

# Book Review Section

Compiled by John Jenkin\*

**John Gascoigne**, *Science in the Service of Empire: Joseph Banks, the British State and the Uses of Science in the Age of Revolution*. Cambridge: Cambridge University Press, 1998. vii + 247 pp., illus., \$49.95.

'The Treasury are not Anxious for the promotion of Science'. Joseph Banks' *cri de coeur* about government parsimony with reference to scientific research has often been echoed in our own day. Yet, as John Gascoigne lucidly explains in his well-researched book, at least since the eighteenth century governments in Britain and elsewhere have often used scientific expertise for national purposes. During the Age of Enlightenment, which was also an age of war and revolution, trade and colonies were seen as providers of military resources, and voyages of exploration were valued for the advantages they could confer over rival states. Men of science were asked to provide advice on the means of obtaining and utilizing new knowledge by, for example, advising the navy or evaluating the botanical specimens brought back to Britain from distant parts of the world.

*Science In The Service of Empire* is not a biography of Joseph Banks; as the sub-title explains, Gascoigne evaluates his career as an example of the use of science by the British state during the late-eighteenth and early-nineteenth centuries. This was an era that has often been described by historians as one of corruption, inefficiency and backwardness on the part of those who governed Britain, but Gascoigne's view is refreshingly different. He places Banks in a context of modernization necessitated by the American, French and Industrial Revolutions, a time when the foundations of the Second British Empire were being

laid. Gascoigne reminds us that, for all their faults, the conservative landowning oligarchy and the governmental system of late Hanoverian Britain eventually triumphed over their foreign enemies. For this was a cohesive oligarchy, bound together not only by the pickings of patronage but by a lively concept of voluntary public service that was resilient enough to breathe a spirit of reform into old structures. Gascoigne offers Banks as an example of this system at scientific specialization and professional administration. Banks became the unofficial scientific adviser to some of the leading ministers of the day on the basis of his contacts with them through the affable eighteenth-century world of gentlemanly society and membership of informal, non-governmental organizations such as the Royal Society and the African Association. This was a world of patronage, to which Banks obtained entry with the help of his neighbour, the Earl of Sandwich; beginning with a shared passion for angling and an admiration for each other's mistresses, they went on to co-operate in the Royal Navy's voyages of exploration, where Banks' scientific knowledge could be of service.

Gascoigne persuasively sets out the principal elements in the ideology that imparted a unity to Banks' varied interests – a loyalty to the well-being of the landed gentry, an attitude to politics that Banks once summed up as support for 'a virtuous King & a Tory ministry', and 'neo-mercantilism', a collection of patriotic ideas which envisaged a strong government using commerce, naval power and scientific knowledge as weapons of national aggrandisement. This approach to reform set Banks against some of the most important Enlightenment thinkers of the day, most notably Adam Smith, whose advocacy of free-market economics Banks on one occasion dismissed as the naivete of a 'a very monk in a Scottish university'. Despite his fame as the advocate of world-wide voyages

\*School of Philosophy, La Trobe University, Bundoora, Victoria 3083.

*Historical Records of Australian Science*, 12(3) (June, 1999)

of exploration, Banks often appears in Gascoigne's pages as a 'little Englishman', who was capable *inter alia* of rejecting the metric system of measurement because he saw it as a product of the French Revolution.

Gascoigne constructs his book around Banks' two interacting roles as the government's 'de facto scientific adviser' and 'the staunchest imperialist of the day'. Australian readers will be interested in the discussion of Banks' attitude to New South Wales, a colony for which he was 'a sort of Honorary Secretary of State', eagerly promoting its development by sending out plants and encouraging projects for merino grazing. The story was similar everywhere. Not only did Banks wish to see the British Empire set free from its dependence on Spanish fine wools, he also attempted to promote tea planting in Assam to oust the Chinese from the British Indies. Although he was a very tepid deist, he used his influence on behalf of the evangelical London Missionary Society in the hope that its stations would serve as outposts of British trade and naval power as well as sources of botanical specimens. Iceland too, which he visited in 1772, came within Banks' net, and, if he had had his way, Britain would have annexed it from Denmark because of the encouragement its fisheries would have given to the seamen on whom the Royal Navy depended in war. This was not 'pure' or 'disinterested' science. Even the botanical gardens that Banks promoted in various parts of the world were meant to serve the interests of the British state as centres of imperial botany.

It would be ungracious to linger long over missed opportunities in a book that offers so many scholarly riches, but it is a pity that Gascoigne has not related his thesis to Oliver Macdonagh's work on the development of British government. It is also to be regretted that this book focuses on a social pyramid that seems to have little or no base. Gascoigne fleshes out Banks' relationship with the ruling élite in some detail, and he makes it admirably clear that Banks' principal concern was always for the well-being of the landed interest, but he says very little about the place of the lower orders in Banks' scheme of things. Significantly, Banks' favourite colony was convict New South Wales, and he saw the Cape of Good Hope as a dumping ground for paupers; but what was to happen to the great majority of the people in the British

state? Gascoigne refers to Banks using his political leverage for 'publicly beneficial ends, or at least for ends that suited the interests of his fellow landowners', but the qualification could profitably have been pressed further. The old variety of mercantilism had included forms of paternalist government that were designed to help the lower orders in such matters as poor relief, wages and prices, but these were either repealed or challenged at the very time when Banks and his associates were adopting their neo-mercantilist schemes. What was their response? Likewise, it should not be forgotten that this was not only the era of Joseph Banks; it was also the era of Thomas Malthus (not mentioned in Gascoigne's index), when a rapidly-rising population was threatened with the prospect of starvation. Banks was aware of this debate, but, so Gascoigne tells us, in his concern for the interests of the landowners he was determined to shut out foreign supplies of grains 'until disaster stared the country in the face', hoping in the meantime that something would turn up in the form of alternative crops and new strains of wheat. If Banks was harnessing science in the service of empire, it is worth asking whose empire this was and what was the place of others in it?

*Science In The Service of Empire* will be read with pleasure and profit, but there are some distracting slips when the writer temporarily loses control of the text. For example, on at least three separate occasions the reader is told that Banks' house was attacked by rioters who opposed the Corn Laws. At one stage Banks is described as a defender of the slave trade 'to a degree', and at another his African Association is described as a means of diminishing it. In his choice of a title, Gascoigne is scrupulous to use 'British', but in the text 'England' and 'Britain' are used interchangeably and on occasion confusingly. Nonetheless, this is a well-written book, and Cambridge University Press has presented it handsomely.

Alex Tyrrell  
Department of History  
La Trobe University

**Patricia Morison, *J.T. Wilson and the Fraternity of Duckmaloi*.**  
Amsterdam: Rodopi, 1997. 477 pp.,  
illus., US\$34.00 pb.

Professor James Thomas Wilson (1861–1945), Professor of Anatomy at the University of Sydney from 1890 to 1920, has joined the ranks of Australian science's luminous but forgotten men. His outstanding record of research, teaching and administration is passed over in the University's most recent history (Turney, Bygott & Chippendale, *Australia's First*, vol.1, 1991), while his influence in Australian monotreme research and, most widely, in the foundation he and his research circle laid for Australian excellence in neuroscience, has called for serious assessment.

This scholarly, detailed, and superbly-written biography by Patricia Morison fully redresses his neglect. The work, long in gestation and widely researched, is more than a biography. In addition to its close examination of the academic, public and private life of Wilson, his distinguished circle of colleagues and his far-reaching research into embryology, neurophysiology and neuroanatomy, it offers a telling route into the history of anatomical thought over a formative half-century and a constructive insight into the history of medicine and medical education.

