SCIENCE AND SCIENTIFIC ASSOCIATIONS IN EASTERN AUSTRALIA, 1820 - 1890

By

Michael E. Hoare.

Thesis submitted for the degree of Doctor of Philosophy of the Australian National University, June, 1974.

THE RESEARCH EMBODIED IN THIS THESIS IS MY OWN ORIGINAL WORK.

Michael E. Hoare

SUMMARY

This investigation is concerned with the establishment of science and scientific associations in the four eastern colonies of Australia, commencing with the Philosophical Society of Australasia (1821) and ending with the movement surrounding the formation of the Australasian Association for the Advancement of Science and other intercolonial organisations for science in the 1880's.

With the death of Banks in 1820 there ended the first era of scientific investigation in Australia. In the 1820's the first efforts to institutionalise science were guided by Sir Thomas Brisbane and his scientific circle. These first experiments are considered against the background of reforming science in Britain, whose institutions were to profoundly affect the course and pattern of science in Australia. Science in Australia must be seen as part of the spread of 'western science' into 'colonial' territories.

The first attempts to establish a local-based science in New South Wales and Van Diemen's Land were ephemeral, affected very much by colonial politics, faction, individualism, lack of facilities and by the seeds of deep-seated and longstanding divisions among the principal proponents of science with differing aspirations and backgrounds. In Van Diemen's Land in the 1820's and 30's, actively encouraged by men of science in Europe eager for data, a scientific circle emerged in Hobart and Launceston which was to provide a basis upon which Sir John Franklin could build in the 1840's. Franklin's Tasmanian Society produced Australia's first regular scientific journal the Tasmanian Journal of Natural Science, capitalising upon the marked growth in scientific investigation and exploration in the Antipodes at this period and achieving for the first time in the Australian colonies a forum for the exchange and dissemination of scientific knowledge. It pointed the way to active intercolonial co-operation in science.

In New South Wales after 1830, during twenty-five years of trial and error attempts to form viable scientific associations, the cause of science depended heavily upon the 'individual enterprise' of the colony's men of

science who remained divided among themselves even within the Australian Museum committees. Science was bereft of effective vice-regal patronage but there persisted a productive commitment to scientific research and debate. In 1856 Sir William Denison, with successful scientific reforms in Tasmania to his credit, revitalised institutional science in the parent colony and the bases were laid in his new associations, institutions and in the University for more professionalism in science and ultimately for the essential close co-operation between men of science in the Banksian-Macleay gentlemen-amateur tradition and the growing semi-professional and professional groups in colonial science.

During the 1850's, despite Denison's reforms, the lead in colonial science passed to Victoria whose scientific institutions were speedily and more or less competently founded on the wealth and expertise generated and attracted by the discovery of gold and the development of its associated industries. The initiative remained with Victoria during the 1860's. In Queensland, one of the first Australian territories successfully examined and exploited by colonial-based scientific enterprise, a settled scientific community emerged slowly and its efforts were, in the main, correspondingly limited to those disciplines best suited to its frontier status viz. geology and natural history. In both Victoria and Queensland where relatively rapid urban growth followed separation men of science were much concerned with utilitarian scientific questions such as water-supply, sewerage and transport.

It is argued that Denison's reforms led New South Wales once more to assume the leadership in the movement 'towards a federated science' from the late 1870's. Henceforth co-operation, formal and informal, was strengthened in many fields including astronomy, geology, meteorology and sanitation and other specialist disciplines as well as in the more popular naturalists' societies and movements for exploration in the interior, Antarctica and New Guinea. By the 1880's and 90's science and its associations in Australia were firmly set in the matrix of the mood and movements for closer inter-colonial, federal co-operation in Australia.

Throughout science is considered in the context of Australian problems, in the emergence from convict-dependent to self-governing colonies, where scientific efforts were very much affected by the changing dynamics of colonial society. Science moved throughout the period from the control of European-based scientists and vice-regal patrons into the hands of colonial amateurs and professionals and eventually under the surveillance of colonial legislatures. Science is also considered, where appropriate, against the development of scientific knowledge in Europe.

The period ends at the commencement of a third era of colonial scientific development in the nineties when a new and brilliant generation of university leaders in science commenced to explore new lines of research and organisation in Australian science aided by the boom of the base-metal industries, agricultural research and improved facilities and heralding the move towards federal-political initiatives in science in the following century.

PREFACE

This study arose as part of the joint research project into the history of science in Australia and its region promoted by the Adolph Basser Library of the Australian Academy of Science and the Department of History of the Institute of Advanced Studies in the Australian National University, Canberra.

Since the Library opened in April 1962 it has been concerned with the locating, listing, describing and, where possible, the housing of manuscripts, original works and papers and secondary literature on the pursuit of the sciences in Australia, as well as with the active support and encouragement of scholarly research into this field.[1] In my capacity as Research Associate (Research Fellow) with the two co-operating institutions I have been guided and assisted considerably by a number of colleagues and scholars attached to both of them. I am particularly grateful to Laurie Fitzhardinge, lately Reader in Australian History, A.N.U., and Sir Keith Hancock, who were both heavily involved in the original concept of the Library and its scholarly work, and with my predecessor, Mrs Ann Mozley,[2] and to Professor John La Nauze who, as successor to Sir Keith, has given the joint project and my own work valuable support at various times. All three have kindly read this and other manuscripts at various stages of evolution.

---

[1]For the work and achievements of the Basser Library see e.g. Ann Mozley, 'The History of Australian Science', Hist. Studies, Aust. & N.Z., 11, No. 42 (1964), pp.258-9; M. E. Hoare, 'Aims and Achievements of the Basser Library, Australian Academy of Science', Bull. Post-Graduate Comm. Med., 24, No.11 (1969), pp.286-94 and the articles and descriptions published in Rec. Aust. Acad. Sci., 1-2 (1966-73) continuing. Over ten years a number of Australian and overseas scholars has used the Library facilities with considerable profit.

[2]Where appropriate Mrs Mozley's work is listed below. Of particular bibliographical value to workers in the field have been her two early papers, 'A Check List of Publications on the History of Australian Science' and 'Supplement to a Check List of Publications on the History of Australian Science', Aust. Journ. Sci., 25, No. 5 (1962), pp.206-14 and 27, No. 1 (1964), pp.8-14 and her A Guide to the Manuscript Records of Australian Science (Canberra, 1966).

In the Academy itself help has been forthcoming at all times from colleagues, especially the Librarians of the Basser, firstly Mrs Lorelei Hooper (until 1967) and then Miss E. G. Newman (1967-73), whose support and ready and critical appraisal at all times has been much appreciated. For the preparation of draft typescripts and final copy I am indebted over the years to my wife, to Mrs Edith Lincoln, Mrs Bev. Gallina, Mrs Jean Dillon and Mrs May Richardson and Mr H. Billerwell of the Academy and Department of History.

Helpful comment has come from a number of colleagues interested and active in the field, who have read my earlier articles and various drafts of the longer study. I record here my special gratitude to Marcel Aurousseau, David Branagan and Bryan Gandevia of Sydney, Miss Joan Radford of Melbourne University and others whose ideas and comments have left a mark on this study.

Access to private, and particularly institutional papers and records, has been graciously granted by the councils, officers and other competent authorities in all of the societies and associations approached in the course of research. I would especially mention the Librarians of the Royal Societies of New South Wales, Tasmania, Victoria and Queensland and the Linnean Society of New South Wales. In Queensland Mr S. Colliver of the Royal Society and University (Department of Geology) was very helpful. The Royal Society of London also made materials available on microfilm and gave permission to use them in this study. The respective staffs of the Mitchell, La Trobe, Oxley Memorial and National Libraries and the State Library of Tasmania, together with the State Archives in each of the capital cities were always forthcoming with help and materials. I am grateful to the Director of the Australian Museum for permission to use the records, correspondence and facilities of that institution and to the former Archivist of Sydney University, David MacMillan, for access to the Liversidge and other papers. Other institutions who provided assistance were the University Libraries (particularly the Menzies Library, A.N.U.); the Queensland Herbarium; the Queen Victoria Museum, Launceston; the National Museum, Melbourne; the Department of History of Melbourne University, which gave permission to use the Bachelors' and other dissertations in its collection, and the Australian Dictionary of Biography, A.N.U., Canberra.

Access to unpublished manuscripts on Australian Science (listed separately in the Bibliography) was granted by Mr G.·P. Whitley - a good friend to the Basser Library - Joan Radford - very knowledgeable on the history of chemistry in Australia - Mr (now Dr) Marcel Aurousseau and Dr G. Bergman of Sydney and Lesley Jones of Melbourne, an accomplished research worker in the history of technology in Australia.

As Ann Mozley wrote in 1964, the Basser Library seeks to bring history and science together in Australia, to achieve 'consolidation' in a 'considerable field' already well charted by scientists, and to achieve this by the greater use of 'the documentary evidence, and above all (by) the historical analysis of the environment and the growth of scientific ideas'. 'Such studies', she continued,

> lie within the ambit of the present interest of social, economic and intellectual history, touching problems of science and government; the history of institutions; scientific biography; the impact of nineteenth century philosophy and scientific theory on the growth of an Australian culture, and the implications of technological advance for Australia's economic development.[1]

To some of these problems, in fulfilment of the Basser Library's aims, this study will address itself.

---

[1] 'The History of Australian Science', Hist. Studies, Aust. & N.Z., 11 (1964), p.249.

C O N T E N T S

List of Abbreviations

(For abbreviation of repositories see 'Bibliography').

A.D.B.	Australian Dictionary of Biography
Bull.	Bulletin
H.R.A.	Historical Records of Australia
H.T.C.	Hobart Town Courier
J.R.A.H.S.	Journal of the Royal Australian Historical Society
J. or Journ.	Journal
L.A.	Legislative Assembly
L.C.	Legislative Council
M.J.A.	Medical Journal of Australia
Proc.	Proceedings
S.M.H.	Sydney Morning Herald
Trans.	Transactions
V.P.P.	Victorian Parliamentary Papers
V. & P.	Votes and Proceedings

CHAPTER I

COLONIAL SCIENCE

This investigation deals with efforts to form associations and societies for the furtherance of science in the four eastern colonies of Australia from 1820 to 1890. The study begins at the end of what may be termed the 'Banksian era' of Australian science (1770-1820), during which the first-contact, ship-based explorations of Cook, Flinders and other navigators and their scientists had added considerably to the data coming from the Australian region. It was a period when interest in the Australian-Pacific hemisphere first waxed strong and then waned considerably in the European scientific mind.[1]

The 'Banksian era', as George Forster (1754-94) the German revolutionary and scientific man of letters had foretold in 1787, owed much to the genius of James Cook:

> What Cook has added to the mass of our knowledge is such that it will strike deep roots and will long have the most decisive influence on the activity of men.[2]

During and long after Joseph Banks's benevolently despotic but fruitful presiding over scientific endeavour in the antipodes men of science in Australia and Europe recalled their debt to him and Cook. This foundation period of Australasian science has been well documented and extensively treated by historians since the last war, notably by J. C. Beaglehole.[3]

---

[1] Studied more fully in Bernard Smith, European Vision and the South Pacific, 1768-1850 (Oxford, 1960).

[2] Quoted in M. E. Hoare, '"Cook the Discoverer": An Essay by Georg Forster, 1787', Rec. Aust. Acad. Sci., I, No.4 (1969), p.16.

[3] Particularly in his editions of Banks's and Cook's voyage journals and his associated essays on the scientific-cultural background of the period.

But, as Geoffrey Serle in his recent book on the 'creative spirit' in Australia remarks, there has been a 'lamentable lack of historical research' in the fields of science and scholarship in Australia for most of the nineteenth century.[1] Equally, and in some ways more tragically neglected, is the history of technology in Australia.[2] It is, indeed, true that the story of scientific endeavour by Australians in the twentieth century has been better, if still far from adequately, told.[3]

There has grown up a widely accepted but erroneous impression among historians of the Australian colonial experience that there was little or no science worthy of the name in Australia before 1850-60. True, some writers, notably Kathleen Fitzpatrick, have recognised briefly the importance of governors such as Brisbane, Denison, Franklin, La Trobe, Barkly and their associates as important promoters and exponents of science, but justice has scarcely begun to be done to the part these and others played in the reform, sustenance and organisation of science in Australia. During the period under review, from the first serious attempt to associate for scientific purposes in the 1820's until the successful foundation of a truly inter-colonial scientific organisation, the Australasian Association for the Advancement of Science, seventy years later, the control of science passed from governors, colonial officials and powerful British-based scientific advisers into the hands of colonial legislatures and locally-employed, resident scientists whose orientation remained largely European but whose commitment and careers became increasingly Australian. In matters of scientific experimentation and observation as well as in the organisation of science Australian workers tested, tried or adapted the models of Europe to suit their peculiar and isolated circumstances.

---

[1]Serle, From Deserts Prophets Come: The Creative Spirit in Australia, 1788-1972 (Melbourne, 1973). As he promises, Serle's treatment of science is brief and shallow.

[2]This fact has been pointed out publicly and privately by many historians, including Blainey, Weston Bate, Phillip May and the knowledgeable Australian medical historian Bryan Gandevia. The excellent work of Lesley Jones at Melbourne University on the history of technology promises to remedy this lack.

[3]See e.g. G. Currie and J. Graham, The Origins of C.S.I.R.O. Science and the Commonwealth Government, 1901-1926 (Melbourne, 1966) and D. P. Mellor, The Role of Science and Industry (Canberra, 1957) in Series 4, vol. V, Australia in the War of 1939-1945).

In the debates on health and ill-health in man and beast; on gold and its attendant technological problems; on how to manage and service burgeoning cities or fluctuating industries and economies, science was required to play an increasingly significant part. It was soon found, too, that even the time-honoured taxonomic and observational tasks of understanding flora, fauna and rocks could not rely exclusively on imported wisdom and theory. The patterns of the antipodean heavens and variations in atmospheric, hydrological, geodetic, oceanographic, meteorological and other terrestrial phenomena also demanded new practical and theoretical responses. Only by dint of long-sustained systematic and sometimes trial and error observation did scientists succeed in establishing satisfactory answers to the problems imposed by environment or proferred by natural history. The establishment of a locally-based science rested ultimately upon the shoulders of those who became committed to and therefore understood the problems and possibilities of their adopted country. In time even the European stay-at-home theorists realised the necessity of genuine partnership between local residents; the transient ship-bound collectors, however well-qualified, and themselves. There evolved, therefore, an important variegated breed of leaders in colonial science, men like Joseph Bancroft, W. B. Clarke, R. C. Gunn, G. Krefft, the Macleays, Brough Smyth and F. von Mueller, to name only a few of like purpose but vastly different temperament and mode of working who pursued their creative scientific careers mainly in Australia.

