‘a few miners to accomplish in weeks what formerly

49 Alexander Don, ‘Our Chinese Mission’, *The New Zealand Presbyterian*, 1 December 1883, 106. Note also, another death: Alexander Don, ‘Our Chinese Mission’, *The New Zealand Presbyterian*, 1 January 1884, 124.

50 *Otago Witness*, 18 September 1869, 2.

51 Otago holds the record for the coldest and hottest temperatures recorded in New Zealand. On its climate extremes, see Julian Kuzma, ‘The 1895 Snowstorm’, *ENNZ: Environment and Nature in New Zealand* 9, no. 1 (2014): 79–103; *Climate, Science, and Colonization: Histories from Australia and New Zealand*, ed. Beattie, O’Gorman and Matt Henry (New York: Palgrave Macmillan, 2014).

52 See Neil Clayton, ‘Settlers, politicians and scientists: Environmental anxiety in a New Zealand colony’, *ENNZ: Environment and Nature in New Zealand* 9, no. 1 (2014): 20–21, 29–39.

53 *Otago Witness*, 18 September 1869, 2.

required a hundred men months to do'.⁵⁴ For example, at Waikaia (then known as Switzers), on the Nokomai Gold Field, Central Otago, Sue Ting managed the Argyle Water Race Co., which had been bought from Europeans. In 1885, with great technical skill and at no small expense, Chinese extended it considerably into an adjacent gully at the cost of £1,500.⁵⁵ This necessitated diverting a creek from 21 kilometres away, and piping it cross a deep gully. In increasing and establishing a permanent water supply, 16 Chinese miners:

are now at work washing away a whole hill. Once the water has been brought to the ground and a tail race provided for its escape downwards, the work is easy. A long canvas hose comes over the face. The water discharged from the nozzle quickly eats away deep incisions below. The top ground falls down, and the whole lot is speedily washed down the race, the gold being caught in the various places provided for its reception. Just as we were watching the operations at one of the faces of the Argyle claim a fall came thundering down, containing probably a hundred cart loads of stuff, but this is nothing to what can be done, seeing that the faces are as much as 75 feet deep, and that the ground is simply drift without much cohesion.⁵⁶

The Argyle Claim exhibited another 'ingenious [Chinese] contrivance' unfamiliar to European observers: this was the placement of boxes, about two feet wide, '[a]t intervals down the hill, and in a regular series of gradations'. They were covered with blanketing, over which the miners had placed 'a series of flexible transverse iron bars'. As the correspondent for the *Mataura Ensign* explained: 'The agitation of the material passing over these keeps them constantly vibrating, and the stuff below is thus not allowed to set, but is what is technically called kept alive.'⁵⁷ Like Round Hill, this area was worked primarily by men from Panyu and exhibited the environmental effects of removing hillsides. These included the removal of large volumes of topsoil and rocks, changes to river channels, and siltation of areas downstream.

Round Hill Chinese undertook significant sluicing and tunnelling, but, as noted, from about 1890, European interests, backed by greater capital enabling operations much larger in scale, increasingly took over the gold-field. In 1882, the *Otago Witness* noted how, through sluicing, 'a large amount of ground is worked by the Chinamen by tunnelling out the washdirt, and washing it in whatever drainage water they can get hold of. The bulk of the sludge goes down the Orawera [sic] Creek to Whakapatu Bay, the rest into Lake George'

54 Rohe, 'Mining's Impact on the Land,' 130.

55 Ng, *Windows*, 1:175, footnote 184c.

56 *Mataura Ensign*, 24 January 1888, 4.

57 *Mataura Ensign*, 24 January 1888, 4.

(Figure 2). As a result of mining, '[t]he whole of the Orawera [sic] flat is sludged up, and the creek itself has disappeared, there being only about [a] 50 feet fall in four miles'.⁵⁸

Both Lake George/Uruwera and Whakapatu Bay suffered from the effects of pollution, the more so since miners also used quicksilver (mercury). In 1882, a reporter for the *Otago Witness* regretted mining's effects on Lake George, 'a pretty piece of water ... [whose] surface is generally dotted with black swan and wild duck'. 'It seems a pity', observed the author, 'that this lake should be destroyed [by this means], but I am afraid it is inevitable.'⁵⁹ Despite the author's fears, in 1888, another *Otago Witness* reporter noted that 'the primeval forest' that 'embosomed' the 91-hectare lake will 'soon, alas ... be the prey of the woodman's ruthless axe', indicating perhaps that the decline in quality of this water body had not been quite so dramatic as the earlier reporter had noted.⁶⁰ Nevertheless, recent scientific monitoring of the lake has revealed 'substantial sediment infilling of the lake bed' resulting from '[h]istorical gold mining activities in the lake's catchment'.⁶¹

Chinese expressed a variety of views on the environmental changes wrought by mining, and on the landscapes they encountered as miners. In walking with an unnamed Chinese miner from the township of Riverton to Round Hill in 1882, Don recorded that the two travellers passed through dense forest. Along the way, Don paused to observe the 'many fern tree gullies, and the banks covered with moss and ferns', and reflected that '[a]s population increases[,] the trees and scrub will, of course, decrease in quantity'. Don contrasted his attitude with that of the majority of Cantonese miners—for, as he perceived it, 'out of a hundred Chinese perhaps ninety-nine have not the slightest relish for the beauties which met us at every turn of this road'.⁶² His comment, of course, could have been equally true of the attitudes of the majority of European miners.

Later that year, again at Round Hill, Don recorded an instance illustrating some miners' awareness of the environmental destruction they were causing. 'Tsaam' and 'Tsang' informed Don that while 'it would never do to dig for gold in China ... in New Zealand it mattered not, as it had only been "opened" for a few years.' This was, they explained, because 'there is no *fung shui* [sic] in New Zealand' since it 'is *tei wan* (of earthy nature?) while China is *t'in wan* [sic] (of heavenly nature?)'. In traditional China, *fengshui* provided a system and set of rituals

58 *Otago Witness*, 7 October 1882, 11.

59 *Otago Witness*, 7 October 1882, 11.

60 *Otago Witness*, 9 March 1888, 14.

61 Marc Schallenberg and David Kelly, *Ecological Condition of Six Shallow Southland Lakes*, Report No. 2198 (Nelson: Cawthron Institute, 2012), 1.

