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FORUM: RETROSPECTIVES

History of science in Aotearoa New Zealand

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History of science in Aotearoa New Zealand exists in varied and shifting niches and has never been securely institutionalized. From time to time some university history or philosophy departments teach history of science, the students write theses, and the teachers research and publish. But history of science is more likely to be written by scientists interested in the history of their specialist areas and science administrators reflecting on the history of their institutions. Numerous others – historical geographers, museum curators, librarians, journalists, for example – have contributed to the history of New Zealand science. Thus, there is much *history* of science in New Zealand, but few who identify as *historians* of science.[1]

Most history of science written in New Zealand is history *of* New Zealand science. Scientists examine their own specialities or institutions, librarians use material from their own archives, journalists have local interests, relatives write biographies of significant family members. Histories written here sometimes extend to the Pacific, but only a small proportion, mostly written by university-based historians trained outside New Zealand, have subject matters beyond our geographical region. Moreover, and more significantly, although developments in science in New Zealand often parallel developments in other former British settler colonies, the lack of broader knowledge among disciplinary specialists and enthusiast historians often results in local stories being interpreted as unique or idiosyncratic, and given local explanations when they could be related to trends found across settler colonies.

What counts as science is contested. For the restricted purposes of this article, I take a narrow view and largely limit myself to the science in the Western, now global, tradition. In recent decades many Māori scientists have asserted the importance and scientific status of mātauranga Māori, that is, Māori knowledge traditions, the big and controversial question being the extent to which mātauranga Māori involves a world view inconsistent with modern science. My narrow definition is not intended to question the value of mātauranga Māori but, because I have questions about the nature and authority of science, I am unwilling to identify all useful or true knowledge with currently dominant conceptions of science. I shall return to these questions below.

[1] Within New Zealand the more common label is 'science historian'. I speculate that this alludes to an assumed base in science rather than history, but it may merely be a local convention of no larger significance.

This article will first cover history-of-science teaching and research associated with the label 'history of science' within universities, then survey the range of research beyond these obvious disciplinary boundaries or outside universities, and third discuss the questions around mātauranga Māori. Although technology and medicine are often included under the umbrella of history of science, in this survey I exclude medicine, as history of medicine is independently and more successfully institutionalized in New Zealand, but I do allude to histories of technologies – for example, agricultural technologies which are particularly important in the New Zealand economy.

History of science has had a small place in some of our universities for many decades. At the University of Otago (in Dunedin), philosophers of science in the Popperian tradition taught history of science in association with philosophy of science within the Philosophy Department. When John Stenhouse, a historian of New Zealand with research interests in science and religion, arrived in the History Department he introduced a graduate course in intellectual history which included history-of-science topics, and when history of science was no longer taught in the Philosophy Department he introduced an undergraduate-level history-of-science course in the History Department. Also at Otago, synergies emerged between history of science and environmental history and between historians and historical geographers researching environmental history (of which more below). More recently, in 2002 the University of Otago established a partnership with Natural History New Zealand (NHNZ), originally a film production group, to teach a science communication course.[2] The emphasis of this course is on visual media, but historical topics are introduced briefly. At Victoria University of Wellington, the member of the History Department representing early modern European history (currently Catherine Abou-Nemeh) has usually been someone with expertise in history of science.

There have been three efforts to establish specialist teaching programmes which include history of science as an element: at the University of Auckland in the mid-1990s, at the University of Canterbury (in Christchurch) in the early 2000s, and most recently at Victoria University of Wellington. At Auckland, when interdisciplinary programmes were encouraged at a new campus (the Tamaki Campus), a Science and Human Affairs programme was established at undergraduate level by Robert Nola (philosopher of science), Willie Smith (geographer, with expertise in science policy), and me (historian of science). It declined when the Arts Faculty withdrew from the new campus and died as financial pressures on departments discouraged cross-faculty and cross-departmental cooperation. At Canterbury, philosopher of science Philip Catton established a programme in history and philosophy of science, located in the Philosophy Department, but with support from colleagues across the Science Faculty: Andy Pratt, chemist; John Campbell, physicist and authority on Ernest Rutherford (New Zealand's greatest scientific hero); and Clemency Montelle, linguist, mathematician and historian of the exact sciences in antiquity. The programme collapsed amidst the pressures on the university and its personnel in the aftermath of the Canterbury earthquakes (2010–12), but Montelle continues to teach and supervise in history of mathematics within the Mathematics Department.[3]