Successful science throughout the period under consideration was usually 'élitist' - to use another of Serle's words. Not, as we shall see, that colonial scientists were by any means a socially homogeneous group, even within the precariously thin veneer of Australia's nineteenth century culture. George Nadel's Australia's Colonial Culture[1] takes as one of its central themes the rise and demise of the avowedly non-élitist mechanics' institute movement, some of whose foundations fell prey to

[1] Australia's Colonial Culture: Ideas, Men and Institutions in Mid-Nineteenth Century Eastern Australia (Cambridge, Mass., 1957).

well-intentioned, well-motivated middle class organisers and patrons of other intellectual enterprises, many of them the self same men who were the backbones and props of the colonies' scientific societies.

As C. Hartley Grattan wrote, Nadel is 'an early pathmaker through an archival wilderness',[1] a pointer to the fact that any 'dead heartland' approach to writing Australian intellectual history is no longer valid. But Nadel's treatment of science is shallow, limited for the most part to the byways of phrenology and other pseudo-sciences. Stephen Murray-Smith has shown, too, that some of Nadel's fundamental assumptions about the mechanics' institute movement are open to considerable question.[2] So, too, are such sweeping generalisations as the following:

> Unlike associations for book-borrowing purposes, libraries, and even institutions for popular education, the scientific societies depended on the immigration of that versatile nineteenth-century professional man, the gentleman scientist, and this had virtually come to an end by the eighteen-forties.[3]

It is partly as a response to the inadequate treatment of science as a factor in Australia's colonial cultural experience that this thesis and the associated earlier papers have been written.

Grattan did admittedly leave wide open the door to examine 'science in its institutional and methodological development and its "results" and their impact on Australian society - all this seen in the large context of the cultural development of the western world in general'.[4]

---

[1] 'Foreword'. ibid., p.xii.

[2] S. Murray-Smith, 'A history of technical education in Australia; with special reference to the period before 1914', Ph.D. thesis (Melbourne University, 1966), pp.46-58. Murray-Smith argues that not all 'mechanics' did leave the institutes and that the rise of 'middle-class' hegemony applied only to certain centres such as Sydney.

[3] Australia's Colonial Culture, p.87. Mueller emigrated in the 1840's, Krefft in the 1850's, and Joseph Bancroft in the 1860's, for example.

[4] Ibid., p.xiii.

Between Nadel's and Serle's treatments of Australian cultural history in its broader aspects appeared Michael Roe's Quest for Authority in Eastern Australia, 1835-1851 (Melbourne, 1965), which touched briefly on science as one element in moral enlightenment and improvement,[1] and a number of what Robert Schofield, a distinguished American historian of science and its institutions, scathingly calls 'periodic expressions of filial piety celebrating some anniversary' of a scientific society or institution, 'useful, but generally unscholarly'.[2] In the United States, where the study of science and its institutions in an emerging colonial society has become a much-tilled and respectable, if somewhat controversial, subject for professional historical research, writers such as Ralph Bates, George Daniels, Hunter Dupree and Raymond Stearns have provided useful guidelines and criteria for the investigation of science in similar settings.[3] There are, indeed, few scholarly studies of science in colonial societies outside U.S.A.[4] An encouraging growth of critical and scholarly studies of the sociology and organisation of science in nineteenth century Britain has, however, more than passing relevance to Australia.

At this point it is useful to define 'science' and 'colonial' as used in this study.

---

[1] See Quest for Authority, esp., pp.147-83.

[2] Robert E. Schofield, 'Histories of Scientific Societies: Needs and Opportunities for Research', History of Science, II (1963), pp.70-83. See also Schofield's The Lunar Society of Birmingham: A Social History of Provincial Science and Industry in Eighteenth-Century England (Oxford, 1963).

[3] See e.g. Bates, Scientific Societies in the United States, second ed. (New York, 1958); Daniels, American Science in the Age of Jackson (New York, 1968) and Science in American Society: A Social History (New York, 1971) and the excellent study by Stearns, Science in the British Colonies of America (Urbana, Chicago, London, 1970). Many of the American assumptions - by no means yet universally agreed upon - are not, of course, even remotely applicable to the Australian setting.

[4] Canada, New Zealand and South Africa, for instance, are still poorly served.

To avoid the protracted semantic debate on the nature, purpose and objectives of science, Lindsay's simple proposition: 'the best way to find out what science is, is to examine with care what scientists do' will be adopted here.[1] Indeed, it is part of the dynamic and dialogue of science that in any setting the arguments of its proponents and critics vary according to the assumptions laid down by society for its practice and promotion. Neither the dialogue nor the dynamic was absent in colonial Australia.

Because they have been examined already, or are still reportedly being studied with varied rigour and success elsewhere, the roles of certain scientific and associated institutions such as mechanics' institutes, acclimatisation, medical and pharmaceutical societies are not considered in detail here.[2] The volume of materials extant for a consideration of the principal attempts to associate for scientific purposes in Australia[3] has regrettably led to the exclusion of South and Western Australia - except as federating entities in the eighties.

George Basalla's essay, 'The Spread of Western Science',[4] has proved a useful model against which to consider the development of European science within a host or 'colonial' country like Australia. In Basalla's thesis any country which receives, embraces and adapts Western European science is 'colonial'. Only Russia and U.S.A., he argues, have ever achieved the potential and actuality of complete intellectual, industrial, economic, technological, scientific independence from the Western European 'established' scientific tradition. Countries still at various points in transition from

---

[1] R. B. Lindsay, The Role of Science in Civilization (New York, 1963), p.7. See esp. 'What is Science?', pp.6-36.

[2] Work is currently in progress on medical societies in Australia (by Mrs. A. McGrath in Sydney) and on the Pharmaceutical Society of Victoria.

[3] See e.g. Hoare, 'Some primary sources for the history of scientific societies in Australia in the Nineteenth Century', Rec. Aust. Acad. Sci., I, No.4 (1969), pp.71-6.

[4] Science, 156 (1967), pp.611-22.

a non-scientific western tradition - the ascientific 'phase-one' stage of Basalla's model - to this 'phase-three' independent ideal goal include Australia, Brazil, Canada, China, India, Indonesia, Japan, New Zealand and most emerging third-world states. Some, clearly, are far more advanced than others along the road of scientific development. These 'phase-two' countries, all of which exhibit some degree of dependency on the European tradition, Basalla calls 'colonial'. Japan, Canada, China and Australia are, for example, well-advanced in the move towards 'self-sufficiency' but in the historical context they all were heavily dependent upon the 'established scientific culture' of Europe.

Defining his concept of 'colonial science' more closely Basalla suggests a range of common characteristics, many of them important to this study. They include the informality of the 'colonial' scientist's training; his lack of wide or profound immediate intellectual and professional contacts; the absence of a scientific-technological base and the desire to seek honours, recognition and publication within the established culture i.e. outside the 'colonial' setting. Certain observational sciences are characteristic of the period, as are embryonic, sometimes unstructured, scientific associations and groupings.

Implicit within most 'colonial' scientific cultures, however, are the seeds of their own fulfilment: a conscious or unconscious development towards embracing the whole spectrum of training, research and scientific activities undertaken in Europe. Men and methods arise to challenge the hold and research monopoly - especially in disciplines directly related to the 'colonial' environment - enjoyed by overseas scientists: demands are made for more and improved local educational, honorific, publication, research, organisational and institutional facilities in science. The establishment of a broader, sounder and more sophisticated economic, scientific and technological - and perhaps ideological - base for industry, invention and innovation is the prerequisite for the final move from dependence to independence in science. Despite its admitted crudities[1] -

[1]Basalla admits the 'crude analysis' of his simplified model, hoping merely to stimulate others to go beyond it and 'make a systematic investigation of the diffusion of Western science throughout the world'.

not all countries, for example, want to or will achieve self-sufficiency in science - no better framework than Basalla's has been suggested for the study of 'colonial' science, which in Australia's case coincides - until the present century at least - with her colonial dependence in all other spheres, political, social, cultural and economic.

This thesis, although dealing specifically with what we might broadly call the organisational and institutional criteria of Basalla's 'colonial' science, necessarily takes cognizance of other aspects of science: factors, social, political, economic, educational and peculiarly colonial which affected the pursuit of science. In the past these factors have generally been ignored, particularly by scientists who have turned their hand to studying the development of their own disciplines and organisations within Australia. While all workers owe a considerable debt to writers like J. J. Fletcher, J. H. Maiden, G. Mathews, H. M. Whittell, and that prolific Australian Museum pair, T. Iredale and G. Whitley, historians of science must conclude that the task has hitherto been poorly done by modern standards.[1]

The Australian historians' neglect of this significant aspect of the country's development is receding slowly. More recently Australia's only two university schools in history and philosophy of science (Melbourne and New South Wales) have begun to show more scholarly interest in the field. Other departments of history have put honours students with some profit to work on essays tracing the organisational and, more rarely, the social aspects of Australia's colonial science, but here the treatment of science itself is very often minimal or shallow and invariably grossly underplays the significance of what was debated and accomplished.[2]

---

[1]See e.g. Professor A.H. Voisey's paper (on 'The Environment') and others in A century of scientific progress: a history of several aspects of Australian scientific development with particular reference to New South Wales, Centenary Volume of Roy. Soc. N.S.W. (Sydney, 1968), and my review of this book in Rec. Aust. Acad. Sci., I, No. 4 (1969), pp.32-7.

[2]Comment on these essays is reserved for the main discussion below. Some valuable work has been done in Brisbane, Hobart and Melbourne. See 'Bibliography' for the theses in question. Jillian Roe's treatment of science in her M.A. Thesis, 'A decade of assessment...a study in the intellectual life of...Melbourne' (A.N.U., 1965) is an example of the failure to recognise the significance in a colonial context of science in Melbourne, 1876-86.

The history of science as an element in the debate on religion and free-thought has been more fundamentally treated by F. B. Smith.[1]

Apart from Murray-Smith's work on technical education - where science and some of its instrumentalities are given useful treatment - and that of John Laverty on local government in Brisbane[2] - where the scientific aspects of the public health debate are briefly examined - few recent writers, other than Lionel Gilbert, have satisfactorily set forth the role of science in nineteenth century Australia. Gilbert's fundamental works on botanical investigation in New South Wales and Eastern Australia stand alone in this regard.[3] As a source and commentary on the place of the scientist in the colonial setting Marcel Aurousseau's edition of Ludwig Leichhardt's letters - with its bibliographical wealth - stands hitherto unrivalled.[4]

Although cause is found at times below to argue with certain of her interpretations on science and its achievements, Kathleen Fitzpatrick's penetrating studies on John Franklin and the Burke and Wills tragedy are by far the most pertinent commentaries in Australian history - all the biography on Mitchell, Mueller, Strzelecki and others notwithstanding - on the aspirations and place of the scientist in the colonial community. Commenting in 1949 on Van Diemen's Land in 1837, the year of Franklin's arrival, Fitzpatrick writes:

---

[1]F. B. Smith, 'Religion and Free-thought in Melbourne, 1870 to 1890', M.A. Thesis (Melbourne University, 1959).

[2]J. Laverty, 'The History of Municipal Government in Brisbane, 1859-1925...', Ph.D. Thesis (University of Queensland, 1968).

[3]They are:- 'Botanical Investigation of Eastern Seaboard Australia, 1788-1810', B.A. Hons Thesis (2 vols., University of New England, 1962) and 'Botanical Investigation of New South Wales, 1811-1880', Ph.D. Thesis (3 vols., University of New England, 1971). The importance of Gilbert's work is referred to in detail below.

[4]M. Aurousseau (ed.), The Letters of F. W. Ludwig Leichhardt (3 vols., Cambridge, The Hakluyt Society, 1968). More scholarly collected editions of scientists' letters and unpublished writings are certainly required.

> But try as colonists will to preserve the characteristics of old world society, environment is too strong for them and they become unconsciously adapted to a changed setting. The lives of Tasmanian settlers and their wives and families were radically different from those of English landowners and it produced people of a different type. Bush life demands the virtues of action - initiative, hardihood, quickness in decision and improvization. The most blessed word in the colonial vocabulary is 'practical' and as the need for the virtues appropriate to pioneering conditions passes away the tradition is tenacious. A contemptuous tolerance is the best that the scholar, the artist and the pure research scientist can yet hope for in Australian society. If he can 'show results' measurable in intelligible, that is, money terms, that is another matter and he may be classed 'very clever but quite practical'. In recent times Australians have been described as 'the poorest rich people in the world' and this trait was already well marked in Tasmanian society more than a century ago.[1]

In the twenty-five years since these sceptical words were written Australian science has advanced in local and world esteem and achieved much more nationally, honorifically, socially and actually towards attaining Basalla's desiderata for setting up an 'independent' scientific tradition. But the 'struggle', as Basalla calls it - if such it ever was - had its roots in the first efforts to assert science in the Australian colonies. The process of formally developing science in U.S.A. in the nineteenth century, Daniels suggests, was four-fold: fact-gathering; 'pre-emption' - the demand for scientific groupings, however loose - 'institutionalization' - where professionals and experts moved to assert their demands and rights against amateur and outside interference - and, finally, 'legitimation' - where 'the frankly avowed pursuit of pure knowledge is a luxury that a democratic society will allow only the well-established profession'.[2] The Australian experience showed certain similarities.

---

[1] Fitzpatrick, Sir John Franklin in Tasmania, 1837-1843 (Melbourne, 1949), p.51. For similar conclusions about the influence of the bush see L. Gilbert, 'Botanical Investigation of N.S.W.', and 'The bush and the search for a staple in New South Wales, 1788-1810', Rec. Aust. Acad. Sci., I, No. 1 (1966), pp.6-17.

[2] G. Daniels, 'The process of professionalization in American science: the emergent period, 1820-60', Isis, 58, part 2 (1967), pp.151-66.