A graduate of Edinburgh University's Medical School, the twenty-six-year-old Wilson arrived in Australia in February 1887 as Demonstrator in Anatomy, to join Professor Anderson Stuart at the School of Anatomy and Physiology at Sydney University, established four years before, and in 1890 rose to become the first Challis Professor of Anatomy. He left Scotland deeply committed to Darwin's scientific ideas – lamented in his going by former fellow-student and philosophical colleague, J.S. Haldane, who feared Sydney would prove 'a barren place' – and early began to transform knowledge of Australian physiology and embryology.

Wilson was multi-faceted. A medical man as well as a teacher and researcher, he at once established a relationship with the Prince Alfred Hospital that was closely associated with the university, becoming an immediate short-term honorary resident medical officer, subsequently a stop-gap resident and medical superintendent,

served as the hospital's first pathologist part-time from 1888 to 1890, and became its honorary secretary from 1897 to 1901.

In 1892, he began to look closely at the physiology of Australia's marsupials and monotremes, a subject that had stirred international scientific interest throughout the nineteenth century. His work, 'steeped', as Morison writes, 'in evolutionary concepts, skilled in histology and microscopy', focused on important new investigative work into marsupials and monotremes and shifted its research centre away from Britain and Europe to Australia. At the same time, Wilson started to collect around him a group of innovative young researchers, who would extend and consolidate this embryological and physiological research and lay foundations for brilliant careers.

From 1891, these included the British physiologist Charles James Martin and biology demonstrator James Peter Hill, and they were joined in 1894 by one of the School's first post-graduate researchers, the highly original Grafton Elliot Smith. From this robust collegiate circle, sharing their scientific inquiry and fieldwork, the 'Fraternity of Duckmaloi' was formed, taking its title – a title that echoed around professional colleagues overseas – from a favourite hunting ground for the platypus on the Duckmaloi River, New South Wales. With Wilson, their work was not only to open up important insights into the enigmatic physiology of the platypus – the duckbill snout, the shoulder girdle and the skull – but to move into the evolutionary physiology, neurology and morphology of Australia's monotremes and small marsupials, with studies that attracted high acclaim abroad. 'By concentrating on the unique opportunities of their geographic base', Morison sums up, 'they made a significant contribution to revealing the secret of monotreme reproduction and early mammalian development'.

The young researchers' contact with Wilson produced singular professional rewards. After work on the brain and evolutionary physiology of the monotremes, Grafton Elliot Smith left the fraternity in 1896 for advancement overseas, training as a physical anthropologist and anatomist and becoming successively Professor of Anatomy at Cairo, Manchester and University College, London from 1900 to 1936. Hill, after highly-creative and sustained research into the embryology of

marsupials and monotremes from 1892 to 1906 at Sydney, and taking with him a large collection of their preserved organs on which he continued to work, became Joderell Professor of Zoology and Comparative Anatomy at London University (1906–21), and Professor of Embryology and Histology at University College, London (1921–38). Martin, moving to the University of Melbourne as Lecturer and then Acting Professor of Physiology from 1897 to 1901, became Director of the Lister Institute in London from 1903 to 1930, was knighted in 1927, and returned to Australia as Director of the CSIR Division of Animal Nutrition in Adelaide from 1930 to 1933. All three of Wilson's associates, and Wilson himself, won election to the Royal Society of London.

Wilson in Australia remained in the mainstream of anatomical research, publishing papers, maintaining contacts with overseas scientists, and putting the Medical School of the University of Sydney on the map. As Morison suggests, the publicly-conspicuous and energetic founding professor, Anderson Stuart, 'built the Medical School; Wilson furnished it with a reputation'. An advanced and constructive theorist, who applied physio-chemical concepts to investigating organic phenomena and tied his work to seminal advances in scientific thought, Wilson also provided a centre for a perceptively scientific approach to evolutionary thought in Australia. He became, too, an important contributor to the development of neurology as a distinct branch of biological science.

In the first decades of the new century, Wilson's commitments spread increasingly beyond teaching and curriculum planning into administration, scientific societies and civic duties. One of the interests of Morison's book is her examination of the evolving character of medicine and science at the University of Sydney in the late-nineteenth and early-twentieth century, where dedicated and brilliant men such as Liversidge, Threlfall, Haswell and Edgeworth David struggled for greater funding and facilities for science, and Wilson became an articulate advocate of a changing curriculum to absorb new scientific knowledge and of laboratory facilities that would lift the Medical School to the standards of America and Germany. Throughout, Morison weaves collegiate friendships and family lives, Wilson's own tragically-brief first and happy second

marriages, and the advancing world and changing personnel of the university, into her professionally and scientifically orientated chapters, imbuing scientific history with a human face.

After serving as Assistant Military Censor in Sydney for a year and a half in the First World War – a full-time and demanding slice of his life described with revealing interest in the chapter entitled 'War' – Wilson returned to his university offices and his research on the transitional area between the brain and spinal cord. Four years later, after succeeding, on Anderson Stuart's death, to the Deanship of the Faculty of Medicine in March 1920, Wilson accepted the Professorship of Anatomy at Cambridge University. It was an appointment that Sydney University interpreted as a singular honour for an Australian seat of learning. Yet ironically, it was the young Australian-born John Hunter, a brilliant and popular demonstrator who had graduated with the University Medal only two years before, who, appointed with Wilson's blessing as Associate Professor with a view to succeeding to the chair five years later, reaped with his sudden and untimely death in 1924 the larger historical reputation, a legend that Morison seeks to examine and correct.

A scholarly and elegant writer, Patricia Morison sees biography as a way of presenting history. With her richly-peopled canvas, the careful penetration of prevailing medical, scientific and philosophical theories, a large Bibliography and Select Biographical Notes on Scientists Mentioned in the Text, she has created a dense and valuable work. Its spaciousness is both its weakness – for those with inevitably-contracted reading time – and its strength. The book can be obtained through the ANU Co-op Bookshop, and from the author, an independent scholar, at 22 Darling Street, Barton, ACT 2600.

Ann Moyal  
Canberra

**Marjory O'Dea, *Ian Clunies Ross: A Biography*.** Melbourne: Hyland House, 1997. xii + 371 pp., illus., \$34.95.

For those privileged to know him, Ian Clunies Ross was the epitome of the 'statesman of science'. In his history of the CSIR, Boris Schedvin claimed to see in him one who, 'more than most scientists of his generation, ... saw the whole as more than the sum of individual parts' – a man with the capacity to see interconnections. Since his death in 1959 and the publication of his posthumous memoirs in 1961, he has long warranted a full biography. It is appropriate that Marjory O'Dea should have taken on the task, for it is one to which she brings a long interest in science policy and the administration of research, and an appreciation of the nuance of federal policies towards science. Moreover, her interest in the technical history of agricultural and veterinary science, on which so much of Australia's post-war prosperity has until recently relied, adds greatly to our appreciation of the value of applied science to the primary sector. Her access to CSIRO records and the private papers of Clunies Ross and his contemporaries gives her a valuable perspective. The result is an impressive labour, but unfortunately one of tragically-limited value.

O'Dea devotes great care to Clunies Ross' ancestry and early life. From his family background and birth in 1899 at Bathurst, the youngest of four sons of a London-trained scientist-father of Scottish ancestry, we are then intermittently introduced to his family, his wife and his daughter and sons, now firmly in the professions. We follow his early trajectory through school and the University of Sydney – where he took second-class honours in 1927 and discovered an interest in veterinary science – to his earliest jobs, as a Walter and Eliza Hall Research Fellow, at the University of Sydney, then at the newly-established CSIR, back to the university as professor of veterinary science, and finally back to CSIR after the Second World War. In both its incarnations, CSIR and CSIRO were to shape his life, even as he gave them direction – ultimately as a member of the Executive and CSIRO's first Chairman – until his death, while still in harness, at the early age of sixty.