62 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 July 1882, 6.

for managing human–nature relations,⁶³ according to which, ‘land forms and bodies of water direct the flow of the universal *qi*, or “cosmic currents” in both propitious and inauspicious ways.’⁶⁴

The opinion of some Chinese at Riverton, the largest settlement near the Round Hill diggings, contradicted the views of Tsaam and Tsang. ‘[O]wing to the arrangement of the hills and rivers about Riverton’, Chinese here believed that they enjoyed ‘good’ *fengshui*.⁶⁵ For those versed in its principles, Riverton, a town nestled amidst hills overlooking water, presented a very favourable situation indeed.⁶⁶ Chinese also regarded Dunedin’s Octagon as lucky because the number eight—corresponding to the Octagon’s number of sides—sounds similar to the character forming part of the word meaning ‘to prosper’ or ‘to grow wealthy’.⁶⁷ Another fascinating insight into attitudes towards environmental change is the opinion among some Cantonese who attributed ‘the increasing mildness of the Southland climate to the presence of Chinese in the country’, possibly a reference to the similar European view that cultivation and deforestation lessened rainfall and increased temperatures.⁶⁸ The environmental effects of Chinese mining operations, especially in their skilled use of water, caused considerable environmental impacts in Otago that elicited a variety of attitudes towards the Otago landscape and its modification.

‘Hungry dragons’:⁶⁹ The dredging boom and mining–agriculture tensions, late 1890s–1910s

By the late nineteenth century, many colonists were starting to question the environmental impacts of mining on agricultural land, especially following the dredging boom of the 1890s, which was started by the Chinese entrepreneur

63 I have struggled to find appropriate or even approximate terms for Chinese concepts of the non-human world. On the epistemological problems of translation of the term ‘nature’, see Robert P. Weller, *Discovering Nature: Globalization and Environmental Culture in China and Taiwan* (Cambridge: Cambridge University Press, 2006), 19–42. On wider issues of translated terms and concepts used in environmental history, see Beattie and Ts’ui-jung Liu, ‘Environment, Modernization and Development in East Asia: Perspectives from Environmental History’, *Environment, Modernization and Development in East Asia: Perspectives from Environmental History*, ed. Beattie and Liu (Basingstoke: Palgrave Macmillan, forthcoming), no pages.

64 Ole Bruun, ‘The Fengshui Resurgence in China: Conflicting Cosmologies Between State and Peasantry’, *China Journal* 36 (1996): 48.

65 Alexander Don, ‘Our Chinese Mission’, *The New Zealand Presbyterian*, 1 July 1882, 7.

66 For greater detail of such views, see: *Chinese Landscapes: The Village as Place*, ed. Ronald G. Knapp (Honolulu: University of Hawai’i Press, 1992); Evelyn Lip, *Feng Shui: Environments of Power: A Study of Chinese Architecture* (London: Academy, 1995).

67 On this, see Beattie, ‘Eco-cultural Networks’.

68 Alexander Don, ‘Our Chinese Mission’, *The New Zealand Presbyterian*, 1 September 1883, 47. On European ideas of climate change, see Beattie, *Empire and Environmental Anxiety*; on Chinese, Mark Elvin, ‘Who Was Responsible for the Weather? Moral Meteorology in Late Imperial China’, *Osiris*, 2nd ser., 13 (1998): 213–37.

69 *Tuapeka Times*, 8 September 1906, 3.

Choi Sew Hoy. Dredging revived a flagging gold-mining industry, but also accelerated the ecological and landscape impacts of mining. Moreover, it threatened the prevailing ideology of closer land settlement and the nascent fruit-growing industry in Central Otago.⁷⁰

To contextualise these impacts, it is necessary to examine existing mining regulations, which magnified tensions between mining and agricultural interests. Gold-mining, notes historical geographer Terry Hearn, 'employed the law of capture to allow mining law, resolve disputes and collect taxes. These private water user rights differed sharply from private property rights, which included rights of possession, use, management, income, security, capital, transmission and absence of term'. Effectively, New Zealand's gold-mining regulations permitted miners to foul waterways and despoil agricultural land.⁷¹ The later introduction of mining regulations in California and Victoria that required miners to restore and revegetate damaged agricultural land merely stoked debates on its necessity in New Zealand.⁷²

Mining's merits versus agriculture were crystallised in an impassioned article that presented mining as an activity inimical to the welfare of the country. It also raised particular concerns about the increasing use of dredges, and their ability to dramatically transform landscapes. In 'Paying Too Much for the Golden Whistle' (1906), the author contrasts mining and agriculture.

Where the one aims at the extraction of the organic wealth of the soil by assisting the slow process of vital development, the other seeks for the inorganic material of divers kinds lying hidden in the bowels of the earth which may be made useful in maintaining the arts and crafts by which civilisation is supported and embellished. Primarily, agriculture seeks to produce food, clothing, and other comforts, while mining seeks to obtain the raw material from which is manufactured the machinery whose use furthers the production and exchange of the food, clothing, and other comforts of civilised life.⁷³

Although mining might well represent the best use of poor quality land, a balance needed to be struck between mining and agricultural interests to ensure the Colony's long-term prosperity. Since New Zealand's soils were productive, the author argued, agricultural land should be protected from mining. Already, he continued, as a result of hydraulic sluicing and dredging, '[i]mmense masses

70 In response to agitation from increasing numbers of land-hungry settlers, a key manifesto of the Liberal Government (1891–1912) involved land nationalisation, the breaking up of the larger estates for closer settlement: Tom Brooking, *Lands for the People? The Highland Clearances and the Colonisation of New Zealand: A Biography of John McKenzie* (Dunedin: Otago University Press, 1996).

71 Terry Hearn, 'Mining the Quarry', in *Making a New Land*, 106–21 (quote at 108); and Bruun, 'Peasantry', *China Journal* 36 (1996): 48. See also, Susan Lawrence and Peter Davies, 'The Sludge Question: The Regulation of Mine Tailings in Nineteenth-Century Victoria', *Environment and History* 20 (2014): 385–410.

72 Hearn, 'Mining the Quarry', 109–10, 117; Isenberg, *Mining*, 23–51.

73 *Tuapeka Times*, 8 September 1906, 3.

of rich cultivable soil have been torn up and buried under heaps of worthless clay and gravel, and much good land on the banks of streams has been rendered temporarily valueless by deposits of raw sludge and silt'. Dredging, in particular, was responsible for converting 'many a smiling green field into a brown stony waste', into which 'the rude and harsh vegetation of gorse, broom, thistles, and ragwort' invade; only once they have 'loosen[ed] and suppl[ied] humus' to the soil, can they be cleared and an attempt made to bring cultivation to the area. By this means, the 'gnawing scoop of the dredge-bucket, and the vicious volleys from the hydraulic nozzle' have converted many 'splendid patches of fruitful land ... into utterly irreclaimable wildernesses'. The author likened a dredge's operation on the Island Block—located between Lawrence and Roxburgh along the Clutha River—to 'hungry dragons voraciously biting off huge chunks of this superb land'. Dredging removed 726,000 cubic yards of soil per year, effectively destroying the equivalent of '£36,000 worth of soil' annually 'in order to get £5,000 worth of gold'.⁷⁴

The dredging boom was started by the Chinese entrepreneur, Choie Sew Hoy, with his second son, Choie Kum Poy (1867–1942). They modified existing mining technology to develop the first dredge in New Zealand whose protruding central ladder of buckets and shallow draught enabled it to work river beds, beaches, and flats. With modifications, the design became known as the New Zealand Gold Dredge, a prototype for gold and tin dredges around the world.⁷⁵

