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Reviews

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Ann Moyal (ed.): *The Web of Science*: *The Scientific Correspondence of the Rev. W. B. Clarke*, *Australia's Pioneer Geologist*. Australian Scholarly Publishing: Melbourne, 2003. 2 vols. xxii + 1340 pp., illus., ISBN 1 74097 042 (set); 1 74097 043 8 (vol. 1, 1836–1863); 1 74097 044 6 (vol. 2, 1864–1878), $175 (set) ($200 for institutions).

William Branwhite Clarke (1798–1878) was one of Australia's leading scientists of the nineteenth century, the 'father of Australian geology' as he came to be described. A graduate of Cambridge University and an ordained minister in the Anglican Church, he had already established a position for himself as an enthusiastic 'man of science' in the classic British style by the time he left England for New South Wales in 1839, having published by then some fifty papers on geological subjects as well as a number of literary works. He had also established connections with the leading British geologists of the day, both individually and through the Geological Society in London, that he maintained by correspondence following his removal to Sydney. Clarke had no private fortune, however — indeed, his move to Australia was prompted by his lack of connections who could gain him preferment within the Church in England — and so he was unable to devote himself solely to his favourite scientific pursuits. Instead he pursued his ministry, at first briefly as Headmaster of King's School, Parramatta, then for several years as rector at nearby Campbelltown, and from 1846 until his retirement in 1871 as parson of the sprawling parish of St Leonard's on the north shore of Sydney Harbour. To enhance his income, he also took up journalism and for many years regularly contributed articles, editorials and letters to the *Sydney Herald*, most of them dealing with scientific subjects or with exploration (he was, for example, one of Ludwig Leichhardt's principal supporters). Most were published anonymously but his authorship was widely known and helped him to quickly win a prominent place among Sydney's small group of science enthusiasts. As that community expanded and viable scientific institutions were established, Clarke continued to play an influential role. In particular, during the last decade of his life he provided important leadership in the Royal Society of New South Wales as Vice-President (and thus effectively the chief office-bearer since the Governor was *ex officio* President) for a period of nine years from the Society's foundation in 1867. In gratitude, the Society immortalized his name by creating its Clarke Medal for 'meritorious contributions to the geology, mineralogy and natural history of Australasia' that is still awarded annually.

Clarke's scientific standing both locally and internationally depended chiefly, however, not on his more ephemeral writings but on his geological work. From his earliest days in Australia, he spent much of his leisure time hammering the rocks, seeking an understanding of the colony's complicated geological structures. The arrival in Sydney Harbour of the United States Exploring Expedition under Charles Wilkes, a few months after Clarke himself had landed, gave this work an early fillip as he went geologizing in the Illawarra region

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with the young James Dwight Dana who became a life-long correspondent. Later, sometimes accompanied by other visitors to the colony such as J. B. Jukes, naturalist on HMS *Fly* during its survey in Australian waters, he ranged both north and south of Sydney, exploring the Hunter Valley and Lake Macquarie as well as the Blue Mountains to the west. By the late 1840s Clarke had become a recognized authority on the geology of New South Wales, and people paid attention when he predicted that gold would be found on the western slopes of the Great Dividing Range. When payable quantities of gold were duly discovered at Bathurst and elsewhere in 1851, sparking the gold rushes that transformed Australia, Clarke became embroiled in an acerbic priority dispute. Credit for the discovery was also claimed by the prospector Edward Hargraves, and by the British geologist Roderick Murchison whose claim was based on the prediction he had made, in very general terms, arising from his theories about the formation of mineral deposits. At a more practical level, Clarke was engaged by the New South Wales Government to undertake a gold survey of the colony that fully occupied him for most of the following two years, while he took leave from his parish duties, and that enabled him to range much more widely than he had been able to do on his own resources. The reports he submitted that drew attention to localities that he judged likely to yield payable mineral deposits were highly regarded by the mining community and consolidated his reputation as a colonial savant.

Prickly and assertive, Clarke did not shy from controversy, whether over his claim to priority in relation to the discovery of gold, or in his long-running dispute with Melbourne's Frederick McCoy and others over the age of Australia's coal deposits. As Vallance argued almost a quarter of a century ago in a magisterial paper: 'The Fuss about Coal: Troubled Relations between Palaeobotany and Geology' (in D. J. and S. G. M. Carr (eds), *Plants and Man in Australia*, Sydney, 1981, pp. 136–176), the 'fuss' was much more than a personal and local battle between Clarke and McCoy. Its ramifications were international — the main questions at issue were eventually resolved not in Australia but in India — and involved both fundamental questions about the interpretation of fossil plants and the abandoning of long-held views about the universality of geological formations (which assumed that the geological column worked out for Europe would apply equally well elsewhere) and a recognition that different parts of the world might have had quite different geological histories. Clarke died before the new understanding was fully worked out and, though he was more receptive to new ideas than McCoy, his thinking (to use Vallance's words) 'remained bound by belief in the primacy of European experience'. In the present volumes, we can trace Clarke's struggling, limited as he was by this unrecognized presupposition, with the deep conceptual problems involved, in the face of McCoy's intransigence and vituperativeness and his own sometimes over-hasty judgments. The conclusions he ultimately arrived at were embodied in his *Geological Sketch Map of New South Wales* that was published by the government of the colony three years after he died, and that is reproduced as a fold-out coloured plate in the present work.

Clarke was a prolific letter-writer throughout his life, and he carefully retained his files of correspondence (including copies prepared by his son of some of his outgoing letters). After his death these were preserved by the son and eventually transferred along with others of his papers to the Mitchell Library in Sydney. In the present volumes, Ann Moyal publishes many of these letters for the first time, together with numerous letters written by Clarke that are held in other collections in the Mitchell Library or in

other repositories. In all, the edition encompasses 895 letters, many of them of great interest. They are preceded by a 65-page biographical introduction by Moyal that sets the letters in context. There is also a comprehensive bibliography of Clarke's scientific publications. Annotations to the letters provide further information. The whole constitutes a tremendously rich resource that will be mined by historians of Australian science, and by historians of geology more generally, for years to come.

The evocative title Moyal has chosen for the edition highlights a major feature of the collection. Scientists working in Australia in the nineteenth century were few and far between, and they depended on their correspondence to keep in touch both with international developments in their field and with fellow workers in Australia and New Zealand. In Clarke's case, we can see from his letters how, especially in the 1860s and 1870s, he was able to build up a network of correspondents among the younger generation of geological workers — men such as Richard Daintree, C.D. Aplin, G.F. Ulrich, Alexander Thomson, Charles Gould and C.S. Wilkinson — with whom he exchanged information and ideas, at the same time as he was relying on his correspondents in Europe to identify the fossils he sent them, to underpin his efforts to unravel the geology of eastern Australia. We can also see how, like Ferdinand von Mueller in Melbourne, he was able through his correspondence to dispense patronage within Australia — for example, by recommending Daintree and Aplin for geological survey positions in Queensland — while his friends in Britain gained recognition for him there, for example by arranging his election as a Fellow of the Royal Society of London. The successful pursuit of science, even in such an essentially local discipline as geology, requires the integration of one's work with what one's peers are doing, and Clarke's correspondence shows very clearly how he went about achieving this.