O'Dea's account follows step-by-step the heights and hollows of his life; as represented, a life of work and committed service – to country, science and nation. From the 1920s onwards, it became notable for features that O'Dea is at pains to emphasize; among these, the ability to move progressively from one research problem to another – from early work on the ecology of the liver-fluke parasite to studies of the hydatid parasite, that linked the interests of agricultural and veterinary science to public health. A second feature was his enthusiasm for the application of research to the wool industry, made easier by his close identification with graziers and pastoralists. Under his guidance, the CSIR's McMaster Animal Health Laboratory became Australia's key research centre in the study of sheep-breeding genetics.

A third quality of Clunies Ross emerges in what Schedvin called his 'Enlightenment' vision of science as a force for betterment in the world, in token of which international scientific co-operation was a political imperative. This dedication was combined with a commitment to a form of 'scientific humanism', especially visible where science and religion met and where the values of general education appeared fatefully compromised by the advance of specialization. Above and beyond these qualities was the characteristic feature of one seeking 'balance' in all things – between basic research and industrial application, between domestic and international policy, between the interests of Australia and Empire, and even between the interests of work and family. He is well remembered for his agility of mind, and as being 'equally at home with politicians, businessmen and scientists'; good will meant 'more to him than proving the other man wrong'.

The achievements of Clunies Ross become more extraordinary as we follow his early visits overseas, not only to Britain but also to Australia's regional trading partners – Japan, China and Korea. How easy it now seems for one whose research began with diseased sheep, to move on to the study of wool economics and the inaugural chairmanship of the International Wool Secretariat. A frequent voice on ABC radio, he was a delegate to the League of Nations Assembly in 1939. Wartime saw him return first to the CSIR, then to the University, then to the Directorate of Manpower. These

were pioneering moments, and his efforts helped win for science a recognized place in post-war Australian reconstruction.

The post-war years also saw the politics of science acquire an intensity of its own. The small scientific community in Australia, crystallized in the culture of laboratory research at CSIRO, reflected a pattern of shared values. When that appeared endangered – in research areas, for example, where outsiders dared to tread – the circle could quickly close. O’Dea commendably recalls CSIRO’s official reaction to Marston’s reports of radioactive iodine in sheep, following the nuclear tests at Monte Bello and Maralinga, with its veiled criticism of Leslie Martin’s Safety Committee. Empirical results of scientific investigation could be, and were, construed as subversive to the interests of science itself.

In his senior position, Clunies Ross inevitably confronted moral dilemmas, a better understanding of which can help explain the fearful behaviour of scientists and scientific organizations during the Cold War. Regrettably, we are not told enough to decide how well he met these challenges. Indeed, we come away with rather more insight into the views of his contemporaries, leaving Clunies Ross occasionally marginalized in his own biography. This tendency is particularly noticeable in the treatment of David Rivett, who is rightly credited with being the ‘principal architect of our national scientific organization’, and who therefore receives an entire chapter to himself; but also in her account of Tom Kaiser, to whose abysmal treatment by CSIRO another full chapter is devoted. Clunies Ross’ own position on many of the issues raised in these chapters is left unexplored. We are reminded of CSIRO’s hugely significant role in radioastronomy and the use of myxomatosis, but where more sensitive issues claim our attention – notably in the events surrounding the secrecy scare and the passing of the CSIRO Act of 1949 – the author fails to engage with the extensive secondary literature. Instead, Clunies Ross’ public statements on science and secrecy, such as they are, are clothed in language that defers to the defence of principle and of government science.

A good ‘life’ must be set in ‘context’. Clunies Ross was widely seen as a romantic figure – the ‘people’s scientist’, Schedvin called him. He seems also to have been an

ideal manager. Yet the protagonist is often left to speak from the sidelines, while ‘context’ threatens to overshadow the person. The recitation of his comings and goings, buttressed by long and heavy quotations, tends to obscure the prominences of his life, while the absence of summary transitions between chapters leaves us with a picture of impressions, dense in fact but light in synthesis.

Overall the book avoids giving offence, but at the price of avoiding conflict. The relations of Clunies Ross with his contemporaries are described in language so decorous as to suggest them incapable of a harsh word. Only occasionally do we get glimmers of difference. At one point, for example, O’Dea brilliantly summarizes Ashby’s talent of matching problems to people, ‘so different from Ian’s confident matching of people to problems or Rivett’s permissive belief that people should find their own problems’. There are also occasional asides that help distance her subject and show flaws as well as virtues. She leaves unrefuted Rivett’s description of him as a ‘showman’ and an ‘empiricist’, and Rivett’s view of his administrative limitations are, at times, forthright. On the eve of his arrival at CSIR in 1946, she says, Clunies Ross ‘had no special plan for the [CSIRO], no sense of mission towards or through it, no expressible opinions about the administration of scientists and no formulated views on the role of Chairman of Australia’s paramount scientific agency’. It is all the more a pity that, at the end, the reader is left without any summary analysis, and a conclusion consisting only of a selection of posthumous fragments penned by friends and colleagues.

Clunies Ross was a man, we are told, of much complexity. In his own eyes, he failed to secure for himself a place in history, a judgement patently false; but amidst the diverse tasks he set himself, there are many that one would wish to see more fully explained. His role on the Murray Commission is highlighted but understated; and the opportunity to wed CSIRO’s laboratories more closely with the universities and industry was a key issue then as now, so why were some co-operative experiments successful and others not tried? What factors gave Clunies Ross an edge over his peers? Statesmen of science are rare in any generation, and in this period Australia was blessed by several; for

example, Julius, Ashby, Martyn, Rivett. They gave Australian science a quality of vision largely forgotten (and certainly less visible) today. At the same time, they differed considerably in their approaches to science and its administration; but where is the conclusion that will compare and contrast their achievements?

It is always a pleasure to welcome an addition to the corpus of Australian scientific history and biography. As to the value of this book, opinions will differ. Some will find a fuller understanding of this period of Australia's scientific coming-of-age; others will be disappointed. Scholarly standards insist on adequate documentation; among the worst sins an historian can commit is a failure to source quotations, to reference archival documents, or to acknowledge and date manuscript and oral evidence. Here, the complete absence of footnotes and bibliography devalues the currency of argument and renders the outcome conjectural or, at worst, anecdotal. The book therefore cannot add permanently to the corpus of our knowledge; at best it will serve as a indicator light for others. If the publisher is to blame for this want of care, so be it; but for a man of science, dedicated to transparency in argument and debate, it becomes an ironic and ultimately self-diminishing tribute.

Roy MacLeod  
Department of History  
University of Sydney

**Ed Muirhead, *Leslie Martin at Melbourne: Profile of a Physics Department (1945–1959)*.** Melbourne: University of Melbourne School of Physics, 1998. xii + 123 pp., gratis pb.

This is an intriguing 'essay' – at once of local and broader historical interest – on a limited period in the history of the University of Melbourne School of Physics: the 'homogeneous period' from the end of the Second World War to the inception of the modern era, characterized by the multi-professor department of 1961 onwards. It also corresponds closely to the Chamber of Manufactures professorship of Leslie Martin (1945–59). The author was a participating graduate student in this period and has surveyed many others who were also there, leading to a consensus 'quite candid and not always flattering'.