Sew Hoy began two dredging companies in 1889; the first was a private company which changed into a public company that successfully worked out its claims before undergoing liquidation. This first one sparked the initial dredging boom. In 1889, Sew Hoy and his son also began another—the Nokomai Hydraulic Sluicing Company—that was a great success, operating under various names until 1943.⁷⁶

For the second venture, which ushered in considerable environmental change in New Zealand and elsewhere, Sew Hoy made use of New Zealand financial systems, as well as expertise and environmental knowledge. He also utilised labour and capital from China, New Zealand, and other New Gold Mountain countries. For example, in 1889, Sew Hoy relied heavily on settler capital to publically float the Sew Hoy Big Beach Gold Mining Company—with a nominal capital of over £87,000, although subsequently revised to £72,000—as a means of taking over from the private Shotover Big Beach Gold Mining Company (mentioned above). After its successful float, Sew Hoy became director and

74 *Tuapeka Times*, 8 September 1906, 3.

75 Ng, *Windows*, 1:316.

76 See Ng, *Windows*, 1:315–20; Terry Hearn and Ray Hargreaves, *The Speculator's Dream: Gold Dredging in Southern New Zealand* (Dunedin: Allied Press, 1985), 12; Ritchie, 'Archaeology and History of the Chinese', 59.

James Gore assumed the chair of the public company. It soon commissioned three large new dredges from a European firm in Christchurch, costing £11,000 in total. As a result of its large yields, the Company was among the first—if not the first—dredging company to seek public listing in New Zealand. Through inexperience in this process, however, it over-capitalised, and so paid poor dividends. Within only a few years, its dredges proved too small to mount the new machinery demanded by the need for ever more powerful dredges.⁷⁷

The successor to this venture, the Nokomai Hydraulic Sluicing Company (Photo 4), yielded much higher returns for investors. It, too, relied on Chinese and European investment for funding, using European and Chinese mining engineers and workers to operate it. Investments from profits made from this, and Sew Hoy's many other enterprises, contributed to the development of other mining ventures, with further environmental impacts. Sew Hoy owned three short-lived quartz mines, again backed by European and Chinese capital, but using Chinese labour. He also controlled 175 hectares of river claims, developed a significant water-race running from Lauder Creek to Becks and, with P. Beer and R. Glenn, owned the Golden Stream Water Race Company, which supplied water to 'part of the Kyeburn Diggings'.⁷⁸

In response to the dredging boom set off and sustained by Sew Hoy, government faced mounting pressure from agricultural interests and land-hungry settlers to regulate and restrict mining's damaging effects. Despite this pressure, government largely continued to support mining interests by introducing piecemeal legislation, none of which significantly restricted mining operations. For example, under Section 12 of the Mining Amendment Act of 1919, miners wishing to operate dredges had to first apply 'to the local Commissioner of Crown Lands for assessment of the agricultural value of the land, and ... to impose such conditions as were necessary "to prevent, so far as practicable, the destruction of the surface of the land or the rendering of it unfit for pastoral or agricultural purposes"'. Yet this legislation did not apply to freehold land. Nor did it provide the facility for reserving or protecting land destroyed by mining.⁷⁹ At the same time, government tried to placate private landowners. The Rivers Commission of 1900–01, established due to pressure from claimants, attempted to ascertain the nature of mining needs and, where appropriate, proclaim watercourses suitable for mining purposes. It also paid compensation to litigants whose land was affected by mining: by March 1907, the Commission had paid out £51,000 in compensation, an indication of the seriousness of mining's impacts on other land uses.⁸⁰

77 Ng, *Windows*, 3:272–83.

78 Ng, *Windows*, 1:315–16.

79 Hearn, 'Mining the Quarry', 117–18.

80 Hearn, 'Mining the Quarry', 110.



Photo 4: 'Sew Hoy's Claim, Nokomai'.

Source: *Otago Witness*, 5 December 1900, 28.

Notwithstanding compensation payments, the Rivers Commission's findings and recommendations illustrate the extent of mining damage consequent on hydraulic sluicing and dredging, and stress officialdom's general disregard for mining's environmental effects. For example, contrary to extensive evidence reported in newspapers, the Commission disingenuously reported that '[i]n working the alluvial drifts by dredges in the beds of streams there is no likelihood of any damage being done to land held by settlers along the banks, as a dredge merely trenches up the gravel in the bed and deposits it again in nearly the same place'. Similarly, it casually noted that 'seeing that some of the principal rivers have been used as main channels to carry off the waste water and silt from gold-workings during the past thirty-nine years', it saw no need 'to recommend that the Clutha, Kawarau, Dunstan, Manuherikia, and Shag Rivers be proclaimed

watercourses into which tailings, debris, and waste water from mining claims may be discharged'.⁸¹ It seemed politically sensible to keep quiet rather than to condone a dubious practice that was already well established.

That Chinese miners contributed to this pollution is in no doubt. As noted, Sew Hoy's investments and improvements in dredging technology substantially accelerated environmental change, as did the operations of Chinese miners engaged in more capital-intensive operations. Photo 5 illustrates the effects of Chinese sluicing and elevating on Spec Gully, near Naseby, on the Mt. Ida Gold Field. Note, especially, the deep gullying caused by the operations, including the removal of topsoil and underlying rock, as well as the diversion of water.



Photo 5: James Ng identifies the individuals as (left to right): Sue/Sew Hoy, G. H. McNeur, and Shum Bun.⁸²

Source: 'Sluicing on the gold-field at Spec Gully in Naseby, shows miners and Rev. George H. McNeur'. McNeur Collection: Photographs of Chinese goldminers who worked in Otago and Southland gold-fields. Ref: 1/2-019157-F. Alexander Turnbull Library, Wellington, New Zealand.

81 *AJHR*, H-21, vol. 1, 1901, 6.

82 Ng, *Windows*, 1:246.

Eco-cultural networks: Commodity and raw material exchanges

These examples of mining enterprises illustrate that Chinese were agents of environmental transformation, willing to contribute 'to the same urge to transform colonial nature into commodities' as colonists 'and, to varying degrees, Māori'.⁸³ Chinese miners seized the opportunities presented by New Zealand's shipping connections and availability of land. They utilised its legal apparatuses and financial systems, and grafted them, in varying ways, onto their own networks of expertise and knowledge drawn from China and elsewhere. This was as apparent on the scale of small, clan-based mining claims as it was in the large-scale operations of wealthy merchants like Choie Sew Hoy.