The most recent and currently flourishing programme is the Science in Society programme at Victoria University of Wellington (VUW). Established by Rebecca Priestley and Rhian Salmon in 2013 as an undergraduate programme, it has expanded to include a full graduate programme with master's and PhD students within the administrative structure of a 'School' of Science in Society. Emphases within the programme are science communication and public engagement with science, creative writing in science, the Antarctic and environmental history. Formal 'history of science' is a small component of the programme.

[2] See https://en.wikipedia.org/wiki/NHNZ (accessed 15 February 2025).

[3] See https://en.wikipedia.org/wiki/2011_Christchurch_earthquake (accessed 15 February 2025).

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Rather, history of science is one of the academic disciplines (another is anthropology of science) contributing to a critical perspective on contemporary technological and environmental issues, such as gene therapy, climate change and loss of biodiversity. Public communication of and debate around these issues are encouraged.[4] For students who wish to emphasize historical perspectives, co-supervision arrangements between the School of Science in Society and the History Department are available.

The disappeared programmes are not without significant outcomes, in particular Rebecca Priestley, co-founder and inaugural director of VUW's Science in Society programme, is a PhD graduate from the HPS programme at Canterbury. Her PhD thesis on New Zealand's fascination with the nuclear, published as *Mad on Radium*, demonstrates a national enthusiasm for nuclear opportunities before our anti-nuclear campaigns of the 1980s.[5]

Thus, in Aotearoa New Zealand, as in France, history of science is marginal in the higher-education system (see Jonathan Simon's account in an earlier Retrospective).[6] There are both economic and cultural reasons for this. New Zealand is a small country of modest wealth. The resident population passed five million only in 2020, as New Zealanders living overseas chose to return home during the COVID crisis. Our history departments are small – and declining as national educational policy shifts resources to the STEM subjects (science, technology, engineering and medicine); we have no stand-alone research centres in the humanities or social sciences. But, as the example of France shows, size and wealth alone do not determine that history of science will flourish in higher education or research institutes. Our cultural traditions are also inhospitable to history of science because our educational curriculum separates the humanities from the sciences. Thus most of New Zealand's historians know little of and have little interest in science. This dichotomizing tendency was brought home to me in 1994 when, shortly after my return to New Zealand, a graduating history student, learning that my field was history of science, responded 'isn't that a contradiction in terms?' Moreover, when historians in New Zealand shifted their emphases from British and European topics to our own history, they found allies among literary scholars, novelists, poets and artists. A central question was identity. In English departments and history departments alike, scholars asked, how does New Zealand Pākehā identity differ from British identity? And when did we become culturally independent? Hence it is not surprising that, in general histories of New Zealand, whether written for the general public or other historians, poets, artists and opera singers gain more attention than scientists and engineers, with the unexpected exception of histories written as high-school texts. It would be unkind to identify specific examples, so I merely offer an exception to prove the rule: *A History of Goldmining in New Zealand* by John Salmon, inaugural professor of history (1964–9) at the University of Waikato and eminent historian of France.[7] Salmon's interest in gold mining is astonishing until one learns that he was born in Thames, which had been the New Zealand centre of underground gold mining since the 1860s.

Recent emphases in historiography both encourage and discourage attention to scientific and technological topics. On the one hand, within New Zealand, the Māori insistence that Te Tiriti (the Treaty of Waitangi in the Māori-language version signed by chiefs) be honoured and the wide political acceptance that this requires compensation for the unjust and violent loss of lands have led to a focus on local histories by many historical and legal scholars. Most recently, the decision that the history curriculum in schools no longer be a whitewashed Pākehā perspective has required focus upon local, New Zealand wars and race

[4] See www.wgtn.ac.nz/scis (accessed 15 February 2025).

