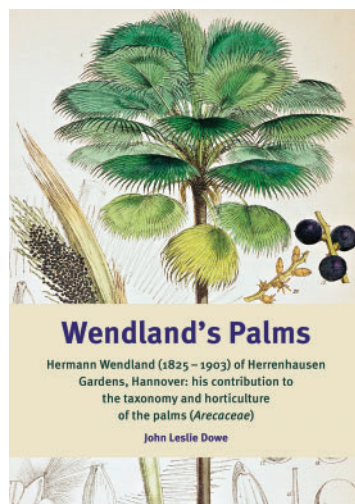


Reviews

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John Leslie Dowe: *Wendland's Palms: Hermann Wendland (1825–1903) of Herrenhausen Gardens, Hannover: His Contribution to the Taxonomy and Horticulture of the Palms (Arecaceae)*. Botanic Garden and Botanical Museum Berlin, Berlin, 2019. 137 pp, illus., ISBN: 9783946292319 (PB), €25.00.

Hermann Wendland was destined to be a key player in the Herrenhausen 'dynasty' as a third-generation member of one of the most eminent horticultural and botanical

families in Europe. He was educated at the Court School of Herrenhausen and was apprenticed to his father, Heinrich Ludolph Wendland, until 1844. In 1845, Hermann studied botany at the Georg-August University Göttingen under the tutelage of Friedrich Gottlieb Bartling, director of the Botanic Gardens, Göttingen.

In 1846, Hermann's father organized a three-year travel plan for him to gain experience in horticulture and botany. He travelled across Europe as a 'journeyman', spending time at the Royal Botanic Gardens in Schöneberg (near Berlin), the Imperial Gardens at Schönbrunn and the garden of Baron Charles von Hügel (near Vienna). In late 1847, he travelled to Switzerland and Italy, then worked for Lambert Jacob-Makoy, a horticulturalist in Belgium. From Liège (Belgium) Hermann went to the Royal Botanic Gardens, Kew, England where he worked under William Jackson Hooker, 1848–49, establishing important collaborations that continued throughout his professional life.

Hermann followed the footsteps of his father and grandfather, Johann Christoph Wendland, when he returned to Germany. After his father's death in 1869, Hermann became the *Oberhofgärtner* and in 1897 was appointed as director of the Royal Botanic Gardens of Herrenhausen in Hanover. In 1902, Wendland suffered a devastating stroke and he died on 12 January 1903.

Hermann Wendland specialized in palms (Arecaceae) and during his career amassed one of the most prominent collections of palms at the Berggarten in Herrenhausen. His author name (H. Wendl.) is associated with 549 names of palms across all

taxonomic ranks, which are listed in detail in the book. The major genera established by Wendland and collaborators included *Chamaedorea*, *Geonoma*, *Bactris*, *Syagrus*, *Malortiea* (*Reinhardtia*), *Washingtonia* and *Welfia* found in the Americas. Wendland also collaborated with taxonomists of his time on palm treatments of Africa, the Caribbean, Indian Ocean region, the Pacific and Asia.

Wendland and Oscar Drude's publication of *Palmae Australasicae* (1875) was an important taxonomic work on Australian palms and was their first on this phytogeographic region. This publication—despite apprehensions due to Wendland and Drude's taxonomic interpretations—formed a significant contribution to the foundation of modern taxonomy of palms in Australia.

The specimens used as a basis for the treatments and new names were provided on loan by Ferdinand von Mueller, government botanist of Victoria from the Melbourne Herbarium. The specimens were eventually returned to Melbourne and the many newly described taxa were conserved as types at the National Herbarium of Victoria. Interestingly, in correspondence to colleagues, von Mueller expressed disapproval at Wendland's vast nomenclatural changes and maintained his own taxonomic names in subsequent publications. However, all twelve new generic names (except *Grisebachia*) erected by Wendland and Drude are still currently accepted.

Wendland's palm classification system was seemingly controversial for his time and differed from the more widely accepted classification by Martius in *Historia Naturalis Palmarum*. In this book, John Dowe provides a useful table of equivalent comparison classifications for the Arecaceae under the systems of Martius (1853), Wendland (1865 and 1866) and Dransfield *et al.* (2008).

Wendland's Palms is a significant contribution to our understanding of Hermann Wendland as a prominent player in palm horticulture and taxonomy. Dowe offers insights into Wendland's work, especially his seemingly radical proposal for classifying the palm family and his recognition of species based on the attachment of seeds either by the raphe or a network of fibres to the endocarp.

Dowe has successfully intertwined botanical history, science and art in *Wendland's Palms*. It is a major body of work on the economics and horticultural importance of palms since its golden age during the mid- to late nineteenth century. Dowe lays out the rich fabric of Wendland's biography and taxonomic prowess, including his vast network of collaborators and plant collectors. Among them were Drude, August Grisebach, William Botting Helmsley, Jean Linden, Gustav Mann, Berthold Seemann, Richard Spruce, Anders Oersted and William J. Hooker.

