GOLD RUSHES, UNIVERSITIES AND GLOBALIZATION, 1840–1910*

Gold! Gold! Gold! Gold!
Burning by the blue;
Gold! Gold! old Gold!
Native, tried and true;
Ore that shines
In priceless mines,
Of memories old and new,
Oh, that's the Gold that heartens me
and you!

'The Blue and Gold'[1]

I

INTRODUCTION

Clues to the gilded heritage of public universities exist today on the surface of those institutions' campuses: in their named edifices, buildings and monuments. These monuments gesture to a history of universities, or of 'colleges on a hill', that in fact began underground. At the University of California, the Sather Tower and Sather Gate still pay tribute to Peder Sather, a Norwegian migrant to California amid its gold boom who donated his time, two hundred acres of land, and at least $7,000 to endow California's state institution.[2] Later, his gifts would be overshadowed by

* My thanks to David Cannadine, Linda Colley, Hendrik Hartog and members of the Cambridge American History Seminar for their feedback on earlier drafts. The research for this article was supported by The Isaac Newton Trust.

[1] *Songs of the University of California* (1905): University of California, Berkeley, Bancroft Library (hereafter UCB), 308sx.m.S69 1905 c.2.

[2] Karin Sveen, *The Immigrant and the University: Peder Sather and Gold Rush California*, trans. Barbara J. Haveland (Berkeley, 2014), 154.

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those of another beneficiary of California's gold rush, the lawyer-turned-goldfield-supplier Leland Stanford and his wife, Jane. Although they funded a private institution, by 1901 this couple had supplied over $30 million to endow Leland Stanford University, making it 'the most richly endowed [university] in the world'.[3]

In Australia, on the University of Melbourne's sloping campus, sits the Baillieu Library, named for William Lawrence Baillieu, a mineral field financier.[4] At the University of Adelaide, any number of edifices — beginning with the Hughes building, moving on to the Hughes Plaza, and catching sight of either a marble bust or classical bronze sculpture of Walter Watson Hughes — might signal the impact of this mining magnate on the university's accounts (Plate 1).[5] In South Africa, the Rhodes Memorial, situated at Devil's Peak on Table Mountain, overlooks the University of Cape Town's rugby fields (Plate 2). It commemorates Cecil Rhodes's vision of building a university for South Africa while also demonstrating the narrowness of that vision in the memorial's vandalized elements.[6] A visitor to the University of Stellenbosch might note the large statue of Jannie Marais, whose exploits in diamond mining still fund student scholarships today. And finally, even the Redpath Museum of Natural Science at McGill University in Canada, which a sugar baron built in honour of a geologist, gestures to the local imperatives and conditions that enabled a groundswell of higher education institutions in the many places touched by gold.

Private benefactions were (and still are) one mechanism of raising endowment capital for universities, presenting an important avenue by which gold profits reached new universities. This article examines how the global gold rushes of the nineteenth century made such benefactions possible, while also enriching other key revenue streams for universities including government subsidies and the value of land reserves. It contends that a set of universities were opened after 1848 across California, Australasia, South Africa and parts of Canada that

[3] *San Francisco Chronicle*, 2 Mar. 1905.

[4] J. R. Poynter, 'Baillieu, William Lawrence (Willie) (1859–1936)', *Australian Dictionary of Biography*, <http://adb.anu.edu.au/biography/baillieu-william-lawrence-willie-5099> (accessed 22 Sept. 2022).

[5] Rob Linn, *The Spirit of Knowledge: A Social History of the University of Adelaide, North Terrace Campus* (Adelaide, 2011).

[6] Gail Nattrass, *A Short History of South Africa* (London, 2017), 89.

1. Unveiling of a statue of Sir Walter Watson Hughes at Adelaide University, 1906. Photograph: Henry Krischock. Courtesy of the State Library of South Australia, University of Adelaide Collection, B 55265.

owed the speed of their formation, if not their existence, to the period's global gold and mineral rushes. During a critical period in these universities' formation, new mineral wealth added liquidity to colonial and institutional finance. The social effects of gold rushes, meanwhile — in that they accelerated population growth and caused forms of social upheaval — stimulated regionalism and drives to re-establish Old World hierarchies in ways that made university building attractive.

Exploring these institutions' interconnected development has important implications for the study of empire, extractive capitalism and globalization. The relationship between higher education and mineral extraction in the nineteenth century was co-constitutive. Goldfield universities' rapid growth depended upon the imperial and global circuits of ideas, people and capital that flowed from the rushes. Yet, once opened, these universities became tremendous drivers of globalization themselves, producing techniques of extraction, expertise and technologies that propelled the global mining industry and prolonged the mineral rushes that had first established them.

Accordingly, and in line with other categorizations of universities that highlight a shared funding source or period of institutional growth, such as the American land-grant universities, the British redbricks and the Australian sandstone institutions, this analysis characterizes a group of universities based upon a causative, supranational dimension of their founding as 'the goldfield foundations'. Blue and gold adorn at least six of these mid Victorian gold rush schools, which include the universities of California, Melbourne, Adelaide, British Columbia, Cape Town, Stellenbosch, Witwatersrand and Otago, among (arguably) others. These institutional colours paired the blue of the Pacific Basin or of English tradition with the dazzling potential offered by their golden beginnings.

While universities varied in style, emphasis and the sufficient causes for their creation, one necessary condition of their establishment was capital. The historian Hugh Parton reminds us that, even in the nineteenth century, it was 'widely held that the necessary condition of university finance [was] endowment'.[7]

[7] Hugh Parton, *The University of New Zealand* (Auckland, 1979), 26.

2. Cecil Rhodes Memorial, Cape Town, South Africa. Photograph © the author.

And yet most colonial and American land-grant institutions spent at least their first few decades without an endowment and one sharp financial shock away from ruin. Queen's University at Kingston (Canada) experienced such a financial blow in 1878. After the Commercial Bank collapsed, a single donor (who was also Canada's first black lawyer) saved the institution from 'oblivion'. This donor, Robert Sutherland, left his entire estate, valued at Can$11,000–12,000, to his alma mater, a sum that was equivalent to a year of operating expenses.[8] As in Canada, the lived conditions of all settler societies engendered various sources of pecuniary precarity, from credit crises to cholera epidemics. But combined with these institutions' many immediate practical and infrastructural needs, what most university administrators, staff and colonial officials came to realize was that university building was (and remains) an incredibly capital-intensive enterprise, especially at its start.

With the exceptions of the South African College (SAC) and University College London (UCL), which began as joint-stock companies, three mechanisms of mid Victorian university financing existed and could be combined. Many universities, including UCL, had hoped to achieve self-sufficiency through student fees. But, in reality, this was not a possibility for almost any public university before 1900.[9] Instead educationalists sought out a public or government grant for yearly or earmarked support; land grants from their governments or clergy reserves that could be sold off to yield an endowment; and benefactions, usually from wealthy citizens. The significance of gold and metal mining, then, was that it enriched all three of these revenue streams.[10] While settler societies without mineral rushes still built universities, many of these places would teeter on the

[8] Born in the 1830s, Sutherland went to Canada from Jamaica in 1849, enrolling at Queen's University, Kingston, Ontario, for his undergraduate degree and then at Osgoode Hall Law School in Toronto. Queen's University Archives, Kingston, Ontario, 1002.7 SE.

[9] The founders of UCL, for instance, expected that the institution would become self-sufficient if 1,000–2,000 students paid fees. When this number of students did not enrol, the institution nearly went bankrupt, its administrators admitting that 'the University has hitherto been much less successful than its Founders anticipated'. University of London, Annual General Meeting of Proprietors, 27 Feb. 1833: UCL, Special Collections, UCL0090156 (A3.1).

[10] Allan Nevins, *The State Universities and Democracy* (Urbana, IL, 1962), 35.

brink of bankruptcy, as the early building efforts of institutions like the SAC suggest.

Removing the national frame of reference applied to much university history reveals the interconnected development of these goldfield universities, whose rapid growth relied upon a series of equally interconnected mineral rushes. This growth far outpaced public demand for higher education. Newly wealthy settler elites, often at the helm of newly responsible governments, encountered little popular resistance in allocating funds to higher education. In some cases, as in Ballarat and Bendigo (Australia), towns that were little more than mining camps built schools of mines. These schools lived diverse institutional lives: as technical colleges, as schools affiliated to a university, or sometimes as the precursor to a university itself. But often government officials and university promoters, including Cecil Rhodes and the educationalist William Charles Wentworth, channelled the benefits of gold mining into 'gateway cities' where different suppliers of investment, expertise and goods could meet the goldfields' demands.[11] Elites in many of these now wealthy cities erected universities. This set of goldfield institutions, therefore, provides a site for exploring university development outside the logics of the nation state while also capturing the pivotal role that mineral extraction played in the history of higher education.

Unlike other colonial institutions funded by mineral wealth, such as art galleries and professional societies, institutions with goldfield foundations provided crucial support to the forms of extractive capitalism that had created them. The experts they trained, the research they produced, and the technologies they fashioned proved essential to the expansion of industrial mining and to globalizing the metals-mining industry. University alumni like John Sutherland of Ballarat became the intellectual backbone of international mining companies (meaning Broken Hill Proprietary in Sutherland's case) that still exist today.[12] Investigating these 'products' of goldfield universities thus uncovers the forms of extractive capitalism and coercive labour

[11] Benjamin Mountford and Stephen Tuffnell, 'Seeking a Global History of Gold', in Benjamin Mountford and Stephen Tuffnell (eds.), *A Global History of Gold Rushes* (Berkeley, 2018), 18.

