

Reviews

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Hugh Tyndale-Biscoe: *Life of Marsupials*.
CSIRO Publishing: Melbourne, 2005.
464 pp., full colour illustrations,
ISBN: 0643091998 (PB), \$69.95,
0643062572 (HB), \$99.95.

Life of Marsupials is a remarkable book. It is a brilliant act of individual scholarship and a crowning achievement of a research career on this fabulous group of animals.

Hugh Tyndale-Biscoe has been a long-term supporter of telling the story of Australia's marsupials and a regular and active participant at the annual meetings of the Australian Mammal Society. It was in that non-hierarchical environment in the mid 1970s that I first met him. He was one of the many generous members of senior CSIRO staff that took a keen interest in those taking their first toe-hold in the discipline. Such thoughtful mentoring remains vividly with those who have been helped, and Tyndale-Biscoe's book reflects the care and thoughtfulness in its interpretation of the works of others. His contribution is worthy of a text on its own, but such historically skilled biographies of Australian scientists are rare.

The intent in this review is to look at the book in contexts other than that of a marsupial biologist, even though zoology is how I earn my living, endeavouring to manage our marsupial fauna. I therefore also inhabit the research science world, in which I have known Tyndale-Biscoe for 30 years, mainly in the constructive environment of the annual scientific meetings of the Australian Mammal Society. The approach here is to look at *Life of*

Marsupials as a scientist who also has to deal with public opinion, public policy and answer media enquiries. This is a parallel universe to the more academic atmosphere of CSIRO, where Tyndale-Biscoe worked. However, both reflect the major historical shifts in the attitudes to Australia's marsupial fauna over the last 50 years — the period in which the conservation paradigm grew from obscurity to a major public policy matter in contemporary Australia.

Tyndale-Biscoe has not written an argumentative text in *Life of Marsupials*, but has concentrated on producing an encyclopaedic work of excellence. Tyndale-Biscoe grew up in an era of the ascendancy of encyclopaedists, where a careful filtering of knowledge and new ideas was the cornerstone of good scholarship. He may be the last of his kind in Australian mammalogy. At the July 2003 meeting of the Australian Mammal Society, I asked him why he was approaching this great task as a single author, rather than editing a volume with others in related disciplines. He replied that he was attracted to the idea of one mind sifting through all the material to come up with a unified text.

There is a tacit assumption in *Life of Marsupials* that the reader can identify a marsupial. The opening etching (p. 1) of an American opossum by Buffon in 1749 is captivating, although it does look like a rat with a pouch. The first figure, Fig. 1.1 (p. 6), is a diagram of the uterus and genital ducts. We rely on the photos on the front cover of the book to give the non-specialist reader a clue as to what a

marsupial looks like until we reach the useful set of plates in the middle of the book. The author's enthusiasm for the inner workings of marsupials appears in chapter 1 and remains the dominant theme for the book. Tyndale-Biscoe's condensation of this material is masterful, nearly free of the frustrations and blind alleys, and the often idiosyncratic style of the original researchers' papers. The process of science is more interesting than the final answers, as the yet-to-be-written history of Australian mammalogy will show. However, one version of such a history will not be enough. The personalities of the players are too diverse to be captured by one scholar. The same could be said for the politics of the way science has been conducted in Australia, within the CSIRO, the universities, and state and federal government departments with their responsibilities to manage marsupials as pests, threatened species, icons or extinct species. In the 1973 edition, the author left the subject to the last chapter, 18 of the total 228 pages. In the 2005 edition, it was also a final chapter, now 17 of 384 pages, i.e. proportionally smaller, although elements of the text elsewhere hold opinions on problems and solutions. If Tyndale-Biscoe's book is successful at encouraging further scholarship, then in another 32 years, a single book will not be able to cope with the volume, complexity and diversity of the subject. Some of the diversity did escape from him in this edition, particularly in the areas of wildlife management, the ethics of research on marsupials, and marsupials as pests [although the brushtail possum in New Zealand gains a detailed mention (p. 264), and he does not shrink from endorsing culling of overabundant koala populations (pp. 237–8)].

Life of Marsupials is as unbiased as one could hope for in any text. This sets Tyndale-Biscoe apart from many current researchers and writers who enjoy the

fierce battle of ideas. However, his occasional lapses are most revealing. Under the heading of 'Remaking the thylacine?', the author deals with the technical obstacles of 'the idea that a thylacine might be resurrected from the DNA stored in museum specimens'. Already, in the word 'resurrected', one sees the writer's answer to the question posed by the sub-heading. In his penultimate sentence to this segment, he concludes that thylacine resurrection is 'squandering limited resources that would be far better used to ensure that other species of marsupial, still alive today, do not go the way of the thylacine' (pp. 161–2).

Let us suppose that in another 32 years this current edition of *Life of Marsupials* will be the benchmark of our knowledge of the beginning of this century. Only the very oldest reader will know what Tyndale-Biscoe was talking about. This edition's segment on the thylacine did not carry even one academic reference to any specific program to 'reconstitute' the thylacine, unlike the rest of the book, which is academically thorough. This looks like a segment that is pure speculation, but in fact the lack of reference is a coy omission. He must be referring to Michael Archer's thylacine program, especially when Archer was Director of the Australian Museum. (See, for example, M. Archer, 'Confronting crises in conservation', in D. Lunney and C. Dickman (eds) *A Zoological Revolution*, Mosman, RZNSW, 2002, pp. 12–52.) Archer himself uses the term 'resurrect', and added that 'it is clearly *not* an alternative to traditional conservation strategies — if anything, quite the reverse'. In the ultimate sentence in the thylacine segment where Tyndale-Biscoe notes: 'But dreams are more powerful than less spectacular and far more achievable goals', it seems that both Tyndale-Biscoe and Archer are really saying the same thing.

Such dreams are a catalyst for change, and Tyndale-Biscoe is equally a dreamer, with this book being a modern dream following a period of widespread marsupial extinction. On the last page of *Life of Marsupials*, the author points to the value of knowing the biology of marsupials as a means for assisting with their conservation: 'if we knew better how marsupials survived for so long and why they died out so rapidly, we might know better how to live in this country for the long term' (p. 384). No scholar has any argument with that proposition, but the history of the timetable of change to our environment does not allow for scholarship to be the sole source of conservation policy. If the book had been written by most other biologists, it would more likely have been entitled *Extinction of Marsupials*. Tyndale-Biscoe's ambition of a scholarship-led recovery of our marsupial fauna took a heavy blow with the recent demise of the CSIRO Division that nurtured him for so many decades. At the annual scientific meetings of the Australian Mammal Society in the 1970s, 1980s, and some of the 1990s, the contingent from CSIRO Division of Wildlife and Ecology was most formidable. Tyndale-Biscoe's solo presence at the July 2006 meeting was a tragic symbol of the short life of this great idea. The history of what has worked to conserve our marsupial fauna has yet to be written. The subject is rich with opinion, dreams and some common sense and, for the intending historians, some substantial sets of documents.

