

Reviews

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David F. Branagan: *T. W. Edgeworth David: A Life: Geologist, Adventurer, Soldier and 'Knight in the Old Brown Hat'*. National Library of Australia: Canberra, 2005. 629 + xix pp. + index, ISBN: 0 642 10791 2, \$39.95.

Universally admired and loved by all — a fine scholar, outstanding scientist, gifted teacher, distinguished explorer, ardent patriot, Christian gentlemen — Edgeworth David has an excellent claim to a place in the pantheon of great Australians. Few words of higher praise can have ever flowed, as those that followed his death, except perhaps those that tagged him during his lifetime. David was a larger-than-life symbol of what his contemporaries believed was found in all the best Australians, if common among few. Much honoured, often cited, at last David has found a biographer worthy of his achievements. This magisterial work, elegantly produced by the National Library of Australia, does credit to all concerned.

Whilst Edgeworth David has never been short of biographers — not least, his daughter, Mary, whose account has been until now the ‘standard’ reference — David Branagan traces a life that blended ‘thought and adventure’. His travels through the voluminous David papers in the Mitchell Library, the National Library, and the University of Sydney, have produced a hefty volume, replete with rich appendices and a formidable bibliography. Branagan meets David in Wales, follows him through Oxford and London, and then brings him to Australia ‘for his health’ (for

the second, and permanent time) in 1882. Thereafter, we see David in the demanding tasks typically set a colonial geologist — and follow him, as with a heady mixture of good luck and skill, he locates coalfields in the Hunter Valley, and encourages geology at the University of Sydney. Unlike many of his more austere contemporaries, David saw ‘colonial geologising’ go hand in hand with teaching and travel, not to mention marriage and parenthood. Situations presented were opportunities seized, as he enlivened geology for a generation of Sydney students. A timely expedition to Funafuti (1895–1898), in the still-romantic Pacific known to Robert Louis Stevenson, brought his name to the popular press; whilst an epic voyage to the Antarctic on the *Nimrod* (1907–1909) with Shackleton — an adventure in which he climbed Mt Erebus with *Paradise Lost* in his pocket — made him a paperback hero. Throughout his life, David held, and shared, a vision of science as excitement that made him a colonial David Attenborough. His fascination with finding the elusive South Magnetic Pole, collecting *japonnais*, promoting Aboriginal anthropology, and unravelling glacial theory, proved preliminary to his unfinished *Meisterwerk*. This, *The Geology of the Commonwealth* — long since known to many (including Branagan) as ‘The Book’ — was finally published in 1950, sixteen years after his death.

Branagan’s judicious use of correspondence and contemporary accounts throws new light on several questions that historians have generally taken as read. He is at

his best in describing David's appreciation of glacial evidence, first developed in Wales, and his work on the Permo-Carboniferous succession in NSW, Victoria, Tasmania and South Australia (p. 341). David's fascination with Precambrian fossils in South Australia — work he apparently regarded as his 'only original discovery' (p. 467) — was, however, to prove no less important than his contribution to theories of continental drift and climate change. All these matters Branagan comprehensively recounts. But he also offers us important insights into what become Australia's first significant contributions to Antarctic studies — and does so in a way that shares credit where it is due, not least to Shackleton and Mawson.

Of course, even great men have failings, and Branagan's quoted criticisms of Edgeworth David by Raymond Priestley are unforgiving, and unforgettable. But in the end, the faithful servant generally excuses his hero, and mostly with justification. For David shone above his contemporaries, as one who combined elementary courtesy with celebrity class. His origins as a son of the manse, and his education in the classics, elevated David to a plane somewhere above that occupied by his more utilitarian, scientifically educated colleagues. His excursions and his extension lectures on India and Antarctica (p. 220) were rapturously received. His imperial patriotism (p. 218) — 'claiming [in 1909] the area containing the Magnetic Pole for the British Empire' (p. 193), and assisting preparations for Scott's doomed 'race to the pole' (pp. 225–6) in 1910–1912 — must have sent a boy's own thrill through classrooms across the land.

Perhaps nothing in David's varied life better illuminates his character than his service in the Great War, to which Branagan rightly devotes most of four chapters. Taking leave from his academic duties, at the age of 57, David led a newly raised battalion of Australian tunnellers to sap

and mine, and with Canadian and British help, to win the 'geological war' on the Western Front, over a year before the Armistice. Victory came in this case not with a whimper but a bang, and with the famous 'blow' on Messines Ridge in June 1917 — following months of unprecedented secrecy. Little did David know that his efforts would contribute a century later to new ideas about strategic resources. But his military-mindedness served him well. Following the war, and far from the front, yet in battles no less furious in rhetoric, he led the Science Faculty at the University of Sydney to new heights, continuing to 'shake up' the Geological Department, animating the lives of first-year students, leading field excursions, and stimulating the widespread use of geological maps. In what Branagan describes as 'the most important single work that he did for Australian science', David helped set up the Australian National Research Council (ANRC), and orchestrated its work as president and officer from 1919 to his death in 1934. Altogether, many of David's achievements were duly acknowledged — by election to the Royal Society in 1900, with a CMG for his Antarctic work (1910); and a DSO (1918) and a knighthood (KBE, 1920) for his war work; and by a string of honorary doctorates, beginning with Oxford in 1911, continuing with Cambridge in 1926, and followed, finally, by Sydney, in 1933.

Given these many plaudits, his popularity wedded to a highly polished profile, it is indeed difficult to see why, in Branagan's words, David's name has 'fallen into relative obscurity in the 70 years since his death.' (p. 3). Surely, his achievements have faded only among those who prefer to forget? Of course, the biographer may protest too much. Most scientists, and not only Australians, battle with the pressures of professional forgetfulness, and few survive. Few are as lucky as Edgeworth David, to have had buildings and lecture-

ships named after him. And few enough manage to capture the imagination in the way that he did. Rarely in this book (and seldom elsewhere, to my knowledge) is an unkind word said of him; and he presents an easy essay for a chronicler looking for a 'parfait, gentle knight', *sans peur et sans reproche* (p. 456).

