

# Book Review Section

Compiled by John Jenkin\*

It has been suggested that this section of our journal might carry brief reviews of museum exhibitions when appropriate subjects arise; that is, when an exhibition is clearly related to the history of science in Australasia or the south-west Pacific region.

At first sight this may seem a curious suggestion, since most exhibitions are likely to be closed before the review appears; but there are other considerations. Reviews can inform readers who weren't able to see the exhibition; they can enlighten researchers to the riches often held invisibly in our museums and awaken interest in the primary objects, photographs and related documents that are sometimes neglected by historians of science; and they can recognize and encourage the work of museums in presenting the history of science in our region and generally enhance the academic credibility of museum work.

We have decided, therefore, to accept this suggestion for a trial period, and the first such review appears below. The book review editor would welcome information on forthcoming exhibitions, people willing to write reviews, and reader reaction to this innovation.

**Macleay Museum, University of Sydney,**  
*Wellington Caves: From History to Prehistory*  
— an exhibition.

The abode of the sibyls and nymphs of Roman mythology, a site for the worship of Mithras in Persia, the refuge of the five kings of the Canaanites, lair of the terrible Cyclops and sensual Calypso ... caves have been home, prison and temple to some remarkable beings in our history. Our culture is, if one may say so, full of caves, those dark, often empty spaces at once fascinating and dangerous, seductive yet repellent.

For a few decades which overlap, not coincidentally, the golden age of geology and the great era of Romanticism, caves burst onto the scientific scene. From Joseph Banks' 1774 enthusiastic report of Fingal's Cave on the

Scottish island of Staffa, through William Buckland's beautifully-composed Homeric monograph, *Reliquiae Diluvianae* (1823), to William Whewell's decidedly peculiar letters to Lady Malcolm (dispatched from the 'Underground Chamber' of Dolcoath Mine in 1828), caves attracted quite extraordinary attention for a while, and seem to have brought out the best and the worst in visitors. Then, by around 1840, caves fell from favour, like catastrophist geology and ecstatic aesthetics, never again to assume a prominent place on our intellectual horizons.

In the late decades of the eighteenth century and especially during the opening decades of the nineteenth, caves were the rage across Europe, and especially in Britain. Everyone — geologist or not — paid a visit to such sites as Fingal's Cave, Peak Cavern and Speedwell Mine. Poems (Erasmus Darwin, Scott, Keats), paintings (Turner), music (Mendelssohn), books of views (William Westall), novels (Scott) and dozens of articles and scientific treatises resulted from such visits and kept cave-lore and cave-worship alive.

It is quite impossible for us to recapture today either the *frisson* experienced by Buckland when he first crept into the bone-bearing cave at Kirkdale in Yorkshire, or the foreboding of Walter Scott as he listened to the unearthly music emitted by the basalt 'organ pipes' at Fingal's Cave. We no longer breathe in the thick atmosphere of myths and legends that surrounded caves two centuries ago, the 'sublime' (the most common adjective associated with caves) is no longer part of our vocabulary, and we are all, more or less, uniformitarian geologists and evolutionary biologists, so that the deep issues which cave exploration might clear up have no hold on us.

This exhibition, put together with care, intelligence and obvious enthusiasm by Julian Holland (Curator of Scientific Instruments at the Macleay Museum), tried nevertheless to convey the dynamics, the thrill and the substance of cave research in the early nineteenth century. The visitor who paid attention to the subtle mix of visual and verbal materials would have obtained from this exhibition a strong sense that caves were not only a basis for the ever-so-slow-to-develop science of vertebrate palaeontology in Australia but also for the somewhat more rapid transition to Lyellian geology in Britain.

The exhibition offered some familiar items (works by Buckland and Cuvier), but most items on display related to the discovery and exploration in 1830 of the famous 'bones cave'

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in Wellington Valley, NSW. It was the 'very respectable Colonist and Magistrate' George Ranken who, in the words of John Dunmore Lang in the *Sydney Gazette*, made the discovery which, Lang rightly foresaw, would 'excite very considerable interest in the scientific world'. A large quantity of fossil remains — some of which appeared in the exhibition — were retrieved and dispatched to Europe for analysis and classification. The results showed that enormous creatures, now extinct, formerly roamed not 200 miles from Sydney and that, as Robert Jameson explained in 1831, earlier catastrophist accounts notwithstanding, 'the same agent or agents that brought together the remains of animals met in bone-caves and bone-brecia in Europe, operated on New Holland'.

While the bones from Wellington caves helped to establish uniformitarian geology in Britain, they did little immediately to help launch Australian earth sciences. Lang wrote in 1830 that the country was becoming 'daily more and more interesting to the geographer and geologist', and he called for the establishment of a Lecturer in the Sydney College devoted to natural history and natural philosophy. Several decades were to pass before such a position was established, by which time the flood of interest in caves — at Wellington and elsewhere — had weakened to a trickle. Julian Holland and the Macleay Museum are to be congratulated for reminding us that deep and dark secrets were once concealed in the secluded and sublime caverns of Europe and Australia.

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**S.C.B. Gascoigne, K.M. Proust and M.O. Robins**, *The Creation of the Anglo-Australian Observatory*. Cambridge: Cambridge University Press, 1990. xiii + 301 pp., illus., \$85.00.

H.R.H. The Prince of Wales in 1974 inaugurated the Anglo-Australian Telescope (AAT) on Siding Spring Mountain; it was commissioned in 1975. In 1953 R.v.d.R. Woolley had launched his proposal for a telescope in the southern hemisphere that would be at least as capable as the best in the north. This book is essentially the history of what happened between 1953 and 1975.

Woolley was Director of Mt Stromlo Observatory from 1939 to 1955. He was overwhelmed by the richness of the southern sky and the huge amount of astronomy waiting

to be done there, and he had faith in the abilities of astronomers and potential astronomers in the Commonwealth. He supposed a telescope such as he envisaged to be beyond the resources of any one Commonwealth country; it had to be an international enterprise. At first he proposed a joint effort by Australia, Canada and the UK. For reasons not immediately scientific, Canada soon dropped out, and so this book is about an Anglo-Australian enterprise.

There is a Foreword by Paul Wild (Canberra) and Sir Robert Wilson (University College, London), successive chairmen of the AAT Board immediately after 1975. They write that the AAT 'can lay claim to being the best instrumented telescope in the world', and that it and its accompanying Schmidt telescope 'have proved to be the most successful combination of telescopes in the world' for the sorts of astronomy for which a combination is designed. Such statements leave little doubt about the status of the book's subject matter!

A word first about how it was possible to achieve such status. At the time there was a general conviction amongst the astronomers and technologists involved that, having regard to all aspects of the available technology, the optimal size for a large ground-based optical telescope was about 150-inch aperture. The pioneering telescope emerging from this school of thought, after prolonged design studies, was the 150-inch telescope for the Kitt Peak National Observatory (KPNO) in Arizona. In 1967, one condition of government approval for the construction of the AAT was the acceptance of a generous offer from KPNO to supply the results of those design studies. Also, when in 1967 the UK decided to construct the Schmidt telescope, the US authorities made available the designs for the Palomar 40-inch Schmidt. This considerable American generosity meant that the two telescopes for Australia could be made far more speedily than otherwise, and also that advantage could be taken of American experience in constructing the designs. At the same time, certain improvements of more recent date could be incorporated.

