www.publish.csiro.au/journals/hras *Historical Records of Australian Science*, 2010, **21**, 283–297

Reviews

Compiled by Sara Maroske

School of Historical and Philosophical Studies, University of Melbourne/Royal Botanic Gardens Melbourne. Email: saramaroske@optusnet.com.au

Roy MacLeod: *Archibald Liversidge, FRS: Imperial Science under the Southern Cross*. The Royal Society of New South Wales and Sydney University Press, Sydney, 2009. xvii + 637 pp., ISBN: 9781920898809 (PB), $59.95.

The printing on the spine makes this look like two books: one Roy MacLeod's 'Archibald Liversidge' and the other 'Imperial Science under the Southern Cross'. There is something in this misapprehension, but the whimsy should not be pushed too far.

I have been hearing about this work in progress for at least twenty-five years, a period when the author grew so familiar with his subject that he was wont to refer to him as 'Livy', a nickname bestowed by Sydney undergraduates. In a small way I helped to bring about its publication when, as President, I arranged for the Royal Australian Chemical Institute to contribute to the costs of publication so it is especially nice to have it in my hands.

'Archie', as the family called him, was born in London in 1846 to John Liversidge, coach builder and his wife, Caroline. Youngest son of a second son, and eighth of nine children. Archie was not expected to inherit the business. Instead he was supported by his family to study chemistry at the City of London College and the Royal Polytechnic Institute. He continued at the Royal School of Mines (which had incorporated the Royal College of Chemistry) where he won a Gold Medal that entitled him to free tuition. He worked as an analyst in Edward Frankland's laboratory, and began to develop his interest in mineralogy. Completing his studies in London, he entered the Natural Science Tripos at Cambridge, where he struggled with examinations but broadened his chemical interest by working in the laboratory of the physiologist Michael Foster.

In 1873, before completing his Cambridge studies, he was recruited by Sydney's chemistry professor, John Smith, then on home leave, and accepted the offer from the University of Sydney of a Readership in Geology and Mineralogy. There he set out to 'follow an imperial agenda, but also to set his own priorities' and he was promoted to Professor in 1874 and his chair was changed in 1882 to Mineralogy and Chemistry. The struggle to establish the sciences, and fund development from the Challis bequest, went on for years. A long-running sore was the requirement for Arts students to take science subjects, and Science students some humanities. Pure learning was acceptable to Liversidge's humanities colleagues, but technical training, that he and others believed was essential, did not find ready acceptance. He was kept busy, as professor and then dean, coping with university administration but finding time for professional activities outside the university, such as those with the museum and the Mines Department. There was also time for the building of a substantial collection of Australian minerals. He worked to found the Australasian Association for the Advancement of Science (AAAS), along the British model, and was successful in bringing other colonies, including the New Zealanders into the fold. Remember that there was still a chance that New Zealand would join the

 10.1071/HR10012 0727-3061/10/020283

Federation, so there was wide geopolitical significance in the AAAS. His Melbourne counterpart was Melbourne's engineering professor, W. C. Kernot, not (as I had parochially assumed) the chemist, David Orme Masson. The first Congress was held in Sydney in September 1888, and the second in 1890 in Melbourne, where Masson played an important role as Organizing Secretary. Liversidge delivered papers at successive congresses about his work on the formation of ore deposits, especially gold, and he turned the presentations into published papers, too. In them, he answered some questions but raised others that are still the subject of research over a century later. They carry great commercial interest just as they did in his day.

Liversidge was elected a fellow of the Royal Society of London in 1882, and he refreshed his British contacts through periods of sabbatical leave, during which he also visited India, Japan and the USA. During the first of these 'home' visits, in 1878, he represented NSW at the Paris Exhibition. The AAAS Congress in Adelaide in January 1907 was his Australian swansong. He retired later that year and, just before Christmas, sailed for England where he spent his final years researching at the Royal Institution and advising government on the subject of magnesium alloys that were in use in German airships during the World War that followed within a decade. He 'died peacefully in his canopied bed' in September 1927.

Another biographer might have simply fleshed out this executive summary, covering Livy's journey in more detail, but this is not the Macleod way. At every point he demonstrates his scholarship by enriching the text with details of everything from the place of carriage building in nineteenth century London, the fortunes of the greater Liversidge family, education in London and Cambridge, the establishment and development of the University of Sydney (including its internecine battles and those of the NSW Government), mining education and the interface between chemistry and geology, where to live in nineteenth century Sydney, and wartime strategy. Never short of an appealing phrase, MacLeod enriches his text with allusions and quotations, some of them of MacLeod's own making—the moving metropolis, for example. Others are attributed, and others again are so well known that we are expected to recognize them and appreciate their contextual aptness. Given the weight of this contextual material, my 'two book' misapprehension doesn't seem so silly after all.

But to return to the biographee, Liversidge, like others who made their scientific (and other?) ways in the colonies, appears as 'neither solely British nor wholly Australian, but deeply both'. He was a cautious man with a stammer that made his undergraduate lectures painful for him and students. He never established a research school like that of Masson, but the Melbournian was unique in the Australian context in that respect, and in any case Liversidge was extremely productive, being the author of 100 of the 291 research papers published by University of Sydney staff in its first fifty or so years. He was 'utilitarian, not utopian', a 'strategist not a tactician', an 'arch puzzle solver' and perhaps understandable in the scion of a business family, he 'took satisfaction in getting things done'. An example of this last quality presents itself in his assertive leadership of the Royal Society of New South Wales, which attracted Macleod's epithet of 'enlightened autocrat'. Liversidge showed no interest in social issues but did support the education of women. He never married, instead living comfortable in gentlemen's clubs or in his houses in Sydney and, later, Sussex.