Australia, in ways uniquely its own, responded to its peculiar circumstances of isolation; small populations and consequent limited intellectual resources; environment and dependent colonialism, and still moves, indeed, through the stages of scientific development and debate suggested by both Basalla and Daniels.

This thesis attempts to examine the second 'era' of scientific development in Eastern Australia, a period embracing all the elements of fact-gathering and efforts to promote science by association, however informal, but forecasting, too, all the aspirations and problems of science in twentieth century Australia; federation, professionalism, 'nationalism' and diversification among them. It is a study of the means, men and milieu for pursuing science, a study taking heed in an historical context of Robert Ardrey's warning:

> ...to believe that a scientist is unaffected by public disapproval, unaffected by the regard or disregard of professional colleagues, unaffected by the lack or abundance of funds for his work, is to characterise the scientist as an unperson. We, the laymen of the world, provide the milieu, from which the scientist must draw his sustaining breath.[1]

In the years after 1820 the painful transformation from the dilettantism of the previous century to the more specialist and technical sciences of the nineteenth took place in Britain. In an era of political and social change scientists demanded and eventually won their own reforms. The Royal Society was forced to awake from its 'slumbers of conscious and secure importance'[2] and between 1820 and 1850 to put its own house in order. After 1820 the scientists (as

---

[1] R. Ardrey, The Territorial Imperative (New York, 1966), pp.218-9.

[2] A.B. Granville, The Royal Society in the Nineteenth Century, being a Statistical Summary of its Labours during the last thirty-five years... (London, 1836), p.x. The reforms in British science are discussed e.g. by G.A. Foote, 'The place of science in the British reform movement', Isis, 42 (1951), pp.192-208, and the reform of the Royal Society in Stimpson, Scientists and Amateurs; a history of the Royal Society (London, 1949), pp.197-219.

opposed to the interested amateurs) began to agitate for a larger control of their own affairs. Charles Babbage, John Herschel, Humphry Davy and David Brewster led attacks on entrenched privilege, complacency and amateurism in Britain's scientific institutions.[1] Much of the nation's most valuable research, some reformers claimed, was hindered rather than helped by the older English universities and scientific institutions.

A number of works appeared dealing with the state of the country's scientific bodies. Babbage published his Reflections on the decline of science in England and on some of its causes in 1830. Brewster immediately reviewed this book, adding his own analysis of the malaise of English science.[2] Brewster was most incensed by the government's complacency concerning scientific affairs. In 1828 the Board of Longitude - for long a major organizer of research in the Australasian region - had been abolished. In contrast to scientists in Britain members of the Royal Academy in France received government aid and pensions. Even the boards set up in the United Kingdom to supervise problems of a technical or broadly 'scientific character' seldom had a man of science attached to them. The British Society for Extending the Fisheries and Improving the Sea-Coasts did not boast even an engineer but consisted

> of individuals who, if they know anything of our coasts at all, must have seen them from the wicket of a bathing machine or over the bulwarks of a steam boat.[3]

---

[1]Babbage (1792-1871), Lucasian Professor of Mathematics at Cambridge, was associated with many of Britain's scientific institutions and was initially encouraged in his 'declinist' view of science in England by Brewster (1781-1868), the Scottish natural philosopher, microscopist and physicist who was a strong advocate of a British Association for the Advancement of Science. Sir John Herschel (1792-1871), astronomer and physicist, was associated with the founding of the Astronomical Society and was a strong critic of Britain's lack of familiarity with foreign research. Davy, President of the Royal Society (P.R.S.), 1820-27, was a experimentalist of great repute but, despite a promising start, his presidency did not usher in the radical reforms the critics desired. For the relationship between the reformers and their differing views on the state of science, especially in Oxford and Cambridge, see A.D. Orange, 'The origins of the British Association...', Brit. Journ. Hist. Sci., VI (1972), pp.152-76.

[2]Quarterly Review, XLIII (1830), pp.305-42.

[3]Ibid., p.323.

Very few of the larger established scientific societies offered remuneration to the research scientist. Although they attracted the foremost scientific papers, there were, particularly in the case of the Royal Society, grave doubts about the criteria by which contributions were selected for publication.[1]

Gloomy and foreboding though the declinists were about the Royal Society itself most were nonetheless encouraged by developments elsewhere and deprecated Banks's later obstructionist policies towards the new Societies. For those in London dissatisfied with the Royal Society's service to their particular disciplines the founding of societies for the pursuit of particular subjects had been an important step forward. Banks himself encouraged the formation of the Linnean Society in 1788 and supported the Horticultural Society in 1804.[2] Indeed, the Royal Institution - where Davy and Faraday did much of their important experimental work - was organized in 1799 at a meeting in Banks's house. But after this display of benign generosity Banks began to fear for the hegemony of the Royal Society and thereafter tended to look with a jaundiced eye on further attempts to form scientific societies. His opposition proved largely ineffectual. In 1807 the Geological Society was founded and in 1820 the Astronomical Society.[3] In the reforming period after 1820 geographers, mathematicians, statisticians, zoologists and even phrenologists were among those who set up their own specialist national associations.

But not all the best of British science was concentrated in London. As Britain emerged from an agrarian to an industrial economy after 1750

---

[1]Publication in the Royal Society depended upon a 'Committee of Papers'. Granville, in his analysis of how papers were chosen, concluded that 'the importance of the papers rejected seems to be in the inverse ratio of the scientific character of the deciding members of the committee'.

[2]H.C. Cameron, Joseph Banks. The autocrat of philosophers (London, 1952), pp.174-7.

[3]These societies took their place along with others in London which had been operating successfully since the end of the previous century. Societies had existed to promote botany, entomology, mineralogy and natural history. The most active, practical and important of the improvement societies was the Society of Arts, founded in 1754. See D. McKie, 'Scientific Societies to the End of the Eighteenth Century', The Philosophical Magazine, 150th Anniversary Number (1948), pp.133-43.

the middle-class manufacturing, commercial and professional groups in the provinces began to recognise the advantages in exchanging ideas on science and technology. Few gained easy access to the Royal Society from the provinces and because of their dissenting beliefs many prominent manufacturers and businessmen sympathetic to science found themselves and their families debarred from Oxford and Cambridge. Of all the organizations in London only the Society of Arts came close to meeting the provincial scientists' and manufacturers' more practical needs and aspirations. For years in England the dissenting academies had filled the gaps in the teaching of science left by the apathy or impotence of the older universities. In fact the Edinburgh professors were the leaders of British academic science at the end of the eighteenth century.[1]

From the provinces there came, then, a new current in scientific organization in Britain: the rise of scientific, usually styled 'philosophical', societies, many of which rivalled the societies of the metropolis. Among the most successful were the Lunar Society of Birmingham and the Literary and Philosophical Society of Manchester. In 1836, following initiatives taken in the Philosophical Society of Yorkshire to set up the British Association for the Advancement of Science (1831), Dr. Augustus Bozzi-Granville (1783-1872), an arch-critic of the Royal Society and a prominent London physician, reviewed the challenges to the Royal Society with great satisfaction. These 'rival institutions', national and provincial, he wrote, had 'sprung up with a luxuriancy of numbers and structural organs, and power of production equalling almost Australian vegetation'.[2]

There was, as we shall see, a real sense in which the suspected vegetal vigour of Australian plants and the richness and 'peculiarity' of the continent's other natural phenomena would have an important influence on the course of science in Australia and Britain as well as

---

[1] J. B. Morrell, 'The University of Edinburgh in the late eighteenth century: its scientific eminence and academic structure', Isis, 62, part 2 (1971), pp.158-71.

[2] Granville, Royal Society in Nineteenth Century, p.x.

on the formation and sustenance of scientific societies in both countries.[1]

Brewster, in his review of Babbage's Reflections on the decline of science, welcomed the proliferation of small provincial scientific societies whose

> principal advantages...must be sought in the prosecution of local researches, which they alone can carry on: we allude to the examination of the natural history of the country, and to inquiries into the meteorological and magnetical phenomena.[2]

It is against the backgrounds of the reform of science in Britain and the continuing European interest in the Australian environment and its peculiarities that we must view the earliest attempts to establish scientific associations in Australia. The manifesto for any British colonial society would clearly approximate to that of Brewster. William Vernon Harcourt (1789-1871), the Yorkshire clergyman who played a significant part in founding the British Association at York in 1831, proposed a programme

> to give a stronger impulse and a more systematic direction to scientific inquiry - to promote the intercourse of those who cultivate science in different parts of the British Empire with one another, and with foreign philosophers - to obtain a more general attention to the objects of science, and a removal of any disadvantages of a public kind which impede its progress.[3]

Here was evidence, repeated frequently to the colonies in the coming years, that the scientific men at home certainly would not forget their 'fellow labourers' in the Empire.

---

[1] E.g. it was reports from Australia which influenced the formation of the Royal Geographical Society of London (1830) and provided materials for the Zoological Society of London (1826). This is, of course, a feature of Basalla's 'colonial science' phase, wherein data from the exploited territory achieves ~~growing~~ growing attention in the colonising country.

[2] Quarterly Review, XLIII, p.325.

[3] Quoted in Orange, 'Origins of the British Association...', Brit. Journ. Hist. Sci., VI (1972), p.172 from Edinburgh Review, LX (1834-5), p.377.

But even in Britain, as Brewster conceded, 'it was no small object to bring together the scientific men of a large city' to discuss science and sustain a society. The difficulties facing aspiring philosophers in the Australian colonies in the 1820's were even more formidable. The population of Sydney at the end of the decade had scarcely reached 11,000 and Hobart boasted barely half of that figure.[1] Neither place had yet achieved a very high level of intellectual or even social refinement. There was a very restricted circle capable or willing to present papers on scientific matters, even where these dealt with the problems of Australia's unique phenomena about which Europe's scientists were anxious to know more. The existence of a society presupposed that there were available competent men to process, however crudely, the material at hand.

---

[1] In 1828 the population of Sydney Town was estimated at 10,815 and the previous year that of Hobart stood at 5,000. Australian Encyclopedia, vol. 4, p.509 and vol. 8, p.399.

CHAPTER II

FIRST EXPERIMENTS

On 27 June 1821, just over one year after Banks's death, the first meeting of the Philosophical Society of Australasia was held at the home of Barron Field (1786-1846), Judge of the Supreme Court of Civil Judicature in New South Wales. Seven 'gentlemen' attended this first gathering,[1] including Frederick Goulburn (1788-1837), colonial secretary; John Oxley (1785?-1828), the much-travelled explorer and surveyor-general and Dr. Henry Grattan Douglass (1790-1865), an accomplished doctor and graduate of Trinity College, Dublin, who had arrived only the previous month in the colony.[2] Oxley, it is clear, saw participation in the society as part of his professional duties; Goulburn was interested in meteorology - he kept a 'meteorological diary' of Sydney from 1 May 1821 to 30 April 1822[3] and Field, although an amateur and antiquarian, took more than a passing interest in natural history, particularly botany, and made, Gilbert writes, 'a worthwhile contribution to colonial science at a time when champions were sorely needed'.[4]

Among others at the foundation meeting was the principal surgeon (since 1819) at the Sydney Hospital, James Bowman (1784-1846), a former convict transport surgeon, and Edward Wollstonecraft (1783-1832), who brought the advantages of his wide mercantile contacts to the Society.[5]

---

[1]Philosophical Society of Australasia, Minute Book (29 June 1821 - 14 August 1822), MSS. D.142., Mitchell Library, Sydney, Minutes reproduced in J. and Proc. Roy. Soc. N.S.W., LV(1921), Appendix, pp.lxvii-cii

[2]For Goulburn see A.D.B., vol. I, pp.463-4 and for Douglass N.J.B. Plomley, 'Some Notes on the Life of Doctor Henry Grattan Douglass', M.J.A. 1(1961), pp.801-07 and K. Macarthur Brown, 'Doctor Douglass and Medical Sociology', M.J.A., 1(1943), pp.455-62. For Oxley see E.W. Dunlop, John Oxley (Melbourne, 1960).

[3]Published in B. Field (ed.), Geographical Memoirs on New South Wales (London, 1825), pp.385-96.

[4]Gilbert, 'Botanical Investigation of New South Wales', vol. II, p.548, footnote 42.

[5]For Bowman and Wollstonecraft see A.D.B. I, pp.137-8, and II, pp.620-1. See also R. H. Cambage, 'Biographical Sketches of Some of the Members of the Philosophical Society of Australasia', J. and Proc. Roy. Soc. N.S.W., LV(1921), pp.xxxiii-xli. The seventh founder member was Captain Francis Irvine, an emigrant soldier from India and landowner at Upper Minto, near Camden.

But it was with Douglass and Field that the destiny of the little group eventually lay. Douglass, the Irishman, boasted the scientific and medical experience,[1] and Field possessed the literary and publicity flair. Both knew that outside knowledge of Australian resources was 'lamentably deficient'. 'Nature', the members concluded at their first meeting, had been leading everyone 'through a mazy dance of intellectual speculation, only to laugh at us at last on this fifth continent'. The colony needed a 'nucleus' to gather in 'the many valuable facts, that are floating around', a society to collect data on

> ...the natural state, capabilities, productions, and resources of Australasia and the adjacent regions, and for the purpose of publishing from time to time, such information as may be likely to benefit the world at large.[2]

These were vast horizons for seven men.

The founder members of the society were intimately concerned with the possibilities of their environment. Some of them saw in the society an opportunity to extend the colony's enterprise in agriculture and commerce, to succeed, in fact, where an Agricultural Society attempted in 1818 under Lachlan Macquarie had failed.[3] These founders ordered their affairs very strictly. They excluded 'polemical divinity and party politics' from the debates, banned intoxicants and laid upon themselves the onerous tasks of producing monthly papers and holding weekly meetings. They were exclusive (or prudent) enough even in their isolation to reserve the right of blackballing suggested candidates for admission and of refusing papers submitted for reading before them. Only 'sickness, public business, or non-residence in Sydney' were considered sufficient grounds for neglecting even the most minor of membership responsibilities.

---

[1] He was elected to the Royal Irish Academy in June 1820; was a member of the Royal College of Surgeons of England and had wide experience of treating diseases at home and abroad.

[2] Minutes, 27 June and 4 July 1821.