The present publication is restricted, in the editor's words, to Clarke's 'scientific correspondence and such of his collected correspondence as is relevant to scientific affairs'. Letters dealing with family matters or with his work as a clergyman are thus systematically excluded. This is to be regretted since it inevitably leads to an artificially narrow view of Clarke the man and of the social context of his science. Also omitted are Clarke's many letters to the newspapers, which may be accessed by means of an index prepared some years ago by Michael Organ, and, more surprisingly, Clarke's correspondence as Secretary of the Australian Museum, 1840–1845. Even more surprisingly, given Clarke's work on the gold surveys and his other contacts with government, no search has been made in the New South Wales Archives for letters from or to him that may be held there. Within the limits set, the edition will give readers both a clear impression of Clarke's life in science during a period of almost forty years and a good idea of the way in which the understanding of the geology of eastern Australia advanced during that time.

More regrettable from an editorial point of view are three other decisions that were made: (1) occasionally to omit passages not relating to science from letters that are published, so that the published version of the letter is incomplete; (2) not to reproduce the many sketches, mostly of fossils or geological formations, that occur in the letters; and (3) not to publish a number of the letters written in French in the original language but only in English translation. Tables of meteorological data included in some letters are also omitted. The omission of the sketches is particularly unfortunate since in their absence it is often impossible to understand the written text. Sometimes, the result is even worse: a letter from Daintree to Clarke dated 10 February 1866 becomes hopelessly garbled when a series of labels written in columns beneath the

omitted sketch of a geological formation are transcribed as though they constitute continuous lines of prose running across the page, a 'line' being made up of two or three words from each column in turn!

While this is an extreme case, it is, sadly, symptomatic of problems that beset the transcriptions of the letters, which are plagued with uncertainties and inaccuracies. Bracketed phrases such as '[words indecipherable]' or '[words obscured]', or '[?]' to indicate a doubtful reading, appear distressingly often. Proper names frequently cause editors difficulties when transcribing old handwriting, but here there are far too many errors that could readily have been checked against standard works of reference. Any number of examples could be given. They include names of people ('Ebrenberg' for the famous German investigator of infusoria C.G. Ehrenberg, 'Guy Lu Sac' for the French physicist Joseph Gay-Lussac, 'Sir Richard McDounall' for Governor MacDonnell of South Australia); institutions ('Geol. Society' when the context clearly dictates 'Geol. Survey'); scientific equipment ('Barling Point Apparatus' for the boiling point apparatus used to determine elevations of mountains); places ('[Raebourne]' for a location on the north-west Australian coast, with the brackets indicating an uncertain reading is surely the historic town of Roebourne; 'Boruthen on the Zambo' in Gippsland in Victoria must be the town of Bruthen on the Tambo River; 'Siebengabage [?]' is the famous German mining district Siebengeberge; the 'Ennesleight River' in central Queensland is presumably the Einasleigh; 'Enisher Bay' in South Australia's south-east is surely Guichen Bay; 'Midway Puielet' on p. 745 becomes the much more plausible Midway Rivulet a few pages further on; the 'country of Cumberland' is almost certainly the County of Cumberland on which Sydney stands); chemicals (the context makes clear that what appear as 'dilute ciciels' are really dilute acids, while 'Todides' must be Iodides); plants ('Lonanthacia' for Loranthaceae, 'Dickenia' for the tree-fern *Dicksonia*, 'Tasmania aromatica' for *Tasmannia aromatica*, 'Epacsis' for *Epacris*, 'sphagum bogs' for sphagnum, 'Richer Grandifolia' presumably for a species of *Richea*); and, most significantly of all, given their importance for Clarke's science, fossils ('Phiosaurus' for Pliosaurus, 'Aulostuges' for Aulosteges, the elephantine 'Pachydermous' for the marine bivalve Pachydomus). Such obvious misreadings are frequent enough that one is left with little confidence in the accuracy with which other names have been transcribed.

Unfortunately, there are grounds for thinking that there may be other problems, too, with the transcriptions. From time to time, sentences appear that are simply mysterious as they stand, that either have been transcribed incorrectly or demand some explanation. What, for example, is one to make of the middle clause in the following, that appears in the version published here of a letter from Daintree to Clarke dated 21 September 1863: 'I weary of the hod so will exchange for a time, oSe for Ta'dda, that is if cattle will fatten in Queensland'? I can only suppose that Daintree with his Cambridge education wrote some words in Greek and that this has not been recognized. (Elsewhere, unforgivably, when Clarke uses a Greek word, this is not transcribed but '[Greek script]' is recorded.) In other cases, one can be certain that a mistake has been made in the transcribing. In a letter to Adam Sedgwick of 2 February 1843, for example, Clarke is shown reporting the discovery of a fossil bone 'about 2000 miles W of the Liverpool Range', which would put the discovery site on the opposite side of the continent! The 'Bearwah' (i.e. Beerwah) peak in Queensland's Glasshouse Mountains is said (p. 258) to be '11 to 12,000 feet above the surrounding country' which, if true, would make it considerably higher than Australia's

highest mountain, Mt Kosciusko. Elsewhere, Clarke is shown reporting (p. 746) that from his house on Sydney's North Shore he could see 'Mount King George 50 miles to the eastward', which would place the mountain well out to sea! If such obvious misreadings can get through, how many other, less obvious ones might there not be? Having access to photocopies of a few of the original letters, I was able to check Moyal's transcriptions for myself and have to report that in the two that I checked, there are, besides numerous small errors of spelling and punctuation, a number of potentially significant misreadings of words. In a letter from Ferdinand Mueller to Clarke dated 5 September 1858, for example, I noted the following: 'parts' where Mueller wrote 'facts', 'however' omitted, 'authoritative' instead of 'authentic', 'shrubs' instead of 'herbs', 'horse' instead of 'desert', 'their' omitted, 'advance' instead of 'ardour'. Again, in the letter from Richard Daintree cited earlier in regard to the misread captions belonging to a geological sketch, I noted the following additional misreadings: 'of them' instead of 'their', 'Pevy's Range' instead of 'Perry's Range', the weight of a nugget of gold given as '47 dwts' instead of 17 dwts. The mistakes are numerous enough to undermine the value of the transcriptions. While these certainly remain useful because for the most part they give a good idea of what is being said, it would clearly be dangerous to rely on the exact wording of any letter as published without checking it against the original.

Finally, there are shortcomings with Moyal's annotations. While extensive biographical details are given when there is a readily available source of information such as the *Australian Dictionary of Biography* or the *Dictionary of National Biography*, no information at all is given about many other, lesser-known individuals whose names appear in the letters. Also, only infrequently are bibliographical details given to identify publications mentioned in the letters. Still the notes include embarrassing errors, of which a few examples must suffice. A gloss in a footnote referring to Mitchell's map of New South Wales (p. 86) solemnly explains that its 1:540,000 scale means 1 inch to 540,000 miles! A footnote identifying 'Humboldt' (p. 291) gives details, correctly, about the famous scientific traveller Alexander von Humboldt, but ascribes the wrong given names to him. And when Clarke in a letter to Charles Darwin remarks (p. 576) that 'In your Monograph you define the oldest Cirripedes to belong to the Oolitic', a footnote identifies the reference as being to *The Origin of Species* when it is clearly to Darwin's classic monograph on Cirripedes. Such errors apart, it would, I think, have greatly assisted many readers if Moyal had included more explanatory notes, to explain allusions in the letters. Certainly I would have appreciated more help of this kind.