This book is an important contribution to the history of science that is in some respects unique in character. One is the singularly appropriate relationship of the team of authors to their subject; intimate without being partisan. Professor Gascoigne is a highly distinguished Australian astronomer; ever since World War II he has been more actively involved than any other single individual in the build-up of Australian optical

astronomy and its instrumentation. In 1967–74 he was Astronomical Adviser to the AAT project; in 1974–75 he was Commissioning Astronomer for the telescope. Mr Robins has spent his career in a considerable range of science and technology, particularly space-science. Two men who figure prominently in the history of the AAT are the late Sir Harrie Massey and J.F. Hosie. For many years Robins worked in London with Massey; in 1972 Robins followed Hosie on the Science Research Council and in 1973–78 as a member of the AAT Board. Miss Proust is an Australian lawyer who was Secretary of that Board from 1983 to 1989.

Gascoigne saw all the Australian happenings on the spot; he writes with intimate knowledge about the technical matters, but without being too 'technical'. Robins saw the British side; he and Proust had a thorough knowledge of the administrative aspects, and they must be more familiar than anyone else with the mass of official records. In particular, it must have fallen to Proust to negotiate the governmental agreement (dated 1 January 1988) that made the Anglo-Australian Observatory a two-telescope observatory.

The first two chapters sketch the scientific and technical background to the theme. Chapter 3 is a concise sketch of 'the tangled web of proposals, counter-proposals, deliberations and negotiations for a large telescope in the southern hemisphere in both Australia and the UK' from the mid-1950s until 1967. I have always marvelled at the vision and conviction that sustained the astronomers through so many frustrations and near fatal setbacks, until in April 1967 came the miraculous arrival of Australian agreement to open substantive negotiations with the British Government about an AAT. The Agreement is fully discussed in chapter 4, and the text of the AAT Agreement Act 1970 is reproduced in Appendix 1.

The next three chapters are clear accounts of discussions regarding site, building, optics and mounting of the telescope. All these matters called for earnest debate and mature judgement, but they provoked no unforeseen controversy. Unanticipated differences of view emerged, however, when it came to the management of the telescope. Chapter 8 is called 'Telescope or Observatory' because the root of the argument was whether the astronomers had been talking about a telescope to be managed by an existing institution in Australia, or about a telescope and its Board that would become a new 'observatory'. The authors must have found it an exacting and delicate task to write this well-balanced

account of those 'stormy years', when so many strong-minded and dedicated personalities found themselves in conflict. It is important for many reasons that the record be set out now, not guessed at in years to come; which may be why the late 'Taffy' Bowen urged the writing of this book. Chapter 9, on 'The Beginnings of the Observatory', sketches the development of the AAO up to the inauguration of the AAT by the Prince of Wales in 1974, the various inaugural addresses being reproduced in Appendix 8.

A wide-field Schmidt telescope has become an indispensable partner to a great reflector like the AAT. Most fortunately, about 1970 it became financially possible to embark upon the construction at Siding Spring of the afore-mentioned 48-inch Schmidt; most fortunately, V.C. Reddish (Astronomer Royal for Scotland) was put in charge; most fortunately, C.G. Wynne of the RGO invented a great improvement of the optical design. All proceeded so excellently that in August 1973 it could formally be opened by Bengt Ström-gren, President of the International Astronomical Union. Chapter 11 is an account of all this.

'Some achievements of the AAT' are recorded in chapter 12. Chapter 13 describes some matters of administration after 1975, ending with the record of the full incorporation of the Schmidt telescope into the AAO, with its headquarters at Epping, near Sydney. On the strength of its performance to date and the promise of additional new instrumentation, the final chapter offers a justifiably-optimistic view of the future of the AAO.

Some of the nine appendices have been mentioned; others supply further useful information. There is an extensive bibliography. The text is well illustrated by diagrams and many fascinating photographs, especially those of many of the leading personalities in the narrative. The book is admirably produced by CUP.

Due reference is made to a detailed account of the UK end of the operation given by Sir Bernard Lovell in the 1987 volume of the *Quarterly Journal of the Royal Astronomical Society*. I am somewhat surprised not to see more mention of the part he played himself in this history, since he was Chairman of the Astronomy Space and Radio Board of SRC during a crucial period; but he was self-effacing in such affairs. It should be more fully recognised, however, that he was generous in not pressing the claims of Jodrell Bank at a time when they might have delayed the progress of the AAO.

The book should be in every library of the history of science as well as every library for astronomers of every sort.

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**R. Hanbury Brown, *Boffin: A Personal Story of the Early Days of Radar, Radio Astronomy and Quantum Optics*. Bristol: Adam Hilger, 1991. vi + 184 pp., illus., £17.50.**

Few people today can recall the fascination of the early days of wireless: voices carried through space from distant places and coaxed from the earphones of a crystal receiver or, when aided by thermionic valves, from a horn speaker. For some who grew up in that era, their imaginations fired by the magic of it all and the need for deeper understanding, it was the beginning of a lifelong devotion to science. Professor Robert Hanbury Brown FRS was one of these, and in this book he succeeds in conveying the sense of purpose and excitement which inspired and sustained him through the three scientific adventures of the subtitle.

His path to science, however, was hardly straightforward. Born in India, where his father served in the British Army, Hanbury Brown's education in Kent was mainly in the classics because his preparatory school was for the 'sons of gentlemen and so taught no science'. Fortunately, his growing interest in the subject was nurtured by his guardian, a former student of J.J. Thompson at Cambridge, who in his private laboratory initiated him into the mysteries of electricity and wireless. Emerging at last from Brighton Technical College with a first-class degree in engineering and a scholarship, he embarked in 1935 on a PhD at Imperial College, London.

There he developed a second love, this time inspired by the magic of flying, and in due course he made the inaugural flight for the University of London Air Squadron. But his PhD was never completed, for he was persuaded by the Rector of Imperial College, Sir Henry Tizard, to join an urgent Air Ministry project. Thus Hanbury Brown found himself in 1936 in a small team of scientists at Bawdsey Manor, the secret laboratory on the Suffolk coast, where the first British radars were being developed. His first year there was 'one of the happiest I have ever spent'.

Personal accounts of the early years of radar have been published since the war by

Robert Watson Watt (*Three Steps to Victory*, 1957) and A.P. Rowe (*One Story of Radar*, 1948). But these books give the review from the top; missing until recently have been the stories of the younger scientists who actually did the research. E.G. (Taffy) Bowen, in his book *Radar Days* (1987), filled much of this gap. Now his story has been complemented by Hanbury Brown, whose radar experiences spanning eleven years are related in the first half of his book. Most of that time was spent in the airborne radar group formed and led by Bowen. Hanbury Brown did a lot of flying in RAF aircraft, sometimes with Bowen, experimenting with radars designed to detect ships and submarines or to intercept night bombers. Their stories of this period do not overlap unduly, and in 1940 Bowen left the group and went with the Tizard Mission to the USA.

The word 'boffin' today means a research scientist, but during the war it was more specific. According to Watson Watt, a boffin was a scientist engaged in operational research. He suggested that the name was invented in the RAF Fighter Interception Unit and was typified by Hanbury Brown, who worked and flew with the Unit during much of 1940–41. His high-altitude flying came to a premature end one night when he was hospitalised after failure of his oxygen supply, and again later with damaged hearing. But by then 'the early days of airborne radar were over. Nothing which I have done since then has been so exciting, so absorbing and so worthwhile.' Posted to America to introduce the system to the US Air Force and subsequently to take part in another combined project, he often wished to be nearer the events in Europe, but the war was over before he returned to Britain.