MacLeod claims that Liversidge's influence on Australia science has been overlooked, in that no biography has appeared in the eighty-odd years since his death, but we should note that he himself has helped to break the drought with a four-column entry

on Liversidge in the Oxford Dictionary of national Biography. Liversidge also acted to perpetuate his memory by making legacies to five institutions to fund lectureships in his name. Three series of such lectures are still given in Australia and his name is ritually invoked at them.

MacLeod has given us fifteen chapters, plus an Introduction and a Conclusion, all having small margins so as to permit 500 words a page. There is a massive set (2,463) of end notes plus 32 pages of Bibliography, 34 of Index and a list of Liversidge's publications. After reading this book and making notes, I sometimes wished that I had the text on CD so that I could hunt electronically when I wished to revisit something. Even without such a digital aid, I noted that Freiberg, the home of the Bergakademie, is spelled correctly on page 33 and in the Index, but incorrectly (Freiburg) on pages 36, 118 and 130.

Many reviewers have used the simile that the text they are called on to consider is like a vessel of greater or lesser proportion floating on a sea of footnotes. Under this literary device, Roy Macleod's ocean is deep and his vessel is a richly provisioned cruise ship in which the reader will find information and entertainment fit for a long voyage. I wonder if Liversidge took anything as substantial when he went on his four trips 'home' to keep alive what MacLeod continuously reminds us were the slender threads of Empire?

Ian D. Rae
University of Melbourne

Linden Gillbank: *From System Garden to Scientific Research: The University of Melbourne's School of Botany Under its First Two Professors (1906–1973)*. School of Botany, University of Melbourne, Parkville, 2010. 38 pp., $25.

The System Garden at Melbourne University is a small green oasis in a campus of concrete lawns and ornamental lakes filled in with carparks. It is surrounded on all sides by the departments whose histories it shares—Zoology, Botany and Agriculture. This old-fashioned garden with its relicts of a systematic botanical education provides a physical focus for the history of the early years of the School of Botany, explored in Linden Gillbank's concise history *From System Garden to Scientific Research*.

This history covers the 'pre-history' of botany at Melbourne University and the tenure of botany's first two professors, James Albert Ewart and John Stewart Turner, which turns out to cover a surprisingly long period of time—up until 1973. I was surprised to learn that botany, one of the older biological sciences, took so much longer to get established in Melbourne than zoology—no doubt due to the zoological bent of early professors McCoy and Baldwin Spencer. Botany struggled to attract senior students, research funding and teaching staff in its early years. Given that Gillbank highlights the importance of both female students and staff in the school's early history one can't help but speculate that some of this early difficulty was due to the perception that botany was a science favoured by women (bringing to mind Linnaeus's famous statement that his system of botanical taxonomy was so simple even women could understand it).

Gillbank provides a tightly summarized overview of the School's history. There is so much information packed into this little book it left me wanting to know much more. There are entire sections that warranted a chapter of their own—such as the story of phytophora, the Herbarium, the connection with botanical artists (like Margaret Stones), the war research and work on the mountain ash forests and alpine meadows. The challenge of condensing a century of research into 38 pages is considerable and I suspect the department's research history really requires more extensive treatment in order to do it justice.

Nonetheless, this is a book to pique the interest and provides a valuable resource for the history of botanical science in Victoria. I can only hope that the author has the chance to expand on her work and bring us a more detailed account of the research she has obviously carried out.

Danielle Clode
Department of Zoology
University of Melbourne

Don Garden: *Droughts, Floods and Cyclones: El Niños that Shaped our Colonial Past*. Australian Scholarly Publishing, North Melbourne, 2009. 414 pp., ISBN: 978 1 921509 38 4 (PB), $44.00.

Don Garden deals with the impact of climate events on the economy, culture and social life of Australia and the Southwest Pacific in three periods, 1864–69, 1876–78 and 1895–03. Based upon work done with a substantial Australian Research Council grant, this study has been eagerly awaited. Historians are not in this modern world as susceptible to ideas of environmental determinism as were their predecessors of the nineteenth century but, Garden argues, the role of such material forces has been wrongly neglected in historiography. Australian historians have devoted insufficient attention to the impact of floods and droughts, even though such environmental 'disasters' loom large in contemporary perceptions of global warming. The concept of the El Niño/Southern Oscillation (ENSO) has now reached media and popular culture far enough to be incorporated in weather reports of television news broadcasts, and despair over the state of Australia's water resources has highlighted widespread concern over climate change. This book speaks to these contemporary issues by filling gaps in our knowledge concerning Australian colonial climate history, as influenced by ENSO. The causes and manifestations of ENSO are succinctly set out. The corresponding but less studied Indian Ocean Dipole is only mentioned in passing, because, Garden argues, its present-day operation is at an early stage of scientific investigation. Yet its interaction with El Nino events may prove to be significant.

Copiously documenting El Niño's impacts, Garden devotes much space to showing the complexities of connections between climate and socio-economic life. He concludes that climate did help shape Australian settler experience, but in uneven ways. In the nineteenth century, the impact of El Niño events was highly variable, particularly due to their quirky nature. Thus the 1870s drought was different, and milder in its effects than the 1980s counterpart, despite the very similar physical indicators of the two ENSO phenomena. Moreover, effects varied markedly by region and causal connections were complicated because humans took action to modify impacts. Thus, for example, by the time of the severe drought of 1898–1903, rail allowed the shipment of food and livestock from region to region to greater degrees than in the earlier periods. Social and economic circumstances, it seems, mitigated drought's effect in this and other myriad ways. The discovery of gold in Western Australia opened opportunities for thousands of disillusioned easterners to move west to areas not severely affected by the El Niño event of the mid-1890s.

