

Book Review Section

Compiled by John Jenkin*

Farley Kelly (ed.), *On the Edge of Discovery: Australian Women in Science*. Melbourne: Text Publishing Co., 1993. xii + 348 pp., illus., \$16.95 pb.

Julie Marcus (ed.), *First in Their Field: Women and Australian Anthropology*. Melbourne: Melbourne University Press, 1993. xvi + 189 pp., illus., \$24.95 pb.

Both of these well-illustrated and generally well-documented collections of essays express a spirit of indignation as well as an intense respect for pioneers that characterizes studies of women in science in the late twentieth century. Each book provides a significant commentary on contemporary affairs as it recounts the lives of women who have worked in science over the past century and more. The contributors bring a range of backgrounds and experiences that show in the organization of the essays, their use of sources and even their length, and they share an investigative intensity that strengthens their collective endeavour. In both there are stories of hardship, inspiration and gritty persistence, told from a feminist standpoint.

The volume edited by Julie Marcus and dedicated to Isobel White contains a series of biographical sketches that emerged from a conference of women anthropologists seeking to identify their predecessors. The authors write with evident sympathy and use an array of primary sources in order to contextualize their subjects, professionally and historically. The six women whose lives they document were all able investigators into the life of Aboriginal people. The title *First in their Field* has at least two meanings, indicating that these women were all field anthropologists and that they were pioneers in terms of the discipline and often the particular topics they chose to study.

Whether recalling the now quite visible Daisy Bates or the more obscure Mary Ellen Murray-Prior, the authors stress the intentions and accomplishments of their subjects, as well as the assessment of contemporaries about their work.

Marie de Lepervanche, in her introductory essay, connects the 'professional' experiences of the early women anthropologists, many of them negative, to those of women working in the discipline today. She suggests that often women anthropologists, because of their gendered identification as women, explored aspects of culture that were disdained or misinterpreted by their male colleagues. Indeed, the accounts of the six women in this slim volume make the point that the personal and professional isolation experienced by each of them at some point in their careers was related to their research and recognition in subtle and not so subtle ways.

The first biographical sketch is that of Mary Ellen Murray-Prior, whose personal effort to collect and describe Aboriginal artifacts resulted in a significant, thoroughly documented collection at the Rijksmuseum voor Volkenkunde at Leiden and the Australian Museum in Sydney. Isobel McBryde's well-researched essay reconstructs Murray-Prior's life, the circumstances surrounding her unpublished description of local Aboriginals, and the collections that she made in the upper Richmond River region. Well-acquainted with women intellectuals like Louisa McDonald, first principal of the Women's College at Sydney University, Murray-Prior had multi-faceted interests but failed to pursue her early interest in native people for reasons that are not clear but may relate to the lukewarm reception the relatively wealthy settler received after her donations to the Sydney museum.

The struggling Daisy Bates was far more persistent in her effort to publish her observations and ideas about the Aborigines. Because there are other accounts of Bates, this sketch deals less with primary sources but is candid about the ways in which the journalist and ethnologist embroidered her personal past even as she lived near and carefully observed the native people of Western Australia. Bates, and later Jane Ada Fletcher, wrote for a general audience and felt that they were recording the stories of 'dying races'. For the Queenslander who had moved to Tasmania, the extinction had already occurred, since she like many others in anthropology essentially ignored those people descended from both Tasmanian and white migrants. Miranda Morris is unblink-

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ing in her assessment of the teacher and author of *Little Brown Piccaninnies of Tasmania*, but careful to acknowledge the author's intentions, cultural setting and influence.

The last three women to be studied—Ursula McConnel, Olive Pink and Phyllis Mary Kaberry—were all involved in varying degrees with the growing anthropological establishment in Sydney. Each had to find her own way to deal with the methods and authority of A.R. Radcliffe-Brown or his successor A.P. Elkins, with the problems involved in the study of Aboriginal women, and with the expectation of 'objectivity' in research and writing.

Anne O'Gorman's 'The Snake, the Serpent and the Rainbow: Ursula McConnel and Aboriginal Australians' emphasizes the unique combination of training in psychology and anthropology that McConnel brought to her study of symbol and ritual among Aboriginal women. Criticism of the management of missionary stations and about the treatment of women, as well as differences with the anthropologists in Sydney, forced McConnel out of the academic setting and into semi-retirement. Concern about Aboriginal women also played an important part in Olive Pink's career, particularly in the 1940s. Like several other women anthropologists, Pink had no permanent academic appointment but managed to support her work through Australian National Research Council grants in the 1930s. When she decided to keep her promise of secrecy after witnessing sacred ceremonies and paintings and thus to reject the behaviour of her fellow anthropologists, the 'men of the university totem', her opportunities for funding vanished. Julie Marcus's essay concentrates on Pink's later years when she applied her knowledge and energy as an activist, working to limit the influence and authority of missionaries and to publicize the maltreatment of Aboriginal women in mining communities near Alice Springs. Her ideal 'secular sanctuary' was never achieved, but her advocacy led others to ask more questions about the circumstances of Aboriginal groups and in some cases to change government policies.

The only woman anthropologist to find success within the academy, albeit in England rather than Australia and then after an unusually long apprenticeship, was Phyllis Mary Kaberry. Like Pink, Kaberry determined that the health and morale of Aborigines was not well served by missionary stations, and she saw her role as a trans-

lator of people she knew well and respected. She also was of a younger generation and, being born in America to British parents who subsequently moved to Australia, seemed uniquely peripatetic among her peers. Her published thesis, *Aboriginal Women, Sacred and Profane*, was a pioneering effort to detail daily camp activities and food production. The book also set out and then demolished false stereotypes about these women regarding their sexuality, their role in community decision making and their sense of the sacred. Christine Cheater follows the life of Kaberry as a student at Sydney, to her post-doctoral work with Malinowski at Yale University, to London, and then to study Bamenda women in South Africa. Ultimately Kaberry's achievements led to a position of Reader in Anthropology at the University of London and accolades from her mentors in Australia.

Recounting these stories at a conference must have been deeply moving, and the polished, published accounts retain the capacity to inspire and to warn younger scholars about the circumstances of professional life in anthropology. They provide a particular orientation toward anthropology in Australia—from its inception to the middle of the twentieth century—that, taken with standard accounts of academic progress in the discipline, make the full history more complex, nuanced and ultimately compelling.

The second volume, with a far more eclectic array of essays, is edited by Farley Kelly. She has drawn together journalists, scientists, writers and historians to reflect on women in science, and her title, too, holds a deliberate double meaning. Most historical figures studied here have been on the marginal edge of science, and yet such women and their more recent counterparts, several authors argue, bring to science a new 'edge' in making discoveries. The volume is a celebration of the first woman science graduate of the University of Melbourne, in 1893, and indeed most of the papers connect to that University or the city itself in some way.

The editor introduces the volume by pointing out that 'Women were part of the development of professional science and even more so of its transmission, at all levels of education, from primary school nature study to public examination standard as well as in the hard, necessary, basic slog of demonstrating to large first-year classes at University ...' Sara Maroske recounts the lives of several nineteenth century women working in science, but most of the volume

deals with the twentieth century when, indeed, science careers became more likely in Australia. Although the notes to the introduction are missing from the review copy, Kelly's essay on the careers of the sixty-two women science graduates taking degrees at the University of Melbourne between 1893 and 1920 is documented by careful research in archives and published sources. Private school teaching may have been 'genteel sweated labour', but many women graduates accepted teaching jobs and persevered. Their honors, prizes, exhibitions and graduate degrees indicate the serious intentions of these early science majors, as does the apparently low marriage rate. Mentors, even somewhat ambiguous ones like Baldwin Spencer, and networks among themselves were important for women 'firsts' like geologist and anthropologist Georgina Sweet. The same seems true for the six women in physical sciences who took degrees between 1930 and 1951, as discussed by Carolyn Rasmussen; four of the six in her study did marry, suggesting it was becoming more possible to attempt to balance career and family. Biographical stories pepper this essay and others, making clear the energy and enterprise, the limitations and discrimination, the triumphs, tragedies and often unpredictable career patterns of these women in science.

While circumstances of women in science are inevitably local and personal, Amaya Jane Alvarez looks at the policies and practices that very directly and arbitrarily limited women in science. Her account of the 'marriage bar' and continuing salary inequities of women at the CSIRO in the 1930s and 1940s makes clear how the infrastructure of science depends on women and yet treats them in less than equal ways. Her penetrating analysis is a reminder that science is a multilayered and collective enterprise and that the 'invisible workers' are often women.