By 1947 Hanbury Brown was ready for a change. He gives an entertaining account of a busy and successful two-year period as a junior partner in a research consultancy run by Watson Watt, but this was merely an interlude. Accepting an offer by A.C.B. Lovell at Manchester University, he began a study of 'cosmic noise', the then mysterious radio emission from space. Thus he joined the ranks of many other ex-radar scientists who went on to pioneer the emerging science of radio astronomy, the catalyst for the great surge of post-war astronomical discoveries. Hanbury Brown's part in this great enterprise is related in the second half of the book.

His story brings out vividly the slow and laborious nature of many of the early experiments. A 218-ft diameter fixed paraboloid at the Jodrell Bank research station was converted into a radio telescope. Its pencil

beam was moved by tilting the very tall feed-support mast, a task he compares to steering the first large optical telescope built by Rosse in 1845. Using the clumsy but powerful instrument, Hanbury Brown, with Cyril Hazard, showed that many localised sources belonged to our own Galaxy, a conclusion which resulted in conflict with Martin Ryle at Cambridge. Later, after three months of effort, they produced the first map of an extra-galactic source.

This research provided strong support for Lovell's proposal for a 250-ft, fully-steerable radio telescope at Jodrell Bank, but Hanbury Brown was only peripherally involved in that troubled project. Soon after joining Lovell, he had invented the intensity interferometer for measuring the sizes of small sources, a highly significant development which was later to dominate his work. An outline history and the scientific basis of this instrument have been given in an earlier book (R. Hanbury Brown, *The Intensity Interferometer*, 1974). Here he relates the more personal stories behind the enterprise, including his very fruitful and often amusing collaboration with Richard Twiss on the mathematical theory. The unique properties of the new interferometer eventually proved unnecessary for solving the problems for which it had been devised, and Hanbury Brown turned aside to develop conventional interferometers for long baselines.

In 1954, however, they noticed a previously overlooked property of the intensity interferometer: its output information was immune to even violent fluctuations of the received signals caused by the ionosphere. The same principle implemented at the wavelength of light, using photo-electric detection, might enable star diameters to be measured, independent for the first time of atmospheric turbulence which had limited earlier attempts. To many physicists, the proposed instrument seemed to violate fundamental quantum theory. Hanbury Brown gives an absorbing and humorous outline of the intense and lengthy controversy which erupted. When the Hanbury Brown/Twiss ideas were at least theoretically vindicated, a difficult aspect of quantum optics had been clarified. In an admirable experiment using two large Army searchlight mirrors, Hanbury Brown produced a final convincing proof with measurements, through a winter of appalling atmospheric conditions, of the size of the star Sirius. The way was now clear to plan the construction of a full-scale stellar intensity interferometer.

For several reasons, not least an offer of shared funding by Professor Harry Messel at

the University of Sydney, the new instrument (after fabrication in England) was erected at Narrabri in NSW. It was no easy task to put the complex installation to work in this remote location. The story of the family's encounter with the heat and insects of the Australian bush is told with humour and an appreciation of the good aspects of life in a country town. With the instrument functioning at last, Hanbury Brown resigned from Manchester University and moved to Sydney, accepting Messel's offer of a Chair of Astronomy. By determination, hard work and the dedication of John Davis and others who had joined him from Jodrell Bank, all of the objectives of a seven-year observing program were accomplished.

There was clearly an exciting field of research for a more powerful intensity interferometer, but ironically, after four years of planning, technical advances indicated that a modernised version of the classical Michelson interferometer might also be able to work through atmospheric turbulence and would be more sensitive and cheaper. It was an agonising choice, but in 1975 existing plans were sadly put aside and the long development of the new scheme was started. For Hanbury Brown, it was 'one of the most painful decisions I have ever had to make'. Ten years later, with the pilot model successful, John Davis started planning the Sydney University Stellar Interferometer. Hanbury Brown had demonstrated the potential of high-resolution optical astronomy and initiated the building of a powerful new observatory here; he could now return to England. His original plan to spend two years in Australia had stretched to twenty seven!

All this Australian experience is contained in the final quarter of the book, and this compression is my one disappointment. During his stay here, Hanbury Brown was in touch with the broad scientific scene and often, especially during the lengthy design studies, was directly involved. But this is a very personal story and some of the discussions are quite brief. Curiously, there is no reference anywhere to Taffy Bowen, although there are several to his Division of Radiophysics in Sydney and a passing mention of friction with Messel.

The book concludes with a short Epilogue, where the author turns to the relation between science and religion. In a previous book, *The Wisdom of Science* (1986), he has argued that they need not be in conflict; both are fallible attempts to make sense of the mysterious Universe. Here he illustrates his ideas with accounts of two talks given a decade ago. The audience reactions were

hardly encouraging. Confronted by misconceptions about the nature and role of science, 'I was wasting my time'.

Notwithstanding the reservation above, this is an absorbing and thoughtful book by an outstanding experimentalist, whose fascination with scientific discovery has led him through an extraordinary diversity of experiences. It should be widely read by historians as well as scientists.

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**William J. Lines**, *Taming the Great South Land: A History of the Conquest of Nature in Australia*. Sydney: Allen & Unwin, 1991. xx + 337 pp., illus., \$34.95.

White Australia indeed has a black history. The blackness of obscenities perpetrated by Europeans on Aboriginal Australians during the past two centuries is increasingly colouring studies of Australian history, while another dark outcome of European domination is environmental despoilation. Over the decades, many people have protested against human and environmental black deeds, but environmental destruction has attracted little historical study. Bill Lines' *Taming the Great South Land* provides a timely and substantial study in this direction and explores and exposes Australia's dark history in both the racial and environmental sense.

It is easy to bemoan the fact that this book tells a story that should have been told decades ago, but then it would have been considered a marginal exercise. *Taming the Great South Land* is an Australian history of its time. It reflects attitudes which have at last become acceptable within the dominant Australian culture. A green, post-bicentennial, post-modernist history of Australia, it does not celebrate white invasion and domination. Instead, Lines seeks to reconstruct the story of European exploration and exploitation by considering the attitudes which shaped two centuries of European destruction of landscape and culture — a history of the conquest of nature in Australia, as the book's sub-title tells us.

Lines' story is not unique to Australia, as David Suzuki notes in the foreword, but has been repeated in many parts of the world: 'Driven by a profound disconnection from the land, newcomers to the New World sought to tame it and its human and nonhuman occupants. The combined technology and the western attitude of rightful domination over Nature were unstoppable'. Lines' story provides a case-study of a widespread phenom-

enon, and it could be read in conjunction with Alfred Crosby's *Ecological Imperialism: The Biological Expansion of Europe 900-1900*, reviewed here in 1987 (HRAS 7(1)).

While Lines' book is an environmental history of Australia, the reader should not expect the documentation of environmental destruction species by species or ecosystem by ecosystem, for that is not Lines' aim. His is a more interesting and more useful account — in effect a gigantic literary collage, whose pieces illustrate the changing phases of Australia's environmental history. Many examples of despoilation are described, some in great detail, to reveal the forces which shaped the European exploitation of the Australian landscape and its inhabitants. Thus the brutal and uncontrolled slaughter to the verge of extinction of seals and whales in the early years of the nineteenth century is vividly described in chapter three, entitled 'No Eden'.