In summary, historians of science are going to be grateful to Ann Moyal for many years to come for opening up for wider study the science-related component of Clarke's fascinating and important correspondence. They are, however, at the same time going to regret that greater care was not taken over the editing, so that they would have a more reliable and more informative text at their disposal.

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Graeme K. Hunter: *Light is a Messenger: The Life and Science of William Lawrence Bragg*. Oxford University Press: Oxford, 2004. xxi + 301 pp., illus.,
ISBN: 0 19 852921 (HB), A$120.

I found this book strangely contradictory: an informative, sometimes revealing and well-written biography of a very important

man and his times, and yet also unsatisfying and perplexing. The major question, as for much of science biography, is what a science biography should be. The 'life and science' of the scientist, the present title suggests, but what does this mean, and has it been achieved?

Much has been written about the biography genre, but much less concerning the biography of scientists. As Shortland and Yeo commented in *Telling Lives in Science* (Cambridge University Press, 1996, p. xiii): 'Since the seventeenth century, memoirs anecdotes and portraits of leading natural philosophers have been central to informing the way in which the scientific community is perceived by outsiders and itself; … the promise of biography … is surely worth taking seriously. So, too, is its occasionally brilliant accomplishment in the integration of a historical subject's private, even intimate, life of feeling with the broader, public domain of career and honour.'

The last sentence is revealing, for, while most forms of biography assume that the integration of the life, times and career is highly desirable, in science it is rare. Scientists themselves have been reluctant to expose their 'life of feeling', and psycho-biographies have been unwelcome. But scientists are human, and their humanity is as important to their science as to the rest of their lives.

Having just graduated from Cambridge and aged only twenty-three, in 1885 William Henry Bragg was appointed to the joint chair of mathematics and physics at the University of Adelaide, where he stayed until he left for England in 1909. By then he was married, had three children, had an international reputation and was an FRS. In 1915, William and his elder son (William) Lawrence Bragg, were jointly awarded the Nobel Prize in Physics for 'the analysis of crystal structure by means of X-rays'. Lawrence was just twenty-five years old, still the youngest winner ever. Father and son subsequently led, indeed dominated, the international flowering of X-ray crystallography for the next fifty years. Their legacy was immortalized when, in 1962 and during Lawrence's tenure of the Cavendish chair at Cambridge, four of his staff won Nobel Prizes: Crick and Watson (with Wilkins) for the structure of DNA, and Kendrew and Perutz for the structure of haemoproteins.

Here are lives that cry out for an intimately integrated account of life, times and career; but there is very little of this in the literature. The only book-length study of William is the charming portrait by his daughter, but it is not strong on the science and Lawrence is given only a minor role. Now we have the first lengthy study of Lawrence. On his childhood and youth I offered the author access to two filing cabinets full of documents concerning the Australian years, but he replied: 'I had thought … of a research trip to Australia but I am afraid the budget will not stretch to that!' Is this, perhaps, why the full Bragg story has not been told? Northern hemisphere scholars are reluctant to come south of the equator. In addition, it was only by special arrangement that a copy of this book was obtained for review, through the USA. It is not generally available in Australia and has not been advertized here. The publisher apparently sees no market in Australia for the story of one of our most illustrious sons, which tells us something about Australia (and about OUP)!

Light is a Messenger covers Lawrence's science and career well. After scientific work during WWI, he succeeded Rutherford at Manchester, where he made crucial discoveries in the structure of minerals, metals and alloys and in order–disorder phenomena. He again succeeded Rutherford when he became Cavendish Professor in 1938. His reorganization of that laboratory was opposed but was essential to its future, and radio astronomy, which he encouraged along with molecular

biology, brought further Nobel Prizes. Finally he became, like his father earlier, Director of the Royal Institution in London. Again there were major organizational difficulties that he conquered, and here his presentation of science to children was unmatched, and the research he led blossomed yet again. All of this, and related matters such as the trauma of the publication of Watson's *The Double Helix*, is told accurately and in detail, and with a touch that makes pleasant reading.

Yet there are major problems. Despite the title, the author admits that his book is 'a scientific biography rather than the biography of a scientist'. Because Lawrence 'did not have a flamboyant personality', 'does not fit into any standard academic pigeonhole', and erected 'a solid wall of privacy … around himself', Hunter largely avoids his life outside science. There are, however, numerous questions that demand a broader treatment, including: what *was* the nature of Lawrence's pivotal relationship with his father, here just a shadow? What was the basis and nature of the 'depressive disorder' Lawrence is said to have suffered? Why did he have serious initial difficulties at Manchester, then Cambridge, and finally at the Royal Institution? Why did the British chemistry establishment 'black ball' him, including his elevation to the presidency of the Royal Society? How much did his Australian origin influence his life thereafter? How did he cope with the expectations of the early Prize and remain so extraordinarily productive for the next fifty years?

Most puzzling of all are Hunter's last four pages, which show that the prejudices that dogged Lawrence's life have been adopted without question by the author. For example: 'his work had no great influence on the physics of his time — or after', 'he was a scientific dinosaur in a world now dominated by mammals', 'Bragg did not make any major contribution to twentieth-century physics', and 'Bragg was quite ignorant of chemistry and biology, and had little interest in either discipline'. The book itself gives the lie to these statements, as does the most active of all the sub-disciplines of physics in the twentieth century, solid-state or condensed-matter physics. Indeed, the author then adds: 'Bragg's earliest work had profound implications for both inorganic and organic chemistry', 'Biology was … more profoundly affected than chemistry', he was 'the Father of Crystallography', and 'The crystallographer is a solid state scientist, and his interests are as broad as all of science'. These last pages illustrate why the book is fundamentally flawed, and they demonstrate starkly where it is defective, despite its real value in other respects.

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Carolyn Rasmussen: *Increasing Momentum – Engineering at the University of Melbourne*. Melbourne University Press: Melbourne, 2004. 254 pp., illus., ISBN: 052285 135 5 (PB), $69.95.

Anyone who read the reviews in *Historical Records of Australian Science*, 2004, 15, of the books on the history of the University of Melbourne, would be surprised to learn that the University has a great Faculty of Engineering. But having regard to the focus of *Historical Records*, it is not surprising that the professional faculties of medicine, law and engineering would not feature in the review, and it is good to see that engineering was not viewed as a subset of science.

The beginning and the end of this book say it all. In 1861 the first University Engineering School in Australia had only a couple of students, a shaky beginning, but intrepid promotion by the foundation Professor of Mathematics, Henry Wilson, who had had associations with engineering education in Ireland. In 2004 it had become a leading Engineering Faculty with 3,700

undergraduates, 25% of them women and 31% from overseas. While the Dean is responsible for the academic leadership of the Faculty, a female General Manager runs the business and student services side of the large undertaking. The first lonely female BMechE graduate in the 1940s would be amazed at such inroads into the hitherto male-dominated profession.

The story between the beginning and now is one of struggle for funds, debates about course content, and tensions between the nature of the cognitive base of engineering and the needs of engineering practice. Those tensions are still with us — between the imperatives of engineering research for the few, and preparation for effective engineering practice for the many. The story is told with admirable insight by a historian who is not of the profession herself, but whose family background is reflected in her insights.