In 2005, this book won the prestigious Whitley Medal of the Royal Zoological Society of New South Wales. The speech by Chris Dickman at the presentation of the award is published in the June 2006 edition of *Australian Zoologist* vol. 33(2). This edition also carries a review of the book by Rob Close; the review having been sought prior to the Whitley awards. Both reviewers are senior university-based

biologists who share much with Tyndale-Biscoe in their fascination with marsupial biology. Both Dickman and Close focus on the 1973 edition of the book and both acknowledge their deep debt to this timely first edition. Their praise remains undiminished for this new edition, and both note that the great increase in the intervening 32 years reflects the growth in the subject. Tyndale-Biscoe's 1973 edition helped propel that growth. This new edition will do the same.

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R. W. Home, A. M. Lucas, Sara Maroske, D. M. Sinkora, J. H. Voigt and Monika Wells (eds): *Regardfully Yours, Selected Correspondence of Ferdinand von Mueller, Volume III: 1876–1896*. Peter Lang: Bern, 2006. 909 pp., illus., ISBN: 3906757102 (HB).

...the Right honourable the Secretary of State will kindly consider, that I have made the study of plants of all Australia an object of life, that I have sacrificed for it nearly all that is dear to us in the world, and that it is with some pardonable pride when I own to have lived through the greater portion of the century of main-discovery of natural history and to have helped to unfold largely the vegetable objects, which nature with prodigal richness has strewed over the grandest possession of the British crown. (pp. 135–6)

This passage, written when Ferdinand von Mueller was fifty-three, sums up many aspects of his life. Not only does it express his life-long devotion to Australian botany, but his claim to pre-eminence in it. Although he was German — perhaps in part because of it — he was a fervent adherent of the British crown and empire. He was also conscious of a sense of sacrifice of other aspects of life in the intensity of his botanical devotion. There is an ambivalence in this sense of sacrifice

grounded in large measure in his removal in 1873 as Director of the Melbourne Botanic Garden, which he had developed for 16 years, while remaining Government Botanist of Victoria.

These themes are played out in the third and concluding volume of Mueller's *Selected Correspondence*. This covers the last twenty years of his life, from the age of fifty. His bitterness at the loss of the directorship — and his contempt for the 'gardener' William Guilfoyle appointed in his stead — recurs in numerous letters. The surviving letters are a fraction of what was written. This volume includes 326 letters to, or from, Mueller, significantly more than in either of the previous volumes.

Although deprived of access to the collection of living plants, Mueller was kept busy with his herbarium, which was the focus of much of his correspondence. With his pre-eminent position he felt he should be the clearing house for correspondence and provision of specimens to experts in Europe. Mueller was annoyed when Frederick Bailey in Queensland — 'in reality my disciple' (p. 276) — sent specimens to be named independently. There was some reason for this. If specimens were being sent independently to different scholars, 'scattering the material of one place without concert, would lead to complications, double working, increased synonymy & so forth'. But it is also clear that behind Mueller's grumbling was an acute sense of his status and its vulnerability.

The immense profusion of Mueller's letters was matched by a prodigious amount of botanical work in the gathering and lending of herbarium specimens, the writing of publications and lectures, and involvement in local scientific bodies. He also read late into the night. 'You probably have no idea,' he informed one correspondent, 'that I read five medical, two chemical, four horticultural, two geological, about half a dozen geographical and just as many botanical journals regularly!' (p. 387).

How did these inform Mueller's thinking? There are clear indications of his strategies for gathering and naming specimens and for disseminating botanical knowledge across the Australian colonies. He was interested in the distribution of species and not merely their classification. But he does not seem to have had such a developed sense of ecosystems as his friend the Reverend Julian Tenison Woods and he saw evolution as a threat to his firm religious belief. After he had distributed copies of a book on nebular theory, he found on reading it that it contained some 'irreligious passages'. 'Should you therefore have received this highly objectionable book, please destroy it,' he told E. P. Ramsay (p. 577).

Mueller's viewpoint underpinned all his work. He was asked for advice on many matters relating to botany, forestry and agriculture. In commenting on a plant that had fatally poisoned some juvenile pigs, he saw a potential benefit from the chemical action of the plant — 'as providence does not call forth organisms of any kind without some beneficent purpose, we may also now obtain a clue, how this new vegetable principle could become a powerful therapeutic auxiliary perhaps in the hand of physicians, to alleviate or even subdue human maladies' (p. 268).

The volume contains two indexes, botanical and general, which are for the most part effective. Concepts and practices are harder to trace. There are passing comments on evolution and a number of interesting passages on illustration, both photographic and woodcut — 'xylographic illustrations' as Mueller portentously calls them. But the index does not help us with these.

An editorial decision was made to head letters by the forename and surname of the writer. This means that familiar forms of name like W. B. Clarke and E. P. Ramsay become William Clarke and Edward Ramsay. In fact in this volume the former

is given as William Branwhite Clarke. But the editorial policy seems to have given rise to confusion between William Sharp Macleay and his cousin William John Macleay, a letter from the latter being misattributed to the former in the index. The correct identification is given in the Biographical Register (Appendix A).

The three printed volumes of selected correspondence are a prelude to a complete edition of all identified extant correspondence to be published electronically. This will provide an opportunity to rectify any minor errors in the printed edition and have all the benefits of a word-searchable text. In the meantime the printed volumes provide a convenient survey of many of Mueller's thoughts and actions, and highlight his most important botanical relationships. And the forthcoming biography will set this detail in context.

While Mueller could grumble all too well, it is delightful that almost the last letter he wrote — to the young Thomas Hart at Ballarat, in August 1896 — overflows with encouragement and enthusiasm: 'But now I like to invoke also your early aid for the promotion of special studies of mine. I am thus eager to get from as many places as possible in the *far interior* during *this spring* particularly *any* kinds of the *minutest plants*, in which Australia is richer than any other wide region of the globe' (p. 747). With all that Mueller achieved in the 'study of plants', his pride was pardonable indeed.

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Ross Humphreys: *Trikojus: a Scientist for Interesting Times*. The Miegunyah Press: Melbourne, 2004. xviii + 154 pp., illus., ISBN: 0 522 85095 2 (HB), \$45.