[12] Geoffrey Blainey, *The Rush that Never Ended: A History of Australian Mining* (Carlton, 1974), 200.

that fed into colonial institutions and which they, in turn, fed. Most gold rush schools offered classes in geology, mining or metallurgy, and chemistry, becoming some of the first tertiary education institutions to offer training in these non-classical subjects. The SAC, for example, combined its classroom training with a practical course conducted at mines in Kimberley. These actions forged links between young universities and mining companies that might provide practical training to undergraduates, and encouraged the professionalization of mining engineering in colonial societies.[13]

Despite this imbrication of extractive economies and higher education, the mineral and financial dimension of university history has not always been visible in institutional biographies or national historiographies. While important and informative, many of these accounts saw universities as defined by personalities, especially those of professors and early administrators.[14] Against these, William Gardner's study of mid Victorian universities across Australasia, *Colonial Cap and Gown* (1979), follows the 'diggers' route from Melbourne to Dunedin' in order to emphasize that although Euro-American ideas informed colonial expectations of higher education, '[the colonies] had to produce the fat of [the universities] from [their] own resources'.[15] The early 2000s saw scholars reconsider university finance. Kaye Tully and Clive Whitehead underline colonial governments' role in funding higher education, leading them to reflect on the gold licence and excise fees that enriched fledgling governments in Victoria (Australia) and Otago, and allowed for greater expenditure on education.[16] Richard Selleck's history of the University of Melbourne similarly draws the social dynamics produced by gold rushes into the picture of university formation. Concerning

[13] The South African College Calendar, 1895–6: University of Cape Town (hereafter UCT), Special Collections, BU 378.687 s. 17.

[14] This is true especially of commemorative volumes, such as G. Mennen Williams, *Convocation Commemorating the One Hundredth Anniversary of the Founding of the Michigan State College* (East Lansing, 1955); Keith R. Widder, *Michigan Agricultural College: The Evolution of a Land-Grant Philosophy, 1855–1925* (East Lansing, 2005).

[15] W. J. Gardner, *Colonial Cap and Gown: Studies in the Mid-Victorian Universities of Australasia* (Christchurch, New Zealand, 1979), 26.

[16] Kaye Tully and Clive Whitehead, 'Audacious Beginnings: The Establishment of Universities in Australasia, 1850–1900', *Education Research and Perspectives*, xxxvi, 2 (2009), 9.

Victoria, 'though intercolonial rivalry had prompted action', Selleck claims, 'the growth and dislocation caused by gold was a greater spur to consensus' among educationalists.[17] More recently, and invigorated by popular interest in the legacies of empire visible in museums, public monuments and institutions today, scholars have begun to assess higher education's connections to colonial wealth. The historians Craig Steven Wilder and Nicholas Draper, for example, have excavated the ties of slave profits to university building in the United States and Britain respectively.[18]

A 'rush' to global history, as John Darwin and Jay Sexton call it, has recently begun as well.[19] Benjamin Mountford and Stephen Tuffnell, along with James Belich, Lloyd Carpenter and Lyndon Fraser, insert the many explosive gold bonanzas that characterized the period from 1848 to 1910 into a broader narrative of transnational connections, the global history of capitalism, and globalization driven by an expanded gold supply.[20] The machinations of individual gold rushes also boast long and detailed historiographies.[21] But reconstructing the circuits of capital, goods, technologies, migrants and mining expertise that connected and propelled further, overlapping rushes in distant lands is a more recent development. After California's gold boom began in 1848–9, over forty mineral rushes would occur in the American Midwest, twenty-eight rushes in Australia from 1851 to 1894, at least five rushes in Aotearoa (New Zealand) after 1857, and a stream of mini-booms in South and West Africa

[17] R. J. W. Selleck, *The Shop: The University of Melbourne, 1850–1939* (Melbourne, 2003), 14.

[18] Craig Steven Wilder, *Ebony and Ivy: Race, Slavery, and the Troubled History of America's Universities* (New York, 2014); Nicholas Draper, 'British Universities and Caribbean Slavery', in Jill Pellew and Lawrence Goldman (eds.), *Dethroning Historical Reputations: Universities, Museums and the Commemoration of Benefactors* (London, 2018).

[19] John Darwin and Jay Sexton, Preface, in Mountford and Tuffnell (eds.), *Global History of Gold Rushes*, p. xiii.

[20] James Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World, 1783–1939* (Oxford, 2009); Lloyd Carpenter, 'Finding "Te Wherro in Otakou": Otago Māori and the Gold Rush', in Lloyd Carpenter and Lyndon Fraser (eds.), *Rushing for Gold: Life and Commerce on the Goldfields of New Zealand and Australia* (Otago, 2016).

[21] See, for example, Bate Weston, *Lucky City: The First Generation at Ballarat, 1851–1901* (Carlton, 1978); Blainey, *Rush that Never Ended*.

following the Witwatersrand rush of 1886.[22] National particularities structured the use and exploitation of each rush and its ecological impact. Yet, in addition, these supposed 'moments of luck' relied on the imperial interconnection of settler societies, especially for labour and expertise, along with the global movement of capital and ideas.

It is worth noting too that gold, that great enabler, has a mixed legacy in colonial history. Gold rush histories have come with many 'success' stories attached, of lone prospectors striking it rich, of democracy and progressive politics taking hold on the goldfields, and of miners becoming, as the 'gentleman adventurer' Owen Letcher put it, the 'masters of the secrets of Mother Earth'.[23] No other four-letter words seemed to excite nineteenth-century Eurasian imaginations as much as these: gold and land. As Timothy Alborn and James Belich remind us, Europeans in particular weighted gold, the 'most precious yet most useless of metals', with heavy cultural associations.[24] (See Plate 3.)

Finally, the mechanisms of university financing and gold's role within them draw colonial universities into the contested spaces shared (or occupied) by immigrants, settlers and Indigenous peoples. The New Zealander politician Vincent Pyke famously informed his readers in 1887: 'that the Maoris were aware of the occurrence of gold, before the arrival of European colonists, is a tolerably well established fact'.[25] Gold rush mythology even in the 1800s eroded the place of Indigenous knowledge that was crucial to its existence. Indigenous aid in producing those discovery moments, later recast as settlers' and prospectors' 'luck', was vital to mineral discoveries in California, Victoria (Australia), Otago and the region that became the Crown colony

[22] Mountford and Tuffnell, 'Seeking a Global History of Gold', 4.

[23] Owen Letcher, *The Gold Mines of Southern Africa* (Johannesburg, 1936), 3; Andrew C. Isenberg, 'The Real Wealth of the World: Hydraulic Mining and the Environment in the Circum-Pacific Goldfields', in Mountford and Tuffnell (eds.), *Global History of Gold Rushes*, 213.

[24] For example, a renewed interest in the search for Ophir, King Solomon's biblical city of gold, increasingly preoccupied British gold migrants as the nineteenth century wore on: Timothy Alborn, 'King Solomon's Gold: Ophir in an Age of Empire', *Journal of Victorian Culture*, xx, 4 (2015), 491–5; Belich, *Replenishing the Earth*, 309.

[25] Vincent Pyke, *History of the Early Gold Discoveries in Otago* (Dunedin, 1887), 2.

3. Hydraulic mining near French Corral, Nevada County, 1866. Courtesy of the Library of Congress, Washington, DC, Prints and Photographs Division, LOT 3544-50, no. 1404 [P&P].

of British Columbia soon after gold's discovery there.[26] In all of these places, Indigenous miners worked in various free and coercive arrangements alongside predominantly Anglo miners, but also beside Chinese, Indian and African American labourers. In some cases, as with the Māori miners who took their expertise to the Yukon's Klondike gold rush, Indigenous peoples and knowledge moved globally.[27]

[26] Transvaal Chamber of Mines, *The Witwatersrand Gold Field: A Brief Survey* (Johannesburg, 1930), 15; Daniel Marshall, *Claiming the Land: British Columbia and the Making of a New El Dorado* (Vancouver, 2018), p. xii; Carpenter, 'Finding "Te Wherro in Otakou"', 87–90.

[27] Margaret Orbell, *He reta ki te maunga: Letters to the Mountain, Maori Letters to the Editor, 1898–1905* (Dunedin, 2001).

Gold rush universities, many of which held Indigenous territory in the form of a land grant, entered into these settler–Indigenous contests. They employed scholars who carried (mis) representations of Indigenous life back to metropolitan audiences in travellers' tales and mobilized imperially sourced mining techniques to exploit Indigenous land further. At the same time, some Indigenous men and women were also the students of, and donors to, these institutions. The work of Susan Hill, Alison Clarke, Linda Tuhiwai Smith and Jodi Byrd alerts scholars to the instances in which higher education institutions acted as organizers of a 'colonial system' and 'agents of colonisation'.[28] And while Indigenous knowledge, land and labour helped to build the world of settler universities, these settler universities, for the most part, later suppressed those Indigenous worlds that had helped to create them.