Two engaging biographical essays highlight the challenges of women in Melbourne's academic circles. Marjorie Fawcett's botanical work on the Bogong High Plains is elaborated in a particularly thoughtful essay by Linden Gillbank. After several years of teaching, Fawcett returned to the University for her MSc and became deeply involved in the study of botany, with particular concern for ecology. Devising her own version of the ecology research frame for quantifying vegetation on steep slopes, she first investigated forested slopes along the Hume catchment; later she turned to the question of soil erosion on the high plains. Working with

local stockmen and engineers as well as with a university team of botanists, geologists, zoologists, soil experts and artists, Fawcett spent nearly a decade doing the preliminary investigation required for vegetation regeneration.

Similar themes of leadership and determination are evident in Sally Morrison's sketch of Nancy Millis. Millis was one of the few women to graduate with a degree in agriculture from the University of Melbourne. After a difficult research stint and life-threatening illness in Port Moresby, Millis managed a grant to study in England, where she took her PhD in 1952. A position in the Department of Microbiology back in Melbourne allowed her to build a program on fermentation technology that linked university and industry and led her to an illustrious career involving considerable foreign travel and significant honours. These stories of largely successful involvement in the world of academic science are followed by more sobering assessments that raise questions about the exceptionalism of such women and consider the ongoing issues facing women in science in the last quarter of the twentieth century.

A major debate surrounds the issue of how, or even whether, having women in science will influence the science itself, and indeed Kelly suggests in the introduction that she is wary of essentialism or biological determinism that would make of 'woman' some fixed set of characteristics. Philosopher Freya Mathews elaborates on the issue and her own position in 'To Know the World: Approaches to science in feminist theory'. She provides a summary of major feminist theorists and debates those who stress diversity or pluralism as an approach. Mathews herself posits that the cultural experiences of women have been distinct and are therefore generalizable. Her conclusion is that 'in so far as these new epistemological dimensions entail more benign and responsible attitudes to the natural as well as the human world, the world itself stands to gain from the transformative effects of women's participation in science'. A similar theme is argued quite differently by Rosaleen Love, who seeks 'grass roots epidemiologists' who will bring sense and sensitivity to major policy issues in science; in feminist thinking she finds a potential positive force needed within the large and complex strata of policy making.

The final three essays move to the contemporary situation, analyzing recent research and programs for girls and women in science

in Australia. Felicity Allen documents some positive signs regarding the increasing numbers of girls and women in science, but she also notes the counter pressures to conform to conventional expectations and thus to constrain their participation in science courses in school or career aspirations thereafter. Nowhere, she observes, do we have very clear information about why these changes in numbers have occurred. What motivates girls (or boys) to study (or avoid) mathematics and science? Her essay, and those that follow, are part of an effort to advocate more analysis, and indeed more action. Sue Lewis is convinced that curriculum and pedagogy hold important clues about retention in science. She argues that intervention strategies to 'prepare' girls for science in the 1970s and 1980s were inadequate to sustain many of them and that, alternatively, science itself must be constructed in ways that are gender balanced. To make the point, she outlines the work of the McClintock Collective in Melbourne that has led to a Maths and Science and Technology Centre for Girls called Hypatia's Place. The final essay by Sally White is more muted as she traces five contemporary women in science who, in various ways, continue to face challenges and personal circumstances that carry echoes of the historical life stories found in both volumes under review here.

Rich in texture and substance, these two volumes offer a useful starting point for those who want to know more about the experiences of women in science and social science. They are a reminder of the frustrations and the aspirations of women—historically and today—who seek equal opportunity within science, and moreover a science that is accountable to the society supporting it. In their direct, assertive approach, a number of the authors point to the contemporary dilemma: despite growing numbers, girls and women still find it difficult to make their way in studies of science.

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Ray Sumner, *A Woman in the Wilderness: The Story of Amalie Dietrich in Australia*. Sydney: New South Wales University Press, 1993. xiii + 148 pp., illus., \$19.95 pb.

Amalie Dietrich was a German naturalist who worked as a collector in Queensland last

century. Before the publication of this book and various papers by Ray Sumner, so little was available on the scientific contributions of this remarkable woman that I had to buy a second-hand copy of a slim 1943 book in a language I do not understand, *Australische Briefe von Amalie Dietrich*, by a professor of German at the University of Melbourne—a collection of her Australian letters. Thanks to Sumner's investigations, I now know something of the Australian work of Amalie Dietrich, and understand why, half a century after her death, her 'letters' were published in Melbourne for use as a German school text.

Amalie Dietrich (1821–91) spent most of her working life as a collector. An interest in natural history was not uncommon for nineteenth century women, often as a recreational and refined activity. However, Amalie Dietrich's interest was vocational and arduous.

Until her marriage in 1846 to the pharmacist, Wilhelm Dietrich, Amalie Nelle lived with her parents in Siebenlehn, Saxony. From her mother she learned about plants and their medicinal uses. From her husband, who preferred collecting to pharmacy, Amalie learned more about natural history, including the Linnean system of classification; for over a decade the Dietrichs managed to make an irregular and unreliable living by collecting, preparing and identifying plants, insects and minerals.

Sumner describes how Dietrich's career was shaped by her marital situation, German economic and scientific interests, and Queensland immigration policy. Following Wilhelm's affair with a younger woman, Amalie sought work as a collector to support herself and her young daughter, Charitas. In 1862, she joined the shipping firm, J.C. Godeffroy & Sohn, whose museum was a scientific institution as well as a business enterprise. As the firm expanded into the south Pacific, collectors were employed to obtain biological and ethnographic items for display in the Museum Godeffroy in Hamburg or for sale. European science was hungry for antipodean specimens. Amalie Dietrich was the only woman Godeffroy employed for scientific collecting—a ten-year contract to collect in the young British colony of Queensland.

In 1863, she arrived at Morton Bay on one of the many Godeffroy ships bringing German immigrants, attracted by the promise of government grants of agricultural land and the hope of finding gold. In Queensland, Dietrich travelled to remote agricul-

tural and mining settlements, sometimes staying with German immigrants. After collecting for more than a year around Brisbane, she sailed north to Gladstone and Rockhampton, then spent 1867–9 in Mackay and on a pastoral property at Lake Elphinstone, hundreds of kilometres inland from Mackay. Although the population of Rockhampton had grown to several thousand, Gladstone and Mackay were still tiny, raw settlements, each with only several hundred residents, very few of whom were German. Dietrich spent her last three Queensland years collecting around Bowen, ten percent of whose population of over 1000 were German. Late in 1872, she sailed back south to Brisbane and returned to Hamburg on a Godeffroy ship via the south Pacific.

Amalie lived in Hamburg until her death from pneumonia in 1891. Before Godeffroy & Sohn went bankrupt in 1879, she lived above the Godeffroy Museum, where she worked on her vast and unique collections. However, as Sumner explains:

Amalie Dietrich, like other field collectors for the great men of science, published nothing in her own name. After her death in 1891, Dietrich remained only a footnote in many papers presented to learned societies and published in journals. It was not her work as a naturalist which finally made the name Amalie Dietrich as well known in twentieth-century Germany as, for example, Florence Nightingale was in England. The fame was achieved through the immensely successful book written after Dietrich's death by her daughter Charitas Bischoff.

Thus, in preparing a biography of Amalie Dietrich, Ray Sumner faced an extremely difficult task. As well as the not uncommon problem of interpreting a paucity of primary records, there was the even trickier problem of dealing with the image so skilfully constructed by her daughter—an image which had invaded cultural and historical literature and enriched her fame.

A Woman in the Wilderness is about three women—Amalie Dietrich, her fictional persona, and the creator of that persona, her daughter Charitas. To illuminate this trio, Sumner attempts to interweave two fascinating stories. As the book's sub-title indicates, one is the story of Amalie Dietrich in Australia—a story of great interest to historians of science. The second story, which is no less intriguing, is Sumner's comprehensive and detailed examination of the picture

presented by Charitas Bischoff and used uncritically by subsequent authors. Certainly a critical appraisal of the mythical Amalie Dietrich is an essential part of any investigation of the work of the naturalist Amalie in Australia; but, presented simultaneously, the two stories complicate rather than clarify each other.

Charitas Bischoff's book, *Amalie Dietrich: Ein Leben*, was first published in 1909, when, like her mother half a century earlier, Charitas had to support herself and her children. Republished many times, it was a very successful income-earner. Sumner describes it as:

an artful blend of sentimentality and adventure, with a good dose of religious moralising—a combination which made it an instant and continuing literary success. More important for the historian or the scientist is the fact that the author's close relationship with the subject ... endowed the book with the undeserved reputation of being an authoritative biography ...