The Second World War is perhaps the most important turning point in the history of Australian science, and so it was for physics at the University of Melbourne. The transition from a post-colonial department on the British model, enhanced by its brilliant leader, Thomas Laby, and based on the Cavendish Laboratory at Cambridge, was halted by the demands of war work and Laby's 1942 resignation. It was left to his successor to push forward the change towards a modern School of Physics.

Martin rose to prominence from humble circumstances, through the award of a number of scholarships, Melbourne BSc and MSc degree work under Laby (1922), a Cambridge PhD under Rutherford, and a Senior Lectureship and then Associate Professorship at Melbourne from 1927. In the search for Laby's successor, the best initial applicant withdrew, Harrie Massey was invited but declined, there was no strong external candidate and, in the face of an increasing need to fill the chair, Martin was appointed from within despite Cambridge reservations. He became a very competent administrator and educationist, who lacked an innovative research flair but who gathered together a particularly good staff, eight of whom were Laby protégés – via 1851 Exhibition scholarships and Cambridge PhDs. Muirhead provides useful pen pictures of all the permanent staff of the time, including Mohr, Burhop, Hopper, Law, Mather, Caro and others. Martin himself was subsequently appointed to numerous government and semi-government organizations, and in 1959 resigned his Melbourne chair to become Foundation Chairman of the Australian Universities Commission and the principal author of the 1961 'Martin Report' on tertiary education in Australia.

Although focused on one university department, this study has rewarding wider perspectives. Martin's plans for Melbourne physics were severely hampered by the rapid post-war expansion in undergraduate numbers and by the lack of adequate resources for an evolving undergraduate curriculum and especially for his chosen programme of nuclear physics research. History is currently repeating itself to a surprising degree, but without any signs that we have learnt from previous experience. How sad that the study of history is in sharp decline, just when we need its lessons and its visions most.

In Martin's department, American influences slowly superseded British ones, as unit undergraduate courses, postgraduate lectures, formal supervision of research students, regular colloquia, staff study leave, and more frequent overseas visitors were progressively introduced.

Research, particularly in nuclear physics, was not only hobbled by inadequate resources and less than cordial relations with the ANU, but also by a lack of adequate definition and planning. There was a too-narrow focus on 'machines for the young men to play with', and a lamentable refusal to promote theoretical physics within the department. And yet, in the fifteen years of Martin's stewardship, there were an average of twelve publications, more than six MScs and two PhDs per year. So if the research output was modest, the training of postgraduate students at the threshold of research was commendable – the list of graduates from this period is most impressive in terms of the positions they now occupy throughout our society.

Overall, I found Muirhead's judgements fair if perhaps a little severe. Martin was not a front-rank physicist, he had significant blind-spots, and he probably chose the School's major research field unwisely; but he did leave his successors a lively and promising department in both teaching and research. What is especially gratifying in this essay is its honesty, modesty and integrity. At a time when so much university 'history' has more to do with public relations and window-dressing than with historical accuracy and completeness, this modest 'interim contribution' is insightful in its coverage and unexpectedly representative of much of the history of science in the Australian context.

John Jenkin  
School of Philosophy  
La Trobe University

**Murray S. Upton, *A Rich and Diverse Fauna: The History of the Australian National Insect Collection 1926–1991*. Melbourne: CSIRO Publishing, 1997. xix + 386 pp., illus., \$59.95.**

Since the first insects from Australia were described by Fabricius in 1775, the immense wealth and diversity of our insect fauna have become increasingly apparent and the object of study and envy by scientists in many parts of the world. The Australian National Insect Collection (ANIC) is by far the largest and most representative collection of Australian insects and their relatives in existence, and it is a resource of immense value for the study of our faunal heritage and as a source of vast amounts of data of increasing relevance to planning conservation and managing the ecosystems in which insects occur. As for many such collections, these contemporary values are not sufficiently appreciated and, as part of CSIRO's Division of Entomology, ANIC has had to fight for survival and 'respectability' in competition with various more 'applied' fields of entomology, perceived by politicians as electorally more advantageous. The protection of agricultural commodities for export, the control of environmental weeds, and attempts to protect Australia from yet more alien insect invaders all attract more public attention than simple taxonomic documentation of our native biota. Yet, even Cinderella had her day, and the last decade has seen greatly increased appreciation of ANIC as a repository for part of our heritage of 'biodiversity' and highly relevant in pursuing effective conservation policy and practice in addition to clarifying the diversity and evolution of our endemic insect fauna. These needs have led to expansion of research activities well beyond those of the traditional taxonomist, to encompass fields such as biodiversity informatics, interactions of insects with native trees, and patterns of diversity of soil fauna, in addition to organising training courses and identification workshops.

Murray Upton's book, recently honoured by a Whitley Award, is the story of the development of ANIC over its first 65 years (1926–1991), written by one associated with many of the more significant advances during the second half of that period. Upton therefore writes from the point of view of an 'insider', justifiably proud of what his

institution has achieved and of its leadership in the discipline it represents. I should, perhaps, declare my own interests: as an insect systematist/ecologist, I have spent considerable time in ANIC over the last 25 years, and I have valued greatly the friendship and collegiality of many of the people there, as well as enjoying access to their remarkable collections. Latterly, I have endeavoured to represent the interests of ANIC on the Division of Entomology's external advisory committee. I admit considerable sympathy for ANIC's place in Australian science.

I found the book interesting, informative and, in places, fascinating. It chronicles a broad sequence of events from the pre-foundation years, with informative vignettes of many of the major personalities involved in the development of a national approach to entomology, and many excerpts from archival correspondence. Early disagreements between strong personalities such as R.J. Tillyard (the first Chief of the Division) and G.A. Waterhouse led to considerable tensions. Tillyard is one of the giants of Australian entomology, but his twin interests of entomology and spiritualism were at times uneasy bedfellows. Upton repeats the anecdote of Tillyard showing a fossil insect to a psychic medium in the hope of resurrecting it, and his interests in both fields were acknowledged internationally.

The practical problems of establishing and staffing the collection are reported in several chapters, where issues and personalities are intertwined. Virtually all significant events and staff associated with ANIC and its predecessors in the Division are profiled and discussed, together with the conflicts, collaborations and symbioses that arose as the institutional structure matured and the role of the insect collection became clearer. Together with numerous photographs and biographical details, the book is valuable simply as a source of information on Australian entomology and entomologists, in addition to charting the emergence of a scientific discipline and discussing the wider issues of Australia's international roles in entomology. The various vignettes, however, range from those essential to the story to more tangential and 'gossipy' items of limited interest other than to the participants. Many of these could have been omitted without loss and, indeed, to the benefit of the continuity and flow of the tale of this outstanding record of achievement. This is

perhaps my only significant criticism of the book; it is understandably institution-centred and at times tends to minimize significant contributions from others to themes of common endeavour, but the trivial and important are not always separated.

The book is a valuable chronicle of the development in Australia of effective field expeditions and natural history exploration. From early trips in the 1930s, the Division's activities have done much to set high standards for others, with remote areas targeted for extended visits. The exploits of W.W. (Bill) Brandt in Papua New Guinea justifiably constitute a chapter of their own. Brandt's exacting standards for specimen preparation under remarkably difficult conditions have never been equalled, and his specimens remain some of the most remarkable ever collected from those remote highland areas.

The contributions of amateur collectors are also detailed. Museum collections are accumulative, and the progressive deposition and amalgamation of individual collections is an integral part of their growth and representativeness. ANIC has been a major beneficiary of such donations, and the stories of some of the donors and benefactors are fascinating.

