

Book Review Section

Compiled by John Jenkin*

C.B. Schedvin, *Shaping Science and Industry: A History of Australia's Council for Scientific and Industrial Research, 1926-49* (Allen & Unwin, Sydney, 1987), 374 pp., illus. (\$29.95).

The CSIRO is among the best known and least appreciated organisations in Australian science. Stories abound of CSIRO's pioneering work in digital computers, in war-time radar and post-war radio-astronomy. Its contribution to the discovery of trace elements and agricultural and livestock research has underwritten some of the most notable successes of this country's primary sector. Yet, in Australia as elsewhere, excellent science often remains decoupled from direct economic pay off, and the CSIRO, as the biggest target, has received the heaviest blows.

In the media, for example, the organisation gets more than its share of critical, if not always trivialised, reporting. The physics of making rain over our brown and pleasant land is a serious business, but one easily prey to cynical journalism. While a newly invented 'bionic ear' attracts technical interest and international praise, the breeding of a 'Black Opal' seedless grape — even if it is the world's biggest grape — cannot promise governments a vine-led route to economic recovery. In university circles, academics take up against CSIRO's monopsonistic allocation of national research and development resources and point to its privileged distance from the cut and thrust of university life. Despite its commercial successes — from Interscan in the 1970s to 'jumping genes' in the 1980s — politicians of both parties have heard, and some have believed, reports of the organisation's alleged indifference to the needs of Australia's manufacture and export industries. Above all, the CSIRO's organisational 'culture' — a product of both its historical leadership and the role given it by government — has been regularly attacked, bitterly defended and, some may add, rarely understood.

However, if, as Barry Jones has put it, Australian science has been treated 'more like a cathedral than a supermarket', there is now no lack of interest in the payable activities of its priestcraft. Indeed, in the last

decade there have been at least three major reviews of the organisation. Governments with an eye to cost control and profit maximisation have looked critically at its large personnel establishments, as well as its publication rates and patent records. Whether these successive reviews achieve their purpose of 'reform' remains one of the great unknowns in Australian science policy. Indeed, whether recent legislation dividing the position of chairman and chief executive, the appointment of a new chairman with political charisma, and a management shift towards industrial applications, will make a further 'difference' — and if so, in what direction — remains another moot point. Criticising the CSIRO has been a popular pastime, but there are signs that expectations are now at last becoming more realistic and more focused.

It is for this reason, among many others, that Professor Schedvin's volume — the first of two scheduled to appear — is so welcome. Inevitably, too, this first volume makes us impatient to see its companion, with its account of the twenty years ending in the 1970s. With this we will have a foundation of solid material upon which others can reasonably build. It has been tempting to blame everything that is wrong, and credit little that is right, to the CSIRO's management, and, by implication, its history. Yet, for many years students of the history of Australian science enjoyed little perspective on the organisation. Sir George Currie and John Graham's pioneering volume, written twenty years ago, was both a first and last resort, overwhelmingly institutional and parochially archival. What we have needed, and were promised, is an interpretative account of the organisation. This, with the aid of CSIRO's excellent archivists, Professor Schedvin has admirably provided.

The CSIRO is to be congratulated upon its conception and its sustained support. In its execution, a labour of Hercules has been matched by the wise judgement of Paris. True to his training, Professor Schedvin has prepared a contextual history, addressing those economic, political and general scientific issues that have 'shaped' Australian science in this century. Although his is not, by definition, a history of science *per se*, it does afford a horizontal dimension against which future, vertical studies of scientific and technical developments within individual divisions of CSIRO, and other institutions outside the organisation, may be placed.

This, in eight chapters, is the story of the birth, youth and adolescence of the CSIR — the Council for Scientific and Industrial Research, to the year when its title changed to the Commonwealth Scientific and Industrial Organisation — a small change in letters, but as we shall see, one pregnant with meaning. A creature of political compromise between Commonwealth and State, the founding of the CSIR managed, in Schedvin's words, to 'blend ingeniously the political dictates of co-operative federalism with the seemingly irreconcilable ethos of scientific autonomy'. But the CSIR had first to

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make secure for the nation research in those fields left half-won by colonial governments during the closing years of the nineteenth century. In the conception of CSIR and its early research agenda, Schedvin rightly refers to Imperial needs and circumstances; even so, he possibly understates the effect of British models and British experience on the early years of the organisation. Perhaps he also draws too lightly upon the considerable British debate that occurred in the 1920s between advocates of the different rules and structures deemed appropriate for such bodies as the DSIR, the MRC and the ARC. Yet, 'for forms of government let fools contest, Whate'er is best administered is best'; and in its earliest three-man Executive Committee, George Julius, A.C.D. Rivett and W.J. Newbiggin, the country could have hardly been better served. Their effect upon the organisation — both Julius and Rivett, sons of the manse — was little less than canonical. Rivett brought a strong theoretical impulse, Julius a fierce dedication to his own corporate priorities. Between them, and Newbiggin's successor, A.E.V. Richardson, emerged a programme of applied research, stimulated by Britain's desire no less than their own, to see CSIR become an 'Australian Rothamsted'.