Its core comprised 31 letters relating to her Australian decade. The epistolary form served to disguise the author's lack of knowledge and increase the credibility of the text.

In *A Woman in the Wilderness*, Sumner skilfully reveals the eleven 'letters' purportedly from Amalie to her daughter to be largely fraudulent and replete with errors of dates, persons and scientific discoveries. English translations are included in an appendix, although Sumner directs the reader there only via a single footnote.

I admire Sumner's wide-ranging and intricate examination of these Australian 'letters'; as well as detecting fictitious details and descriptions, she attempts to explain their presence and explores the relationship between Amalie and her daughter. From her detailed detective work, she has amassed a wealth of information about the context of Dietrich's Australian efforts. However, Sumner has not used this to generate a clear picture of Dietrich's work in Australia, and my interest in her scientific contributions remains unsatisfied.

Sumner notes that the size and significance of Dietrich's botanical, zoological and ethnological collections make her one of the most important naturalists ever to collect in Australia, but she includes few details to substantiate that claim. She states that Dietrich's ornithological collection of 266

species represents half of Queensland's recorded species and is possibly the largest Australian bird collection made by a single person. She merely mentions one of Dietrich's important zoological discoveries—an unrecorded large venomous brown snake, now commonly known as the taipan. Sumner also mentions her botanical work around Brisbane:

From the Morton Bay area Dietrich sent back to Hamburg over 600 plant species, with so many multiple specimens of each that the Museum Godeffroy was able to print by October 1866 its first botanical sale catalogue ... of 364 species.

The Director of the Hamburg Botanical Gardens, who identified the plants for the catalogue, named a species of *Drosera* after her. But what was the importance of Dietrich's collections? How many previously unrecorded species were included? Which are type specimens? Which specimens went to which institution? Why?

Sumner appears to misunderstand the taxonomic process. As part of her elaborate explanation of information in one 'letter', she mistakenly blames Mueller for misnaming the mountain ash *Eucalyptus amygdalina*. Until Mueller named it *E. regnans* in 1870 (not 1888), the earlier name, *E. amygdalina*, was not an error; it was the accepted name.

The evidence on which Sumner bases details of Dietrich's work are often inaccessible to the reader; sometimes footnotes are non-existent (eg. for her medal-winning timber collection (p.6), club and shields from Rockhampton (p.42), and birds from Lake Elphinstone (p.50)), or sometimes for a Sumner paper rather than a primary document (eg. for Dietrich's discovery of the taipan (p.38), and Mueller's naming of *Acacia dietrichiana* (p.60)). Sumner also appears to suffer from selective scepticism. While refuting much of the material in the 'letters', she accepts a story that survives as folklore—about Dietrich's request for an Aborigine to be shot for his skin or skeleton. Surely there are many possible reasons for the generation of such an unforgettable tale; it could arise from a genuine misunderstanding—Dietrich's mother tongue was German not English—or ethnic, gender or class bigotry could be involved.

A Woman in the Wilderness includes an index and three useful bibliographies: English-language publications, Museum Godeffroy publications, scientific articles in which specimens collected by Amalie

Dietrich were first named and described.

Sumner deserves congratulations for her fine detective work but not for the compilation of this book. The remarkable deconstruction of the mythical Amalie Dietrich dominates *A Woman in the Wilderness*, while her remarkable scientific contributions, based on her Australian collecting, are lost in the detail of disproof of her 'letters'. Amalie Dietrich, naturalist and collector, has not yet emerged from behind her fictional shadow.

It is ironical that, a century after her death, the form of her biography is still being determined by the 'letters' which were created to shape the mythical Amalie Dietrich—the fictional persona which this biography successfully undermines but does not fully displace.

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William Lines, *An All Consuming Passion: Origins, Modernity, and the Australian Life of Georgiana Molloy*. Sydney: Allen & Unwin, 1994. 398 pp., illus., \$39.95.

The history of botany is intimately and irrevocably intertwined with imperial expansion and exploitation of territories and resources. Australian botany is no exception; from the moment Europeans discovered the coastline of Terra Australis, its botanical novelties were eagerly sought to fill European herbaria and taxonomic systems. Early in the nineteenth century, as British invaders struggled across the Australian landscape, many specimens of indigenous plants were sent to Europe. Some were collected and sent directly by settlers like Georgiana Molloy; some were despatched by visiting collectors like Amalie Dietrich.

It is ironical that those involved in the destructive conversion of indigenous vegetation into pastoral wealth were occasionally involved in the documentation of that vegetation. Georgiana Molloy was at the frontier of the first invasive wave of white settlers in the south-western corner of Australia. As indigenous people and plants were sacrificed to the god of British economic expansion, Georgiana noted with increasing affection and interest the flora around her; collecting plants for despatch to England became her 'all consuming passion'.

William Lines describes the circumstances of Georgiana Molloy's arrival in the embry-

onic British settlement of Fremantle in 1830, only a year after its establishment, and the subsequent development of her botanical passion. Newly married to Captain John Molloy, a veteran of the Napoleonic Wars, Georgiana left England with her husband en route to a new civilian life in the Swan River Colony. In search of available fertile land, they left the dust, flies, fleas and mosquitos of Perth and Fremantle for the cooler, moister and unsurveyed jarrah-forested hinterland of Flinders Bay to the east of Cape Leeuwin. Captain Molloy became the resident magistrate for the tiny community at the site of the newly-surveyed township of Augusta at the mouth of the Blackwood River. Lines explains that Governor Stirling, another Napoleonic veteran, named the river after one of Nelson's officers—not the wattle, as I had wrongly surmised. However, he does not reveal the source of the name Augusta. Could it have been the Princess of Wales, who, from Kew House many decades earlier, had helped shape the then royal Kew Gardens?

Lines weaves the lives of the Molloy and their neighbours at Augusta and later Busselton into an interesting regional history, long before vineyards appeared along the Margaret River. In the 1830s and early 1840s, in between bearing, rearing and burying children, manifold household and farm duties, and, during her husband's absences, the duties of resident magistrate, Georgiana Molloy cherished her garden of exotic flowers and collected flowers from the encircling bush. As she explained in a letter, 'being in the Bush was one of the most delightful states of existence free from every household care'. She even named one of her babies Flora.

Her systematic plant collecting was spurred by a request for Western Australian plants by Captain James Mangles, another Napoleonic veteran and cousin of Governor Stirling's wife, Ellen. In return, Mangles sent her precious English seeds, botanical books and other gifts. Georgiana's collecting was organised and thorough. She numbered each selection of seeds, carefully pressed plant specimens, included information about their growing conditions and locale, and kept a set of duplicate specimens. She even convinced 'native Herdsmen', local Nyungar people, and soldiers travelling along the Augusta-Vasse Track to bring her plants. She valued the opportunity to exchange Western Australian plants for botanical information which would enhance her understanding of the plants she collected, and so

asked Mangles for the botanical names of the plants that she sent him.

Via Mangles, her plants reached British botanical authorities. Many were among the first plants to be collected around Augusta and Busselton. Some were new to science. As Professor Lindley wrote to Mangles

Your friend Mrs Molloy is really the most charming personage in all South Australia, and you the most fortunate man to have such a correspondent. That many of the plants are beautiful you can see for yourself, and I am delighted to add that many of the best are quite new.

Lines does not reveal which were 'new', nor whether any were named after Georgiana. Lines notes that Lindley's *A Sketch of the Vegetation of the Swan River Colony* was based largely on Mangles' herbarium, which included Molloy's specimens, but he does not reveal whether Molloy's contribution was acknowledged.

She invited the German botanist, Ludwig Preiss, who was visiting the colony, to stay at the Molloy home on the Vasse River (near today's Busselton), and in December 1839 she took him collecting in the bush. Although Preiss provided some plant names, Molloy was disappointed with his 'rough and ungainly' preparation of plant specimens and his unfulfilled promise to provide further botanical information.

Three years later, she was on the verge of death after the difficult birth of her seventh baby. In April 1843, a few weeks before her 38th birthday, Georgiana Molloy died—after thirteen years and eight pregnancies in Western Australia. She was survived by five daughters, including baby Georgiana, and her husband who was a quarter of a century her senior.