Interesting times indeed. This reviewer would say 'more than just *interesting times*' — fascinating, challenging and rewarding, sometimes breathtaking. And

yes, this is the period in Australia (say 1900–1960) when our colleagues in the humanities found Australia a dull and wretched place, an intellectual quagmire, lacking all cultural virtue. Such reaction simply demonstrated the inability of those scholars to appreciate the excitements of scientific discovery, the ferment of new ideas, that were sweeping over the world. And most especially in the physical, chemical and biochemical sciences. (Geology and biology had to await a later period.)

As but one example, and one relevant to Professor Trikojus's outstanding contributions here in Australia, I can cite our understanding of the structure and function of proteins in living cells. This body of knowledge grew at a staggering pace from say 1930 to 1960. For those of us involved in, or just as spectators of that new learning, it simply didn't matter where we lived or worked — we were part of an international network, sharing in the excitements of scientific progress.

Professor Victor Trikojus, Professor of Biochemistry in the University of Melbourne from 1943 to early 1968, was a major participant in this scientific intellectual ferment. Ross Humphreys has done an excellent job in describing his life — his discoveries, his triumphs, his virtues, his humanity — the full tapestry of a remarkable life.

Two great scientific chapters in the Trikojus story concern sulphaguanidine and thyroid metabolism. Trikojus was trained essentially as an organic chemist, and during the 1930s at the University Sydney, he made contributions to many important medical agents — arsenicals, hypnotics, vitamins, mercurials and essential oils. In 1941, Trikojus devised a new and very effective method for the synthesis of sulphaguanidine from the readily available sulphanilamide. This bacteriostatic agent was particularly effective for the treatment of bacillary dysentery and was badly needed by the Australian forces in

New Guinea, where cases were at epidemic proportions — 50–80 soldiers per day. Through April 1941 Trikojus and his staff worked round the clock and produced 81 pounds (37 kg) of the drug. Further production using the Trikojus process was then done at Monsanto in Melbourne. Supplies were sent to New Guinea and had a dramatic effect in the Owen Stanley and Buna campaigns, where over 2000 men had been incapacitated by dysentery. Colonel Sir Alan Newton, Director-General of Medical Services, reported that ‘Development of local production of the drug sulphaguanidine played a vital role in saving Australia from Japanese invasion’.

From early in his career Trikojus had become interested in endocrinology and the iodine metabolism of the thyroid gland, and this became his major research preoccupation for the next forty years. The fascination of this field can be well understood. The thyroid gland was thought by 19th century anatomists to be merely a means of filling out and beautifying the neck (especially in females). In the 20th century this gland was recognized as the source of a hormone (thyroxine) that regulates the body’s energy consumption, and also controls the development of part of the embryo.

The thyroxine molecule contains chemically bound iodine, and many people in regions lacking iodine in their water or foodstuffs had an enlarged and defective thyroid, a condition sometimes described as ‘Derbyshire neck’. The children of such people were often born with defective hearing and in severe cases, mental deficiency. Iodine-deficient regions (such as Derbyshire) are often characterized as places of high rainfall, or where the land had been submerged by floods or glaciers. Over long periods, salts in the soil, including iodide salts, were leached away. It is of interest that this effect can be sudden. In the remote Jimi valley of New Guinea, the natives traditionally used a natural rock salt rich in iodide in their cooking, but in

the 1950s, they switched to commercial salt from shops. Quite soon, many children were born deaf.

Chapter seven of the book is entitled ‘Thyroid Metabolism – Life Work’ and in eleven pages Ross Humphreys gives a fascinating summary of Trikojus’s very significant contributions to this important field. There is also much to interest those concerned with the history of the University of Melbourne and the development of biochemistry in Australia.

The book contains an illuminating preface by Peter Doherty, Nobel Laureate, which reads as a scholarly book review. I wish to quote two sentences from this essay; they well reflect my own opinion: ‘In summary, this book is well worth reading, both as an account of a man who made major contributions to medical biochemistry, his university, his nation and the world community, and as a history of a revolutionary time in science and world events. — He was a scientist’s scientist, who continued to do active research until well after his official retirement and, at the end of his career, had the perception to promote the growing importance of molecular biology.’

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D. J. Carr (ed): *A Book for Maisie. Celebrating the Life and Work of S. G. M. Carr née Fawcett, Pioneer Australian Alpine Ecologist, 1912–88.*

D. J. Carr: Canberra, 2005. xiii + 356 pp., illus., ISBN: 0-646-45596-6 \$30 (PB) (limited edition of 300 copies).

Stella Grace Maisie Carr, née Fawcett, had a long association with Australian science. From her postgraduate research in Melbourne the 1930s until her death in Canberra in 1988, she contributed to various aspects of Australian botany and its history. Ecological studies prompted her interest in landscape history, while her interest in botanical history grew out of her

taxonomic work. She and her husband, Professor Denis Carr, the editor of this volume, produced a pioneering publication on the history of Australian botany in time for the International Botanical Congress in Sydney in 1981 — the pair of books, *People and Plants in Australia* and *Plants and Man in Australia*.

A University of Melbourne science graduate, Maisie Fawcett, gained an MSc degree in 1936 and continued investigating fungi and fungal and nematode diseases of plants in the University's botany department. When a severe facial injury curtailed her microscopical work, Maisie's scientific mind moved to ecology and in 1941 she had a university research scholarship for an ecological study of the Dandenong Ranges. The recently appointed professor of botany and plant physiology, John Stewart Turner, was keen to encourage university ecological research, and was happy to help Victoria's new Soil Conservation Board (SCB), which lacked money and staff to undertake investigations. Contrary to Carr's claim, Turner engineered her ecological opportunity. To facilitate an investigation of soil erosion in the widely burnt (1939) catchment of the Hume Reservoir, Turner convinced the SCB that a woman could undertake the work and arranged for the redirection of Maisie's research scholarship to the Hume catchment. He wrote to her in September 1941 'you now have 2 years (at least) for almost full-time research....I hope that in pushing you into ecology I have done the right thing — but I believe I have'.

This was how Maisie Fawcett came to live in the Victorian country town of Omeo in 1941. Her alpine ecological efforts were prompted by her observations of soil erosion on the highest part of the Hume catchment, the Bogong High Plains, which for nearly a century had been grazed and trampled by cattle. Parts of the High Plains were in the catchment of an expensive engineering project — the Kiewa hydro-

electric scheme, which was then being constructed by Victoria's State Electricity Commission, whose engineers were concerned about the effects of soil erosion on the scheme.