Beautifully illustrated, *Wendland's Palms* features reproductions of exquisite chromolithographs of palms by noted botanical

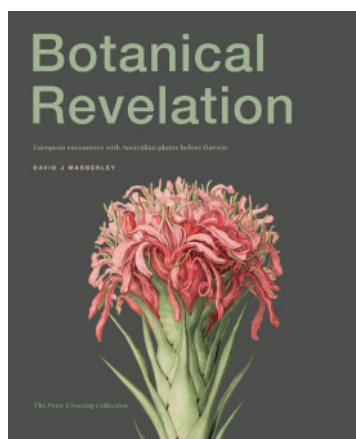
artists. These include Walter Hood Fitch and his nephew John Nugent Fitch in *Curtis's Botanical Magazine*, Pieter de Panne-macker in *Les palmiers* and P. Stroobant in the *Horto Verschaffelt*.

Wendland's Palms is a taxonomic treasure trove and the list in Appendix 1 provides a particularly valuable annotated record of names historically associated with Wendland and citations of synonyms. This book is highly recommended for readers interested in the history of horticulture, science, taxonomy and classification, and the art of palms, the *princeps* (princes) of the botanical world.

Bee Gunn

Postdoctoral Fellow

Royal Botanic Gardens Victoria



David Mabberley:

Botanical Revelation: European Encounters with Australian Plants before Darwin. NewSouth Publishing, Sydney, 2019. 384 pp., illus. ISBN: 9781742236476 (HB), \$89.99.

Charles Darwin arrived in Australia aboard HMS *Beagle* on 12 January 1836. This important historical fact both begins and ends David Mabberley's new book, *Botanical Revelation*.

Mabberley has crafted a unique work, examining the history of European discovery, documentation and trade in the plants of Australia pre-Darwin. He places this unique botanical environment as a contributing factor in triggering one of the most profound scientific and philosophical theses the world has ever known: Darwin's theory of evolution by natural selection.

Mabberley has already written numerous texts on the flora of Australia, stating that 'this book in effect brings together much of my work on Australian plants over some 40 years'. However, this new work is unique and offers the reader far more than simply the sum of his previous publications. The author has made an inspired choice in using the astonishing Peter Crossing Collection as his source library. It enables close examination of some of the most important books published on the botany of this country. Ruminating on these rare texts and illustrations, together with other equally rare and important works, provides the framework upon which Mabberley crafts a book that combines history, science, exploration, commerce, biography, memoir and art.

The result is a large-format monograph of impressive dimensions, volume and scope. A wide-ranging narrative, it is beautifully and generously illustrated throughout. The book can be equally appreciated as a detailed historical study or a stunning volume of artwork. As a confirmed bibliophile and a librarian working in a science library, I find this book offers numerous points to engage with.

As with much of their exploration of the 'New World', Europeans viewed Australia as highly attractive for its assumed bounty of spoils and riches. Mabberley examines here closely the driving motivation that economic botany played in the discovery

and gathering of Australian plants. After Dutch, Spanish and French attempts, it was the English who came to see what was ripe for the taking and of course decided to stay.

In rich detail and a most engaging narrative, the author describes these successive expeditions to Australia and the first attempts at botanising this strange new land. Using first-hand accounts, letters, journals and other historic documents, he follows the various journeys of discovery which promised so much but in fact delivered so little. Or so it seemed at the time. Initial plant collecting expeditions provided little in the way of economic potential. The native flora seemingly produced little that was edible (at least, according to European tastes), nor did the plants on offer provide materials for building construction and manufacturing so desirable for an ever-expanding Empire.

Nevertheless, a steady stream of plant specimens was dispatched to the home country to find their way to Kew gardens or the private collections of the wealthy and powerful. Mabberley details the burgeoning nursery market dealing in the trade of Australian plants which helped to flame the mania for these new and exotic examples in England and eventually throughout France and Germany. Against this background of commerce, back in Australia various botanists and artists continued to gather, name, document and illustrate the new plants they discovered.

Figures now well familiar such as Joseph Banks, Robert Brown, Allan Cunningham, Ferdinand Bauer, Pierre-Joseph Redouté and William Hooker all feature prominently. Mabberley humanises them in a way that draws the reader into their world. The pride, the prejudices, the generosity and the selfishness of man is well on display. Constant throughout much of the book is the figure of Banks, 'omnipresent' as Mabberley so aptly terms him. Responsible for gathering so much of that early European knowledge of Australian flora—and facilitating the work of others in whom he recognised merit—it is Banks to whom we owe so much to for his tenacity and commitment to the collection of specimens and publication of books concerning Australian flora.

Throughout the book, Mabberley balances the passages of text with glorious illustrations. Many of them are rare and seldom seen before, often featuring in prominent full page display, these illustrations form an important part of the narrative. It was through the power and beauty of botanical illustration that most Australian plants were first introduced to European eyes and it is easy to see how meticulous depictions of their lush foliage, brilliant colour and complete exotic otherness captivated and entranced audiences on the other side of the world.

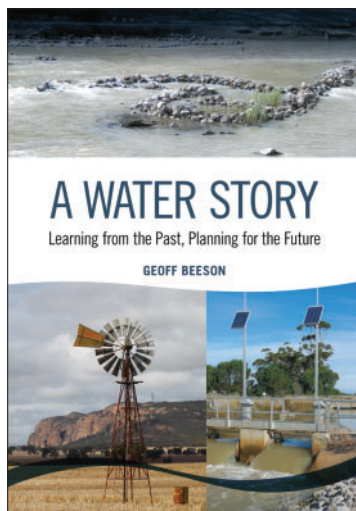
Having been fortunate enough to see many of these original illustrations, I can attest to the quality of reproductions in use here and commend NewSouth for publishing such a well resourced and high-quality monograph.