Like several other merchants, Sew Hoy's warehouses supplied gold-fields Chinese, and some Europeans, with goods from China and elsewhere. Merchants like Sew Hoy provided vital support to Chinese going to the gold-fields; in Sew Hoy's case, to men from Panyu. Their stores operated as bridgeheads into the interior for incoming Chinese. Merchants supplied goods and services, such as accommodation, loans, and advice to Chinese miners, as well as 'gambling and opium smoking ... cooked meals and alcohol, a meeting place and an informal "news exchange" ... and usually services such as interpreting and letter writing'.⁸⁴ They also often provided medical treatments, as well as ingredients for use in traditional medicines.⁸⁵ By the 1880s, there were at least 40 Chinese storekeepers.⁸⁶ Archaeological evidence—and advertisements from the time—demonstrate the local and international resource demand created by Chinese mining.

Chinese miners' resource demands had environmental impacts locally, nationally, and internationally. Overseas resource demand developed environmental exchanges and furthered environmental exploitation and investment in China and New Zealand, connections reinforced through the export of New Zealand natural products to China.⁸⁷ For example, Sew Hoy's investment in other mining operations and ventures brought further environmental impacts. Although Sew Hoy's business dealings were unusual, because of the large capital he had available and in the associations he developed with European investors, most

83 Beattie, 'Eco-cultural Networks', 165.

84 Ritchie, 'Archaeology and History of the Chinese', 37.

85 Ng, *Windows*, 1:200–201; Beattie, 'Eco-cultural Networks', 161.

86 Ritchie, 'Archaeology and History of the Chinese', 34.

87 Beattie, Melillo, and O'Gorman, 'Introduction: Eco-Cultural Networks and the British Empire, 1837–1945', in *Eco-Cultural Networks*.

small-scale Chinese operations, even with relatively little capital and reliant on Chinese investment, created local and international resource demand, with resulting environmental impacts.

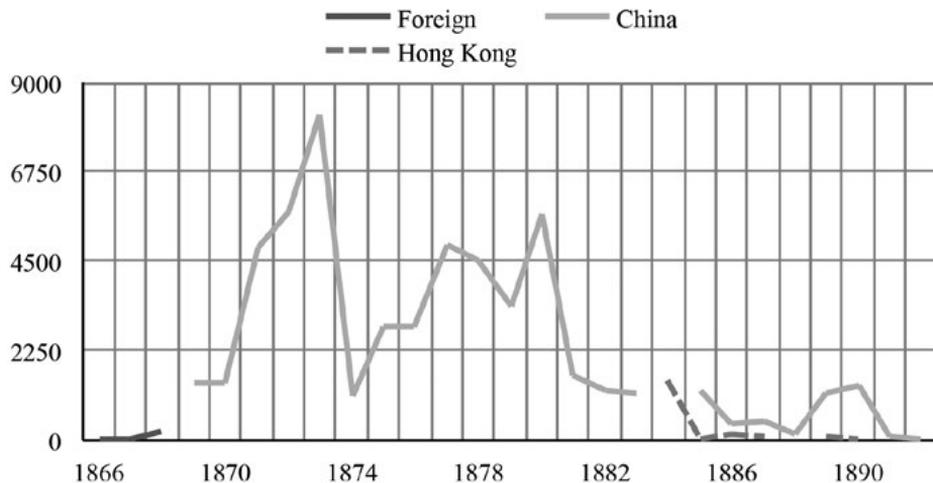


Figure 4: Gold exported from New Zealand to Hong Kong and China in ounces, 1866–1901.

Source: 'Table 7—Gold Exports to China', in Ng, *Windows*, 1:349.

It is as difficult to chart the specific domestic and overseas environmental impacts resulting from the demand for goods from New Zealand-based Chinese as it is to discern the associated services and labour flows which underpinned them. Such an undertaking requires investigation of resource chains associated with particular commodities, a process I have only just begun to untangle as part of research on a manuscript on which I am presently working.⁸⁸ Nevertheless, an outline of some of the goods consumed by Chinese miners in New Zealand offers a starting point for considering some of the interlinked environmental, social, and economic dimensions of Chinese migration.

Chinese imported much of their food and drink, and other daily items, including medicine, from their homeland and elsewhere. This included everything from rice (Figure 5)—mainly from Australia, India, Java, and from the 1880s, Japan and Hong Kong⁸⁹—and ceramics, along with newspapers, writing tools, coins, and opium (Figure 6).⁹⁰ Among the Chinese, rice, as Don observed, 'is the stuff [sic] of life, and occupies greater prominence than any single dish among

88 At this stage a working title is *South China–New Zealand Environmental Connections: Market Gardening, Gold Mining and Guangdong's 'Guiqiao' Landscapes*.

89 Ng, *Windows*, voll, 355, note 29a. See also, E. O'Gorman, 'Experiments, Environments, and Networks: Commercial Rice Cultivation in South-Eastern Australia, 1900–1945', in *Eco-cultural Networks*, 233–62.

90 Ritchie, 'Archaeology and History of the Chinese', 155–710.

ourselves, being eaten at least twice and sometimes thrice a day'. Sometimes, it would also be accompanied by 'pork, cabbage, mutton, celery, onions, fish (fresh and preserved), pickles, turnips, fowl, potatoes, duck, &c. At a "small meal" sometimes only pastry is eaten'.⁹¹ More commonly, however, miners in New Zealand ate simple meals of rice, often served with a small portion of meat or, more rarely, preserved fish.⁹² Occasionally, more luxurious items were sold in Chinese warehouses. Don ate moon-cakes, presumably locally made.⁹³ At his Round Hill store, the *Otago Witness* reporter noted that its proprietor, Wong Young Wah, offered the reporter 'cum quots [sic], preserved plums, and other Chinese delicacies, which we find very grateful [pleasing] to our European palates'. The reporter also recorded some 'queer-looking objects' dangling from the roof, including 'deer's feet, dried serpents, and other indescribable atrocities', an illustration of the importance of imported items in Chinese traditional medicine.⁹⁴ Very rarely did Chinese use locally grown plants in preparing their medicines.⁹⁵



Figure 5: Rice imports into New Zealand.

Source: 'Table 9—Rice Imports', in Ng, *Windows*, 1:350.

91 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 December 1882, 104.

92 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 October 1882, 66.

93 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 November 1884, 85.

94 *Otago Witness*, 9 March 1888, 4.

95 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 1 August 1882, 28.



Figure 6: Opium imported into New Zealand, 1866–79.

Source: 'Table 10—Opium Imports', in Ng, *Windows*, 1:351.

Demand for perishables, such as hens and wild-fowl, pigs, and cattle, as well as eggs, bread, sugar, and flour was satisfied locally.⁹⁶ Most Chinese supplemented this diet with produce grown in a domestic vegetable garden or orchard. Indeed, among the gold seekers, the Chinese were unusual in that most miners had a garden—including even the poorest living in the most ramshackle of abodes (Photo 1.6).



Photo 6: Unidentified Chinese man and the Rev. Alexander Don outside a dwelling and vegetable garden in Waikaia (also known as Switzers).