By federation's dawn, Garden argues, Australians had begun to accumulate and incorporate knowledge of the cyclical variations of climate into their experience. They had started to seek policies of adaptation to an El Niño-influenced climate and had begun working to 'drought-proof' Australia. Climate's variability had become part of popular life, through religion, painting, poetry and other arts. Weather predictors such as Clement Wragge in Queensland emerged as figures of folk culture, and farmers and the wider public followed their

work (including comic attempts at rainmaking). Australians, Garden concludes, had arrived at a 'clear understanding that droughts were a regular occurrence, not an aberration' (p. 298).

To be sure, Australians were learning to live with drought and flood, but this knowledge could be taken in two ways: adaptation of humans to the realities of climate constraints, or sustained efforts to override climate's limitations. When one thinks of the Bradfield scheme of 1942 to bring water from the far north to the parched southern inland, one wishes that Garden had continued his story forward in time, and hopes he might explain how it was that these schemes could resurface in Australian history as promethean alteration, not human adjustment to the realities of farming a land with unreliable and inadequate rainfall. Judging by the crackpot revival of the Bradfield plans by radio talk-back host Alan Jones in 2002, and the positive response from sections of the public, many Australians had learned little or nothing since 1900.

This raises an important possibility: That colonial Australians had indeed learned about climate variability and the need to adapt sensibly, and that they subsequently unlearnt their knowledge. The increasing separation of most of the Australian population from rural production after World War II and especially since the 1960s, may have encouraged both ignorance of the need for humans to adapt and hubris about how climate should adapt to us. This is not unprecedented in modern history. In Southern California, for instance, an air-conditioned urbanism has been installed to beat the heat and a hydraulic society extended to triumph over rainfall deficiency.

One does not find such broad-ranging comparisons in Garden's work, nor the structural analysis of demography, social change and technology that would help understand patterns of adaptation. Indeed, there is very little in this study by way of systematic comparison and interpretation; the weight of evidence is presented in detail, often with long slabs of fascinating quotations from nineteenth-century newspapers. The analytical points are lightly and reticently made, and much is left to reader inference. One is left uncertain about the author's stance on environmental determinism. Yes, El Niño shaped Australian society in the nineteenth century, but to what degree and with what limits?

Certainly there are comparisons here, and Garden's reading of Mike Davis's *Late Victorian Holocausts* was an important starting point for his study. Comparison of the Australian cases with Davis's Indian El Niño-induced droughts of the 1870s shows that the farm impacts were less and more variable than in India. Comparisons are implicit, too, in Garden's decision to study not just Australia but the South Pacific. It turns out that the ENSO impact was extensive there, but effects across the region were vastly different in type and degree. Tahiti and Fiji experienced debilitating cyclones, parts of New Zealand excessive storms, fires, floods and even abnormal snow, and Australia predominantly drought though also floods. The social circumstances varied too. In Fiji the indigenous—increasingly deprived of their land—were more vulnerable to the social and economic impacts than commercial farmers were. Here again, it seems that human conditions mediated climate's deterministic effects.

Garden argues convincingly that nineteenth-century droughts, however bad, were not in the class of those of the early twenty-first century. Nor do the consistently high temperatures of recent years have parallels in the earlier records studied. In a too brief conclusion (which, by the way, is not listed in the table of contents and sits in place of a list of abbreviations I could not find in the text), Garden counters the suggestion that the copiously documented experience of recurrent droughts in the colonial past and evidence of colonial

alarmism about climate change provide fodder for climate change scepticism in the present.

*Droughts, Floods and Cyclone*s is a mine of useful information and empathetic treatment of its subjects. While this reviewer hoped for a more analytical and more comparative account, the book reflects in its approach the author's respect for the problems of fragmentary evidence, the complexity of impacts and the importance of El Niño for a fuller understanding of Australian history.

Ian Tyrrell
Scientia Professor of History
University of New South Wales

Linda Groom: *First Fleet Artist: George Raper's Birds and Plants of Australia*. National Library of Australia, Canberra, 2009. viii + 146 pp. + index, illus. (colour), ISBN: 978-0-642-27681-0 (PB), $49.95.

The voyage of the First Fleet to Botany Bay and the subsequent difficulties of establishing a permanent settlement at Port Jackson must be one of the most diarised events in the history of this country. What a surprise and delight it is, then, when new material is unexpectedly added to the corpus. Such a situation occurred in 2004, with the discovery of 56 previously unknown watercolours by George Raper (1769–1796), a young Midshipman aboard HMS *Sirius*.

Raper has long been known as the creator of several watercolours depicting natural history subjects, landscapes and maps relating to Australia. The collection of images that are the focus of this book came to light only recently in the estate of the late sixth Earl of Ducie. After a protracted and exacting process the works were authenticated (necessary because none of the works had been signed) and purchased by the National Library of Australia. This book follows a public exhibition of those watercolours and some research into the life of the artist.

Beautifully produced and in full-colour, this volume is divided into two parts, each taking up an equal portion. The first half, comprising eight chapters, provides a basic overview of the short life of George Raper, and details how the artworks came to Australia. Throughout this part, the text is fittingly illustrated, mostly by Raper's watercolours. The second half of the book is a portfolio of the 56 watercolours by Raper that form the Ducie collection, plus another 21 by the same artist, that were already held by the National Library of Australia.

For a couple of reasons, it is the latter section of the book that is of more interest. In the first place, the artistic works stand on their own merits; they are of value also for their rarity, and for the unlikely fact they have survived at all, and in excellent condition (something noted by the author). It is likely the paintings can be dated to 1788, making most of them the earliest representations of the species figured. The collection comprises 19 paintings of birds and 34 flowers. The former group includes Laughing Kookaburra, Sacred Kingfisher, Bronzewings, King and Swift Parrots, a couple of cranes and a honeyeater; the latter takes in specimens from at least 20 families, including Orchidaceae, Rutaceae, Fabaceae, Myrtaceae and Proteaceae. Interestingly, in many of these paintings Raper has also illustrated the root system of the plants, and occasionally includes a rendering of the Aboriginal name of the plant, as for example 'wa-ra-ta' on the iconic Telopea species.

