

## Reviews

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**Iain McCalman:** *Darwin's Armada: How Four Voyagers to Australasia Won the Battle for Evolution and Changed the World.* Viking (Penguin): Camberwell, Vic., 2009. 429 pp., illus. (colour), ISBN: 978067007 1586 (HB), \$49.95.

**Tom Frame:** *Evolution in the Antipodes: Charles Darwin and Australia.* UNSW Press: Sydney, 2009. 368 pp., ISBN: 9781921410765 (PB), \$39.95.

As I write this review the great Darwin bicentenary edges closer to its finale; the flood of books has begun to subside, newspaper items have all but ceased and television documentaries have passed from our screens. Not that the Darwin industry has ceased or requires any kind of stimulus package; all the time that 'intelligent designers', 'new atheists' and Darwin scholars generally can find something that has not been said about the squire of Down. His theory then, to paraphrase, will be with us always.

What can be said that will still raise the Darwinian eyebrow? What is left to rake over? After all we have had books covering everything from orchids to barnacles, coral reefs to religion (at least two on the latter), two books on Darwin's own illness, one detailing his daughter Annie's early death, a book on the garden at Down House and perhaps most curiously of all, a reproduction of Emma Darwin's recipe book. Not all of these have come out this year but between them they constitute a formidable

corpus of sources detailing the work and private life of perhaps the most intriguing figure in the history of science. When one adds to this list the online availability of all the published, and most of the unpublished material at Cambridge and elsewhere, the picture is simply staggering. What about all those biographies? I counted 57 on my shelf and they are only the ones in English! (Most are brief and only three are worth reading but still, the point remains.)

What about the rest of the Darwin gang—disciples, advocates or (depending on your point of view), plotters and henchman—the Huxleys, Hookers, Wallaces and Lyells? Though less well documented they are hardly absent, as my own bookshelf attests: 14 biographies of Huxley, 12 for Wallace, though only 1 for Hooker and 2 for Lyell, ignoring the early double and triple decker '*Life and Letters*' collections so beloved of Victorians (and so misleadingly mutilated and irritating to scholars since).

One growth area in Darwin studies has been research into the diffusion of Darwinism from its centre in Europe to the far-flung corners of the globe, particularly Darwin's own ports of call on the Beagle voyage. Australia sits squarely in this category—despite the fact that Darwin was here but a few weeks at the end of a long voyage and, let's face it, hated the place. There have been a number of books detailing his time here beginning with Jock Marshall's in the 1960s through to the works of Patrick

Armstrong, and Frank and Jan Nicholas in the 1980s, with a bicentenary reprint this year (reviewed in this issue). There have been a number of studies of the impact of evolutionary theory in Australia from the time of the first publication of the *Origin*, including Ann Mozley Moyal's pioneering *Scientists in Nineteenth Century Australia* (1976), Colin Finney's well-illustrated histories of natural history in Australia (1984, 1993), and my own contributions, notably in this journal (*HRAS* 8(1), 1989, pp. 1–14) and in the edited collection *Disseminating Darwinism* (Numbers and Stenhouse, eds, 1999).

This long introduction is designed to provide a scholarly context for the two volumes under review, and to raise a few key questions. For whom are they written? Nearly 30 years ago, one reviewer of David Oldroyd's *Darwinian Impacts* (1980) commented that it was 'not for the jaded Darwinian palate'. Neither are these two books. But like Oldroyd's book, they both have something to say to a new audience, curious to find out what some of the fuss is about.

Iain McCalman's volume is a study of the impact of sea voyages to Australasia by four of the chief protagonists in the early Darwinian debates. Each of the four figures under scrutiny made important contributions to evolutionary theory and its defence in the exciting years of intellectual change that characterized the late Victorian period in Britain. Darwin of course is both catalyst and king. He described the Beagle voyage as 'the most important event of my life'. It was while he lay on Australian soil that he pondered whether the curiosities of ant-lions and platypuses suggested two creators rather than one. He famously hated Australian materialism and had a sneaking regard for the Indigenous peoples of the country. Which parts of the voyage most affected his later transmutational ideas? Australia has never been at the forefront of scholars' minds, coming a poor fourth at

best behind the Galapagos, South America and Tierra del Fuego.

McCalman does not really attempt to change this and perhaps the evidence is not there. (As one who desperately tried to show it was some 20 years ago, I write those words with some sadness.) McCalman comes the closest to making such a claim for priority when he notes that while pondering the relationship between the European and indigenous populations in Australia Darwin was 'clearly laying down the elements of his future theory of the survival of the fittest' (p. 72). Really? Isn't this reading history backwards? Then we are told that Darwin, when contemplating the ant-lion, was 'gently deconstructing the logic of creation theory' (p. 75). What grounds are there for this statement when the original is simply written musing?

McCalman's other three voyagers are far less well known than Darwin, Hooker especially so. Thomas Henry Huxley spent the longest period in Australia (more than a year in total) and while here, he found a wife, narrowly avoided being murdered by Aborigines and laid down the basis for his future career as an outstanding scientist and spokesman for both science in general and Darwinism through his work on small oceanic creatures. Joseph Hooker, second in a dynasty of botanists, achieved international fame for his work on global floras and his astute and able manipulation of Kew Gardens as a Latourian 'centre of calculation'. He was also Darwin's best friend and one of his most eloquent supporters and this is brought to life for a popular audience by McCalman. In Tasmania, Hooker made contact with local botanists, including Ronald Gunn, with whom he continued to work collaboratively for many years.