Source: 'Chinese man and Reverend Alexander Don outside a dwelling in Waikaia'. McNeur Collection: Photographs of Chinese gold miners who worked in Otago and Southland gold-fields. Ref: 1/2-019146-F. Reproduced with the permission of Alexander Turnbull Library, Wellington, New Zealand.

⁹⁶ Ritchie, 'Archaeology and History of the Chinese'; A. Piper, 'Chinese Diet and Cultural Conservatism in Nineteenth-century southern New Zealand', *Australian Journal of Historical Archaeology* 6 (1988): 34–42.

In addition, Chinese introduced seeds and bulbs of plants familiar to them from their homeland, as well as growing vegetables commonly found in colonial New Zealand, especially potatoes. In 1883, for example, Don '[c]aught up with a man carefully carrying a stock of turnip seed grown in China; the seed, like all other Chinese productions, he considered immensely superior to the foreign article'.⁹⁷ Box-thorn is likely to have been cultivated by Chinese, who ate its leaves.⁹⁸ Bok Choy, and Pak Choi, as well as rhubarb, and chives, and bean sprouts were also commonly available.⁹⁹ Chinese grew vegetables eaten by Europeans—potatoes, peas, carrots, etc.—for their own table,¹⁰⁰ but appreciated aesthetic varieties too. At Round Hill, 'Banner of Joy' proudly showed Don his neighbour's rose bush.¹⁰¹ Indeed, Chinese market gardeners were also probably the first to introduce several ornamentals from China into New Zealand. For example, in 1871, the gardener Wong Koo displayed 'Chinese Narcissus', possibly *Narcissus tazetta* var. *chinensis* (Chinese Sacred Lily or daffodil) at the Dunedin Horticultural Society, winning a special prize for them. This is the first recorded mention of the Chinese Sacred Lily in New Zealand.¹⁰²

Many Chinese market gardeners entered—and won—horticultural and sometimes floricultural competitions run by Europeans. By the latter nineteenth century, they also supplied colonial towns with most of their vegetables.¹⁰³ The grudging respect accorded to Chinese miners by colonists applied equally to Chinese market gardeners:

There is no class of people on the face of the earth that can take more out of a half-acre of good soil than the Chinese—every inch of surface is brought into requisition and nothing is wasted. With all other conditions equal, John Chinaman will make more out of one acre than John Bull will out of double that area.¹⁰⁴

As I have shown in much greater detail elsewhere, Chinese market gardening, just like Chinese mining, was an important source of environmental change in New Zealand, but an activity which also encouraged cultural and intellectual interactions otherwise prevented by linguistic and racial divisions. Chinese vegetable sellers, and later fruit shops, were a commonplace sight—and an integral part of the colonial economy. Market gardening and vegetable selling afforded Europeans an opportunity to judge and criticise Chinese, but at other

97 Alexander Don, 'Our Chinese Mission', *New Zealand Presbyterian*, 1 January 1883, 127.

98 Ng, *Windows*, 1:338, note 143g.

99 Ng, *Windows*, 1:341, notes 151a, 151b.

100 Beattie, 'Empire of the Rhododendron'.

101 Alexander Don, *New Zealand Presbyterian Chinese Mission: Twenty-first Inland Otago Tour, 1907–1908* (Dunedin: Otago Daily Times, 1908), 5.

102 Beattie, 'Eco-cultural Networks', n. p.

103 Beattie, 'Empire of the Rhododendron', 251–57.

104 *Tuapeka Times*, 7 August 1886, 2.

times a chance to praise their practices, share garden cultures, and foster economic transactions and cultural exchanges among them, and sometimes with Māori too.¹⁰⁵ Indeed, the employment of Māori in Chinese market gardens in northern New Zealand led to more permanent Chinese–Māori relations through intermarriage, to the outrage of some in colonial New Zealand.¹⁰⁶ On the Otago gold-fields, too, it is likely that the fresh vegetables supplied by Chinese market gardeners helped stave off scurvy.¹⁰⁷

Chinese gold-fields stores, and restaurants, also catered to European customers. For example, at Cromwell, in 1881 Kum Good Wa described himself as a ‘Chinese Storekeeper and Fancy Goods Warehouseman’. He advertised ‘On Sale ... at Prices which will command a regular market, Teas, Sugars and General Groceries for English as well as Chinese customers’.¹⁰⁸ European storehouses also imported Chinese goods, as shown in the advertisement reproduced in Photo 7. Imports for a European market included Chinese tea, which remained very popular in early colonial New Zealand until a gradual shift towards the consumption of tea grown in Ceylon (Sri Lanka) and India from the 1850s, a trend also reflected across the British Empire.¹⁰⁹

Aside from gold (Figure 4), vast quantities of New Zealand resources were also exported overseas. The entrepreneur Chew Chong (c. 1830–1920) amassed a fortune by exporting the edible tree fungus—*Auricularia polytricha* (Photo 8)—that grew in abundance in the North Island’s forests, particularly on rotting logs. Chew Chong collected the fungus from colonists and Māori, and, once dried, sent it to Dunedin for export to China—with some also being sent to New South Wales.¹¹⁰ Most likely this operation took place in conjunction with a number of Chinese merchants, including Choie Sew Hoy—at the very least, Sew Hoy was involved in shipping the fungus, as was Chan Ah Chee (1851–1930, but

105 On the nineteenth century, see: Beattie, ‘Eco-Cultural Networks’; Beattie, ‘Empire of the Rhododendron’. On the twentieth century social interactions, see Lily Lee and Ruth Lam, *Sons of the Soil: Chinese Market Gardeners in New Zealand* (Pukekohe: Dominion Federation of New Zealand Chinese Commercial Growers Inc., 2012).

106 ‘Report of the Committee on the Employment of Maoris on Market Gardens’, *AJHR*, G-11, 1929, 5; J. B. J. Lee, *Jade Taniwha: Māori-Chinese Identity and Schooling in Aotearoa* (Auckland: Rautaki Ltd, 2007); M. Ip, *The Dragon & the Taniwha: Māori & Chinese in New Zealand* (Auckland: Auckland University Press, 2009); Jessica Heine, ‘Colonial Anxieties and the Construction of Identities: The Employment of Maori Women in Chinese Market Gardens, Auckland, 1929’ (M.A. diss., University of Waikato, 2006).

107 Ng, personal communication.

108 *Cromwell Argus*, 17 May 1881, cited in Ritchie, ‘Archaeology and History of the Chinese’, 36.

109 Melillo, ‘Empire in a Cup: Imagining Colonial Geographies through British Tea Consumption’, in *Eco-cultural Networks*, 68–91. Over the nineteenth century, New Zealand colonists remained avid tea drinkers, out-sipping all other colonial consumers per head of population in the 1860s and 1870s. Tony Ballantyne, ‘India in New Zealand: The Fault Lines of Colonial Culture’, in *India in New Zealand: Local Identities, Global Relations*, ed. Sekhar Bandyopadhyay (Dunedin: Otago University Press, 2010), 24–25.