It is difficult to fault what may arguably be the definitive work on the history of Australian plants before the arrival of Darwin. If there is one small absence, it is the lack of photographs of the Crossing Collection itself. Although the spines and covers of several individual books are shown, there are no images of the library collection itself. As the library features as the impetus to this work, I think a small selection of photographs of the collection would be of interest to most readers and offer a thematic ending to the journey offered in the preceding pages.

I for one—whilst reading the text that explores these titles—could not help but imagine what a library that held such remarkable

volumes all in one place looks like. Perhaps such a catalogue of wonders could be Mabberley's next project.

Philip Bertling
Library
Royal Botanic Gardens Victoria



Geoff Beeson: *A Water Story: Learning from the Past, Planning for the Future*. CSIRO Publishing: Collingwood, 2020. 289 + viii pp, ISBN: 9781486311293 (PB): \$69.99.

At a juncture when Australia is beset by bushfires and a pandemic, this book by Geoff Beeson comes as a timely reminder. An abiding concern—at least since European settlement—has been with securing reliable sources of water. We neglect this enduring problem at our future peril.

A Water Story is an encyclopaedic handbook on the use and abuse of water. Its focus lies mainly in Australia, but it also offers a brief introduction to water use across human history. The approach is strong on description and facts—the length of rivers, of water pipelines, the capacity of dams or of land areas being irrigated—but light on explaining historic changes in water use.

The early chapters move between descriptions of the natural world, including the world water cycle, the operation of El Niño and La Niña, the Great Artesian Basin and the periodic flooding of Kati Thanda (Lake Eyre). They span human activity in Aboriginal Australia, as well as irrigation-reliant ancient civilisations such as Egypt, Mesopotamia and India. There are thumbnail sketches of the use of aqueducts, cisterns, wells, pipes and qanats, alongside other technologies developed by these civilisations.

The choice and organisation of topics is somewhat idiosyncratic and sometimes lacks balance. The author is clearly a great admirer of the feats of water engineering undertaken in the Roman Empire and allocates a whole chapter to describing them. Conversely, the greatest hydraulic civilisation the world has seen—and which still feeds many millions in China—is dismissed in less than a page. The description of qanats—Google them if you are curious about what they are—rates nearly two pages.

Later, the Snowy Mountains scheme, by far the largest and most complex water project yet completed in Australia, rates only a paragraph while the unrealised Snowy 2 proposal earns almost as much space. The immensely expensive and often politically divisive provision of pure water to homes in cities and towns throughout Australia over the last two centuries is squeezed into one chapter, which is shorter than that devoted to the admittedly dramatic pipeline built to take water to the goldfields in Western Australia in the late nineteenth century. Most of the water engineers who created the dams and other water works described

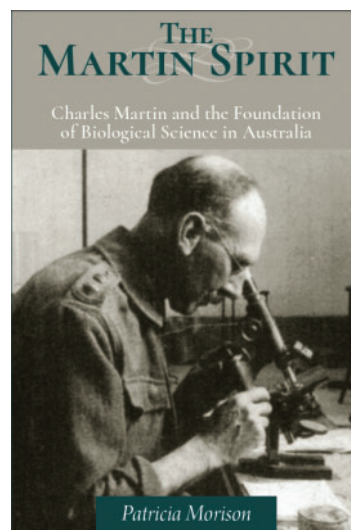
here remain anonymous, but a few do get a guernsey. Unfortunately, James Blackburn is credited with the design of the Yan Yean reservoir, Melbourne's first major water storage. In actuality it was Matthew Bullock Jackson who designed and built the dam that created what was probably the largest artificial reservoir in the world in 1857, as well as the delivery system that took water over what was then regarded as an immense distance into Melbourne.

The very real strengths of the book lie in the author's more detailed discussion of Australian water use and abuse over the last few decades, followed by what we must do for the future. With a sure touch he discusses recent developments in desalination, wastewater recycling, stormwater harvesting, more economical irrigation techniques, water-sensitive urban design and much else besides. He points out significant advances, such as the restoration of environmental flows into the Snowy River, as well as mistakes.

Beeson's central concern is the continuing tragicomedy of the Murray–Darling Basin Plan, which he analyses in detail and with a common sense that eludes the vested interests that continue to compete for the shrinking waters of this vital and much-misused river system. He is out of sympathy with water trading and recent privatisations in water management. *A Water Story* rightly insists that 'water is a public good, essential for life, and that ownership and control must remain in public hands'. Beeson sees a solution to the Murray–Darling Basin in close and continuing public oversight of water allocation, based on balancing the public good against private interest.

This is a book for the general reader wanting to become more broadly informed, rather than the expert. It is clearly and concisely written. Anyone seeking a broad perspective on the whole field will find this an accessible and non-technical guide, including useful references in the footnotes to direct further reading on a whole range of more specialised topics. CSIRO Publishing has produced an extensively illustrated and attractive paperback printed on paper of a quality rarely found in paperbacks.

Tony Dingle
Melbourne



Patricia Morison: *The Martin Spirit: Charles Martin and the Foundation of Biological Science in Australia*. Halstead Press, Canberra, 2019. 296 pp, illus., ISBN: 9781925043471 (PB), \$36.95.

I was delighted, a decade ago, when I learned that Patricia Morison was crafting a life of Charles Martin. Her 1997 study of anatomist James Wilson, *The Fraternity of Duckmaloi*, continues to impress as a finely researched, humane biography.