The fourth voyager, Alfred Russel Wallace was the ongoing enigma. Co-founder of the theory of natural selection, professional collector of natural history specimens in both South America and 'the Malay Archipelago' (now Indonesia and

Malaysia), Wallace was the only one of the four to have no training in medicine or natural history. Indeed he had virtually no training at all in anything but surveying. Wallace was never part of the inner scientific sanctum. Driven by an urge to find the ultimate secrets of life, he had the good luck to find them and the bad luck to be the second to do so. His contribution to zoogeography and the formation of the Wallace Line are his greatest gift to Australian scientific thinking. At the end of the 19th century, he arguably provided a greater boost to scientific research in Australia than even Darwin's theories.

In these four, a great deal of scientific and even cultural change is encapsulated; these men helped frame the boundaries of Darwinism and revolutionized science. The danger in concentrating on them is of course that the lesser figures in the debate, the carriers of water and hewers of wood are lost in the background. Still, Iain McCalman has done an impressive job of making accessible to a wider popular audience some of the dramatic events that shaped the lives of four significant voyagers to Australasia.

Tom Frame's book is very much a personal memoir; it ranges widely and despite the title it covers a great deal of ground that has little or nothing to do directly with Australia. Frame admits this and gives a perfectly good reason that context and background are crucial. Perhaps not quite so much Darwinian biography was really needed though...

Overall this is a well-written and informative volume for those outside of professional history of science, but it is frustrating in that it attempts to do too much. Certainly Frame gives us some material on the historical response to Darwin in Australia but this remains rather undeveloped. Too much time is spent on Darwin and Darwinism in Britain, and too little on the subject of the title. There are occasionally lapses that make one groan, especially as Frame has a good sense of historical nuance elsewhere.

'English Society was thrown into turmoil on 24th November 1859' (p. 76), he writes. Now come on Tom, are you pulling our leg? The first publication of the *Origin* caused a stir (both positive and negative) among those few who read it in 1859, but it took a further 2 years to crank up a contrived Darwinian controversy at Oxford. In the meantime that other 'notorious' book, the theologically suspect *Essays and Reviews* published in 1860 had caused rather more excitement (though again, hardly social turmoil).

Frame attempts to rewrite some Darwinian scholarship by trying to show how much Anglican social background and personal experience of Anglican theology influenced Darwin and how this kept him from the jaws of the atheists. I remained unconvinced. Certainly Darwin came under the influence of Anglicanism both socially and academically, but his Anglican heroes were Adam Sedgwick the geologist and John Henslow the botanist, both clergymen and both rather unorthodox when it came to basic Biblical ideas of Creation; neither subscribed to a literal interpretation of Genesis. Darwin stated in his autobiography that while on board the *Beagle* he firmly believed in the account of creation given in Genesis, but his recollections written over 40 years later are surely unreliable, for at the same time he was reading Charles Lyell's distinctly non-Biblical geology. Certainly he claimed that he read Paley on design with pleasure while at Cambridge, and that his favourite read on the *Beagle* was Milton's *Paradise Lost*. After all, he was about to become (supposedly) an Anglican clergyman and he desperately needed to make up lost theological time. Pardon my cynicism.

There is a good deal more I could add on this claim regarding Darwin's orthodoxy during his time on the *Beagle* but perhaps it is better to move on to the Australian scene. And here Frame's general reader will find some new history, albeit brief. The contemporary response to Darwin in Australia

accounts for a mere 34 pages out of a total of over 300. Here we learn of the rows over gorillas, of the travails of the enthusiastic Darwinian Gerard Krefft, curator of the Australian Museum in Sydney who fell foul of the anti-Darwinian Trustees. We see the religious disputes between those who are sympathetic to Darwin and those, like the Anglican Bishop of Melbourne, Charles Perry, who spoke loud and publicly against it. Judges, surveyors, amateur and professional botanists joined the fray, along with University professors like George Britton Halford (against) and William Edward Hearn (for). Frederick McCoy, founder and long-time head of the National Museum in Melbourne used his position to thunder against transmutation, going so far as to arrange exhibits in order to demonstrate the falsity of Darwinian doctrines. All good fun but underneath it all a serious set of issues were at play: who were to be the arbiters of knowledge? Who controls knowledge in a new colony? What are the effects of Darwinian thinking on traditional religion? Frame addresses these questions particularly well.

Later chapters deal with the impact of creationism in Australia and general discussion of the new creationism, Intelligent Design. Here I take issue with the author for his neutrality, a curious charge to make but a valid one in this instance. Frame's passionate defence of the possibility of reconciling Darwinism and Christianity is perfectly acceptable, but this does not demand a 'hands off' approach to creationism. Being fair to all sides is at times not enough. Let me give one example—not important in itself perhaps but one that details a long myth, which has given succour to creationists for nearly a century; the great Darwinian death bed conversion, won by the appropriately named Lady Hope. It is a myth, in the worst sense of that term; it has been shown convincingly to be so, by a number of scholars, most trenchantly by Jim Moore in his short book on the subject *The Darwin Legend*

(1994). Yet Frame retells the story with no indication of this, leaving the reader with the impression that it is plausible that Darwin returned to Christianity literally on the death knock. It isn't, and a mass of evidence says so.

I began this review with a discussion of the wider context of Darwinian studies and where these books fit into that context. In summary I would say that both make for an enjoyable read; that most readers will learn much about the so-called Darwinian Revolution and its aftermath, and that both books will tempt the reader to delve further into a subject that continues to fascinate and enthrall, threaten and delight. So be it.

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*Note:* Darwin's *Armada* was shortlisted for the *Age Book of the Year* and *Victorian Premier's Literary Awards for Non-Fiction in 2009*, and for the *2009 Queensland Premier's Literary Awards for a Science Writer and for a History Book*.