The importance to the study of Australian natural history of Raper's paintings from Port Jackson largely stems from their early date. But the watercolours also provide insights into some aspects of life in the First Fleet. In comparing Raper's works with those of John Hunter, Raper's commanding officer on the *Sirius*, it became clear that many of Hunter's published pictures are direct copies of works by his midshipman. A minor botanical problem in Hunter's works was solved by the discovery of Raper's paintings. It says something about Hunter

that he could happily accommodate the fact that Raper, a mere midshipman, was both a better artist and could afford a better set of paints.

The overview of Raper's life, which forms the first half of the book, is hampered by a lack of direct source material. Unlike many of his contemporaries, Raper wrote little of interest. Only a part of one of his letters home survives, written on Norfolk Island while he waited rescue following the wreck of the *Sirius* in 1790. As a biographical subject, Raper is thus difficult. The author has done what she can but ultimately has to observe that 'Most of the story of Raper and his paintings has to be inferred from the words of others' (p. 65).

Perhaps because of this, idle speculation has crept in occasionally. There are also a couple of unreferenced quotations (p. 40). These quibbles are of minor importance; however, the book's real value and appeal lie in the faithfully reproduced watercolours of plants, animals and landscape by George Raper.

For that reason alone *First Fleet Artist* is a book to be cherished, by naturalists and by a wide range of readers with interests in the history of natural sciences in Australia.

Gary Presland
School of Historical and Philosophical Studies
University of Melbourne, Victoria

Kirsty Douglas: *Pictures of Time Beneath: Science, Heritage and the Uses of the Deep Past.* CSIRO Publishing, Melbourne, 2010. viii + 215 pp.,
ISBN: 9780643097049 (PB), $89.95.

Alongside the depth of scholarship evident in the production of this book, is its inherent challenge. For all those attempting to understand the Australian environment—from intellectual or economic, cultural or historical perspectives—there is a challenge thrown down here, to expand all our horizons, beyond just the need for collection of further discipline-specific data. It is the demand for different disciplinary perspectives to be covered and considered in our thinking and decision making. Specifically, different disciplinary perspectives on time. Understanding the Australian environment requires the integration of concepts of time from (in increasing breadth of focus) European, Indigenous, archaeological, anthropological, biological and geological perspectives.

This demand is illustrated through an analysis of the political and intellectual processes behind the establishment of three of Australia's recognized heritage landscapes: Hallett Cove, Lake Callabonna and the Willandra Lakes. Changing intellectual attitudes (from both Australian and international perspectives) towards the age of the earth, evolution and the long-term effects that humans have upon the environments in which they live, are integrated into the detailed political history of the preservation process for each heritage area. In addition, further reflections are made from within different discipline areas, on the need to understand or define what it means for something to be called 'Australian'.

The author's familiarity and ability to encompass historical, cultural and scientific domains is impressive. While at one level, the book is about the history behind the preservation of three heritage landscapes of Australia, at a deeper level, it challenges every reader to step outside the comfort-zone of their own discipline or interest area. This is a relatively small book, but very broad in its liveliness and demands; a spirited source of intellectual stimulation.

Bob Paddle
Australian Catholic University

Catherine Brady: *Elizabeth Blackburn and the Story of Telomeres*. The MIT Press, Cambridge, MA, 2009. 392 pp., illus.,
ISBN: 978-0-262-02622-2 (PB), US$16.95.

This very readable biography examines the life (to date) of the Australian-born

molecular biologist Elizabeth Blackburn. In 2009, she received the Nobel Prize in Physiology or Medicine (sharing it with Carol Greider, whose PhD she supervised, and Jack Szostak) for discovery of telomerase (an enzyme thought to be active in cancer and cell division). Nevertheless, her name is perhaps most associated with her controversial dismissal from the US President's Council on Bioethics in 2004 by White House directive after she objected to the Council's proposal of a moratorium on stem cell research and to its neglect of relevant scientific evidence in its deliberations. This book tells the story of both the development of Blackburn's career as well as her contributions to the field of molecular biology, particularly with regard to her investigations of the telomere and processes associated with it. The tone used to present the story is rather journalistic, with a fair amount of material derived from interviews interspersed with the 'story' of Blackburn's life. Slightly less successful in its execution is the presentation of the scientific material, which at times is rather dense and assumes a facility with biological concepts, despite the fact that the book is otherwise pitched at an accessible level. Another important strand in the account that fails to hit the mark centres on the theme of the challenges of being a woman in science. At some points in the book, discussion of this issue arises somewhat naturally in the context of conflicts arising between Blackburn's day-to-day laboratory and administrative responsibilities and her family commitments, but at other times its examination becomes rather heavy-handed and abstract (for instance when statistics are provided about rates of completion of science degrees by women) and less compelling as a result. Overall, the book is at its best in showing the transformation in Blackburn's personality and character, from a 'nice girl' to a champion of innovative scientific discovery and of 'accurate representation' of scientific evidence especially in the processes of science policymaking.

Rachel A. Ankeny
School of History and Politics
University of Adelaide

Elizabeth Ellis: *Rare & Curious: The Secret History of Governor Macquarie's Collectors' Chest*. Miegunyah Press, Melbourne, in association with the State Library of New South Wales, Sydney, 2010. 275 pp., illus. (colour), ISBN: 9780522853797, $59.99.