In Schedvin's account, the contributions of Julius and Rivett, in defining the conditions of scientific autonomy and their commitment to basic research, is well juxtaposed against those political pressures that required Australian science to play (and pay) its part in an unfolding story of Imperial scientific obligation and Commonwealth self-interest. Its policy enhanced agricultural exports, rid Australia of animal pests and the prickly pear, fostered research on forest products and fuel, and set up Imperial co-operative programmes that made the most of Australia's intellectual links with Britain. In physics and chemistry, priorities were set to seek import substitutes and establish new industries. That links between government research and manufacturing firms remained few and tenuous, reflected difficulties for which no major industrial country — including Germany and the United States — found, before rearmament, feasible remedies. During the war, the CSIR's technological services naturally gained prominence. Radiophysics became a field in which Australia became world-class. Schedvin's excellent chapter on radar is the best account we have of that heroic story, relayed in its austral dimensions. The war, which made the CSIR one of the world's largest scientific organisations, also provided the challenges that quickened basic 'problem-solving' skills within the organisation. By 1945, these had helped transform Australian technology and had brought Australia to a position poised for future development.

But the dawn of Reconstruction brought with it clouds of Cold War and deep political suspicions, which today seem tragically overlaid. These delayed and diverted the energies of the CSIR's management for half a decade. In the event, the CSIR, threatened with bureaucratic control, was ironically preserved from its

worst effects by the Science and Industry Research Act of 1949. This secured for the organisation a reasonable command of its own scientific destiny. With the coming of CSIRO that year, indeed, came a greater degree of scientific freedom and funds to exploit new lines of research. When, however, in the first two post-war decades the CSIR's basic research ideal in many ways reached its highest expression, Australia's promising future of increasing economic self-reliance was compromised, by both domestic political decisions and international pressures. In these circumstances, it is clear how the history of the CSIR and its successor has reflected the country's wider ambivalences and dependencies.

Forty years on, the critics of CSIR/O can look back to a record of activity shaped by political pressures but arbitrated by men of ability and vision. In becoming an institution 'committed to the advancement of knowledge, internationalist in outlook, and largely insulated from day-to-day political pressures', it was inevitably to challenge the self-legitimising primacy of the universities and destined to fall short of the demands of industry. Whether such changes in the organisation as are today forecast are likely to be commercially successful, however, must surely depend to a large extent upon the co-operation of private industry, motivated sufficiently to take up research and make it pay. What is needed, perhaps, is less factional rivalry and more co-operation in those sections where benefits may yet be had.

In this process, histories of this kind have a special importance. It has been remarked in Britain and Europe that we are entering a new ice age of official history, in which fewer works will be commissioned and fewer supported by public funds. From the effects of such a freeze this country has so far been happily spared. Indeed, quite apart from the bicentennial bonanza, we have before us a growing shelf of official or semi-official volumes on Australian public organisations. Appropriately, in some respects, the War Memorial continues to lead the march in the tradition of C.E.W. Bean, with its support of research on Australians in Korea and Vietnam. In the civil sphere, we already have in Ann Moyal's history of Telecom, Ken Inglis's work on the ABC, and Gavin Souter's new book on the Federal Parliament, testaments to professional standards in the service of public interest. Professor Schedvin's book would be excellent in any context, but it is particularly significant today, as a tribute to the way in which independent, disinterested academic research can work to the combined advantage of scholarship and of government. In these Dawking days, it is a lesson well to be remembered.

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J.R.H. Andrews, *The Southern Ark: Zoological Discovery in New Zealand, 1769–1900* (Century Hutchinson, Auckland, 1986), 237 pp., illus. (NZ \$85.00).

Should fate command me to the farthest verge of this green earth, to distant barbarous climes.

Thus the Rev. Richard Laishley inscribed the title page of his book of natural history drawings while working at Onehunga in the 1860s. Although he, and most others who came out of New Zealand, were not really driven by fate alone, there was certainly a sense of retreating as far from Europe as the earth would allow. Yet it was European and especially British culture that they brought out with them, and right from the start there was a flow of scientific and other cultural links. At first this followed the typical colonial trade pattern — export of raw materials, import of the processed product — but eventually there were men in New Zealand quite capable of processing their discoveries. Zoology is a good example and in essence this is the story that John Andrews tells, and tells extremely well: the gradual emergence over nearly a century and a half of a truly New Zealand zoology, with its own institutions, journals and workers, all of more than just local repute.

When Captain Cook, with Joseph Banks and his retinue of assistants and artists, arrived in New Zealand in October 1769, they adopted their now familiar procedure of recording what animals, plants and people they encountered, for this correctly appeared to be the first major task. To some extent New Zealand was disappointing. The fauna and flora were certainly novel, but not remarkable: no native mammals (the two bats were missed), and no extraordinary beasts or plants to excite Europe. However, the two subsequent voyages added to the list, and in spite of the failure to publish the results in one piece, the ground was prepared for the next phase of exploration. In recounting this early stage, and by an imaginative blend of journal quotations and narrative, John Andrews makes something as well-worn as the Cook voyages spring to life. No less successful is his analysis of the zoological results, especially for entomology, conchology and ornithology.

The second phase, lasting virtually three decades into the 1820s, was an interim period, with no major attempts to explore the natural history and with even the flurry of interest associated with Australia and the First Fleet barely touching New Zealand. The only notable discovery was the Brown kiwi, described in 1813 by George Shaw on a skin he had acquired. Curiously, the zoological story begins again, but tentatively, with the Russians (Bellingshausen) and more confidently with the three great French voyages between 1822 and 1840 (Lesson and Garnot on the *Coquille*, Quoy and Gaimard on the *Astrolabe*, Hombron and Jacquinot on the *Astrolabe* and *Zélée*). In promptness of publication and care of the specimens, the three French voyages were far superior to those of Cook.