**F. W. Nicholas and J. M. Nicholas:**

*Charles Darwin in Australia:*

*Anniversary Edition* (2nd edn).

Cambridge University Press:

Melbourne, 2008. xix + 260 pp., illus.,

ISBN: 13-9780521728676 (HB), \$49.95.

In February 2009, the National Museum of Australia hosted a Darwin symposium day at which Frank Nicholas—one of the authors of this volume—gave a splendid talk, taking his audience at rattling pace through Darwin's travels in Australia. His illustrations were the 'before and after' pictures that form a part of this book. I was in the audience for his talk, and therefore opened this book with a feeling of pleasant anticipation.

Are you sick of Darwin yet? (I'm not.) By December 2009 we will have reached the end of a year in which two big Darwin anniversaries have been much celebrated: the 200th anniversary of his birth on 12 February 1809, and the 150th anniversary

of the publication of *On the origin of species by means of natural selection*, in November 1859. Isn't it good that so many people have commemorated this thinker, natural historian and writer who so greatly influenced our own thinking?

This book, re-issued specifically for the 2009 anniversaries, first appeared in 1989. The authors list relevant main works published in the 20 years since the 1st edition, but these necessitated only minor changes to the text. Its greater length (260 pages, compared with 175 in the 1989 edition) is mostly a result of larger type and the increased size of some illustrations. It is easier to read and the pages look better to the modern eye. The new foreword by James Moore claims that the edition is 'new and improved'. The improvements are largely in layout—the original was a well-written piece of scholarship, the re-publication remains one. What is not immediately obvious from the book's layout is that it contains the whole of Darwin's 1836 diary of his visit to Australia.

Darwin was aboard HMS *Beagle* as companion to Captain Robert FitzRoy who wanted, as he explained, 'some well-educated and scientific person' (p. 8) on his circumnavigation. This second voyage of the *Beagle* was for hydrographic and geological surveys, and the visit to Australian ports in part came from the need to check the vessel's chronometers. The *Beagle* arrived in Sydney in January 1836 from New Zealand's Bay of Islands. It went to Hobart in early February and King George Sound (Albany) in Western Australia in March, before continuing westward to England and home.

In *Charles Darwin in Australia*, subtitled on the title page 'with illustrations and additional commentary from other members of the *Beagle*'s company including Conrad Martens, Augustus Earle, Captain FitzRoy, Philip Gidley King and Syms Covington', the authors aim 'to present the story of Charles Darwin's visit to Australia, and to show how that story provides new

perspectives not only on Darwin and the colony, but also on Martens, Earle, Covington, and the substantial number of other people who ...were involved with his visit' (p. xv). They do so by using Darwin's diaries, field notebooks, correspondence and published works. In addition to drawing on other transcriptions, the Nicholases have made their own transcriptions of the Australian parts of his diaries and notebooks. Paintings and drawings are reproduced from the work of Augustus Earle, Conrad Martens and John Gould (and Gould's 'stable' of painters)—'Darwin's cameramen', as the authors call them.

When books are written for a general audience, as this is, details must always be simplified, a cost that is worth the larger gain in this case. The background information is extremely useful. For example, we learn that the *Beagle*'s second voyage under Captain FitzRoy carried a remarkable 22 chronometers. To interpret this, the authors have given a potted history of the determination of longitude using chronometers. Because the determination of correct longitude was part of the reason for the *Beagle*'s visit to Australia, it was therefore also responsible for Darwin's visit.

Sometimes I am reminded that my profession, the writing of historical dictionaries, has much to offer other fields of enquiry. The authors note (p. 123) that Darwin was mistaken when he described cliffs at the mouth of the Derwent River as 'basalt' rather than the related 'dolerite'. But though Charles Lyell in his *Principles of Geology* (p. 154) wrote that greenstone or dolerite is 'usually defined as a granular rock ...', the term 'dolerite' was very new in English in the 1830s. Lyell might have been the first to use the word dolerite in print in English in his three-volume *Principles of Geology* (1830–33); certainly this is what the Oxford English Dictionary suggests in its entry for dolerite (even though it used in a later 1838 edition of Lyell's work). Darwin's failure to use the name in 1836 can be explained

simply by the lack of currency at the time of writing of the word *dolerite*, rather than necessarily a mistake (and of course the two rocks are closely related anyway).

Darwin was in fact pretty up-to-date in his use of geological terminology. He wrote his notebooks and published his 1839 *Journal of Researches into the Geology and Natural History of the Various Countries Visited by HMS Beagle* at a time when the geological timescale was still settling into shape. In the *Journal*, for example (quoted on p. 131), he referred to the geological period the Silurian, whose first established use in print by Roderick Murchison and Adam Sedgwick had been only a few years before, in 1835.

It is difficult to know what Darwin's main impressions of Australia were. More than four years had passed since leaving England. He never repeated anything like this too-protracted voyage. He saw Australia both as 'a rancorously divided community' (p. 104) and a 'new Continent ... a wonderful place' (p. 114). After reading this book I am left with the belief, perhaps wrong, that his naturalist's sensibility was too jaded by then for any deeply enthusiastic response to be possible.

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**L. Ross Humphreys:** *Crawford Munro:*

*A Vision for Australia's Water.*

Engineers Media: Crows Nest, 2009.

xiv + 174 pp., illus. (B&W),

ISBN: 9780858259522 (PB), \$45.45.

Crawford Munro (1904–1976) began his career designing and maintaining local sewerage systems. He ended his career as foundation Professor of Civil Engineering at the University of New South Wales, and is lauded in this book as the 'father of the discipline of hydrology in Australia' (p. xi). Munro's life charts the rise of technical arts and education, from its origins

in trade schools, to the suite of university-based disciplinary fields that were at the heart of technological transformation in the twentieth century.