'Our first lieutenant was fortunate enough to bring a hogshead of [rum]; and consequently has filled the ship with kangaroos, parrots of different kinds, opossums, flying squirrels, shells, &c' (p. 62). So wrote a visitor to Sydney in 1810. Beyond the transmission of specimens for formal description in the natural history journals of the day in London was a vast but largely unrecorded shipment of living plants and animals and carefully preserved dead specimens. Few of the kangaroos, emus, parrots or black swans survived the journey. The dead specimens fared better.

In London in 1937 Sir William Dixson purchased an 'interesting old Colonial Chest' (p. 5), which he promptly donated to the Mitchell Library in Sydney. The chest was empty except for two drawers of shells set in neat patterns. But the chest concealed another secret, numerous painted wooden panels, most showing pairs of birds in a landscape setting as well as a stunning scene showing an array of fish in all their colours laid out on a beach. The Dixson chest, as it became known, had no provenance but the landscape backgrounds of the paintings connected it with the penal settlement of Newcastle to the north of Sydney in the late 1810s.

Then in the 1970s a similar chest preserved at Strathallan Castle in Scotland came to notice. It was of very similar construction with a matching set of paintings and this time it was full of

specimens, mainly birds, insects and shells. This 'Strathallan' chest was shipped to Melbourne for auction in 1989 and finally joined its companion at the Mitchell Library in 2004. In a sequence of twenty-five mainly brief chapters, *Rare & Curious* explores the content and context of the 'Macquarie' chest, as it is now designated. In fact, there is no explicit documentary evidence linking the chest with Governor Macquarie and it is only towards the end of the book that the circumstantial evidence for the attribution becomes clear.

Each chapter is like the drawer of a mysterious cabinet itself, exploring an individual theme, whether the getting of the Australian timbers of which the chests are made (mainly rosewood and red cedar), the known skilled convict carpenters in Macquarie's time, Macquarie's relations with the commandant at Newcastle in the late 1810s (Captain James Wallis), aspects of Macquarie's own career, and so on. In a virtuoso interplay of text and image, these chapters provide a novel exploration of the colonial elite taking an interest in local timbers for more elegant purposes than windows and skirting boards, gathering natural history specimens as gifts for mentors in Britain, and patronising skilled convict artisans including carpenters and artists. Through all the roughness and hardship of the convict colony Macquarie and his officials were building the makings of a more civil community.

While *Rare & Curious* contributes little to our understanding of the formal channels of scientific practice regarding Australia's novel fauna, it richly emphasizes how the interest in Australia's fauna and flora was part of a broader cultural phenomenon at a time when virtually all scientific practitioners were amateurs. In addition to the steady flow of live and preserved plants and animals sent 'home', artists captured the appearance in life of flowering plants and colourful fish. The specimens of birds and insects in the Macquarie chest have been locked away from the effects of light and variations in humidity so they still have a remarkably vivid freshness even though many of them are decades older than the type specimens by which they entered the scientific domain. Such specimens were among the supplements to letters, which maintained fragile links with families and patrons. They had the potential to enhance a patron's reputation through scientific recognition. This lies behind a gift of '12 very curious Skins of Pidgeons', which Colonel George Johnston sent to the Duke of Northumberland in 1818 with the suggestion 'that they are entirely Non descripts' (p. 107); that is, they had not received formal scientific description.

Two substantial chapters are devoted to the specimens and the painted panels, accompanied by comprehensive illustrations. In addition, three appendices give detailed descriptions of the two chests, catalogue the painted panels and list the specimens. The Macquarie chest was a message to the old world about the natural richness of the colonial frontier, a message it carries to us today.

Julian Holland
Sydney

Blanche Hampton with Ben Allen and Robert Loeffel: *The History of the UNSW Faculty of Engineering*.
UNSW Press, Sydney, 2009. 352 pp.,
ISBN: 9781742230320, $99.95.

At the end of World War II Australia had six universities, one in each state, all established in the nineteenth and early twentieth centuries. All had engineering schools organized along similar lines. At that time the government of New South Wales decided to establish a new university, the NSW University of Technology, which would help to overcome the shortage of qualified engineers and encourage the industrial development of the state. It was founded in 1949, initially making extensive use of the facilities and teaching resources of

the Sydney Technical College, and with the administrative services provided by the NSW Department of Technical Education.

The Faculty of Engineering was formally established in the same year, with Harold Brown, an electrical engineer recruited from CSIRO, as the first Dean. By 1950, there were over 2,000 engineering undergraduates enrolled, a level not greatly exceeded until the 1990s. The Engineering Faculty had quickly become the largest in Australia. By 2008 over 5,000 were enrolled in undergraduate engineering courses, over 600 in postgraduate research, and over 1,000 in postgraduate courses. The Engineering Faculty was not only large but diverse and highly regarded.

This book was published to mark its 60th anniversary, celebrated in 2009. Work on a history of the Faculty had commenced in 1999 with a substantial oral history program, and continued with the compilation of chronologies, the collection of images and the review and organisation of archival material. An Editorial Committee and an authoring team were appointed in 2007. The result is a handsome, copiously illustrated volume in coffee-table format.

After a rather scratchy introductory chapter that covers the evolution of engineering and the history of engineering in Australia, there are ten chapters that deal chronologically with the periods of office of each Dean. Interspersed are articles on the major research activities, written by the contributing authors, and short articles on the individual schools that make up the Faculty, student affairs and other topics. Thirty-one contributing authors are named, all present or former senior members of the academic staff.

This book is based mainly on material in the university archives. There is little on the relationship between the Faculty and the outside world, and little attempt to put in context or explore the significance of what is described. It's worth reading by everyone interested in engineering education and engineering institutions in Australia, but to me it's not quite a history, more a record of events and activities.

Ian Arthur
Secretary ASHET

Patricia Fullerton: *The Flower Hunter: Ellis Rowan*. National Library of Australia, Canberra, 2002 (reprinted 2007). 105 pp., ISBN: 97806422107602, $24.95.