*A Rich and Diverse Fauna* is an important contribution to the history of entomology in Australia, and significant for its insights into the political process in science, the personalities who have influenced entomology, and how it is perceived in the wider community. The account of early attempts to employ entomologists from overseas reveals the obstructions of government policy at that time; at one level, the story of ANIC is the story of the search for funds, staff and facilities. The book culminates with the history of the major home of the collections, the D.F. Waterhouse Laboratory of Insect Taxonomy, and the difficulties of bringing this outstanding facility to fruition. Even today, political sympathy and funding support for taxonomic and other basic documentation of our fauna remains pitifully small in relation to the need and, indeed, obligation to fulfil Australia's formal commitments under recent international agreements. Basic systematics is not glamorous, but it underpins so much other contemporary science that it must be pursued diligently, vitally and urgently in this country. Recent

developments summarized at the end of this book help to explain why this is so, and endorse the importance of ANIC as a resource of global significance for biodiversity appraisal. Upton notes that the major aim of the collection is formally stated to be 'to describe, document and classify the Australian insect fauna', and he then comments 'With scarcely more than 60% of Australia's insect fauna yet known, this mission remains the program's primary goal. Until the fauna is known, how can we possibly conserve and sustainably manage our natural resources and biodiversity?'

The record of publication and achievement is one told with justifiable pride, but the impetus generated could so easily be dissipated in the current political climate, where business management and financial parsimony displace scientific ideals and best practice all too readily. Fundamental documentation is a laudable and necessary aim, and must not be replaced entirely by taxonomic approximation and rapid biological assessment in seeking optimal means to understand our biota; the twin activities are complementary, not substitutive.

Appendices include lists of the staff (with biographical details) and office-bearers associated with ANIC, important collections incorporated, lists of major publications, field trips and other significant achievements. They are followed by a comprehensive bibliography (some references are obscure, but copies of all are stated to be held in the ANIC archives) and an index, which is of considerable help in cross-referencing some of the more disjunct themes in the text. The book is appropriately dedicated to K.H.L. Key, whose influence on ANIC for well over fifty years well merits such acknowledgement.

Finally, who is this book for? Entomological historians are not a large group, but for them it is a seminal addition to documenting Australian entomology, and it is of international interest. For those associated, even tangentially, with ANIC, it will provide interest and opportunities for reminiscence and minor prurience. However, for many others it can provide insights into the difficulty of establishing and maintaining our heritage and the importance of archival collections in helping to safeguard our collective future. Unfortunately, the opportunity to reach this wider readership is likely to have been

largely lost through the high cost of this excellently-produced book. A more tightly edited and shorter text, produced in a soft-cover version, would surely have had wider appeal. Nevertheless, it is a worthy addition to the list of entomology books produced by CSIRO.

T.R.New  
Department of Zoology  
La Trobe University

**Wayne Orchiston, *Nautical Astronomy in New Zealand: The Voyages of James Cook***. Wellington, N.Z.: Carter Observatory Board, 1998. 131 pp., illus., NZ\$29.95 .

This well-illustrated book on early New Zealand astronomy is beautifully reproduced by the Carter Observatory with a limited edition print run of 750 copies. The book is well laid out with many well-reproduced photographs, tables of results and figures.

From a range of sources, the author has meticulously collected together the details surrounding the early work on astronomy in New Zealand following the arrival in 1769 of James Cook on the first of his three voyages to New Zealand. Cook, Charles Green, William Wales, William Bayly and James King were all charged with astronomical duties associated with the Cook voyages, and the author outlines in detail the work of the different astronomers. A range of other people who also helped with astronomical observations are also discussed.

For those interested in the technology of the day, Orchiston reviews the instrumentation available to astronomers on the voyages – including, in one section, a discussion of the telescopes, quadrants and sextants, in another a discussion of the clocks, watches and the chronometers, and in a third the tent observatories used.

In astronomy, the eighteenth century was dominated by the need to determine accurately latitude and especially longitude around the world for navigation, the study of planets and gravity physics, the determination of the distance from the Earth to the Sun, and the trajectory of comets. Orchiston's book focuses on this area of research in the New Zealand context. The book also provides a New Zealand

context for a comparison between New Zealand and Australian astronomy for the extended time period covered by *Explorers of the Southern Sky* (Haynes, Haynes, Malin and McGee, CUP, 1996).

*Nautical Astronomy in New Zealand* additionally provides a very useful, if short, discussion of Maori astronomy. This is a field that has been overlooked in the literature in the past, and although Orchiston introduces the subject, much work clearly needs to be done to enlarge this field of research.

The last section of the book outlines some of the work done by Arthur Stock in the second half of the nineteenth century and introduces the work of Alexander Bickerton, who arguably could be classified as New Zealand's first professional astronomer. The book also looks at the involvement in astronomy of a number of amateur astronomers in New Zealand in the early part of this century.

I have only a few minor criticisms of the book. There seems an overly-large use of long quotations, and although these are generally interesting, I found them annoying towards the end of the book, since they occurred so frequently. I also noted that much of the material to do with Cook's voyages and with eighteenth-century clocks can be found in other sources. I was also left wishing that the author had expanded his discussion beyond the purely astronomical to include the developing social role of astronomy in New Zealand in the nineteenth century.

This is a book that historians of southern-hemisphere science will want to add to their collections. Interested readers will also find that it presents a different perspective on the voyages of James Cook, one that they may find intriguing.

Raymond Haynes  
Australia Telescope National Facility  
CSIRO, Sydney

*Journal of Astronomical History and Heritage*, vol.1, no.1. Perth: Astral Press, June 1998. 92 pp., illus., \$30.00 p.a.

The *Journal of Astronomical History and Heritage* is a new, peer-reviewed journal featuring review papers, research papers, short communications, book reviews and bibliographies on research in the history of astronomy. All aspects of astronomical history are covered, including studies that place the evolution of astronomy in political, economic and cultural contexts. There is also an emphasis on astronomical heritage, with papers dealing with historic telescopes and observatories, conservation projects (such as the conversion of observatories into museums of astronomy), and archaeological investigations of astronomical sites and buildings. The first issue of this biannual journal appeared in June 1998.

The decision to establish the *Journal* was made at the 1997 General Assembly of the International Astronomical Union in Kyoto. A number of historians of astronomy felt that there needed to be an alternative outlet for those who traditionally published in journals such as the *Quarterly Journal of the Royal Astronomical Society* and *Vistas in Astronomy*. To oversee the foundation of the new journal, an international Editorial Board was appointed, that includes Professor Ben Gascoigne from Australia. The Papers Editor is Dr Wayne Orchiston, Executive Director of the Carter Observatory in Wellington, New Zealand, and well-known historian of Australasian astronomy. The production of the journal is in the hands of the Managing Editor, Mr John Perdrix, from Astral Press in Perth, Western Australia.

Strictly speaking, the *Journal of Astronomical History and Heritage* is not a new venture but a successor to the *Australian Journal of Astronomy*. That journal was founded in 1985 with the aim of being the major outlet for research by amateur astronomers in the South Pacific region. It gained the support of the main amateur astronomical societies in Australia, and over the following years it published research papers by both amateur and professional astronomers alike. There was also a significant number of papers on the history of astronomy and, in particular, on the development of astronomy in nineteenth-century Australia. In recent years,

however, the journal began to struggle as the submission of papers fell away. The new *Journal of Astronomical History and Heritage* can be seen, therefore, as a reincarnation of the now-defunct *Australian Journal of Astronomy*.