110 No. 2. Mr. W. Townsend to Mr. W. Seed. (No. 8.) Custom House, New Plymouth, 15 March 1873, in ‘Exportation of Fungus to China (Correspondence Relative to)’, H-39, *AJHR*, 1873, 1.

commonly known as Ah Chee) in Auckland.¹¹¹ The fungus generated significant export revenue for Chew Chong and the others involved in the industry; from 1880 to 1920 New Zealand fungus exports totalled £401,551.¹¹²

Sales by Auction.

WEDNESDAY, OCTOBER 23,

**NEW SEASON TEAS,
MATTING,
PRESERVED GINGER,
CHOWCHOW & GUMGNOTS,
&c. &c. &c.**

EX 'WAVERLEY,'
FROM CHINA DIRECT.

STANNUS JONES

Has received instructions from the Importers, Messrs. CRUICKSHANK, SMART, & Co., to sell by public auction, at his Mart, Brunswick Buildings, on Wednesday next, October 23rd, at 11 o'clock,

THE CARGO OF THE 'WAVERLEY,' consisting of—

M A T T I N G.

'Waverley,' C. S. & Co. (in diamond)—
100 rolls, 4-4, Red and White, each 40 yards
50 ditto, 4-4, White, each 40 yards

T E A & S.

'Waverley,' C. S. & Co. (in diamonds)—
25 chests Finest Congou
50 ditto ditto ditto
75 ditto ditto ditto
25 ditto ditto ditto
75 half chests ditto ditto
150 ditto ditto ditto
150 ditto ditto ditto
100 ditto ditto ditto
35 ditto ditto ditto
15 ditto extra fine Souchong congou
5 ditto Gunpowder
5 ditto S.O. Pekoe
5 ditto Scented Tea Dust
200 boxes Finest Congou
200 ditto ditto ditto
150 ditto ditto ditto
50 ditto ditto ditto
20 ditto Extra Fine Souchong Congou
20 ditto Gunpowder
20 ditto S.O. Pekoe

TEA NUT OIL.

25 cases, each 4 tins Tea Nut Oil

PRESERVES.

10 cases Ginger, preserved, each 6 jars
10 ditto Chow Chow
10 ditto Comquots.

AS A SAMPLE OF CANTON PRODUCE—

6 boxes Chinese Tobacco
20 bags White Canton Sugar
40 ditto Canton Rice.

The Chinese Curiosities will be catalogued and on view at Hobson's Buildings, Sheridan-street, on and after Tuesday next, and will be sold there by auction, on Thursday, the 29th inst, at 12 o'clock.

Samples now on view at the Auction Mart, and Messrs. Cruickshank, Smart, & Co.'s Stores, High-street.

TERMS:

Under £50, Cash; under £100, Approved Bills at 3 months; over that, Approved Bills at 3 and 4 months from day of Sale.

Photo 7: Advertisement showing the popularity of varieties of Chinese tea among colonists.

Source: *New Zealand Herald*, 24 October 1868, 2.

111 Ng, *Windows*, 3:269.

112 *AJHR*, 1880–1920.



Photo 8: Specimens of New Zealand fungus.

Source: Supplement to the *Auckland Weekly News*, 22 August 1901, 11. Sir George Grey Special Collections, Auckland Libraries, AWNS-19010822-11-6.

Sew Hoy, Chew Chong, and Ah Chee were unusual among Chinese in that they chose to reinvest much of their profits into enterprises in New Zealand. Most of their countrymen instead sent money as remittances to China. Unlike the contribution of Chinese from South East Asia to their homeland, an overall picture of remittance payments sent from overseas Chinese in New Zealand to southern China is unavailable because of the paucity of sources. Based on what scattered evidence remains, James Ng has shown that of the relatively few recorded remittances from New Zealand, the largest amount was £22. Most were of a few pounds sterling only.¹¹³

113 Ng, *Windows*, vol. 1, 345–356.

This reflected the fact that many Chinese were left stranded and indebted in New Zealand. For example, in a rare letter preserved from the nineteenth century, in 1889 Chau Pak Cheung 陈亚详 thanked the 'Honourable' issuer of the original loan for reducing his brother's debt to him and described his brother's situation in the following terms:

无奈亚恒从前做金，亦无银积聚。今又贫穷，未能如命奉回。而我又穷，亦无力代亚恒还账，料必亚恒不能回家矣。现下他身体亦已平安，暂寓本号。俟迟日寻得工做，有银定必送回。

Ya-Hang [?] was only a gold-miner, he had no savings, and is now living in poverty. He has not been able to return the money. And I am also poor and thus not in the position to repay the debt on his behalf. I guess that Ya-Hang will not be able to return home. Now his health is restored and lives at my shop temporarily. Once he finds a job and is able to make some savings, he shall repay the debt.¹¹⁴

Overseas Chinese provided an important source of revenue for particular districts of southern China—which became known as *qiaoxiang*, 'returners' villages'—the families of which were, by late Imperial and early Republican times, eagerly courted by government authorities desperate for foreign exchange.¹¹⁵ Research on Chinese remittances indicates that such funds were used in a variety of ways, from the establishment of businesses, orphanages, and hospitals, to the refurbishment and erection of buildings, including ancestral halls, private residences, towers, and the like. Returning Chinese also spent their money on buildings and gardens, which often incorporated architectural or botanical elements from the places they had lived in overseas.

Environmental changes in south China

The return of many overseas Chinese—or their remains (known as 'former men')—to their places of birth established ongoing trans-local environmental connections between south China and parts of New Zealand. At the same time, New Zealand missions to the Chinese from the late nineteenth century (as a result of the migration of Chinese to New Zealand) also set in motion new eco-cultural networks.

114 Alexander Don, 'Chinese Booklets, posters, etc', New Zealand Presbyterian Archives, Dunedin, 3/131.

115 *The Encyclopedia of the Chinese Overseas*, ed. Lynn Pan (Cambridge, MA: Harvard University Press, 1998), 18–23; Ta Chen, 'Livelihood', in *Homeland Ties and Agencies of Interaction*, ed. Hong Liu (vol. 4, *The Chinese Overseas*) (Abingdon: Routledge, 2006), 3–26 [originally published as Ta Chen, *Emigrant Communities in South China: A Study of Overseas Migration and its Influence* (New York: Institute of Pacific Relations, 1940)]; George L. Hicks, *Overseas Chinese Remittances from Southeast Asia, 1910–1940* (Singapore: Select Books, 1993); Hsu, *Dreaming of Gold, Dreaming of Home*.