Even so, at the end of the day, while David may have been a scientific Lancelot in a brown hat, Australia was (and is) not Camelot, and Branagan finds it necessary to explain — and to labour in some detail — the significance of David's contributions to Antarctic exploration, to the emerging science of geography and geophysics, and to the creation of the ANRC, the precursor of the Australian Academy of Science. In his exhaustive footnote references, amounting to over a quarter of the book's length, Branagan captures an impressive range of sources. But this is not quite enough. Science today takes much of this early ground-breaking and institution-building for granted, and in so doing, forgets the vision and understates the struggle its pioneers endured. Possibly, today's leading-edge science, even in its interdisciplinary, 'triple helix' incarnations, cannot quite grasp the universalizing quality of those men and women of David's generation who seemed to claim all knowledge for their province. It is indeed sometimes hard to reconstruct their sense of vocation, or to explain their significance to a generation that marches to a different drummer.

Perhaps Branagan is right to be cautious. At the end of the day, David's great book remained incomplete; and quite what the Department of Education, Science and Training, in an age dominated by Research Quality Assessments, would make of David's ten-year delay in publishing the scientific reports of his Antarctic journey — or the twenty-year delay in bringing his Hunter Valley coal work to publication (p. 216) — can only be imagined. Quite

what a modern Pro Vice Chancellor (Research) would make of such a professor is hard to conceive. He was, perhaps, not an outstandingly original thinker, but he did have, as Branagan rightly reminds us, a 'remarkable capacity to recognise scientific opportunities...'. In such cases, it remains necessary for historians — and biographers — to put on record what may otherwise be overlooked in the rush to avoid being penalized by the push to publish. We are, after all — to paraphrase Matthew Arnold — the residue of what we know when we have forgotten what we have learned. The sensibilities of science, and the challenge of intellectual excitement, so aptly brought out by this fine book, are surely of enduring importance. The National Library is to be congratulated for choosing to be the medium through which this message has been so beautifully expressed.

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Mary McEwen: *Charles Fleming: Environmental Patriot*. Craig Potton Publishing: Nelson, New Zealand, 2005. xxiii + 382 pp., B/W illustrations, ISBN: 1 877333 23 9 (HB), NZ\$50.

This biography traces the life of Charles Fleming (1916–1987), one of New Zealand's greatest scientific polymaths. Readers of *Historical Records of Australian Science* may know him as the chair of the opening session of the International Ornithological Congress held in Canberra in 1974 (*Historical Records of Australian Science*, Vol. 13[3], pp. 233–254). He was one of Australasia's most distinguished ornithologists, a rare New Zealand Fellow of the Royal Australasian Ornithologists' Union, and a founder in 1944 of the Ornithological Society of New Zealand. But he was best known as a geologist, palaeontologist and biogeographer, and it was for his

work in these disciplines that in 1967 he was made Fellow of the Royal Society, London, then only the tenth New Zealander to receive this honour. Fleming even wrote some history of science in the 1950s and 60s.

Charles Fleming was ideally qualified for the session on the 'Origins of Australasian Avifauna'. His geological training (BSc and subsequent work) and his ornithological Masters degree came together with his passion for big questions in biogeography, as Mary McEwen's engaging and beautifully produced biography reveals. Fleming's first job was as a practical palaeontologist for the New Zealand Geological Survey during World War II. He was already familiar with fossil shells and molluscs (from collecting them as a boy) and this proved very important to determining stratigraphy in an era when it took several weeks for fossils to be formally identified far away from survey sites. Later his work on *Pecten* (fan-shells or scallops), published in 1957, was fundamental to the zoning of the Castlecliffian Stage in New Zealand's Quaternary Period.

International scientific congresses and scientific visitors were crucial to his work all his life; they provided the critical and comparative context for his New Zealand-based hypotheses. Aged just 16, through the influence of a schoolmaster who knew of his interest in natural history, he was invited to visit the remote Chatham Islands as part of a party organized by Baden Powell. There he collected or saw 112 of the invertebrate species, as well as making notes on the birds and vegetation types. Four years later, in 1937, he attended his first international scientific congress, the Auckland meeting of the Australian and New Zealand Association for the Advancement of Science, and met many distinguished scientists, including Douglas Mawson, C. T. Madigan, Ernest Skeats, Gilbert Whitley, Joyce Allen and G. A. Waterhouse from Australia, and New Zealand's Robert Falla, later Director

of the Canterbury Museum, who shared Fleming's passion for ornithology and created opportunities for his younger colleague over many years. (Charles Fleming was later elected President of ANZAAS for the meeting held in Adelaide in August 1969.)

After the war Fleming was granted six months leave to attend the Eighteenth International Geological Congress in London in 1948, giving him access to the British Museum (Natural History) and other international research collections and libraries lacking in New Zealand. The congress stimulated his interest in the geology of sea and ocean floors, something new for scientists still working within the limits of theories of continental drift.

Fleming's interest in island biogeography, seeded by his early visit to the Chathams, was followed by detailed studies of these and other islands. His first serious research was undertaken in the Hen and Chicken Islands north-west of Auckland, but his interests included the sub-Antarctic Auckland Islands, and the Snares, south of Stewart Island. He studied birds, molluscs, cicadas and theories of biogeography in relation to these islands and was involved in many practical conservation biology projects, restoring and relocating endangered species.

Mary McEwen is better known as one of New Zealand's distinguished forest ecologists. In this, her first book, she has shown that she is also a fine writer and a sympathetic biographer. McEwen does have an advantage with her subject: she is Charles Fleming's middle daughter. But while this book includes many 'family history' gems (and some excellent family photographs), it remains a serious study of Fleming the scientist in his society. The scientific life of Charles Fleming also provides an excellent introduction to the history of science, natural history and scientific conservation activism in New Zealand over most of the twentieth century,

and McEwen brings out these broader aspects in her study.