[3] The failure was due, it seems, to disagreements over the membership status of emancipists: Macquarie refused to patronize the society unless they were admitted. See J.H. Maiden, 'A Contribution to a History of the Royal Society of New South Wales...', J. and Proc. Roy. Soc. N.S.W., LII(1918), p.217

W. B. Clarke many years later described the Philosophical Society of Australasia as a 'Mutually Friendly Association', a kind of 'Scientific Club'.[1] A 'club' it certainly set out to be but within a very short time the very last quality it dispensed was 'mutual' friendliness. Exclusive it certainly was, and not only in the narrow sense of colonial exclusiveness. The Philosophical Society in Sydney saw the Royal Society of London and the older Societies of Britain as its models. Hence the secretiveness and solemnity surrounding the admission of persons and papers. By August 1821 the founders' self-esteem had risen to demanding that new candidates state their qualifications of membership.

Starved of books and scientific intercourse the members leaned heavily on each other. They agreed to draw up a catalogue of books in each others' libraries and to make it available for their mutual use.[2] Goulburn offered a room at his office for museum exhibits and the members agreed to contribute £5 each towards the cost. The museum was fitted out and ready to receive exhibits by the end of August. Before any papers were read or, it seems, offered, aspiring authors were formally required to perform and verify 'every experiment' relating to the topic under discussion. All results and the apparatus used in such experiments were to be deposited in the Society's museum.[3] This bold regulation suggests that the members were expecting as many 'mechanical' papers as they were topics on natural history.

Despite their exclusiveness there was a practical no-nonsense efficiency about this group of men. The quest for other members of the same type was certainly one reason behind Field's proposal of Rev. Samuel Marsden (1764-1838) - described by Governor King as 'the best practical farmer in the colony' - for membership of the Society in July 1821.[4] Wisely, and

---

[1]Inaugural Address to Roy. Soc. N.S.W., Trans. Roy. Soc. N.S.W., I (1867), pp.11-12.

[2]For details on the books available see Peter Orlovich, 'The Philosophical Society's Library, 1821-2', Biblionews, 2nd Series, I (2 April, 1966), pp.9-12.

[3]Minutes, 18 July 1821.

[4]Ibid, 25 July 1821. For Marsden see A.D.B., II, pp.207-12.

perhaps mindful of their resolve to keep 'party politics' out of the society, the members did not pursue the candidature of the controversial cleric, who formally requested permission to withdraw his own nomination.

The philosophers of Sydney soon moved to inform the outside world of their plans. Douglass, the interim secretary, prepared a circular letter for despatch to twenty major academies and societies in Austria, Britain, Denmark, France, Germany, Italy, Russia, Sweden, United States, the Indian states, Ceylon and Java.[1] After careful consideration Douglass first limited the objects of the society to enquiring into 'the various branches of Natural History of this vast continent and its adjacent regions' - making special reference to geology and mineralogy. He called for correspondents to submit 'suggestions or enquiries' to the society and for the exchange of duplicate specimens. After further reflection the members themselves broadened Douglass's draft suggestions to embrace 'the various branches of physical science' and added the important subject of 'the history and character of man, together with the diversities of his language'.[2] For the moment, however, the lure of the continent and its 'adjacent regions' overrode the urgency of despatching letters to 'various Philosophical Institutions of the Globe' for Wollstonecraft and others were demanding immediate action on matters of more local scientific interest.

On 29 August Wollstonecraft informed the society that Captain Thomas Raine (1793-1860), master of the convict transport Surry bound for Macquarie Island, was ready to receive written 'Instructions and Queries' for pursuing scientific work on the voyage. Raine was an experienced mariner and interested with Wollstonecraft in the commercial possibilities of shipping elephant-seal oil from Macquarie Island to Britain.[3] The Surry had already done good service for Governor Macquarie in carrying

---

[1]Minutes, 25 July 1821.

[2]Ibid., 26 September and 10 October 1821.

[3]See R.H. Goddard, 'Captain Thomas Raine of the "Surry", 1795-1860', J.R.A.H.S., XXVI (1940), pp.277-317. Wollstonecraft had been attracted by Raine's account of a visit to Pitcairn Island published in the Australian Magazine, I (1821), pp.80-84 and 104-14. Raine made five voyages from England to Australia between 1816-23 and established the first shore-based whaling station on mainland Australia at Twofold Bay in 1818. He had already visited Macquarie Island in 1819. After 1823 Raine involved himself more and more in business affairs in New South Wales, see also A.D.B. II, pp.359-60.

Charles Frazer's, the colonial botanist's, seeds and plants to England in 1819,[1] and her master was known to be a keen, competent observer of natural phenomena. On board, too, was Dr David Ramsay (1794-1860), an M.D. of Edinburgh University, who had already accompanied Raine on one voyage across the Pacific and done some useful work on natural history.[2]

Seeing themselves in the Baconian tradition and fully aware of the growing interest in Antarctic exploration the Sydney philosophers agreed to provide Raine with instructions which were approved on 5 September, the day the Surry sailed.[3] Two days previously Wollstonecraft had written privately to Raine asking him and Ramsay to pay particular attention to the 'Natural History' of Macquarie Island.[4]

In view of Sydney's already well-established position as a centre for Antarctic and South Pacific whalers and sealers the decision by the Philosophical Society to take advantage of the Surry's voyage was quite logical.[5] Whaling and sealing were important in the colonial economy and a growing acquaintance with southern waters enhanced interest in the natural phenomena of those regions. The Russian Antarctic circumnavigation under Faddei Faddeevich Bellingshausen (1778-1852) and Mikhail Petrovich Lazarev (1788-1851) in the Vostok and Mirny (1819-21) had excited intense interest when the ships were in Port Jackson for two visits between March and May and September and November 1820.[6] Douglas Mawson later noted the importance of this Russian enterprise:

---

[1]Macquarie to Bathurst 18 and 22 July 1819, H.R.A., Ser.I, vol.X, pp.177 and 195. See also Gilbert, 'Botanical Investigation...', vol.I, p.59.

[2]A.D.B. II, p.361 and I. Brodsky, Dr David Ramsay (Sydney, 1960).

[3]Goddard, op. cit., p.287. The instructions were drawn up by Field and Wollstonecraft. They have not been located. Similar instructions were authorized on 17 October for 'Mr Kent of the Colonial Marine' bound for Hawaii.

[4]Wollstonecraft to Raine, 3 September 1821, Goddard, op.cit., p.303.

[5]R.A. Swan, Australia in the Antarctic (London and New York, 1961), pp.17-35.

[6]The expedition's astronomer Ivan Mikhailovich Siminov (1794-1855) was permitted by Macquarie to establish an observatory at North Head to study terrestrial magnetism. The expedition had received the personal support of Banks in July 1819. See A.D.B. I, pp.83-4, and II, p.99 and F. Debenham (ed.) The voyage of Captain Bellingshausen to the Antarctic Seas, 1819-1821, 2 vols. (London, 1945).

> As a result of Bellingshausen's voyage and the operation of sealers in the interval post-dating Cook's effort, the unknown in the Southern Hemisphere was considerably reduced by the year 1821.[1]

Bellingshausen himself visited Macquarie Island - discovered in 1810 by Captain Frederick Hasselburg in the Perseverence - after he finally left Sydney towards the end of 1820.

For the first three months the Philosophical Society's members were busy soliciting information from all the colonies. For the first time in Australia the main emphasis of a group of scientists was on geological topics.[2] On 3 October the Mineralogical Committee (Oxley and Wollstonecraft) reported that they could find no mineralogical collection in New South Wales to purchase for the museum. But Captain Francis Irvine had better news from Port Dalrymple, northern Van Diemen's Land, where Rev. John Youl (1773-1827) had assembled a collection of minerals, fossils and petrifactions, which was sent to Sydney some months later.[3] Oxley's mineralogical collection from Port Macquarie was acquired for the museum and requests were sent to surgeons and military men at outlying settlements to send in specimens of minerals and coal.[4] The Museum Committee, Douglass and Bowman, were kept busy assembling their exhibits and Douglass at least did not forget the needs of his Alma Mater, Trinity College, Dublin.[5] In December Alexander Berry (1781-1873), a well-read former student at St. Andrew's and Edinburgh and long-standing business associate of Wollstonecraft, was elected to the Philosophical Society.

---

[1]Cited in A. Grenfell Price (ed.), The Winning of Australian Antarctica: Mawson's B.A.N.Z.R.E. Voyages 1929-31 (Adelaide, 1962), p.3.

[2]D. F. Branagan, 'Words, Actions, People: 150 Years of Scientific Societies in Australia', J. and Proc. Roy. Soc. N.S.W., 104 (1971), pp.124-5.

[3]Ibid. and Minutes, 10 October 1821, 1 and 15 May 1822. Goulburn also a collector of geological specimens, was added to the Mineralogical Committee on 10 October. For Youl see A.D.B. II, pp.632-3.

[4]Correspondents outside Sydney included Major James Thomas Morisett (1780?-1852) at Port Hunter (Newcastle) and Captain Francis Allman (1780-1860) and assistant-surgeon Fenton at the newly-established Port Macquarie, N.S.W. On 28 November 1821 it was resolved to ask members to 'transmit to the Museum specimens of the different soils in their respective districts of the country, noting the depth at which each specimen was taken, and such other particulars as they may deem proper'.

[5]Minutes, 7 February 1822.

Berry was an accomplished geological observer, as his reports to the society were soon to show.[1]

Even while the Philosophical Society was beginning its efforts to marshall data a scientific benefactor of high standing and deliberate intention to advance Australian science was on the way from Britain. Thomas Makdougall Brisbane (1773-1860) had applied for the post of governor of New South Wales as early as 1815 and three years later Banks wrote to Allan Cunningham, the King's Botanist, who despaired constantly of Governor Macquarie's luke-warm support of science, promising him Macquarie's imminent recall and replacement 'by a more Scientific Governor'.[2] Brisbane's ambition was not realized, however, until November 1820 when, with the support of his old benefactor, Wellington, he was appointed to New South Wales.

Scientists at home and in the colonies set great store by Brisbane's governorship. During his successful military career the governor's chief scientific interests had been in astronomy and meteorology. He had built Scotland's second observatory at his home in 1808 and two years later was elected a Fellow of the Royal Society. He had also furthered the interests of the new Astronomical Society of London. Brisbane's anxiety to seek out new skies for his observations and experiments received an added boost with the expected passing of Encke's comet in 1822.[3]

---

[1]Berry sent specimens of his mineral collection to the Edinburgh University Museum. John Busby (1765-1857) was appointed civil engineer and mineral surveyor in New South Wales in 1823 and came to the colonies with wide experience and achievement as a mineral surveyor in Britain - including the development of machinery for boring. Governor Bathurst hoped that Busby's 'professional assistance' would be applied to an examination of the colonies' 'Minerals and Geology'. These expectations were not disappointed for Busby used his skill and experience to make important recommendations on coal mining at Newcastle and for engineering projects in Sydney. The best account of Busby's earlier work on the coal measures (with references to his influential unpublished reports) is by D. F. Branagan, Geology and Coal Mining in the Hunter Valley 1791-1861, Newcastle History Monographs No. 6 (Newcastle, 1972), pp.31-5 and 87-8. See also A.D.B., I, pp.188-9 where, however, little consideration is given to Busby's geological and mining work.

[2]Banks to Cunningham, 6 August 1818. Banks Papers, G026 (MF), National Library, Canberra. Cited in Gilbert, 'Botanical Investigation', vol. I, p.53. See also Bathurst to Brisbane, 24 November 1815 and 30 March 1821, Brisbane Papers, Nan Kivell Collection, MS 6787, National Library, Canberra.

[3]V.W.E. Goodwin, 'Parramatta Observatory. The story of an absurdity', J.R.A.H.S., XXXIII (1947), pp.173-87. There was certainly no 'absurdity' in Brisbane's time at Parramatta!

Like some others in the colony Brisbane's intellectual and scientific home was Edinburgh and it was to the scientists and institutions of that city that he sent reports of many of his discoveries.[1]

Brisbane brought the German Christian Carl Ludwig Rümker (1788-1862) as his private astronomer to Sydney. Rümker's first astronomical papers on some Maltese observations had appeared in the Edinburgh Philosophical Journal in 1819 following encouragement he received from the eminent Austrian mathematician Franz-Xaver Freiherr von Zach (1754-1832). In Brisbane's opinion Rümker was 'second to no astronomer in Europe'.[2] Like the governor's other assistant, James Dunlop (1793-1848), his 'very able zealous'[3] fellow countryman, Rümker was supported initially from Brisbane's own pocket. Indeed, the new governor's expenditure on scientific equipment for his planned observatory was staggeringly large,[4] amounting to £1,261 for instruments and over £350 for books.[5]

---

[1] See e.g. 'Observations made at Parramatta on the inferior contingency of Venus with the sun, in October 1823'. Edinburgh Journ. Sci., I(1824), pp.236-9 and 'Observations on the temperature of the earth at Parramatta, New South Wales', Edinburgh Phil. Journ., X(1824), pp.219-22. Meteorological and astronomical observations for 1822-3 appeared in the latter Journal in 1824 and other papers on astronomy, geophysics and meteorology were published in Edin. Journ. Sci. and Trans. Roy. Soc. Edinburgh.

[2] Brisbane to Bruce, Sydney, 28 March 1822, Brisbane Papers, National Library, Canberra. Rümker, after teaching mathematics for two years in Hamburg, went to England in 1809 and thereafter had a varied and colourful career on merchant and Royal Navy vessels. Brisbane brought Rümker from Hamburg - to which he had returned in 1819 - before sailing for New South Wales. See G.F.L. Bergman, 'Christian Carl Ludwig Rümker (1788-1862), Australia's First Government Astronomer', J.R.A.H.S., XLVI(1960), pp.247-89, and A.D.B., II, pp.403-4. For Brisbane's high opinion of Rümker's science see Brisbane to Bathurst, 15 November 1823, H.R.A., Ser. I, vol. XI, p.154.

[3] Brisbane to Bruntly, 13 May 1824, Brisbane Papers.