The first number contains four articles on topics as diverse as Leonid meteors over the last millennium, William Scott and the first Sydney Observatory directorship, Mary Evershed as solar physicist and Dante scholar, and the oldest extant observatory in the USA; then a comprehensive listing of recent publications relating to the history of astronomy, and finally two book reviews. Interesting historical illustrations are also plentiful, well-chosen and clearly reproduced on good-quality paper; overall, a worthy beginning for the new journal. For more information, including how to subscribe, visit the journal web site at [http://www.vuw.ac.nz/~bankst/jah2\\_top.html](http://www.vuw.ac.nz/~bankst/jah2_top.html).

Peter Robertson  
CSIRO Publishing  
Collingwood, Victoria

**Alan Frost, *Voyage of the Endeavour: Captain Cook and the Discovery of the Pacific*. Sydney: Allen & Unwin, 1998. xxviii + 140 pp., illus., \$19.95 pb.**

This brief history of Cook's voyaging was written for the general reader who might visit the new *Endeavour* or even sail in her. The new *Endeavour* is a replica of Cook's eighteenth-century vessel that was constructed between 1988 and 1993 in Fremantle and has since sailed the world under the auspices of the H.M. Bark Endeavour Foundation. More details can be found in the CD-ROM *Endeavour: Captain Cook's Journal 1768-71*, available from the National Library of Australia, and on the website of the New England Maritime Museum (<http://www.neaq.org>), arising from the ship's visit to Boston in 1998.

Frost has drawn on standard histories, especially on the journals of Captain Cook as they were edited by J.C. Beaglehole, but uses this popular text to introduce new views which he says are based on up-to-date scholarship and archival research. Later, he expects to publish a scholarly study of British imperialism in the latter part of the eighteenth century, but in the present volume his views are presented without

much in the way of supporting evidence and without the extensive notes that would be out of place in such a popular work.

As a potted history, Frost's book is a useful source of factual data, although the price of brevity is sometimes high – a page that includes no fewer than twenty-five dates, for instance. The author makes extensive use of maps to show ocean currents and winds and the routes and dates of exploratory voyages. These begin with Spanish voyages of the sixteenth and early seventeenth centuries, and then cover Cook's three voyages (not the singular of the book's title) as well as French and British exploration in the eighteenth century. Another useful feature is a chapter on those who sailed with Cook and went on to form a loose school of exploration and scientific enquiry. Included here are brief notes on Banks, Billing, Bligh, Colnett, Forster, Gore, Hodges, Ledyard, Matra, Riou and Vancouver.

At the end of it all, Frost plumps for trade as the driving force in British exploration of the Pacific, and he organizes his comments around the four possible entry points to this vast ocean. Travelling west around the Falklands fell from favour when Spain rebuffed Britain's attempt at settlement there in the 1760s. The north-west passage, long sought from both sides of the North American continent, failed to eventuate. That left the route through the East Indies, with Penang as the jumping-off point and the Philippines and China as trade destinations, that largely coincided with the trade and migration route to the south of the Australian continent, making Sydney a hub for trading in the Pacific.

In journalistic style, Frost has given us boxes containing information about special topics. For example, 'navigation' includes information about the Harrison chronometer that Cook carried on his second voyage; and 'life at sea' covers booze and boredom, scurvy, discipline, half-rations and the lash, but not buggery – it's not that sort of book. We can also ascribe to journalistic flair Frost's description of Cook's second voyage as an oscillation between massive sweeps across the reaches of ocean and periods of quietude, resting and refreshing at the tropical islands, as well as another kind of oscillation between crumbling ice and sounding whales on one hand and the warm, lush, erotic, life-restoring ambiance of Polynesia on the other.

Perhaps the most interesting feature of the book, however, is the psychological profile of James Cook that emerges as one works through the text. At the outset, Cook is described as applying his precise and practical habits of mind to everything he did, although he evidently took some convincing that the scientific work of Banks and Solander had any more than novelty value for Europeans. There is the merest hint of the martinet in this, but Cook continued to grow in stature and self-confidence, and his contacts with Pacific peoples helped him to move beyond the confines of his own culture and to see that European reality was not the only one nor even, in certain circumstances, the most appropriate one. By the time of the third voyage (1776–1780), Cook the master organizer, manager of men and tolerant liberal was giving way to a Cook who could not control the world around him in the ways he once seemed to do, and whose life was marked by stridency and desperation. He fell into wild rages with members of his crew who had transgressed through theft, carelessness or sexual profligacy, and he responded to thievery by the Melanesians and Polynesians with increasingly-vicious methods of punishment that included floggings, destruction of property and the taking of hostages.

Despite the master mariner's decline in his later years, Frost credits him with contributing to the development of discourse between Europeans and non-Europeans in the Pacific, a civilized alternative to the rapacious and murderous behaviour that had marked earlier contacts and a foundation for literary romanticism and the anti-slavery movement. Frost's admiration for Cook shows through again and again and, I believe, leads to him to overstate the strong case for Cook as a new-style hero.

Perhaps it is the lack of extended argument in this brief account, or the absence of footnotes or endnotes, but Frost fails to convince me that there is a singularity to Cook himself or a quality to his voyages that sets them apart, as, indeed, I was brought up in Australia to believe.

Ian D. Rae  
Department of History and Philosophy  
of Science  
University of Melbourne

**E.M. Johnston-Liik, G. Liik and R.G. Ward, *A Measure of Greatness: the Origins of the Australian Iron and Steel Industry*. Melbourne: Melbourne University Press, 1998. xviii + 358 pp., illus., \$45.00.**

The company that has become known simply as BHP is at the core of this book. The study ends with BHP's take-over in 1935 of its only competitor, Australian Iron and Steel. This merger rounds off the muted triumphalism with which Johnston-Liik, Liik (both formerly of Macquarie University) and Ward (formerly of BHP) present the place of Newcastle in the creation of the modern Australian industry.

The authors praise the decision by BHP's management and directors in 1912 to build an integrated blast-furnace and steelworks on a deepwater site using coastal shipping to transport raw materials, and they are, of course, quite right to approve the combination of flexible and economic carriage of heavy goods, the use of American technology, and the ability to raise capital quickly and effectively. The example set by BHP was, after all, followed in due course by their only serious rival, when the Hoskins firm transferred its operations from inland Lithgow to the deepwater Port Kembla at the end of the 1920s.

With the Liiks' solid background in economic history and the steel-making experience of Ward, the context of the industry's slow and spasmodic growth over the century before the Second World War is well explored. The politics of free trade and protectionism, the tensions of labour relations and the fluctuations in the global economy are explored in some depth, culminating in the discussion of the critical merger of BHP and Australian Iron and Steel. This treatment, although always anchored in the iron industry, leaves less room for a detailed examination of what was happening on the ground. There is remarkably little consistent discussion of the lay-out of the works, their infrastructure of local and internal communications, or their provision of accommodation for managers and workers. Lay-out is demonstrated only once, in the caption to an aerial view of the Newcastle steelworks in about 1927, and there is throughout a reluctance to address the material evidence of these profoundly physical plants.

As a result, workers do not live anywhere or with anyone, they merely work or wrangle with management. Thus, Lithgow's housing development on the land around the blast furnaces, owned first by Sandford and then by Hoskins, is a dimension of a dominant employer that is unexplored. Similarly, the physical divorce of the Lithgow blast-furnace of 1907 and beyond from the rolling-mills and foundries established in 1874 by James Rutherford, on a site over a kilometre away, is commented upon but not sympathetically examined. In fact, Sandford had planned an integrated steelworks on the new blast-furnace site, with steel furnaces directly fed by molten, newly-smelted iron, and with the finished product and surplus pig-iron just beside the main railway line, connected by an efficient system of sidings.