Charles's wife Peg is also a major character in this work; indeed McEwen commented that she 'deserved a biography in her own right' (xiii). Peg Fleming (*née* Chambers) (1917–2000) was also trained in science, and her engagement with scientific ideas was integral to Fleming's rich intellectual life. Later, Fleming's daughters — all three of whom ultimately qualified with doctorates (two in natural science and one in anthropology) — joined in on some of these family collaborations and field work.

Take the example of cicadas, something Fleming discovered only in his late forties, when helping a colleague's son with a school project. They went on a collecting expedition to the hills near Wellington and 'He was hooked', McEwen writes. 'What began as a friend's request..., rapidly became an obsession' (p. 174). And it was not just Fleming's obsession, Peg and his daughters Robin, Mary and Jean, 'together with our boyfriends and (later) husbands' were all enlisted. Robin spent part of her honeymoon collecting cicadas, and Mary and her husband Andrew met up with Charles and Peg on a 'cicada holiday' in 1969 in Glenorchy on Lake Wakatipu. Describing various species of cicadas and their song continued as a major research passion for Fleming through the years he was burdened with the responsibilities of President of the Royal Society of New Zealand, ANZAAS and other scientific administrative tasks.

The family collaboration was probably most important in the later years of Fleming's life, when he became a scientific activist in many of the New Zealand conservation campaigns associated with the clearing of native forests for *Pinus radiata* plantations from the late 1960s. Fleming's most notable conservation battle (from 1970–1972) was the one that eventually saved Lake Manapouri from

being 'raised' (or flooded), just as a similar battle for Lake Pedder was less successfully waged in Australia.

The long conservation fight came at a high personal cost to Fleming, however — he suffered a major heart attack in 1971; after this time, he tried to lessen his public speaking and conservation commitments. But he continued to attend and speak at a formidable number of international scientific congresses, and many of these also had strong conservation agendas. Science, sensible conservation policies and nationalism were deeply intertwined in his public and private life. He could never hold back from what he called 'environmental patriotism'.

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John Kendrick: *Alejandro Malaspina: Portrait of a Visionary*. McGill-Queen's University and University of Washington Presses: Montreal and Kingston, and Seattle, 2003. xi + 212 pp., ISBN 0 7735 1830 8 (PB), US\$18.95.*

With this book John Kendrick has filled what has long been a conspicuous gap in the study of European exploration in the age of the Enlightenment by providing a soundly researched biography of Alejandro Malaspina. While other major explorers of this period such as Cook and La Pérouse have received extensive biographical treatment, Malaspina has languished in relative obscurity. This owes much to the fact that his expedition never had the impact that it merited: five years' work from one of the most successful voyages of exploration and scientific discovery of all times was left unpublished and undissemminated because of the vagaries of Spanish politics in the age of the French Revolution. However, with the recent publication by the

Naval Museum of Madrid of the massive multi-volumed edition of the complete transactions of the voyage and the just completed Hakluyt Society three-volume English translation of Malaspina's own journal, Malaspina and his great voyage of 1789 to 1794 are finally receiving the long overdue acclaim they merit. Kendrick's work adds further to this recovery of a hitherto relatively neglected major chapter in the interaction of the world of the European Enlightenment with the Pacific.

Like Columbus before him, Malaspina was born in Italy (in 1754) but enlisted in the service of the Spanish navy. Kendrick brings out the cosmopolitan nature of the world from which he came: a member of the minor Italian aristocracy, which was well used to dealing with the various foreign powers that ruled the land for centuries before Italy became a unified country in 1871. Family contacts combined with those of the highly international Catholic Church to obtain for Malaspina a naval post with the Knights of Malta — an order whose origins went back to the Crusades and which continued to rule Malta until the time of Napoleon. This, in turn, provided a useful preliminary for entry into the Spanish navy.

Malaspina's time in Spain came at a time when that highly traditional land was subjected to new winds of change. The increasing realization that Spain was receding in importance prompted some moves to modernize and to implement some of the ideas of the eighteenth-century Enlightenment — the movement of ideas that stood for taking a more critical view of tradition including the entrenched power of the clergy and the aristocracy and subjecting institutions to the light of reason and the methods that had proved so successful in the sciences.

Malaspina's great voyage was one of the outcomes of such a change in the climate of ideas within Spain: a scientific voyage using the best methods and equipment then available represented a modern response to the problem of Spain's waning power. One of

the greatest of such challenges was the increasing intrusion of the British: hence in 1793 Malaspina called at both Doubtful Sound, New Zealand, and at Botany Bay, New South Wales, to see what inroads the British were making into the Pacific, an ocean long considered as a Spanish lake. He was reassured that New Zealand had not come under British imperial sway but was concerned at British activity in Australia. He viewed British protestations that they were only interested in establishing a penal colony with extreme scepticism, regarding the colony as a potential base for an assault on Spanish interests on the other side of the Pacific in South America. Malaspina's voyage, then, was part of an attempt to reassert Spain's position in the world. But his determination on his return to hitch the ramshackle vehicle of the Spanish crown to the cause of modernization led to a very imprudent foray into court politics and his subsequent arrest. Not only was Malaspina himself incarcerated but so, too, were the papers from the voyage — casualties of factional struggles that had been exacerbated by the momentous events of the French Revolution.

Within the compass of one hundred and seventy pages of text Kendrick has given us a well-rounded account of Malaspina's achievements and, in particular, the intellectual influences that shaped his view of the world. As with Cook, it is difficult to penetrate far into the psyche of Malaspina himself — the absence of personal papers means that we largely know these two great explorers only through their journals. If the work were written on a larger scale it would have been worth devoting more space to an analysis of the impact of the Enlightenment within Spain and the way in which its impulses were both welcomed and condemned. It would also have been interesting to locate Malaspina more firmly within the company of his fellow Pacific explorers of this period comparing his methods and goals more programmatically.

cally with figures such as Cook, La Pérouse and Vancouver. But this is to ask for a different and bigger book — brief is often beautiful and Kendrick is owed our thanks for providing us with a long overdue life of Malaspina which is both economical in scope and perceptive in its portrayal of that star-crossed visionary.