Munro worked in the era of large state-driven dam construction projects, but he was only incidentally concerned with how to build dams. Rather, he pushed for widespread collection of hydrological data and for research and education on hydrological processes. For Munro, sound decision-making for water management could only be achieved through a comprehensive understanding of how water functions in the Australian environment. Surface run-off, evaporation, infiltration, precipitation and stream flow were his obsessions.

How does one come to found a discipline for the nation? Reading this biography I had the impression that in this case it came down to the quirks of personality. Munro, a six foot tall, solidly built rugby player, was loud, brash and impulsive. He kept a red swimming costume in the boot of his car in case he felt a need to go to the beach while working in Sydney, he crammed books and papers into an old tennis racket sleeve in lieu of a briefcase, he conducted job interviews for the University of New South Wales over beers at the local pub, and while working on flood mitigation at Launceston he wore gumboots even when dressed in a suit because 'Tasmanians were more accepting of strangers if they wore gumboots' (p. xi).

The author of this biography, L. Ross Humphreys, includes these details of eccentricity throughout the book for a greater purpose than simply 'colour'. They help explain how Munro worked. He didn't have the patience to be tied down on a series of long-term in-depth studies, nor could he limit himself to specialized methods of investigation and their associated technologies. Indeed, Munro's academic record was a relatively poor one. He held a pass degree in engineering and had a 'meagre' publishing record (p. 91). He was not, however, without ambition or enthusiasm. His

obsession with all aspects of hydrology made him a strong advocate for engineering as a discipline, and for encouraging greater research into Australian water. Munro's achievement was to bring together the specialists who could do the work in which he was interested—he was one of the great facilitators in academia.

Munro was born in Toowoomba to an estranged and recently impoverished line of an aristocratic family. He won a place at the Sydney Technical High School in 1917 and wrote a piece on the physics of surf for the school magazine. He scraped through university at Sydney, not allowing 'academic work to interfere with his social and sporting obligations' (p. 9). He worked in sanitation for ten years, first at Wellington in central western New South Wales and then for the Metropolitan Water, Sewerage and Drainage Board in Sydney. Humphreys gives thorough details of technical work and some of Munro's innovations over this period. In 1936 Munro began teaching at his old school, Sydney Technical College. During the Second World War Munro was involved in the production of the Australian Cruiser Tank and he ignored labour restrictions on engineering instructors, joining the British Army in Burma at the end of the war. The tank never saw combat, and neither did Munro, but it gave him organizational and coordination experience. It was this experience, as well as his passion for teaching, that assisted in his selection as foundation Professor of Civil Engineering at the recently established University of New South Wales.

In 1955 a symposium at the University of New South Wales launched the Water Research Foundation of Australia. The symposium's title is indicative of the national agenda for water at that time, 'The Water Resources of Australia—Their Control and Development'. Munro gave the keynote address and remained the Foundation's Honorary Director of Research until his death in 1976. He established the Manly Vale Water Research Laboratory in 1959. At

the laboratory he built a physical model of Launceston to gain a better understanding of water behaviour in that drainage system and produced a cheap and pragmatic flood mitigation solution.

Munro was a keen advocate for irrigation in Australia and publicly campaigned for development of the Fitzroy and Burdekin Rivers. He gave overlarge estimates of the land that could be irrigated, which Humphreys admits were 'brave' (p. 114). In 1974 Munro published *Australian Water Resources and Their Development*, a textbook for a general audience, in which he criticized Bruce Davidson's economic assessments of irrigation schemes. Munro argued Australia's high per capita storage capacity was a natural consequence of the need to deal with variable rainfall. He claimed there were errors in Davidson's figures, and he argued Davidson used flawed comparisons between wheat and irrigation districts in analyses of irrigation's contribution to decentralization. Munro contrasted Davidson's studies with his own cost-benefit studies of Keepit and Burrendong Dams.

Humphreys writes that of the mostly small-scale research projects Munro worked on, his most 'serious' research contributions were the economic studies of Keepit Dam on the Namoi River, and Burrendong Dam on the Macquarie River (p. 102). Here I must raise an issue I found distracting. Throughout the book Humphreys states that Munro had prophetic visions for water management in Australia. Humphreys is at such pains to protect Munro from a current readership that might lump Munro with all the other 'progressives' in a negative appraisal of the 'development' era of water engineering that he ends up making too much of Munro's apparent environmental concerns. Humphreys uses the 1971 study of Burrendong Dam as evidence that Munro showed great prescience in environmental matters because the study factored in an allowance of water for the Macquarie

Marshes wetlands. Yet New South Wales government water, land and agricultural departments had included ‘wildlife’ allocations long before Munro was involved—indeed, since the earliest stages of the dam’s construction in the 1940s. Munro was following, not setting precedent. There is no doubt that Munro had a vision for water akin to ‘sustainable development’, but often the environmental concern in his work is overstated by Humphreys. This is a result, I think, of an author too wary that his subject will be judged by today’s attitudes and values.

In the final chapter Humphreys breaks with the biographical narrative. As readers we have to jump from the 1970s to an overview of the present situation of water management in Australia. Humphreys provides a summary of the National Water Initiative and various water bureaucracies, and then offers a different solution to water management problems. He states the current agenda has been hijacked by ‘environmental determinism’ and suggests an alternative approach called ‘Social Learning for the Integrated Management and Sustainable Use of Water at Catchment Scale’ (p. 160). This sounds interesting but it would have been better if it had been developed further in a standalone essay, or perhaps interspersed throughout the biography with more evidence and persuasion. As it stands, it is an awkward way to end the book. I can feel myself being lured into a debate but the concluding chapter is not the place for it.