To attempt to explore two centuries of Australian environmental history is an enormous task; to attempt to explain such a complex history in terms of the prevailing social, political and economic pressures requires monumental inter-disciplinary effort. The availability of documentary evidence varies across the disciplines and the decades, so it is not surprising that there is a variation in the accuracy and degree of detail through the chapters. A single volume can accommodate only a limited litany of detail, and overall the book is engagingly and powerfully written.

Chapter one, 'A continent adrift', sets the geographical stage for Lines' story with a racy overview of Australia's Gondwanan origins and the evolution and extinction of its inhabitants. In the chapter's final paragraph, Lines echoes Suzuki's sentiments and presages the main thesis of his story: 'In 200 years, European technology, warfare, culture and political economy have swept across the Australian landscape as an expression of manifest destiny, changing forever the face of the land . . . In under 200 years, a natural world millions of years in the making, and an Aboriginal culture of 60 000 years duration, vanished before the voracious, insatiable demands of a foreign invasion.'

In his second chapter, 'Terra Incognita', Lines sets the intellectual scene. He discusses the relationship between the blossoming of scientific inquiry and the European craving to dominate and exploit the natural world — human and nonhuman, animate and inanimate — and explains how the British discovery, exploration and invasion of the eastern coast of *terra nullius* was timely for

science and empire. It occurred on the crest of an Enlightenment-fuelled faith in and thirst for the scientific acquisition of new knowledge, and served British political and scientific goals. The influential ideas of Francis Bacon, Joseph Banks, William Howitt and Thomas Huxley are considered.

Subsequent chapters, 'A camping ground for profit', 'Dark deeds in a sunny land', 'World quarry', and 'Not by conquest' follow mining and pastoral expansion, legislation and railways, droughts and strikes, wars and conservation, slaughter and settlement, to contentious environmental issues of the 1980s: the damming of Tasmania's wild rivers, a road through the Daintree rainforest, oil-drilling on the Great Barrier Reef, the Wesley Vale pulp mill, logging in National Estate forests, the Very Fast Train and the Multifunction Polis. It is a breathtakingly compelling tale.

For historians of science, Lines' book is of interest not so much for what it says about science but for what it omits. In larger histories there is always the problem of accurately situating that other culture — science. Due recognition is rarely given to the scientific endeavour which underlies more obvious historical change, and this environmental history is no exception. However, while not adequately exploring the scientific foundations, Lines does give some scientific credits. He provides occasional glimpses of the importance of science in determining landscape change — such as William Farrer's breeding of the popular Federation wheat, which coloured much of Australia's landscape in the early decades of this century.

While an adequate exploration of the influence of science on landscape change would fill another book, the paucity of scientific episodes in Lines' story and the errors therein illustrate the problems posed to historians by science. Thus, although Lines does mention early-twentieth-century hopes for Australian science in the development of the British Empire, and post-WWI federal funding for Australian science, he does not mention the importance of Britain's Empire Marketing Board in the funding of Australian agricultural science in the inter-war years. As Lines correctly notes, Prime Minister Hughes' considerable faith in science was crucial to federal involvement in Australian science; but it was not a Council for Scientific Research (CSR) but an Advisory Council of Science and Industry which was appointed in 1916 to prepare a national plan for Australian science. Years later, after a precarious ride through parliament, the Bill establishing the Institute of Science and

Industry was passed. It was this Institute (not mentioned by Lines) which, without its own laboratories, funded prickly pear and some of the other 1920's research which is mentioned. The Science and Industry Research Act of 1926 — not the Commonwealth Scientific and Industrial Research Bill — allowed the establishment of the Council for Scientific and Industrial Research (CSIR), whose laboratories and divisions later grew into the CSIRO. Boris Schedvin's history of CSIRO, *Shaping Science and Industry* (reviewed in HRAS 7(2)), is not mentioned.

Lines' undeveloped claim that CSIRO/O scientists were charged with the task previously undertaken by member of mid-nineteenth-century acclimatisation societies is both insightful and overly simplistic. CSIRO/O officers inherited a twentieth-century version of the acclimatiser's perceived duty to improve nature's landscape. However, as well as 'improving' and exploiting natural ecosystems, CSIRO/O scientists also sought to understand and rectify damage to the landscape which had resulted from inappropriate European land management practices and unforeseen consequences of other European activities, such as the introduction and escape of the rabbit. Inadequate attention is given to the influence of CSIRO/O research on agricultural, pastoral and other changes to the landscape. Francis Ratcliffe's investigations in the 1930s of Australia's arid pastoral regions are noted, but not CSIRO/O's other pasture research. Nor does Lines mention crucial CSIRO research in his discussion of the clearing in the 1950s and 1960s of vast areas of Queensland brigalow for pasture. The technological masterpiece of the Snowy Mountains Scheme is also discussed, but not the research into soil erosion it provoked and required; nor, despite mention of various conservation issues, is the landscape destruction of the devastating dust storms of the 1930s and the consequent formation in several states of soil conservation bodies which orchestrated soil erosion research.

Lines' book reflects the current inadequate presence given to science in general histories, and highlights the need for historians to become better acquainted with science. Despite this, *Taming the Great South Land* provides a fascinating back-drop from which to discuss the place of science in the complexity of Australia's environmental history, and it is certainly worthy of the attention of those interested in the history of Australian science. It could be read in tandem with a book with a very different style but which covers a similar literary landscape

— Paul Carter's *The Road to Botany Bay: An Exploration of Landscape and History*.

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**David Walker and Jürgen Tampke (Eds),** *From Berlin to the Burdekin: The German Contribution to the Development of Australian Science, Exploration and the Arts*. Sydney: New South Wales University Press, 1991. xi + 274 pp., illus., \$44.95.

The title, though poetic, seems to indicate a rather narrow subject; perhaps an exploratory expedition by Ludwig Leichhardt, the Prussian explorer who figures prominently in the book. The subtitle sounds quite different; readers may assume that they are offered an encompassing treatment of the German contribution to Australian science and arts, and the story of Germans exploring the continent as well. A quick glance at the table of contents, however, helps us to come to a more sober assessment of what might be expected. Indeed, the book contains much more than the poetic title suggests, but less than the subtitle promises. Somewhat modestly, the editors reveal that the book is, so to speak, a child conceived at the bicentenary celebrations, with its symposia and all that.

The thirteen contributions are of very different quality — some excellent and thought provoking, others less convincing. The first group of five essays, headed 'Science and Exploration', opens with a paper by Edward Kynaston on Ferdinand von Müller, the great German botanist in Melbourne. Here readers will be disappointed, as we are offered a psychological explanation of the strange scientist but learn nothing new of the man, on whom the author wrote a book some years ago. It is sad to discover that the explanations of Müller's escapism are still accompanied by some of the mistakes that marred the earlier book. Harder facts are offered, on Leichhardt, by Colin Roderick, who attempts to discover the explorer from his fields of study in Germany, Britain and France before he embarked for Australia.

Rod home's paper on 'Georg von Neumayer and the Flagstaff Observatory, Melbourne' is an excellent combination of the biographical method with a socio-political and historical approach to the development of science in Australia. We are told that in those days, when public money was scarce, Neumayer was able to enlist support for his studies in Victoria from the Bavarian king and the

German community in Melbourne. Neumayer, who attended Carl Rümker's nautical school at Hamburg, created the Flagstaff Observatory to conduct regular meteorological and magnetic observations in Melbourne. He started a magnetic survey of Victoria which, he hoped, might reveal auriferous tracts of land. Yet the instruments he deployed were not yet good enough to utilize the findings for practical purposes, which indicates that, while at Melbourne, Neumayer's ideas were far ahead of his time. Neumayer was, moreover, according to Home, the first professionally trained physicist in Australia, who also introduced the 'Humboldtian field-based observational and world-encompassing style' in scientific research, akin to the field research methods of Leichhardt.