The thread had meanwhile been taken up by missionaries and travellers, those who not only explored at occasional landings but who ventured into the interior. Men like Yate, Collenso, Pollack, Taylor and Dieffenbach now passed beyond mere inventory and began to build a more inclusive zoology. The exciting days of moas and the discovery of *Nothornis* are exceptionally well told. Brief calls by the *Beagle*, *Erebus* and *Terror*, *Rattle-snake*, *Acheron*, *Challenger*, *Novara* and others were punctuated by hesitant steps to form societies, museums and journals that would make a truly indigenous applied and theoretical zoology possible. These were the days of Mantell, Potts and Travers, to be superseded by Hutton, Hector, Haast, Buller, Parker and others, some of whom worked almost full time in science (Buller and Hudson share a whole chapter).

But how to sum all this up? Zoology, concludes John Andrews, was given a flying start, but the 'natural sciences, which were a large part of New Zealand's science, retreated from a position as part of a world view to one of increasing introspection and utilitarianism. Ignoring the warnings, the country was placed at the mercy of introductions and exploitation: the insult to the fauna, flora and landscape has still not been forgiven.' He sees the choices of pragmatism and the *ad hoc* approach as resulting in science reacting, not science leading, with a consequent failure to integrate science into the culture. Regrettably, this seems increasingly true also of the Mother Country.

In its production and presentation, this book is a model. The footnotes set in the wide margins are not only convenient: they are simply packed with important data painstakingly sifted from documents, journals, collections and other sources, quite apart from references to a very large bibliography (over four hundred titles). The design is extremely pleasing and for once is a vehicle for readability and not its enemy. A very worthwhile book, which has no serious rival.

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Harold Attwood and Geoffrey Kenny (Eds.), *Reflections on Medical History and Health in Australia: Third National Conference on Medical History and Health in Australia, 1986* (Medical History Unit, Univ. of Melbourne, and Medical History Society, AMA (Victorian Branch), Melbourne, 1987), 278 pp., illus. (\$23.00).

This is the third in a series of publications containing papers on Australian medical history. The aim of the series is to make available the fruits of recent work in the

field. The first, H. Attwood, F. Forster and B. Gandevia eds. *Occasional Papers on Medical History Australia*, appeared in 1984; the second, H. Attwood and R.W. Home eds. *Patients, Practitioners and Techniques*, presenting papers from the second national conference on medical history, appeared in 1985. (The papers from the first conference were published in J.H. Pearn and C. O'Carrigan eds. *Australia's Quest for Colonial Health*, 1983).

The volume under review contains papers delivered at the third national conference held at Adelaide in 1986. These volumes, and the conferences on which they draw, represent a new upsurge in activity in the history of medicine in this country. Other signs point in this direction: Melbourne University intends to increase the number of lectures in medical history given to first and third-year medical students; the Faculty of Medicine at Sydney University introduced a compulsory course for first-year medical students in 1986; and a national association, the Australian Society of the History of Medicine, was established late in the same year. Bryan Gandevia, former medical academic and long-time contributor to Australian medico-historical scholarship, was elected foundation President of the Society, but only a small number of the members of the foundation Council are full-time historians of medicine with postgraduate training (or equivalent expertise) in history. The rest are medical academics or medical practitioners with a part-time interest, although it must be said that one or two of these have made very useful scholarly contributions to the field. The composition of the Council probably reflects accurately the balance between full-time and part-time practitioners of the history of medicine in the country at large.

The history of medicine has had a chequered career in Australian universities. It was established here well before its cousin, the history and philosophy of science (HPS), but history of medicine has never enjoyed the same degree of visibility, a result of its more limited intellectual compass, and perhaps also of its failure to achieve independence from medicine.

The later nineteenth century saw the establishment of positions in the history of medicine in German and French academic institutions. The first research institute in Europe was located at Leipzig University, and Henry Sigerist, a director there, carried the European tradition of scholarship and his personal concern with the social history and sociology of medicine to the United States when he became foundation Director of the Institute of the History of Medicine at Johns Hopkins University in 1929. Medical history in Australia could boast of no such illustrious connections, but limited recognition came quite early. The influential foundation Dean of the Sydney University Medical School, the Edinburgh-trained Thomas Anderson Stuart, believed that history of medicine was 'rather an important subject, because medicine is very ancient, and no portion . . . has arisen *de novo*'.¹ Thomas Fiaschi, an Italian graduate and a leading Sydney surgeon, was appointed honorary lecturer in the history of medicine in 1902, and he delivered lectures at the Sydney University Medical School until

1915 when he left on war service. The subject then languished for a period in Sydney until revived in the 1920s by Leslie Cowlshaw, a Sydney medical graduate and an avid collector of medical history books. In 1925, Cowlshaw, together with enthusiasts like Harvey Sutton, foundation Director of the National School of Public Health and Tropical Medicine at Sydney University, formed the Section of Medical History of the NSW Branch of the BMA. Some indication of the practising profession's view of the subject is to be had from the fact that Cowlshaw was warned by a senior colleague to avoid allowing his historical interests to stand in the way of his proper professional commitment.

A Section of Medical History was also formed in Victoria, in 1933, and while this, like the NSW Section, later became inactive, it was revived in 1953 and has continued to flourish since then. Cowlshaw was instrumental in the formation of a Medical History Section at the Australasian Medical Congress, and this continued from 1929 to 1965. In 1931, he was appointed to an honorary lectureship in medical history at the Sydney University Medical School. On his death, the lectureship was taken up by Keith Macarthur Brown and then by Ronald Winton, until the lectureship lapsed again in the 1970s. Cowlshaw's library was acquired by the Royal Australasian College of Surgeons, and this acquisition, along with other developments, helped give Melbourne, until quite recently, a decided edge over Sydney as a centre for history of medicine. K.F. Russell had been appointed first Reader in Medical History at Melbourne University in 1956, and funds from the Wellcome Trust were used to establish a small Department of Medical History in the new Medical Library building in 1967. When Russell retired from his personal chair in 1976, medical history disappeared, but in late 1980, after some struggle, a Medical History Unit was created, with Harold Attwood as Curator.