This is L. Ross Humphreys’ sixth biography of an Australian scientist and for the most part he handles the genre well. He uses an extensive and eclectic range of sources, and personal details are integrated with wider context skilfully and efficiently. In his introduction Humphreys comments, ‘to write of Munro is really to write the history of Australian water management over the middle decades of the twentieth century’ (p. xiii). However, I felt the more continuous narrative throughout the book was the

rise in status of technical education, and a good number of pages are given over to the politics of establishing a new academic institution. For readers interested in post-war water development this book puts a face to technical expertise and authority. Munro was an unconventional and endearing character who played a significant role in shaping Australian water management. This book serves as recognition of his strong advocacy for hydrology as a discipline. It will appeal to anyone interested in the expansion of disciplinary knowledge of water as a resource in Australia.

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**William E. Davis, Harry E. Recher,  
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**Jackson (eds):** *Contributions to the History of Australasian Ornithology*. Memoirs of the Nuttall Ornithological Club, No. 14. The Nuttall Ornithological Club: Cambridge, MA, 2008. 480 pp., ISBN: 1-877973-43-2, \$50.

The prestigious Nuttall Ornithological Club, based at Harvard University, was founded in 1873. It says much for the sophistication of Australasian ornithology that this, the fourteenth memoir published by the Club since its first in 1886 (*Bird Migration* by William Brewster), celebrates its long history and considerable achievements. Thus far, it is the only Nuttall volume to deal with ornithology beyond the western hemisphere, previous publications all concentrating on North America, with Cuba being the furthest afield.

The gestation of this volume on Australasian ornithology has been a long one. As the four editors, all familiar with Australian ornithology, explain in the Preface, a symposium on the history of North American ornithology held in 1991 resulted in two Nuttall memoirs (1995 and 2000) and these sparked a comment by Walter Boles of the Australian Museum in Sydney

that a similar exercise for Australia would be extremely useful. In fact, he said, 'it would fit nicely on the shelf next to *The Flight of the Emu*' (p. v) and it is greatly to the credit of the authors that it does. Libby Robin's *The Flight of the Emu: A Hundred Years of Australian Ornithology, 1901–2001* (Melbourne University Press: Carlton, 2001) focused on the social history of Australian birding through the records of the (Royal) Australasian Ornithological Union more than on developments in museums and other research-based bodies. The present volume, however, matches it by detailing scientific ornithology in formal Australasian institutions, including one contribution on New Zealand, and provides information on collecting and surveying expeditions into Papua and New Guinea. Together, the two books present a rounded history of Australians and the study and appreciation of their birds.

A caveat in the preface warns that the majority of the seven chapters of this book have been written by 'people who participated in making the history they write about' (p. v). The editors do not see this as a problem, rather as a benefit, because 'insiders have the advantage of personal experience, an intimate knowledge of their subject matter, and access to rich anecdotal material' (pp. v–vi). To some extent, this personal involvement tends to favour description and listing more than interpretation or analysis, but all the contributions are very rich accounts, and all—even those that present a very personal story (such as that by Richard Schodde)—are balanced and explanatory, not score-settling or polemical.

The book is generally arranged chronologically. Only one chapter is not strictly Australian: 'Ornithology at the Auckland Museum, New Zealand', by B. J. Gill, its Curator of Land Vertebrates since 1982. Gill's account provides a narrative of the museum from its foundation in 1852 and describes its transmutations into a national natural history and ethnographic

museum with substantial ornithological collections.

The six chapters that relate to Australia are more extended and cover considerably larger areas of ornithological research. Chapter 1, by Clemency Fisher (of the National Museums in Liverpool), is a biography of John Gould's collector, John Gilbert, and a reassessment of his scientific contribution. As Fisher explains, Gilbert spent the period between 1838 and 1845 amassing a collection of thousands of birds that formed the basis of much of the early knowledge of the wealth and importance of the avifauna of Australia. Great strengths of Fisher's work are its very detailed 233 explanatory footnotes, themselves a work of great scholarship and brimful of important information and her meticulous explanations of Gilbert's collecting localities and the subsequent fates of the skins, collections and documents relating to this period.

Analogous to the chapter on New Zealand's museum is that by R. E. Johnstone on the Western Australian Museum. It presents a general overview of the difficulties and changes in organizational structures in addition to collecting and curating philosophies in a museum environment. There are two chapters about CSIRO, 'The role of the Commonwealth Scientific and Industrial Organization in Australian Ornithology' by Ian Rowley and 'Establishing a national reference collection of birds: The first forty years of the birds of the Australian National Wildlife Collection' by Richard Schodde. Together these two contributions summarize the critical role that CSIRO has played in creating policy around scientific research into Australian wildlife and environment that has played out rather unevenly for ornithology, at times to its benefit, at other times to its detriment. A major change that occurred in the case of ornithology relates to the shift from collection and species description to ecology and then into the active promotion of sustainable agriculture and land use. Together with

the truly excellent section on 'The changing faces of systematic and biogeography in Australian ornithology: A young Turk's view' by Leo Joseph, these three chapters are fascinating for the insights they give into the impact that changing government priorities and institutional reorganizations can have on a scientific discipline.

The final piece, 'The history of threatened birds in Australia and its offshore islands', by Stephen Garnett and Gabriel Crowley, is a survey of the subject of rarity and extinction from pre-human times and will be very useful for all who are concerned about the loss of biodiversity in Australia that has occurred over past centuries.

Although this volume is a collection of essays on discrete topics it gels into a coherent and readable history of ornithology 'Down Under' and is highly recommended to anyone with an interest in the avifauna of the region.