In 1944 Maisie Fawcett was appointed the SCB's first research officer. Visitors to the Bogong High Plains and historians of Australian ecology will know of the two areas that she had fenced in the mid-1940s so that various types of vegetation could be monitored in the presence and absence of cattle. For a decade of summers, Turner brought a university team to record the vegetation in sister plots inside and outside the two exclosures. These exclosures have produced some of Australia's longest quantitative vegetation records, continuing long after Maisie Fawcett's 1949 return to Melbourne to teach plant ecology and systematics, and Maisie and Denis Carr's departure for Queen's University Belfast in 1960.

Maisie wrote engaging and eloquent letters. Much of her Omeo correspondence with Turner is in the University of Melbourne Archives (UMA). Carr acknowledges UMA access to some material, but does not indicate which of the letters he has selected are held in UMA. Maisie's correspondence and recollections provide splendid glimpses of the route by which a young woman from a working-class family in one of Melbourne's western (industrial) suburbs came to teach and undertake research across a broad botanical spectrum. Her long November 1949 letter to Turner provides a wonderful description of her busy first year lecturing in the Botany School.

A Book for Maisie includes letters to and from Maisie interspersed with her autobiographical notes, excerpts from an interview she gave not long before she died, and contemporary and historical accounts of her life and work. The ten chapters in Part I cover her childhood, her University of Melbourne undergraduate studies, postgraduate research and teaching, her work from Omeo, and her

subsequent work in Belfast and Canberra. Chapters 3, 4 and 5 cover her ecological work from Omeo and Melbourne from 1941 to 1960. Chapters 7 and 8 cover her subsequent work on the Bogong High Plains. Chapter 9 covers her work on *Eucalyptus* morphology and taxonomy, often in collaboration with Carr. Part II includes three unpublished pieces — her huge ecological report on the Hume catchment, her paper on the physiography of north-eastern Victoria, and her notes on *Eucalyptus* species in series *Clavigerae*. *A Book for Maisie* starts with a clear chronology and ends with a list of her publications and a reasonably comprehensive index. There are numerous interesting photographs (sometimes undated) and footnotes about Maisie's correspondents and colleagues, including the Australian ecologist Alec Costin and the British ecologist Alex Watt (who was from Cambridge not Canberra). It is a pity that errors have crept into the preface and elsewhere.

A Book for Maisie is timely. Across waves of interest in Australian women scientists, cattle-grazing in Australia's alps and Australian landscape history, Maisie's pioneering ecological work has slipped into the public imagination. Her High Plains vegetation plots have featured in conservation discussions, from consideration of a Victorian alpine national park in the 1970s and 1980s to consideration of the recently accomplished complete removal of cattle from it. The 2001 *Bogong High Plains Natural History* pamphlet, produced by La Trobe University's Centre for Applied Alpine Ecology, features 'Maisie's Plots', and the *Australian Dictionary of Biography* will soon include an entry on her. Professor Carr is to be congratulated for making Maisie's correspondence and other unpublished material accessible to historians of science.

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Don Garden (Mark Stoll, series ed.):
*Australia, New Zealand and the Pacific:
An Environmental History*. ABC-Clio:
Santa Barbara, 2005. 398 pp.,
ISBN: 1-57607-868-X (HB), US\$85.00.

This is a fine, scholarly textbook, which should prove useful for anyone interested in the environmental history of this large segment of the globe. Unlike most textbooks it is written elegantly and with passion. Even better it is tied together by a coherent argument. Garden aligns himself with the so called 'black armband' group of Australian historians who are determined to examine the more awkward aspects of Australia's past and so overturn Australians' amnesia concerning their history. Like authors such as Henry Reynolds who have broadened our understanding of Australia's turbulent and troubled racial history, Garden issues stern warning concerning the environmental future of not only Australia but many Pacific Islands and New Zealand as well. Chapter headings such as 'The Tragic Ringbarked Forests', 'Broad, Busy Bulldozed Acres', or 'And Mar the Loveliness of Ages' make his intentions and arguments crystal clear. He thereby adopts an approach not unlike that of Donald Worster in *Dustbowl* and *Rivers of Empire*, or Jared Diamond in *Collapse*, by warning that unless rapid changes are made, aridity will make human life in Australia impossible just as global warming will inundate many Pacific islands and large parts of New Zealand's low-lying coastline. A section on 'Contemporary Concerns' such as climate change, blended biotas and sustainability reinforces his firm arguments. Although this somewhat apocalyptic approach may alarm practitioners such as John MacKenzie, William Cronon and Richard White, it makes this the rarest of creations — a provocative textbook that is relevant to the lives of students and other readers! This outcome would also win the plaudits of

White and Cronon as well as Worster, because all three agree that there is no point in doing environmental history unless it challenges complacency and has some relevance for planners, politicians and concerned citizens.

Garden's evocative prose helps to get across the immediacy and relevance of problems such as salinity (toxicity resulting from rising salt levels) and sodicity (disintegration of soil into crusts and potentially fine dust so that it blows away in dust storms and cannot sustain agriculture) of Australia's soils. So too do the numerous excellent photographs, many of them taken by the author himself. Useful boxes, glossaries, timelines, a well-chosen set of primary documents ranging from explorers' accounts through memoirs to poetry and a helpful essay on further reading add to the usefulness of the book. Perhaps it could have employed more maps but it is a well-illustrated and handsome volume.

Garden's stress upon 'hybrid' landscapes draws readers' attention to the extent to which the landscapes and environments of the smallest Pacific Atolls to the giant island continent of Australia have been remade by human activity. Such transformations, which are as true of New Zealand as of Australia, are all too often overlooked in orthodox historical accounts. Garden's excellent volume helps make up this deficit.

Inevitably as an Australian environmental historian Garden pays most attention to the country he knows best. The New Zealand account though is comprehensive and up to date and he covers the vast expanse of the Pacific by employing case studies of Rapanui/Easter Island, Hawa'ii, Fiji, Nauru, Western Samoa, Cook Islands and New Guinea. Some readers may have liked more such case studies but this would have made it a very long book.

This kind of tripartite comparison, as attempted by Donald Denoon and Philippa

Mein Smith in *A History of Australia, New Zealand and the Pacific*, does not always work as a textbook because the units under study are so diverse. In this case, however, it is these differences that stand out and make for illuminating contrast. Garden must be congratulated, therefore, on achieving coherence in his coverage of such a vast and hugely variegated part of the planet earth. Nobody teaching environmental history in this corner of the world, nor anyone interested in that environmental history and the problems it has bequeathed us today, should be without this important and passionately argued work of synthesis and original scholarship.