[5] Rebecca Priestley, *Mad on Radium: New Zealand in the Atomic Age*, Auckland: Auckland University Press, 2012. There were several MA graduates from the Canterbury programme, but Priestley was the only PhD graduate.

[6] Jonathan Simon, 'Retrospectives: History of science in France', *BJHS* (2019) 52(4), pp. 689–95.

[7] John H.M. Salmon, *A History of Goldmining in New Zealand*, Wellington, Government Printer, 1963.

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relations within the higher-education curriculum. On the other hand, the boom in environmental history, the growing interest in global and transnational histories, and the rise of cultural history direct attention to previously unrecognized areas for historical investigation. Topics about the non-human environment, transport and communication, and beliefs and attitudes have many overlaps with topics falling under the umbrella of history of science and technology. Fortunately, there is an existing literature on which to draw, although little of it has been written by New Zealand's historians.

Although history of science has seldom flourished in our universities, there are other supportive institutions and networks where history of science has been given a home. The earliest significant reflections on the history of New Zealand science were published by senior administrators in the Department of Scientific and Industrial Research (DSIR). When the now independent universities were 'university colleges' of the University of New Zealand, their staff had heavy teaching loads and were not expected to do research. The research role was given to the DSIR, founded in 1926 on the model of the British institution of the same name, to research issues of relevance to the New Zealand economy.[8] Forty years on, Frank Callaghan, then secretary of the DSIR, edited a collection of short papers, *Science in New Zealand*. For the DSIR's fiftieth anniversary in 1976, J.D. (Torchy) Atkinson, ex-director of the Plants Diseases Division of the DSIR, wrote an institutional history, *The DSIR's First Fifty Years*.[9]

The outstanding contribution to Callaghan's volume is Ian Dick's brief 'Historical introduction to New Zealand science'.[10] Dick had an important place in the post-war development of New Zealand's science. As a new graduate in physics at the beginning of the Second World War, he was 'manpowered' (that is, ordered) to work on radar. He later joined up and became an astute observer of military strategy in North Africa. When he returned to New Zealand he took up his war-delayed position as the founding director of the Biometrics Laboratory (later the Applied Mathematics Division) of the DSIR. He later became assistant secretary of the DSIR and, later again, secretary of the Mines Department. In these positions he used strategic insights gained during his war experience. His short historical essay was based on wide research. For decades, in his spare time or when frustrated by his superiors, he was writing a history of science in New Zealand which, unfortunately, was never published. Dick read widely and thoughtfully. He began his four-hundred-plus-page typescript with a quotation from the Marxist historian of science J.D. Bernal, thereby affirming his own intention to write a 'history of science as an institution in relation to social and economic events' rather than as a collection of 'pious records of great men and their works'. His typescript is the grandest attempt at a synthesis of science in New Zealand's history ever attempted and would have been a valuable source for future historians if only he had been encouraged to publish.[11]

[8] The four university colleges of the University of New Zealand became independent universities in 1962. DSIR focused on the biological and agricultural sciences relevant to the NZ economy and only responded to broader uses of science after the Second World War. The Geological Survey, an independent institution established decades earlier, covered the nationally important subject of geology.

[9] Frank Callaghan, ed., *Science in New Zealand*, Wellington: A.H. and A.W. Reed, 1957; J[ohn] D. Atkinson, *The DSIR's First Fifty Years*, Wellington: DSIR, 1976.

[10] Ian D. Dick, 'Historical introduction to New Zealand science', in Callaghan, op. cit. (9), pp. 11–17.

[11] A version of the typescript with lengthy handwritten additions is held in the Alexander Turnbull Library. Dick began his history with the Cook voyages and finished with 1927 when his own institution, the DSIR, was established. Biographical information comes from my oral-history interviews with Dick, also held in the Alexander Turnbull Library. A brief account is given in Ruth Barton, 'A mathematician in management: the public service career of Ian Dick', *New Zealand Science Review* (2002) 59, pp. 99–103. Dick hoped that his manuscript could be submitted for a doctoral degree but was discouraged by the then professor of history at Victoria, John C. Beaglehole.