The struggle across the interface between the mathematical and scientific foundations of engineering analysis, and the practicalities of engineering practice, are epitomized in the career of the first Professor of Engineering, William Charles Kernot. As the first graduate from the Certificate of Engineer (CE) course in 1865, the young Kernot (MA 1866) encountered prejudice from established, pupil-trained engineers, who railed against 'useless' formal learning. No doubt the more perceptive of the 'old school' engineers felt threatened by the new breed with their facility in quantitative analysis. Kernot was in the forefront in promoting the value of education underpinning sound engineering practice.

Kernot became the first Professor of Engineering in 1882, and by the end of the century his graduates were seeding the new approach to engineering education and practice throughout Australia. But he was being left behind. One of his lecturers, Bernard Smith, was complaining against the inadequacy of the mathematics and science in first and second year, for the satisfactory treatment of advanced engineering studies in third and fourth year. Kernot was immovable and the problem was only solved after his death in 1909.

Financial stringency delayed the emergence of mechanical and electrical engineering in the years before the First World War, and research was a minor factor between the wars. The book describes personalities and struggles as the Faculty grew. Appointment of young Dr Aubrey Burstall from Birmingham as Professor of Engineering in 1937 brought challenges to a Faculty that needed new blood. As a mechanical engineer, Burstall challenged the dominance of civil engineering. But his background was a problem for him in understanding the nature of the Australian profession, by contrast with British conditions, and he resigned in 1945.

His replacement, Louis Matheson, also from England, was a different character and he played a critical role in post-war redevelopment. Other leading contributors who followed, Arthur Francis, Robert Blackwood, Paul Henderson and Charles Moorhouse, developed and broadened the range of courses as student numbers increased. From Kernot's emphasis on model testing rather than research, the recent decades of the faculty have seen a burgeoning of engineering research across the wide range of specialisms, from chemical engineering to information technology.

An essential mark of a professional faculty has to be a porous interface between the faculty and the profession at large. From the beginning, members of the profession have contributed to the Faculty in various ways, and Professor Kernot was strongly embedded in engineering business. But this is one aspect of the history of the Faculty that could have been addressed more fully. Many members of staff have contributed to the leadership of Victoria Division, the Accreditation Board, and the National Council of the Institution of

Engineers, Australia. Several contributed to the landmark Professional Engineers Case of 1959–1961. However, in 1965 Professor Charles Moorhouse was the only one to become National President of IEAust. As a comment on the evolution of the Faculty, the specialism espoused by Moorhouse, Electrical Power Engineering, is no longer offered.

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Richard Aitken: *Gardenesque*: *A Celebration of Australian Gardening*. Miegunyah Press (Melbourne University Publishing): Carlton South, 2004. 226 + xiv pp., full colour illustrations, ISBN: 0 522 851274 (HB), $45.

Paul Fox: *Clearings*: *Six Colonial Gardeners and their Landscapes*. Miegunyah Press (Melbourne University Publishing): Carlton South, 2004. 269 +xvii pp., full colour illustrations, ISBN: 0 522 850863 (HB), $59.95.

Are these books really about scientific history and should they be reviewed in this august journal? Well 'yes' actually, if we are to examine some of the underpinnings of Australian scientific history and its relationship with the public. In the early to mid-nineteenth century, botany, in its manifestation as plant hunting and classification, was arguably one of the two or three strongest 'scientific' disciplines in Australia. Of course the discipline was not called that and the practitioners were not called botanists, many of them would be what we call 'amateurs' usually forgetting that the original use of this term was not a pejorative but a very positive term.

Richard Aitken is almost a 'Victorian' himself in his obsession with detail and with unmitigated scholarship. This book is his 'cabinet of curiosities' at least as rich as most of the nineteenth century collections. *Gardenesque* has an entry for each year from 1801 to 2004 selected from the State Library of Victoria, and they vary from serious Napoleonic/Regency science to frivolous but engaging trivia of the fifties and polemics of the nineties.

As François Péron commented: 'New Holland defies our conclusions from comparisons, mocks our studies, and shakes to their foundations the most firmly established and most universally admitted of our scientific opinions' (p. 19), an apt early observation from arguably the most important, yet unlauded, scientific expedition to survey Australia. Aitken begins the collection with this scientific study, undertaken in many ways to 'ground truth' the imagining of the Great South land that had been under way for several hundred years. The structure of the book is what you might call 'themed decades'.

The objects illustrated reveal, as was intended, what a rich source for scholarship exists in the Victorian State Library. Included are many illustrations from rare books such as Robert Thornton's *The Temple of Flora* (1807), the third volume of his extraordinary work *The New Sexual System of Linnaeus*. However, a contemporary resonance demands our interest in the work illustrated by Jacques-Julien Houtou de Labillardière. His work *Novæ Hollandiæ Plantarum Specimen* of 1804 suggests the huge amount of both natural history and physical scientific work undertaken on the expedition of d'Entrecasteaux, as well as the troubling fate awaiting the probable key site of this expedition in Tasmania at present (the dispute over the so-called French Garden).

Firstly, as attractive as many of the objects illustrated are, this book will serve a useful purpose if it only introduces a broad audience to the richness of the collection. Secondly, it may induce an interest in scholarship into the periods, using these resources. Thirdly, from there perhaps a logical reappraisal of some of the scientific

and political theories underlying many of the actions of our forebears might help us in managing or 're-imagining' how to manage our environments.

This book and its associated exhibition at the State Library of Victoria are highly recommended as both stimulators of ideas and for pure pleasure, exactly what a 'cabinet of curiosities' was designed to do.

Clearings, on the other hand, is an intense but rewarding read. Paul Fox has dedicated the book to the Wardian Case, that wonderful small travelling greenhouse that so facilitated plant translocation from the mid-nineteenth century. Tea clippers at times had up to a thousand of these cases as deck cargo leaving China for England, giving rise to one of two explanations for the appellation 'hybrid tea rose'.

Fox's book is essentially six discrete essays, beautifully written, about collectors, nurserymen and botanical scientists of the nineteenth century and their interaction with the Australian environment. From a 'history of science' perspective it is most interesting how quickly and thoroughly new scientific ideas have been absorbed into the ideas of practical plantsmen. For instance the very influential gardener William Ferguson (c. 1827–1887) in his *Notes on Ornamental Planting* (1863), published four years after *The Origin of Species*, is strongly influenced by notions of natural selection and he suggests '…that the stronger species "in a state of nature" soon weaken and destroy others, "even in the most favoured situations"'. Similarly Ferguson was extremely concerned by 1863 of the threat of soil depletion and what he described as 'unscientific agricultural practices' (p. 192). Ferguson's 1863 call for better forest management would resonate well with many today: 'Unless a stop is put to the wholesale destruction of native forests and new forests are erected in many of our ranges, man will have much cause for regret for having laid waste the true source of his prosperity and destroyed their blessings stored up in the soil for future generations by exhausting its vegetable mould' (p. 192). Six years later Ferguson was appointed Inspector of Forests under the newly passed Land Act.