The Canton Villages Mission (CVM) was established in 1898 by the Presbyterian Synod of Otago and Southland. The CVM built on Cantonese sojournourism, as illustrated by Don's remarks on revisiting the Pearl River Delta region in the late 1890s after an absence of some 17 years. At Nam-Kong (Mandarin, Nan He, or South River village), Don 'met a man who knows intimately the family of my first Chinese teacher, and another who lives a few doors from a man known in New Zealand for 14 years'.¹¹⁶

Remittances sent by Chinese in New Zealand, like those from elsewhere, helped to alter south China's landscapes. For example, at Shek Ma (Mandarin, Shi Ma, or Stone Horse village) Don recorded that the Chan Ancestral Hall had been built almost entirely using money collected by New Zealand Chinese.¹¹⁷ Remittance money enabled improvements to, and investments in, existing property, as well as the purchase of new. For example, Don recorded that a 'Mr Kong' 'wants to make £200 here [New Zealand], when he will return to China, get married again, and buy a farm. Land will cost from 40 to 60 taels of silver per mau [*mu*] (£100 an acre), but 8 or 10 mau (1½ acres) is a large farm'.¹¹⁸ Another example comes from the family of the historian James Ng. At Wing Loong (Toishan), several generations of chain migration enabled the family to buy land, build a tower (for security purposes), and educate the clan.

Some of the wealthy returnees even built houses in the 'Western style'. The Rev. George Hunter McNeur (1874–1953), of the CVM, recorded visiting a Chinese man, near Whitestone Mart, returned from Sydney, who had built a house 'as far as possible, in Western style'.¹¹⁹ The Auckland merchant, Chan Ah Chee and his wife, Joong Chew Lee, retired in 1920 to a fashionable area of Canton. Their three-storey house at 19 Sai Street, Tung Shan, Canton (Mandarin, Dong Shan), set in extensive grounds of about two to three acres (0.6 to 1.2 hectares), had a 'Western room' in which Joong Chew Lee, 'would display western style art and pictures', as well as play the piano and sing hymns.¹²⁰ Like many other wealthy returning Chinese, Ah Chee constructed a garden at his mansion, although few details of it survive. Other returning Chinese developed gardens showing some of the designs and plants Chinese migrants had experienced while in Gold or New Gold Mountain.¹²¹

116 Alexander Don, *Under Six Flags: Being Notes on Chinese in Samoa, Hawaii, United States, British Columbia, Japan and China* (Dunedin: J. Wilkie & Co., 1898), 91.

117 Don, *Under Six Flags*, 91–92.

118 Alexander Don, 'Our Chinese Mission', *The New Zealand Presbyterian*, 2 April 1883, 184.

119 George Hunter McNeur, *Feeling the Way in the Canton Villages* (Dunedin: Otago Daily Times, 1902), 33.

120 May Sai Louie [grand-daughter of Ah Chee], interview, 21 December 2007, Lily Lee, cited in Lee and Lamb, '陈达枝 Chan Dah Chee, 1851–1930', (unpublished research paper, 2009), 25–26.

121 Selia Jinhua Tan, Guangdong Qiaoxiang Culture Research Center, Wuyi University, Jiangmen, is undertaking pioneering work on the landscapes created by these returning Chinese. Also note, for example, Judith Brandel and Tina Turbeville, *Tiger Balm Gardens: A Chinese Billionaire's Fantasy Environments* (Hong Kong: Aw Boon Haw Foundation, 1998).

The repatriation to south China of the bodies of Cantonese who died in New Zealand represented a different kind of connection established between New Zealand and the districts around Guangzhou. The need to inter the remains of returning Chinese from New Zealand and other 'gold mountains', and to maintain the appropriate rituals of veneration, impacted on land-use practices in south China.¹²² A mortuary temple and site near Upper Panyu's Shek Moon was maintained by Cantonese from Panyu and Hua districts, who had formed the Cheong Shing Tong, a burial society that also kept up a society house in Hong Kong for its members.¹²³

Another dimension of the landscape changes initiated through New Zealand–Chinese migration was the CVM presence in Panyu, at Kong Chuen. The CVM established a network of churches as well as a hospital and theological college there, which led to a greater frequency of contacts between south China and southern New Zealand through the movement of people, the advent of mission work, and regular accounts in New Zealand of life there. For example, missionary interest in Panyu and its surroundings triggered articles and talks about Chinese garden practices and landscapes in New Zealand.¹²⁴ Indeed, some missionaries, like George McNeur, regarded an understanding of Chinese customs and practices, including its agricultural systems, as absolutely central in laying the groundwork for evangelisation. In his *The Missionary in Changing China*, McNeur claimed that South China's 'intensive system of cultivation which has been prevalent for so many centuries' was '[a]nother almost universal factor in the evolution of the Chinese brain'.¹²⁵ In addition to such written descriptions is the possible introduction of New Zealand plants into the missionary compound in Kong Chuen, which had formal pathways and gardens.¹²⁶

Chinese and British imperial environmental historiography

If the history of overseas Chinese in New Zealand contributes to growing scholarship highlighting the importance of non-state actors as agents of landscape change in the British Empire, then it also challenges the overwhelming attention given to Europeans as drivers of that environmental transformation. In 2011,

122 Note, Elizabeth Kenworthy Teather, 'The Road Home: Repatriating Chinese Emigrants After Death', *New Zealand Geographer* 58, no. 1 (2002): 5–13.

123 Ng, *Windows*, 1:64–66.

124 Note, for example, the descriptions in Don, *Under Six Flags*, 96–97;

125 McNeur, *The Missionary in Changing China* (Dunedin: Foreign Missions Committee of the Presbyterian Church of New Zealand, 1935), 28.

126 Note images in William A. Mawson, *Canton Villages Mission of the Presbyterian Church of New Zealand* (Dunedin: Foreign Missions Committee, 1926), 49–50.

Paul Star coined the memorable phrase ‘biota barons’ to describe colonists who had played a disproportionate part in causing New Zealand ecological change.¹²⁷ He had in mind primarily Europeans. This article suggests the need to broaden his category to include Chinese—not just in studies of New Zealand environmental history, but also for those of other settler colonies and New World societies. This responds to Micah Muscolino’s suggestion that scholars need to situate Chinese environmental history within global trends.¹²⁸ For this article, this has meant examining the importance of trans-local case studies—mainly between Canton and Otago—in colonial environmental history.