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**Libby Robin, Robert Heinsohn and Leo Joseph (eds):** *Boom & Bust: Bird Stories for a Dry Country*. CSIRO Publishing: Collingwood, Vic., 2009. 312 pp., illus., ISBN: 9780643096066 (HB), \$39.95.

*Boom & Bust* is a delightful set of ten natural history essays about birds written by ten different authors with varying backgrounds. The stories present an informed picture of contemporary Australian avifauna (with two exceptions on extinct birds) that is accessible to the general reader and engaging to read. Historical vignettes are included in many of the essays, and they add to the overall interest of the volume. Readers of the *Historical Records of Australian Science*, however, will find little to add to the history of pure or applied science in Australia. The chapters of *Boom & Bust* focus on individual species, and although some provide sketches of recent

scientific research on various birds, the volume does not raise or investigate any historical questions or issues. The 'boom and bust' theme that provides a unifying thread for the book serves to direct most of the essays to discuss aspects of avian life in the challenging environments of Australia and especially how successful species have adapted to arid conditions. The interdisciplinary set of authors also discuss some Aboriginal knowledge of birds, and consider what additional stress global climate change might add to the environmental obstacles avian life has to confront. Illustrations from John Gould's *The Birds of Australia* enhance the appearance of this attractive volume.

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*Note:* In September 2009, *Boom & Bust* was awarded the Whitley Medal by the Royal Zoological Society of New South Wales for 'a landmark contribution to the understanding, content or dissemination of zoological knowledge'.

**Rosemary Fleay-Thomson:** *Animals First: The Story of Pioneer Australian Conservationist and Zoologist Dr David Fleay*. Petarus Publishing: Nerang, 2007. 338 pp., illus. (B&W), ISBN: 9780980422801338, \$55 (available from dewrang@hotmail.net.au).

David Fleay, author, naturalist, zoo keeper, bushman and passionate advocate for the preservation of Australian animals, is well known to zoologists and historians of Australian science, but surprisingly little has been written about him. This volume, written by his daughter Rosemary Fleay-Thomson, includes the author's recollections of their family life, and paints the portrait of a remarkable father and his extensive work with animals, a portrait enhanced by extracts from Fleay's own writings and diaries.

The book begins with Fleay's childhood and gives a vivid insight into how his life-long interest in animals began. The story of the rescue and successful rehabilitation of a sick Powerful Owl from the Ballarat Zoological Garden attests to his innate skill and feeling for animal care and welfare from a young age. He set up his own little zoo in the back garden of his home and faithfully recorded details on all the animals, along with observations on behaviour. At this time Fleay began writing for his local newspaper. Writing popular accounts of native flora and fauna, lecturing and speaking on radio became occupations that he continued into adulthood and throughout his life. He was always a passionate advocate for the preservation of native fauna. Unlike many, he did not confine himself to enigmatic species such as the thylacine, birds of prey and the platypus (although he did write about these), but included a wide range of animals such as water rats, quolls, snakes, sugar gliders and native mice to name a few.

Particularly fascinating are the descriptions of the methods used by Fleay to capture and keep his animals. Field biology and zoo practices have changed dramatically in recent years. During Fleay's time, collecting was allowed with a permit (and Fleay always obtained permits), but he was also concerned about the ethics of his interactions with animals. In this regard, Fleay was a man before his time. Today's constraints were not in place during this time; however, the author constantly reminds us that Fleay was always concerned about animal welfare and was a vocal critic of those who did not consider such things.

When a request came from the Tasmanian Government for Fleay to provide lyrebirds to Tasmania, he had very mixed feelings about the ethics of establishing a species in a state where they did not occur naturally. He was well aware that problems could result from such a relocation, but felt it was necessary to save the mainland species from the introduced fox. The birds

were released into the Tasmanian bush, and thrived in their new fox-free environment. We now know that Fleay was right; lyrebirds in Tasmania have proven to be detrimental to several plant and invertebrate species in the forests.

The photographs in the book are a rich resource. From images of the animals that Fleay kept as a young man to the crowds gathered to view the platypus enclosure at New York Zoo. They are a browser's delight.

Every biography needs to include detail on the subject's family life to put their later achievements in context. The author has included long transcripts of many of the hundreds of letters and diary entries, at times taking up an entire page. Sometimes these letters are more to do with family issues rather than Fleay's work with animals. Although they provide a framework, the book might have made more interesting reading with tighter editing of these passages.

This book is a remarkable study of a remarkable man. It is, however, written only from a family perspective. No doubt Fleay made some mistakes, but this book does not seek them out. The author simply refutes recent questioning or criticism of anything that Fleay said or did; there is no critical analysis. It is as if the man could do no wrong—but we all know that could never be the case. In saying that, after reading this volume, I am full of admiration for Fleay.

Despite the book's limitations, it tells us a lot more about David Fleay than was known before. As the title suggests, he was a pioneer in many fields. He was instrumental in establishing native animal sections in zoos in Australia and his field trips to remote places to collect animals, described in great detail, revealed innovative approaches to field biology. Throughout his long career he was a most vocal advocate for the dissemination of knowledge on the Australian fauna, did much to generate public interest in fauna matters and was a leader in introducing much needed advances to

zoo-keeping practices in Australia. The full list of his publications, lectures, special projects and expeditions is included in the back of the book, and these are impressive achievements.

Fleay achieved an enormous amount in the days when the words ‘conservation’ and ‘preservation’ were little regarded by governments. Without his work, Australian animals would be in a far worse state that they are now.