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Samuel Furphy: *Selbys the Science People, A History of H. B. Selby Australia Limited.* Australian Scholarly Publishing: Melbourne, 2005. xi + 369 pp., illus., ISBN 1 74097 092 6 (PB), \$39.95.

This is a moral tale. Samuel Furphy describes the rise of a scientific supply business from very modest beginnings in the 1890s to national pre-eminence around 1980, and what happened after.

As a scholarship student at the University of Melbourne, Carl de Beer thought he could provide the necessary chemical glassware and equipment to his fellow students more cheaply than the locally available stock — and supplement his income. So in 1897 he placed his first order with the German firm of Bornkessel. The venture paid off and another order was placed the following year. By the end of 1898, the backyard business was prospering to the extent that two of Carl's brothers were now involved and they sought the assistance of an uncle in London to extend the range of suppliers. Among the contacts was the German chemical manufacturer, E. Merck of Darmstadt.

Carl's tragic death in 1899 at the age of 22 disrupted the family but did not end the business. Carl's younger brother Ernest had already developed a prominent role in marketing the brothers' scientific imports.

Operating from his uncle's office in Melbourne, Ernest assiduously worked to extend the range of customers in order to secure the confidence of suppliers in granting agencies. In 1900 Ernest secured from Merck the sole agency for Victoria.

With expanding stock and business, Ernest not only required larger premises, he soon needed more capital. In 1903 he formed a partnership with H. B. Silberberg. Born in 1873 in Branhholme in western Victoria, Silberberg had saved up several hundred pounds working as a miner and storekeeper in Kalgoorlie. De Beer, Silberberg & Co. was short-lived. For reasons that are not clear the partnership proved unsatisfactory and after four months it was dissolved with H. B. buying out Ernest's share. This did not prevent H. B. from forming another de Beer partnership — later in 1903 he married Ernest's sister Aimée.

Under the management of H. B. and later his sons, Esmond and Benn, the business continued to expand for nearly 80 years. Building on the foundation the de Beer brothers had established, H. B. expanded the scope of the business and the range of agencies. In 1912, with H. B. Silberberg & Co. operating soundly in Melbourne, H. B. and his family moved to Sydney and established a new scientific retailing business of the same name. These remained separate companies until brought under the ownership of a holding company in 1949.

The First World War had an important effect on the businesses. Many of the important companies for which Silberbergs had agencies were German and so supply was completely cut off. H. B. compensated for this by placing trial orders with several Japanese companies including Shimadzu & Co., which led to a purchasing trip to Japan in 1917. Anti-German sentiment made Silberberg's German-sounding name a liability for business, so H. B. changed the

family name to Selby, with both businesses becoming H. B. Selby & Co. by 1917.

H. B.'s sons Esmond and Benn joined the Sydney and Melbourne businesses in 1929 and 1936, respectively, and so were well placed to continue the development of Selbys when their father died in 1937. Following the Second World War, the expansion of manufacturing created new opportunities for Selbys, which developed a market for industrial process-control equipment. Esmond also realized his plan to develop a manufacturing business, known as Analite. Among its notable achievements, Analite developed one-piece stainless steel analytical masses.

In 1974 Selbys undertook an unusual assignment, the delivery and installation of the aluminizing plant for resurfacing mirrors at the Anglo-Australian Telescope at Siding Spring in New South Wales. The plant was built by Edwards High Vacuum, an English firm that Selbys had represented for over 30 years. The 3.9-metre mirror required large equipment. Selbys was responsible for the transport of more than 50 tonnes of equipment from Sydney to Coonabarabran for installation at Siding Spring.

The expansion of Selbys required new capital. This led to the establishment of a public company, H. B. Selby Australia Ltd, in 1949. This holding company acquired all the shares in the Sydney and Melbourne businesses, and in 1951 also acquired Analite. Subsequent share issues continued to dilute the ownership of members of the Selby family. By the late 1970s Selbys had branches in every state capital, manufacturing plants in Sydney and Melbourne, a New Zealand subsidiary and even a branch in Papua New Guinea. As an asset-rich company with growing sales — over \$20 million in 1977 — it was a target for a takeover. Having fended off a first attempt in 1977, Selbys succumbed to a triple takeover five years later, being swallowed up by Warburton O'Donnell, Comeng and

Australian National Industries (ANI) in rapid succession in 1982–1983.

These takeovers meant an end to the involvement of Esmond and Benn Selby in the management of the company. They had both retired from executive positions by then, and ANI forced them to resign from their positions as directors. In the midst of these changes the brothers wisely removed the company's historical records from the offices in Sydney and Melbourne. Now in the Noel Butlin Archives in Canberra, these records have been drawn on extensively for Furphy's excellent biography of the company, along with the recollections of former Selby staff.

Two notable features struck me in reading this book, the adaptability of the company and the longevity of the staff. Through war and depression, industrial expansion and technological change, Selbys was able to survive the tough times and exploit new opportunities. It was H. B. Selby's genius to exploit the 'tyranny of distance' for commercial success. By maintaining regular personal contact with his suppliers abroad, a practice continued by his successors, H. B. secured and maintained an extensive range of suppliers — an appendix lists several hundred companies for which Selbys were agents or distributors in 1976. By the 1970s, however, improvements in transport and communications meant that it was increasingly practicable for international firms to set up their own offices in Australia. Selbys lost the agency for the American firm Beckman Instruments in 1980. Selbys had been selling Beckman products since the 1930s and had built up an extensive market. How Selbys might have adapted to this changing market is hypothetical. The triple takeover ended the company's expansion. Loss of staff and reduction of services followed. ANI brought a policy of 'profit before prestige' to the management of Selbys, which turned the spirit of the company on its head.