[4] Goodwin, 'Parramatta Observatory', op. cit., p.181. For a more expert discussion of Brisbane's instruments and fitting-out of the Parramatta Observatory see H. C. Russell, 'Astronomical and Meteorological Workers in New South Wales, 1778 to 1860', Rep. A.A.A.S. (Sydney, 1889), pp.53-6 and 78-84. In 1827 the value of instruments Brisbane left in the colony was put at £1,614.13s, Darling to Colonial Secretary, 10 September 1827, in Russell, op. cit., Appendix B, p.78. Dunlop's skill as an instrument maker was considered indispensable by Brisbane.

[5] J.E. O'Hagan, 'Sir Thomas Brisbane, F.R.S., Founder of Organised Science in Australia', J. Roy. Hist. Soc. Queensland, VI(1959-60), pp.594-603. O'Hagan's paper perpetuates the oft-repeated error that Brisbane founded the Philosophical Society of Australasia. O'Hagan draws heavily upon the eulogistic worked edited and compiled by W. Tasker from Brisbane's papers, Reminiscences of General Sir Thomas Makdougall Brisbane, Bart., (Edinburgh, 1860)

The news of such a windfall of scientific talents, means and prestige as Brisbane and his party promised was not long ignored by the Philosophical Society of Australasia, some of whose members were, for other and more political reasons, looking forward to the departure of Lachlan Macquarie and the start of a new administration. More than a month before his arrival Brisbane was suggested as the Society's first president and Douglass wrote to him in November 1821 two weeks before he assumed office from Macquarie soliciting his patronage for 'their infant body'.[1] Within two days the new governor replied, accepting 'with much deference' the position of president but pointing out that 'the public service' might demand so much time as to leave insufficient 'to devote to the laudable objects of the society'.[2]

The momentum of scientific activity at Sydney and Parramatta was as striking as that of Brisbane's pendulum in the new observatory, which was set up only one hundred yards from his back door at Government House, Parramatta. By April 1822 the building was complete.[3] Everyone took new heart. In December 1821 Phillip Parker King (1791-1856), his four major hydrographic surveys of the Australian coast nearly completed, was elected to the society in absentia.[4] Sharing in the rapid progress of exploration within the colony the society heard an account of Hamilton Hume's expedition from Lake Bathurst 'to Pigeon House, on this Coast' and another of Charles Throsby's 'tour' from Sutton Forest to Jervis Bay.[5]

In this year of increased scientific interest in New South Wales the short-lived Australian Magazine was started to keep literature and science 'subordinate and subservient' to the dissemination of 'useful knowledge, religious principles and moral habits'.[6] The editor, the Methodist Rev. Ralph Mansfield (1799-1880), firmly adhered to his own brand of 'natural

---

[1]Minutes, 26 September and 14 November. Brisbane took over the administration on 1 December.

[2]Brisbane to Douglass, Parramatta, 16 November 1821, Minutes, 21 November 1821.

[3]Russell, 'Astronomical and Meteorological Workers', op. cit., p.54.

[4]Minutes, 14 November 1821. King was to be a doyen of colonial science for another thirty years.

[5]Ibid., 19 and 26 December 1821.

[6]Australian Magazine, I(1821), pp.iii-iv.

philosophy' and openly declared his suspicion of the 'French schoolmen' of the previous century and of any modern thought which 'exalted Chance to the throne of the Deity'. It paid, Mansfield warned, to shun those who declared that

> an effect can be produced without a cause: that the universe was formed by the fortuitous coherence of atoms, which had danced from eternity in the wilds of space; that all the wonders of the structure and organization of the material globe, and all the outpouring grandeurs of the starry firmament, are alike unable to yield one solitary proof of contriving wisdom or creating power.[1]

There was to be no such nonsense in the columns of the Australian Magazine. Only science which led to the contemplation of natural causes and God would have the journal's support. Such contributions would be welcomed from 'scientific gentlemen of the colony', who might '...give a marked prominence to those features of the natural history which are peculiar to the vast continent of Australasia'.[2]

But the Magazine published very few articles and notes on natural history, of which only Dr George Shaw's 'The Duck-Billed Platypus; a Native of New Holland' dealt with specifically Australian material. Other articles extracted promiscuously from European journals were on the 'History of Water Snakes, Sea Snakes and Sea Serpents'; 'The Instinctive Tenderness of the Bear' and the cataracts of Niagara. The infant Philosophical Society contributed nothing and was not even noticed by Australia's first short-lived periodical.

Brisbane, however, compensated for that neglect. Early in January 1822 the Philosophical Society met at Government House, Parramatta, where the governor encouraged members to prepare quarterly meteorological tables

---

[1] Australian Magazine, I, p.14. Mansfield was a Methodist Missionary who arrived in the Surry in September 1820. Publication of his Magazine was later prohibited by the Wesleyan Committee in London.

[2] Ibid., p.15.

and support his astronomical work.[1] They also heard Barron Field's desultory, pedantic paper on the 'Aborigines of New Holland and Van Diemen's Land', a performance easily overshadowed soon afterwards by two talks from Alexander Berry. Braving 'the perils of the seas' along the coast of New South Wales, Berry had gathered material for a general account of his expedition to the Clyde River and Bateman's Bay and for a perceptive memoir on the coastal geology from Newcastle to Bateman's Bay.[2] In January Wollstonecraft received, too, from Raine and Ramsay a report of the Surry's visit to Macquarie Island.[3]

In a lucid, brief account Raine set forth the advantages of the island as an anchorage and assessed its extent and position. He knew, too, his own scientific limitations:

> There is no appearance of volcanic origin - no appearance of fossil remains - no precious stones - of what the nature the rocks be, I must confess my ignorance but have sent you a few specimens and must leave you to determine...[4]

The Surry's party explored the island's fresh water lakes and noted that they were 'probably glacial [there being] evidence everywhere that the Island had been covered with ice in the past'. Although Raine, unfortunately, did not elaborate on his physiographical findings his preliminary remarks on the glacial features were quite accurate. As a sealer he had, too, a critical eye for the island's fauna and described in detail the habits, physiology and commercial possibilities of the 'sea elephant' (Monachus Leoninus)and made some remarks on ornithology.[5]

---

[1]Minutes, 2 January 1822.

[2]Ibid., 13 February and 6 March 1822.

[3]Raine to Wollstonecraft, January 1822, in Goddard, 'Captain Thomas Raine', J.R.A.H.S. XXVII(1940), pp.304-07.

[4]Ibid., p.305. Brisbane forwarded an amended version of Raine's account to Edinburgh. 'Notice in regard to Macquarie Island by Mr Thos Raine...' Edinburgh Phil. Journ, XI(1824), pp.46-50. Macquarie Island is, in fact, of volcanic origin.

[5]The elephant seal was called Morunga elephantina in one report and Phoca Leonina in the Edinburgh version. The remarks on glaciation were omitted in the latter.

Allowing for later botanical corrections in nomenclature, Raine's and Ramsay's summary of vegetation was also quite accurate. Bellingshausen, who preceded the Surry to Macquarie Island by twelve months, eventually produced a far less detailed account than that presented by the less qualified men from Sydney Town.

This was the first scientific report expressly commissioned by a learned society in Australia. It is remarkable that there is no evidence of any discussion on it, although Brisbane recognised its importance by despatching a version of it to Edinburgh.[1]

At the end of March 1822 Brisbane looked back confidently on four months of scientific and governmental involvement. 'I think it will be easy' he wrote home 'to establish that the Science of Political Economy has not extended her advantages to Australia' and he predicted that

> Science will gain rather than lose by my other occupations, altho' the Climate is particularly well calculated for that sublime study [astronomy]. Avec un Ciel Vierge!!! what may not be achieved?[2]

'The diversity of occupation here', Brisbane found, particularly benefited his 'turn of mind' and he 'would not exchange this Government with any one under the Crown of Gt. Britain'. Those were the words of a novice in colonial administration but a generous optimist in science. But the two occupations, alas, could not be divorced, much as the governor might try.

The tensions between Brisbane and his friends - like Douglass - on one side, and his enemies - mostly exclusivists, conservatives and large landowners - on the other were brewing during 1822. Brisbane's liberal ideas on the treatment of convicts and his implementation of Commissioner Bigge's recommendations on land policies aroused the ire of certain settlers and revived a longing for the 'caprice, favouritism & cabel' (sic) of Macquarie's reign.[3] For the time being, however, Brisbane remained master

---

[1]See also J.S. Cumpston, Macquarie Island (Melbourne, 1965), pp.50-53.

[2]Brisbane to Bruce, 28 March 1822, Brisbane Papers, National Library, Canberra.

[3]Brisbane to Bruce, 15 February 1822, ibid.

in his own house and observatory at Parramatta and was able to counter successfully the 'slander and malevolence... constantly stalking abroad'[1] and get on with the pursuit of science unmolested.

Once the social junketings and scientific eulogies accompanying the erection of a commemorative tablet to Banks and Cook at Kurnell, Botany Bay, were over in March 1822,[2] the Philosophical Society of Australasia drifted into decline. Rümker's paper on Australian astronomy in the same month attracted a respectable audience but for three months following only the museum activities flourished.[3] At the beginning of June the members relaxed the harsh and unrealistic rule prescribing six months suspension for any person failing to present a paper in his due turn. 'Interest and zeal...without any penalty for default', it was hoped, would bring forth a better response from the reluctant philosophers. Had the rule been strictly applied from the start most of those who now agreed to its relaxation would have been suspended since the beginning of 1822. Country members in particular found it difficult to get to town and so Douglass's house at Parramatta, being 'centrical' for most, was chosen as the venue for 'one of the weekly' meetings in every month. Brisbane reported on his astronomical observations to the Society and, seeking revitalisation, invited his fellow members to take their anniversary dinner at Government House. On 3 July nine of them assembled at Parramatta to sample the government's fare but one noticeable absentee was Barron Field, whose personal disenchantment with Douglass and Brisbane was nearly complete.

Sometime during the southern spring of 1822 the formal work of the Philosophical Society ceased. Before its demise Field had prepared the planned catalogue of members' books and P. P. King read a report at the beginning of October on Australia's 'maritime geography' and promised 'a

---

[1]Brisbane to Bruce, 13 December 1822, ibid.

[2]Minutes, 27 March 1822, and Sydney Gazette, 15 and 22 March. See Branagan, 'Words, Actions, People', pp.126-8. Most writers on the history of science in New South Wales have seen the erection of this tablet as the most significant achievement of the society!

[3]Minutes, March-May 1822.

more detailed and satisfactory paper' upon his return from Britain.[1] But reviewing King's October paper was the last recorded act of the Society before, as Field wrote, it 'expired in the baneful atmosphere of distracted politics, which unhappily clouded the short administration of its President'.[2] Politics apart, Brisbane regarded 1822 as a most successful year for colonial science. On 9 September the first series of Rümker's astronomical observations were despatched to the Royal Society of London. Encke's comet had been discovered and 'the meteorological department' was well attended to at Newcastle, Parramatta, Macquarie Harbour, Port Dalrymple and the Derwent (Van Diemen's Land), 'at all of which accurate registers are kept' and transmitted to the governor to help establish the 'climate' of the Australian colonies.[3] Brisbane on his inland excursions took barometric and other meteorological readings as he travelled.[4] He was optimistic about the acclimatization of crops such as cotton, Indian corn and New Zealand flax and placed great faith in the Agricultural Society of New South Wales - formed in July 1822[5] - expecting it to unravel 'all the races of animals...

---

[1] Minutes 24 July 1822 and B. Field (ed.) Geographical Memoirs on New South Wales (London, 1825), p.296. King reached England in 1823 and did not return to Australia until 1832.

[2] Geographical Memoirs, p.v.

[3] Brisbane to Bruce, 13 December 1822, Brisbane Papers, Canberra; Meteorological Archives (MA 57-62) and Brisbane to Roy. Soc., 6 September 1822, Roy. Soc. Archives, London. Brisbane's meteorological papers are discussed briefly in J. Gentilli, 'A History of meteorological and climatological studies in Australia', University Studies in History, V, No. 1. (Perth, 1967), pp.62, 82 and 88.

[4] Brisbane to Bruce, 22 March 1822.

[5] Sydney Gazette, 5 July 1822. The list of first office-bearers was almost identical with the membership of the Philosophical Society. They included: Sir John Jamison (1776-1844), president; Field, Marsden, William Cox (1764-1837) and Dr Robert Townson, vice-presidents; George Thomas Palmer (1784-1854) and A. Berry, joint secretaries; with Wollstonecraft on the Sydney committee and Douglass on the Parramatta one. Oxley and Charles Throsby also held office on 'council'. Brisbane was patron and Goulburn vice-patron. For an undocumented, uncritical account of the agricultural societies see H. M. Somer, 'Short History of the Royal Agricultural Society of New South Wales', J.R.A.H.S., IX(1923), pp.309-32. Brisbane thought highly enough of the society to donate £100 towards a yearly medal 'for the best colonial produce'. See Sydney Gazette, 3 November 1825.

sadly jumbled together without either science or system' in Australia. Agriculture, Brisbane observed, had been conducted hitherto in 'a barbarous manner'[1] and was to the majority of colonists a much more pressing cause to promote than science and philosophy. It was left, therefore, to the little circle around Brisbane in Parramatta to make sure that 'pure' science did not succumb completely.

Field's remarks on the 'distracted politics' of Sydney were written nearly two years after his departure from the colony and were tinged with that quarrelsome judge's own shades of political thinking. Field left for England to 'vent his spleen'[2] against Brisbane early in 1824 but the disagreements and tensions which 'clouded' the governor's administration were already apparent by the end of 1822. At that stage they were mostly of a personal nature. Douglass,'a man of liberal and independent principles', was wont to speak his mind openly. He fell foul of Marsden and his friends[3] and was not long in arousing the ire of Field. Brisbane's own liberal attitudes towards convicts and emancipists added further fuel to the anti-government exclusivist fire, a fire which men such as Field, Sir John Jamison, the Macarthurs, Marsden and others were only too ready to fan in high places by misrepresenting Brisbane in London.

Politics were certainly not the sole cause of the Philosophical Society's eclipse, for men of very different political persuasions did associate successfully, albeit with some friction, in the Agricultural Society. But by the spring of 1822, largely for personal <u>and</u> political reasons, the Philosophical Society had become a house irrevocably divided among itself.

---

[1] Brisbane to Bruce, 13 December 1822, Brisbane Papers, Canberra.

[2] Brisbane to Bruce, 31 December 1823, ibid.