II

GOLD FEVER: POPULATION, REGIONALISM AND SOCIAL COHESION IN GOLD RUSH SOCIETIES

The global 'gold fever', which expanded the world's gold supply by over $13 billion before 1910, generated two important drivers of university formation.[29] The first was rapid population increase. Almost overnight, as Owen Letcher would say of Johannesburg, the 'Mining Camp . . . has grown into a Metropolis'.[30] These new metropolises, starting with California in 1848, grew from both internal and external migrations. At their peak, the Californian and Victorian rushes drew in as many as a hundred thousand people per year. Baltimore's *Sun* reported in 1850 that the California mines 'had shipped $260,000 in gold to England, and that there was upwards of two millions of dollars ready to be shipped to this city (New York) as soon as vessels could be found to bring it'.[31]

[28] Susan M. Hill, *The Clay We Are Made Of: Haudenosaunee Land Tenure on the Grand River* (Winnipeg, 2017), 3–4; Alison Clarke, *Otago: 150 Years of New Zealand's First University* (Dunedin, 2018), 22. See also Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (Dunedin, 1999); Jodi Byrd, *The Transit of Empire: Indigenous Critiques of Colonialism* (Minneapolis, 2011).

[29] American Metal Market Company, *Metal Statistics, 1911* (New York, 1911), 196.

[30] Letcher, *Gold Mines of Southern Africa*, 1.

[31] *Sun* (Baltimore), 26 Sept. 1850; Belich, *Replenishing the Earth*, 307.

Such swift population growth and 'fast' money inspired university builders for a variety of reasons. Students (and capital) were quintessential inputs for universities, and pupils often kept their institutions afloat by paying class fees.[32] Population thus functioned as a justification for the creation of higher-education institutions throughout the nineteenth century.[33] But, in addition, gold immigration fostered rich cities to rival older centres of settler population. New population centres and their citizenry saw no reason to let other cities and states have a monopoly over university education. Both regionalism and the talent of newcomers pushed university promoters onward.

Yet while the relationship between demographics and settler institutional development may seem obvious, it has been under-studied. James Belich has notably asserted that steady population increase and the beginnings of economic prosperity were preconditions of the Californian and Victorian gold rushes. But this article argues that once those rushes got under way an acceleration in population levels and the 'boom-plus-rush economy' that Belich describes encouraged the formation of educational institutions.[34] At the same time, rushes of newcomers landed heavily upon local environments, depleting food sources and sparking conflict with Indigenous communities.[35]

The story of gold-driven population booms began in California. Although gold had been identified in the region earlier than 1848, the publicity afforded to the discovery of gold at Sutter's Mill on the South Fork American River convinced thousands that the terrain near the Sierra Nevada was

[32] Student fees were an important source of income for poorly endowed institutions anywhere in the British empire. UCL's Annual Report (1827) shows, for instance, that this institution's councillors estimated the university's revenues knowing that 'there are in London not less than five thousand young men from the age of sixteen to twenty-one, the children of persons who can easily defray the expense of an education conducted as it is proposed to be in this University': *Statement by the Council of the University of London, Explanatory of the Nature and Objects of the Institution* (London, 1827): UCL, Special Collections, UCL0090156 (A3.1).

[33] J. C. Beaglehole, *Victoria University College: An Essay towards a History* (Wellington, 1949), 1.

[34] Belich, *Replenishing the Earth*, 312.

[35] Mountford and Tuffnell, 'Seeking a Global History of Gold', 7.

the modern-day El Dorado.[36] In 1850 the *North-China Herald* in Shanghai informed readers that ships lying at anchor anywhere near California suffered 'the immediate desertion of a large portion of the crews'.[37] Gold rush news spread by national and colonial newspapers attracted over eighty thousand people to California in the first year of the rush. Between 1848 and the end of 1853, the state's non-Indigenous population would increase from fourteen thousand to over three hundred thousand people.[38] And while many migrants moved on to new rushes or back home once the fever 'died down', many others could not. Diggers spent between $500 and $1,000 to get to the diggings. According to one mining correspondent, there were 'three times as many here as will ever get able to pay their passage home [*sic*]'.[39]

With little in the way of a state government at the time of its mineral rush, early settlers and Indigenous groups in California saw much of the gold dust, nuggets and the opportunity to levy excise and licensing fees slip away to Britain and the East Coast. What California did gain from its rush, however, which applied to university development, was a large tax base and the wealth and talent that gold attracted. Ministers like the Reverend H. W. Bellows arrived in California to combat the avarice inspired by gold, advocating for 'Minds over mines' in promoting a college, the College of California, that would promote intellectual and cultural pursuits.[40] For others, gold was a magnet for money-making, and technical pursuits were just as important as classical subjects.

One influential gold immigrant, who was also a Norwegian migrant to New York in the early 1800s, was Peder Sather. Amid California's gold boom, Sather expanded his East Coast banking business to San Francisco, establishing Drexel, Sather & Church in 1850. His interest in, and presence on, the College

[36] John Sutter, proprietor of Sutter's Mill, relied upon hundreds of mostly Miwok and Nisenan labourers to run this enterprise, along with his fort and other properties: Albert L. Hurtado, 'California Indians and the Workaday West: Labor, Assimilation, and Survival', *California History*, lxix, 4 (1990), 5.

[37] *North-China Herald*, 3 Aug. 1850.

[38] Mountford and Tuffnell, 'Seeking a Global History of Gold', 7.

[39] *Sun* (Baltimore), 26 Sept. 1850.

[40] Sveen, *Immigrant and the University*, trans. Haveland, 154.

of California board of trustees after 1860 aided the institution's expansion into a university. Becoming one of California's richest men, Sather gave the institution at least $7,000 and two hundred acres of land in North Berkeley that could be used or sold.[41] Sather's wife, Jane, would commemorate her husband's role as an early benefactor, donating funds for two of the university's most iconic structures: the Sather Gate and the Sather Tower (Plate 4).

Within a decade, the alluvial mining of California had dried up and turned into a more capital-intensive, company-driven model. Nonetheless, California's boom and the expertise it nurtured fed into new gold rushes emerging elsewhere. The English-born Australian miner Edward Hammond Hargraves, for one, had gone to California in the 1840s and then returned to New South Wales confident that a search of his adoptive homeland would be rewarded. This instinct proved correct. In February 1851, he found gold near the Carcoar sheep run of a wealthy squatter, a discovery likely aided by both local and Indigenous knowledge. While earlier Indigenous and non-Indigenous gold discoveries had occurred near Sydney, Hargraves secured a government reward for his finds and relied on publicity to undermine the British Crown's legal control of gold.[42]

Likewise, it was the Australian gold prospector Gabriel Read, having spent time on the goldfields of both California and Victoria, who went to New Zealand believing that gold existed there as well. Read spotted alluvial gold on the banks of the river Tuapeka in 1861, setting off Otago's gold rush. A combination of rumour (most likely based on Māori knowledge), an ability to attract British capital, and Read's prior experience in mining transformed the region, thereafter named Gabriel's Gully. Between 1861 and 1864, the non-Māori population of Aotearoa would swell from 98,000 to 171,000, with most of these newcomers flocking to Dunedin.[43] Further, to push the notion of these connected rushes in a different direction, the historians Daniel Marshall and T. A. Rickard have claimed that the Fraser River Fever of 1858 in the Crown colony of British Columbia

[41] *Ibid.*, 160.

[42] Blainey, *Rush that Never Ended*, 13.

[43] Mountford and Tuffnell, 'Seeking a Global History of Gold', 8.

was an extension of the Californian rush. 'The search for gold in our Province [British Columbia]', Rickard writes, 'was incited by the successful exploitation of auriferous river-beds in California'.[44] Information derived from different Indigenous groups who had long mined minerals near the Queen Charlotte Islands lured European prospectors northward to the river Salmon.

What these numerous connected rushes and population booms produced, and which shaped university development, was a set of rich, upstart settler cities with the ability to act on regionalist tendencies. The pre-gold city of Sydney, with a pre-rush population of 54,000, positioned itself at the top of the Australian colonies' social and political food chain. Gold rushes upset this balance of power between colonial centres. Whereas educationalists like William Charles Wentworth in Sydney and John Strachan in Toronto had imagined their cities becoming regional capitals or eventually hosting a 'national university', new gold rush cities and states rapidly emerged to challenge those visions.[45]

In the Australian colonies, buoyed by mineral rushes and their attendant population growth, both Melbourne and Adelaide rose to contest Sydney's control of education and politics. Victoria's legislative council put up '£32,000 for educational purposes' and a grant of £9,000 per annum for a new University of Melbourne in 1854.[46] This amount for 'Marvellous Melbourne' surpassed the £5,000 granted to the University of Sydney by its colonial government a few years before.[47] The politics of regionalism enveloped South Australia as well. That colony's politicians and clergymen kept track of Sydney's land values and annual grants. In 1865 the local *Church Chronicle* published an article submitted

[44] Marshall, *Claiming the Land*, p. xiv; T. A. Rickard, 'Indian Participation in the Gold Discoveries', *British Columbia Historical Quarterly*, ii (1938), 3.

[45] Clifford Turney, Ursula Bygott and Peter Chippendale, *Australia's First: A History of the University of Sydney, 1850–1939*, i (Sydney, 1991), 14; John Strachan, 'Report for Establishing the University' (1837): University of Toronto Archives, B1988-0002, box 001, fo. 7.

[46] *Argus* (Melbourne), 4 July 1854; Ernest Scott, *A History of the University of Melbourne* (Melbourne, 1936), 3.

[47] 'Adventures in Australia in 1852 and 1853, by the Rev. H. B. Jones', *Athenaeum*, no. 1355 (1853), 1223.