I am glad that, 150 years after her death and nearly 40 years after the publication of Alexandra Hasluck's *Portrait with Background: A life of Georgiana Molloy*, thanks to William Lines, this early collector of Australian plants is not forgotten. The foundations for both biographies were provided by the subject herself in her sometimes expansive and detailed correspondence with Mangles and others. However, no matter how detailed and personal her extant letters, no matter how substantial the background material and how grand the interpretations of her letters, they provide but fragmentary glimpses of her busy but short life in Australia. The certainty with which Lines presents her Australian experience is surely

presumptuous. Of the many attitudes and emotions Lines attributes to Molloy, I kept wondering how he could be so sure. Lines has added much social and geographical background but little personal detail to Hasluck's *Portrait*.

Lines has described the circumstances of Georgiana Molloy's Australian plant collecting. However, two important phyto-historical questions remain unanswered. First, how important was her contribution to the documentation of the flora of south-western Australia; for example, which of her specimens were used to name new species and so became type specimens in European herbaria? Second, how many of the plants that she collected over one and a half centuries ago still survive in the region?

If you are interested in a regional history of south-western Australia, you will probably enjoy reading this book. However, if you are interested in the unusual life of a young wife and mother, who found time to develop a botanical passion, you may be less than fully satisfied.

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Peter Robertson, *Beyond Southern Skies: Radio Astronomy and the Parkes Telescope*. Cambridge: CUP, 1992. xi + 357 pp., illus., \$59.95.

There is no doubt that radio astronomy has been one of the crown jewels of Australian science in the twentieth century. In this book, Peter Robinson, Editor of the *Australian Journal of Physics*, traces much of the history of Australian radio astronomy, from its beginnings during World War II until the dawn of the Australia Telescope, an array of antennas commissioned at the time of the Bicentennial in 1988. The book features a smoothly written and accurate narrative, excellent illustrations, a set of twelve informative and enjoyable digressions called 'tangents', many fascinating endnotes and a marvellous Aboriginal painting on the dust jacket. It is certainly a good read ... and yet I have trouble in knowing exactly how to treat it, for it is neither a popular astronomy book (although two of the chapters are in this vein) nor a critical historical study (although much historical research has been conducted). The main audience that will find it fully satisfactory consists of scientists (primarily astronomers and physicists) and the

science-oriented layperson. (These same persons will find the recent book *Parkes: Thirty Years of Radio Astronomy* (CSIRO, 1994) nicely complementary.)

The book's chronicle is tripartite. Part I starts with the origins of Australian radio astronomy in the wartime CSIR Radiophysics Division, charged with the development of military radar systems. It then traces how this field flourished in the pre-1960 era under the leadership of Joseph Pawsey and Edward 'Taffy' Bowen. Part II traces the efforts, from the early 1950s, to raise money for, to design and to build a very large 'dish' antenna, then called the Giant Radio Telescope. In the event this became the 64-meter (210-ft) dish commissioned in 1961 at Parkes, New South Wales. Part II ends with a chapter, for me the best in the book, detailing how the Division was torn apart in the early 1960s, largely because of tensions created by the decision to build the big dish. We learn how the key players such as Bowen, Pawsey, John Bolton, Paul Wild, Bernard Mills, 'Chris' Christiansen, Robert Hanbury Brown and Harry Messel played high-stakes astro-politics. It is ironic that Robertson several times states (and I agree) that the most innovative and exciting period of Australian radio astronomy ended precisely with the coming of Parkes, and yet this book centres itself around the Parkes dish. Finally, Part III describes the salient scientific discoveries and spacecraft-tracking feats achieved with the Parkes dish in its first thirty years. These include work on interstellar magnetic fields, quasars, radio source surveys, pulsars, interstellar molecules, and vital support of the NASA Apollo missions in the 1969–72 period.

Along the way we hear fascinating stories and learn much historical detail. Examples include:

- Only in 1873 did the town of Parkes change its name from Bushmans; otherwise we'd now be talking about the Bushmans (no apostrophe) dish!
- The Radiophysics Division had a major program in artificial rainmaking during the 1950s, in which Bolton, later the director of the Parkes dish, spent many years.
- A large portion of the funds for the Parkes dish came from the Ford and Rockefeller Foundations; later Mills was heavily supported at the University of Sydney by grants from the US National Science Foundation.
- After obtaining important observations in 1962 of a radio source that turned out to be the first recognised quasar (3C 273),

Bolton and Cyril Hazard flew back to Sydney on separate planes carrying duplicate copies of the records ('as a macabre precaution').

Although on the whole the accuracy of the historical and scientific details is impressive, there are nevertheless mistakes. Examples include:

- (p.83) The collaboration in 1951 of the first 21cm hydrogen line investigators was not the 'first example of international cooperation in radio astronomy'; in 1947–48, Bolton and Martin Ryle in Cambridge had extensive correspondence and interchange of latest results regarding radio stars.
- (p.241) 'The detection of increasingly remote [quasars] has pushed back the known age of the universe'; the age of the universe is set by one's adopted values for the Hubble constant and the deceleration parameter, not by the most distant quasar observed.
- (pp.256–7) The Sugar Grove (USA) 600-foot antenna (which wasted \$100 million before being cancelled in 1962) was never intended to bounce signals off the moon for conventional military communications, but to use the moon only to monitor the general level and nature (not the 'content') of Soviet communications; also, its collecting area of eight times that of Parkes would not have allowed tracking spacecraft *eight* times further away, but only 8 times further.

As noted earlier, despite extensive research and citations of archival materials and interviews, *Beyond Southern Skies* cannot be considered a scholarly and critical historical study. In many instances Robertson appears to have relied too heavily on interview material, in particular with Bolton. I am not in the least impugning John Bolton's memory or intentions, but this reliance often produces more an official history than a critical history. Moreover, the author has supplied little historical analysis, nor has he set his study in the context of the corpus of twentieth-century history of science, the history of disciplines, or institutional and national histories.

For example, the historian looks in vain for analysis of the peculiar situation wherein the United States supplied a major portion of the funding for Australian radio astronomy in the 1955–75 period. Was Australia getting a good deal or were there, perhaps, subtle strings attached? Archival research at the American end is undoubtedly required to properly investigate this question, but much more could undoubtedly be done, even with

a restriction to Australian sources. As a second example, the book actually covers a portion of the worldwide history of radio astronomy (usually to set the context for Australian work), but little solid evidence is adduced to establish the importance of the Australian science relative to that done elsewhere. One finds not even counts of publications or personnel, let alone more sophisticated measures. I am confident that such studies would be highly favourable toward Australia (especially before 1965), but we need more than the author's word to establish the historical case. A third example: how unusual is the Radiophysics situation amongst the many CSIRO Divisions during the various decades? There is a small discussion of this point with regard to the mid-1950s, but much more light could be shed on the development of Radiophysics over the decades and how its position within CSIRO affected its science. Even on the issue central to the book's purview, namely an analysis of the wisdom of the decision to build the Parkes dish, Robertson spends only three pages. On the book's penultimate page he states that the Parkes dish has been an outstanding success, but at the cost of Australia losing its brilliant leadership in scientific and technical innovations in radio astronomy to other nations. But there is nothing more on this theme, which has potential to be richly provocative and fruitful.

In summary, *Beyond Southern Skies* is of a genre that will be found problematic by historians of science, but nevertheless acceptable to many others. It is definitely worthwhile as an overview of the development of most aspects of Australian radio astronomy, but much remains for any future historian who wishes to undertake a critical analysis.

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D.E. Goddard and D.K. Milne (eds),
Parkes—Thirty Years of Radio Astronomy.
Melbourne: CSIRO, 1994. ix + 162 pp., illus.,
\$40.00.

At a good birthday party there should be plenty to eat and drink, a wealth of anecdotes, some lively gossip and, hopefully, genuine affection. One can't tell what the food and drink were like at the thirtieth birthday of the Parkes Telescope, but all the other needs of a good party were surely met.

We are warned in the introduction to this account of that party that it doesn't contain much science, but at any gathering of scientists there is always a good deal of 'shop', and this was no exception. The party itself was a symposium held at Parkes on 22 November 1991 to celebrate the opening of the 210-ft radio telescope thirty years before; it was attended by many of the scientists, engineers and technicians who were involved in the design, development and use of this remarkably productive instrument. The word symposium, we are told in the welcoming speech, means a 'convivial meeting including a dinner for drinking, conversation and intellectual discussion' and that is how it comes across. By recording on tape the twenty-six 'talks' given at the meeting, the editors have successfully preserved its conversational tone and relaxed attitude; after reading this book I felt that I had actually been there.