[3] Over the vendettas started between Douglass and his fellow magistrates at Parramatta, including Marsden and Hannibal Macarthur, when they fell out over Douglass's convict servant girl Ann Rumsby. Douglass's enemies maliciously implied that he had an immoral relationship with her. See K.B. Noad's articles on Douglass in <u>A.D.B.</u>, I, p.314 and <u>Bull. Post-Graduate Comm. Med. Univ. Syd.</u>, 18(1962), pp.125-47, and M. Clark, <u>A History of Australia</u>, vol. II(Melbourne, 1968), pp.24-6. Brisbane supported Douglass throughout the ensuing wrangles.

Rümker, in a paper on southern astronomy, hinted broadly at another obvious difficulty facing the society:

> In offering to this Society the present paper, I must beg leave to remark that, if it cannot be expected in any science that the most learned themes shall excite general interest, but, if, on the contrary, they rather lose popularity in proportion as they are rich in intrinsic value, this is most to be feared of astronomical tracts, in which conciseness and simplicity constitute the highest perfection of style, and by far the most essential points are expressed in algebraical formulae, which to non-mathematicians are less intelligible than hieroglyphics, and where a few figures often comprehend the whole fruits of many years' uninterrupted tedious labour. The entertaining topics of this science, that please without requiring theoretical knowledge, are so much exhausted, the wonders of the heavens have been so often profaned by astronomical book-makers, that I should be sorry here to follow so sacrilegious an example...[1]

Rümker's and Brisbane's 'astronomical tracts' were beyond most of the members of the Philosophical Society. The qualities of 'conciseness and simplicity', intrinsic to astronomy as Rümker conceived it, were furthest from the expansive pen of Barron Field, who tried his hand at astronomy, botany, ethnology and, indeed, almost anything.[2] There was, then, as unspoken, unrecorded, tension between the amateurs and full-time scientists, the 'experts', a barrier which Allan Cunningham felt acutely in the pursuit of his botany.[3] For many the science of Parramatta Observatory was too 'hard' and too mathematical - although a wider educated circle could and did share in the meteorological and mineralogical surveys organized in the more distant settlements. Agriculture, in spite of politics and personalities, was a field more colonists could till with profit and prospects

---

[1]Geographical Memoirs, pp.257-8.

[2]For an appreciative view of Field's botanical accounts of his visits to Bathurst (1822), the Illawarra and Shoalhaven (1823) see Gilbert, 'Botanical Investigation', vol.II, pp.547-8. Field published his journals in the London Magazine and reproduced them as an Appendix to his Geographical Memoirs (pp. 401-84) together with a short glossary of the most useful natural history products of N.S.W., and Van Diemen's Land. Field was certainly widely read but had the unfortunate tendency to display his erudition on every conceivable occasion. He was not above criticising Brisbane's scientific work as well as his politics. As a patron and promoter of colonial science Field would have been more effective had he confined himself to his 'proper sphere'.

[3]See, e.g. Gilbert, 'Botanical Investigation', vol.I, p.52 and vol.II, pp.458-60. Cunningham was a rigid upholder of 'scientific' standards in the colony, particularly in his policy towards the Botanic Gardens in Sydney.

of a return. After 1822 Brisbane's science was to become a cudgel for his enemies in the petty but deadly serious knockabout of faction and party which was so common an element of colonial life.

Despite the Philosophical Society's short life its achievements, although modest, were an important step forward in local awareness of science and a pointer to what might be achieved in the Australian colonies. In broad outline the society's real and professed interest in exploration of the Pacific, Antarctica and New Guinea and in the recording of data and phenomena of the coast and interior of Australia set forth the guidelines for later colonial scientific societies. The best known but by no means the sole record of its achievements are in Field's Geographical Memoirs.

In his paper on the Aborigines - which the author himself modestly conceded 'was not a complete and satisfactory dissertation upon a subject... which is so difficult of investigation' - Judge Field had called upon the Philosophical Society to collect 'all the physiological facts' concerning Australia's 'black races'. He himself had made a cursory examination of aboriginal crania and customs and his scholarly apparatus, more often heavier than the new data or argument, certainly revealed that he was well-read in the anthropology of the South Seas, in the writings of Blumenbach and J. R. Forster, for instance.[1] Field's resounding programme of anthropological investigation was not matched by his own performance. He was benevolently tolerant of the Aborigines but his recommendation was that they should be left to decay quietly and freely in their natural state while the European proceeded with his colonizing.

In contrast to Field's 'humble paper' stands Berry's 'On the Geology of Part of the Coast of New South Wales'.[2] Berry made a careful investigation of the coal-bearing strata of the Newcastle coalfield - where 'Dr Hutton would have given much for a single day's walk along [the] shore' - and examined the local geomorphology and geology from the Hunter to Port Jackson. Berry owed much to his teachers in Edinburgh and, like James Hutton (1729-97), the famous Scottish geologist, was a modest worker, hoping

---

[1] Geographical Memoirs, pp.217-22.

[2] Ibid., pp.233-54. Read on 6 March 1822.

that his 'mere hints [would] induce some adequately scientific person to investigate this curious and untrodden field'.[1] The paper comprehended a survey of the geology of the Shoalhaven and the Clyde Rivers in which Berry clearly recognized the significant relationships between river patterns and flow; stream inundation; rock structure and the broad physical divisions of the coastal ranges and interior tablelands.[2] He realised that the study of soils and plant ecology was important for future cultivation and insisted that the 'just and rational principles' of science - rather than 'mere experiment' or, even worse, 'false theory' - were necessary for the colonies' development. Berry had learned his lessons on the new concepts in geology well from his Edinburgh professors, although in Sir John Jamison (M.D. St. Andrews, 1808) (1776-1844) he met in New South Wales an exponent of the opposing Neptunist or Wernerian school whose teachings were being strenuously disseminated in Scotland early in the nineteenth century. Hamilton Hume and William Hovell thought highly enough of Berry to entrust him with the identification of the small collection of geological specimens they brought back from the overland expedition to Port Phillip in 1824-5.[3]

Despite his reservations about popularizing science Rümker, in his paper on southern astronomy, sketched the advantages which an astronomer might look for in the Australian heavens, which offered 'as ample a field for [researchers] as any branch of natural philosophy'. Distance between observers, Rümker explained, was important for determining the 'parallax which everybody knows is the change in the apparent place of an object,

---

[1]Ibid., p.236. Hutton published his epoch-making Theory of the Earth in 1795 but it was left to other professors in Edinburgh such as Sir James Hall and John Playfair to espouse, test, disseminate and eventually to conquer, with Hutton's ideas on Plutonism and Uniformitarianism in the geological world.

[2]The soundness of Berry's geology is acknowledged by those few historians of the subject who have examined his work. As Branagan notes Berry 'recognized the unconformity between the rocks of the Sydney Basin and the older rocks in the Bateman's Bay area; he had more than an inkling of the significance of the Lapstone Monocline, and described in some detail the character of the Hawkesbury Sandstone'. See Branagan, 'Words, Actions, People', p.126.

[3]W. Bland (ed.), Journey of Discovery to Port Phillip New South Wales by Messrs W.H. Hovell and Hamilton Hume in 1824 and 1825. (Sydney, 1831), p.49.

produced by a change in the place of the observer'.[1] One disadvantage of Australia in measuring the parallax lay in the meridional differences between the colonies and Europe. The taking of simultaneous observations was impossible but having an established base in a colony did cut down the expense of sending out astronomical observers in ships of war. Triangulation would allow an absolute distance of the sun from the earth to be determined and southern astronomers could play their part in linking up with their colleagues in the north in a

> chain of triangulation, from the north of Denmark and Norway... down to the south of Italy, with a view of determining by a comparison thereof with the astronomical observations, the real shape of the earth.[2]

It was the duty of Australian observers, Rümker claimed, to see whether the southern hemisphere was 'differently shaped, since being proportionately covered with more water, it ought, in order to balance the northern half, to be of greater bulk'.[3] The work of Nicolas Louis de Lacaille (1713-62) at the Cape of Good Hope was well known to Rümker. Lacaille had been sent to the Cape by the Académie des Sciences between 1751 and 1754.

> with the principal goal of determining the solar parallax by observations of the parallaxes of Mars and Venus while similar observations were being made in Europe, and of compiling a catalogue of circumpolar southern stars.[4]

Lacaille, in Rümker's opinion, had been 'badly supplied by his government and worse fitted out with instruments',[5] but despite this had proved an assiduous and accurate worker. His efforts at the Cape produced the first extensive catalogue of southern stars. Lacaille also carried out experiments with the pendulum and measured the meridian arc. Rümker stressed the

---

[1]Geographical Memoirs, p.258. Russell, 'Astronomical and Meteorological Workers', p.62, wrote that Rümker's paper was of 'no value to science, as it simply points out the advantage of the geographical position of Parramatta for observations, a fact which did not need a paper before the Society to make it obvious'. This remark was made with a considerable hindsight of developments in astronomy in N.S.W. Rümker's audience was less well informed.

[2]Geographical Memoirs, p.263.

[3]Ibid.

[4]G. Abetti (trans. Betty Burr Abetti), The Story of Astronomy (London, 1954), p.142.

[5]Geographical Memoirs, p.267.

advantage of a southern location for observing those celestial bodies which are partially, rarely or never visible in the northern hemisphere. One such phenomenon was Encke's comet observed in Europe in 1819 and predicted again for June 1822. Rümker, speaking on behalf of his benefactor and employer, Brisbane, foresaw a significant role for the Parramatta Observatory.[1] Both astronomers regarded it as an important inheritor of the work already started in southern astronomy by Edmund Halley (1656-1742) at St Helena (1676-8), and Lacaille.

King's paper on the 'maritime geography' of Australia provided the society with a preview of the published results of his surveys.[2] King, 'the greatest of the early Australian marine surveyors',[3] had returned to Sydney from his last survey in April 1822. His follow-up work to Flinders was now complete. The 1822 paper contained some minor notes on ethnology, botany, geology and zoology - with some pedantic editing by Field - but the bulk of King's scientific findings was processed by naturalists in Britain.[4]

King's departure for Britain soon after reading his paper was a serious loss to the tiny New South Wales scientific community. In 1824 he was elected F.R.S. - the first colonial to be so honoured - and from 1826-30 was engaged on survey work as commander of H.M.S. Adventure - in company with H.M.S. Beagle - in South American waters, during which time he led a new generation of young naval officers, some of whom were to do important scientific work in Australasian waters.[5] Upon his return to New South Wales in 1832 King assumed a role of leadership in the colony's science during

---

[1] Brisbane's programme for Parramatta Observatory was, in fact, largely completed by 1830.

[2] Narrative of a Survey of the Intertropical and Western Coasts of Australia Performed between the years 1818-22, 2 vols. (London, 1826).

[3] G.C. Ingleton, Charting a Continent (Sydney, 1944), pp.38-41 and see also A.D.B., II, pp.61-4.

[4] For the vertebrates and shells King depended upon John Edward Grey of the British Museum and for the botany on Allan Cunningham. He also received help from Nicholas Vigors, the zoologist, with the ornithology, and from W.S. Macleay for the entomology. William Henry Fitton used Flinders's and King's geological specimens in his account of Australian zoology read before the Geological Society of London in November 1825. See Narrative of a Survey, vol. II, pp.408-649.

[5] They were Owen Stanley (1811-50); John Lort Stokes (1812-85) and John Clements Wickham (1798-1864).

a lean period.

While Brisbane supported Rümker in his efforts to chart the heavens Field was engaged in more mundane pursuits. His paper before the Agricultural Society in July 1823 'On the Rivers of New South Wales'[1] demonstrated the contemporary ignorance about New South Wales geography. Since Oxley had failed to determine the ultimate course of the rivers Lachlan and Macquarie in his explorations of 1817-18 and had postulated the existence of an inland sea in his Narrative of Two Expeditions into the Interior of New South Wales (London, 1820) disagreement had reigned between those who supported Oxley and others, like King, who favoured the theory that the western rivers converged into one 'great river' to emerge on Australia's northern or western coasts. The problem was clearly of more than academic importance to explorers such as Cunningham and Oxley,[2] but to Field it was also a political shibboleth. Making some deliberately cutting remarks on Brisbane's 'error in using the barometer' and determining the fall in inland rivers, Field took the part of his exclusivist 'friend', Oxley, deprecating the need for 'liberal science' to bend to 'national distress and political system'[3] with the curtailment of exploration under Brisbane. While thousands of pounds were being expended on Arctic and African exploration and surveys in North America, Field complained, nothing could be spared for 'a few convicts and spare horses to see what becomes of the last drop of [the] singular New Holland rivers'. 'Economy', he fumed, 'is now the order of the day'.[4]

It was, of course, Brisbane's economies and 'political system' which Field could not stomach. He did not shrink from using his position as president of the Agricultural Society or from mounting any other rostrum, public or private, to vent his disapproval of the governor. Later Goulburn, the colonial secretary, caused further friction by suppressing and inter-

---

[1]Geographical Memoirs, pp.299-312.

[2]For discussion on the problem see J.H.L. Cumpston, The Inland Sea and the Great River (Sydney, 1964) and W.F. McMinn, 'Botany and Geography in Early Australia: a Case Study', Rec. Aust. Acad. Sci., vol. 2, No.1(1970), pp.1-9.

[3]Geographical Memoirs, p.305.

[4]Ibid.

fering with Brisbane's letters and despatches.[1] Even Jamison entered the fray accusing Brisbane of trafficking in animals and government bonds in favour of his friends, including Rümker. 'I have', Brisbane indignantly replied, 'not one living Animal in the colony nor an interest in one, except those of Nat$\frac{1}{-}$ History such as Kangaroos, Emus etc'.[2]

The bitterest blow came in June 1823 when Rümker quit his post at Parramatta Observatory and retired to his land grant (Stargard) at Stonequarry Creek (Picton). Brisbane's faith in his astronomer had up to that time been amply rewarded by work of a high quality which found recognition in Britain and France.[3] Brisbane and Rümker were further estranged when the governor tried to withhold his land grants and no amount of remonstrance, not even a polite request for help in measuring the arc of the meridian for the Royal Society, could persuade Rümker to return to Parramatta.[4] Rümker set up his own observatory at Stargard, taking observations and preparing his papers for publication in Europe.[5] He remained on good terms with Oxley and Field.