Christine Morton-Evans and Michael Morton-Evans: *The Flower Hunter: The Remarkable Life of Ellis Rowan*. National Library of Australia, Canberra, 2008. 329 pp., ISBN: 9780642277015, $34.95.

Leonie Norton: *Women of Flowers: Botanical Art in Australia from the 1830s to the 1960s*. National Library of Australia, Canberra, 2009. 126 pp., ISBN: 97806422768354, $34.95.

Australia's wildflowers, colourful and sometimes bizarre, have attracted the attention of illustrators whose lively paintings provide us with valuable scientific information from the earliest days of European settlement of Australia. From the National Library of Australia come three recent works that draw attention to the rich legacy that is the depictions, particularly by nineteenth-century women, of this unique flora. They are at once a celebration of the work and talent of these women, and of the collections housed in the National Library of Australia.

Two of the works reviewed here take as their subject Ellis Rowan, 1848–1922, one of the earliest Australian wildflower painters to gain an international reputation for her work. The first of these books is the catalogue of an exhibition of Rowan's works selected from the National Library's collections. This highly successful exhibition was held in Canberra in 2002 and later in galleries in several Australian States. The catalogue is generous in the number of high-quality reproductions of works

included in the exhibition. These include not just her paintings but also screens and items of porcelain, and while principally of flora, Rowan's zoological subjects, particularly birds of paradise, are also represented. What can be seen from these works is the development of her style from the typically Victorian bunches of flowers to the much later, freer works, which usually depict only one species. In these later paintings Rowan included insects, perhaps offering some hints as to pollinators, and by painting birds-of-paradise with the flowers suggesting natural associations in the wild. Rowan's depiction of animals was as lively and direct as her flowers; her paintings of butterflies are acknowledged as being scientifically highly accurate. In Rowan's time such crossover between botany and zoology was somewhat unusual. Of particular value in this catalogue is the inclusion of a chronology of the chief milestones in Rowan's life.

The second book is a biography, adding to the increasingly well populated field devoted to Rowan and her work. The books published in the past thirty years have gone a long way to redress this situation. *The Flower Hunter: The Remarkable Life of Ellis Rowan* (its title, together with that of the exhibition catalogue, derives from Rowan's autobiographical work published in 1898) is intended for a popular audience: it is highly readable and presents an entertaining and wide-ranging picture of colonial life. Rowan's thirst for botanical knowledge and her determination to travel extensively in remote areas in pursuit of plants to paint are vividly depicted. She was the first person to paint the flora of some of the areas into which she ventured, particularly in the northern tracts of Australia.

The reliance of this book on the work of previous biographers is apparent in the footnotes. On occasion this has led the authors into the error of repeating, uncritically, stories that have proved incorrect. Ferdinand von Mueller, for instance, is credited with assisting Rowan's father in the design of the family garden at Mount Macedon north of Melbourne, but no evidence has come to light that casts Mueller in the role of garden designer. Further to this, an acquaintance with recent scholarship about Mueller would have prevented the authors from committing the errors of having him resign from the position of Director of the Melbourne Botanic Gardens and replace Augustus Gregory as leader of the North Australian Exploring Expedition.

An assessment of Rowan's contribution to the scientific knowledge of the Australian flora is not one the principle aims of this biography. The authors note, for instance, Rowan's meeting with Marianne North, an English wildflower painter who travelled the world seeking subjects on which to exercise her talent. There are many parallels that can be drawn between the careers of both women. The inspiration Rowan drew from meeting North is highlighted, but there is no attempt to draw comparisons between their work or their contribution to our understanding of the plants they painted. It is known that Rowan sent specimens to Mueller for identification, although probably not in the vast quantities suggested (Mueller's herbarium, the National Herbarium of Victoria, has no specimens collected by Rowan).

Rowan also features in the third book under review here, *Women of Flowers: Botanical Art in Australia from the 1830s to the 1960s.* Most of the paintings reproduced here are from the National Library of Australia's collections, with the addition of some from State Libraries in New South Wales and Tasmania. The book offers an enticing glimpse of the work of eleven women. Some of these painters were active in the early nineteenth-century: Mary Allport in Tasmania, Dorothy Paty around Newcastle in New South Wales. Others are well known to students of Australian natural history. Louisa Atkinson (later Calvert) corresponded with leading botanists of the day including Ferdinand von

Mueller in Melbourne and William Woolls in Parramatta. She wrote prolifically on natural history subjects especially in the newspapers, and is acknowledged as a dedicated naturalist and keen observer. So too are the sisters Harriet and Helena Scott deservedly renowned for their natural history paintings. While their botanical work is the focus here, they are possibly better known for their zoological work, especially on butterflies (which feature in several the works reproduced here) and reptiles. They worked closely with leading scientists of their time, including Gerard Krefft and Ferdinand von Mueller.

Except for Ida McComish (who was active in the first half of the twentieth-century), the other painters mentioned were also from the nineteenth century. Each artist is introduced with a page of text followed by the reproduction of up to ten of their paintings, carefully selected to show the range of their style and the variety of their subjects. At the end of the book are thumbnails of every painting giving the details including the current botanical name of each plant. That the plants could identified, in most cases to species, is an indication of the accuracy of the draftsmanship: paintings lacking sufficient diagnostic detail are difficult to identify to that level. This book is an invitation to look further for the works of these talented women and for others who have contributed to our knowledge of the Australian flora.

Helen M. Cohn
Royal Botanic Gardens Melbourne

Joan Webb: *A Birdstuffer's Library: A 19th Century Naturalist's Library*. Joan Webb, North Ryde, NSW, 2009. vi + 99 pp., illus., ISBN: 978-0-9580 2277-3-1, $35.