History of medicine, then, has had a rather marginal existence at the two senior Australian universities. For most of its history it has been fostered by members of the practising profession rather than by academic historians. However, the situation is changing. Historians in HPS schools and history departments, as well as a few practitioners of the art located in other disciplines and the odd independent historian, are producing a growing volume of scholarly work. But the historical imbalance needs to be further redressed. As Ronald Winton pointed out to his medical colleagues twenty years ago, one of the advantages of involving professional historians is that the historian may bring 'not only his special capacity as a student of history but also a certain objectivity by which he may come nearer to the truth than those of us who have been in a sense brain-washed by our medical training'.²

Reflections on Medical History and Health in Australia reveals the problems that may arise from this historical imbalance. The bulk of contributions come from medical practitioners (including medical academics), and these reflect the strengths and

weaknesses of their authorship. A rich variety of topics is covered in the twenty-one brief papers (and three abstracts) included in the book. Many show evidence of considerable research into original sources, and a keen appreciation of the significance of technical developments in medicine. The topics include: sunstroke and insanity; nineteenth-century disease theories; wounds of the head from Vesalius to Cairns; the training of nurses in South Australia; historical disease patterns in that state; the history of the Adelaide Children's Hospital; industrial hygiene and the Commonwealth; the exclusions policy of the Ballarat Hospital, 1856-76; country practice in Victoria; and biographical accounts of E.S. Jackson, Michael Kelly, Lilian Foster, H.B. Ellerton, F. Wood Jones and Sir Constantine Champion de Crespigny. But there is too much of the view from within the profession in many of the papers. Except for the contributions of Richard Gillespie, Anthea Hyslop and Susan Hardy, who have been trained in history, and perhaps one or two others, there is little evidence of a grappling with larger intellectual issues such as the relationship between medicine and its social context or the place of medical ideas in the general history of ideas. These issues are standard fare for practitioners of HPS or the better overseas historians of medicine. Nor do the editors offer us any intellectual guidance. In their introduction they provide no basic analytical framework in which to view the papers, let alone an appraisal of the state of the discipline in this country. 'Reflections', but reflections revealing what, posing what questions, and opening up what research agendas? There is no mention of current international perspectives in the discipline and their relevance for Australian scholars. There is not even a basic classification of papers. The overall impression created is one of an almost random outpouring of material, lacking coherence and intellectual structure. This does less than justice to what in many instances are well researched and well presented papers.

It would be naive to suggest that professional historians would avoid all bias, but a larger contribution from them might be expected to raise the level of intellectual debate in the discipline. Creation of new institutional bases for the discipline, more independent of medicine, might well aid this maturation process. The idea of a National Institute of the History of Medicine 'to serve as a focal point of education, research and preservation'³ might be resurrected, or units similar to the Wellcome Units for the History of Medicine in United Kingdom universities might be established through private endowment. Whatever the institutional setting the future brings, it is to be hoped that a situation emerges where history of medicine stands in closer relationship to history, while not losing the enthusiasm brought and the often valuable contributions made by part-time practitioners of the art, whose primary professional commitment continues to be medicine itself.

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References

1. W. Epps, *Anderson Stuart, M.D.: Physiologist, Teacher, Builder, Organizer, Citizen* (Sydney, 1922), p.123.
2. R Winton, 'The Presentation of Medical History', *Medical Journal of Australia*, 2 (1967), 946.
3. F.M.C. Forster, '30 Years On: Medical History Society, 1953-83', in *Occasional Papers on Medical History Australia*, eds. H. Attwood, F. Forster and B. Gandevia (Melbourne, 1984), p. 200. A Commonwealth Health Department committee recommended unanimously in 1975 that a National Institute be established in the Institute of Anatomy building in Canberra, but the National Committee of Inquiry on Museums and National Collections said the project should have very low priority. The financial stringency of the later 1970s ensured that the project was shelved indefinitely.

Stephen Murray-Smith and Anthony Dare, *The Tech: A Centenary History of the Royal Melbourne Institute of Technology* (Hyland House, Melbourne, 1987), 495pp., illus. (\$49.95).

Warren Perry, *The School of Mines and Industries Ballarat: A History of Its First One Hundred and Twelve Years, 1870-1982* (School of Mines and Industries, Ballarat, 1984), 635pp., illus. (\$35.00).

These two histories of two of Victoria's leading technical colleges contain a message for our present day national planners in education and training. Here is the evidence of much grass roots support for technical education, but it contrasts sharply with years of official indifference by governments and public service administrators, and employer willingness to take all that the colleges could offer and give very little back in return. With regard to status, the colleges were always kept in their place, well below that of the University of Melbourne.

Today, with official emphasis on relating education and training to the needs of industry and commerce, these realities need to be considered.