In *The Martin Spirit*, Morison has again confirmed herself as one of Australia's finest scientific biographers.

Born in London in 1866, Charles Martin faced a frail and unpromising upbringing, destined to enter his father's actuarial business. If he saw in medicine a more meaningful profession, however, it was a discounted book detailing a hundred simple chemistry experiments that kindled the teenager's dedication to applied research. Determination, application, matriculation and above all a potent intellect saw Martin complete his medical studies, earning both scholarships and patronage from a growing cadre of world-class British physiologists. Arriving at the University of Sydney in 1891, Martin's curiosity, pedagogy and pragmatism proved transformative for Australian approaches to medical science.

Commencing with work on snake venoms and the physiology of monotremes, by the end of the decade Martin was tackling fundamental problems in immunology and homeostasis. His oeuvre of Australian work saw Martin awarded Fellowship of the Royal Society in 1901, by which time he had moved to the University of Melbourne and overhauled its medical curriculum. Departing in 1903 to commence the directorship of London's Lister Institute of Preventive Medicine, he remained both a mentor and a partner for Australian investigators and institutions over the following fifty years. This was the 'spirit' of the book's title, formally celebrated by the Australian Government in 1951 through the creation of the prestigious Sir Charles James Martin Overseas Fellowships for Biomedical Research.

Having written in detail about Martin's Australian snakebite and immunology research, I was somewhat familiar with his involvement in the Australian Army Medical Corps through World War 1. Fully a third of *The Martin Spirit* focuses on his contribution to the health of Australian troops over 1914–19, especially his leadership in field bacteriology and pathology, in addition to promoting innovations in immunisation and nutrition. It was also during this period that Martin's unwavering support for women in biomedical science helped vindicate their essential contributions to research.

These chapters are so full and fulsome because Morison draws judiciously from Martin's wartime letter books and personal correspondence with his beloved daughter, Maisie. Access to these papers was provided by Maisie's son, Martin Gibbs, whose own very personal biography of Charles Martin appeared as a privately published volume in 2011. Indeed, throughout *The Martin Spirit*, Morison intercuts her subject's intellectual and institutional achievements with his good humour, firm friendships and devotion to family. These insights ensure that Martin is remembered not only as a scientist, but as a fully rounded individual.

Yet what I found most impressive with this book is the author's complete immersion in her subject's science. Morison has pointedly read all of Martin's published papers, adroitly summarising and contextualising the work in its investigative and practical milieu. Moreover, she affirms that Martin was valued not merely for a single innovation or institution, but rather for his lifelong habit of identifying the underlying research problem before incisively establishing the steps necessary to address it.

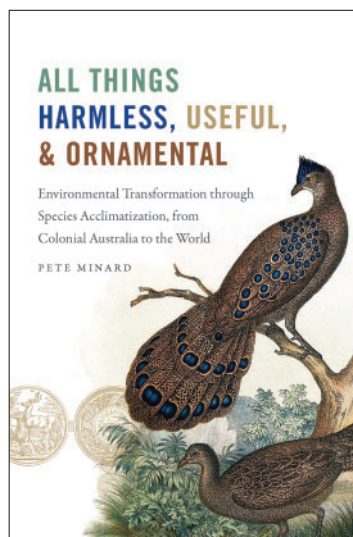
This was the larger contribution that Martin modestly bestowed upon British and Australian science through the final decades of his career. In the 1920s his team at the Lister addressed major aspects of exercise, vitamins and biochemistry, while his nominal retirement

in 1931 saw Martin inveigled into moving to Adelaide. Here, then subsequently in Cambridge, he assisted Australia's Council for Scientific and Industrial Research in solving pressing problems in sheep nutrition and wool science, as well as exploring myxomatosis to control the nation's rabbit plague.

Both of Morison's biographies are characterised by an unstinting engagement with the scientific and practical context of her subject's career. Equally, she draws discerningly upon obituaries, memoirs and personal papers to flesh out the feelings, foibles and frustrations of her protagonists. As in life, so in her text: work and home are intertwined to offer a fuller appreciation of the person. The author's astute character insights are often couched in her perceptive prose. Thus 'Martin was driven by curiosity, and scientific puzzles were manifold', and moreover he 'knew how to solve a problem, and it was not through classic science searching for basic knowledge. It was through interdisciplinary collaboration in the field'. This pragmatic approach, she argues, was Martin's most enduring contribution to Australian science.

As with any book, there are some minor quibbles. Some sections of text are a little repetitive across chapters, while very occasionally details slip, such as 'National Australian Archives' rather than 'National Archives of Australia'. Having contributed some small elements to Morison's research, however, I remain deeply impressed by this second major biography of a significant figure in Australian biomedicine. In its breadth of research, context, perception and expression, it deserves wide readership and high praise. It both encapsulates and perpetuates the essence of 'the Martin spirit'.

Peter Hobbins
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The University of Sydney



Pete Minard: *All Things Harmless, Useful, and Ornamental: Environmental Transformation through Species Acclimatization, from Colonial Australia to the World.* University of North Carolina Press: Chapel Hill, 2019. 196 pp., illus., ISBN: 9781469651613 (PB), US\$32.95.

Pete Minard has written a nicely balanced account of the efforts of the Colony of Victoria to acclimatise 'all things harmless, useful, and ornamental', from the gold rushes of the 1850s until the late nineteenth century.