The national, honorific scientific society, the Royal Society of New Zealand (RSNZ), located in Wellington, has often given stimulus and support to the history of New Zealand science. Originally established as the New Zealand Institute in 1867, it became the RSNZ in 1933. Co-located in the national capital with the national museum, the national library and the institutions of central government, it has hosted and co-hosted lectures, conferences and exhibitions. While the chief focus of these events has usually been the achievements of New Zealand scientists, it has also promoted other milestone celebrations, such as the four-hundredth anniversary of Galileo's discovery of the telescope.

A stimulus to the expansion of history of science in New Zealand was the appointment of the English- and Australian-trained historian Michael Hoare to the Royal Society's James Cook Fellowship in 1975. Hoare's appointment occurred with the support of Sir Charles Fleming, then ex-president of the RSNZ and an eminent ornithologist and geologist, who was sufficiently interested in history of science that he was writing a history of the society.[12] The fellowship required Hoare to give annual 'Cook Lectures' to the society. Hoare was an expert on the Forsters, naturalists on James Cook's second voyage, and thus he fitted the contemporary national perception that New Zealand science started with Cook's voyages, but his project for the fellowship was history of science within New Zealand. His three Cook Lectures (published in 1976–7) were on the institutional developments and personal conflicts of the later nineteenth century. During his years as Cook fellow, he was physically located in the History Department at Victoria University of Wellington, where he introduced a graduate course in history of science, the first ever in New Zealand. Historically trained, and not New Zealand-born, Hoare brought a comparative sense to the history of New Zealand science.[13]

Significantly, in February 1983 Hoare organized a conference on the history of New Zealand science, sponsored by the RSNZ and the Alexander Turnbull Library (the specialist New Zealand section of the National Library of New Zealand). It resulted in a modest-looking publication, *In Search of New Zealand's Scientific Heritage* (1983), which nevertheless was the widest-ranging account of New Zealand science then published.[14] The list of conference contributors indicates the wide variety of people interested in the history of New Zealand science at that time.

After Hoare, the most significant individual contributor to the history of New Zealand science has been Ross Galbreath. When the fourth Labour government of the later 1980s began to pressure the DSIR divisions to orient their research more commercially, Galbreath, a zoologist working at the Plant Science Division (in Auckland), decided to pursue his broader interests in race relations and environmental issues. He began an arts degree, majored in history and then wrote a doctoral dissertation on the eminent colonial ornithologist, conservationist and – ironically – trader in bird skins Walter Buller (published as *Walter Buller: The Reluctant Conservationist*). Galbreath went on to follow a career as a public historian, ranging across history of science, environmental history and business history. *DSIR: Making Science Work for New Zealand* is a history of the DSIR from 1926 to its restructuring into Crown Research Institutes in the 1990s. It covers the biological and agricultural

[12] Published in 1987, C[harles] A. Fleming, *Science, Settlers and Scholars: The Centennial History of the Royal Society of New Zealand*, Royal Society of New Zealand, Bulletin 25. Fleming became Sir Charles in 1977.

[13] Michael E. Hoare, 'The relationship between government and science in Australia and New Zealand', *Journal of the Royal Society of New Zealand* (1976) 6(3), pp. 381–94; Hoare, *Beyond the 'Filial Piety': Science History in New Zealand: A Critical Review of the State of the Art* (Second Cook Lecture), Melbourne: Hawthorne Press, 1977; Hoare, *Reform in New Zealand Science 1880–1926* (Third Cook Lecture), Melbourne: Hawthorne Press, 1977. The October 1996 issue of *Archefacts* contains a bibliography and essays in Hoare's honour, including a substantial obituary of Hoare by Brad Patterson.

[14] Michael E. Hoare and L[inda] G. Bell (eds.), *In Search of New Zealand's Scientific Heritage*, The Royal Society of New Zealand, Bulletin 21, 1984.