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**Ted Lefroy, Kay Bailey, Greg Unwin and Tony Norton (eds): *Biodiversity: Integrating Conservation and Production: Case Studies from Australian Farms, Forests and Fisheries*. CSIRO Publishing: Melbourne, 2008. 272 pp., ISBN: 9780643094581, \$89.95.**

There are seventeen case studies in this collection, selected with care and flanked by four introductory essays and two in conclusion. Read together there is a pleasing unity about the selection that transcends the more usual conference proceedings and yet retains the spirit and enthusiasm of its 2007 conference origins. The question around which all authors dance is, as the title suggests, how to create a productive landscape less compromised environmentally than is so often the case now.

But do not expect the answers to this question, so charged with the Landcare ethos, to read like a technical manual from natural resource management. These diverse contributions are, some more than others, intent on earnest dialogue across the different languages of farmer, academic, advocate and management professional. In this collection we have, for example, sense of place, harmony, emotion, nature and culture mixing with ecosystem processes, agricultural enterprises, human species and habitat. Different concepts of environmental change breach the language

divide. For some it is people’s altered perception of their environment that is critical in the analysis of conservation behaviour. Academic Pete Hay, for example, and farmers Graham Strong, Cynthia and Tom Dunbabin, advocate Severn Cullis-Suzuki and agrarian consultant Cam Nicholson are more in this camp. For some others, the majority in fact, the starting point is the environment as a changing but fixed biophysical entity around which people orbit.

In pursuit of a more blended landscape we travel to multiple farms, several with forestry components, across southern Australia, to floodplains in northern Australia, to the upper Murray–Darling Basin in Queensland and to barramundi fisheries and prawn trawling in tropical waters. The proportion of case studies from farms, forests and fisheries reflects the papers presented at the conference. Only two are from fisheries, with none at all authored by fishers to parallel the powerful ‘personal case studies’ section from farmers. This in itself becomes an interesting statement about the low conservation status of our oceans relative to land, and of the relatively untapped potential of those directly involved in the industry.

In the concluding chapter Ted Lefroy articulates the ambiguities of biodiversity as the basis of a landscape vision and as a policy component to be monitored and measured. Even though ‘biodiversity’ is a moving target in these case studies it does not detract from the worth of the collection. The best papers challenge the discrete boundary implied between ‘biodiversity conservation’ and ‘production’, and invite readers to understand significant shifts in thinking that have prompted on-ground change. These stories of hard won ‘adaptive management’ by individuals, families, agencies and researchers tells us much about what is happening out there in rural Australia.

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**Richard E. MacMillen and Barbara**

**J. MacMillen:** *Meanderings in the Bush: Natural History Explorations in Outback Australia*. CSIRO Publishing: Melbourne, 2009. 208 pp., illus., ISBN: 9780643097063 (PB), \$49.95.

This charming book relates some of the serendipitous stories emerging from four decades of field work in the Australian arid zone (starting in the 1960s), by the American zoologists Richard and Barbara MacMillen. The major author is Richard, who is best known for his physiological work on the adaptations of animals to deserts, Australian, American and in other places. Most of his published papers are based on laboratory studies of captive species, but this book is a timely reminder that laboratory studies have a 'pre-history' of field work, capturing the animals that become central to behavioural and physiological insights.

The second author Barbara's main contribution is an intriguing interlude about the couple's sabbatical with their family on Dangar Island, in the Hawkesbury River near Sydney in 1985. During this sabbatical, their son Ian was born, and he proves to be a keen naturalist, important to field work in subsequent visits. It is clear that the couple have worked closely together in much of the field work, and so although the stories are told with Richard's voice, from the 1970s, Barbara's contribution has also been significant.

These 'meanderings'—reflective writings, written for a non-technical audience—are important to the history of arid zone zoology in Australia, not least because many of the animals the MacMillens collected had been little studied before. Partly, this is because arid zone animals are cryptic and hard to catch. Marsupials, rodents, inland crabs and birds all require different techniques—and the stories include discovering some of these techniques as well as trying to find the animals themselves.

'Plaguing' and disappearing, these animals present challenges and riddles to biologists, perhaps particularly to visiting Americans who only have the span of a sabbatical visit to capture and study the animals in question. The presence or absence of animals in an arid zone landscape is very much related to rain events, and to 'flows' in the Channel Country in Queensland where much of their work is undertaken. Both rains and flows are seasonally unpredictable and extremely variable, and of course can cause havoc with vehicles. We meet Richard as 'Bogger Dick' on his first field trip to this country, seriously bogging the University's vehicle. Many of his other stories are just as humorous and self-deprecating.

Another reason that this book is important in the history of science in this country is that it relates to one place, Sandringham Station, sampled extensively four times in 1966, 1974, 1989 and 1992. Places repeatedly visited are rare, and this is even more the case for places that are privately owned. Unlike the CSIRO research stations, or University research stations like Koonamore or Fowler's Gap, scientists visit a private pastoral property only with the permission of the owners and managers of that time. There is no 'annual report on research' as with dedicated scientific research stations, but the conservation of animals in pastoral landscapes depends entirely on scientific research undertaken alongside stock, not just in idealized landscapes like national parks and reserves. In the Channel Country there are still few reserves (and there were even fewer in the 1960s) so the only way to investigate arid-zone animals in this region is with permission of private landholders. In the case of Sandringham Station, the owner was Kidman Enterprises, a vast corporate body built from the historical purchase of properties by 'Cattle King' Sidney Kidman. The manager of the day must give (or deny) permission to the 'rat catchers' (as Richard records these scientists being called in the Windorah pub in

1974 (p. 33)). The hospitality of Reg and Marj Arthur, the 1960s managers, and Norman (Pee Wee) Clark (rum-drinking champion of Bedourie) and his wife Diane, the 1970s managers of this station, was essential to scientific work. The stories of these local people become intertwined with the MacMillens', when they turn up in later visits as managers of other stations.