Essentially he nuances older arguments, particularly those of Alfred W. Crosby in his seminal *Ecological Imperialism* (1986 and 2004). In this influential book, Crosby built on earlier work like *The Invasion of New Zealand by People, Plants and Animals* (1949) by the famous Canadian historical geographer, Andrew Hill Clark.

Clark, who taught the likes of William Cronon and Richard White at the University of Wisconsin, Madison, argued that acclimatisation was essentially all about a deliberate imperial desire to remake parts of the planet newly discovered by Europeans as 'neo-Europes'. Crosby developed that idea much more fully and extended its application from the South Island of New Zealand to everywhere colonized by Europeans. Since Crosby's book appeared, the idea that imperialism only ran in one direction, operating from the 'centre to the periphery', has been convincingly contested by a range of historians identified as the 'new imperial' school, as well as some historical geographers. Minard builds on this corpus of work by revealing that the objectives of acclimatisers were far too complicated and sometimes contradictory to be dismissed as thoughtless environmental engineering solely concerned with imposing imperial systems on large swathes of newly conquered territory.

Minard bookends his text with a charming introduction and epilogue, written in Royal Park, Melbourne, where the Royal Melbourne Zoo evolved out of the Acclimatisation Society of Victoria (founded in 1861). Today this busy park is very popular with visitors, reminding us that the British established such appealing gardens and parks throughout the length and breadth of their once vast Empire. From this busy site the early 'scientists, dreamers, and land owners' of Victoria tried to acclimatise an intriguing range of animals to help fill perceived gaps in the 'economy of nature' and provide more game animals for hunters and fishermen.

Indeed, although many colonial administrators were trained in botany, the Victorian society concentrated on animals. The oldest of Australasia's acclimatisation societies, backed by the Victorian Government, it set about assisting the formation of such societies across the Antipodean colonies. The Victorians also helped organise acclimatisation in Britain, and 'facilitated the exchange of animals across the globe'. However, despite such ambitious aims and somewhat naïve enthusiasm, their achievements were rather modest.

Minard disputes older condemnation of the acclimatisers as reckless experimenters and destroyers of the continent's unique plants and animals. He shows, convincingly, that Victoria's acclimatisers hoped to 'correct' environmental damage caused by colonial expansion, especially of sheep farming, even if they made obvious mistakes like the introduction of rabbits in pastoral areas and sparrows in wheat-growing districts. They may have been deliberate shapers of the new environments they found, but they too were shaped by those environments as well as by grander imperial ambitions. And they also wanted to encourage the survival of 'useful' native animals as well as supposedly helpful introduced creatures.

Minard is also convincing because he situates this story in relation to important developments in the history of science and shows that working farmers and fishermen—along with hunters and recreational anglers—modified some of the wilder schemes of the acclimatisers. Editor of the Melbourne *Argus*, Edward Wilson, suggested in 1857 that koalas and wombats should be introduced to England, for example. While his proposal still seems rather bizarre, even from the distance of the twenty-first century, he earned the support of Darwin's great rival, Richard Owen.

Acclimatisers influenced by the American naturalist George Perkins Marsh showed interest in aquaculture. They had more success with recreational species such as salmonids in freshwater areas than they did with more commercial marine fish. In both environments, though, the Acclimatisation Society of Victoria did try to restore numbers of useful local fish before handing regulation of commercial fishing over to government agencies. Atlantic salmon failed to flourish and brown trout did not thrive as in cooler Tasmania or New Zealand, although local acclimatisation societies managed to spawn reasonable numbers in some streams until 1909 when the Fisheries and Game branch of the Department of Agriculture hatched sustainable numbers. Californian salmon also failed whereas they became established in New Zealand from the 1870s.

Efforts were made to save the native black fish, counter to the idea that acclimatisers always valued the exotic over the indigenous. However, they gave up because of Darwin's pernicious notion of 'displacement', that is, the local fish were less vigorous than the more highly evolved, introduced fish species from the 'old world'.

The arrival of Darwinists at the University of Melbourne from 1887—especially Walter Baldwin Spencer, first Professor of Biology—generally meant that the society's aims became more realistic and took greater advantage of established 'networks of exchange'. From the 1890s the new Darwinian orthodoxy, along with the ideas of Alfred Russell Wallace on extinction, tended to suggest that acclimatisation was often a mistake that did little to fill the supposed gaps in Australia's 'economy of nature'. Thereafter the Acclimatisation Society increasingly became an operator of the zoo and a protector of endangered native animals.

The acclimatisation of vertebrates ceased and any introduction of mustelids, or mongooses, to control rabbits was rejected in the 1890s. The society also had to concede to farmers that the introduction of rabbits had ravaged pasture just as sparrows damaged wheat crops and foxes hunted ornamental and useful native animals and birds. Having shifted from being an enthusiastic acclimatiser to a more cautious protector of native animals, Donald Macdonald lamented in 1908 that in Australia, 'Nature ... had established her own balance before the white man came. Everything we do to upset that balance, which has worked out to perfection through many centuries, merely increases our difficulties'. These are not the words of a gung-ho ecological imperialist.

I have few concerns other than that more illustrations than the attractive cover and half a dozen contemporary ink drawings would have enhanced the text and strengthened the argument. Maps would also be helpful for those who do not live in Victoria. Perhaps, too, Minard could have talked a little more about Indigenous people's reactions to these experiments and explained why New Zealand botanist Leonard Cockayne and Otago naturalist G. M. Thomson were more critical of Darwin's notion of displacement than Victoria's acclimatisers, but perhaps these matters deserve another volume.