Selbys the Science People is very much a story about people. While the company was expanding and adapting it also provided a working environment that encouraged longevity of employment. Bob Murray who joined Ernest de Beer in 1901 retired in 1952. J. T. Pollard, whose able management of the Melbourne business enabled H. B. Silberberg to move to Sydney in 1912, retired in 1969. There are numerous lesser examples. One can only wonder at the short-sightedness of the disruptive management practices following the takeovers. Indeed there is more than a hint that 'prestige' or reputation for reliability and service is essential to the profit of such a company. The Selby name continued through further changes of ownership until 2002, when as part of the Biolab Group, it was finally dropped. Yet the 2005–2006 White Pages lists 'Selby Biolab' with a referral to Biolab (Aust.) Pty Ltd.

The Selby name continues to be associated with science in Australia through the Selby Fellowships, which have been awarded since 1961 and are now funded by the Selby Scientific Foundation.

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Webber: *Yesterday's Tomorrows: The Powerhouse Museum and its Precursors 1880–2005*. Powerhouse Publishing in association with UNSW Press: Sydney, 2005. 288 pp., illus. (full colour and B&W), ISBN: 0 86840 985 5 (PB), \$54.95.

The forerunner of the Powerhouse Museum, Sydney's Industrial, Technological and Sanitary Museum was born of the optimistic instructional impulses of the Victorian age. Like the Science Museum in South Kensington, London, Sydney's technological museum was also animated by the nineteenth century desire to display the

material fruits of science and technology. The Science Museum's precursor had drawn on collections massed for the Great Exhibition of 1851. In a sense, so did the Sydney museum. As Graeme Davison and Kimberley Webber point out in *Yesterday's Tomorrows*, the museum's foundation was tied to Sydney's international exhibition of 1879 — one of several colonial homages to the Crystal Palace exhibition of 1851.

Both Sydney and South Kensington museums linked educative goals to a generalized faith in the industrial miracles of the nineteenth century. They were, argue Davison and Webber, places where people 'glimpsed the future', where they could see what was on the horizon. 'In the 1890s we came to see steam hammers, in the 1930s plastic, in the 1950s television, and in the 1980s computers and holograms,' the editors write in the preface to their volume, published to celebrate 125 years of the Powerhouse and its forebears (p. 11). The chapters that follow, many of them co-written by academics and museum workers, tease out the particular mix of arts, science and industry that has determined much of the institution's own history in the twentieth century.

Sydney's museum was ambitious from its inception, driven by the zeal of Archibald Liversidge, its intellectual champion from the University of Sydney. Liversidge envisaged an institution that would not only activate, but also participate in the development of colonial science and technology. Roy MacLeod's chapter, 'South Kensington come to Sydney', reveals the strength of Liversidge's interests in the museum's foundation. Not only would the museum collect and mount displays, it should also be a research and educational institution:

...the goal was to emulate, not imitate, London's example. The museum Liversidge foresaw would be more than merely a loan collection, as at South Kensington. It would

also offer lectures and be a place to generate and apply new knowledge (p. 50).

In the late nineteenth and early twentieth centuries, the museum expanded its mission to amplify the economic value of science, as MacLeod and Webber show in a later chapter. Under Joseph Maiden, and later Richard Baker, the museum developed its research reputation, especially in the study of the chemical composition of eucalypts and other native flora. Remarkably, a role for the museum in applied research would continue until 1979, though its work suffered a relative decline from the end of the Second World War in the face of competition from CSIRO and the universities.

The Industrial, Technological and Sanitary Museum was therefore a place that revealed and produced new and 'useful' applications of scientific knowledge. This gave it an express orientation to the future; the museum instructed visitors, as Ross Gibson puts it, in the 'confident creed of modernity' (p. 55). However, Gibson's chapter, 'Wonders of the World On Show', also explains that the museum was an experiential space, a theatre of the future that could leave visitors struck with wonder. His contribution to the volume introduces a sense of the museum's audiences, and comments on the unpredictable, even volatile, nature of their experiences in its exhibitions.

Gibson's purpose is to contrast the felt, or embodied, nature of wonder with the museum's rational, educational goals. While he sensibly cautions that curators 'eliminate wonder at their peril', he also acknowledges the ambivalence that this may provoke in visitors. Wonder can be a visceral experience, but it is potentially distancing and oddly alienating. The mixed public reception of the 'Transparent Woman' display at the museum in the 1950s gives a sense of this. Discussing the exhibit, Megan Hicks and Martha Sear note that:

...so shocking were the plastic organs glowing behind her lucid plastic skin that it had been necessary for the museum's director to convince a Customs Department official that it was appropriate to import such a model for showing to the general public (p. 69).

Imagined as a state-of-the-art hygiene display, Hicks and Sear show that reactions to the model often tended to the prudish or the prurient. No doubt this was true, but the images accompanying their chapter suggest another, complex response was also possible. The Transparent Woman was a strange mix of the technological and the grotesque. Its plasticity and technical precision invoke a scientific otherness and, conceivably, a weird alterity or oddity. In this reading, the model may have been disconcerting for audiences, as much as fascinating and instructive; a counterpoint to the museum's prosaic interest in making knowledge of the body openly available.

This sense of ambivalence, of the uncertainty provoked by the experience of wonder, is still a feature of the Sydney's museum's natural comparison, the Science Museum in South Kensington. There, the museum's Wellcome Wing promotes itself as a 'high-tech' vision of the future, complete with 3D animations and virtual technologies in its three gallery levels, 'Who Am I?', 'Digitopolis' and 'In Future'. Despite displays of Stephenson's 'Rocket' and beam engines, the Museum retails its visions of the future, surveying and sometimes speculating on what is to come. It is both fascinating and faintly disturbing at the same time.