This book is a successor in some ways to Francis Ratcliffe's *Flying Fox and Drifting Sand: The Adventures of a Biologist in Australia* (1938, 1947 in Australia). Ratcliffe too depended on the hospitality and goodwill of landholders in the 1920s and 1930s, and his book was one of the first to consider the fate of the indigenous animals in the land-management regime of settler Australians. Like Ratcliffe, the MacMillens were 'foreigners' (this time from the USA, rather than Scotland); this could be both an advantage and a disadvantage in developing such relationships, and at times a source for the humour that abounds in this book. *Meanderings in the Bush* is also a literary successor to A. J. Marshall and Russell Drysdale's *Journey Among Men* (1962). Jock Marshall was a colleague of MacMillen's, and responsible for inviting him to Monash in 1966, though by the time to take up his fellowship, Marshall was 'nearing the wrong end of a bout with cancer' (p. 7).

Richard MacMillen was also following in the footsteps of his great UCLA mentor, George 'Bart' Bartholomew (1919–2006), who pioneered the comparative method in desert studies (and worked in Australia on quokkas in the 1950s and flying foxes in the 1960s). Along with Knut Schmidt-Neilsen (Duke University), Bart encouraged many bright young biologists (both American and Australian) into physiological ecology, something that Terry Dawson (from the University of New South Wales) and MacMillen recalled in the Birdsville pub in 1974, when they sat down together to write them postcards. One of

the intriguing aspects of these meanderings is what they reveal about scientific networks: as MacMillen confesses 'academia is an internationally nepotistic business' (p. 77), yet seldom are these networks revealed, except in joint authorships in papers. In field work stories the links between Tony Lee (Monash), Alan Newsome (CSIRO), Russ Baudinette (Flinders), Steve Morton (then Sydney, later CSIRO) and many others are revealed, many of these field experiences being reinforced by stints by Australians at MacMillen's own University of California, Irvine. Even the generation of Channel Country ecologists who took over after 1992, especially Chris Dickman who has now worked twenty years in this region, is represented, in this case indirectly, through his student Pip Masters who had a major role in the MacMillen family's last trip to Sandringham. Dickman no longer works at Sandringham. The animals MacMillen witnessed there in the 1960s are gone, and the continuity of scientific work with the station was lost when there was a manager who declined to let them work there. 'Rat catching' continues, but the sites have moved further into the desert, especially Ethabuka and Craven's Peak, properties now managed by Bush Heritage Australia (another sort of private owner, that is managing land for conservation rather than production). The studies are more ecological and less physiological, undertaken 'in situ', rather than interpreted later in the laboratory with captive animals.

I don't want to leave the impression that this book is just a scientific travelogue. Travels (and travails) feature in the first six chapters, but the two final chapters are more reflective. The themes of 'desert wildlife' (chapter 7) and 'humans and wildlife together' (chapter 8) provide a surprisingly serious way to finish this 'memoir' and a reminder that this life in science is also a life dedicated to natural history and its conservation. MacMillen's published insights are largely physiological,

the 'travel writing' context has added depth to the ecological dimensions, something that he draws out in these final chapters. These chapters develop ideas based on work well beyond his own laboratory studies.

This is the 'second edition' of this book. The first was privately published in the USA, and not available to the Australian audience it deserved. CSIRO Publishing has encouraged this revised edition, tightened and more clearly targeted to an Australian readership concerned about the future of arid zone wildlife. We in Australia, most of all, need to understand the adaptive features of creatures living with the boom and bust conditions of the Australian inland, and it is important that this book be available to us, and targeted to our readership. In the penultimate chapter, MacMillen summarizes his four decades of thinking about life in the Channel Country, clearly explaining the strategic choices of the animals. For aquatic animals, either they can remain aquatic throughout their lives and move to find watery places when the desert dries up (an *obligatory* strategy, like fish and turtles), or they can stay in the desert and adopt a drought-resistant dormant life stage that can wait for months or years for rain or flows (a *facultative* strategy, like the Inland Crab and frogs). Terrestrial animals vary in their mobility rather than their evolutionary strategy: they can be *nomadic* (birds, bats, kangaroos, flying insects), moving away in resource-poor times, or *sedentary* (invertebrates, snakes, lizards), saving energy and making do with the resources of their environments regardless of climatic variability.

In chapter 6, MacMillen wryly thanks the National Science Foundation for failing to fund his project to look at the effects rainfall and bushfires had on the population energetics of coexisting small marsupials

and rodents at Uluru National Park, a project that he had planned to undertake with his former student Steve Morton, who was then (in 1992) at CSIRO's Centre for Arid Zone Research. As in many of the field stories in this book, serendipity came to the fore. Instead of working hard on peer-reviewed papers in technical journals impressive to the NSF, the idea of a book for a general audience was nurtured by this unfunded sabbatical trip.

This book meanders, indeed, as it promises. But it also packs a punch at the end, because these meanderings together document changes over four decades. They form a sort of meta-longitudinal study that would never see the light of day in a technical journal, but nonetheless has practical and policy implications both desert-wide, and very locally. The detailed understanding of life on Sandringham Station, and local extinctions documented in this period of mulgaras and other animals, is only possible because of the long continuities (and perhaps the discontinuities) in the research. This book is constructed from the work of the extended networks of rat catchers and other scientists since the 1950s. The rise in feral cats and foxes that the MacMillens observe there in 1992 was a comparison with previous visits (and the rise continued into postscript years in other Australian desert country explored in 2002). Feral animals are a major concern, but they also suggest immediate and practical action plans. Occasional visitors, where they are fine observers like the MacMillens, can offer gentle policy advice along with readable autobiographical reminiscence.

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