After a eulogy to Taffy Bowen, to whose energy and enthusiasm we owe the existence of the Parkes Telescope, the next four talks are about the telescope itself. Frank Kerr puts it in the perspective of world astronomy and tells us about the choice of the design and site, Harry Minnett tells us a little about the design study, John Bolton outlines some of the mechanical problems of making it work, and John Masterson, the staff photographer, gives us a history of the telescope in 37 interesting and amusing photographs—everything from the site before the start of construction to the Governor-General arriving to open the telescope. These photographs are an attractive and valuable feature of the book; if you want to see pictures of the construction and of the characters who built, worked and visited it, here they are!

The next three talks by Brian Cooper, John Brooks, Mal Sinclair and Pip Hamilton take us in a light-hearted manner through the development of receivers and computers for Parkes and point up what a significant stimulus to the development of sensitive receivers the work on this telescope has been.

The following nine talks are devoted to the astronomical programme and, inevitably, do not do justice to the impressive body of work which has been done with an instrument which, so we are told, has discovered and catalogued more radio sources than any other radio instrument in the world. Alan Wright, Ann Savage and Jasper Wall list, all too briefly, the work on continuum surveys of the sky and on the identification of radio sources; Dick Manchester, John Whiteoak

and Doug Milne give us short but interesting accounts of the work on pulsars and polarisation; Brian Robinson and Miller Goss tell us about the work on spectroscopy, and Don Mathewson about the Magellanic Clouds.

In the next two articles Radhakrishnan and John Ables reminisce about their time at Parkes. Rad tells about the Parkes Interferometer and makes the amusing point that its major contribution was to train two people who became the leaders of two of the leading aperture synthesis observatories, Ron Ekers and Miller Goss.

In the five talks which follow, John Bolton tells us about the part which the Parkes Telescope played in the Apollo mission—quite exciting! John Ables and Mike Dinn tell us about the part it played in the Giotto and Voyager missions—all this was, I guess, good for public relations and certainly financially profitable.

Finally, after a rambling talk by Marc Price which was, I suspect, better in warm blood than cold print, Ron Ekers winds up the meeting with some brief but interesting remarks. He asks, for example, 'why the Parkes design was so successful compared with that of contemporary telescopes?' The key difference, he suggests, was the integration of the broad range of disciplines involved—engineers, servo, receiver and computer designers and so on. This cooperation and integration of skills has, so he says, become of necessity an indigenous Australian style, and was special to Parkes while often lacking in other places.

I would prefer to put the answer to Ron Eker's question into a wider historical context. In the first 30 years of the Parkes telescope, we are looking at the early days of an entirely new branch of astronomy, which was originated by radio engineers and not by astronomers and has only recently been assimilated into the main body of the great and ancient science of astronomy. For example, radio astronomy was for many years a topic of URSI (International Scientific Radio Union) and *not* of the IAU (International Astronomical Union). It was dominated by questions of radio technique and not astronomy; indeed, in those days many of the leading 'radio astronomers' hardly knew the difference between a planet and a star!

Classical optical astronomy was a separate discipline ruled by astronomers, people who did know a planet from a star and usually something about optics, but had weak links to the separate disciplines of electronics and engineering, links which were made even

weaker by the fact that optical observatories were in such remote and inaccessible places. It is symptomatic of this separation that optical astronomers were slow, indeed reluctant, to introduce the image tube. In contrast, most radio astronomy observatories were developed in close association with physicists and electronic engineers and were quick to adopt things like masers and computers; moreover, they were reasonably accessible.

These, I suggest, are the main reasons why the rapid and successful development of radio astronomy has been due to what Ekers calls 'the integration of a broad range of disciplines'. They were by no means peculiar to the Australian environment, but their importance to the great success of the Parkes telescope are well illustrated by the talks in this book, and for that reason alone it is to be welcomed as a contribution to the history of science.

Both the principal characters concerned with the building and success of this telescope, Edward Bowen and John Bolton, are now dead, and I regret that there could be no contribution by Bowen. I am sure they would both have enjoyed reading this book.

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Ragbir Bhathal, *Australian Astronomer, John Tebbutt: The Life and World of the Man on the \$100 Note*. Sydney: Kangaroo Press, 1993. 111 pp., illus., \$14.95 pb.

The town of Windsor in New South Wales nestles below the eastern escarpment of the Blue Mountains. The first Europeans who settled there farmed the rich earth, battled against the floods which occurred when the waters of the Hawkesbury River rushed through the town and surrounding district, and clashed with the Aborigines of the Dharug tribe.

John Tebbutt (1834–1916), the son of successful local traders and merchants, established and maintained a remarkable career in astronomy on a farm at Windsor, which his parents had purchased after the closure of their local business. The new family home was built in 1845 and was established a short distance from the town. Tebutt erected his first observatory on this land in 1863, followed by additional observatories in 1874, 1879 and 1894. He rarely moved beyond Windsor; Tebbutt's isolation and independence were his strength. He was able to use

these qualities effectively when he fuelled intense controversies during the early development of astronomy in Australia.

Indeed, the notion of independence and isolation in scientific work are given prominence in Bhathal and White's book on the history of astronomy in Australia, *Under the Southern Cross: A Brief History of Astronomy in Australia* (Kangaroo Press, 1991). In choosing Tebbutt, Bhathal has been able to weave these central themes throughout the story of John Tebbutt's life, work and world.

Tebbutt's early formal education was placed in the hands of local Presbyterian and Church of England schoolmasters. There were few students in the church schools at Windsor, but there was plenty of Latin, Greek, German and French studies. His interest in astronomy was probably aroused by his studies of algebra and Euclid, and 'the use of globes'. Tebbutt also was self-taught in elementary mechanics, the workings of the steam engine, and clocks. As astronomy emerged as his major interest, his knowledge was further enlarged by the popular-interest articles he read in the *London Illustrated News*.

Tebbutt began astronomical work fully in 1863, when he established his first observatory and began work on Jupiter's satellites, comets and lunar occultations, even though between 1853 and 1862 he had already achieved a number of observations, including lunar occultations, variable stars, meteors and sunspots. Among his first instruments were a chronometer and a refracting telescope; further instruments, mainly telescopes, were added when he built the larger observatory in 1879, and when, in 1886, Tebbutt installed his 'famous' equatorial refractor. With these instruments he further observed Jupiter's satellites, comets, lunar occultations of stars, minor planets and double stars.

In October 1904, when Tebbutt reviewed his work from the Windsor observatory, he was able to claim that his various observations and the assembled information had been utilised by other important astronomers. Furthermore, he began to boast that the range and extent of his astronomical work truly justified his view that Windsor was indeed the centre of astronomical activity in Australia throughout the second half of the nineteenth century. Though isolated, he ensured that his results were published and lodged in the best astronomical libraries available in Sydney, located at the Sydney Observatory, the University of Sydney, and

at the Royal Society of New South Wales.

All of Australia's State observatories were built in the second half of the nineteenth century. Sydney Observatory, with which Tebbutt had numerous dealings, was finally established in 1858. Tebbutt's relations with the Sydney-based astronomers, as critic and controversialist, is, in large measure, the life story that is told in this book. Work at Sydney Observatory ran into initial trouble when the Cambridge mathematician William Scott, who was not at ease in using a telescope, was appointed to direct the observatory's work. The expectations of the Government Astronomer were high, but Scott could not maintain the necessary level and standard of work required by political authorities and public demands. Shortly before his early retirement in 1862, Scott wrote to Tebbutt, pleading with him to take over the directorship of the observatory. Tebbutt declined. He was not at all interested in exchanging his private means for the responsibilities and burdens attached to public office.

In 1870, Henry Chamberlain Russell, a graduate from the University of Sydney, was appointed Director of the Sydney Observatory. Tebbutt and Russell clashed: over the ill-defined boundaries between the professional and amateur astronomical workers in late nineteenth-century Australia, over Russell's failure to keep important scientific correspondence flowing to Tebbutt, and over the omission of Tebbutt's early astronomical work from Russell's Presidential Address (which dealt specifically with the work of local astronomers from 1788 to 1860) to the first meeting of the Australasian Association for the Advancement of Science (Sydney, 1888). Russell's work in meteorology at Sydney Observatory, to the detriment of astronomy, also added to the tensions between the two men.

Finally, the author devotes a chapter to Tebbutt's religious beliefs, informing us variously that Tebbutt adopted a 'Low-Church attitude', that 'he used astronomy for the advancement of the Anglican Church', and that 'to Tebbutt the workings of the universe were ample proof of the manifestation of the hand of God'. And although the author is not entirely clear on this point, there is a hint that Tebbutt was sufficiently concerned by what Darwin had to say in *The Origin of Species*, that in 1878 he wrote a lecture entitled 'The Testimony which Astronomy Furnishes to the Attributes of the Creator', which he delivered to pastoralists and merchants from the pulpit at Windsor and to

members of the Young Men's Christian Association of New South Wales (in Sydney).