Dr Webb's *George Caley, Nineteenth Century Naturalist* (Surrey Beatty & Sons: Chipping Norton, NSW, 1995) refers briefly (p. 158) to the auction by Christie's on 19 June 1829 of the books collected by Caley during his career in England, New South Wales and the West Indies. In the present work she undertakes a detailed analysis of the sale catalogue preserved in the Natural History Museum in London, thereby complementing her earlier biography of Banks's collector in Australia between 1800 and 1810. The volume is informed by Joan Webb's precise knowledge of the primary sources held in both hemispheres and by painstaking new research on the material owned by Caley.

By the bibliophilic standards of his time George Caley's library was a very modest one. Dr Webb compares it with those of Horace Walpole and Joseph Banks (pp. 89–90), both of which were more than ten times bigger. However, despite his limited means, Caley's lifelong passion for reading was strong, and his collection was clearly focused on natural history as well as on travel and exploration, especially in the regions of the world of which he had personal experience. In this way the Caley catalogue can be claimed as one of the earliest manifestations of an interest in Australiana.

The approach taken by Joan Webb is a discursive one. The account of what she considers to be significant books in Caley's collection is interwoven with the details of his life to produce what is in effect a second version of the 1995 biography. On the one hand this bolsters some of her conjectures about the dates at which certain titles were acquired and gives some coherence to the narrative; on the other it leads to a fair amount of repetition and increases the temptation to dwell on tangential questions.

From the point of view of the historian of books, *A Birdstuffer's Library* could profitably have adopted quite a different presentation. We are not given a bibliographical description of the Christie's catalogue, and a lone facsimile page (p. 85) illustrates the problems of working with the norms followed by London auctioneers in contrast with the Paris booksellers' subject classification. The

price and purchaser annotations—carefully studied by Dr Webb—are a distinct advantage, but one can still regret that the whole document was not reproduced in facsimile to allow users with different specializations to exercise their own discretion and critical acumen. Much of the material in Dr Webb's various chapters could have been incorporated in notes giving readers the results of her researches on the titles held by Caley and on the purchasers at the sale. The resulting work may well have been more austere, but it would have been more useful in the longer term, especially since *A Birdstuffer's Library* has no index.

The study of private libraries and of marginalia has become a fashionable field. Alongside Caley, there is scope to look further at the collections brought to Australia in the first quarter of a century of European settlement. We need to know more about Robert Townson's books—far from irrelevant to scientific topics—and also to look at what more or less longterm visitors brought with them. Caley himself was so much a loner that he may not have guessed what was around. Curiously, the most substantial library brought into Australian waters in the first decade of the nineteenth century was that of Baudin (see Jean Fornasiero & John West-Sooby, 'Baudin's Books', *Australian Journal of French Studies*, 39 (2002) 215–249).

Wallace Kirsop
School of Historical and Philosophical Studies
University of Melbourne, Victoria

Tim Flannery: *Here on Earth: An Argument for Hope*. Text, Melbourne, 2010. 352 pp., ISBN: 9781921656668 (PB), $34.95.

Here on Earth is Tim Flannery's first major book since *The Weather Makers* (2008). Like *The Weather Makers*, it speaks to concerns about global change, but it is less about climate and more about the history of globalization. This is a biologist's big history and philosophy of the Earth. In *Acquiring Genomes* (2002), Lynn Margulis and Dorion Sagan made the claim that 'the future of science belongs more to biology, the study of complex systems, than to physics' (p. xv). Flannery goes further, arguing for a unity of the disciplines of biology and physics in the service of a planet shaped by and for life. He also uses history in interesting ways.

Flannery's *The Future Eaters* (1994) was about the New Lands: New Holland, New Zealand, New Caledonia and New Guinea. *Here on Earth* is about five superorganisms, the first agricultural societies that shaped Earth's biological and physical functioning. The places where agriculture arose independently were the Fertile Crescent (Turkey to Iran), East Asia (China), South America (Peru), North America (Mexico) and New Guinea. Flannery's personal history in New Guinea has enhanced both books. Writing of agricultural societies, Flannery acknowledges the historians' traditional interest in 'powerful individuals', but as a biologist argues nevertheless that rules 'guide the development of civilisation'. He establishes these rules through the histories of very different agricultural societies and how each became a 'superorganism'.

The essay-style chapters in *Here on Earth* together form a big overall argument, but each is easy to read alone. Part 1, *Mother Nature or Monster Earth* examines evolutionary theories and their motivations, including the evolution of the Earth and a global 'Commonwealth of Virtue' based on co-evolution. Flannery argues that 'co-evolution, in both a biological and a cultural sense, is critical to our hopes for sustainability' (p. 69), and returns to this theme again and again. Part 2, *A Turbulent Youth*, is a history of the first peoples on the Earth, underscoring the traits that make humans different from other organisms, and looking at how a love of nature might be the basis for sustainable behaviours, following E. O. Wilson's notion of biophilia. Part 3, *Ever Since Agriculture* considers the

'human superorganism' that is an agricultural society. The 'glue' of these superorganismic structures is social, not genetic, but is enhanced by the narrow genetic base of humankind to enable universal understanding. Part 4, *Toxic Climax?* considers the war waged on the planet by the global, post-industrial world. Its historical focus is the years since the 1950s, the Great Acceleration. There is a chilling chapter on biomagnification that made this reader think twice about eating fish ever again. Part 5, *Our Present State* is more economic and sociological, and less biological and historical than the rest of the book, but it provides key arguments about creating social structures for life on earth. The final part, *An Intelligent Earth?*, is just one chapter, in which Flannery tackles James Lovelock's big question: does humanity 'constitute a Gaian nervous system and a brain?' (p. 273).