4. Sather Tower, University of California at Berkeley, 2012. Photograph: The Jon B. Lovelace Collection of California Photographs in Carol M. Highsmith's America Project. Courtesy of the Library of Congress, Washington, DC, Prints and Photographs Division.

by several of Adelaide's clergymen noting that 'Our neighbours have their Universities, and first rate Professors attached to them . . . what an advantage, in these institutions, have the youths of Sydney and Melbourne over those in Adelaide!'[48] Enjoying one of Australia's only instances of employing a land grant as a financial mechanism, the University of Adelaide dragged itself

[48] Quoted in Michael Whiting, *Augustus Short and the Founding of the University of Adelaide* (Adelaide, 2014), 15.

into existence, along with fifty thousand acres of Indigenous land to lease or sell, in 1874.[49]

Given the influx of labourers and miners that came with mineral rushes, certain colonial officials looked to higher education to re-establish the social hierarchies thrown into flux by demographic change. Consolidating class and racial authority was a significant motivation in settler university building. The educationalists that pushed for a university's establishment in Melbourne, for example, were some of Victoria's most conservative men. An early resident of Melbourne and university board member, Lachlan Mackinnon, recalled that the colony's first school inspector and then auditor-general, Hugh Childers, had initially proposed a university for Melbourne.[50] While designing the institution, Childers and most of the university's council were also involved in prosecuting a group of miners who had violently rebelled against the British-backed government's autocratic hold over the goldfields at Eureka. Childers and fellow university promoters like Sir Redmond Barry saw this Eureka Rebellion (1854), viewed as a significant episode in Australia's national history, as a threat to Victoria's social order. Barry, the presiding judge at the Eureka trial, was set to become the first chancellor of the new University of Melbourne later that year. The attorney-general, William Stawell, who had prepared the University Bill of Establishment, was the trial prosecutor.[51]

In the midst of this commotion, the university's professors arrived from Britain and Ireland. Justice Barry had relied on the English polymath Sir John Herschel for help in selecting these men. His instructions to Herschel, according to the historian Richard Selleck, 'drew Herschel's attention to the discovery of gold because it helped to explain "the nature of the society for which the Council of the University is to provide instructors"'.[52] With a budget of close to £4 million a year in the early 1850s, Barry and his council allocated funds for a school that would

[49] University Lands Rent Book, 1876–88: University of Adelaide Archives, ser. 5, vol. 1.

[50] 'Mackinnon, Lachlan', 27 Dec. 1881: University of Melbourne Archives (hereafter UMA), 1984.0137.

[51] Selleck, *The Shop*, 32; 'Mackinnon, Lachlan', 27 Dec. 1881.

[52] Selleck, *The Shop*, 31.

churn out 'well-bred English gentlemen'.[53] In this case, the first university council in Melbourne saw revolutionary impulses and looked to re-create an Old World social hierarchy. Word of new political creeds in ascendance across the globe had, by this time, reached Victoria. To its first founders, a new university would inveigh against the influences wrought by the revolutionary tide of 1848 and the possible export of both Irish nationalism and British Chartism to Australia.[54]

By 1910 Anglo-American settler societies had topped the charts of annual gold production (ranked by country) for over twenty years.[55] During this time, a series of connected gold rushes made miners globally mobile and produced fertile environments for university development. It is notable too that universities were not the only institutions to proliferate in these gold rush societies: mechanics' institutes, libraries and museums multiplied as well.[56] Of these, goldfield universities were the largest, most capital-heavy undertakings. Goldfield gains refreshed and infused liquid capital into different university revenue streams, even as their demographic and social effects made institution building a settler imperative.

III

FROM THE GROUND UP: GOLD AND THE FINANCING MECHANISMS FOR SETTLER UNIVERSITIES

Unlike most institutions with private endowments, the need to build paying constituencies drew public universities towards their local communities. Student fees and occasional government support had traditionally undergirded university finance, but goldfield universities got under way before there was much

[53] William Howitt, *Land, Labour and Gold: or, Two Years in Victoria, with Visits to Sydney and Van Diemen's Land*, 2 vols. (Boston, 1855), ii, 295–301; Scott, *History of the University of Melbourne*, 22.

[54] Alexander Brady, *Democracy in the Dominions: A Comparative Study in Institutions* (Toronto, 1947), 7.

[55] Dr J. Mackintosh Bell, speech, 17 Feb. 1927: Libraries and Archives Canada, Ottawa, R1928-0-7-E.

[56] 'Mackinnon, Lachlan', 27 Dec. 1881.

public demand for them.[57] Instead, advocates of colonial universities had to convince other elites, legislators and 'publics' that higher education was worth the investment.

In almost every settler society, there were those who objected to the expense of a university and to the classical subjects they typically taught. An article published in Melbourne's *The Age* entitled 'University Extravagance' argued in 1855 that 'Our University is at length fairly launched; and now that the project stands visibly revealed, we are compelled to assert that a more cumbrous, useless, and needlessly expensive folly could hardly have been perpetrated by any rational community'.[58] In America there was the notable example of 'Pitchfork Ben' Tillman, whose anti-intellectualism manifested in a pledge to abolish the University of South Carolina during his gubernatorial campaign in 1891.[59] It could be hard at times to separate objections to higher education based on its class connotations or anti-intellectualism from the claims of those concerned by universities' sheer expense. Often, those criticisms were tied together.

Gold and mineral rushes lowered popular resistance to university building because they enriched government and institutional revenue streams. As William Gardner pointed out with regard to the University of Melbourne, 'Who could complain about an item of £20,000 [for buildings] in a budget of near four millions?'[60] While university officials often combined financial tools, the general sources of university income were three: government or public grants, grants of (Indigenous) land that could be sold to raise capital, and benefactions. In addition, gold rush institutions would gain greater liquidity and new *raisons d'être* as mining interests increased.

Both attacks on 'useless' knowledge and the need for geological expertise encouraged the development of schools of mines

[57] Roger L. Geiger, 'Land-Grant Colleges and the Pre-Modern Era of American Higher Education, 1850–1890', in Alan I. Marcus (ed.), *Science as Service: Establishing and Reformulating American Land-Grant Universities* (Tuscaloosa, 2015), 16.

[58] Michael Cannon (ed.), *The Australian Thunderer: The Age after the Gold Rush, 1854–1859* (Melbourne, 1926), 14.

[59] Laurence R. Veysey, *The Emergence of the American University* (Chicago, 1965), 15.

[60] Gardner, *Colonial Cap and Gown*, 21.

and departments of geology and mineralogy. The expense of 'scientific apparatus' and laboratories favoured the inclusion or affiliation of these mining schools, in some capacity, to settler universities. Many schools of mines, at the same time, invented their own revenue streams. The School of Mines at Ballarat had its students conduct mining assays for money. In 1874 the institution recorded £321 made from the assays its students carried out for the Victorian government and different companies. This figure would rise to over £1,100 in the next two years.[61] The University of California would similarly offer its assaying laboratory and expertise to both governments and private companies.[62]

Especially in Australasia and South Africa, university promoters looked to their governments and the public for educational grants. Since each episode in settler university history was also an episode in colonial politics, the roles of politician and educationalist often overlapped. Politicians like Charles Nicholson earmarked funds for Sydney's university, an institution he promoted. High levels of public spending were also made possible largely by gold rush revenue. Settler governments charged miners for licences eventually called the 'miner's right', while also licensing businesses near the goldfields and receiving companies' fees for surveying, rents and royalties.[63] They also built mints for coining gold, and levied gold duties on exports. As it turned out, there was very little that did not have a government price attached on the goldfields.

The Transvaal Chamber of Mines recorded over £1 million in customs and 'mining revenue' in 1903 even before it counted the 'native taxes and pass revenue' it raised. These taxes forced migrant black and Indigenous labourers to pay for their mobility within goldfield regions.[64] In New South Wales, the colonial legislature's total revenue (before expenditures) rose from £370,354

[61] Ballarat School of Mines Annual Report and Calendar, 23 Dec. 1874: Geoffrey Blainey Research Centre, Ballarat (hereafter GBRC), object no. 8317.

[62] Walter S. Morley, 'Laboratory Instruction for Fire Assays of Gold, Silver, and Lead: Mining 107 a–b' (1913): UCB, 308x M865 l.

[63] *Public Accounts of the Government of New Zealand for the Financial Year 1870–71, Commencing 1st July, 1870, and ending 30th June, 1871*, Appendix to the Journals of the House of Representatives, 1872 Session 1, B-01 (Wellington, 1872).

[64] Transvaal Chamber of Mines, *Thirteenth Report for the Year 1902* (Johannesburg, 1903), 451.

before its gold rush in 1850, to revenues of £1,509,681 on the export of gold alone in 1858.[65] Little wonder then that in 1854 the state's legislature made a nearly uncontested initial allocation to Sydney of £5,000 per annum; a 126-acre site on Grose Farm; and eighteen acres, a £20,000 building grant and a £500 principal's salary for each constituent college.[66]

Within Otago and Southland, too, gold production closely mapped onto trends in government revenues (see Figure). Although gold rushes could upset the pre-planned institutional arrangements that were characteristic of Wakefieldian settlements, they did increase the province's spending power and raise the value of the hundred thousand acres of Māori land gifted to the university by its provincial government in 1869. With a little extra funding from the Presbyterian Church, the university provided professors' salaries of almost £700 per annum.[67] Such a large amount was nearly £300 above the going rate in Britain.[68] Otago's university was not alone in incentivizing imperial talent to make the trip to a settler institution. Tully and Whitehead have shown that the 'Victorian gold rush provided the funds to set the salaries and conditions that attracted professors from the fledgling Queen's Colleges in Ireland to the University of Melbourne'.[69] When most British institutions did not offer professors more than £300 a year, the settler empire's education market became competitive (see Table). McGill University in Montreal, for example, attracted the famous New Zealander physicist Ernest Rutherford by investing heavily in their laboratory facilities.[70]

Another favoured institutional financing mechanism depended on an asset that the New World had seized or appropriated in abundance: land. Settler governments used grants

[65] *Launceston Examiner*, 2 Apr. 1859; *Queenslander*, 23 Oct. 1869.