Throughout the book, there is a certain distance between the presentation of historical analysis and any realization of the complex human dimension. This is caused partly by a relative lack of interest in the material and archaeological evidence and partly by an insufficient depth of curiosity about the men involved, except for the high-flyers of BHP. The reader gets to know the complex and flawed Guillaume Delprat, who wielded so much influence in Newcastle's formative years, but comparably significant figures such as William Sandford and Charles Hoskins are less successfully presented. Although the bibliography lists the Sandford papers in the State Library of New South Wales, there are no citations from them. As a result, the telling and sometimes pathetic confidences made by Sandford to his private diaries or in his extensive correspondence are never used to give the flavour of this interesting and complex man. Sandford in his own words is a fascinating contrast to his successor, Charles Hoskins, but this contrast (which can easily be oversimplified) is not developed in any depth. It is particularly surprising that the Hoskins papers, which include the relevant minute-books (as well as some important photographs) have not been consulted, although they, too, are on easy access in the State Library of New South Wales. The contrast to the good use made of BHP's extensive manuscript and photographic archive is striking, and it intensifies the feeling that BHP has been given preferential treatment. The 'triumph of manage-

ment and organisation' that is recurrently observed in BHP is less easy to discern elsewhere; but materials do exist.

At Fitzroy ironworks at Mittagong, where the earliest successful smelting operation took place, the dominating figure in the 1860s was Ebenezer Vickery, the Methodist entrepreneur with touches of Holmes à Court. Vickery's significance at Fitzroy was profound throughout his period as chairman of the board of directors (from 1864 to 1872), and the minute-book for this period, a magisterial volume of 380 large pages, has managed to survive in private hands. Extensive use of this significant source in *Australia's Age of Iron* (OUP, 1994) by Jack and Cremin, gave new understanding of the failure of the company even under Vickery's leadership. It is a pity that the present authors did not pursue any of this new evidence.

An apparent unwillingness to pursue thoroughly the South Australian, Tasmanian, Victorian and early New South Wales enterprises deprives the early chapters of additional depth. The long and fascinating apologia written by Dunois, the manager of the South Australian furnace near Mount Jagged, and published in the *Illustrated Adelaide News* of January 1875, is not used, although it is reprinted in full in the study of the metal-casting industry in South Australia by Needham and Thomson (*Men of Metal*, Adelaide, 1987). A remarkable journalistic description of the Ilfracombe plant in Tasmania (where the physical remains are very striking and instructive), printed in the *Launceston Examiner* on 20 September 1873, is ignored, although references are made to other issues of this newspaper and to its rival, the *Cornwall Chronicle*, that had different industrial-political agendas that also go unexplored. One of the consequences is that Ilfracombe's provision for re-using the hot gases from the furnace-top to heat the blast, if deemed desirable in the future, is unrecognised: Fitzroy is not the only nineteenth-century Australian furnace with this economical potential. This in turn would have given sharper point to the critical comment that the otherwise state-of-the-art blast furnace at Redbill Point (near Ilfracombe) failed to re-utilize the gases. The Redbill Point furnace of 1876-8 is given disproportionate space beside the four other Tasmanian furnaces of this period. In particular, more might have been said about the Derwent

Iron Works at Battery Point in Hobart, especially since this is the most interesting forerunner of the coastal works at Newcastle and later at Port Kembla that constitute the main thrust of the book. It may be true that in 1874 'the idea of importing *all* raw materials was perhaps too novel to attract adequate financial support', but it would have fulfilled a thematic need to explore the promoters of the Derwent company, and in particular Christie Beaudarick, who built the second blast-furnace at Lal Lal in Victoria in 1880 and later was a prime mover of the abortive Federal Iron Company. Beaudarick is a tantalizing minor figure who keeps re-emerging in the iron industry, and it would be good to know more of such men in depth.

Overall, *A Measure of Greatness* is an excellent measure of the greatness of BHP, but it is a less reliable measure for the assessment of its predecessors.

R. Ian Jack  
Department of History  
University of Sydney

**Ralph W. Birrell, *Staking A Claim: Gold and the Development of Victorian Mining Law*.** Melbourne: Melbourne University Press, 1998. xvi + 228 pp., illus., \$39.95.

The history of mining law in Australia is in many ways a condensation of the history of the nation since the 1850s. Mining law (or the lack of a coherent policy thereto) led to one of the most famous civil disturbances in our history – the Eureka uprising. Mining law is also deeply implicated in many of the core debates as to property in Australia – it encompasses issues as diverse as native title, the nature and extent of 'ownership' of land under a Torrens title, and responsibilities not to pollute waterways. Indeed, in regard to the last point, the mining industry has been concerned since its earliest days in issues that today would be broadly embraced under the rubric of 'environmental protection'. Mining law also encompasses government policy in respect to different groups of capitalists – on one side the interests of small, speculative capitalists, extending down to lone prospectors digging a shallow shaft or panning for alluvial gold, on the other the interests of large corporate undertakings

with capital and resources to engage in deep shaft mining and to use complex and expensive means of extracting minerals. Mining law has even at times encapsulated the racial tensions that have characterized certain periods of Australian history. In the 1850s, the exclusion of Chinese from the Mining Court system, and also their exclusion from certain rights as to registration of businesses related to mining, were reflections of broader currents of racism in Australian society. Finally, since the latter years of the nineteenth century, the regulation of the mining industry in Australia has also been concerned with issues of safety. The degree of danger associated with mining in the early days was well captured by Henry Handel Richardson in the opening pages of *The Fortunes of Richard Mahony*, where the horrific death of a miner due to the collapse of slabbing on the walls of a shaft is depicted as if it was a routine event on the goldfields. The dangers became different but no less sobering as the century wore on. As shafts became deeper, more miners died of silicosis than of collapses. Nevertheless, mining was always a dangerous occupation – the possibility of fatal explosions, flooding or breaking of cables on cages, as well as the slower carnage wreaked by the dust, gases and moisture encountered in deeper tunnels, were all regarded as part of the inherent risks associated with the life of a miner. Part of the story of mining law is thus also the story of establishing a safer working environment for workers, though the leaden pace at which this occurred at times is perhaps also reflective of some of the deeper failings of the social fabric.

Birrell has managed to capture the complexity of mining law and its importance in the development of Australian society in a readable and accessible account. He well captures the manner in which mining law has at times been progressive in focus, leading to innovation and development, and at other times sluggish and unresponsive, leading to stagnation and failure. He begins his examination in the period leading up to the Eureka uprising, attempting to trace the aspects of the system of regulation then in place that triggered discontent among the miners. He concludes that, while the rebel miners involved in the Eureka stockade were overcome by government forces, their actions had a long-standing effect on mining law. The Royal Commission that followed Eureka made a number of significant

recommendations, including the abolition of the miners' licence and its replacement by a miners' right that would cost one pound per year, and it also suggested a number of incentives to encourage the use of the latest technology for mining and for entrepreneurs to pool resources in the establishment of centralized quartz-crushing plants.

One of the more interesting developments arising from the Act for the Better Management of the Goldfields of 1855, which incorporated a number of the Royal Commission's recommendations, was the replacement of Goldfields Commissioners by a system of Local Courts. Perhaps the best part of this book is Birrell's account of the establishment and operation of these Local Courts (or Boards), that were given powers to adjudicate in partnership disputes involving less than 200 pounds and to make regulations governing the operation of machinery and the nature of mining claims. The Courts for each district were elected from a constituency composed of all those holding a valid miners' right in that district. Birrell's description of the operation of these Courts displays his exhaustive knowledge of the peculiarities of each of the districts. Indeed, one of the real strengths of this book is Birrell's almost encyclopedic grasp of the nuances of concern in the various districts, something that is often lacking in Australian legal and economic histories. The embracing of this concept of Local Courts as a democratic, populist tribunal was reflective of the low esteem in which lawyers were held in Victoria at the time. They were not perceived in a positive sense as carriers of British values, but rather as a conservative force, acting only to impede the resolution of disputes by 'common men' among themselves. The tradition of informality of dispute resolution was later incorporated into the functioning of other distinctively Australian forums for dispute resolution, such as Conciliation and Arbitration Tribunals.