In many respects this impressive history of the Royal Melbourne Institute of Technology (RMIT) is a commentary on the general role and status of technical education in Victoria from 1887, when the College was founded, to the present day. It could be easily character-

ised as a hundred years of government neglect and (quite often) hostility. Technical education has not had an easy ride in the state which historically has always devoted more resources to this area than any other state. It is the story of a hundred years of staff and students getting on with the job of providing a multitude of courses, but with little recognition. An administration is portrayed striving to lift the status of the institution but constantly coming up against the realisation that those with power in the land held it in low regard. The Vice-Chancellor of the University of Melbourne, J.D.S. Medley, parodied this situation in 1947:

The wise man breaks his bloody neck
To get into the Melbourne tech.,
For there an atmosphere sublime
Is working on him all the time . . .
But how can experts function free
With no degree, with no Degree
While all the credit and the cheers
Are pinched by Carlton Engineers?

As pointed out in the epilogue of the book, while the University of Melbourne has always represented the pinnacle of academic achievement in Victoria, technical institutions 'have occupied a twilight world of trade, technology, apprenticeship and quasi-scientific mysteries largely unappreciated by a society permeated with other values'. There has been 'a deeply rooted sense of "second best" '.

There are many achievements that can be credited to the RMIT, but two stand out in this book. Firstly, it gave boys and girls from working class and impoverished families a chance to enter skilled and professional occupations. This was probably uppermost in the minds of the trade unionists who were strong in their support for the College in its early days. But it also catered for clerks, salespeople, failed public school boys(!), providing a means whereby 'mature age' students could achieve or upgrade their qualifications. The College also performed a crucial role in each of the World Wars, and in the immediate post-war periods in re-training programs for ex-service men and women — roles quickly forgotten by contemporary governments.

The history does not suffer from the main characteristic of other similar histories of educational institutions — turgid recitations of events generally linked to the comings and goings of the chief administrators. There is much detail here of the life of the students and staff at the College (the illustrations help a lot). There is a willingness to look at situations critically and to place them in their historical context. The general impression given is of a group of men, women and students going about their business in a thoroughly competent manner, but plagued by inadequate resources, little finance and largely left to their own innovative devices.

There is little evidence of any substantial support or interest from the captains of industry or commerce, although the College was always ready to provide new courses to meet their needs. After all, a batch of qualified immigrants could always be relied on to fill any gaps, and at far less cost to industry or the government. There is an ongoing struggle with the Education Department, whose administrators resented

the independence of the College and tried on many occasions to take it over.

In all this we have a history worthy of such a worthy institution. The authors and publishers are to be commended.

The Ballarat School of Mines was in existence for seventeen years before the RMIT was founded. It was the product of a different era — an era dominated by the aftermath of the gold rushes, when there was a specific demand for mining engineers and managers, surveyors and miners to work in the deeps shaft mines which had followed the earlier alluvial successes of the 1850s. The workload of the first instructor who gave classes in mathematics and surveying in 1870 reflects this strong link with mining (the *other* instructor was in chemistry):

. . . arithmetic, mensuration, logarithms, trigonometry, Euclid's elements, algebra to quadratic equations, and their application to surveying. Levelling and engineering, plotting, mapping, topography, use and adjustment of instruments, mechanical and perspective drawing from specifications, isometric drawing, projection, mine planning, projection of workings, cross-sections, with all the calculations and checks connecting surface with underground lines, mine boundary questions as cases of arbitration, surface surveying, levelling and construction on paper, courses of land surveying such as Gillespie's and subsurveying such as Baker's.

The School of Mines was to help the industry get out of a period of depression by 'scientific education of those engaged in mining pursuits', for the depression was seen as a result of 'numerous failures of enterprises either ignorantly entered upon or unscientifically conducted' (p.10).

The history is more readily seen as an institutional history in the traditional pattern. Great attention to tedious detail, long unedited quotes from original sources, and a definite propensity to mention as many names in the text as possible. The text of some 574 pages would have been vastly improved if an editor's blue pencil had been freely used. This is not to suggest that the research and scholarship is anything other than impressive, but the lack of editing has made this book reference material only, rather than a work of general interest.

All the detail, however, cannot hide the ongoing struggle the Ballarat School of Mines had to survive from its establishment in 1870. Lack of government support, a constant shortage of funds and resources, and on occasions, very few students.

There are many illustrations, but unlike the history of the RMIT these are mostly static photographs of individuals in authority (very few students), and none showing what actually went on in the School.

Indeed, these two books present quite a contrast. Both are formidable volumes. They are the products of a daunting amount of historical research. Yet the results are so different. One, the product of a past era in historical writing; the other, hopefully, a foretaste of the future.

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Rupert J. Best, *Discoveries by Chemists: A History of the Chemistry Departments of the University of Adelaide, 1885–1984* (Univ. of Adelaide Foundation, 1987) 252 pp., illus. (\$27.75).

This book, in part autobiographical, should be of interest to chemistry graduates of Adelaide University, being, as it is, an overview of its chemistry from 1885 to 1984, under the direction of its professors Rennie, Macbeth, Jordan, Stranks, Bruce, Badger, Beckwith and Bowie.

It outlines the growth of a small department of 16 students under the 'trail-blazing' leadership of the first Angas Professor, Edward Henry Rennie, passes through the separation of chemistry into two distinct departments, 'Physical and Inorganic' and 'Organic', with the diversification within them, and finishes with the present situation where, as in other Australian universities, there has been a move away from the administrative authority of the professorial head of department to departmental committee systems, with chairmen of departments elected for periods of two years.

The account covers staffing, syllabus details, examining procedures (with examples), laboratory procedures, lecture presentation, and the growth of higher degree studies, research groups and funding. As well, it relates involvement in extramural events such as meetings of AAAS (later ANZAAS), ACI (later RACI) and learned societies, and cross-fertilization with other tertiary education bodies throughout the world.