However, the descendant of Sydney's technological museum — the Powerhouse — has followed a different path from that of the Science Museum in recent years. Perhaps against expectations, the Powerhouse redevelopment in the late 1980s produced a more strongly historicized account of science and industry than the Science Museum, or that of its own fore-

runner. For Richard White, this reveals a central tension in the museum's history that has parallels with that of the nation. Like the museum, White argues, 'Australia's identification with the future was always being undermined by a creeping up of the past' (p. 140). Tomorrow quickly becomes yesterday.

White's chapter, 'Representing Australia', notes that the Powerhouse was marketed as a 'cutting edge' museum in the 1980s. Its redevelopment accented the new museology and claimed a place for the institution in the contemporary renaissance of museums. The redevelopment project also led to more deliberately crafted historical displays on science, technology and industry. White suggests the museum's break from its own past may have been more apparent than real, pointing out that 'history had been going on in the museum all along' (p. 140). But an internal reorganization, the introduction of social history, the strengthening of design and decorative arts history, and addition of historic treasures to the collection all indicate a deepening of its historical vision. As the museum's interpretive approach took a bold leap forward, its interests seemed to turn increasingly to the past.

So, a museum that seeks to educate about science, technology and industry and yet provokes ambivalent wonder? A theatre of the future that is also a treasure house of the past? Davison and Webber's volume is alive to these and other tensions and ambiguities in the history of the Powerhouse Museum. Organized in three main sections focusing on visions of the museum, stories from its collections, and its dreams for the future, the book is a fascinating, multi-stranded history of the museum in all its incarnations. Collaborative writing has its pitfalls, but many of these pieces show a synthetic strength from their co-authorship. As a collection, *Yesterday's Tomorrows*, also manages to avoid the more archly triumphal tone of books published

to honour an institutional anniversary. It offers a variegated view of the museum rather than a singular vision. Themes and interests are followed and debated in its pages, much like the experience of a visitor wandering the museum's galleries. I was delighted by the implicit debates that could be read between the chapters and their conceptual reach.

Finally, there is the museum's collection itself. A large-format book, *Yesterday's Tomorrows* is blessed with wonderful illustrations, the best of which are images of the collection holdings. Vignettes on artefacts, collectors and benefactors are interspersed between the longer chapters, leavening the whole. Remember, this is a museum that embraces broad and disparate interests under the rubrics of science, technology, industry and arts. Its collection ranges widely over our material efforts of the past two centuries and beyond, from locomotives to Jenny Kee designs, from Roman antiquities to samples of wool fleece. It's the sheer strength of its collection that makes the Powerhouse a great museum. In this, it benefits from a history stretching back 125 years; proof that in collection-building, there is no substitute for time.

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David J. Collins (ed.), and Nicola H. Williams and Ernest K. Nunn (assistant eds): *Chemistry at Monash University 1986–2003: A Sequel to Twenty Five Years of Chemistry at Monash*. Monash University: Melbourne, 2005. 150 pp., colour photographs, price on request.

The book contains a series of impressions, documentation and personal recollections that chronicle the activities of the Chemistry Department/School at Monash University. The series of essays represent the recollections of the major players in the teaching, research and administration leadership over the period 1986–2003. It is a

sequel to I. D. Rae's *Twenty Five Years of Chemistry at Monash (1961–1885)* published in 1986.

Chemistry at Monash begins with the recollections of the leaders of the separate sections that made up the Chemistry Department: Professor R. D. Brown and colleagues recall the Physical and Analytical section; Professor West and later Dr Deacon document the Inorganic section; and Professor Jackson writes of the Organic section. These summaries indicate how strong and separate these sections were within the larger Department, a department that much later narrowly elected itself to become a School.

A chapter by Professor Dickson details some of the major changes affecting the Department in the period when Professor R. D. Brown stepped down as Head and then soon after retired from his Foundation Chair. (Brown remained in the Department as an Emeritus Professor.) Following a review of the Department in the early nineties, both staff structures and mode of management changed. Budgetary constraints led to staff cuts and the elimination of workshops, whilst falling student numbers in mainstream Chemistry in Science over the years 1991–2002 (clearly shown without comment in a table on page 111) added to the pressure on the department. The question begged by these chapters was: 'Why did student numbers in chemistry drop so dramatically (around 50%) over the years?';

The Monash Chemistry Department survived and was sustained through a merger with the Chisholm Institute, and through its Water Studies Centre plus the formation of a 'Green Chemistry' initiative that captured an Australian Research Council Special Research Centre award. These and a program of early and semi-retirements helped Monash stem the resource drain brought about by a financial drought.

Chemistry at Monash makes for disappointing reading as a whole, because it is a series of separate and largely uncoordinated chapters. Initially the chapters are by professorial discipline leaders who mainly deal with research and teaching topics. After the Departmental review the successive Heads of School report on problems of staying alive whilst financial and political issues dominated. It is a credit to the united efforts of the senior staff that Monash Chemistry survived, but there is not enough in the book about the actual chemistry research undertaken during these financially stressed times. The claim to being the best chemistry department in Australia is largely unsubstantiated, and might well raise some vigorous response from Chemistry Schools in the Universities of Melbourne, Sydney, Adelaide or NSW.

Only 62 pages (40%) of the 150 pages are written commentary on the progress of the department over the period 1986–2003. Of this, 15 pages (25%) are a lifetime autobiographical review of the research career of Professor R. D. Brown spanning more than the timeframe of this history. There is overlap between the various chapters and a repetition of the staff listings from the earlier publication. All the staff details (academic, technical, administrative) are listed not over the period 1986–2003 but from 1960, repeating the 1961–1985 publication.

I think this second period of history is not as well presented as the first publication and that Monash should have employed a historian, or at least a chemist-historian (like Ian Rae, who compiled the twenty-five year history) to co-ordinate and better integrate the book.

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David Owen and David Pemberton:

Tasmanian Devil: a Unique and Threatened Animal. Allen & Unwin: Sydney, 2005. xi + 225 pp., illus., ISBN 1 74114 368 3 (HB), \$35.