As mentioned previously, this is the author's second book on the history of astronomy in Australia. With the exception of the chapter on Tebbutt's religious beliefs, much of what is said about Tebbutt in his first book is repeated in the work under review, with only a slight change in the wording. In telling the story, the author relies heavily upon quotation in his narrative, but unfortunately the material is never referenced, either at the conclusion of a chapter or at the end of the book. Neither are the quotations referenced to the material which is listed in the bibliography. I mention this point because the author in the Preface implies further work on Tebbutt ought to be undertaken, and as some readers might want to pursue this suggestion, references would be additionally useful. Furthermore, a proper referencing system would have more fully acknowledged the author's debt to the work of Wayne Orchiston, especially in regard to Tebbutt's refusal to take the directorship of the Sydney Observatory, and the failure of the Australian Association of Comet Observers (see *Australian Journal of Astronomy*, Vol. 2, pp. 149–158 and *The Journal of the Astronomical Society of Victoria*, Vol. 35, pp. 70–83 respectively). Indeed, it is Orchiston's previous publications on Tebbutt which should be used as the chief guide for further work on him.

These reservations aside, Bhathal's book is a useful addition to the literature on John Tebbutt. There is an astronomical glossary with diagrams, selected correspondence, details of what you can do at the Windsor observatory (it is now a museum, where public viewings of the night sky may be taken, and a range of artifacts which belonged to Tebbutt are on display), and there is a good selection of photographs.

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Hermann Beckler, *A Journey to Cooper's Creek* (translated by Stephen Jeffries and Michael Kertesz, edited by Stephen Jeffries). Melbourne: MUP Miegunyah Press with State Library of Victoria, 1993. xiv + 205 pp., illus., \$44.95.

It is remarkable that over 130 years have had to elapse before a detailed account by one of the participants in the Victorian

Exploring Expedition was published. The first contemporary accounts of the expedition were merely the diaries of the principal participants, which generally amounted to no more than a list of dates and observations on position. Lack of scientific accounts arising from the expedition is surprising in view of the fact that the expedition was organised as a scientific expedition by a scientific society, the Royal Society of Victoria.

Much emphasis has been placed previously on Burke and Wills 'tramp', as Ernest Favenc so aptly termed it, and on the alleged failings of William Wright and his supply party to support them. The difficulties faced by Wright and his companions and their scientific activities have been largely ignored. Marjorie Tipping's account of the expedition artist and zoologist, *Ludwig Becker: Artist and Naturalist with the Burke and Wills Expedition* (1979), helped to rectify this, though it was not until the publication of *Burke & Wills: from Melbourne to Myth* (1991) by Tim Bonyhady that an objective assessment of the role of Wright's party was undertaken. Amongst other sources, Bonyhady used the unpublished account of Hermann Beckler, one of Wright's party. This account vindicated the members of the supply party and provided good reasons for Wright's so called failure. Beckler's account is now published and readers have all the evidence to make their own judgements. Far from the book being a disgruntled expedition member's justification for failure, it is a fascinating first-hand account of the activities of the supply party as well as an accurate record of the country traversed by one who was an enthusiastic observer of the arid interior of Australia.

The manuscript for this book arose from Hermann Beckler's perception that there was a need to counter the scurrilous book written by William Wills, father of William John Wills. He attempted to justify Burke's incompetent leadership and place the blame for the expedition's failure on the members of the supply party, which included Beckler as the expedition's doctor and botanist. Unfortunately Beckler, having finished his account and provided it with maps and illustrations, for some reason did not publish it. Had he done so, there is no doubt that it would have had a considerable influence on the perception of the expedition as a whole and on Wright and Beckler in particular. Because this account was intended for the public, Beckler did not go into details of personalities, nor make recriminations against Burke. He provided ample factual evidence

to allow readers to make up their own mind as to the reasons for failure.

Beckler's account is preceded by an introduction by Stephen Jeffries, the editor and one of the translators. He gives a biographical sketch of Beckler, including details of Beckler's early career in Australia up to the time he joined the expedition, together with a short account of the expedition itself and an assessment of the value of Beckler's narrative.

Beckler divided his book into parts, each with its own short introduction. The introduction to the first part deals with the formation of the expedition and its equipping. The first part itself charts in some detail the progress of the expedition from Melbourne to Menindie on the Darling River, where Burke split his party into two and moved on, leaving Beckler with the supply party under the leadership of William Wright to follow later with the main body of the stores. The final section here deals with the period when Wright was waiting for authority to take over as leader of the supply party, and describes Beckler's rescue of Trooper Lyons and the saddler Alexander McPherson.

The second part describes the move of Wright's party north to Bulla and the retreat to Menindie forced by illness of members of the party and the lack of water. Beckler describes the landscape through which they passed and records the vegetation, so it is an important account of western New South Wales before it was dramatically changed by grazing, which began in earnest shortly after the expedition withdrew.

Beckler resigned from the expedition on 16 October 1860, shortly before the whole party reached Menindie, for reasons that are not entirely explained. He agreed to remain with the expedition until relieved by his replacement as doctor to the expedition. This did not happen until the arrival of Alfred Howitt's relief party in August 1861, so Beckler undertook all the duties for which he was originally appointed. However, because of his resignation he received the opprobrium of the leaders of the expedition and later of members of the public when this news arrived in Melbourne, despite the fact that he served the expedition faithfully and honourably with considerable dedication in the face of tremendous difficulties and saved the lives of several of the participants. In addition, he received little or no credit for the painstaking collections of plants that he made nor for his creditable reports on the nature of the country and the medical reports on the health of the expedition members.

Beckler's account is a sober description of all the problems faced by the supply party, from which four men died including his fellow German, Ludwig Becker. Beckler cared for these men until the end. Despite terrible hardship, he managed to undertake several side trips for the purpose of collecting plants and recorded the nature of the terrain through which he passed. As a consequence, we have a fascinating account of the party and of the area. Beckler had a passion for this dry country matched by few other Europeans. He also had sympathy and understanding for the Aboriginal people who resented the white intruders' presence in the area. Beckler's scientific observations and his thorough collecting fully justified Ferdinand Mueller's confidence in him, but his work remained unrecognised and unused. The members of the Royal Society of Victoria Exploration Committee, including Mueller, were more anxious to protect their own reputations and justify their own actions than to try and salvage any science from the ruins of the expedition. Beckler was made one of the scapegoats for the failure, though not directly criticised by the later commission of inquiry; yet his account makes it abundantly clear that he carried out his duties efficiently and in many instances beyond what could be reasonably expected of him.

Even with the publication of this book, his work seems to be underrated. Jeffries in his introduction states that he cannot be compared to Ludwig Leichhardt, Ludwig Preiss or Amalie Dietrich. Yet the evidence in his own translation is to the contrary, at least as far as collecting is concerned. Jeffries overlooks his own comment that Beckler was well trained and experienced from his work in Mueller's herbarium and from his collecting expeditions for Mueller.

Even Beckler's art work seems to have been denigrated. Jeffries calls his drawings forced and amateurish in contrast to Becker's. That is certainly not the impression given by the few drawings reproduced in the book. Some of the drawings in the so-called Becker album were attributed by Marjorie Tipping to Becker and not Beckler, though some bore Beckler's handwriting. It seems appropriate that these be reassessed in the light of Beckler's account. It is greatly to be regretted that some of the 35 illustrations prepared by Beckler were not reproduced, despite the apparent difficulties in doing so, as they would have thrown light on this question.

A.G.L. Shaw, in his entry on Ludwig Becker in the *Dictionary of Australian*

Artists, states that Ludwig Becker was the most gifted member of the exploring party, but the information in this book definitely indicates otherwise. It was a great loss to Australian science when Beckler, who had such enthusiasm and genuine feeling for inland Australia, felt compelled to regard himself as a failure and returned to Germany.

In a work such as this, maps are essential for a proper understanding of the text. The map provided with this book is not as helpful as the editor claims. I found it hard to determine Beckler's position when reading his narrative, and it does not show the route of the party prior to Menindie. Beckler's own maps are reproduced, but they are difficult to use. It would have been more useful to the reader to have redrafted Beckler's maps onto a modern base and shown the route up from Melbourne.

The dust jacket claims the work to be a 'highly readable account'. It is. Beckler wrote an interesting and comprehensive account which has been admirably translated by Jeffries and Kertesz. They, Melbourne University Press and the State Library of Victoria are to be congratulated on a fine reproduction.