Best reveals the great respect and authority afforded to the early professors and their staff up to the end of World War II, the heavy workload they carried, and the services they rendered to the community as a whole. But he is far less revealing of parallel attitudes, of, for example, the public towards university chemists in what may be called the modern era (1950 ♣). Similarly, Best lists the chemical achievements of staff and research students in each of the professorial 'kingdoms', and their impact on, and influence in, selected Australian industries, professions and government departments; but he does not discuss the role, place and influence of the pass graduates.

One can search, largely in vain, for the contributions of the women in the department. The only mentions made in the text are: student seating at Macbeth's lectures, members of the family and 'girlfriends' of some staff, the first female demonstrator appointed in 1904, the hard-working secretary appointed in 1950, one of Jordan's research students of 1954–5, and the six female names in the facsimile of a list of forty-eight research staff, scholars and assistants compiled by Badger in 1964. However, it is possible that some women are concealed in the two bibliographies of research within the text (1885–1934 and 1935–1954), and in the lists in the appendices of M.Sc. and Ph.D. awards (to 1984).

Despite its title (whose significance is explained in the Preface), this book is less valuable as a history of chemistry. It is not a scholarly work, being devoid, for example, of footnotes — the references quoted in the text are difficult to find and usually impossible to corroborate. The author has chosen to quote extensively from the retrospective recollections, memories and assessments of former staff and students; but there is no balancing opinion from contemporary sources, and it is almost impossible to separate the author's narration from that of the eminent scientists whose opinions he is quoting. In so doing, these sections of the text carry the flaws of much oral history, being unsubstantiated by corroborative, contemporary detail.

The technical production of the book sometimes makes it difficult to read. The appendices are detailed and valuable, but sources and selected references are very limited, and the publisher has failed to insist on thorough proof reading. The only figure (Figure 1, not indexed) is elusive; it is first mentioned on p.30, and again on p.203, but does not actually appear until p.211, about 30 pages from the end of the text. When discovered, it provides valuable data: graphs showing numbers of students, graduates, undergraduates and staff from 1885 onwards.

It is a pity that the author has not chosen to refer to the published histories of the University of Sydney Science Faculty and of the Chemistry Departments of the University of Western Australia and Monash University. And, too, on matters of educational import, that he has missed seeing the recent theses on his acclaimed 'Martin Committee Report'. Had he done so, he may have had some doubts on its validity as a blue-print for all tertiary education.

Unfortunately, for most readers this book will be rather dull, and it cannot be used as a ready reference text. It will best be used by Adelaide graduates, already familiar with the local scene, to recall the achievements of the Chemistry Departments of the University of Adelaide and of their 'greats'.

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Editorial note: A second, briefer account of the same subject has also appeared recently; namely, V.A. Edgeloe, *Chemistry in The University of Adelaide, 1876–1980* (Univ. of Adelaide Foundation, 1988), 61 pp., illus. (no price given).

Lionel Gilbert, *William Woolls, 1814–1893: 'A Most Useful Colonist'* (Mulini Press, Canberra, 1985), 138 pp., illus. (\$25.00).

M.M.H. Thompson, *William Woolls: A Man of Parramatta* (Hale & Iremonger, Sydney, 1986), 135 pp., illus. (\$19.95 hb, \$9.95 pb).

The appearance of two biographies of the minor nineteenth century figure, William Woolls, within twelve months of one another, raises the question of the purpose the biographers had in mind. While simple biography is perhaps the most basic of human historical interests, the most elementary way of serving the human need to extend present identity into the past through records of the names and dates of genealogical lines, the skilled biographer can transform the narrative into a window onto a past society and a different culture.

Neither of these biographers has seen the Reverend Doctor as such a conduit to his world, but have rather confined themselves to the more conventional presentation of the recoverable facts concerning his life. Since the available evidence comes almost entirely from the public and printed record, or from his more formal professional correspondence, the resulting biographies concern themselves almost entirely with Woolls' public face as immigrant, schoolmaster, minister of religion and botanist. Inevitably they traverse much the same ground, use the same documentation and come to broadly similar conclusions. There are minor factual discrepancies from time to time, such as his age at his father's death, but none which would have a significant impact on the writer's evaluation of his subject.

Thompson, the less experienced historian, writes the more polished account by permitting himself some speculation to fill the narrative gaps: on the question of what drew the young Woolls and his first wife together, for example. Gilbert, on the other hand, writes less fluently, occasionally, indeed, giving the impression that he is providing only the notes from which the reader may construct his own biography, and resolutely and professionally refusing to speculate on matters beyond the immediate record. Both provide a formal backdrop of the wider events in the colony in the sixty years which Woolls spent there, but as a flat and unrelated scene. Woolls and the wider society are rarely in mutual focus.

To my mind, neither biographer makes enough of Woolls' role as an educator. Woolls spent over thirty years as a schoolmaster. We are told his was one of the three leading private institutions in the colony, we are told he committed his views on education to print, and we are given such eulogies of his pupils as have survived; but the material is not used to estimate the impact he had on colonial schooling and the transmission of culture within the colony. Clearly Woolls did not keep a daily

record of his teaching which has survived, but with perseverance his role as an educator might have made a most interesting study.