One of the most engaging chapters of this book concerns Daniel Bunce (1812–1872) who Fox describes as 'The Man on the Edge'. Bunce may have been a rogue. His claims to be a trained botanist seemed to unravel soon after his book *Hortus Tasmaniensis* was withdrawn from sale when the publisher had numerous errors in it pointed out to him by third parties. But relocating to the settlement of Port Phillip only four years after Fawkner had established it, he moved into an otherwise unoccupied intellectual territory. From an early meeting in Port Phillip with an Aboriginal man known as Benbow who lived in the garden of John Batman, Bunce developed an interest in the plant descriptions of the Indigenous people. Perhaps now being an 'outsider' Bunce had a different view to the majority of the population when he observed of Benbow: 'He was not only an intelligent native, but a really worthy fellow: an evidence that the aborigines of Australia are not, as has so frequently been stated by various writers, incapable of being civilized' (p. 65). Subsequently Bunce undertook a number of field trips botanizing and trying to tie together plant distributions along with a growing knowledge of plant descriptions and indeed ecosystem descriptions of the Indigenous people of Port Phillip to Western Port.

Bunce's most prominent scientific moment was as a botanist to Leichhardt's second expedition — although even this led to a falling out with the leader, an event that luckily spared him from Leichhardt's next and fatal expedition. Despite the fact that some of his claims were clearly false, Daniel Bunce hit a high point in Victorian society when in 1857 he was appointed curator of the Geelong Botanic Gardens.

From the perspective of the history of science, this book reveals many of the interesting contests between those who would later represent the academy in plant science versus those of the dilettante. As botany was a key science of the nineteenth century, this struggle to create a scientific discipline, to have it recognized as serious business in the academy, took many turns over this century and some of those turns were played out in the remotest parts of the antipodes. That contestation is well documented between the lines of this well-written set of vignettes of some of the key players.

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Robyn Stacey and Ashley Hay: *Herbarium*. Cambridge University Press: Melbourne, 2004. viii + 155 pp., colour illus., ISBN 0 521 84277 8 (HB), $79.95.

This large folio-sized volume, produced in both slip-cased and hardback versions, consists of about 100 photographs of herbarium specimens taken from the extensive collection of dried plants at the National Herbarium of New South Wales. Short notes are given on the botanical collection of each plant species photographed, along with an introduction of 26 pages giving a detailed historical account of the total collection that illustrates several distinct stages in botanical history and collection in eastern Australia. The photographs are by Robyn Stacey, while the historical introductory chapter was written by Ashley Hay and the short species notes by various Sydney Herbarium staff.

Such a matter-of-fact summary of the contents does not do this book justice, however. It is a beautifully designed and produced volume that, given its release date (November 2004), was obviously intended to capture the Christmas gift market and to grace coffee tables. So fine is the design in my opinion that it seems a pity that the book's designer (Melissa Fraser) is mentioned only in the Acknowledgments. So much of the impact of the book depends on its excellent design and the high quality of the photographs. There is a strong emphasis within the species photographed on ferns and marine algae, both of which groups are often forgotten or overlooked by botanists in general. Another group of plants underrepresented in most herbaria is the numerically large group of species introduced to Australia; some introduced species are included in this book however. For a scientific audience, the main interest will be in reading the notes at the back of the book on each species photographed and its collection details. And finally, a bibliography and an index are provided, which will enhance the usefulness of the book to students of Australian botany.

While initially overwhelmed by the beauty of this book, I soon began to have some doubts about its utility. Firstly, the grouping of the photographs into sections titled 'The new world', 'Scientific fascination', 'Hobby and decoration' and 'Exotics' is not tied into the separate themes of the historical introduction, and this internal mis-match is regrettable.

The species most recently collected and highlighted in the introduction to this book is the orchid *Dendrobium gracilicaule* — collected in 1923 by the Anglican clergyman H.M. Rupp. What about species collected more recently? While the relatively recent discovery in 1994 of the Wollemi pine (*Wollemia nobilis*) is mentioned briefly on p. 26 and a photo of it is indeed included, no detailed account of its taxonomic classification is given — and yet it was identified by scientists in the very same institution that this book covers. The interested reader will need to go elsewhere [see, for example, James Woodford, *Wollemi Pine* (2000)] to find the exciting story of the discovery and elucidation of the taxonomic affiliations of Wollemi pine,

the latter using modern methods. The reader of this book is left with an impression that only species collected more than 80 years ago are significant.

I currently sit in an herbarium building and hear many seminars on DNA sequences, cladistic trees and other aspects of twenty-first century taxonomy. But there is no hint of these recent developments in taxonomic science in this book. Even more surprising is the omission of any mention of chemotaxonomy and its role in species identification, despite its considerable role in eucalypt classification by Sydney-based chemotaxonomists of the early twentieth century. The book implies that taxonomy was strongest in the nineteenth and early twentieth centuries rather than being currently strong and using molecular markers as well as the traditional morphological characters of so-called alpha-taxonomy.

Throughout this book references are not cited in the text and the endnotes are not keyed in to the introductory text, which I found unsatisfactory, although for the general reader may be advantageous. In summary, if you can persuade someone to give you this book, do so and you will be well satisfied with its beauty and production. The audience for the book is a general one and not a scientific one. Only a few plant scientists will find value for money from the contents of this book, splendidly produced though it is.

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W. M. Blacklow, S. L. Farrer and T. M. Launonen (eds): *Prospects for Biodiversity in Salinising Landscapes*. Special Issue of *Australian Journal of Botany*, 51 (6), 2003. ISSN: 0067-1924. Issue available from CSIRO Publishing.

In this special issue of the *Australian Journal of Botany* thirteen papers together consider the plight of biodiversity in Australian landscapes affected by salinity. The papers are a subset of those presented at a conference held in Albany, Western Australia in October 2002. *Prospects for Biodiversity in Salinising Landscapes* provides detailed insight into the costs of salinization. The volume also summarizes the sobering predictions of degradation to come and the efforts applied thus far to address the problem. The diversity of perspectives and disciplines is impressive. While a range of biophysical topics are presented, there are also analyses of salinity-related policy including a strategic response framework for predicting impact and recovery and a decision tool for assessing risk to aquatic fauna. Other papers present a framework for adult learning in relation to improved land management and a discussion of agribusiness directions and options. If the volume is read from cover to cover one develops an understanding of how tolerance, avoidance and acclimatization affect the response of individual organisms to salinity; the relevance of alternative states theory to salinity-affected systems; the role of treatment triage for salinity; the application of non-market methods for valuing biodiversity; and the need for farm design and whole-landscape water management to take account of salinity issues.

The breadth of papers presented also highlights the complexity of quantifying salinity effects. Effects may be felt at the individual organism, population, community or ecosystem level. Changes may occur in the chemical and physical properties of natural systems, resulting in altered system dynamics. For example, Neilson *et al.* argue that increasing salinity alters the light climate and mixing properties of water, which then impact on cycling of energy and nutrients. Further complexity in addressing salinity is added in relation to water resource demands made on these saline-affected environments. Goss presents a case study of the Murray Darling Basin where highly regulated flow and

over-allocation of water resources are also added to the equation.

While history is not a strong focus of the publication several papers provide some interesting historical context. Briggs and Taws argue that the cause of dryland salinity has been recognized for fifty years or more, and the effects on native vegetation for seventy years. Despite this knowledge, dryland salinity was ignored at an official level for many decades. We are also reminded of the long history of salt in human culture — symbolizing punishment and sexual depravity in the biblical story of Sodom and Gomorrah. Australia's agricultural history is briefly mentioned with government and society of the past strongly encouraging landholders to clear their land, one of the major causes of dryland salinity.