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John Dargavel and Sue Feary (eds), *Australia's Ever-Changing Forests II: Proceedings of the Second National Conference on Australian Forest History*. Canberra: Centre for Resource and Environmental Studies, ANU, 1993. v + 297 pp., illus., \$25.00.

Australia's Ever-Changing Forests II is the product of the second in a series of conferences, held under the auspices of the Forest History Society of Australia at the Victorian Forestry School at Creswick in December 1992. Like all such collections, the results are uneven and difficult to summarise in a short review. The book is best judged not as a critical history but as an interesting 'work in progress' report on one of the most important aspects of Australian environmental history. Its ambition and importance are indicated by the interdisciplinary spread, and the book should be of interest to historians, forest ecologists, silviculturalists, policy makers in the area of sustainable development of forests, and historians of science.

Themes which run through the volume

concern the interaction of nature and culture: the importance of fire in the management and regeneration of forests; the importance of afforestation and reforestation; and the issue of heritage, both natural and human, in forestry practices. A related theme is the importance of public history—the investigation of practical historical problems as a guide to policy formation. Considerable stress is laid on regional studies that emphasize the diversity of Australia's forests and their history, and especially the need to comprehend the detail of the ecology and human history of particular regions to gain an insight and grasp the public policy management issues.

The editors declare that 'today's forests are the result of a long history of complex interaction of human beings with their environment, whether it be a spear or a chain saw.' Recognising the difficulty of talking about human interactions and perceptions without subordinating the natural history of the forests, the editors warn that 'This volume is focussed on *forestry* history rather than *forest* history, illustrating perhaps the difficulties of maintaining a nexus between the natural sciences and culture [sic] history.'

The volume opens with an all-to-brief section on early perceptions of the forests. Linden Gillband studies 'Nineteenth century perceptions of Victorian forests: ideas and concerns of Ferdinand Mueller.' Given Mueller's great and only partially understood importance in Australian and indeed world forestry in the nineteenth century, it is fitting that the volume should start with his work. Gillbank draws attention to the way Mueller presaged ideas of sustainable development, but the article is basically descriptive and only scratches the surface of what might be said about the German-Australian botanist's scientific and religious ideas, his German romanticism, his links to the acclimatisation movement, the impact of international debates about the tree famine on his perceptions, and the influence of his praise of Australian forests on foreigners (mentioned but not developed in terms of Mueller's critical role in the 'emigration' and valuation of eucalyptus trees in the nineteenth century).

'Tall Stories and Tall Trees', by Frank R. Moulds, is rightly placed second, since no one spread more of the tall stories than Mueller himself. Moulds discusses an interesting and neglected aspect of nineteenth century perceptions of the Australian forests—the idea that the Australian trees were exceptionally

tall by world standards (up to 500 feet, as Mueller surmised); but nowhere does Moulds explain why Australians sought to establish that their trees were so large, nor does he make the obvious connection with the height of the American sequoias, with whom the mountain ash and karri forests were typically compared. Moulds, or Gillbank, might also have speculated on the meanings of this valuation of the tall forests alongside the typical negative attitudes towards forests in the colonies in the nineteenth century, emphasized in most studies of changing Australian perceptions of the landscape.

A second section of the book deals with regional studies. These vary in quality and thoroughness. Leaving aside Tom Griffiths' piece, which I shall discuss later, the most thorough in the presentation of its data is 'Land Use History of the White Cypress Pine Forests in the Snowy Valley, Kosciusko National Park' by Pulsford, Banks and Hodges. This paper is useful for both demonstrating the complex interaction of natural and human effects and for looking at the important and distinctive ecology and history of *Callitris* species. However, the findings are presented in a matter-of-fact way that does not explain what the effects on policy could be. These could have been spelt out in a development of the statement that 'the manager is now in a position to develop socially and environmentally responsible policies for future management'.

R.C. Ellis is more effective in drawing out the effects of his historical research for policy, noting how successful the regeneration of eucalyptus has been in the wake of early clearing followed by fire in the central plateau forests of Tasmania. His 'Effect of Settlement on the Forests of the Central Plateau of Tasmania' is one of a number emphasizing the role of historical investigation as an aid to policy and practice. Ellis states that 'In the course of a study aimed at formulating silvicultural practices for *E. delegatensis* it became clear that an elucidation of the effect on the forest of past human activity was necessary to an appreciation of the effects of present activity', a statement gratifying to this historian. Ellis deals also with the role of fire in regeneration since Aboriginal times as an example of human intervention, and is impressed by the potential of the forests under its influence to regenerate and to overcome severe cutting and agricultural clearing. Ellis' detailed arguments are more complex than can be conveyed here, but his finding needs further study and comparison with patterns of

cutting and regeneration practiced elsewhere in eucalyptus forests. Nowhere does Ellis deal with the impact of clearing on the various species of native fauna that might inhabit the forests. Indeed, the absence of interactive study of forests and wildlife is a notable omission that weakens the impact of many of these forestry studies as a whole, and undermines the impact of Ellis' contention that clearing can be a temporary setback, with renewal always possible.

Renewal, even improvement, of the native forests is the subject of 'Penders Perpetual Forest Plantation'. Sue Feary deals with an example of a managed eucalyptus area in southern New South Wales, begun by a German, John Cremerius, in 1960. This is an interesting contrast to the more common case of plantation forestry using European and American pine species. Feary emphasizes European influences on Penders plantation that stemmed from the origins of its developer—in such things as silvicultural practices like coppicing—but does not consider the impact of more recent American and European forestry practice through pine, with which I suspect the Penders practice should be compared.

Other useful contributions to this section include two pieces on the Victorian Forestry School (though here the information presented on forestry practice is tantalisingly brief); an environmental history of Waratah Creek Catchment in the Coolangubra State Forest of New South Wales; and a discussion of the study of the cultural significance of historic places in East Gippsland Forests, undertaken by the Department of Conservation and Natural Resources in Victoria. The author of the last contribution, Anita Brady, concludes that 'the heritage of these forests is ... found not only in the relics and physical remains of human occupation and activity, but in the stories and hopes and attitudes of those who moved into and through these sometimes inhospitable environments'.

The book's third section is entitled 'Forest Industries', where Kevin Frawley writes on 'Logging technology and forest cutting practices', Peter Evans assesses the heritage values of sawmills and tramways in central Victoria, and in 'Tracking the KTC from Kauri to Karri to Chatlee', Roche, Dargavel and Mills hint at the importance of transnational business enterprises and capital in the exploitation of forests. They describe a New Zealand kauri timber firm that shifted its operations internationally as *Agathis australis* was logged out in New Zealand, into

the karri and jarrah forests of Western Australia and into new stands of *Agathis australis* in the Solomons. But the authors do little to explain how the expertise and technology developed in one type of forest was translated into the exploitation of other forest timbers. They mention also diversification into softwoods but do not say whether the company was involved in the development of the *pinus radiata* plantations today so vital in New Zealand timber exports (and in South Australia too).

The final theme is public history, though the impact of local studies of environmental history in the second section is just as intimately bound up with the issue of public policy and land management, so that the distinction is perhaps artificial. In the longest and most important paper in this section, L.T. Carron treats the 'Changing nature of Federal State relations in forestry.' Carron gives only skimpy attention to the period before 1960, and his most important sentence is the first—that at federation, the states 'retained, as "a residual power", responsibility for and administration of the lands and its accompanying resources such as forests'. If greater attention was paid to the earlier period, much could be learned about Australian forestry policy and the heritage of that tradition for recent developments in environmentalism.

Probably the best and certainly the most polished of the papers in the entire volume is Tom Griffiths' 'Secrets of the Forest: Writing Environmental History.' Like many others in the collection, this traverses important themes such as the impact of fire and human/cultural interactions with the environment. Griffiths emphasizes the need to look closely at regional variations in forest ecology, and is particularly concerned that the natural history of the forests be incorporated into the study of human interactions. He shows how different types of forest trees and forest stands react in different ways to fire and to human impact, both Aboriginal and European. He contrasts the special case of Mountain Ash (*Eucalyptus regnans*) with the well-known example of the Pilliga scrub studies by Eric Rolls in *A Million Wild Acres*, where forests have changed and recovered as a result of the removal of Aboriginals and native fauna. Since the Mountain Ash depends on catastrophic fire, Griffiths concludes that they 'defy many of the generalisations about Australian forest history.'