This New Zealand environmental historian happily endorses American Tom Dunlap's and Australian Libby Robin's enthusiastic assessment of this excellent book.

Tom Brooking
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University of Otago



Russell McGregor: *Idling in Green Places: a Life of Alec Chisholm*. Australian Scholarly Publishing: North Melbourne, 2019. 285 + viii pp., illus., ISBN: 9781925801996 (PB), \$49.59.

Idling in Green Places is the first substantial biography of Alexander Hugh Chisholm (1890–1977), naturalist, ornithologist, conservationist, journalist, popular writer of natural history, and historian. Born in the central Victorian town of Maryborough, Chisholm's career as a journalist would take him to Brisbane, Sydney

and Melbourne. His great interest in ornithology and nature would lead him into obscure corners of the bush, to remote locales in all three states in which he lived, and on nature rambles with groups that ranged from small children to the rich and famous. Historian Russell McGregor is well placed to write this biography, being, like Chisholm, 'a keen birder'.

The biography is eminently readable, accessible to the specialist and general reader alike. McGregor has drawn extensively from the large collection of Chisholm papers held at the State Library of New South Wales. The early chapters cover Chisholm's childhood and youth in Maryborough, where he found school restrictive, and much preferred discovering nature. He left school at twelve, moving through odd jobs to a position of coach painter and then, almost accidentally, to junior reporter for the *Maryborough and Dunolly Advertiser*. Young Alec read widely, particularly literature, and developed the habit of going out to nature with a book in his pack, reading while patiently waiting for bird-life to reveal itself.

Continuing with Chisholm's career as a journalist with Brisbane's *Daily Mail*, Sydney's *Daily Telegraph*, and Melbourne's *Australasian* and *Argus* and *Herald*, chronological chapters are interspersed with others devoted to his ornithology and nature publications. In 'The Paradise Parrot', McGregor describes Chisholm's quest for sightings of this very rare bird, resulting in a personal viewing in Queensland in 1922. Although he never sighted the bird again, Chisholm consistently refused to declare the species extinct. McGregor argues that his optimism was not unreasonable, given that Chisholm also maintained that the rare night parrot might still be living, a position proved correct when it was sighted in 2013.

Other chapters discuss Chisholm's books of literary non-fiction devoted to nature. The first, *Mateship with Birds* (1922) was positively received by public and reviewers alike. In McGregor's words, the book was 'an exuberant, lushly-written tribute to Australia's birdlife'. Chisholm's nature writing

conveyed an emotional response to the natural world while at the same time minutely documenting it. His aim was to encourage Australians to observe, understand, love and embrace Australia's birds, other animals, and landscape as part of their own national identity. That would ensure the success of conservation efforts.

This aim was entirely consistent with Chisholm's active support of the nature study movement when it became influential in school curricula and the wider community in the early decades of the century. Chisholm was welcomed into schools to talk about birds and to lead nature excursions. He actively supported the Gould League of Bird Lovers in all three states in which he lived and explicitly promoted nature study's distinctive ideas in his books and nature columns.

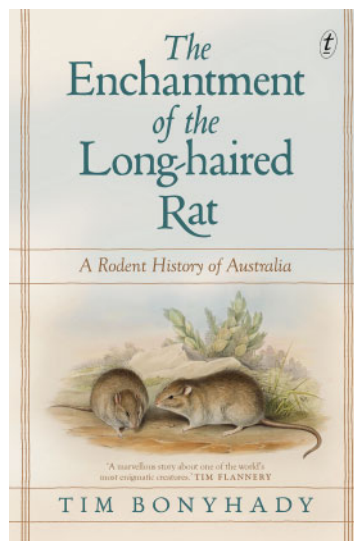
Chisholm is often remembered as a historian and as editor of the *Australian Encyclopedia* (1958). McGregor recounts Chisholm's increasing interest in history after a trip to England and Europe in 1938 where he located invaluable material in the possession of descendants of John and Elizabeth Gould. McGregor is not impressed by Chisholm's histories, but he discusses the various publications fairly. In 1948, Chisholm began work for the publishing firm Angus and Robertson in Sydney, as editor of a new *Australian Encyclopedia*. The enormous demands of this task, which took ten years and resulted in a ten-volume work that drew national and international acclaim, are convincingly portrayed.

Chisholm was awarded an OBE in 1958 in recognition of his contribution to Australian literature. After the *Encyclopedia*, he remained active: he continued birding excursions all his life, made many more contributions to natural history and history, and filled executive roles of the Royal Australian Historical Society. Acknowledged as a prominent conservationist in the 1950s and 1960s, Chisholm, however, became disillusioned with the environmentalism that was emerging in the late 1960s.

McGregor acknowledges that Chisholm was irritable and argumentative in his old age, but challenges any overall attachment of these appellations to his earlier years. Chisholm was not always disagreeable; indeed, argues McGregor successfully, the evidence points otherwise. In the 1970s, Chisholm sorted through his extensive papers before they went to the State Library and destroyed some which he considered too personal. As a result of this culling, Chisholm retained influence over his remembered life, and details of his personal life, beliefs, and feelings remain somewhat obscure. McGregor regrets, for example, that he was unable to say much about Chisholm's relationship with his wife, Olive. The reader is also left wondering about Olive. What did she do while Alec did all that he did?