There is an unmistakeable Australian bias in the case studies and examples in this very global book. For example, rabbit invasions in Australia illustrate Malthus's population theory (p. 205), and the theory of co-evolution is explained through the mutual dependence of scribbly gums and their beetles (p. 30). Aboriginal societies and their cultural use of fire are important in creating certain biodiverse environments, and Flannery's experience with the work of the Australian Wildlife Conservancy provides one of the hopeful parables for storing carbon in rangelands and desert country (pp. 268–9). But even more than Australia, the biology and cultures of New Guinea underpin many arguments. Life on the 'other side' of Wallace's Line has shaped Flannery's synthesis, giving him a fresh angle on crucial questions tackled by other global change thinkers with a northern hemisphere bias.

As well as a compelling argument about Earth and its historical relations with people, *Here on Earth* provides a fascinating study of the role of the history of science in communicating complex ideas to a wide range of audiences. The book opens with Flannery strolling along Darwin's famous 'sand walk' at Down House, paying pilgrimage to the evolutionary thinker and reflecting on the history of ideas about natural selection. After a wealth of bicentenary books, Darwin's life history is well known—and for historians of science, this brief encounter is perhaps a little too brief, but Flannery uses it as a hook to introduce not so much Darwinian evolutionary theory, but rather the different classes of characteristics that may be inherited. There are genes and there are mnemes: here Flannery summarizes the work of Richard Dawkins. The 'selfish' gene develops over evolutionary time. The mneme is a self-replicating brain structure, that, like a gene is transferable, but it travels between generations of cultures, rather than directly from parents to children, and has the potential to change through the rather different evolutionary framework of Alfred Russel Wallace. Instead of the 'red in tooth and claw' reductionist evolution of Darwin, Flannery describes Wallace's evolutionary process as a 'series of win-win outcomes that has created a productive, stable and cooperative Earth' (p. 25). Flannery is not just writing about what happens when cultures meet biology—the old, grim story of extinctions, but rather how biological systems and human cultural systems together with physical systems work together to constitute the living superorganism, Earth itself—or Gaia, as Lovelock calls it. This is the space where stories of hope can emerge.

Historians of science might be surprised at the contrast Flannery paints between Darwin as 'patient, mechanical toiler, a scientist in the finest reductionist tradition' and Wallace the synthesiser whose 'description of the evolutionary process was dashed off' in 'a flash of genius' (p. 26). Flannery, while rather aligning himself with Wallacean synthetic thinking, is alert to its limits: 'Most of the researchers working in what we might call the Wallacean tradition

of holistic, planetary-scale science seem to have arrived in the field more or less independently, unaware of the writings of their predecessors. Perhaps', he muses, 'this is because the Wallaceans have rarely been part of the academic mainstream' (p. 32). Wallace and Lovelock, a century later, were academic outsiders convinced that the key to understanding life as a whole was the atmosphere. Getting outside disciplinary straitjackets was crucial to their synthesis. Like the atmospheric chemists who discovered the traces of human history in the upper atmosphere, Flannery argues for the importance of understanding the role of people in historically shaping all Earth's systems in our new era, the Anthropocene. Everyone needs history—not just historians, and it is very important that such global histories are scientifically informed, culturally rich and scaled from microbes to the whole planet. Writing about extreme scales for a human reader is a particular challenge and this is where Flannery's skill as a writer and synthesist in the Wallacean tradition is crucial.

Flannery, like the atmospheric chemists, is convinced that the atmosphere is Gaia's most important organ. Indeed he suggests (via a Chinese translation of the original Darwin) that evolution by natural selection is the 'performance of the heavens', all Earthly nature is constituted by the workings of the atmosphere. He writes well of its oceans and lands as well, and, as you would expect of a biologist, most passionately of all about the role of biodiversity in Gaia's functioning, maintenance and evolution.

Some of the most enjoyable passages are about the 'mammoth steppe'—the lands created by mammoths in the era before the last Ice Age. Flannery describes these huge hairy beasts as 'ecological bankers': ploughing up the snow in winter to find food to graze and defecating nutrients and stored carbon back into the dry, frigid grasslands that then stretched from central France to Alaska. During their reign, mammoths enriched the productivity of these frozen plains, but without them, today's Siberian tundra is impoverished: its acid soils support only boggy plant matter of low nutritional value. When dying plants rot, they return carbon to the soil (a process important in every era, but especially our own). When rotted plants freeze instead they form peat, a highly acidic substance hostile to plant growth. The growing season for plants has, despite the amelioration of temperatures over the last 10,000 years, become *shorter* without mammoths. They bared the soil to the sun with their long tusks as they foraged—where now frozen peat delays the warming of roots and reduces the growing season. Mammoth droppings used to add nutrients to the system: 'by eating the vegetation that would have become peat, and returning it as fertiliser, they kept a climatically formidable environment productive and alive', Flannery explains (p. 89). Human hunters hunted mammoths out as the climate warmed, eventually pushing on into north America, where mass mammalian extinctions quickly followed—probably within 500 years, a story that Flannery has told in detail in *The Eternal Frontier* (2001), but here told in a different way, for a different purpose.

What is exciting about *Here on Earth* is the way Flannery has moved beyond the 'people meet animals' arguments of *The Eternal Frontier* and *The Future Eaters* to take an Earth-centric view of these events. Life itself creates the physical shape of the planet, and the planet is a 'superorganism' that enables life. Life is no longer 'on' Earth but rather 'of' Earth, while Earth itself is the unique planet of life. This is a big synthesis, but it is still written in reader-friendly detail with characteristic charm, and with a passion that this understanding is essential to finding rational hope for the planet's future.

Libby Robin
The Fenner School of Environment
and Society, ANU
Centre for Historical Research,
National Museum of Australia