Environmental history, Griffiths persuasively argues, demands that we go beyond a

description of how humans perceive or interact with their environment over time. 'That might be very good historical geography or settlement history. We need to broaden the cast of historical actors to include plants and animals, whole ecosystems, even the elements.' And more generally, I endorse his edict that 'Environmental history demands that we incorporate the environmental sciences into our historical discourse, mining them—as we do the social sciences—for explanatory tools.' These statements might be fitting ways to conclude this review, but, unfortunately, one practical note must be mentioned: my review copy began to fall apart after only a little wear. This paperback deserves to be included on reading lists for environmental studies and history courses, but it will not stand much use unless it is carefully rebound by libraries.

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Ronald Strahan, *Beauty and the Beasts: A History of Taronga Zoo, Western Plains Zoo and their Antecedents*. Sydney: Zoological Parks Board of NSW, 1991. viii + 160 pp., illus., \$20.00 pb.

This history of the Taronga Zoo and, more generally, zoo activity in Sydney concentrates on the institution; hardly surprising, since the zoo's board commissioned it for the seventy-fifth anniversary and a former director wrote it. Strahan has, in fact, organised it around the different boards and plans for zoo development. Public perceptions of the zoo or the way in which its development reflected the changing value of animals and nature in Australian society, get short shift, and there is little on scientific studies done at the zoo. On the other hand, Strahan gives a clear picture of policy and programs from the mid-nineteenth century to the present. There are ample illustrations of buildings and exhibits and a good selection of quotations. With the appendices, which list governing bodies and their members from the time of the Acclimatisation Society, it will serve as a basic reference for the history of the institution.

The Taronga Zoo, established in 1912, grew out of an earlier institution formed by the New South Wales Acclimatisation Society in 1879, and the first two chapters put the new zoo and its backers in historical context. They sketch in the development of the zoo as an institution in Europe, early

calls for a zoo in Sydney, the history of the Acclimatisation Society, and the work of Carl Hagenbeck, whose zoo in Hamburg influenced zoo design worldwide. They raise themes that dominate the rest of the narrative: the place of a zoo as a cultural and civic institution, the conflicting demands of a paying public and zoological science, and the need continually to renovate and update physical facilities and exhibits.

The next five chapters trace the zoo's trajectory from its founding to the present. Construction dominated the first phase. The site's exposed rock ledges shaped the layout of exhibits and facilities, and its location, on a peninsula in the harbour, dictated how and how easily people could get to it. Then there was the question of exhibits. A 'bar-less' zoo was attractive but, as Strahan makes clear, possible only if other things were sacrificed. Once built, the zoo went through a period of amateur management. Edward Hallstrom, director from 1941 to 1967, was enthusiastic, but during his tenure the zoo provided little more than access to animals. Strahan sees the next phase, his own regime (1967–1974), as the start of professional management. A zoologist, he introduced training for the staff and a program of scientific research. This memoir (he writes this chapter in the first person) also introduces a current concern, the role of modern zoos in faunal conservation. The next eleven years (1975–1986) were a period of consolidation. Money was tight and the board considered a number of ways of making ends meet. Some (animal acts in particular) Strahan does not feel were appropriate to the institution. In the last few years the zoo, he feels, has entered a new realm, one of 'Big Business'. A final chapter describes the planning and building of the Western Plains Zoo, an attractive, 'open-range' zoo in Dubbo, some 400 km north-west of Sydney. This chapter provides a contrast and a useful expansion of interest, for Western Plains is a very different kind of zoo. It is not a general collection but specialises in large plains dwellers; it is not a cultural amenity for an established city but a tourist attraction for a region.

Administration organises the story, but there are other themes as well. One is the complexities of the zoo director's job, which requires some of the talents of a veterinarian, bureaucrat, manager, restaurateur, amusement park operator and public relations pitchman. The director must see that the animals are housed and cared for—and in some cases provided with special conditions for breeding—and the public given

everything from bus connections to spectacular exhibits, all while dealing with a board of directors and several layers of government. The job has changed over time, and so has the profession. Directors were once amateurs; now they are professionals. Knowledge came in scraps, jealously hoarded; now there are institutional means to communicate information generated by planned study. There is also the evolution of the zoo. It began as an exhibit of startling animals, added public education, began doing scientific research, and now serves as a refuge and ark for threatened species. This is a lot to cover, and Strahan is under no illusion that he has produced the definitive work. This is 'simply one of many quite different histories that could be written about the public zoos in New South Wales' (Foreword).

The major virtue of this history is that it gives a reasonable narrative account of major developments at the Taronga Zoo. Strahan's experience directing Taronga and laying out the Western Plains Zoo allows him to comment from the inside on many zoo issues. He has a good eye for illustrations and an ear for the useful, occasionally the telling, quotation. The extensive use of old newspapers and board reports tells, more than narrative, the ideas and concerns of each period. As history, though, this is more a source for scholarship than a contribution to it. It is aimed at a general audience, is more a narrative than a critical analysis of the administration of the zoo, and it leaves out (as it must in so short a piece) many important themes. Zoos have been one of the major civic institutions for public education about wild animals and a key element in faunal conservation. Their history is a rich source of material on humans' ideas about nature in the industrial world. Strahan has made a start, but there is much more to be done.

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Kathleen Ralston, *A Man for Antarctica: The Early Life of Phillip Law*. Melbourne: Hyland House, 1993. x + 236 pp., illus., \$29.95.

This biography recounts the life of one of the principal Antarctic protagonists of Australia up to the time when the Australian National Antarctic Research Expeditions (ANARE) established 'Mawson', its first continental station. The work is an intriguing one but,

because of its rather sudden conclusion (in 1954), does lead one to anticipate a second volume. The problem of where to divide a biography is undoubtedly an awkward one and the point selected has some logical justification, but the Antarctic aspects of Dr Law's biography, up to 1966 when he resigned as Director of ANARE, would perhaps have provided a more thorough justification of the title 'A man for Antarctica'.

The biographer has worked well, with the full cooperation of her subject, and has been thorough with documentary references and other research. The time covered was an important period in the development of science in Australia, of which Antarctic aspects were one of the important components. Family environment and early days of the subject are well described and indicate a life adapted to outdoor pursuits, including time in the high snow-covered regions of the Australian Alps, combined with an education in the physical sciences. The exceptional circumstances of the Second World War also became a significant influence. This combination formed a good basis for his Antarctic period—the aspect of his life for which Phillip Law is best known. An introductory comment correctly observes that he was 'in the right place at the right time'. It was fortunate that he knew Sir Douglas Mawson and several others associated with the early days of Antarctic continental exploration (from Australia and elsewhere); this effective continuum resulted in greater consistency in the development of contemporary programmes.

A clear awareness of the political aspects of the Antarctic, internal and international, is shown throughout the book. Despite the error in the suggestion that an Order in Council 'proclaimed British sovereignty over all Antarctic territory', the theme of exercising Australian sovereignty over the Australian Antarctic Territory pervades the work. The methods adopted were science and exploration, both benefiting the advance of knowledge. The emphasis on the political aspect as one of the reasons for establishing 'Mawson' station is appropriate.

Politics of an internal nature may be more contentious than the international variety in Antarctic affairs, as elsewhere. Some of the manoeuvres involving Public Service regulations are disclosed—undertaken both because of the exceptional circumstances of the Antarctic and because of some of the personal conflicts involved. Law is quoted as conducting a 'war of attrition' with what he regarded as the intransigence of the Canberra administration, where the differences

in operations between diplomats and expeditioners were exacerbated by confining both in the same ministerial department. It is fitting to see such observations included, as they were a significant aspect of the expeditions and Dr Law's involvement.

In addition to the specific biographical information, the book is a valuable source for much of the early history of the ANARE. Details of early vessels and their problems, the first ANARE logo, and many other persons prominent in the development of the organisation are to be found throughout these pages. The 'trade mark' comment 'get in and get it done while the weather's good' remains as valuable advice in all Antarctic operations as well as typifying Law's operating style.

As well as the sources listed at the end of each chapter, the book concludes with a comprehensive biography and list of sources, which include works up to the date of pub-

lication—a most useful compilation, taking this part of the work well beyond 1954. In many instances diary entries are quoted, which is particularly appropriate in several descriptions of storms and other difficulties at sea. The book is well indexed, provided with sufficient maps, and has a good range of illustrations. A list of acronyms and a glossary are appended. The concluding page-and-a-half of the Epilogue endeavours to summarise the subsequent forty years, in effect providing an overture to a completion of the account of Dr Law's Antarctic years and those following. I note that the most recent Australian Antarctic station is named 'Law Base', a suitable tribute to the man who established 'Mawson'.

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