Historians of science, natural history and conservation will find this book valuable. Photographs augment the text and endnotes document the sources consulted although the publication lacks a bibliography. A listing of Chisholm's published books and selected articles would have been a valuable inclusion.

Dorothy Kass
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Macquarie University



Tim Bonyhady: *The Enchantment of the Long-haired Rat: a Rodent History of Australia*. Text Publishing: Melbourne. 2019. 284+ viii pp., illus., ISBN: 9781925773934 (PB), \$32.99.

The 'enchantment' of this book's title refers to the ceremonial practices of Indigenous groups, aimed at ensuring the presence of the long-haired rat in their world. For groups such as the Diyari of the Cooper Creek delta in South Australia, the rats were of fundamental importance.

To the Europeans who increasingly encroached on this Aboriginal country, however, the rats were creatures to be feared and loathed. Both of these culturally-based perceptions of the long-haired rat are central in the fascinating story Tim Bonyhady tells so well in this delightful study.

Bonyhady's text is basically chronological in structure, arranged around three themes. 'The land of the *Mayaroo*' introduces the rat, along with a collection of humans whose interactions with the rodent help to tell its tale.

Initially, there was confusion among the earliest European observers, as well as some bungling by both local and English scientists, as to what to call the beast and also where it fitted in the animal kingdom. One source of confusion was the widespread presence, from early colonial times, of the introduced English and Norway rats, which were often mistaken by observers in the field for the Indigenous long-haired rat. For the Indigenous peoples across its range the rat had many names, according with different language groups. *Mayaroo* is the Indigenous name (among the many) preferred by scientists, but the creature was identified in various terms by Europeans when they first encountered it, over widely separated parts of the Australian interior. Today, the long-haired rat is fixed in the taxonomic system as *Rattus villosissimus*; it was originally described and classified by scientists as a mouse and referred to as *Mus longipilis*.

The multi-faceted history of the *Mayaroo* has a wide range of human contributors. Explorers Burke and Wills, Kennedy, and Eyre; scientists Krefft and Leichhardt, and later Finlayson; Lutheran missionaries Reuther and Strehlow; and artists Becker, Gould and Richter—all encountered the rat in various circumstances. However, the central (human) figure in this tale is Kenric Harold Bennett, a station manager, rabbit inspector, bush naturalist, collector of natural history specimens for the Australian Museum, and ultimately a Fellow of the Linnean Society of New South Wales.

Bennett was a keen amateur ornithologist but he had a deep interest in the natural world as a whole, and a good eye for observing it. His employment kept him largely isolated in the back country of far-western New South Wales, but from 1879, through the pages of the weekly *Queenslander*, Bennett spread his increasing

understanding of the natural world to a wide readership. His first letter to the paper told of his recollections of an irruption of the rat in the Gulf country in 1864. From the early 1880s until his death in 1891 he regularly sent natural history specimens to Edward Ramsay, curator of the Australian Museum.

The long-haired rat was perhaps best known for its propensity to suddenly assume 'plague' proportions. These rapid increases in the rat population were welcomed by local Indigenous peoples but mostly feared by Europeans. At such times the rats swarmed in huge numbers and were unstoppable. They ate everything in their path, and were particularly attracted to European foodstuffs. Anything made of leather was a target for the rats; on occasion they aggressively gnawed on stockmen's boots, even while they were being worn. As Bonyhady suggests, 'Possibly no other Australian animal—not even the dingo—responded so aggressively to Europeans'.

In the book's second part, 'The great irruption', Bonyhady relates the most severe of these cycles, a series of plagues that began late in 1885 and lasted well into 1888. In that final year, the spread of rats was at its greatest. Between March and May the rodents were reported variously in huge numbers in the Gulf country and in disparate parts of the back country of Queensland and New South Wales. Early in March 1888 rats crossed the Murray and in the following couple of months were active in Victoria, for the first and only time.

Other rodents are known to irrupt in similar circumstances, and other animals such as the letter-winged kite *Elanus scriptus* also. This bird has an ecological relationship to the *Mayaroo* in that its numbers increase dramatically during a rat irruption. It was Bennett who first noticed the kite preying on rats, near the Lachlan River in 1864. He noted also that this kite, alone among raptors, hunted exclusively at night.

These irruptions were linked to the oscillations of the El Niño/La Niña cycle, which bring alternate periods of drought and excessive rain. The exact detail of this connection has not been determined but the rain that spells the end of a drought leads to rapid plant growth and a corresponding increase of rat numbers.

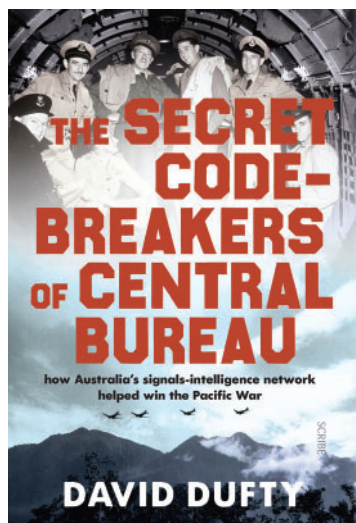
The third and final theme, 'Decline', charts the downturn in rat numbers and plagues. Irruptions still occurred in the channel country—from the 1940s to the 1980s—but never equal to the enormous spread of the 1888 plague. Detailed studies by scientists identified species such as the taipan (*Oxyuranus scutellatus*) that preyed on rats. And the increasing numbers of feral cats also had an impact on the rat population.