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Andrea Gaynor: *Harvest of the Suburbs: An Environmental History of Growing Food in Australian Cities*. University of Western Australia Press: Nedlands, 2006. 264 pp., illus., ISBN: 1 920694 48 (PB), \$39.95.

Nothing excites opinion like Australia's suburbs. Ever since detached housing supplanted the two-storey terrace, we have been arguing incessantly about the merits of suburban life. Critics decrying the narrow, stifling life of the 'burbs have been many and varied, from the *Bulletin* writers to Robin Boyd. Then in 1970, Hugh Stretton famously rebutted the standard critique of suburban enervation, arguing that private residential land was both an 'environmental good' and 'vital educator'. More recently, Mark Latham's 'insiders' and 'outsiders' updated this long-standing contest, setting inner-city elites against the ordinary folk of low-density residential suburbs.

Andrea Gaynor contributes to this debate by taking as her focus the hidden histories of food production in Australia's suburbs. In the process, she portrays a nation of

backyard farmers, motivated by economic, cultural and other impulses. *Harvest of the Suburbs* carefully assembles disparate sources to create a complex picture of household food production from the 1880s — a time when animals almost outnumbered people in low-density suburbs:

[I]n Brunswick in 1881, with 2.3 persons per acre, approximately 40% of households owned large livestock, and 63% of households owned poultry; in Melbourne city, with 13 persons per acre, 8% of households owned livestock and 21% poultry. (p. 19)

As well as providing food and transport, this suburban menagerie was an important source of fertilizer for the house-bound horticulturalist. Animal manure was keenly sought by backyard farmers and commercial growers alike in the late nineteenth and early twentieth centuries. Human waste was also used, though the official advice that it should be composted or buried seems rather obvious, yet compelling nonetheless! Adequate supplies of water were often an issue for suburban food producers, as was pest control. By 1895, however, chemical compounds such as copper arsenate, or 'Paris green', were available to deal with insects. Other later sprays included lead arsenate, an effective remedy for pests but one that posed significant health risks to humans too. In the end, Gaynor surmises, household growers still relied primarily on hard work to bring their backyard crops to the table.

Popular wisdom has it that this suburban bounty was produced to meet the needs of the working class, particularly in times of economic exigency. Gaynor points out that in the first decades of the twentieth century, the average household spent 30 to 40 percent of its income on food. Yet at the same time, she argues, backyard farming was a middle-class interest as much as a working-class necessity. Food production required significant access to resources, not the least an adequate area of land. While the poor of the

inner city might have had the need, they didn't always have the opportunity. Better-placed were the respectable working classes and middle classes of the suburbs, who with ample backyards and some capital, could afford to grow their own. By 1941 in Melbourne, it was genteel suburbs like Caulfield, Malvern, Camberwell and Kew that were big backyard producers. The working-class suburbs of Port Melbourne, Collingwood, Fitzroy and Richmond trailed in their wake. Yet if not driven by economic need, why did the middle classes bother to grow their own?

The answer lies, according to *Harvest*, in their self-conscious pursuit of independence as a moral virtue. In this, the backyard farmer shared some of the character of the yeoman, the independent land-owning agriculturalist who lived by the self-help maxims of Samuel Smiles. The yeoman vision sustained settlement and extension of Australia's arable lands, and Gaynor contends that it suggested an ideal type to the small landholder in the nation's cities too. By growing one's own food, a householder mimicked the independent stance of the small land-owning farmer. Furthermore, backyard farming described a new sphere for the masculine, symbolically freeing men from the shackles and compromise of city life. Like Wemmick, these home growers created a private, protected field from which they might hold the city at bay.

This search for independence underpins continuing interest in suburban food production today. Gaynor interviewed more than fifty backyard farmers for her book, and many of them refer to the deep personal satisfaction they derive from growing their own food. In 1998, Andrea Vis told the author that

Looking down at your meal at night and going 'yeah, wow, we grew the salad, and the eggs have come from here', it's a great feeling. I really like that; it's an independence that you can't really explain. (p. 191)

For Vis growing food at home is an important choice, infused with a subjective sense of her personal relationship to her own 'place'. Other home producers like her set great store in disengaging from the market — quite literally, the supermarket — and its resource-rich systems. Many are impelled by their sense that contemporary society is 'out-of-control' and blighted by high levels of consumption, according to Gaynor. In these terms, home growers find themselves in a long lineage of critics who have condemned the city and its vices, preferring to locate virtue in an idealized rural economy. They are enlivened by the sense of providing for themselves, and of being intensely local at a time when the city is determined by increasingly complex, abstracted networks.

Yet *Harvest of the Suburbs* claims that this independent stance is itself in some tension with contemporary ecological imperatives. Despite the sense of eschewing materialism, backyard farming is often resource hungry, using quantities of water, manures and pesticides that have significant environmental impacts. Rather than contributing to a more sustainable future, the practice may in fact carry its own costs. The independent household food producers, therefore, are also implicitly at odds with the interdependence encouraged by community gardening projects. Many of these projects were born of an alternative politics and a growing sensitivity to the complex human ecology of the city. Rather than isolated backyard farms, their interest is in pooling people and resources in co-operative farming ventures on available land. In this sense, the community garden is more than a place to grow vegetables; it is also something of a polemic that challenges the atomization of post-industrial societies.

Gaynor's great strength lies in the way she has widened the scope of her study and its interests. Avoiding the traps of sentimentality and nostalgia always lurking

with a topic like this, she suggests we think more deeply about an aspect of suburban life sometimes thought trivial. She has also managed to tease out continuities, rather than focusing on the changing character of suburbanism. At the same time, the author has contributed to broader discussions of suburbia, sustainability, class and cultural politics. In her introduction to *Harvest of the Suburbs*, Gaynor announces her intention to take suburbs seriously as sites for urban environmental history. She has done that, and encourages us to do the same.

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George Seddon: *The Old Country: Australian Landscapes, Plants and People*. Cambridge University Press: Port Melbourne, 2005. xvii + 270 pp., 80 full colour photographs, ISBN: 0 521 84310 3 (HB), \$49.95.