Halse *et al.* also provide some useful historical context across geological time frames. Salt has been accumulating in the south west of our continent for hundreds of thousands of years. The naturally saline lakes (playas) of this region support more than half of the Western Australian wheat-belt plant species. Playas are incredibly species-rich. For example, they support a great diversity of brine shrimp — twelve endemic species — compared with just two species in eastern Australia.

Halse observes that while salt is an integral part of the Western Australian landscape, the integrity of saline playas can still be threatened by secondary (anthropogenically induced) salinity. Specifically, waterlogging associated with secondary salinity results in deleterious changes to the flooding cycle and fluctuations in salt concentrations. Acidification of groundwater associated with secondary salinization is also likely to have negative impacts on the plant and animal communities of saline playas.

Salinity 'losers' are identified in almost every paper, but some are not as obvious as others. Cocks and Goss both point out that there are water quantity tradeoffs in dealing with salinity. A reduction in dryland salinity will come from a reduction in overland flow, which also has the effect of increasing riverine salinity at least in the short term (loser = riverine biodiversity) and reducing river flow (loser = downstream water users). Goss presents examples of how these tradeoffs may be managed, through consideration of differences in rainfall and levels of salt export across a catchment, locating biodiversity values at risk and identifying potential impacts on water users.

As with many land degradation processes there are always some 'winners'. Broad patterns show that increasing salinity results in a reduction in species richness. However, at a more detailed scale there are some species that appear to benefit from salinity, at least in the short term. For example, McKenzie *et al.* show saline areas support more species of Lycosid spiders than non-saline areas.

Several papers express concern at the lack of information and research on the affects of salinity on natural terrestrial systems. This volume itself lacks papers on terrestrial systems. A lack of information on aquatic systems is also noted in several papers. James *et al.* point out that much of our knowledge in this area is drawn from adult life stages with little known on the impacts of salinity on early life stages of aquatic organisms, which are likely to be more sensitive. Neilson *et al.* argue that salinity tolerance in freshwater systems comes from lowland systems that are likely to have been historically exposed to salt and therefore may be more tolerant than upland systems. Sub-lethal, long-term, synergistic and antagonistic effects of salinity are all poorly understood, even for aquatic systems. In addition, there has been a focus on riverine systems, with far less information available on impacts on wetland environments.

Our understanding of salinity threats to biodiversity are founded on, and continue

to be primarily informed by, the salinity experience in Western Australia. This is reflected in the papers in this special issue. While there are some similarities between the salinity situations in eastern Australia and Western Australia there are also considerable differences: in the way salinity is expressed and in the biodiversity and dynamics of the natural systems at risk.

Do we know enough about salinity to manage the risk and avoid further loss of biodiversity? *Salinising Landscapes* suggests not and identifies some important gaps in our knowledge. While there is a considerable amount of 'doom and gloom' in the volume (for example, many species are at risk, the need for more knowledge, policy change, land management change and funding for research) there are also plenty of strategies suggested for improving the situation.

If the knowledge and tools presented in this volume are applied in saline affected/threatened landscapes, we should see a future where these areas are filled with alternative agribusiness that is perennial and does not leak water into the groundwater. Landholders will be further empowered to make decisions on how to manage their properties effectively for salinity. At a regional planning level we will see the risk of salinity clearly identified, underpinned by an understanding of catchment-scale hydrological processes. Biodiversity assets most at threat will be identified with the systems least able to recover from salinity best protected.

Anyone with a desire to understand current knowledge of salinity impacts on Australian biodiversity and current thinking on how to address it should read at least a selection of papers from this volume. This knowledge needs to be shared amongst land managers, policy makers, funding bodies and natural resource management staff. I would hope that aspects of the content of this issue of *Australian Journal of Botany* also appears in other, less-scientific forms, to suit these different audiences.

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Rob White (ed.): *Controversies in Environmental Sociology*. Cambridge University Press: Melbourne, 2004. 312 pp., illus., ISBN: 0 521 60102 9 (PB), $49.95.

As the term 'environmental sociology' suggests, this book presents a collection of essays in which conjunction between the environment and society is the central theme. It is a textbook that aims to introduce the student reader to several central 'controversies' in the field of 'environmental sociology'. In the book's introduction, its editor, Rob White, provides an extended explanation of the book's purpose and what is intended by the term 'environmental sociology'. Sociology, he states,

> [I]s about people, institutions and behaviours. It is about social interactions and social structures… Sociology is about understanding and dealing with social problems. … In my view, sociology is about putting things into context about challenging the status quo and about making the world a better place. It is essentially about three important tasks: *see*, *judge*, *act*'. (p. 2)

By extension therefore, '[e]nvironmental sociology is about translating these tasks into analysis and action around environmental issues' (p. 3).

The book is also 'very much informed by a sense of "controversy"' that arises from the dynamic relationship between society and environment. The controversies examined are not disputes about environmental issues *per se*, but those between writers and their viewpoints in the field of environmental sociology. Each chapter attempts to convey a sense of lively scholarly debate in the area being addressed. The controversies are grouped

into three parts: 'Social Perspectives', 'Social Trends' and 'Social Issues'. In the first part, the chapters survey conceptual or theoretical perspectives within broadly sketched social areas and their relationship to the environment; such areas as religion (Douglas Ezzy), social theory (Stewart Lockie), gender and eco-feminism (Val Plumwood), animal rights (Lyle Munro), and risk (Vaughan Higgins and Kristin Natalier). In the second part, students are introduced to a selection of broad themes or problems central to environmental issues. Included here are the themes of world population growth (Natalie Jackson), inequality, social difference and environmental resources (Roberta Julian), sustainable technology (Aidan Davison), the relationship between global and local challenges (Elaine Stratford), citizenship, rights and responsibilities (Julie Davidson), and environmental movements (Bruce Tranter). The third section focuses on specific examples of social issues that have an impact on the state of the environment. The issues covered are news media (Sharon Beder), agricultural production (Geoffrey Lawrence, Lynda Cheshire and Carol Ackroyd Richards), environmental health (Peter Curson and Lindie Clark), social impact assessment (Frank Vanclay) and criminology and environmental harm (Rob White).

Each chapter follows the same format: it begins with a brief introduction, discusses the 'background to issues', the 'key debates', and examines 'future directions'. This is followed by a list of 'discussion questions', a 'glossary of terms' used in the chapter, and references. As a general observation I would say that those chapters concerned with a specific issue or body of theory fulfil their purpose better than those that attempt to survey a broad trend or more general area of scholarly work. For instance, the chapters on news media, agricultural production, risk society and gender and eco-feminism are well focused and achieve a sense of completeness in their overview and analysis. Whereas, those attempting to harness a large area of scholarship or map trends over time, such as is the case with population, religion, citizenship, social theory or animal rights, are less successful.

There is no doubt that a reviewer's task is made easier if the book can be read as 'one long argument', rather than as a collection of topics on a related theme. In this case coherence is further compromised by it being a textbook that aims to introduce students to a new field of enquiry and that must therefore cover very large scholarly areas that bear at best a family resemblance.