Ray Sumner, who in her doctoral thesis has in a painstaking and detective-like way demolished Charitas Bischoff's story of her mother Amalie Dietrich's Australian sojourn, offers a brief biography of this German botanist, who provided the ideal of a heroine for two generations of middle-class German women. For about a decade, she single-handedly collected plants and animals in Queensland for the Godeffroy Museum in Hamburg.

The Australian experience of Roberg von Lendenfeld is the subject of the paper by David Sandeman, whose major interest seems to have been the exploration of the Australian Alps. It was von Lendenfeld who determined which peak was the highest; the one he named Mount Townsend was higher than the former Mount Kosciuszko, known in 1885 as Mueller's Peak, but the names of the two have since been interchanged.

The second group of papers combines three contributions on 'Encountering Aboriginal Culture'. Marjorie Tipping's essay on the artists Ludwig Becker and Eugene Guérard is not, as its title suggests, confined to the Aboriginal habitat, illustrated by excellent pictures by the two; it clarifies much of the artists' backgrounds, their styles and techniques, and their lives.

An excellent and thought-provoking paper is Walter Veit's 'In search of Carl Strehlow: Lutheran missionary and Australian anthropologist'. It attempts an explanation of why Strehlow's important contributions to Australian anthropology have either been forgotten or not been given their deserved place in the history of the discipline. A number of his works were published in German, the two world wars resulted in much of the German contribution to the development of Australia being swept under the carpet, and most important, Strehlow's methods, based on a knowledge of Aboriginal languages and an



'understanding' approach, were by the turn of the century pushed aside by the seemingly 'more scientific' methods propagated by Andrew Lang and Baldwin Spencer. The 'culture-clash' apparent in the different works of Strehlow and Spencer, as well as Strehlow's unrecognised research results written in the German medium and hidden in learned journals in Germany, will have to be rediscovered, a task upon which the author has obviously embarked. Veit hopes his project may also help to depict 'historically important inter-cultural relations between Australia and the German-speaking countries'.

Silke Beinssen-Hesse investigates 'The study of Australian Aboriginal culture by German anthropologists of the Frobenius Institute'. The results of the research conducted by this famous Frankfurt institute in 1938 were not published, due to the outbreak of the Second World War, and during the war much of the documentary material was lost or destroyed. The author also focuses on the controversy in the post-war period between Andreas Lommel and Helmut Petri, due to their different approaches to anthropology. She traces in Lommel's ideas a spirit of gloom and doom in the thirties, and a basic dislike of Australia. Petri, on the other hand, is seen much more positively, as a competent scientist in the field. The author does not hide an important personal interest in the subject: her father had been a contact person for the Frobenius Institute in Australia.

The third group of five papers is headed 'Literature and Identity'. Irmeline Veit-Brause writes about Hugo Zöller's view of Australian society. Different from the bulk of German travellers to Australia, Zöller was a journalist (employed by the *Kölnische Zeitung*), who presented facts and figures about developments in Australia. In his outlook a cosmopolitan, an Anglophile and a German nationalist, Zöller was mainly interested in British colonialism and Australia's economic progress. The author interprets Zöller's concern with the preservation of 'Deutschtum' — the character, language and ways of life of German immigrants — as an early form of 'multiculturalism'. She visualises in Zöller a 'precursor of the transnational politics of ethnicity'. One wonders whether Zöller really deserves such a modern epithet, and whether the deployment of present day vocabulary, customary in political science, is a useful way to understand the past.

Gerhard Fischer unearths an interesting aspect of German intellectuals in Australia in his paper 'Imagining an Australian nation: the German community of South Australia during the nineteenth century'. The drive of

Germans in that colony to promote an Australian national consciousness, which would relieve them of the stigma of not being from British stock, has never been examined before. Carl Mücke, a 'forty-eighter' from Berlin, was a prominent spokesman of the German community in South Australia, which anguished over the development of a 'biculturalism' that could make German culture a constituent element in Australia's progress. The commonality of the 'Teutonic races', a frequently employed phrase in Britain and Germany, eventually proved to be a fallacy.

H. Priessnitz titles his contribution 'The "Vossification" of Ludwig Leichhardt', meaning the transformation of the historical explorer into a symbolic figure in literature, as portrayed by Patrick White in his novel *Voss*. Disappointing to the historian, there is very little in this paper that might give an idea of the 'historical' Leichhardt, the starting point, so to speak, of the changes he underwent under the pens of poets and novelists. But there is much of his metamorphosis in literary enterprises, which, one must admit, have been a very powerful influence in shaping the figure of Leichhardt in the public mind.

Robert Sellick will, in the course of time, confront us with the historical figure in his 'Leichhardt's diaries', which he has begun to edit. Yet how difficult it is to piece the written words together and how elusive the hero remains even then, is a fascinating story in itself. Historians may still hope to gain a more complete view of this great German-Australian explorer than they have hitherto been offered, by the study of fragmentary sources and under the influence of masters of the pen.

Volker Raddatz' 'Intercultural encounters: Aborigines and white explorers in fiction and non-fiction' is a befitting conclusion of the subject. One of the major difficulties between Aborigines and Europeans was the want of communication between them, and thereby a lack of understanding. The author compares some of Leichhardt's descriptions of his encounters with Aborigines with passages from White's *Voss*. The literary field reflects the historical: both texts reveal an incompatibility in understanding which was bound to end in failure.

One would have wished that the editors had devoted more care to the book, so finely made up by the publishers. In the bibliography, Gerhard Fischer's work *Enemy Aliens* is listed under the name of D.C. Mulvaney, whereas the index gives two Mulvaney's, D.J. and John. Ludwig Becker and Ludwig Beher are both mentioned in the index, when they

are obviously the same person. There are a number of spelling mistakes, as in the case of Spanish, Göttingen or Trebatsch. The index seems to be confined to the names of people and places, but occasionally other items are included, such as 'Biology, development of theories ...' But where are equivalent terms like anthropology or the many other sciences mentioned in text? A closer examination of the proofs could have saved the publisher and editors from such flaws, in a book where outstanding contributions mix with papers that do not enhance its quality.

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**James Gillespie**, *The Price of Health: Australian Governments and Medical Politics 1910–1960*. Cambridge: Cambridge University Press, 1991. xvii + 358 pp., \$49.95.

In *The Price of Health*, James Gillespie examines the history of the provision of medical care in Australia during the years 1920 to 1950. Historians and sociologists have written extensively about what happened in Great Britain and the United States during those years, principally because the organization of medical care in these countries seemed to be predicated on two radically different visions of how a liberal democracy might increase public access to doctors and hospitals. To what extent should the government intervene in the market for medical care: should medical professionals become salaried public employees, or should they remain independent providers while the government or private health insurance funds help the public obtain their services? While British doctors became salaried employees, their American counterparts were paid by the patients or by private health insurance funds.