Neither biographer can make much of Woolls' poetry. In the conventional style of the time, in which an ability to versify was an expected accomplishment of the well-educated, such poetry as Woolls' is quite alien from present day tastes (although similar poetry is still widely known as the words of hymns). Gilbert provides sizeable chunks so the reader can make a personal judgement, but categorises it as coming 'into that category once described by John Keats as having been written by poets who were riding a rocking horse when they believed they were riding Pegasus'. With Thompson he concludes that the sentiments are commonplace and their expression mediocre, which, while it may be a fair literary critique, hardly serves as an analysis of them for biographical purposes. They might have been employed for a variety of purposes, not least an investigation of how Woolls handled the deaths of two of his three wives and all three of his children.

Thompson's objective is to provide a balanced account of Woolls' life and career, which he develops in a strictly chronological order, giving approximately equal weight to the various stages of a long and honoured life. Gilbert, as might be expected, is more concerned with Woolls' scientific career and Woolls' position in the development of colonial science, which he is better equipped to judge than Thompson. His chapters on Woolls as a scientist and Woolls as a conservationist give an invaluable account of the way in which a comparatively sedentary man, whose education although apparently excellent had never included a period at University or any formal training in science, could, in between the very real demands of employment as a schoolteacher and later an Anglican minister, establish himself as an acknowledged expert on native flora, especially the eucalypt. Gilbert shows that Woolls had a network of support, which included W.B. Clarke, Robert King, Ferdinand von Mueller, George Turner and Louisa Calvert. He also developed a passion for botany in a number of the schoolboys who passed through his hands and who remained in touch with him. One can only regret that he does not offer here a more detailed study of this network and of the precise role which Woolls played in it.

Gilbert also illuminates the limits which a situation like Woolls' placed on the colonist with respect to his ability to criticise the more theoretical aspects of classification, which were imposed on colonial flora by those in the northern hemisphere with only minimal personal knowledge of the terrain. Gilbert is concerned to show the balance and wisdom of some of Woolls' expressed views on the relationship of botany to geology and the fauna, and the dangers of indiscriminate interference with an established environment; but he is less interested in treating ideas which he dismisses as outdated. For the historian of science this must be a disappointment, since changes in the intellectual orthodoxy cannot be properly understood solely by abstracting the presently acceptable.

It is also a pity that Gilbert does not carry further his investigation of the relationship which Woolls saw between his religion and his scientific works, and his response, as a botanist, to Darwin's theories. What he says tantalises with the promise of an unopened window onto new perceptions.

Both biographers agree on their evaluation of Woolls. He was not a man of exceptional genius or profound insight. He was, nonetheless, a man worthy of the admiration and emulation which he inspired in his time for his ability, his general wisdom, his systematic approach, his perseverance and his capacity for inspiring friendship. His concept of honorable behaviour must have been significant to his role as a teacher. From these biographies, perhaps particularly from Thompson's, emerges the portrait of the ideal nineteenth century Anglican cleric, concerned for the welfare of the people, amongst whom were included, in a manner outspoken for the time, the aborigines; believing that an increase in knowledge brings the student closer to the Creator of all knowledge and so to Christian belief. Neither biographer, however, has exhausted the possibilities of the subject. A closer study of the writing which Woolls left in some abundance may still tell us more about the man and his world.

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Edward Hill, *My Daughter Beatrice: A Personal Memoir of Dr. Beatrice Tinsley, Astronomer (American Physical Society, New York, 1986), 118 pp., illus. (US\$11.00).*

This is the second collection to celebrate the life of Beatrice Muriel Hill Tinsley (1941–81), a New Zealand astrophysicist whose brilliant research career in the U.S.A. was sadly cut short by cancer (see previous review in *HRAS*, 6(3) (1986), 440–1).

It has been observed that daughters are generally more accomplished biographers of famous parents than are sons. The major section of this unusual book, however, is a portrait of Beatrice Tinsley written by her father, Rev. Edward Hill. An Introduction is provided by Sandra Faber, representing a very wide circle of Beatrice's professional acquaintances and correspondents, while the small volume concludes with a formal Obituary, written by her close friends and colleagues Richard Larsen and Linda Stryker and telling something of her seminal contributions to theories of galactic evolution.

Hill is at his best when discussing those parts of his daughter's life that he observed at first hand: its beginnings (childhood and young womanhood) and

poignant and tragic end. For the rest he relies largely on information and quotations from her letters home, and these were often designed to hide rather than reveal the true situation: the difficulties Beatrice's adopted children experienced during the frequent moves the family made, problems with her marriage (so that news of its conclusion came as 'an unpleasant surprise'), and her rejection of her father's Christianity.

There is here a potential biography of almost unlimited dimensions. Four quotations may perhaps give a hint of the hidden riches lovingly suggested here but not yet adequately explored.

The publisher: 'In her tragically brief career Prof. Tinsley revolutionized the study of the evolution of galaxies. She was famous among astronomers for her prodigious creativity, and also as a gracious friend and dedicated teacher, mentor and colleague'.

Beatrice to her father: 'You refer to my descriptions of "human foibles" of my cosmological friends, but in fact I don't think it is weakness to be motivated by emotions. What else is the driving force or the inspiration to think of useful theories?'

Faber in the Introduction: '. . . a major and continuing problem [was] how to balance commitments to family and career. The many difficulties that she met early in life . . . were eventually solved . . . [but] the problem with her family was never fully solved'.

Faber again, this time on the gifted child: 'Many individuals in her childhood were impressed with her talents and many encouraged her, but not many, it seems, took her aside and urged her to look deeply within herself, to question whether the conventional path . . . was the best way for her, a budding scientist, to enter adult life'.

This book is a special project of the American Physical Society Committee on the Status of Women in Physics.