As a 'Brit', married to a Western Australian, two regular public service features on the city of Perth television news have always intrigued me during my visits. The first is the way that the locations of all the Police mobile speed traps for the next day are broadcast the evening before (which seems to defeat the whole purpose of the 'trap'); the second is the Water Watch sprinkler roster telling citizens which suburbs can water their gardens on which designated days. The second has even taught me a new word, 'reticulation'. Where I've lived in northern England and Scotland, 'reticulation' is unheard of, and is a wholly unnecessary practice. I've now moved south to the East Midlands, where 2005/2006 has seen low winter and spring rainfall. There have been some declarations of drought conditions by water companies in South East England. Water meters are being installed along with hose-pipe bans, television gardening programmes are talking water conservation,

and there are telephone numbers you can call to inform on your neighbours if you catch them washing their car or watering their garden under the cover of darkness. A recent BBC radio debate challenged the folk of southern England to turn off the tap when cleaning their teeth. The South East corner of England, and parts of the Midlands, are facing a crisis and serious water shortages. The BBC evening news now carries some of the same water messages as the Perth evening news, a message repeated on the inside cover of George Seddon's *The Old Country*: 'We are a nation of gardeners, and we take pleasure in tending our backyards. But this pleasure sits uneasily with our knowledge that the places where most of us live are running out of water'. Like you Australians, we Brits are a nation of gardeners and allotment tenderers, so this will be a tough reality to accept over the coming decades.

Seddon strikes out on his botanical journey in *The Old Country* with two primary aims: to encourage a far richer and deeper awareness of the beauty and diversity of the Australian flora, and to promote a more sensible and appropriate use of water in gardens in urban areas. As such the book charts a history of the Australian flora, and reflects on the changing relationships that all humans have had with it over time. The native plant is celebrated over the alien invader, but Seddon does warn the reader about how the languages of science deeply affect the way that we understand ('conceptualize'), and thus respond to modern conservation imperatives. There is much in this book about direct human awareness of Australian biodiversity, but not just through hard scientific classification, botanical expeditions and collections, but also through the senses, emotions, through art and illustration and through photography and verse. The introduction urges the growth and celebration of local and regional plants, more importantly plants that have evolved

to grow unaided and untended (unwatered) save for the odd affectionate glance of a plant enthusiast's eye. And where people feel they must design and plan, Seddon urges Australians to learn design tips from wild nature around them.

The meat of this book looks at various thematic stories, case studies in some cases. For example, chapter two looks at the Boab *Adansonia gregorii* as a recent introduction to horticulture. Seddon argues that although the Boab could be grown successfully in the city of Perth, this does not mean that it should be. Seddon talks of gardeners' choice playing a role here, but freely admits that the thriving suburban nursery trade often shapes public choices for the worst. Chapter four tells the still remarkable story of the discovery of the Wollemi Pine *Wollemia nobilis* in the Blue Mountains in 1994, and seeks to expand the plant story of Australia into a much wider (and more suitable) Gondwanan context. Seddon believes the Wollemi Pine story should be all the inspiration that Australians should need to get out and explore and understand and respect the unique nature and pace of their island's evolutionary story. 'Scientific knowledge of the Australian flora, its history and its linkages is still, in part, exploratory' (p. 101), he enthuses. Chapter five is deeply personal, a celebration and exploration of the glorious Banksia family (*Banksia* spp.) intimately associated with Western Australia, and if properly marketed a potential money spinner for Tourism Western Australia. The theme of this chapter is how Banksias flood the senses and emotions of all Western Australians, from art and decoration, to the adventures of Snugglepot and Cuddlepie. As Seddon suggests: 'Care for the heritage of our natural environment needs legislative protection, but it needs much more; knowledge, affection, associations, stories, so that awareness is part of the fabric of our consciousness' (p. 129).

Chapter six on 'Mediterraneity' is thought provoking. It argues that Perth gardeners are enamoured of places such as Tuscany and Provence, places in another hemisphere, other cultures, but in no way iconic of Australia. Seddon lays down a challenge to all: 'It might be time to redirect our dreams. We are here, and not somewhere else. There are design and planning alternatives' (p. 166). Chapter seven looks at the deciduous and semi-deciduous trees and shrubs of Australia, most of which grow far from urban centres. In an elegant Epilogue, Seddon glorifies the floral wealth of Australia, and speaks of how slowly but surely public awareness of and interest in it is growing. By urging Australian gardeners to grow plants that look comfortably at home and need no supplementary watering, Seddon is taking his anti-reticulation stance to its ultimate conclusion. And you can hear him shout his warning for the future: 'Fear the hose!' (p. 239).

I stumbled across the odd mistake: on p. 12 the desperately unspecific and ghastly term 'seagulls' is used. If that wasn't a bad enough label, the birds illustrated are not even gulls *Larus* spp., but actually crested terns *Sterna bergii*. In the chapter on weeds, the impact of a fascinating series of statistics about alien plant species in South Africa (on p. 225) is slightly lessened by the repetition of Central America next to two different figures. It was heartening to see a book of such public importance as this receive financial sponsorship from botanic gardens in Perth, Adelaide and Melbourne, alongside noted private donors, and most pressingly, from the utility company Melbourne Water, which Seddon salutes as being 'acutely aware of our need to make better use of a resource we have taken too much for granted in Australia' (p. vii).

Seddon writes with considerable wit, charm and wisdom. His style is as ever engaging, argumentative and accessible;

indeed the appeal of this book is wide, encompassing academic, public and policy-making audiences. There is a campaigning zeal here as well, fired out to the nation from a chair in his own Fremantle garden (a garden that should surely be open to the public from time to time!). Seddon's passion and intellectual curiosity challenges us all to search for our own botanical 'sense of place', from which will surely come a much more dynamic and intense relationship between us and our cherished landscapes (in which plants play such a fundamental role), founded on both the aesthetic and the practical. The wild-flower displays in spring in Western Australia are already a tourist attraction. Finally, I applaud Seddon for calling for the creation of a living 'Green Museum' (p. 118), where knowledge and physical experience of a network of key plant sites across Australia will come to shape the national identity of Australians: Nature and the Nation — Australian landscapes, plants and people as one.

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Thomas Barlow: *The Australian Miracle. An Innovative Nation Revisited.*

Picador/Pan Macmillan: Sydney, 2006.

xvi + 262 pp., ISBN 10 0 330 42232 4
(PB), AU\$25.00.

Reading this book in England during both Wimbledon and the World Cup, this reviewer is particularly conditioned to the laying of blame — usually put at the foot of facile individuals, faulty training or lack of government support. But at least in such cases, those who complain of a lack of 'national' support or culture have some sort of clear target to attack — England is not about to win at either soccer or tennis (and the awfulness of test cricket against

Australia has yet to come). But what do we do when the object of criticism is a moving beast without defined form whose exact condition we are unsure of? I have never known an engineer or a scientist who complained mightily about government spending too much on research, who shouted loud about the shining surfaces of university infrastructure or who boasted of his nation's 'capacity to harness its collective intelligence' (p. xi). Yet the common self-interested pessimism of all public scientists in all countries does not deter Thomas Barlow from focussing on this as serious matter for Australian public discussion.