These were the two examples that seem to have guided the deliberations of successive Australian governments, Labor and Liberal alike, as they sought to increase public access to medical care. But as Gillespie points out, the final outcome was rather extraordinary; Australia is today the only liberal democracy to have first built a national system for health care and then to have dismantled it within a few years. According to Gillespie, such an outcome lends added significance to this first comprehensive study of medical care in Australia. Much recent work seems to him to have depicted the emergence of national health services as a step toward the creation of a society controlled by the profes-

sional classes in the name of greater social efficiency; but this unwelcome picture seems less convincing in the light of the Australian experience. Contingent factors, such as the deep divisions within the medical profession between general practitioners and specialists and the tensions between federal and state governments, Gillespie argues, were far more important in the peculiar history of health care in Australia than any logic of social control.

Gillespie opens his thesis by assessing the state of the Australian medical profession in the 1920s. Most doctors were self-employed general practitioners who aspired to work on a 'fee-for-service' basis, but the number of patients who could afford such service was small. Therefore, many of the doctors had to earn their livelihood by joining urban, working-class practices run by mutual aid associations — the 'friendly societies'. In these 'lodge' practices, doctors were paid a single fee for each member of the society they visited, regardless of the treatment they dispensed. The Australian Branch of the British Medical Association was strongly opposed to this arrangement because it undermined the independence of the profession and also reduced the pool of potential fee-paying customers. Hence, it sought strict enforcement of a demeaning 'means test', so that the middle-class and wealthier members of the working-class were barred from admission to the lodge practices. But the Association also realized that this relatively wealthier section of the public had to be enabled to obtain medical care under the more lucrative fee-for-service regime.

During the decade after the First World War, expanding and rationalizing public access to medical care became a subject of considerable political importance. 'National hygienists', led by Sir Raphael Cilento, argued that government should become more interested in this subject, and especially in promoting the prevention of disease, since it was the chief source of social and economic disorder. The national hygienists proposed to establish a network of regional diagnostic laboratories staffed by salaried medical officers to aid and educate provincial and rural doctors about the wonders of a more specialized and systematic approach to medical work. The Commonwealth Department of Health, established in 1921, was strongly influenced by this technocratic vision of the future of medical care in Australia. However, the British Medical Association was opposed to it; the Association objected to state interference in the organization of medical care

implied by the subordination of curative to preventive medicine.

State governments were as unconvinced about the merits of the national hygienists' plan as the medical profession. What effect would greater state intervention have on voluntary organizations? Would they be displaced by public ones? In the poorer states, the Labor Party supported universal access to medical care by encouraging the expansion of friendly societies. Here there was apparently more fertile ground for the ideas of the national hygienists; Raphael Cilento was appointed in 1934 to the position of Director General of Health for Queensland, where he sought to mesh the national hygienist and Laborite programs. But the Labor Party was not prepared to sacrifice the autonomy of its allies in the friendly societies to a centralized health service controlled by medical professionals alone.

The proposals for a national health insurance scheme which were aired during 1937 and 1938 drew far greater support from the medical profession and from governments, both Liberal and Labor, because they only aimed to expand access to medical care within the existing institutional structures. But even these more conservative plans were resisted. General practitioners objected to the panel practices that would be created to contain the costs of medical services because they would weaken their professional status. The Labor Party opposed them because they were to be funded by taxing workers' wages. The effort to establish national health insurance died with the resignation of the Liberal government in 1939.

The organization of medical care became a crucially-important issue as the incoming Labor government prepared for war. At first the medical profession resisted all attempts to reorganize its services; however, as more doctors enlisted, fewer could provide services to civilians and the pressure on the medical profession mounted. The need for a shift to contract and salaried medical services became apparent to all parties. Thus, from 1940 to 1943, national hygienists again planned for a salaried national health service, which they hoped would become a permanent institution after the war. But their gains were swiftly reversed as the tides of war turned and the earlier sense of crisis waned. The Labor government began to plan for wider access to medical care within a broader social welfare program. The working class was, for the first time, to choose between different doctors and hospitals, something to which both the most radical statist and self-described liberals in the

medical profession strongly objected. These plans were nonetheless immensely popular with the public. Once again, however, the antagonism between federal and state authorities blocked any reform of the health-care system.

With the end of the war, enthusiasm for any kind of social planning waned and the opportunity to create a national health service dissolved. State intervention in the organization of medical care could be dismissed far more easily as 'socialist', an accusation which weighed very heavily in the Cold War. Furthermore, drug therapies developed during the war had begun to transform social diseases such as tuberculosis into problems for therapeutic medicine. This shift was accompanied by changes in the National Health and Medical Research Council. The former bastion of the national hygienists was now dominated by research scientists rather than public health officers, and they had a very different vision of the future of medical care.

It was within this more conservative environment that the government of New South Wales sought to introduce a limited scheme to improve public access to medical care by establishing a Medical Benefits Fund similar to the Blue Cross fund in the United States. This scheme was more acceptable to the medical profession, as subscribers would have no input into policy decisions about the organization of the Fund and there would be no panel practices; but unlike the United States, the Australian middle-class would not cooperate and invest in the Medical Benefits Fund. Eventually, the federal government took up the scheme and began to subsidize patients' purchases of medical services on a fee-for-service basis. Even this scheme collapsed, however, as the Labor government was defeated in the 1949 election.

Confirming the universality of concern about the organization of medical care, the incoming Liberal government continued the effort to expand public access to doctors and hospitals. However, the Liberals sought to rely more on market forces than the authority of government; the role of the Commonwealth Department of Health was to be reduced to a minimum and all ideas of fostering preventive care were abandoned. The Treasury would instead subsidize friendly societies for the working class and private benefit funds for the middle class; but this program stalled once again before the historical antagonism between the British Medical Association and the friendly societies.

In 1951 the friendly societies finally agreed to drop their support for panel prac-

tices and provide coverage on a fee-for-service basis. Having relinquished all attachments to the values that had inspired their organization during the nineteenth century, the friendly societies were now on their way to becoming simply health insurance funds.

Given this conclusion, it is difficult to agree with Gillespie that the history of medical care in Australia undermines current interpretations of the evolution of national health services. Alternatively, what is the evidence for the claim that the evolution of the Australian organization of medical care was simply the product of uniquely Australian circumstances rather than, as Gillespie writes, a local variation on 'a standard international pattern'? It's hard to say. International comparisons could provide such evidence. Gillespie does often refer to developments in Great Britain, the United States and other countries, but these comparisons are not so systematic and directed that they can help the reader to understand why Australia followed its exceptional path. He also emphasizes repeatedly the crucial importance of conflicts between federal and state authorities to explain the failure to develop an Australian national health service. Yet these conflicts were equally evident in Canada throughout this century, and that country still developed a quite successful national program. In fact, the history of Canada is so similar to that of Australia that an explicit comparison of developments in the two countries might have been very useful in understanding what was so peculiar about Australia that it 'has been the only liberal democracy to legislate to establish a popular national health insurance system, only to see it promptly dismantled'. Contingent factors may indeed be as important as Gillespie claims, but the argument needs to be sustained by a more directed examination of developments in other countries, especially if it must stand as a critique of a more general interpretation of the evolution of national health services. But Gillespie's work is still a richly detailed history of medical care in Australia, which will inevitably prove useful to future work on the development of modern liberal societies.

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**Glynn Barratt**, *Melanesia and the Western Polynesian Fringe*. Volume 3 of 'Russia and the South Pacific, 1696-1840', Vancouver: University of British Columbia Press, 1990. xvii + 257 pp., illus., £34.15.

This is the third volume in a series on the naval, scientific and social activities of the Imperial Russian Navy in the South Pacific. The author, Glynn Barratt, is the Professor of Russian at Carleton University in Canada, and it is clear that he has studied many of the artefacts from the Pacific which are preserved in Russia. He has also had access to unpublished accounts of Russian voyages to the Pacific Ocean. Many of these sources, and even the published sources, are relatively unknown to English-speaking scientists. This further book by Barratt is therefore to be warmly welcomed.