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D.W.H. Walton (Ed.), *Antarctic Science (Cambridge Univ. Press, 1987), 280 pp., illus. (\$59.50).*

This is a beautifully presented book, and essential reading for anyone with a deep interest in Antarctic science and the role of science in Antarctic affairs.

David Walton has called upon the expertise of four British authorities in addition to his own. The result is a book of five parts, covering history/geography, biological science, glaciology/geology, atmospheric science (in the broadest sense), and politics/future. The book claims to review what has been done to date in these key areas of science and to suggest important lines of research for the future.

The introduction by Sir Vivian Fuchs outlines very clearly the development of British interests in Antarctic

science and promotes the role of SCAR (the Scientific Committee on Antarctic Research). It is a valuable chapter.

From the beginning, the book emphasises the role of science in Antarctica, showing that even such 'purely' naval expeditions as those of the Rosses produced excellent scientific results; even more so was that of the cultured Frenchman Dumont d'Urville. The specific exclusion of politics from the planning for the International Geophysical Year was a key element in its success and is noteworthy. Also emphasised is the care for the environment provided through various management initiatives.

The history/geography section (chapters 1-4) by Walton himself is excellent. The historic illustrations are well chosen, beautifully presented (with a few minor quibbles) and supported by good modern diagrams. These form an excellent source for anyone with an interest in a brief but comprehensive history of Antarctic exploration.

This section moves quickly from the earliest years to modern shipping and the dangers (still evident) of Antarctica. A startling comment is that, despite the large number of accidental deaths, Antarctica is a 'remarkably safe place to live'.

The modern phase of internationally-co-ordinated programs, with science at their core, is simply a continuation of traditions, perhaps pragmatically established, set in train in the latter days of the last century and eventually encapsulated in the Antarctic Treaty. Walton makes a strong case for SCAR, contrasting its scientific openness with the 'secrecy' of the diplomatic Antarctic Treaty, itself a child of the co-operation during the International Geophysical Year. The historical section concludes by raising issues of the future, such as the future of the Treaty, tourism and the like.

The biological chapters provide a good review of known and yet-to-be-resolved components. This section, and the later sections on scientific topics, are written for those with some knowledge of science and may be a little heavy going for the general reader. This section emphasizes very well the summer/winter contrasts and the strategies for survival employed in the Antarctic. It discusses relatively few species, however, leaving the impression that few species have been researched in detail. The field is thus an open one.

The food web and fishery chapters are particularly informative and interestingly written. These chapters will form an important and readily available data source. It is a pity that 1985/86 fishery figures could not have been incorporated to show the upsurge in the krill fishery following the identification of a means of commercially 'peeling' krill. The section concludes with a short but highly appropriate statement on the need for research and conservation, and the role of 'altruistic science'.

The glaciology/geology chapters reinforce the role of Antarctica as a global monitoring laboratory for the past and for the future, and point very well to humanity's impact on the earth and the need to use information, such as that contained in the ice, to make changes to some of our practices.

I found the geoscience chapter not as strong, but then I am biased (I am a geoscientist). It is heavily oriented

towards the Antarctic Peninsula — Lesser Antarctica region, and I would have preferred more breadth and depth in this chapter. The discussion of mineral resource potential, while brief, is good.

The weather/climate/upper atmosphere physics chapters are the best review I have read. They cover the most comprehensive and traditional area of Antarctic research. The discussion of weather and climate is a highlight and should be read by anyone with an interest in this field, not just by Antarctic enthusiasts. Again the timing of publication is unfortunate, coming just before the ozone-layer problem assumed such importance.

Throughout the book the value of scientific co-operation without political interference comes across very clearly, and there is a strong call for this to continue. It provides a lesson to human practices elsewhere.

Dr. Laws' brief but stimulating and thought provoking closing section discusses potential political scenarios for the future of Antarctica and the role of science. Much of what he says has been said elsewhere, perhaps not so well. One strong, clear point he makes concerns the relegation of scientists to 'second class status' and the decreasing role of SCAR as a body within the Antarctic arena. Many scientists view with concern and apprehension the evolution he describes. Perhaps already we are seeing a reduction in the role of science on a continent where scientific activity is the currency of credibility.

The book closes with the text of the Antarctic Treaty and information sources on various Antarctic matters.

The illustrations are excellent, the diagrams first rate (and generally useful for both slides and book illustrations). The format is very attractive. Nowhere else have I seen such an interesting collection of figures, with the possible exception of the Reader's Digest book on Antarctica, but Walton's book has the advantage of a more flexible format. The explanations of figures, however, are sometimes difficult to follow, particularly when there are several illustrations on one page. The book could have been improved by including a list of symbols and their meaning, a list of acronyms, and by attributing photographs where used.

The book contains few editorial mistakes, although some are significant. Antarctica contains 90% of the world's ice and 75% of its fresh water, not 90% of its freshwater (p. 153), and on page 42 the table of Antarctic Investigations should refer to glaciological rather than geological. The common mispronunciation of Antarctic is reflected on pp. 161 and 176. This error is somewhat counterbalanced by the generally correct use of that most misused of words — data.

This excellent book is a British compilation and thus has a small bias in that direction. It should be read in conjunction with the soon-to-be-released *Achievements in Antarctic Science* by Richard Fifield for SCAR, the Scientific Committee on Antarctic Research. Fifield's book is somewhat broader in scope but may lack the depth of coverage of those disciplines covered here.

If you are interested in Antarctic science you must read this book, even if you don't buy it! I commend it very strongly.

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