Barlow is fed up with gross Australian negativity. In a book without specific references many targets remain unnamed — there is a strange lack of reference or allusion to the work of Ann Moyal or Barry Jones or Don Lamberton — but at times they also appear unformed. Thus, who precisely is it that simply equates agriculture with low or non-technology? Is it true that 'everyone' thinks Australia is failing at innovation? Who ignores the earlier Australian colonies' brilliant survival tactics based on partial transfers of global techniques and artefacts combined with sheer ingenuity and talent? How does such historical analogy or tale telling relate to a world of bureaucracy and complex policy formulation in a global setting of post-machinofacture technologies, where the global significance of traditional agriculture, metal working and heavy transportation have receded in the face of micro- and bio-technologies and much else besides? How are the attitudes of Australian politicians, intellectuals, scientists and artists as reflected in the ten myths about Australian science (pp. 4–5) any different from those of their counterparts in the UK or USA, or France, Italy and India?

This book is not designed to address such queries in any technical way, and it may be ungracious to raise such matters as methods of proper international compari-

son in preference to our author's episodic flourishing of contrasts. Perhaps the more interesting and testable claim is that such faulty attitudes have the potential 'to drive science and innovation policy in directions unhelpful to our nation's future' (pp. xvi, 113), and if true, this would be a matter of real concern. This is something that is very hard to show convincingly — for instance, any (seeming) under-investment in national research and development may have more to do with resource distributions, with economic structure (the proportion of small firms in the total) and with size and geographical location than with any sort of public mythology. Indeed, attitudes or myths and a surfeit of platitudes may follow from such conditions rather than determine policy directions. Here, laced throughout his briskly written text, Thomas Barlow points to the following key links: an obsession with insufficient spending could lead to neglect of such vital policy areas as company and capital gains tax or intellectual property; an obsession with the need for greater cooperation and community amongst Australian scientists ('holding one another's test tubes' p. 38) may create white elephants and narrow-minded collusions; attitudes that deride technological borrowing as morally or intellectually inferior will deprive Australia of both vital knowledge and superior core techniques, both of which might otherwise be exploited through ingenious adaptations; the existing emphasis on big projects will fail to scale up to a level comparable with major large nations, will breed mediocrity, and will neglect to capture the potential productive breakthroughs in small biotech companies; policies encouraging collaboration, cross-cutting and boundary crossing might replace creativity with assemblage and reduce risk taking; bureaucratic administration and centralized funding, the effort to control innovation, will remove serendipity and the breakthroughs that arise from local confusions and inefficiencies.

In reaction Barlow makes a good case for an alternative policy trajectory that relies on the 'fluid ecology of the economy', breaks the old attitudes and acknowledges the value of individuality and unpredictability, and allows scientists to manage themselves, allows time, and takes scientists seriously, not as pawns in a passing game.

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Alasdair McGregor: *Frank Hurley: a Photographer's Life*. Viking (Penguin Australia): Camberwell, 2004. 460 pp., maps, colour and B/W illus., glossary, bibliography, index, ISBN 0670888958 (HB), \$65.

I am a part of all that I have met;
Yet all experience is an arch wherethro'
Gleams that untravelled world, whose
margin fades
For ever and for ever when I move.

From the elegantly apt introductory epigram — taken from Tennyson's 'Ulysses' — I knew I was in good hands. The author's own background includes photography, painting, architecture, and travelling to polar places. McGregor is ideally equipped to write about Hurley, and he does so with an assurance sustained by three full years of work on his subject.

According to McGregor, James Francis ('Frank') Hurley was 'the first Australian photographer and film-maker to forge a truly international reputation' (p. 414). His invincibly good photographs were often taken — whether in Antarctica or at war — where, as he himself remarked, 'no conditions could have been more unsuited for photography' (p. 57). About 100 are reproduced in the book.

Some of the most gripping events in Hurley's life and work revolve around two Antarctic expeditions whose stories are already familiar to many — Douglas

Mawson's 1912–13 sledging journey and the death of his two companions, the loss of Shackleton's *Endurance* when it was crushed by ice in 1915, the return of the tiny ship *Yelcho* to rescue The Boss's men from Elephant Island (a moment whose pictorial depiction is re-composed by Hurley, we learn). McGregor provides succinct accounts of these expeditions, but retains a firm focus on Hurley.

After his second Antarctic expedition, Hurley went south again as soon as he could, travelling by whaling supply ship from Scotland to South Georgia to film the wildlife scenes he felt were lacking from his film of the expedition. By the time he returned to England in mid-1917 and joined the AIF as Australia's official photographer, others from the *Endurance* had already been wounded or killed in France. Hurley's photographs show an empathy with the plight of the common soldier, but his role in early photographic recordings of the Australian experience of war was frustrating. He was not allowed free licence with his camera, or in the darkroom, unlike his Canadian counterparts (p. 158ff).

The internal tension between perfectionist artist and practical money-maker goals was matched by one between commercial imperative and historical accuracy which, in his working life, also brought him into conflict with Canadian–British press magnate Lord Beaverbrook. Hurley's practice of marrying different images to produce particular effects — which had its counterbalancing in his determination to wait hours or days for the right moment — has sparked some debate today on the creation of composite images in photography. I was curious to see whether McGregor discussed it. (He did not.) Hurley in his photography was a chronicler of dispassionate clarity, but he was no historian. He altered the dates of his travels in Papua for the sake of 'continuity' in his hastily written *Pearls and savages* (p. 426).

McGregor begins the book by pushing into Hurley's icy darkroom in a hut in Antarctica. The hut is at Cape Denison, Commonwealth Bay, built in 'a raging river of wind' (p. 54) by the men of Mawson's 1911–14 Australasian Antarctic Expedition, an expedition on which science was a significant goal (unlike Shackleton's). This scene is a powerful introduction and — given McGregor's own Antarctic sensibilities and visual training — my one regret is that he does not show his own face more often, but retains a scrupulous distance in his careful documentation of Hurley's story.

Hurley emerges from the biography as a talented, tireless and ambitious man, remote from his family, an 'occasional father' (p. 347) who spent long periods (up to six years) away from his wife and children, most notably in Antarctica, Europe, Torres Strait and Papua, and the Middle East.