Part one of the book is devoted to the visit of the Russian expedition led by Vasilii Mikhailovich Golovnin to the islands of Aneityum and Tana in Vanuatu (formerly New Hebrides). It begins with an account of the friendship and cooperation between the British and Russian navies — what Barratt refers to as the 'Anglo-Russian understanding and alliance in the wars against Napoleonic France'. Under this 'understanding' many junior Russian naval officers were able to spend time (often years) aboard British ships as 'volunteers' and study navigational and other techniques. Moreover, there is no doubt that Russian naval officers regarded the exploits of Captain Cook with considerable awe; as Barratt points out, Russian interest in Pacific exploration was greatly stimulated by Cook's visit to Unalaska Island and to Kamchatka in 1778-1779. It must also be remembered that many British naval officers served on board Russian ships, especially after the conclusion of the Seven Years' War when many British officers became unemployed.

Golovnin was an officer who had spent several years as a 'volunteer' in the British Navy, and he had even served with Collingwood and Nelson. Golovnin was given command of the *Diana* in 1807 and, after calling at Portsmouth to purchase instruments, he sailed for the Pacific. He reached Vanuatu in July 1809 and, after touching at Aneityum (the southernmost island of the group), he continued to Tana Island and anchored in Uea Bay, which Cook had visited before him and named 'Port Resolution' after his ship. Golovnin's own account of his visit to Aneityum and Tana has been translated and published in English for the first time in Barratt's book, and it makes fascinating reading. In it, Golovnin compares and contrasts his own observations of the customs, the lives, the language and the artefacts of the Tannese with those of Cook and of George Forster. This is followed by a detailed chapter on the 'Ethnographic Record'.

Part two of Barratt's book is devoted to the Russians and Fiji, and particularly to the visit by the two ships captained by Faddei F. Bellingshausen and Mikhail P. Lazarev in August 1820. This visit, after sailing to the Tuamotus, Tahiti and to Tonga, was part of a 'winter cruise' as an interlude to their exploration of Antarctic waters. The Russians called at Ono-i-Lau, one of the southern islands of the Lau group, and made a number of important observations on the customs, weapons, language and so on of the islanders. One of those who came on board was called Paul; he was a Tongan who had been carried on to Ono in a storm. This is interesting as it emphasizes the close proximity of Tonga and the southern Lau islands and explains the mixed nature of Lau-Tongan culture. Barratt has included English translations of the written observations about Ono by Simonov (astronomer), Mikhailov (artist), and Egor'Kiselev (leading seaman) as well as by Bellingshausen himself. Mikhailov was the official artist for the expedition and much of his work is preserved in Leningrad (St Petersburg). One fine drawing of an Ono islander is reproduced on the dust cover of the book. Many artefacts were collected at Ono and details of a number of these are given.

Part three of the book is concerned with Russian visits to Nukufetau Atoll in Tuvalu (formerly Ellice Islands) and to Anuta Island in the eastern Santa Cruz group, both of which are inhabited by Polynesians. Incidentally, Anuta Island was first discovered (by Europeans) by Captain Edward Edwards in the *Pandora*.

This is a scholarly book about Russian voyages in the Pacific Ocean and about the islanders and their customs. It contains a wealth of detailed information and will be of great value to all those who study ethnography, linguistics, weapons and naval history.

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**Stephen J. Pyne, *Burning Bush: A Fire History of Australia*. New York: Henry Holt & Co., 1991. xix + 520 pp., illus., \$47.50.**

This is Stephen Pyne's fourth book on fire in the environment, but the first outside his native North America. It is a monumental investigation into the role of fire in the Australian environment and society, from the earliest imaginings to the bicentennial circle of bonfires around the coast in 1988. Four 'books' trace first the ecological context of the

eucalypt-fire dependent relationship, second the Aboriginal-fire interdependence, third the European-fire ambivalence, and finally the 'New Australian' or, as he terms it, 'Antipodean' strategic relationship with fire.

Pyne provides a comprehensive overview of the fire ecology of the Australian biota, ranging from the conjectured fire regimes of Gondwanaland through to the demonstrated accounts of contemporary fuel loads, plant reproductive adaptations to fire, burn tolerances, fire-induced initiatives in plant successions, and the existence of the 'fire flume' in the particularly vulnerable south and east of the continent.

Aboriginal fire-stick hunting and farming is exhaustively chronicled, and the role of fire in the Dreaming and in maintaining grasslands and open routeways through the woodland and scrub is documented. The origins of the British cultural baggage of fire management as imported into Australia is linked to earlier European land clearance processes and is seen as the rationale behind the indiscriminate early and continuing (at least until the 1950s in Gippsland) use of fire in land clearance for agriculture.

Changing attitudes to fire and its management are linked to the rise of forestry in Australia, with each colony — and later State — producing its own version of management along a spectrum from attempts at complete protection from fire to the advocacy of preemptive, prescribed burning — the Antipodean strategy in Pyne's view. The innovative work of R.H. Luke and A.G. McArthur is emphasized in the latter context. In recent years, as Pyne shows, this strategy has been criticised by conservationists who see prescribed burning of national parks and reserves as an anathema. As he also shows, however, the optimal strategy is still undecided.

Throughout the book the message is loud and clear: the history of Australia's biota has been dominated by fire, the current landscape is still highly vulnerable to fire (probably more vulnerable than before if we acknowledge the risky spread of the suburbs into the bush), and yet Australian society has not adequately accepted these facts.

Pyne brings a global perspective to his view of 'downunder', he has a clear command of the local research findings and sources, he documents his message carefully but unobtrusively, and he writes with verve and commitment. The parade of statistics passes as quickly as the fire front, while the eloquent prose burns longer in the mind: thus, '*Eucalyptus* ... elevated nutrient scavenging and hoarding to an art form'; 'what the fall of

Singapore was to Australian political history, Black Friday [1939] was to its environmental history'. He is sometimes repetitive, and occasionally he is wrong (brigalow is not *Acacia aneura*, p.33, and the 1974–5 fire season in the Centre owed more to the one-in-a-hundred-years rains of 1974 than to overgrazing and the lack of Aboriginal burning, p.375); but these faults cannot seriously detract from what is a *tour de force*. This book offers insights into not only the natural ecology of fire in Australia, but also insights into the human ecology — how our society has tried to come to terms with both the fire weed and the fire continent.

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**Norm Neill**, *Technically & Further: Sydney Technical College 1891–1991*. Sydney: Hale & Iremonger, 1991. 119 pp., illus., \$19.95 p.b.

The origins of technical education in N.S.W. can be traced to 1933, when the Sydney Mechanics' School of Arts (SMSA) was founded in the hope of improving morals as well as skills. Several decades would pass before anything resembling organised and systematic vocational training would come to this growing colony, and 1891 did not mark any such event.

This centenary publication therefore opens with an explanation of why the 100th anniversary of this year is worthy of celebration. The answer concerns buildings: 1891 was the year that technical education in N.S.W. gained its first permanent home. This history, then, is the history of the Ultimo campus, where Sydney Technical College fought a seemingly continuous battle against the constraints of funding and space. Its centenary also marked a major institutional change when, on 1 February 1991, TAFE was formally converted from a government department to a commission and given eight years to become 50% self-funding.