Few Australian animals are the subject of a book as readable as this one. It was conceived by Allen & Unwin's science commissioning editor Ian Bowring to follow the other successful titles in this series, *Platypus: the Extraordinary Story of How a Curious Creature Baffled the World* (Ann Moyal, 2001; reviewed in *Historical Records of Australian Science* 13[4], p. 532) and *Thylacine: the Tragic Tale of the Tasmanian Tiger* (David Owen, 2003; reviewed in *Historical Records of Australian Science* 15[1], pp. 124–125). Its authors are novelist David Owen, author of the thylacine book and David Pemberton, zoologist and curator at the Tasmanian Museum and Art Gallery in Hobart. Pemberton's 1990 PhD thesis examined the social organization and behaviour of Tasmanian devils.

The Tasmanian devil, the subject of this present volume, has been regarded as anything but 'timid and sensitive', but reading this book will remove any lingering doubts of its satanic nature! In the twenty-first century, one hardly needs to be told that passages such as A. A. Wilkie's 1917 description now appear 'ludicrous':

During the day it is too sleepy to be otherwise than very stupid, but with the coming of covering darkness it displays a cunning and a cleverness inseparably connected in the human mind with the original owners of the despised name of devil. (p. 16)

The book's eleven main chapters cover the devil's ecology and behaviour, history and iconic status, and its present situation. Most of all, they tell of our changing attitudes to the world's largest surviving marsupial carnivore in the time since European settlement, summed up by the chapter title: 'From Antichrist to Ambassador'. Comparisons with the other 'stock-

destroying vermin', the Tasmanian tiger or thylacine, and its fate are unavoidable. The 'lengthening shadow' of the tiger's disappearance reached well into the twentieth century.

The devil's image as 'pest' endured longer. Some writers and naturalists worked to dispel popular misconceptions of the animal — extinct on mainland Australia for less than 500 years — while others fostered it. In 1880 Louisa Meredith helped to reinforce the devil's status as nuisance (or worse) when she wrote:

They seem to go about in families or parties; for when you catch one, you are tolerably certain of getting six or seven more, one after another, and then perhaps you will not hear of any for a good while. Of course they are much scarcer than formerly, and a very lucky thing, too. (p. 83)

Another Tasmanian woman, Mary Roberts, kept a private zoo at Beaumaris House in Hobart in the late nineteenth and earlier twentieth centuries, and successfully bred the Tasmanian devil in captivity. Her detailed observations of the devil displayed an intense sympathy which — as she herself wrote — was 'probably evoked by [them] having suffered much mentally owing to the gross cruelties' of trapping (p. 92).

Other fine students of the devil include mammalogist Eric Guiler, whose name and work on both devil and thylacine will be known to many readers, and the earlier Theodore Thomson Flynn, inaugural Professor of Zoology at the University of Tasmania. Flynn is certainly no household name, but there is an interesting link through his son — the actor Errol Flynn — to the American film studio Warner Brothers. In the 1950s this company created the Looney Tunes cartoon character 'Taz, the Tasmanian devil' — a feisty character the authors credit with wide international recognition. Owen and Pemberton feature Warner Brothers at some

length here in discussions of ownership of the devil.

Devil facial tumour disease, a virulent cancer fatal within months of its manifestation, was first clearly noticed in 1996 and is the subject of the book's last chapter. This disease gives added urgency and poignancy to the book, adding to habitat loss and persistent persecution as contributors to the animal's declining population. Like many of the sources the authors cite, the book itself is an impressive argument in favour of detailed natural history work and careful analysis of data. Though a sad tale, it is one we should all read.

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Penny Olsen: *Wedge-Tailed Eagle*. CSIRO Publishing: Melbourne, 2005 (Australian Natural History Series). 111 pp., illustrations: Humphrey Price-Jones, photographs: Peter Merritt, ISBN 0 643 09165 3 (PB), \$39.95.

Scientists are not always given to writing for a public audience. They generally prefer to place their work in specialist journals and to write in arcane jargon that their peers alone understand. On the other hand, non-specialists often lack the insight and rigour that comes with scientific training and may sometimes misrepresent, exaggerate or underplay facts, issues and concerns when they write about science for the popular market. It is therefore a particular pleasure when a highly respected scientist such as ornithologist Penny Olsen produces an accessible book for the non-specialist, and one that is accurate, comprehensive, written with flair and brimming with the confidence of knowledge and experience.

Dr Olsen is an authority on Australian raptors and she is internationally well respected. Her monograph, *Australian*

Birds of Prey, appeared in 1995 and she has over one hundred scientific articles to her name. In addition, she has had extensive field experience over some thirty years. She has, however, also made it her special task to mediate her subject to the broader community and is the author of books for children, of *Feather and Brush*, a book about Australia's bird artists (reviewed in *Historical Records of Australian Science* 13[4], pp. 530–532), and is currently the editor of *Wingspan*, the membership magazine of Birds Australia. Consequently, she is the ideal person to write about Australia's great bold eagle — the Wedge-tailed Eagle *Aquila audax*. Olsen's text is accompanied by dramatic illustrations by Humphrey Price-Jones and a portfolio of photographs by Peter Merritt that add to the value and interest of the text.

Olsen's initial plan for this book was as bold as her eagle for it was envisioned as a large-format coffee table book that would have given the illustrations full play. She says nothing about her text, which might well have been enlarged in a grander publication to become something akin to Valerie Gargett's marvellous book on Africa's giant raptor *Aquila verreauxii*, *The Black Eagle: A Study* (Johannesburg: Acorn Books, 1990), which has not yet been surpassed. But while smaller in scope and shorter in text than Gargett's, Olsen's *Wedge-Tailed Eagle* is not a compromise and demonstrates the talent that is required to translate data into narrative. It is a clear, succinct, attractive and useful book that one hopes will become a standard on the bookshelf of every Australian interested in the environment.