[66] Julia Horne and Geoffrey Sherington, *Sydney: The Making of a Public University* (Carlton, 2012), 13; John Woolley to William E. Gladstone, 9 May 1853: University of Sydney Library, Rare Books and Special Collections, 1117/1, no. M135.

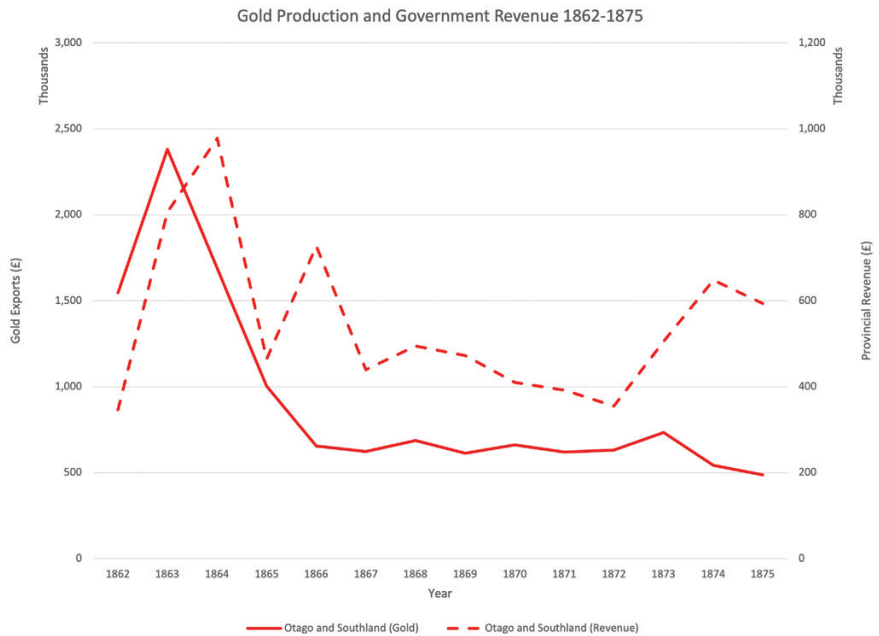
[67] W. Lauder Lindsay, *The University of Otago, New Zealand, as a College for the People* (Dundee, 1875), 17.

[68] William Whyte, *Redbrick: A Social and Architectural History of Britain's Civic Universities* (Oxford, 2015), 66.

[69] Tully and Whitehead, 'Audacious Beginnings', 35.

[70] Tamson Pietsch, *Empire of Scholars: Universities, Networks, and the British Academic World, 1850–1939* (Manchester, 2013), 109–14; McGill University Archives, Montreal (hereafter MUA), RG4, container 0504, file 06793.

GOLD PRODUCTION AND GOVERNMENT REVENUE IN OTAGO AND SOUTHLAND, NEW ZEALAND, 1862–1875 (£000)*



* Source: Compiled from University of Otago, *NZ Statistics: Historical Statistics*, <https://otago.libguides.com/nz_statistics/historical_statistics>, table V.22, 'Gold Exports by Goldfield, 1857–1920'; table VIII.3, 'Provincial Revenue and Expenditure, 1862–1875' (revenue only) (accessed 23 Sept. 2022).

of 'public land' or of clergy and Crown reserves, often wrested violently from Indigenous communities, to fund railways, turnpikes, canals and the creation of land companies.[71] So it was hardly a leap for legislators to propose this solution for university financing also. And importantly, the land provided to settler universities was much greater than the university campus itself, and could be situated in multiple cities or states. The trustees of Cornell University, for example, chose the lucrative timberlands of Wisconsin for their grant. These lands had once supported various Indigenous nations, including the Ojibwe (Chippewa), Sioux and Ho-Chunk.[72] By 1865 the Michigan Agricultural College (later Michigan State University) had similarly chosen disparate locations for some of the 240,000 acres it received, a grant that was obviously much larger than the institution's campus and was connected to the Ottawa and Ojibwe (Chippewa) peoples.[73]

American state and federal governments had, in fact, used land grants for education long before the Civil War. The federal Morrill Act of 1862, however, released one of the largest grants of public land in the history of the United States — over ten million acres of federal land — to states not 'in a condition of rebellion or insurrection' with the hope that state legislatures would offer further support.[74] New Zealander officials and clergymen shared Americans' affinity for land grants, as did South African benefactors and certain Canadian legislators. Perhaps in a spirit of competition with Otago, which had received at least two hundred thousand acres, the government of Canterbury made it the largest landowner in the province in

[71] Eldon J. Johnson, 'Misconceptions about the Early Land-Grant Colleges', *Journal of Higher Education*, lii, 4 (1981), 333.

[72] Robert Lee, 'Morrill Act of 1862 Indigenous Land Parcels Database', *High Country News*, Mar. 2020, <https://github.com/HCNData/landgrabu-data> (accessed 15 Oct. 2022).

[73] 'Report of the State Agricultural College', in *Third Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan for the Year 1864* (Lansing, 1865); Silas Chapman, Map Showing Cornell University Lands in Wisconsin for Sale (1877): Wisconsin Historical Society, Madison, Archives Division Maps, H GX902 1877 C.

[74] Act of July 2, 1862 (Morrill Act), Public Law 37-108: United States National Archives, Washington, DC, Enrolled Acts and Resolutions of Congress, 1789–1996, Record Group 11.

SALARIES OFFERED BY COLONIAL OR SETTLER AND BRITISH INSTITUTIONS*

Institution	Years	Professors' salaries
Colonial or settler institution		
University of Sydney	1854–60	£500 (for principal or professor)[a]
University of Melbourne	1854–60	£1,000, with a four-room apartment £300 for outfit and travelling expenses[b]
University of Otago	1869–75	£600, plus the value of class fees (*c.* £100)[c]
Victoria University College (now, Victoria University of Wellington)	1898–1905	£500 for first year, £700 thereafter[d]
University of California	1880s	US$3,000 for a full professor[e] [£600–50][f]
King's College (now, University of Toronto)	1837–41	Expected: £450 (anticipated expenditure)[g]
	1890s	Can$3,200 for a full professor[h] [*c.* £600][i]
University of Adelaide	1874–80	£800, professorial chairs[j]
South African College	*c.* 1830	Expected: £300–400 (anticipated expenditure), decreased to £100–200 during fiscal crisis[k]
British institution		
University of London	1836–55	£150–500[l]
	1845–50	£132 plus some student fees[m]
Queen's University, Belfast	1878–80	Under £300 (total allocation for the fiscal year of £1,339) plus student fees (large variation)[n]
	1899–1900	£400 for salary of a fellow[o]
Owens College, Manchester	1855	£37–137 depending on rank (possibility of student fees)[p]

* Sources:

[a] Julia Horne and Geoffrey Sherington, *Sydney: The Making of a Public University* (Carlton, 2012), 13.

[b] 'University of Melbourne Endowments', 29 Aug. 1917: Public Record Office Victoria, Melbourne, VPRS 3253, 1031.

[c] W. Lauder Lindsay, *The University of Otago, New Zealand, as a College for the People* (Dundee, 1875), 17.
[d] Minute Book of Victoria College Council, 29 June 1898: J. C. Beaglehole Room, Kelburn Library, Victoria University of Wellington.
[e] *Report of the Committee on Finance and Audit, 1887*: University of California, Berkeley, Bancroft Library, 308dh.P1 v.1:3–12.
[f] See, in particular, Rodney Edvinsson, Historical Currency Converter, <https://www.historicalstatistics.org/Currencyconverter.html> (accessed 22 Sept. 2022).
[g] University of Toronto Archives, B1988-0002, box 001, fo. 7.
[h] McGill University Archives, Montréal, RG4, container 0007, file 09007.
[i] Edvinsson, Historical Currency Converter.
[j] Michael Whiting, *Augustus Short and the Founding of the University of Adelaide* (Adelaide, 2014), 29.
[k] W. Ritchie, *The History of the South African College, 1829–1918* (Cape Town, 1918), esp. 27–8.
[l] William Whyte, *Redbrick: A Social and Architectural History of Britain's Civic Universities* (Oxford, 2015), 66.
[m] The National Archives, London, AO 19/75/17.
[n] The National Archives, London, T 1/16483; W. Whitla, *The University Education Question in Ireland: Its Difficulties and their Solution*: Queen's University Belfast Archives, QUB/2/1/12.
[o] Whitla, *University Education Question in Ireland*.
[p] University of Manchester Archives, GB 133 OCA/5/1/2.