The book concludes with an epilogue in the form of a sober reflection on the lack of action by the Federal and Queensland governments in preventing the recent extinction of a rodent species. This was the Bramble Cay mosaic-tailed rat, *Melomys rubicola*, regarded as the first extinction of a mammal species due to anthropogenic climate change. While the long-haired rat is not in any immediate danger of extinction, its habitat is constantly being degraded through human use of the landscape, and its refuges are failing. It may be just a matter of time.

This book is environmental history writing at its best. Bonyhady's fluent and compelling narrative couples the diversity of natural history with accounts of wide-ranging human action and thinking, to create a telling example of human/environment interaction. The notional subject of the book may be the

long-haired rat, but in the telling of that tale Bonyhady also says much about the harmful impact on Australian environments of European settlement.

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David Dufty: *The Secret Code-breakers of Central Bureau: How Australia's Signals-intelligence Network Helped Win the Pacific War.* Scribe Publications, Brunswick, 2017. 451 pp, illus., ISBN: 9781925322187 (HB), \$49.99.

The demise of the Australian Computer Museum Society in 2018 revealed a great deal about Australia's difficult relationship with our digital heritage. Our scientific and engineering community has been responsible for computing innovations ranging from CSIRAC

to wi-fi, but we have preserved precious little of the nation's hardware and software, nor have we valued the human resources once disparagingly termed 'wetware'. Ironically, the oh-so-human memories of engineers, programmers, analysts and developers often outlast their redundant platforms and unreadable file formats.

Even more elusive are the origins of Australia's early forays into data processing and algorithmic thinking. But as *The Secret Code-breakers of Central Bureau* reveals, during World War 2 Australian women and men were world leaders in cryptanalysis and signals intelligence ('sigint'). Their focus on logic, language, codes, patterns and traffic analysis helped transform ideas about data and how it could be manipulated through manual and semi-automated systems.

This is a potent yet poignant story, well told. David Dufty, a researcher and writer, has integrated archives, publications and interviews. His account details the development and demise of Australia's wartime code-breaking units, especially the army-led Central Bureau and the navy's Fleet Radio Unit Melbourne (FRUMEL). Together with other signals interception and intelligence sections, they recruited a miscellany of linguists, classicists, mathematicians, radio technicians, clerks and career military personnel.

In 1939, however, virtually none of this infrastructure existed. Among its creators was Eric Nave, a long-term sailor who had served both with the Royal Australian Navy (RAN) and Britain's Royal Navy. Skilled in both Japanese and cryptanalysis, Nave was posted from Singapore back to Melbourne in 1940. There he worked with another naval officer, Jack Newman, to create the Special Intelligence Bureau. This local code-breaking unit enlisted members from all three military services, plus civilians.

Amongst the latter were a group of women who had elected to learn Morse code. Led by electrical engineer Florence McKenzie—affectionately known as 'Mrs Mac'—the Women's Emergency Signalling Corps was a pre-war not-for-profit initiative. Its intention was to train women in Morse signalling, and by 1941 her pupils proved so adroit that Newman campaigned for them to be among the first women to join the RAN.

It was in this technical capacity that many of Mrs Mac's women moved into intercepting messages transmitted in the Japanese Kana code. After the Pacific War opened in December 1941, their work directly contributed to decoding Japanese naval air-to-ground messages, which had immediate operational value in predicting and intercepting air raids.

Most Japanese codes, however, proved far more arcane. High-level army and navy messages were encrypted via several layers of transformation, based on regularly revised codebooks. Increasingly integrated with American and British efforts, Australia's code-breaking contribution operated on several levels.

Deliberately given an innocuous name, Central Bureau tackled some of the hardest targets. One innovation introduced to the unit was IBM machines—not computers exactly, but tabulators. They could assist in code-breaking by rapidly sorting messages transcribed onto punched cards. This method allowed the identification of strings of similar identifiers, frequently used words and messages emanating from a particular source. By late 1943, bulk sorting by these machines helped Australian and American cryptanalysts break the water transport code, which identified Japanese convoy locations and hence made them targets for Allied submarines.

Another major victory for Central Bureau was the Imperial Japanese Army's 'Mainline' code, transmitted in strings of four digits. The code was broken after a fortunate field discovery of Japanese codebooks, abandoned in northern New Guinea in 1944. Transferring messages onto punched cards, the IBMs operated day and night to provide 'industrial-level decryption' of Japanese army communications for Allied intelligence units and commanders.

Sigint and traffic analysis was also a significant project. It defined the locations and relative importance of Japanese units, which in turn helped reveal their command structure and deployments. The key to cracking the Japanese radio network turned out not to be the message contents, but their preambles, which contained routing details to identify the sender and recipient. 'When the routing code system was completely solved by Central Bureau in March 1943, in partnership with the American cryptanalysts', Dufty notes, 'Japanese army movements became an open book'.

The *Secret Code-breakers* of Central Bureau shares many similar tales, often kept secret for decades. Indeed, Nave himself was tasked with incinerating the vast bulk of Central Bureau's wartime records. The book's poignancy lies in the often unrecognised efforts, intelligence and sacrifices made by these covert units. It was also tragic to read of the IBMs being lost both to Central Bureau and to the University of Sydney, where they may have aided the development of local data processing and computational mathematics. Soundly researched, carefully paced and well crafted, Dufty's book is an engaging account of a long-overlooked technical and intellectual victory.

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