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emphases of the early DSIR, the competition for territory between the DSIR and the older Department of Agriculture, and the post-war shift to include physical sciences within the DSIR's many divisions – leading to important work on radio astronomy and atmospheric radiation. Another important contribution to New Zealand's science history is Galbreath's biography of father and son G.M. Thomson and Allan Thomson, the first a major science lobbyist at the end of the nineteenth century, the second a promising geologist who died of consumption only a few years after returning to New Zealand from graduate study at Cambridge.[15] The publishers of Galbreath's later books – the RSNZ and the Historical Branch of the Department of Internal Affairs – indicate sources of patronage for history of science.

Anniversaries have been catalysts for the writing of histories. We have a centenary history for the Ministry of Works, the government department under which New Zealand's hydroelectric and geothermal power stations were designed and built, along with more mundane bridge, railway and road building.[16] The Institute of Chemistry published a collection of essays for its centenary. Contributors recounted important developments with which they had been associated – for example, the improvement of cheese making, and the turn to local manufacture of oils when the Second World War hindered imports. The essays show the chemists' awareness of the extent to which success, as measured by money-making applications, depends on the exigencies of politics and markets as much as on the quality of the science. The title, *Chemistry in a Young Country*, alluded to the youth of New Zealand science, but referenced more directly the geological youth of New Zealand, its unstable geology, fierce weather and sub-fertile soils, and hence the frequent irrelevance to New Zealand conditions of sciences developed for application in other countries (such as Britain). The centenary of women's suffrage in New Zealand in 1993 was marked by a conference and a subsequent book containing biographies of ten significant women in New Zealand science.[17] The centenary of Sir James Hector's death was celebrated by a Hector symposium in 2007, Hector having been director of almost all national scientific institutions in the late nineteenth century – national museum, Geological Survey and New Zealand Institute. In 2017, VUW's Science in Society programme hosted a conference to mark the sesquicentenary of the founding of the New Zealand Institute.[18]

Among the scientists interested in their own history, the most important are the geologists – important because geology has been a pre-eminent science in New Zealand, the history of geology has an institutional identity, and the work is historically astute. Rebecca Priestley and I hypothesize that because geology is largely a 'historical science' or 'narrative science', geologists are better prepared than most scientists to argue historically. In 1990 a Historical Studies Group within the Geological Society (later renamed the Geoscience

[15] Ross Galbreath, *Walter Buller: The Reluctant Conservationist*, Wellington: GP Books, 1989; Galbreath, *DSIR: Making Science Work for New Zealand. Themes from the History of the Department of Scientific and Industrial Research, 1926–1992*, Wellington: Department of Internal Affairs, Historical Branch, 1998; Galbreath, *Scholars and Gentlemen Both: G.M. Thomson and Allan Thomson in New Zealand Science and Education*, Wellington: Royal Society of New Zealand, 2002. Also by Galbreath, *Working for Wildlife: A History of the New Zealand Wildlife Service*, Wellington: Department of Internal Affairs, Historical Branch, 1993.

[16] Rosslyn Noonan, historian, trade unionist, local-body politician and, later, human rights commissioner, wrote *By Design: A Brief History of the Public Works Department Ministry of Works 1870–1970*, Wellington: Ministry of Works and Development, 1975.

[17] Peter P. Williams, ed., *Chemistry in a Young Country*, Christchurch: New Zealand Institute of Chemistry, 1981; Paula Martin, ed., *Lives with Science: Profiles of Senior New Zealand Women in Science*, Wellington: Museum of New Zealand Te Papa Tongarewa, 1993.

[18] Papers from these conferences have been published in edited collections: Simon Nathan and Mary Varnham, eds. *The Amazing World of James Hector*, Wellington: Awa Science, 2008; Simon Nathan and Rebecca Priestley, eds., *Journal of the Royal Society of New Zealand* (2017) 47(1, 2).