1871 with 305,000 acres. In doing so, they directly enriched these institutions with Māori lands only recently confiscated during the New Zealand Wars.[75] In a few cases, mineral profits fed directly into university coffers. Like the mineral prospecting licences offered at some American and South African institutions, the University of Otago's administrators included 'goldfields revenue' from mining on university land and rents for mineral-rich land directly on their balance sheets. The land given to the university thus gave it an immediate stake in Dunedin's gold boom. It also gave this institution a reason to create university chairs in mining and metallurgy swiftly.[76]

[75] Today the University of Canterbury still holds 40,302 hectares of land: W. J. Gardner, E. T. Beardsley and T. E. Carter, *A History of the University of Canterbury, 1873–1973* (Christchurch, New Zealand, 1973), 42; *Otago Daily Times*, 17 Oct. 2019.

[76] The Morrill Act declared that mineral lands within the United States could not be included in the lands granted (if known to be mineral lands): Audited Annual Accounts, Mar. 1892: Hocken Collections, Dunedin, New Zealand, AG-180-044/001; Report of the Finance Committee, 19 Nov. 1885: University of Adelaide Archives, ser. 145, vol. 1.

Finally, one of the most coveted forms of institutional financing throughout the nineteenth century was philanthropic: benefactions. With the global gold rushes came a new generation of mining magnates, their wealthy widows and daughters, and corporations that associated their good fortune with a particular place. Financial family dynasties in London, New York, Melbourne, Cape Town and elsewhere grew out of the wealth in settler ores. University councillors in the British colonies looked enviously at American millionaires' propensity for philanthropy even before American foundations, like that of Andrew Carnegie, reached out to them. While giving an address at the University of Adelaide in 1912, the British academic and politician James Bryce would complain that the United States has 'millionaires as plentiful as blackberries . . . with constant fertilizing streams of gold'.[77] A professor at Adelaide also calculated that by the 1910s each state university in America was receiving at least $100,000 per year in 'private gifts'.[78] But, to some extent, educationalists across the British empire who suffered from these jealousies overlooked the significant benefactions that moved from the mines to their own universities.

For the University of Melbourne's library, which is still named after him, the family of the mine financier and politician William Lawrence Baillieu donated £100,000 in his memory.[79] At Adelaide, meanwhile, the speed of founding a university in that city derived almost entirely from the wealth of a 'copper king', Walter Watson Hughes. The Scottish-born Hughes went to South Australia in 1840, where he became a pastoralist. But his prospecting efforts on the pastoral runs he owned revealed what would become the Wallaroo copper mines, and nearby, the Moonta Mines. The Moonta Mines alone was the first mining endeavour in Australia to pay over £1 million in dividends.[80] In November 1874, Adelaide's Act to Incorporate and Endow the University credited Hughes with his substantial role:

[77] James Bryce, 'Functions of a University: An Address', 19 July 1912: National Library of Australia, Canberra, Np 825 BRY.

[78] William Mitchell, lecture, 10 July 1917: National Library of Australia, Canberra, nla-obj.2381491.

[79] Poynter, 'Baillieu, William Lawrence (Willie) (1859–1936)'.

[80] Whiting, *Augustus Short and the Founding of the University of Adelaide*, 46.

> Whereas it is expedient to promote sound learning in the Province of South Australia . . . and endow an University at Adelaide . . . And whereas Walter Watson Hughes, Esquire, has agreed to contribute the sum of Twenty Thousand Pounds towards the endowment of two chairs or professorships of such University . . . [there] shall be a body politic and corporate by the name of 'The University of Adelaide'.[81]

Hughes's donations set off a cascade of further benefactions from his friends and fellow pastoralists. Robert Barr Smith, who dabbled in copper mining and general business supply, offered at least £5,000 to endow the university's library, while Smith's business partner Thomas Elder gave almost £100,000 over his lifetime, in one case to fund the professorial chair that the famed mathematician Sir Horace Lamb held. These additional gifts, it seemed, answered the prayers of the Reverend Augustus Short at the university's inauguration. While detailing the patronage placed at the direction of Oxford and Cambridge, he entreated his audience to 'Let the strong Commonwealths of Australia rival by private gifts the munificence of Princes'.[82]

Varied and sometimes inscrutable motives inspired gold rush university donors. In California, educationalists connected the $7 million in private gifts they had received by 1897 to philanthropists' eagerness to give 'when they became assured that the money would be spent in a way that would immortalize the donors'.[83] Other benefactors were mining bosses or owners, who contributed funds to establish chairs of geology, mining or mineralogy that might provide technical knowledge. For South Africans, benefactions from gold and diamond mining transformed the landscape of higher education, just as mining itself ecologically transformed the veld.

Mining heavyweights like Cecil Rhodes and John W. Jagger assumed political as well as economic power, an influential combination. Rhodes, along with other colonial administrators, pushed racial unification — between 'the two great white races of

[81] Acts, Statutes and Regulations of the University of Adelaide: State Library of South Australia, Adelaide, S Australiana Pamphlets, 378.42.

[82] Inauguration Addresses, 25 Apr. 1876: State Library of South Australia, Adelaide, S Australiana Pamphlets, 378.942 M987.

[83] Samuel E. Moffett, 'A Western City of Learning', *Harper's Weekly*, 11 Sept. 1897: UCB, 308g.P18 (Pamphlets Descriptive of the University of California Berkeley), item 6.

South Africa' — through higher education.[84] Yet Rhodes's donation of his enormous Groote Schuur estate worried Afrikaners because of the influence it would give to a supposedly British-run education system. As with his scholarship system, Rhodes spoke freely about his intention to foster unity among white male leaders. 'Nothing will overcome the associations and the aspirations they will form under the shadow of Table Mountain', he told an audience at Kimberley about the SAC.[85]

Nevertheless, Rhodes was just one of many mine-made educational philanthropists in South Africa. John W. Jagger had followed gold to South Africa (from Britain) in the 1880s and set up a profitable supply and manufacturing business there. Jagger donated periodically to the SAC, which became the University of Cape Town (UCT) after 1918, throughout his lifetime. By the 1920s, he had given over £26,000.[86] Joining Jagger on a list of donations made to the SAC in its Appeal of 1904 were the diamond magnate Frederic Philipson-Stow (£10,000), De Beers Consolidated Mines Ltd (£5,000), and the owners of several supply and outfitting companies like J. Garlick and William M. Cuthbert.[87]

Securing the largest bequest left to the SAC, and by extension to UCT, depended on the organizing efforts of the SAC's professor-turned-principal 'Jock' Carruthers Beattie. Beattie, a professor of physics who had laid 'the groundwork for modern geophysical prospecting', was acquainted with Rhodes and the German mining magnate brothers Alfred and Otto Beit. When Alfred Beit died in 1906, leaving £200,000 for a university in Johannesburg, Beattie and Otto Beit worked together to ensure that the trustees of the Beit Bequest instead devoted this money to support Rhodes's dream of a national university in Cape Town.[88] In the 1920s, UCT would gain a further £300,000. This too was a gift from the Beits, this time

[84] Lord Selborne, speech, 1906: UCT, Special Collections, BCS466, fo. 1.

[85] Cecil John Rhodes, speech, 30 Mar. 1891: University of Cape Town Libraries, Cape Town, stack 24, bay 1, shelf 7, box 3, id. 102.

[86] J. C. Beattie to Otto Beit, 31 July 1929: UCT, Special Collections, BUVZ, fo. 1.

[87] South African College Development Pamphlet, 1904: UCT, Special Collections, BUVZ, fo. 1.

[88] 'Mining Pioneer Who Became University Principal', 1937: UCT, Special Collections, BC 215, ser. A.

from Otto Beit, along with his late brother's colleague Julius Wernher. Their donation would establish the Wernher–Beit Medical Laboratories at UCT.[89]

As the historian Jill Pellew has documented, funds from this influential set of randlords (especially Wernher and the Beits) also made their mark on British metropolitan higher education. Otto Beit and Wernher together donated over £300,000 in funding and fellowships to the Royal School of Mines in London, which became an important component of the Imperial College of Science and Technology in 1907. These men of unprecedented wealth, she argues, 'well understood the urgent need for a stream of experts in mining techniques as mine managers'.[90] Today, the position of Beit Professor of History of the British Commonwealth at the University of Oxford, established in 1905 as the Beit Professor of Colonial History, still draws an annual contribution from the Beit Fund, the charitable trust established by Alfred Beit.[91] To some extent, then, even the production of historical knowledge has been framed and entangled with the long history of colonial mining.

Administrators at the Afrikaners' university in Stellenbosch, meanwhile, watched this philanthropic activity warily. While they had once hoped to secure some of the land near Table Mountain given away by Rhodes, they found their financial saviour in Jannie Marais of Coetzenburg. Marais had attended the Stellenbosch Gymnasium in the late 1860s and would transform the institution he had attended (then called Victoria College, Stellenbosch) with a donation of £100,000 in 1915. His fortune stemmed from his diamond-mining exploits with his older brothers along the river Vaal. And while he later became a Cape parliamentarian and co-founded a media conglomerate (now called Naspers), students at Stellenbosch long referred to him as 'Jan the Giver'.[92] One of the university's largest contemporary

[89] Centenary Appeal, July 1929: UCT, Special Collections, BUVZ, fo. 1.

[90] Jill Pellew, 'Donors to an Imperial Project: Randlords as Benefactors to the Royal School of Mines, Imperial College of Science and Technology', in Pellew and Goldman (eds.), *Dethroning Historical Reputations*, esp. 37–43.