Rümker, impulsive and self-willed, had his head turned by the anti-Brisbane faction in New South Wales. By far the most competent astronomer up to that time in the Australian colonies, he could not, however, stand aloof from the pressures surrounding his employer. He was also jealous

---

[1] A.D.B., I, pp.463-4. On 27 June 1824 Brisbane wrote to Bruce about Goulburn: 'I hope with all my heart they will remove him or he will embitter the whole of my residence here'. Brisbane Papers, National Library, Canberra.

[2] Brisbane to Bruce, 15 February 1823, Brisbane Papers. Brisbane sent home many natural history specimens including minerals, plants and zoological species to Edinburgh, and W.J. Hooker in Glasgow. Brisbane to Cowper, 30 June and 3 July, 1824, Brisbane Papers. Not all of Brisbane's gifts arrived safely: his zoological specimens were destroyed by insects, although the single platypus which found its way to the Edinburgh University Museum meant that more progress could be made on that one specimen alone 'than 14 elsewhere'. Robert Knox to Brisbane, Edinburgh, 9 March 1824, Brisbane Papers.

[3] He was, for instance, awarded £100 by the Royal Astronomical Society and a gold medal by the Institut de France for his rediscovery of Encke's comet in June 1822.

[4] Bergman, 'Rümker', J.R.A.H.S., XLVI(1960), p.256, and Rümker to Brisbane, 23 August 1823, Brisbane Papers, Canberra.

[5] Rümker established an observatory on Reservoir Hill above Picton. Bergman, op. cit., pp.260-1 and Russell, 'Astronomical and Meteorological Workers', p.60.

of James Dunlop, the other assistant, who shared the work and Brisbane's confidence. Nearly twenty years later Rümker confessed his folly:

> Sir Thomas Brisbane, my former patron, who behaved most kindly towards me, then being governor, caused the grant (1,000 acres at Stonequarry Creek) to be made out for me. It is true, I regret to say, that I have not adequately returned his kind treatment. I was blinded and actuated upon by mistaken notions. At present I know the world better. I should now better distinguish my friend....[1]

Deprived of Rümker's services Brisbane leaned heavily on the loyal Dunlop, who between 1823-27 worked hard and methodically at the Parramatta Catalogue of Stars (London, 1835) and taking observations of nebulae, star clusters and double stars.[2] Dunlop also used his skill to maintain old and construct new instruments. His work was recognized in February 1828 by the award of the Royal Astronomical Society's gold medal, but as an astronomer he was certainly not Rümker's equal.

Maiden has argued that the Agricultural Society of New South Wales (1822-26) carried on the traditions set by the Philosophical Society.[3] Many of the principals of the Philosophical Society, it is true, did become involved in the Agricultural Society and took their interests with them. But even there, Brisbane was confronted with 'political questions' and 'party purpose' and when Barron Field departed the colony in February 1824 the governor moved to expunge from the Sydney Gazette certain remarks in the agriculturalists' valedictory address to Field which were offensive to him and his government, remarks which did not belong to the legitimate transactions of a society.[4] Brisbane had been appalled when the

---

[1] Rümker to John Lee, 4 January 1842, John Lee Correspondence, Microfilm G204, National Library, Canberra.

[2] A.D.B., I, p.338 and Russell, 'Astronomical and Meteorological Workers', pp.63-70. The usefulness of Catalogue of 7385 Stars from Observations made at the Observatory at Parramatta was marred by the faulty instruments Dunlop had at his disposal.

[3] Maiden, 'History of the Royal Society of New South Wales', J. and Proc. Roy. Soc. N.S.W., LII(1918), pp.224-5.

[4] Brisbane to Bathurst, enclosures replying to charges against Brisbane in Morning Chronicle, 9 February and 23 May 1825. H.R.A., Ser.I, vol.XI, pp.519-21 and 612-3.

Agricultural Society elected Field as president, 'who barely knows a plough from a harrow'.[1] The governor was heartily glad to see the back of the 'firebrand',[2] Field, although he had no doubts about what damage that gentleman would try to do to the reputation of himself and the colonial government once in England.

The Agricultural Society received Brisbane's support because it 'promised to be no less valuable to the agriculture of the Colony than to Natural Science'.[3] In the end, shortly before Brisbane's departure in November 1825, the agriculturists led by Berry and Wollstonecraft, united to pay tribute to the governor's advancement of agriculture, science and exploration during his term of office. Now, 'instead of being hemmed in by the forbidden and almost sacred stream of the Nepean' the colonists had 'a boundless extent of land' before them.[4] Ironically, despite the personal attacks on the governor, it is Field's Geographical Memoirs which provide the most complete record of the non-astronomical achievements in science under Brisbane. The book also contains some of Allan Cunningham's botanical work and Oxley's report on the survey of Port Curtis, Moreton Bay, and the Brisbane River at the end of 1823.[5] Brisbane's administration marked, indeed, the first major attempt at expanding scientific effort beyond the permanent settlements into territories like Moreton Bay which would themselves become important centres for further scientific activity.

Finding little solace during most of his unhappy Australian career from local men of science Brisbane was much cheered by generous encouragement from overseas. In 1823 he was made a D.C.L. by Oxford University. His scientific correspondents were unceasing in their applause for his efforts.

---

[1]Brisbane to Bruce, 31 December 1823. Brisbane Papers, Canberra.

[2]Brisbane to Bathurst, 30 January 1824, ibid.

[3]Australian, 17 November 1825. Governor's reply to an address by Agricultural Society of N.S.W.

[4]'Addresses to Sir Thomas M. Brisbane', Address of the Agricultural Society, 25 October 1825. Brisbane Papers, Canberra. See also Sydney Gazette, 27 October 1825.

[5]Geographical Memoirs, pp.3-86. Allan Cunningham submitted papers on the 'indigenous botany' of the Blue Mountains and on his journey from Bathurst to Liverpool Plains.

Although primarily a physical scientist Brisbane worked closely with British zoologists and anatomists who were trying to revive the standing of those sciences at home, some of them by research into Australia's 'anomalous' species. 'It is in the Country over which your Excellency presides', Robert Knox, the Edinburgh anatomist, told him, 'where the most wonderful deviations from the usual types or forms which nature employed in the formation of the animal kingdom are to be found', peculiarities which lie 'more in the internal organs than in the mere integuments'.[1] Preserved specimens, therefore, were more essential than skins. 'The field', Brisbane's eager Edinburgh correspondent told him, 'which the Zoology of Australasia presents to the comparative anatomist is immense'.

While Knox preached to the most zealous proselyte the cause of colonial science had known since the death of Banks, Field was playing the role of devil's advocate against Brisbane in London. Stories enough had gone around about the 'Scientific Governor' spending more time gazing at stars than attending to government business and now Brisbane's detractors seized hold of that weapon as a means of discrediting him. On 19 August 1824 the Morning Chronicle in Britain took up that very theme.[2] Brisbane, with his own friends to forewarn him, had already told Bathurst that his 'calculations are not confined to the aberration, and notation of a storm or marked in computing the orbit of a Comet, but devoted to the best interests of John Bull'.[3] Brisbane sent Douglass to England early in 1824 as commissioner of the Court of Requests to represent his government's case. But the visit to London, where Marsden and friends had planted their whispers, proved disastrous and embarrassing. With Brisbane and his colonial secretary, Goulburn, at loggerheads Bathurst recalled them both in December 1824.

The legacy of Brisbane's science however did not die with his departure a year later. On 13 October 1825 he wrote to the Legislative Council agreeing for a consideration to leave his instruments and 349 volumes of scientific books, which 'may lay the foundations for future progress in Astronomy and other science in the Southern Hemisphere', and suggesting a

---

[1] Knox to Brisbane, 9 March 1824, Brisbane Papers, National Library, Canberra.

[2] 'Statement of Circumstances as Governor of New South Wales, 1825', dated 13 May 1825, Brisbane Papers, Canberra. 'The greater part' of Brisbane's time, the Morning Chronicle alleged, was spent 'in the Observatory or shooting Parrots'. For Brisbane's detailed refutation of these charges see H.R.A., Ser.I, vol.XI, pp.606-14.

[3] Brisbane to Bathurst, 23 March 1823, Brisbane Papers, Canberra.

programme for the Parramatta Observatory.[1] Dunlop was left to continue the observations until February 1827 but it was Rümker who found official favour in London. Following his recall to the Observatory by the Executive Council acting on the advice of Alexander McLeay (1767-1848), the new colonial secretary, Rümker recommenced his work at Parramatta in May 1826. On 21 December 1827 Darling authorized Rümker's appointment as Government Astronomer at £300 per annum.[2]

Rümker's mistake came when he returned to London in 1829 to purchase better instruments for the Parramatta Observatory. Brisbane had taken steps after his return to rally support for a case against Rümker, whom he considered had deserted and snubbed him. Brisbane was aggrieved by the German's apparent readiness to take advantage of his earlier generosity and publish results from Parramatta without due acknowledgement of Brisbane's role in the enterprise. The Scot accused Rümker of withholding certain manuscript notebooks of observations taken at Parramatta. Sir James South (1785-1867), President of the Royal Astronomical Society, a lover of polemic with a nose for scandal, took up Brisbane's cause and led a campaign against Rümker.[3]

The good-natured Brisbane now saw the 'affair' escalate out of control. Rümker became a lost pawn in South's real campaign against David Gilbert (1767-1839), F.R.S. The Royal Astronomical Society and astronomers were ranged against the Royal Society, which, under pressure, appointed a committee to enquire into charges against Rümker. Despite protestations of innocence and non-complicity to defraud Brisbane of his just claims

---

[1] Brisbane to Legislative Council, 13 October 1825. Brisbane Papers, Canberra. Brisbane took a vital interest in the Observatory long after he left Australia. When the British Association met at Glasgow he discussed the Australian work with Encke, both of them agreeing that Parramatta could be considered 'the Greenwich of the Southern Hemisphere'. Autobiographical notes, Brisbane Papers.

[2] Minute No. 98, Appendix C, in Russell, 'Astronomical and Meteorological Workers', p.79. Russell reproduces the correspondence and memoranda relating to the sale of Brisbane's instruments.

[3] Bergman, 'Rümker', op. cit., pp.266-71.

Rümker was censured by the committee for withholding Brisbane's books.[1] In June 1830 Rümker was dismissed as Government Astronomer of New South Wales, a victim, he claimed, of 'opposition and party spirit' between the 'leaders of science in England'.[2] In the same month James Dunlop, 'a gentleman...strongly recommended...by the President of the Royal Society', was appointed superintendent of the Parramatta Observatory.[3]

Rümker suffered because he chose to align himself with Field and his friends against his generous benefactor, Brisbane. With the two principal astronomers estranged the polemics of New South Wales spilt over into the reform debates on science in Britain, where personality feuds were just as strong. Because Brisbane had the same professional determination as Rümker the scientific programme of Parramatta Observatory was largely carried through.

Although the scientific circle which Brisbane found in Sydney in 1821 failed to retain any formal cohesion it did continue in a looser way in the Agricultural Society and the informal contacts around Government House in Parramatta.

In 1828 John Herschel, when presenting Brisbane with the Astronomical Society's gold medal for the Parramatta work, described the Scot's administration as 'the most brilliant trait of Australian history'.[4] There is no more modest yet apposite summary of the achievements of astronomy and science in Australia in the early 1820's than Brisbane's own:

---

[1] Ibid. See also Copy of Minute of Council of Royal Society, dated 22 May 1828, and Edward Sabine, Secretary to the Royal Society, to Brisbane, 13 March 1830, Brisbane Papers. Letters and Papers (1828-31) concerning the Rümker affair and observations in the Southern Hemisphere are in the Royal Society's Archives (D.M.4.65-111), London.

[2] Quoted in Bergman, op. cit., p.275 from Rümker's pamphlet <u>On the most effectual means of encouraging scientific undertakings, ensuring universal respect to learned national societies and promoting the interests of science in general</u>...(Hamburg, 1831). See also Hay to Darling, 5 July 1830, <u>H.R.A.</u>, Ser. I, vol. XV, p.600.

[3] Murray to Darling, 9 November 1830, <u>H.R.A.</u>, Ser.I, vol.XV, p.812, and Russell, 'Astronomical and Meteorological Workers', Appendix E and F, pp.79-80.

[4] Quoted in Ingleton, <u>Charting a Continent</u>, p.42. See the remark by Frederick Watson on Brisbane's administration: 'possibly one of the most momentous epochs in the history of the Australian colonies'. <u>H.R.A.</u>, Ser. I, vol.XI, p.vii.

> Science has not been allowed to flag, as the scientific journals of Great Britain and the Continent of Europe will testify, independent of the great mass of valuable material sent home near 10,000 stars of the hemisphere have been observed...etc. etc..., which is a pretty fair contribution from private individuals without any appointment from the Crown.[1]

Frustrated by their own feuds colonial men of science made their appeal to Britain's established scientific tradition in transition, where they also returned to seek advice, honours and outlets for publication. P.P. King, the most prominent native-born Australian of his day, achieved early recognition from the home scientists and was soon bent on training and leading a new group of surveyors later to be prominent for their own work in Australia. Brisbane's wealth and prestige assured his rapid re-entry as a leader and organizer into the Scottish tradition from which he had come. Rümker's experiences and achievements, despite his increasing eccentricity as the years passed, assured him of an honourable and productive career in Hamburg and Germany. Ultimately King and Douglass were the only prominent members of the Philosophical Society and Brisbane's circle to return and become leaders of the scientific movement in New South Wales. The 'second-rank' scientific men of the circle contented themselves with work in the Agricultural Society, whose utilitarian aims corresponded most closely with their needs and aspirations. Some, like Douglass and Goulburn, quitted Australia. Most of them, however, the prosaic Field included, retained a common belief in the future of the country.

Contemporaries did not see Brisbane's departure in 1825 as the end of the scientific movement in Sydney. It was, Field wrote, 'only a case of suspended animation'.[2] The scientific achievements of the previous five years had made the home government more willing to support science. Hence the retention of Rümker at £300-400 per annum and the purchase of the Parramatta books and instruments for over £1,600. Government had also been persuaded by the Royal Society to go forward with measuring the arc of the meridian, as Brisbane had suggested. Even more important for the scientific community in Sydney was Bathurst's success in persuading Alexander

---

[1]Brisbane to Bathurst, 23 March 1823. Brisbane Papers, Canberra.