How then might one evaluate the success of such a book? It would have been ideal if I could have given it a 'test run' in one of my classes. This was not practicable so instead I imagined a first-year university subject called something like 'Environment and Society' that surveyed a range of environmental issues and thereby offered an introduction to key areas of scholarship and their seminal texts. I asked myself, 'How suitable would this book be for such a subject?' How accessible to first-year students was the text and what would students learn from reading this book? I think the book would be useful for a first-year subject of the kind I imagined. It would, however, need to be accompanied by additional reading and lecture material that would help flesh out the topics, themes and arguments. The discussion questions that follow each chapter often do little more than serve as a comprehension test of the chapter's contents. Students would need to be encouraged to address questions that extend and challenge some of the statements and claims made in this book. The glossary of terms at the end of each chapter, while necessary for the sake of brevity within the chapter, can convey a false sense of closure to some terms that are in fact highly contested. The book could be a useful resource for lecturers and students engaged in teaching and learning about the

conjunction between sociology and the environment, but it is necessarily partial in its coverage and certain authors are at times partisan in their views, so as with all texts one would want to offer this one to students with various caveats.

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Museum Victoria: *Treasures of the Museum*, *Victoria*, *Australia*. Museum Victoria: Melbourne, 2004. ix + 206 pp., illus., ISBN: 0957747152 (HB), $39.95.

National Museum of Australia: *Land Nation People*: *Stories from the National Museum of Australia*. National Museum of Australia Press: Canberra, 2004. xii + 144 pp., illus., ISBN: 1876944099 (PB), $24.95.

Australia is blessed, it seems, with a frightening abundance of treasures. A quick survey of our cultural institutions reveals an escalating 'treasures race', as libraries, museums and archives bombard the public with accounts of their rarest, most beautiful and most interesting items. The State Library of Victoria, for example, has published a lavish description of its 'treasures', and features them prominently on its redesigned website. The National Library of Australia also has an online display of its most treasured holdings, hoping to bring in sponsorship for a permanent 'treasures gallery'. Meanwhile, the 'Treasures Gallery' at the National Archives of Australia is already up and running, while the South Australian Museum guides visitors around a 'treasures trail'. The Australian Museum recently presented their 'treasures' in a special exhibition, and even the University of Melbourne has catalogued the highlights of its collections in a glossy book of 'treasures'. Celebrating its 150th birthday, the Museum of Victoria has made an impressive entry into the fray with a well-designed treasures website, a trail for visitors and a beautiful volume simply entitled *Treasures of the Museum*.

All this treasure hunting might be seen as a sign of conservative pressure upon our cultural institutions. Instead of seeking to enlarge their roles as places of research, interpretation and debate, it seems safer to fall back on familiar stereotypes of vaults and storehouses, keeping safe the nation's heritage. Treasures are, by their nature, precious things — often protected by 'lock and key', 'hidden' from casual scrutiny. It is a label that promotes difference over familiarity, a feeling of reverence and awe over our ability to engage and connect. On the other hand, in an age of interactive exhibits and virtual museums, it is rather reassuring to realize that objects still provide such a potent source of meaning. Institutions trade on their treasures because we crave the experience of authenticity. We want the feeling of wonder, recognition and surprise that only comes from getting up close to the 'real thing'.

In any case, cultural 'treasures' can be identified in a nuanced and reflective way, as *Treasures of the Museum* well demonstrates. Some of the objects it describes are beautiful, some are perplexing, some are funny, some are horrifying. Seemingly commonplace items are revealed as amongst the most challenging and evocative, such as the red vinyl suitcase with which Cuc Lam fled Vietnam in 1978. That most treasured of treasures, Phar Lap, is included of course. However, 'the most famous quadruped in Australia' is introduced by a guest contributor, Phillip Adams, whose recollection of his own childhood fascination, of 'nose prints on the glass case', focuses attention not on the object but on our own experiences and memories. The majority of entries, illustrated by a magnificent series of photographs, are by museum staff, and vary in quality and tone. Some are merely descriptive, others offer intriguing fragments of

larger stories. There is much pleasure and interest to be gained from repeated dipping and browsing.

Whilst no doubt wishing to claim its own share of treasures, the National Museum of Australia chooses to cast itself not as a repository, but as a 'storyteller'. Seeking to interpret the 'national story' is a brave undertaking, as evidenced by the criticism that has dogged the museum since its opening. *Land Nation People*: *Stories from the National Museum of Australia* is a determined restatement of the museum's commitment 'to telling the stories of Australia and Australians, and debating the key issues, events and people that have shaped and influenced our nation'. The book provides a condensed version of the museum itself, presenting major themes and selected objects from each of its exhibition areas: 'First Australians', 'Horizons', 'Nation' and 'Tangled destinies'. With the exhibitions set to change in response to a review foisted on the museum by its critics, the book is an interesting historical document in itself. While the Museum of Victoria celebrates its long and illustrious past, the National Museum of Australia seeks to record the ambitions and achievements of its first few, turbulent years.

By unashamedly drawing attention to the process and practice of storytelling, the National Museum challenges curators, historians and visitors to face up to the difficulties of narrative. With conservative commentators calling for the reinstitution of grand narratives of Australia's progress all the way from Cook to cricket, there needs to be greater acceptance that the crafting of engaging and insightful stories from the complexities and contradictions of the past is hard, skilled and creative work. There are no easy answers.

That said, there is nothing particularly innovative about the storytelling in *Land Nation People*. The stories are colourful and interesting, though rarely surprising, the themes are important, and like the *Treasures of the Museum*, the book assembles an intriguing collection of objects and illustrations. Indeed, despite the possible tension between 'treasures' and 'stories', there is much in the two books that is similar. The organization of *Treasures of the Museum* also reflects the institution's current structure, with the treasures divided into their respective collection areas of 'Australian Society and Technology', 'Indigenous Cultures' and 'Sciences'. This is uninspired and unfortunate: Weary Dunlop's medical instruments, for example, are uncomfortably tacked on to the end of 'Sciences', while the anthropological collections of Baldwin Spencer and Donald Thompson, featured in 'Indigenous cultures', are separated from their collectors who are locked up in the 'Sciences' section. If you are going to take a 'treasures' approach, why impose disciplinary boundaries at all? The companion website offers an alternative structure, grouping objects under such headings as 'Celebrity', 'Messages', 'Journeys' and 'Survivors'.

More importantly, of course, both books are concerned with the relationship between object and story. 'Museum objects', remarks the Museum of Victoria's CEO, 'are like comets travelling through time and space, trailing streams of meanings'. Both books seek ways of making these meanings visible, and in doing so they reveal connections, contrasts and queries. This process is more explicit in *Land Nation People*, but *Treasures of the Museum* traverses much the same thematic territory, relying on assemblage instead of argument to explore the broader significance of its objects. The experience of immigration and arrival feature prominently in both, as does the complexity of indigenous culture. Both also seek to document ways in which we have come to know and understand the continent.

The 'Tangled Destinies' section of *Land Nation People* is most obviously concerned

with the interaction of people and environment, but examples of change and adaptation are spread across both volumes. One has the story of William Farrer and his 'Federation' wheat, the other counters with the stump-jump plough. The sophistication of Indigenous technology, and the ability of Indigenous people to adapt to environmental change are well demonstrated. Both books feature a display of 'Kimberley points' — spearheads crafted not just from traditional materials, but also from ceramics and glass.