[91] University of Oxford, Beit Fund, Part of Council Regulations 25 of 2002: Trust Regulations (22 July 2022), <https://governance.admin.ox.ac.uk/legislation/beit-fund-0> (accessed 23 Sept. 2022).

[92] Hans Heese, 'The Origins of Stellenbosch University', in A. M. Grundlingh, Hans Oosthuizen and Marietjie Delport (eds.), *Stellenbosch University 100: 1918–2018* (Stellenbosch, 2019), 24.

scholarship funds still derives from the institution's 'Het Jan Marais Fonds'. Combined with additional donations from De Beers Consolidated and other companies, Victoria College would assume the title 'the University of Stellenbosch' and university status on the same day as UCT in 1918.

As 1900 approached, settler universities, including the American land grants, would start to seek out large philanthropic bodies for support as much as individuals. The foundations run by Andrew Carnegie, John Rockefeller and the mining family made wealthy by their Yukon Gold Company, the Guggenheims, offered unparalleled financial support.[93] Before this happened, however, many private gold-mining benefactions propped up public institutions, an arrangement that had not been made on this scale before. In addition, gold profits fuelled new industries that further enriched mining men. Queensland gold, for one, proved essential to the development of British oilfields in the Middle East, as the case of William Knox D'Arcy demonstrates. The English-born D'Arcy made a fortune in Queensland's Mount Morgan goldfield, paving the way for him to secure a sixty-year oil-mining concession (for over half a million square miles) in Iran from 1901.[94] The settler universities founded during or after gold rushes nonetheless discovered that the mix of gold-enriched government support, mineralized land grants and mineral-fired benefactions sufficed to set them on a steady course.

IV

MINING PROFESSIONALS AND KNOWLEDGE NETWORKS ACROSS THE SETTLEMENT EMPIRE

The relationship between mineral extraction and higher education in settler societies was dynamic and co-constitutive. While mineral rushes had contributed to the proliferation and financial underpinnings of new institutions, once in operation these institutions took on the concerns of the mining industry.

[93] Papers of Carnegie Trust for the Universities of Scotland: National Records of Scotland, Edinburgh, repository no. 234, GD1/464/1/34.

[94] D'Arcy's first oil strike in 1908 led to the formation of the Anglo-Persian Oil Company in 1909: David Carment, 'D'Arcy, William Knox (1849–1917)', *Australian Dictionary of Biography*, <http://adb.anu.edu.au/biography/darcy-william-knox-5882> (accessed 23 Sept. 2022).

They developed techniques of extraction that moved with mining experts and prolonged the rushes that had first established them. In other words, gold mining propelled and incentivized the development of mining expertise, and then the development of mining expertise remade the metals-mining industry.

Elite and lay knowledge of geology, metallurgy and mining existed prior to 1848, growing in professionalization in tandem with colonial developments. In London, the Royal School of Mines grew out of a government school set on Jermyn Street in 1851.[95] By that point, the École des Mines in Paris and the Bergakademie in Freiberg already existed. Yet the rise of the mining expert in the late nineteenth century as a trustworthy and technocratic professional owed a great deal to settler universities. These universities, as this article explores, offered situated knowledge and the fashioning of mining expertise after California's rush in a form that benefited both European metropolitans and settlers. It also justified these institutions' continued use of public funds.

A global 'circulating elite' emerged out of universities and technical institutes that managed the mass transfer of technologies and institutional forms across the Anglo and sometimes the non-Anglo settler world.[96] This global connectivity, as Tuffnell describes it, draws scholars' attention to 'the multidirectional exchange of technologies' between Europe and settler societies, challenging unidirectional models of technological diffusion from imperial metropole to colonial periphery.[97] Gold rushes themselves gave impetus to the inclusion and growth of geology, chemistry, mineralogy and metallurgy within goldfield universities or affiliated schools. After 1862 the Morrill Act in America pushed the mechanical arts, including engineering, deeper into the heart of settler higher education. To some extent, it also unlocked the college curriculum from the grip of classical knowledge.[98]

[95] Roy Macleod, '"Instructed Men" and Mining Engineers: The Associates of the Royal School of Mines and British Imperial Science, 1851–1920', *Minerva*, xxxii (1994), 422–3.

[96] *Ibid*., 422.

[97] Stephen Tuffnell, 'Engineering Gold Rushes: Engineers and the Mechanics of Global Connectivity', in Mountford and Tuffnell (eds.), *Global History of Gold Rushes*, 231.

[98] Applied Science Endowment, 1880: MUA, RG4, container 0431, file 07683.

It seems unsurprising, then, that most universities first buoyed by gold booms offered courses in the 'three sister sciences', geology, chemistry and mineralogy (or mining), from the moment their classes began. One of the foundation professors at the University of Melbourne, for instance, was Frederick McCoy. McCoy had never received a university degree, but had been a professor of geology and mineralogy at Queen's College, Belfast.[99] He would teach natural science at Melbourne, including courses on geological subjects, from its foundation in 1854. A school of mines established at Ballarat in 1870, and another later at Bendigo, would supply additional training in 'mathematics, mining and land surveying, mechanical engineering, chemistry, and telegraphy' to Victorians and students from all over the world.[100] Other gold rush institutions which had received major benefactions from mine owners also accepted funds that came with an unconditional directive to offer mining-related education. In his gift to the University of Adelaide in 1874, for instance, Walter Watson Hughes set aside certain funds tied to the creation of a chair of natural science (to teach subjects that included geology and mineralogy).[101]

In addition to these, the universities of Toronto, Otago, Sydney, McGill and others provided courses in mineralogy, mining or geology before 1870. Dedicated schools of mines like that of Ballarat, with varying degrees of attachment to universities, grew out of the gold era. The South African School of Mines, an institution affiliated to the SAC, had students complete a portion of their course in Cape Town followed by two years of practical training split between Johannesburg and the De Beers diamond mines of Kimberley. The SAC college calendar for 1895 assured students that this programme would give them 'every facility for studying the actual development of the Gold Mining Industry'.[102] Although taught locally, this training could then be repurposed to assist corporations and governments globally.

The School of Mines at Ballarat (SMB) thrived on the mobility and networks forged by empire. From 1874 it received

[99] Selleck, *The Shop*, 23.

[100] Ballarat School of Mines Annual Report and Calendar, 23 Dec. 1874.

[101] Whiting, *Augustus Short and the Founding of the University of Adelaide*, esp. 30–6.

[102] UCT, Special Collections, BU 378.687 s. 17.

curricular information from 'honorary correspondents' listed under the locations New York, Italy, Ararat, Wellington (New Zealand), London and Geelong (Australia).[103] It also welcomed foreign visitors and students. Sir Julius Vogel, New Zealand's future prime minister, visited in 1875, as did the governor of Western Australia, Sydney's commissioner of railways and the German-born New Zealander geologist Julius von Haast. Von Haast remarked that the school was already notable for its 'reputation outside the Colony'.[104] Distant yet imperially connected companies, such as the New Rietfontein Estate Gold Mines Limited of South Africa, sought out expertise from SMB too.

One of the greatest products SMB offered to the world was the experience of its professors and alumni. Noting the influence of Daniel Walker, one of SMB's earliest professors, the students' magazine boldly claimed that 'There is perhaps not a country in the world where a mining engineer, metallurgist, or analyst cannot be found who received instruction from and affectionately remembers "Danny": while in our own country his past pupils are to be found in all parts carrying on important work'.[105] Like Ballarat's mining school, other settler institutions could boast of globally mobile graduates and of the move towards professionalization conferred by the 'graduate' label. Engineering graduates and alumni from the University of California, one university official claimed, 'have been called to China, Japan, the Philippines, Guam, New Zealand and the Hawaiian islands, as teachers, engineers, chemists and public officials, and this call will grow constantly more imperative'.[106]

Alumni of mining associateship programmes across the Americas, South Africa and Australasia became a desirable engineering workforce in the 1890s. While an Associateship of the Royal School of Mines, London, maintained a globally recognizable status, an Associateship of the Otago School of Mines, Dunedin, or Associateship of SMB soon conferred 'high standing in the world of mining engineering too'.[107] The reputation of

[103] Ballarat School of Mines Annual Report and Calendar, 23 Dec. 1874.

[104] Extracts from the Visitors' Book, 1875: GBRC, object no. 8317.

[105] Daniel Walker, clippings folder, *c.* 1899: GBRC, bio. 7655.

[106] *Sunset: A Magazine of the Border* (1902): UCB, 308g.P18 (Pamphlets Descriptive of the University of California Berkeley), item 12.

[107] Parton, *University of New Zealand*, 24.

these mining institutions and of goldfield universities, moreover, acted as a justification for their continued existence and for the funding put forward by their local governments. The perceived utility of mining education to settlers accelerated the process of popularizing settler universities within their communities. As one correspondent to the *Otago Daily Times* wrote in 1903, he 'considered the Otago Mining School of the greatest importance — not only to their University, but to the whole colony'.[108] Higher education had not always received such rave reviews. To some degree, mining education in settler societies had escaped the 'stain' of elite knowledge, while demonstrating its utility to local landscapes, to mining men and to women.[109]

The movement of technologies between settler mining sites is another example of the interconnectedness of settler institutions, experts and ecological impacts. Although Californian miners rather than professors or students piloted early iterations of hydraulic mining and spread this technique to Australasia, later versions of hydraulic technology in quartz and deep-lead mining owed their design to settler scientists.[110] Once settlers had exhausted placer or alluvial mining in each 'rush' location, improved ore mining and conglomerate mining techniques allowed for greater and more destructive digging. It took ever-increasing skill to craft water races, sluices, tunnels and deep shafts far underground. At the Victoria Quartz Mine in Bendigo, the deepest shaft was '4650 ft. deep vertically'.[111] These technologies prolonged the life and increased the value of gold mines in both the United States and the British dominions. The development of the cyanidation process for extracting gold from low-grade ores, for instance, was revolutionary for the productivity of Johannesburg's gold mines, yet devastating to water sources and both settler and Indigenous communities almost anywhere it was employed.