Wedge-Tailed Eagle is divided into eleven short chapters covering the different aspects of this raptor's taxonomy, biology and ecology. Chapter 1 provides the context in which Olsen has done her raptor work and the reasons she embarked on this book. Known to science since 1801, Wedge-Tailed Eagles have, of course, been

familiar to Aboriginal Australians for centuries. They have a strong presence in Aboriginal myth, custom and subsistence as the author explains in Chapter 2. Olsen next sets the scene for the colonial encounter with this eagle, its closest international relatives (*Aquila verreauxii* is one of them), the country it prefers to inhabit and 'Eagle specifics', i.e. what distinguishes an eagle from other raptors. The generalizations thus dealt with and the context established, the author then homes in on the biology of the Wedge-Tailed Eagle, explaining how it flies, what it sees, how it reproduces and advances to adulthood, how it hunts and what its preferred prey species are. The last chapter, number 11, discusses the threats that eagles face from ignorant farmers and a modernizing agricultural and industrial economy, and finally, the bird's conservation status. The writing style is spare, never tedious or cluttered with jargon, and one is easily led from one page to the next.

Eagles are not an easy group of birds to study. As African ornithologist Leslie Brown expressed it in his *Eagles of the World* (London: David and Charles, 1976): 'Wonder, tinged with awe, leads rare enthusiasts to seek out eagles and study them. They are few, because this is no easy field of work ... This is no easy bird to know; he does not come to any bird table' (pp. 6–7). While always an authoritative voice, Olsen does not minimize the difficulties of studying eagles and does not hesitate to explain where scientific evidence is thin or where more research would be productive. Her humility in this regard is important at a time when scientists are often criticized for their dogmatism.

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Tim Flannery: *The Weather Makers: The History & Future Impact of Climate Change*. Text Publishing: Melbourne, 2005. 384 pp., illus., ISBN: 1 920885 84 6 (PB), \$32.95.

Until very recently, climatology was a quiet backwater of science, and climatologists were largely ignored by the public, politicians, the media, and even other atmospheric scientists. All this has changed. Now climatologists are portrayed as heroes (in the film *The Day After Tomorrow*) or villains and fools (Michael Crichton's novel *State Of Fear*), and have their morals impugned in opinion pieces in the pages of our major newspapers. All because the use of fossil fuels has led to increased carbon dioxide concentration in the atmosphere, which in turn has led to global warming (the enhanced greenhouse effect) and other climate changes. Given the intensity, and importance, of the public and political debate on the greenhouse effect and global warming it is not surprising that distinguished and high-profile scientists such as Tim Flannery (director of the South Australian Museum and much else besides, as well as a prolific author) have stepped into the fray. Flannery's latest book is a passionate attempt to convince a wide public that climate change is real, that we are the cause, and that we must take steps now to avoid ever-increasing damage and disaster. His understanding of the physical science of climate change is good, his exposition of the likely impacts on humans and (especially) biological systems is wide-ranging and convincing (not surprising given his knowledge of ecosystems), and he discusses a wide range of approaches to mitigating the enhanced greenhouse effect. Although there is a substantial focus on Australia, Flannery's viewpoint is global and he discusses examples of probable climate change impacts from many countries. This is a book for all the world.

Nevertheless, I have to admit that I was somewhat uneasy reading his book. I initially thought this was due to Flannery's informal style. (It certainly is an easy book to read.) My involvement in the climate change debate has been in writing papers for scientific journals (in a typical formal style) and in participating in the preparation of the assessments of the Intergovernmental Panel on Climate Change (IPCC), which Flannery correctly depicts as 'dull as dishwater'. So I have trouble dealing with informal writing on the topic. But I was also surprised that Flannery devotes considerable time to aspects of climate change science that are neither central to the main thrust of the book nor well established. One example is the work of William Ruddiman suggesting that humans may have been having a substantial impact on the global climate for much longer than the last 100–200 years. Another example is the way in which Flannery starts his book with a discussion of Gaia, the James Lovelock postulate that the climate and the composition of the Earth always are close to an optimum for whatever life inhabits it. Flannery's devotion of space to such ideas may lead a naïve reader to conclude wrongly that all understanding of climate change is on an equal footing with these concepts. (These ideas may well be correct, but they are not rooted deeply in physics, as is the enhanced greenhouse effect.) This is compounded by Flannery's tendency to include 'throwaway' lines that are probably inaccurate and do little to advance his cause or throw light on the subject of climate change. His statement that a Perth taxi driver is 'likely to be a bankrupt wheat farmer' is one example. Such throwaway lines have, predictably, been used by some commentators as an excuse to dismiss both the book and climate change as green hysteria. Finally, because Flannery comes to this subject as an outsider, he sometimes

overlooks relevant literature supporting his thesis. For instance, he discusses the decreased rainfall south-west Australia has received for the past three decades, but does not mention the seven-year research program (the Indian Ocean Climate Initiative) that concluded that the enhanced greenhouse effect has 'most likely' contributed to this decline.

But this is nit-picking. The book is a great read (once you get past Gaia). Flannery is a superb writer and demonstrates, once again, his encyclopaedic knowledge and his ability to assimilate many streams of science. His chapters on the biological impacts of climate change are almost scary (even for a hardened reader of climate-change impacts studies). The book alerted me to many technological approaches to mitigation of which I was not aware. And he includes a comprehensive exposé of the so-called 'sceptics', along with a well-deserved defence of the IPCC. *The Weather Makers* is a comprehensive, accessible, and — apart from a few minor glitches — a well-balanced account of the greenhouse effect, its impacts, and what can be done to mitigate it. I do not know of any better book on this topic for the non-specialist. The only publications that come close are Mark Maslin's *Global Warming. A Very Short Introduction* (Oxford, 2005), which does not discuss impacts in depth, and *The Climate of Man*, a three-part article by Elizabeth Kolbert in *The New Yorker* in April–May 2005. Anyone who wants to understand climate change could do no better than to read Flannery, Maslin and Kolbert ... and then, perhaps, move on to the 'dull as dishwater' IPCC assessments.

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