Birrell is concerned throughout the book to demonstrate the innovative character of Victorian legislation of the nineteenth century. This is often refreshing and at times throws light on little-explored areas. However, at other times this concern perhaps blinds him to the realities of some of these legislative initiatives. One example is his treatment of 'no liability' company legislation. The Victorian government of the late nineteenth century is often claimed to

have been particularly innovative in developing corporate forms more suitable for mining endeavours than the 'limited liability' company. Early attempts to apply English company legislation to the mining industry had proved a failure; the limited liability company did not prove to be suitable for the development of mining ventures in an Antipodean setting. Shareholders in such companies would prove to be will-o'-the-wisps when a company began to fail, and the extensive use of 'dummy' shareholders meant that the mining industry began to be perceived as overly risky by genuine investors and creditors. Many potentially fruitful new ventures were therefore unable to realize their potential for want of the necessary investment capital and/or credit. This led the Victorian Parliament in the 1870s to introduce the no liability company form, unique at the time. When calls were made, shareholders in such a company could choose either to pay and remain a member of the enterprise or not pay and forfeit their shares, which would then be sold by auction. The principal purpose behind this flexible structure was to make dummification of shares pointless and at the same time to ensure a steady flow of investment capital into these speculative enterprises.

Birrell follows the conventional path in seeing this innovation as a success, a demonstration of the relative independence of local legislatures and a sign of the preparedness of the Australian colonies to innovate rather than simply emulate English legislative models. In these assumptions I would suggest Birrell is wrong, for rather than being seen as an 'autochthonous [sic] expedient ... developed to defeat fraudulent practices arising out of the mining boom' (P.Redmond, *Companies and Securities Law*, 1988, p.31), the no liability company was seen by others as creating a range of new opportunities for devious practice: 'If the statute book of any English-speaking country were searched, it would in all probability not disclose so shoddy an act of legislation as the [No Liability Mining Act]' (A. De Lissa, *Companies' Work and Mining Law in New South Wales and Victoria*, 1894, pp.192-3). Thus the introduction of no-liability mining-company legislation did not really solve the problem for creditors of having assets against which to retrieve their debts, for if an undertaking appeared hopeless, no investors would step into the breach left by

those who had chosen not to pay their calls. Some revision is therefore necessary in regard to the previously uncritical acceptance of this legislation as an efficacious and original colonial contribution to company legislation.

The preparedness of Birrell to accept 'conventional' accounts of the utility of certain legislative innovations in respect to the mining industry is one of the weaker aspects of this enjoyable book, as is also the limited reach of his historiographical framework. However, Birrell has produced a very readable text that will have a wider audience; it is both an accessible book for the casual reader and covers a wide range of issues of interest to legal historians, economic historians, scientists and engineers. While the book has some limitations, it is nevertheless a significant contribution to the history of mining law in Australia and its relevance to a broad range of social and economic aspects of our national development.

Rob McQueen  
School of Law and Legal Studies  
La Trobe University

**K. L. Chappel, *Surveying for Land Settlement in Victoria 1836–1960*.**  
Melbourne: Office of Surveyor  
General, Victoria, 1996. vi + 166 pp.,  
illus., \$25.00 pb.

The title page of this book causes a certain confusion by giving the author's name and qualification but no publisher or place of publication and a date of 1966. It was actually published by the Office of the Surveyor General of Victoria in 1996, from a typescript compiled by the late Keith Chappel (1898–1987) and held in the Office after his retirement as a surveyor and historian of surveying. A brief foreword and introduction by the then Surveyor General, John Parker, outlines Chappel's career and the reasons for publishing the results of his research.

This has been a worthwhile effort, in that the subject has not elsewhere been brought together and updated to the mid-twentieth century. However, the fact that the publication has been taken from a typescript shows in errors and inconsistencies of spelling, punctuation and capitalization, as well as in some repetition

and mis-binding of the pages. The most glaring examples of the former are found in the description of the marking of the Victoria-New South Wales border in 1869–70, reiterated in part in Appendix 1, entitled 'Survey of the Victoria-New South Wales boundary'. The subject of Appendix 2, 'Survey of the Victoria-South Australia boundary', however, although much more complex and drawn-out in time – from 1836 to 1914 – receives a mere couple of sentences in the body of the book.

The text takes a largely chronological approach, beginning with the first surveys of Melbourne and the Port Phillip District in 1836–1838 and continuing through the land boom of '1939–40' [sic], the early sales of Crown land, and the Special Surveys. Chappel appears to have had a particular interest in these surveys, especially that of W.J.T. Clarke, approved in 1842 after the rescinding of the 1841 Regulations under which eight other land-holders each purchased selections of 5120 acres. Clarke's Parish of Buttlejork Special Survey was about six times this acreage, showing the privilege that those who already had large land-holdings were able to obtain through influence with the Government and the Survey Office.

Throughout his text, Chappel gives snippets of information about various surveyors such as W.S. Urquart, Clement Hodgkinson, G.C. Darbyshire, and the first and second Surveyors General, Robert Hoddle and Andrew Clarke. He mentions the difficulties under which most surveyors worked in the field, and describes the techniques used, beginning with the Gunter's chain, compass and theodolite, then trigonometrical surveying, and also the Geodetic Survey and Triangulation of Victoria under Government Astronomer R.L.J. Ellery and Surveyors General Ligar, Skene, Black, Callanan and Reed.

The author sets the political background against which surveyors worked, particularly the Land Acts of the 1860s and 1880s and the Royal Commission into Crown Land Administration of 1878. These had profound effects on the volume of land to be surveyed and on the infrastructure that followed closer settlement across the colony.

Chappel brings us into the twentieth century with the Mallee surveys, the Closer Settlement schemes, and the creation of the Commonwealth and its concern for mapping

for defence purposes. He touches on the creation of the Australian Survey Corps and its topographic mapping, and the advent of aerial photography and photogrammetry in the 1930s. The Survey Co-ordination Act of 1940 set standards for the large amount of mapping that was required for post-war redevelopment, but Chappel's text about this period becomes more sketchy, and it stops abruptly with a description of survey markers. Had he intended to write more, or were some of his notes not transcribed? This is not clear from the book, although an index, a table of contents and a list of the seventeen illustrations have been created. A particularly worthwhile addition to the text are the coloured and mainly folded maps from the Historical Plan Collection of the Office of the Surveyor General, annotated with their identification numbers in the Victorian Public Record Office. However, a number of important maps mentioned in the text – such as 'the first general map of the province of Victoria ... published' (in 1851) – are not identified, nor is Arrow-smith's 1853 'Map of the Province of Victoria' from the State Library of Victoria collection, used as cover and end-paper illustrations.

This book will find its readership among those with an interest in surveying and mapping and some of its associated personalities. They will, however, find it a rather prosaic account, that in places leaps from one aspect of a topic to another, leaves some areas unclear, and finishes chapters abruptly. These defects stem partly from the fact that the Department has left it until thirty years after the compilation of the research and nearly ten years after the author's death to publish his life-time's work.

Judith M. Scurfield  
Map Librarian  
State Library of Victoria