Gesturing towards the inventive streak within the Australian character, *Land Nation People* introduces two of the best known — and perhaps most overrated — Australian inventions under the banner of 'Nation'. Yes, where would we be without the Victa mower and the Hills hoist? *Treasures of the Museum* takes us into less familiar realms with the black box flight recorder and the Shephard micro-ruling engine, which, in the late-nineteenth century, pushed the limits of precision measurement. Technologies of measurement and control appear in a variety of guises, reflecting the desire of European settlers to define the limits and boundaries of their new possession. Artefacts from the geodetic survey of Victoria can be contrasted with the Anton Breinl's hot-air cabinet, used to study the effects of the tropical climate on white workers — both speak to questions of possession and legitimacy. The clock used to maintain standard time throughout Victoria has little in common with the field trowel used by archaeologist John Mulvaney. But both sought to redefine our conception of time: one brought local timekeeping practices within a centralized system, the other helped locate the human occupation of Australia within the immense span of deep time.

The natural sciences, of course, dominate the scientific collections of the Museum of Victoria, reflecting both the nature of the disciplines and the history of the institution. However, featured prominently amongst its 'treasures' are not just collections of birds, insects, minerals and fossils, but the people who assembled them. John Gould, Alfred Russel Wallace, William Blandowski, and even Charles Darwin, make appearances. These important inclusions emphasize the *process* of collecting, the way in which scientific knowledge is constructed. Although most of the national science collections went elsewhere, the National Museum effectively uses the stories of Harry Burrell and Colin Mackenzie to similar ends. The lives and works of such individuals offer insight not just into the development of biology, but into the passion for collecting, understanding and knowing that motivates science in general.

While it is perhaps the historical and aesthetic dimensions of the scientific collections that make them appealing, their continuing role in research is vitally important. *Treasures of the Museum* notes the scientific significance of type specimens within its collections, as well as the ongoing work of its staff to develop a cryogenic collection of tissue samples from rare and threatened species. Such a reminder that the collections themselves are living, growing things offers further complexity to the idea of 'treasures'. Strangely, while the National Museum describes work to conserve and develop the National Historical Collection, there is little mention of its other research activities in environmental and Indigenous history. Surely these too are stories worth telling?

This omission adds to the rather static feeling of *Land Nation and People*. As a snapshot of the museum, complete with obligatory corporate guff about its cutting-edge multimedia technology and innovative architecture, the book seems to be more of a record of a visit — a reminder or a souvenir — rather than something to be explored and enjoyed for its own sake. *Treasures of the Museum*, on the other

hand, offers the twin pleasures of familiarity and surprise. Museum-tragics like myself, who spent happy days wandering amongst the old Swanston Street exhibitions, will discover many favourites amidst the 'treasures'. One of the goldfield models is included, as well as the wax fruits and the working models case. At the same time, you have the sense that you are peeking behind the scenes, gaining access to wonders rarely seen in public.

The National Museum is committed to telling a diverse range of stories, but this worthy aim does not seem well-served by *Land Nation People*. The attempt to downsize the exhibitions for book consumption has taken away any feeling of exploration or uncertainty — it all seems a little too controlled. It is precisely this feeling of exploration that makes *Treasures of the Museum* so much fun to dip into. There's more space here to imagine, wonder and connect. There is much left unsaid, many questions unanswered, and the entries are frustratingly brief. But you are left with the feeling that there is much more to know, many more stories to tell, many more treasures to be revealed.

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Exhibitions

On the Record: 50 Years of the University of Sydney Archives.
Macleay Museum, University of Sydney until 23 February 2005.

The Curious Economist: William Stanley Jevons in Sydney.
Powerhouse Museum, Sydney (permanent).

This exhibition of the University of Sydney Archives celebrates the anniversary of the appointment of David Macmillan as the first professional archivist in any Australian University archive, but the material he and others have catalogued and conserved covers not fifty, but 150 years. The formal collecting of archives started in 1913, staffed by honorary archivists, including Maude Yeomans Fitzhardinge, Australia's first woman archivist. During this period, many photographs and other records were kept and preserved in addition to official University of Sydney material, including personal materials of some of the University's distinguished professors. *On the Record* is curated by the University of Sydney archivists, and Macleay Museum curator, Julian Holland, and showcases a good deal of material of interest to historians of science.

Harold Cazneaux is a famous photographer of Sydney and his splendid 1927 photographs of the University of Sydney — an anatomy class in action and a view of the Physics building — open the display. Physics features prominently in the exhibition, as Harry Messel, Professor of Physics from 1953–1987, in his own words went 'to a helluva lot of trouble' to organize the department's 'foundation files, council files, black files' because he believed that 'this is an institution that goes on forever'. In addition to the photographs and notes from the Physics departmental files, we can hear Messel's charming Canadian cadences from a 1978 interview, supported by digital photographs of his energetic style on an audiovisual loop that also features zoologist, Elizabeth Pope, anthropologist A.P. Elkin and Sir Hermann David Black, an economist and Chancellor of the University. There are clearly some great finds to be had in the University of Sydney archives. The personal papers of Edgeworth David, Professor of Geology and Antarctic explorer, include his illustrated field notebook from the 1908–1909 trip to the South Magnetic Pole, and an entertaining photograph album from his 1922 field trip to 'the roof of Australia', Mt Kosciuszko.

If you have missed this exhibition, it is still worthwhile visiting the **Macleay Museum**'s newly revamped permanent collections. They remain in traditional nineteenth century cabinets, but the displays themselves have a fresh flavour, as they have been recently renewed. There is a single cabinet featuring 150 years of science at the University as told through scientific instruments, including the rare Caldwell Microtome, invented by Richard Threlfall and built by the Cambridge Instrument Company in 1884. Another cabinet features some of the collections of the 1894 Horn Expedition to Central Australia. Colonial Sydney's scientific institutions — the Royal Botanic Gardens, the Australian Museum and the Macleay Museum — are juxtaposed in another cabinet, where Gerard Krefft's famous lungfish is the centrepiece. Julian Holland's expertise, particularly with the history of scientific instruments, is evident, and also his sharp eye for a good story to accompany them.

Don't miss the small exhibition on polymath **William Stanley Jevons** in the huge galleries of the Powerhouse Museum. Beyond the large train in the main hall of the fourth floor you find this little gem. Jevons lived in Sydney from 1854–1859, before returning to Britain to take up a distinguished career as a Political Economist, first at Manchester, and then in London. Trained originally as a chemist, he worked in the Sydney mint, the first outside Britain, at the time when the goldrushes were at their peak and there was a real risk that gold itself would become the currency of the realm. The careful skills he needed for assaying gold were also of great value to him in the very new subject of photography, in the 1850s a highly chemical exercise. The exhibition is rich with his images of early Sydney.

Jevons was known for his development of the concept of 'utility' — the idea that an object's worth was not intrinsic, but determined by the extent to which it might be desired. He was also a mathematical logician and developed a 'logic piano', which anticipated the training devices used in computer science by about a century. He was a keen commentator on the social structure of early Sydney, and there is a voice-over and interactive display interpreting a map of 1850s Sydney with his words. His love of careful measurement and exact instruments also led him into meteorology. The cabinet featuring 'Jevons the meteorologist' contains a reconstruction of the cloud chamber he built in 1858 in Sydney, to explain the patterns of clouds. It also shows the map he drew in 1859 of Australia and New Zealand inverted over Europe, a graphic representation of our 'upside down' climate. Jevons' time in Sydney was both productive and varied. Typical of colonial scientists, he turned his hands to many tasks, but he was unusual in that he did all with such distinction. His precision training in chemistry truly found many unlikely applications in the colony.

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For another project about the history of meteorology in Australia see:
http://www.humanelements.info/