Society) of New Zealand began publishing a newsletter which grew to become the *Journal of the Historical Studies Group*. One of the members, Simon Nathan, has a long-running project to make accessible the letters of New Zealand's geologists. Thousands of letters by the four pre-eminent H's of nineteenth-century New Zealand geology (Ferdinand Hochstetter, James Hector, Julius Haast, Frederick Hutton) have been transcribed and published in inexpensive formats; many are freely available for download from the Internet.[19] Nathan has also written an accessible biography of James Hector, *James Hector: Explorer, Scientist, Leader*.[20] Many other scientists have contributed to histories of their sciences, but these contributions usually lack institutional continuity. John Andrews, a zoologist at Victoria University of Wellington, who had broad historical interests, published *The Southern Ark*, a beautifully illustrated history of zoological discovery in New Zealand.[21] Brian Gill, curator of vertebrates at the Auckland Museum for decades, writes widely on the history of museum exchanges, most notably bird skins.

There are also contributions to history of science from the humanities. There has been a long-standing research group in the German Department at the University of Auckland. James Bade and a group of his students (especially James Braund and Sascha Nolden), in association with colleagues in Germany and Austria, began studying German-speaking scientists in colonial New Zealand – from honoured geologists to now excoriated collectors of bird skins and Māori skulls.

A few topics have entered mainstream research – for example, the history of anthropology, especially where it intersects the history of race relations and conceptions of race. History of anthropology has flourished among historians, anthropologists and museum studies scholars. Major historians have written studies which can be counted in the history of anthropology. Keith Sorrenson (historian of South Africa and New Zealand) wrote a centenary history of the Polynesian Society, New Zealand's anthropological society. In *The Quest for Origins: Who First Discovered and Settled New Zealand and the Pacific Islands?*, Kerry Howe, historian of the Pacific, gave an intellectual history of Western ideas about Polynesian origins.[22] Conal McCarthy, from museum studies, wrote an analysis of the racial assumptions at work in museum exhibitions, *Exhibiting Māori: A History of Colonial Cultures of Display*.[23]

New Zealand's curious fauna has attracted international attention since bones of an extremely large bird, the moa, arrived in Europe in the 1840s. Europeans in New Zealand sent bones of a large creature to Richard Owen in London, and Owen assembled them into a skeleton, which he originally classified as *Dinornis novae zealandiae*. Moa have been of continuing historical, palaeontological and anthropological interest. One of the first historians of science from outside New Zealand to take an interest in our history was Jacob Gruber, whose path-breaking article argued that, because moa classification was a widely fascinating problem best answered from within New Zealand, the moa helped to establish the independence of New Zealand science. Susan Sheets-Pyenson, an American-born scholar working in Canada, published an ambitious comparative history of colonial museums, including their practices of exchange, which, for the Canterbury Museum under Julius Haast, included the exchange of moa bones. These authors stimulated my first excursion into New Zealand's science history on debates about moa classification. More recently,

[19] The website of the Geoscience Society of New Zealand is the starting place for a search: https://gsnz.org.nz/publications-and-webstore/category/5 (accessed 2 May 2024).

[20] Simon Nathan, *James Hector: Explorer, Scientist, Leader*, n.l.: Geosciences Society of New Zealand, 2015.

[21] John R.H. Andrews, *The Southern Ark: Zoological Discovery in New Zealand 1769–1900*, Auckland: Century Hutchinson 1986.

[22] M.P. K[eith] Sorrenson, *Manifest Duty: The Polynesian Society over One Hundred Years*, Auckland: The Society, 1992; Kerry R. Howe, *The Quest for Origins*, Auckland: Penguin, 2003.

[23] Conal McCarthy, *Exhibiting Māori*, Oxford and Wellington: Berg and Te Papa, 2007.