Examining overseas Chinese environmental transformation in places like New Zealand has potential to shift scholarship on relations between China and the western world away from questions framed solely around opium and the unequal treaties. Asymmetries in power relations existed, of course, and in New Zealand legislative and social racism faced by Cantonese restricted their ability to migrate and access capital, as well as limiting other opportunities. Yet, alongside stories of China’s ‘one hundred years of humiliation’, through examination of the transformation of imperial environments, historians can recover something of the agency of Chinese in this troubled century and the next.¹²⁹ In addition, it has the potential to enrich scholarship on Chinese diaspora and migrant networks, which has ignored the environmental dimensions of migration.¹³⁰

Paying attention to overseas Chinese environmental history can help place into stark relief the sometimes profound differences within China’s own environmental history. Notably, it can stress the need to recognise China’s environmental heterogeneity and, as Robert B. Marks and Mark Elving among others have noted, the existence of major environmental sub-regions in China and the role of different hinterlands in creating them.¹³¹ As Marks showed in *Tigers, Rice, Silt, & Silk*, post-sixteenth century overseas contact coupled with the activities of overseas Chinese in South East Asia fundamentally shaped

127 Star, ‘New Zealand’s Biota Barons’.

128 Micah Muscolino, ‘Global Dimensions of Modern China’s Environmental History’, *World History Connected* 6 (2009): 31 paragraphs, www.historycooperative.org/journals/whc/6.1/muscolino.html, accessed 19 January 2012.

129 See: Beattie, ‘Chinese Ghosts in a New Zealand Landscape: Environmental Change and Perception among Cantonese in Otago and Europeans in Canton, 1860s–1930s’ (draft MS).

130 Most studies of the Chinese diaspora examine self-help societies and political organisations, as well as business and migration networks, and issues of identity formation and racism. McKeown, *Melancholy Order*; Keir Reeves, Lionel Frost, and Charles Fahey, ‘Integrating the historiography of the nineteenth-century gold rushes’, *Australian Economic History Review* 50 (2010): 111–28; Reeves, ‘Tracking the Dragon Down Under: Chinese Cultural Connections in Gold Rush Australia and Aotearoa, New Zealand’, *Graduate Journal of Asia-Pacific Studies* 5 (2005), 41–66.

131 Robert B. Marks, *China, Its Environment and History* (New York: Rowman & Littlefield, 2012); Elvin, *Retreat of the Elephants*.

Guangzhou and Fujian's environmental histories. This article demonstrates that nineteenth-century Cantonese access to southern Pacific capital and resources also contributed to environmental change near Guangzhou.¹³²

Several fruitful areas of comparison are also opened up through studying Cantonese-New Zealand exchanges. For example, did environmental change by overseas Chinese in Gold Mountain and New Gold Mountain represent the same drive to exploit China's 'internal' frontiers as was evident in late Qing Mongolia, Manchuria, and Yunnan? Was private capital—as utilised by overseas Chinese in Gold Mountain and New Gold Mountain—or state direction (Xinjiang) of Chinese entrepreneurs the best means of ensuring the success of such operations, and which had the greater environmental impacts? For example, in contrast to earlier policies, the late nineteenth-century Chinese state encouraged gold-mining near Tacheng, Xinjiang¹³³ as a means of pacifying and securing a marginal region. Did this changing opinion on Xinjiang gold-mining shift official attitudes towards Chinese gold-miners overseas, too?

In this period, as scholars such as Peter Lavelle and Joseph Lawson are demonstrating, the model of Euro-American imperialism and resource development received widespread, if not always accurate, reporting among officials tasked with settling China's frontiers.¹³⁴ The irony was it was the likes of the overseas Chinese more than the scholar elite who not only knew more about, but also implemented and sometimes introduced and adapted Western technology in new territories in the British Empire and elsewhere. This points to the lack of knowledge transfer in China across social classes as well as over geographical boundaries, from north China to south China. Each group had different sources of information: scholar officials commonly gained much knowledge about the outside world from Japan,¹³⁵ while overseas Chinese gained this directly, from the countries in which they were living.

Finally, the article's focus on the environmental dimensions of gold-mining highlights a strangely neglected, yet significant, dimension of New Zealand's environmental historiography. From 1850 to 1908, New Zealand provided three per cent of the world's gold production.¹³⁶ In the 1860s, gold was New Zealand's

132 Marks, *Tigers, Rice, Silt, & Silk*.

133 Judd Kinzley, 'Turning Prospectors into Settlers: Gold, Immigrant Miners and the Settlement of the Frontier in Late Qing Xinjiang,' in Sherman Cochran and Paul G. Pickowicz, eds., *China on the Margins* (Ithaca: Cornell University East Asia Series, 2010), 17–41.

134 Peter Lavelle, 'The aesthetics and politics of Chinese horticulture in late Qing borderlands,' in *Environmental History in East Asia: Interdisciplinary Perspectives*, ed. Ts'ui-jung Liu (London: Routledge, 2014), 213–42; Joseph Lawson, 'The Chinese State and Agriculture in an Age of Global Empires, 1880–1949,' in *Eco-Cultural Networks*, 44–67.

135 Lawson, 'The Chinese State and Agriculture', 50–55.

136 *Bateman New Zealand Historical Atlas/ Ko Papatuanuku e Takoto Nei* (Auckland: David Bateman and Department of Internal Affairs, 1997), plate 44.

main source of export revenue. For example, in the 1860s, '[s]ome £21 million worth of gold enriched Otago'.¹³⁷ Even after this period, it enjoyed periods of economic significance, notably during the dredging boom of the 1890s.¹³⁸ Yet despite its economic, social, and environmental importance, gold-mining's history has been largely subsumed by a dominant scholarly focus on pastoralism and small-scale farming. Industrial mechanisation and the accumulation of the necessary capital, especially following hydraulic mining and dredging, points to a similar situation as that in California, in which, as Andrew C. Isenberg has noted, 'the intervention in the form of steam and hydraulic engineering stabilised and ordered a dynamic system' that attracted 'further investment capital'.¹³⁹

Conclusion

Especially in Otago, Chinese gold-miners had significant environmental impacts. Their activities altered hydraulic regimes and caused soil erosion. They reduced timber supplies, displaced vegetation, and diverted scant water supplies. In developing these new resources, Chinese miners seized opportunities presented by the Colony's shipping connections. They took advantage of its legal apparatuses and financial systems, and incorporated them into their own networks of expertise and knowledge, labour, and capital drawn from China and elsewhere. Through their access to Chinese and New Zealand capital and labour, a few high-earning Chinese, such as Sew Hoy, invested profits in the Colony, by developing new industries and opening up new frontiers of resource exploitation.

Their activities, impacting on environments in south China and elsewhere, need to be included in environmental histories of both settler societies and China itself. The story of the overseas Chinese can add a global comparative dimension to Chinese environmental history and significantly enrich regional understandings of that country's environmental diversity. Finally, this article supports Christine Meisner Rosen's argument for the 'urgent importance of engaging in research that integrates business and environmental history',¹⁴⁰ by stressing the environmental dimensions of Chinese business activities.

137 Erik Olssen, *A History of Otago* (Dunedin: John McIndoe, 1984), 66.

138 See Graph 4: Composition of exports, 1861–1976 (by value) in Geoffrey W. Rice, ed., *The Oxford History of New Zealand*, second ed. (Auckland: Oxford University Press, 1981), 597.

139 Isenberg, *Mining*, 21.

140 Christine Meisner Rosen, 'The Business–Environment Connection', *Environmental History* 10, 1 (2005): 77.

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