[108] *Otago Daily Times*, 5 May 1903.

[109] The early schools of mines and mining departments hired female graduates as demonstrators and sometimes as professors, including Bella Guerin at SMB from 1887 and Ida Allison Brown at Sydney University from 1922: Federation University Australia, *Lines of Succession: The Origins of the University of Ballarat from 1870* (Ballarat, 2012), 3; 'Ida Allison Brown (1900–1976)': University of Sydney Library, Rare Books and Special Collections, P187, boxes 1 and 3.

[110] Isenberg, 'Real Wealth of the World', 214.

[111] E. J. Dunn, *Geology of Gold* (London, 1929), 97.

A series of international mining institutes and bodies operating in a space adjacent to and sometimes dependent on universities gained traction in the 1880s and spread this sort of research to other mining professionals. Through circulated publications, international congresses and personal networks, mining expertise travelled to different imperial and American sites. Alongside universities, key vectors for transmitting mining knowledge were the American Institute of Mining Engineers, formed in 1871, the Transvaal Chamber of Mines in the 1890s, and the Institution of Mining and Metallurgy (IMM) in London after 1892.[112] Word of further innovations by German, Scottish and settler researchers working with cyanide moved along the knowledge networks fashioned by and through these organizations.

Often mining experts were members of more than one international organization. Charles Butters, for example, who was both a cyanide specialist from California and a member of the IMM, became the first president of Johannesburg's 'Cyanide Club' in 1896. Membership in mining organizations had soared by 1900, with the IMM listing over a thousand members. The IMM's members list included the future United States president Herbert Hoover and the inventor John Hays Hammond.[113] And increasingly, then overwhelmingly, the professionals connected to these mining institutions were graduates of university or technical programmes in mining, chemistry, geology, physics or some combination of these. All this co-ordination between professionals and institutions dramatically increased the profitability and extraction rates of gold mining in South Africa and elsewhere, but it also brought globally and imperially sourced techniques to bear on local terrains and populations.

Mining engineers served the needs of both industrializing and extractive economies in the last decades of the nineteenth century. In doing so, they and the innovations emanating from settler universities tore up and reshaped settler landscapes. Hydraulic mining required tremendous volumes of water, while miners felled whole forests to satiate the demand for the wooden flumes and beams of mine shafts. By the 1870s, an estimated one-third of California's timber was already gone.[114] The cyanide process,

[112] Tuffnell, 'Engineering Gold Rushes', 233.
[113] *Ibid.*, 235.
[114] Isenberg, 'Real Wealth of the World', 217.

so treasured by mine owners and engineers, poisoned workers and water sources across the settler world. These imperially transferred technologies and knowledge did keep gold production high, yet they had significant destructive effects on local environments. Mining's terrific resource use, meanwhile, provoked conflict between Indigenous peoples and settlers. The Fraser Canyon War of 1858, between the Nlaka'pamux people and Euro-American miners, began in part because miners threatened critical food sources. Mining communities rerouted waterways, upsetting the salmon runs relied upon by various Indigenous groups.[115]

The circular dynamic produced by gold rushes, of shaping institutions that in turn reshaped them, tied into the many other 'webs' and information cycles of empire.[116] Some settler mining engineers sustained a 'lived global connection' by moving between settler universities or between companies once they became alumni.[117] Settler circulation, the metropolitan uptake of colonial situated knowledge, and the impact of imperially created technologies on colonial landscapes did not follow a random pattern, however. Those people, not just settlers, who lived within the orbit of Anglo-American empire found that their actions and decisions — informed by imperial information networks, circumscribed by fixed shipping or travel routes, impeded by new immigrant populations, and recast by literature, performance art and music for English-language audiences — were set within globalizing geopolitical structures. Settler universities extended the bounds of imperial and transnational worlds, but still operated within them. Gold mining and gold rushes, nonetheless, were among the local features of settler societies that drew the peoples, technology and capital of a globalizing world towards them.

V

CONCLUSION: SURFACING FROM THE MINES

At his inauguration as president of the University of Wisconsin in 1850, John Lathrop decreed that

[115] Marshall, *Claiming the Land*, p. xiii.

[116] Tony Ballantyne, *Webs of Empire: Locating New Zealand's Colonial Past* (Vancouver, 2012).

[117] Pietsch, *Empire of Scholars*, 201.

> Money was styled by Tacitus as the *nerves of war* . . . Money may with equal propriety be termed the *nerves of learning*, because money can command the books which record the thought of past and present, the apparatus which is essential . . . and what is more than all, the talent and character of the living instructor.[118]

Gold, along with the conditions surrounding its extraction and exchange, was one asset that could stimulate these 'nerves of learning'. The impact of the Victorian era's global gold rushes to fund institutions and to transform administrators' ideas into blueprints and buildings produced a generation of universities with deep golden roots.

This article contends that the gold booms that connected settler societies after 1848 encouraged the proliferation of a particular set of universities — the goldfield foundations — because these mineral frenzies invigorated university-financing mechanisms. At the same time, the social upheaval and population growth brought on by gold lust made the university seem like an attractive structure for upholding Old World values. Built before widespread elementary or secondary education existed, settler universities benefited from the ways in which gold enriched their sources of financing, from government grants to the value of land endowments. As James Belich has argued, in 'settler history, it's the speed [of settlement] not the length that counts'.[119] Amid the tremendous movement of settler populations, then, university administrators operated strategically and opportunistically. Not all gold rush societies founded universities. Dawson City in the Yukon, for one, did not. Often the financial and institutional gains of gold rushes were incredibly uneven, both geographically and between racial groups or social classes. But for more than a few sites and institutions, gold's boost to settler financing strategies fulfilled a necessary condition of their establishment (the money) and provided an additional motivation to teach subjects that would support the mining industry.

In a broader sense, the significance of the goldfield foundation universities lies in what these entities ultimately produced: engineers and expertise, which drove the global mining industry and

[118] 'Inauguration of Hon. John H. Lathrop LL.D., Chancellor of the University of Wisconsin, at the Capitol, Madison, January 16, 1850': University of Wisconsin-Madison Archives, Madison, ser. 4/00/05, box 1.

[119] Belich, *Replenishing the Earth*, 558.

the many other industries reliant upon minerals or metals. Just as the American land-grant universities gradually furthered agricultural and mechanical research (as they were legislated to do), the goldfield institutions accelerated industrial mining and prolonged mineral extraction because they were born with a vested interest in these activities. Innovations such as kerosene, tunnelling technology and advanced explosives emerged from university research or its applications.[120] Investigating this material dimension of university history thus reveals meaningful patterns in how and why educational institutions were established in colonies of settlement, and also how these institutions then furthered economic development, technological innovation and globalization.

The connection between gold rushes and university building might be cast as a tale of success. Yet the combination of gold-fuelled immigration and the application of imperial knowledge to mining problems had enormous costs. In some settler societies, abandoned mine shafts, craters, deforested landscapes and contaminated ore-refining stations still dot the countryside, a testament to the ecological destruction wrought by mining technology. The value of Indigenous knowledge to fostering and working gold rush sites is also largely missing from the historical record. In one instance related by Lyndon Fraser, the whaling-ship captain John Howell and his Māori in-laws travelled from Aotearoa to California to take part in the 1848 gold rush. 'Howell was dumbfounded when, after the party had found its first valuable strike of gold', Fraser narrates, 'his Māori relations said that it was a waste of time coming so far for such stuff given it was plentiful in New Zealand rivers'.[121] Documenting episodes like these helps to regain the ground overrun by gold rush mythology, and re-establishes the significance of Indigenous knowledge to the history of 'discovery'.

In some ways, this investigation also responds to the challenge put forward by Mountford and Tuffnell 'to plot more carefully the places and infrastructure that anchored global connections and the people and processes involved in creating and managing long-distance trade, communication, and exchange'.[122] Once

[120] Loris S. Russell, 'Gesner, Abraham', *Dictionary of Canadian Biography*, <http://www.biographi.ca/en/bio/gesner_abraham_9E.html> (accessed 23 Sept. 2022); 'Canada: Processes for the Fixation of Nitrogen, 1917–1918': TNA, MUN 4/5448.

[121] Carpenter, 'Finding "Te Wherro in Otakou"', 89.

[122] Mountford and Tuffnell, 'Seeking a Global History of Gold', 18.

opened, universities were social anchors amid the frenzy for gold. They held people and expertise in place for a time, before releasing them to repurpose the knowledge they had gained and to foster mineral frenzies again in different environs. Like the global history of gold rushes, then, which has only recently brought these booms into a single analytical frame, this article groups together a series of distant mineral booms that forged equally distant universities, and then considers how those universities reforged colonial landscapes so that they would boom again and again.

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