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Quinn Berentson, a documentary film-maker, has written a substantial history of moa discovery which, with its beautiful illustrations, is also a delightful coffee-table book.[24] Linking back to the earlier discussion of institutions, Berentson was a documentary film-maker with Natural History New Zealand and much later in his career studied for the MSc in science communication, the degree which was the outcome of collaboration between NHNZ and the University of Otago.[25]

Historical geographers, economic historians, some journalists and a growing number of environmental historians are active in agricultural history. Agriculture is often perceived as the opposite of industry, but agriculture in New Zealand has long been a high-tech industry. Studies have included the transformation of tussock land and native forest into pasture, the transformation of native forest into monocultural exotic forestry, and the breeding of animals for higher productivity, together with the scientific research that supports the industry. Over half a century ago, Peter Smallfield, then director general of agriculture, wrote *The Grasslands Revolution in New Zealand*. The historical geographer Eric Pawson has recently written *The New Biological Economy: How New Zealanders Are Creating Value from the Land*. A journalist and social critic, Gordon McLauchlan, wrote the biography of Campbell McMeekan, founding director of the Ruakura Agricultural Research Station, located in the rich dairy-farming region of Waikato. Among the many achievements of McMeekan's research group were the first twin studies in cattle. MacLauchlan has also written on the history of agriculture more generally.[26] Another outsider to academic history, Tony Nightingale, wrote, *White Collars and Gumboots*, a history of the Department of Agriculture (and its later institutional formations), which, with the agricultural and horticultural divisions of the DSIR, has been a major location for scientific research.[27]

The dominance of New Zealand topics is clear in my many examples. The few historians of science trained overseas provide the only exceptions, Montelle (ancient mathematics), Abou-Nemeh (early modern science) and myself (nineteenth-century Britain in addition to my New Zealand topics). There are also a few scholars who have returned to New Zealand but not found suitable academic positions. Richard Sorrenson (scientific instruments, the eighteenth century) and Alistair Kwan (scientific instruments, the classical world, history of astronomy) have maintained publishing programmes in history of science.

Before concluding, I return to the topic of mātauranga Māori. In recent years every history-of-science conference in New Zealand has included contributions on mātauranga Māori. Strictly these are not historical, but rather philosophical reflections on the epistemological status of mātauranga Māori – that is, Māori ways of knowing, or knowledge systems, or, as my mentor Arnold Thackray might have called it, natural knowledge. Many Māori scientists are working to recover the traditions of mātauranga Māori and to reassert their significance. Māori knowledge of nature has been particularly rich in navigation

[24] Jacob Gruber, 'The Moa and the professionalising of New Zealand science', *Turnbull Library Record* (1987) 20(2), pp. 21–39; Susan Sheets-Pyenson, *Cathedrals of Science: The Development of Colonial Natural History Museums during the Late Nineteenth Century*, Kingston, ON: McGill-Queen's University Press, 1988; Ruth Barton, 'Haast and the moa: reversing the tyranny of distance', *Pacific Science* (2000) 54(3), pp. 251–63; Quinn Berentson, *Moa: The Life and Death of New Zealand's Legendary Bird*, Nelson: Craig Potton, 2012.

[25] See www.otago.ac.nz/postgraduate-study/otagopost/real-stories-master-of-science-communication-student-quinn-berentson-gets-up-close-to-a-giant-eagle (accessed 2 May 2024).

[26] Peter W. Smallfield, *The Grasslands Revolution in New Zealand*, Auckland: Hodder & Stoughton in association with English Universities Press, London, 1970; Eric Pawson, *The New Biological Economy: How New Zealanders Are Creating Value from the Land*, Auckland: Auckland University Press, 2018; Gordon McLauchlan, *McMeekan: A Biography*, Auckland: Hodder and Stoughton, 1982; McLauchlan, *The Farming of New Zealand: The People and the Land*, new edn with Ian Baker, Auckland: Penguin, 2006.

[27] Tony Nightingale, *White Collars and Gumboots: A History of the Ministry of Agriculture and Fisheries, 1892–1992*, [Wellington]: Ministry of Agriculture and Fisheries and Department of Internal Affairs, Historical Branch, 1992.

and astronomy (for example, how did the Polynesian voyagers first find their way to Aotearoa, return home, and then find the same place again on later voyages?); there are also significant traditions in horticulture and in pharmacopoeia.