McGregor draws at length on Hurley's diaries as well as his photography, the former a source to be used carefully, as the author points out. The diaries describe his two months with Australian Light Horse Brigades in Palestine during World War I, after his time on the Western Front, but Hurley later tore out the entries for the eight weeks in which he met and married Antoinette Thierault-Leighton in Cairo. Similarly, his diary observations on missionary stations in Papua in the 1920s were 'only for private information' (p. 234). His photographs of villages in Papua form an important anthropological record of cultures now radically changed, whatever the diaries reveal of what now appear as racial insensitivities.

As McGregor points out — and Hurley's diaries confirm — he wrote with eventual publication in mind. Aware of the implications of this, McGregor extensively uses other standard biographical tools. The careful endnotes show a vast assemblage of books, published and unpublished

diaries, correspondence, government files, interviews, paintings and photographs in order to draw as full a picture as possible. Highly recommended.

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Jack Copeland (ed.): *The Rutherford Journal: The New Zealand Journal for the History and Philosophy of Science and Technology* (online). School of Philosophy, University of Canterbury, New Zealand. ISSN 1177-1380, free.

Some years ago there was a flood of new journals, as publishers sought to boost their bottom line. More recently the flood has dried up as libraries have cut their journal subscriptions; the sad reality of truncated journal runs is now all too common. However, there are new and alternative possibilities: online journals at a cheaper rate, or even free, as in the present case.

The Rutherford Journal (<http://www.rutherfordjournal.org/index.html>) was launched with its first issue in December 2005. It says little about its intentions and scope, other than it 'publishes invited articles from leading international scholars'; but the editor, Jack Copeland, Professor of Philosophy at the University of Canterbury, has provided the following information regarding its intended characteristics. The journal is designed 'to disseminate research in the history and philosophy of science and technology'; is only available online and is free; is financed by the editor donating his time and by his department paying for an editorial assistant; will be published annually, containing invited articles only, on topics of interest to the readership; plans a wide range of topics ('Any topic in the history and philosophy of science and technology is fair game. The first issue gives an idea...history of code-breaking, history of computing, philosophy and history of chemistry, history of

Artificial Intelligence and cognitive science’); and is seeking ‘a 50–50 balance between history and philosophy in the long run’.

The first issue is a very good beginning, albeit with a bias in the broad area of the history of computing, a major interest of the editor. The articles are of two types: shorter and designed to introduce the non-expert to a particular topic (up to 2500 words), and longer and more specialist (about 8000 words). Ernest Rutherford received his early tertiary education at Canterbury; hence the title of the journal and its first article, ‘Rutherford at Canterbury University College’, based on John Campbell’s useful book (*Rutherford: Scientist Supreme*, 1999). Amongst the shorter items are articles on an early (1880s) Hollerith tabulating machine in wood; a 2004–2005 exhibition (see review *Historical Records of Australian Science*, 16(1) 2005, p. 125) at Sydney’s Powerhouse Museum on the life and work of William Jevons, 1850s Sydney photographer and later important economist and early logic machine builder; a new interpretation of the Turing Test; the solution of a complex mathematical equation using an early Manchester computer; and previously unpublished notes of a discussion between Turing and others on the mind and the computing machine, during a Manchester University philosophy seminar in 1949.

The longer articles cover a wider range. Two concern computing: Martin Campbell-Kelly’s introduction to human–computer interaction studies, and a lengthy article by Frode Weierud on the breaking of German cipher machines by the British at Bletchley Park during the Second World War. Alan Chalmers and Rom Harré are well known in the field of the journal and contribute thought-provoking articles on Dalton’s atomic theory and its relationship to the emerging experimental evidence from chemistry, and on what explanation as practised in chemistry can add to the debate on

causality, respectively. Articles by Derek Browne on paradigm cases of instinct (‘the result of natural selection acting on behaviour’), and by Eileen Magnello on ‘Karl Pearson and the origins of modern statistics’, together with a critical notice of a recent book, complete the offerings.

The online format allows copious illustrations: helpful, and an attractive encouragement to read on. While the number of endnotes is limited, each article carries a useful bibliography. It would be helpful to add the affiliation and contact details of the authors. Overall a very creditable beginning; and it is a pleasure to see a new journal in this broad field, especially one from south of the equator.

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Exhibition Review

Rocks to riches, a special exhibition within the *Nation* gallery at the National Museum of Australia opened on 16 June 2006, to coincide with the sixtieth birthday of Geoscience Australia, formerly the Bureau of Mineral Resources (BMR). Although it is just a small exhibition it represents the reuniting of part of the present Geoscience collections of attractive minerals, and some of the past BMR collections of instruments and other historical objects that are in the National Historical Collection (NHC) curated by the National Museum of Australia.

The exhibition was opened by the Parliamentary Secretary to the Minister for Industry, Tourism and Resources, the Hon. Bob Baldwin. It must have been a rare opportunity for him to see all aspects of that portfolio captured so elegantly in a small space. ‘Industry’ was captured by the high tech samples of oil donated by Geoscience; varying from pale yellow and

blue, through to plum and burgundy, depending on the oilfield of origin, the colourful samples demonstrated the variety possible within the booming oil fields of north-west and northern Australia. But such industry also has a history, including a fine 1928 Oertling gradiometer from the NHC, a device that measures variations in Earth's gravitational field to reveal oil-bearing structures, which had been used for prospecting in East Gippsland. Some of Australia's most beautiful 'Resources' — crystalline minerals — are featured, many on loan from private collections. They included bright blue azurite from the collection of Clem Latz and, the centrepiece of the minerals display, a fabulous pale turquoise Coober Pedy opal still embedded in a huge rock (from the Geoscience Australia collection). The 'Tourism' of course was represented by the presence of the exhibition itself in the popular National Museum. Geoscience Australia hopes that by stimulating an interest in minerals

among general exhibitions, more visitors will be encouraged to find their way out to the larger, more specialized minerals exhibition at their Symonston headquarters on the other side of Canberra.

The exhibition allowed the National Museum to explore the history of science in the national imagination and also the place of the minerals industries in present society. The latter was neatly presented through a small exhibition of the seed mixes that were used to re-green the 'golden mile' in Kalgoorlie — a 2006 project. The newly planted vegetation is 'light' (the traditional native grasses of saltbush/bluebush country), 'heavy' (acacia/casuarina woodlands), and 'fluffy' (a seed mix yielding *zypogphyllum*, *stipe* and *helipterum*). Kalgoorlie's Golden Mile will be very different in another sixty years.

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