The first chapter provides the prehistory: the formation of the SMSA, the lead-up to its establishment of a Working Men's College in 1878, the government assumption of financial responsibility for its operation in 1883 (via the Board of Technical Education), leading in 1889 to full government administrative responsibility when the independent Board was dissolved and its functions transferred to the Technical Education Branch of the Department of Public Instruction. This chapter also identifies the traditions passed on from the era of private provision of technical

education to its establishment in the public domain. These traditions included: the system of administration which grouped courses into departments, the system of awards, a curriculum geared to the needs of full-time workers, a responsibility for provision of technical education in suburban and country areas, and the practice of using external examiners. Most significantly, there came a tradition for defining the role of technical education, only to find intentions thwarted by circumstances outside its control.

What follows is essentially a chronological account, marked out roughly in decades. The first 21 years saw the creation of a physical presence for the College and an institutional form which put it at the centre of the whole state system of technical education. In 1913–1915, under the impetus of the apparent shortage of apprentices and their often limited range of skills, a set of reforms was instituted which would consolidate the centrality of the College and its emphasis on 'supplementary trade instruction'. The innovative day-time courses introduced in 1902 were discontinued, replaced by programs to complement the practical experience gained on the job and open only to those working in related industries, a condition which effectively barred women from participation. The advisory committees established at this time to give industry input on syllabus content remained a feature until 1986.

Developments of buildings, courses and awards are then traced through war and peace, through a 'kind of golden era' of the more prosperous 1920s, through depression and war again. The 1950s saw an expanding system in transition, as a new role was incubating. December 1959 brought the ingredient necessary to make a major shift into a new era, when amendments to the Industrial Arbitration Act made it compulsory for all apprentices to have their technical college training in daylight hours, leaving facilities free to cater for different needs in the evening. This opened the way for the formation in 1975 of a separate Department of Technical and Further Education, to priority ranking of individual development needs over those of industry, and to a new role for the Sydney Technical College.

Those familiar with the earlier history, *Spanners, Easels, and Microchips*, which celebrated 100 years of state responsibility for technical education in N.S.W., will find Norm Neill's effort far more substantial and satisfying than that very brief overview. On the other hand, it has nothing of the richness of the RMIT history produced by Stephen Murray-Smith and Anthony Dare. Obviously pro-

duced to a much slimmer budget, it comprises 95 pages of text interspersed with 40 photographs and some additional appendices. It is indeed a very matter-of-fact account, clearly directed towards an audience with some relationship to the College, for it would only be such an audience that would find an interest in much of the detail about buildings, for example. Yet there is something here for others whose interests relate more to the place of the College in the educational structure of N.S.W., and the organisation of the book is such that it can be read selectively by those more attuned to courses and themes than to buildings. Not that the building theme is unimportant, for in that tale there is a progressive unveiling of new or expanding skilled trades and a wider message about funding priorities. Also, the several photographs which reveal what was going on inside those buildings provide a valuable record in themselves.

Major issues are indicated rather than debated, although themes do emerge, two of which are of particular contemporary relevance. Throughout we find a recurring theme of the upgrading of courses and awards to higher standards, only to have them split off to new institutions, leaving a gap in provision at the original 'technician' level. Related to this is the continuity of focus on vocational training, sometimes provided in different ways but generally oriented by the priority given to perceived industry needs, except for the TAFE period from 1974 to 1990. The final chapter indicates the critical assessment of that latter period by the new philosophy and administration which followed the Liberal/National Party government to power in N.S.W. in 1988.

This book must be judged in terms of what it sets out to do, which is to provide an account readily accessible to the general reader. This it undoubtedly does. It is simply and clearly written, and most chapters open with an analytical paragraph summarising the major thrust of the following pages. Sections are short, and subheadings provide accurate signposts to content. Overall, the author has managed to achieve a level of writing which conveys a sense of the broad changes, philosophy and context of each period, dipping into detail only at selected moments. It is not burdened with lengthy descriptions of administrative changes nor with character sketches of a succession of administrators, which we often find in such accounts. Indeed, there is little of the personal element, except for a section on the energetic but controversial Dr Murphy, pioneer of chemical engineering, and the

strong and influential Miss Roberts, who steered the Department of Women's Handicrafts in a direction which would equip women for roles as housewives or wage earners.

As a straightforward account of how an institution developed under the influence of internal and external forces, this book would be attractive and relevant to anyone with a past or present association with the College, including those many eminent scientists and technologists who began their professional training within its walls. It would also be a useful addition to the library of anyone seeking the historical outline of a significant part of the technical education system in N.S.W.

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**T.A. Darragh**, 'Frederick Proeschel, Colonial Map Maker', *Bulletin of the Bibliographical Society of Australia and New Zealand* (special double issue), vol. 15, nos. 3 & 4, 1992. \$15.00.

This is a well-researched record of the activities of Proeschel, who is claimed to be Victoria's only professional map publisher. This statement must be taken to read the only professional private-sector map publisher.

Proeschel conducted his business, mostly in Melbourne, in the period 1853 to 1864, and produced many maps on a number of themes. He started with maps showing the whereabouts — and the ways to — the various goldfields which rapidly opened up in the early days of the colony of Victoria, after it had separated from New South Wales in 1851. These were to be the forerunners of later road maps.

He is also credited with initiating consecutive dwelling-house and business-premise numbers, with appropriate identification, in the municipal street patterns. This practice was soon adopted by the various municipalities in and around Melbourne. It no doubt provided the impetus for the later business directories produced over a long period by Sands and McDougall for both Melbourne and, successively, most of the rural towns and settlements of Victoria.

Another very useful contribution to the community was the preparation of maps showing the electoral boundaries, needed as a consequence of the declaration of Victoria as a separate colony. Maps showing boundaries of mining districts, locations of wardens' offices, and other information to assist in mining administration were also published. With many of these maps, there came refer-

ence books, which provided the first place-names gazetteer of the new colony; and yet another innovation was the use of alphanumeric grid references to locate places of interest.

Unlike British cartographers of this period who published Australian material — the Jas. Wylds (father and son), Arrowsmith and Johnston, who mostly relied on official publications — Proeschel was the man-on-the-spot, with the added advantage that his topographic intelligence was gleaned from personal travel and other first-hand reports. Proeschel's activities extended into all the colonies, with the apparent exception of Western Australia, and his last and major work was an *Atlas of Australasia*. His cartographic talents had a strong geographic content.

The term 'mapmaker' can be rather confusing to the uninitiated. There are really two categories of these practitioners: first, those who prepare the topographic base from observations on land and water, and following these, those who use this base material for the addition of overlays related to specific subjects or themes. In the terminology of today, these latter are thematic cartographers, and Proeschel was one of these.

It is noted in the text that Proeschel made frequent reference to county maps and other maps from the official survey departments, which provided base material for his own overlays. These official maps, mostly a record of the cadastre and put together from a multitude of individual surveys, were loosely related to piecemeal geodetic surveys and astronomical fixes on land and sea in the nineteenth century. The compilation of the cadastral county, parish, hundred and township maps has been largely overlooked in the story of mapping, as these impinge only lightly on the community at large, which favours maps with more everyday themes. There remains a need for the story of the techniques used for early cadastral mapping to be told — to complement those of the early thematic cartographers. In many cases the results were not particularly accurate, but the story should not be permitted to go unrecorded.

Dr Darragh's contribution to the history of early Australian cartography is timely and well and carefully done, as evidenced by the extensive notes and the listing of the maps he has uncovered.

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