Controversy over the scientific status of mātauranga Māori erupted into the public sphere in 2021, when a new education policy required that mātauranga Māori be taught in secondary schools within the science curriculum, and that teachers show how science had supported colonization. Seven senior academics at the University of Auckland reacted with a letter to the editor in a national magazine, *The Listener*, arguing that mātauranga Māori was not science, and that although science had been used to support colonization, this was misuse. Many Māori scientists responded rapidly and indignantly, and were supported by the University of Auckland's vice-chancellor, the union of university staff and the Royal Society of New Zealand. Some dared to offer public support to the original letter writers, and at least one New Zealand politician and one eminent foreigner, Richard Dawkins, spoke out in their favour. Controversy went on for over a year. The debate generated more heat than light, for the definition of science is a philosophical question on which there are many positions. In the debate, positions ranged from the claim that mātauranga Māori is a traditional indigenous form of science to assertions that the two forms of knowledge are incompatible and that the myths embedded in mātauranga Māori have no place in science.[28] Although I do not know enough about mātauranga Māori to contribute to the specifics of this debate, I want to advocate for history of science in this context. History of science has much to contribute to debates over what counts as science. We have many examples of scientific advances that were deeply embedded in metaphysical and religious world views. Similarly, historical examples show that the conceptions of a universal 'scientific method', often advocated by scientists, are inadequate, and that good methods have often been insufficient to resolve controversies. For example, neither confirmation by repeatable experiments nor Popperian falsification are adequate to the complexities and varieties of theoretical debate in science. Moreover, I would argue that the mechanistic and materialist assumptions of much modern science are themselves a metaphysic.

The Pacific Circle, a regional history-of-science society founded in 1985, offers a collaborative path forward. Its statement of purpose includes a definition of knowledge that privileges no particular culture:

> to support and promote research and exchanges in the history of science, medicine, and other practices of knowledge in the Asia-Pacific region, broadly construed. We take knowledge to encompass a cross-cultural diversity of beliefs about the workings of the universe and the command of a myriad of techniques applied to investigations and manipulations of worldly phenomena.[29]

What of the future? It seems there is little chance for New Zealanders trained overseas to obtain positions in New Zealand that directly use their expertise. As far as I know, the only position advertised as history of science by a New Zealand university was the position in 'history of science and technology' that I was appointed to at the University of Auckland in 1993. Some historians of science have moved sideways, into science communication, science education, educational administration or archival work, for example, in order to live in New Zealand. This may sound gloomy, but I expect there will continue to be historians appointed to more broadly defined positions who will be able to teach and research in their

[28] See the Wikipedia article at https://en.wikipedia.org/wiki/Listener_letter_on_science (accessed 15 February 2025) for further information on the lengthy debate.

[29] See https://thepacificcircle.com (accessed 15 February 2025).

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specialist fields while teaching more broadly. Those who move sideways often have opportunities to research in history of science, even if they wait until retirement. I am hopeful that the School of Science in Society at Victoria University of Wellington will flourish. It has advantages over previous programmes in being located in a science faculty, and in the city which is the centre of government and national policy making. Its focus on science communication and topics of contemporary concern is likely both to be widely perceived as useful and to attract a variety of students. Collaboration between the school and the History Department broadens the range of supervision expertise available to its students. I hope that synergies between the study of mātauranga Māori and history of science, especially the history of premodern science, will develop, enabling fruitful discussion that avoids the polarizations of modern science good and pure/other knowledge systems contaminated by myth and religion. I expect that many histories which can be labelled history of science or technology will continue to be produced by historical geographers, economic historians and scientists.

To sum up, history of science in New Zealand is not the domain of historians of science. Those few of us formally trained in history or history of science can be grateful that geologists, chemists and astronomers study the history of their disciplines; that German scholars are able to read classic German handwriting; and that historical geographers ask interesting questions and offer different perspectives on industrial and agricultural technologies to those already familiar to us. To be sure, there are benefits to historical training, but the field is big enough for everybody.

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