[2]<u>Geographical Memoirs</u>, p.v.

McLeay to go with Governor Ralph Darling (1775-1858) as colonial secretary to New South Wales.[1]

Field hoped that the Philosophical Society would be 'resuscitated by the new colonial government'[2] and was loud in his praise of McLeay, Robert Brown's close, 'profound entomologist and...practical botanist' friend.[3] Glad to find government more liberally supporting science, Field articulated for Australia those arguments which declinists and reformers such as Babbage and Brewster, and zoologists, such as Robert Knox, were pressing home in Britain: the need for scientific chauvinism. Spiced with the tale of antipodean anomalies such arguments were calculated to prise open government's purses even further.

It was a disgrace, maintained Field, that Britain should 'conquer and acquire colonies' and yet permit foreigners to 'reap the honour of their zoological history', as Johann Friedrich Blumenbach, Georges Cuvier, Étienne Geoffroy St Hilaire and others were doing:

> Australia is the land of contrarieties, where the laws of nature seem reversed: her zoology can only be studied and unravelled on the spot, and that too only by a profound philosopher.[4]

Knox - who was introduced to Brisbane by Brewster - appealed to the same sentiments when asking for birds, marsupials and mollusca. Dilatoriness and failure to preserve specimens from Australia thwarted the 'cause' and progress of science

> ...whilst neighbouring & rival European nations by being more fortunate in obtaining specimens of Natural History make rapid strides towards perfecting Zoology, & will shortly, unless additional efforts be made, cause it to appear that British Zoologists have not only contributed little or nothing to that science but are actually ignorant of most of its great and leading peculiarities.[5]

---

[1] A.D.B., II, p.178.

[2] Geographical Memoirs, pp.v-vi.

[3] Quoted in J.J. Fletcher, 'The Society's Heritage from the Macleays', Proc. Linn. Soc. N.S.W., XLV(1920), p.585. Fletcher's studies are still the most detailed on Alexander McLeay and the Macleays, as his descendants and nephews preferred to spell their name.

[4] Geographical Memoirs, p.viii.

[5] Knox to Brisbane, 9 March 1824, Brisbane Papers.

The botany, geology and geography of Australia were better known than its zoology. 'Public munificence' had supported 'the masterly labours of Brown': he and other botanical collectors in Australia had raised that science to a high status in the colonies. Now, Field argued, was the time to appoint the author of Horae Entomologicae,[1] William Sharp Macleay (1792-1865), Alexander's son, as 'zoologist of our colonies in Australia'. While Field's zeal to get the Macleay scientific dynasty launched in Australia was very commendable he, knowing the state of colonial science, might have guessed that William Sharp's Quinarian ideas on zoological classification were too 'profound' a philosophy for New South Wales in 1825. And most of the colonists, moreover, were anxious to see what value a man of Alexander McLeay's scientific eminence would place on science compared with the calls of his governmental duties. For them the appointment of a zoologist could wait.

The elder McLeay was the most experienced leader of British science yet to settle in Australia. A Fellow of the Linnean Society since 1794, he was that society's secretary from 1798 to 1825. He was elected F.R.S. in 1809 and became a councillor of the Royal Society in 1824. His private collections of natural history specimens, particularly insects, remained unrivalled by any others in Britain.[2] But McLeay had come forewarned as a public servant to Sydney. He was a government officer first and foremost, loyal to the letter to Darling and punctilious in his duties. He showed this in the careful way he handled the delicate Parramatta Observatory affair and the appointment of Rümker.[3] With his classical education and solid commitment to English scientific institutions McLeay paved the way for men of similar background who followed him to Australia.

The human resources from which Field hoped 'the Mercury of a scientific body might be made'[4] in New South Wales, were not forthcoming. Oxley, ailing from the 'privations' he had suffered during his explorations, died in 1828, the year in which H.G. Douglass, a thorn in the new government's side, left the colony. Archdeacon Thomas Hobbes Scott (1783-1860) an implacable Tory and foe of Douglass, was another person in whom Field placed some hope to revive corporate science. But Scott, although zealous in his

---

[1] Horae Entomologicae: or Essays on the Annulose Animals, 2 parts (London, 1819-21).

[2] Fletcher, 'Society's Heritage', pp.574-8.

[3] Bergman, 'Rümker', pp.261 and 283-5.

[4] Geographical Memoirs, p.vii.

support for education and the founding of mechanics' institutes, had himself made only one rather unoriginal contribution to Australia's geology.[1] Allan Cunningham was too busy exploring inland and in New Zealand to lead the sedentary life of a philosopher and the colony's most learned, long-resident philosopher, Robert Townson (1763-1827), died in 1827.[2]

Alexander McLeay, the cautious catalyst, lent his support as vice-patron to the Agricultural and Horticultural Society of New South Wales. Inaugurated under the energetic Jamison as president in February 1822, this body grew out of the former Agricultural Society.[3] It counted among its members John Blaxland, Berry, Hovell, Raine and George Ranken (1793-1860), an early settler in the Bathurst district. Jamison took a keen interest in the improvements in colonial agriculture and manufactures and reported in detail each year on the advances made.[4] In the late twenties the society had between 140-200 members and was active in promoting acclimatization. Through the good offices of Joseph Sabine, secretary to the Horticultural Society in London, the Sydney Agricultural and Horticultural Society undertook exchanges with India and also maintained a correspondence

---

[1]'Sketch on the geology of New South Wales and Van Diemen's Land', Annals of Philosophy (1824), pp.461-2. For Scott see A.D.B., II, pp.431-3.

[2]Townson came to Australia in 1807 after pursuing a long career as a 'gentleman scholar' in the European universities. He set himself up in Göttingen in 1792, travelled widely and published a number of papers and books on natural history, mineralogy and travel. His scientific work in Australia was minimal, although his contributions to agriculture and horticulture were among the most successful of the period. He was one of the principal opponents of Bligh. He was proposed as a member of the Philosophical Society on 7 August, 1822. See A.D.B., II, pp.537-8.

[3]Sydney Gazette, 2 March and 20 September 1826.

[4]Somer, 'Short History of Royal Agricultural Society', J.R.A.H.S., IX(1923),p.318 A.D.B., II, pp.10-12. In 1830 Jamison was awarded the gold medal of the Royal Society of Arts, Manufactures and Commerce for his invention for 'extirpating stumps'. See Sydney Gazette, 1 October 1831 and Report Agric. and Hortic. Soc. N.S.W. (Sydney, 1829), pp.9-14. The society maintained close links with the London Society. Wollstonecraft was one of the Agricultural and Horticultural Society's leading promoters.

with W.J. Hooker and other prominent overseas botanists.[1]

In April 1827 the barque Elizabeth brought William Holmes to Sydney with a commission from Bathurst to collect and arrange zoological specimens for a proposed colonial museum.[2] On board the same vessel was Rev. Charles Pleydell Neale Wilton (1795-1859), M.A., a member of the Cambridge Philosophical Society and the Ashmolean Society of Oxford.[3] Aware of Holmes's plans, Wilton resolved to try and stimulate an interest in science in the colony. In January 1828, amid wide discussion in the press on the merits of founding a colonial museum, Wilton launched his Australian Quarterly Journal of Theology, Literature and Science. This short-lived periodical was the first in Australia to promote a serious discussion of scientific topics.

Wilton wanted to honour his Alma Mater, Cambridge. A former student of the geologist-clerics there, he was determined to make up for the deficiencies in colonial science and, in so doing, to dispel the notion that the colony was 'a mere Botany Bay, an immense hulk..., or common sewer, into which the refuse of the Jails of England periodically drains'.[4] The geologist,

> in observing the several stratifications of the Globe, and the various petrified remains of what once formed part of animated nature, beholds the exact accomplishment of Scripture, and is enabled by adducing the strongest evidence of a universal Deluge, to put to silence the Infidel and the Sceptic.[5]

---

[1] See e.g. Report of Agric. and Hortic. Soc. N.S.W., (Sydney, 1830). Cunningham and Charles Fraser worked closely with the society, which kept a garden at Parramatta. See also Gilbert, 'Botanical Investigation', vol. II, pp.442-57. The old tensions were maintained within this society and Field was remembered by some as 'a busy meddler in political affairs' and as a puerile poet, 'some silly school-boy, who, mistaking the drift of his genius, had been neglecting his lessons, and wasting his time in futile mimicry of some jaded Muse'. Sydney Gazette, 17 January 1829. Brisbane still had his friends in N.S.W. About this time there began a move to form separate horticultural and agricultural societies.

[2] G.P. Whitley, 'William Holmes, the Australian Museum's First Custodian', Aust. Mus. Mag., XIII, No. 9(1961), p.306.

[3] A.D.B., II, p.613.

[4] Aust. Quart. Journ. of Theol. Lit. and Science, I, No.1(1828), Introduction.

[5] 'On the connection between religion and science', ibid., pp.1-5.

The present age, Wilton told the philosophers of New South Wales, was not for sitting 'framing and multiplying theories' but 'on the contrary [one] of active and spirited research...an age in which fact is for the most part substituted for hypothesis, and the results of a careful investigation for the visions of fancy'. Geologists in Australia, Wilton pleaded, should go into the field, go inland.

Wilton unashamedly used his Journal to try and achieve co-operation among the colony's scientists. Capitalizing on the debate concerning the setting up of a public museum, he wrote an article using the now familiar arguments in favour of antipodean science.[1] 'Australia', he claimed, 'presents herself in forms so remarkable' that only minds 'in a deplorable state of apathy and dullness' could fail to respond. Scientific institutions were the Briton's heritage. The study of nature 'has no drawbacks whatever' and everything leads to God. Wilton demanded £3-5,000 for a museum building with rooms for lectures, a library and exhibits and a sizeable land grant to support the institution. 'Scientific and learned men from all parts' would come to study the 'Australian productions', and 'frequent intercourse and correspondence' with European men of science would 'associate the talent [and] stimulate to exertion the Inhabitants of Australia'.

The most practicable of Wilton's sound proposals were not realized until the next decade when the Australian Museum (officially so-called first in 1836) was put on to a firmer scientific footing. Thereafter the Sydney museum developed to become a recognized agency for research into the Australian fauna, a centre around which the colony's foremost scientists gathered. Even after Holmes's death on a collecting expedition to Moreton Bay in August 1830 the colonial government continued to allow £200 in its estimates for a 'colonial zoologist', although the position remained vacant but coveted for over five years.[2]

---

[1] 'Suggestions for the Establishment of an Australian Museum', Aust. Quart. Journ. I, No.1(1828), pp.58-65. The flamboyant attorney-general, Alexander Macduff Baxter (1798-1836?), was one of the principal contributors to the museum debate, for which see e.g. Sydney Gazette, 29 June 1827 and 18 June 1828.

[2] Holmes assembled the nucleus of the Australian Museum collection before his death. For the earliest votes and estimates for the Museum see R. Etheridge, 'The Australian Museum - Fragments of its early history', Rec. Aust. Mus., XI, No.4(1916), pp.67-78 and G.P. Whitley 'The History of the Australian Museum', unpublished typescript, MS 22/1, Basser Library, Canberra.

Alexander McLeay, while prepared tacitly to support any efforts to advance science in New South Wales, proved unwilling to assume an overt role of leadership. The initiative remained, therefore, with Wilton who found a useful, albeit short-lived, ally in the South Asian Register (October 1827-December 1828) which published several articles on local science.[1] One correspondent, "G.R." (possibly George Ranken), called upon the colony's 'geological amateurs' to provide more data to place their 'sublime science (on a) secure and permanent foundation' and send Australian materials on for the geological debates in Europe.[2] In 1828 reports of a 'volcano' or burning mountain, Mt. Wingen in the Upper Hunter Valley, began to reach Sydney.[3] In February 1829 Wilton, himself a keen field worker, hurried to Mt. Wingen to investigate the phenomenon at first hand. In March 1829 he published a preliminary report in the Sydney Gazette and forwarded a copy to the Cambridge Philosophical Society 'where it excited much interest among the Members'.[4]

Wilton's further visits to Wingen and the papers he published in New South Wales and in Britain continued to capture the interest of European geologists.[5] A confirmed Neptunist, Wilton correctly pronounced Mt. Wingen to be a burning coal seam,[6] which was very convenient fuel for Wernerians

---

[1]Including a version of Berry's earlier paper on coastal geology as 'Sketch of the Coast from Hunter's River to Bateman's Bay', South Asian Register, 1 (October, 1827), pp.97-100. The Register was highly critical of Field's paper on Aborigines in Geographical Memoirs, dismissing it as 'a mere tissue of random hypotheses, taken from various authors'. South Asian Register, II (January, 1828), pp.160-2.

[2]Ibid., p.162.

[3]Australian, 19 March and 30 July 1828 and 'A Volcano in Australia', Aust. Quart. Journ., I, No.4(1828), pp.382-5. See also W.E. Abbott, Mount Wingen and the Wingen Coal Measures (Sydney, 1918).

[4]Sydney Gazette, 10 March 1829 and Wilton, 'Australian Geology: A sketch of the Geology of the Country about the River Hunter...', Australian Almanack (1832), pp.179-88. The first British report was a version of that sent to the Cambridge Society, see Edin. Journ. Sci. II(1830), pp.270-3. Further accounts of Wilton's researches at Mt Wingen were published in South Asian Register, II(April, 1828), pp.282-3; Australian Almanack (1830) and N.S.W. Magazine I, No.1 (August, 1833), pp.45-6.

[5]E.g. 'A Sketch of the geology of six miles of the south-east coast of Newcastle in Australia, with a notice of the three burning cliffs on that coast', London and Edin. Phil. Journ., I(1832), pp.92-5 and 'On the fossil woods at Newcastle and the districts of the Hunter River', N.S.W. Mag., II No.6 (January, 1834), pp.28-32. For a discussion of Wilton's work see Branagan, Geology and Coal Mining in the Hunter Valley, pp.39-41 and 88.

[6]Australian Almanack (1832), pp.179-82.

in Britain at a time when their fortunes were sagging badly. Wilton also sent fossil woods for examination[1] to Professor Robert Jameson (1774-1854) of Edinburgh, originally the most ardent exponent of the Wernerian geological system in Britain.

By publishing the results of his geological researches immediately in Sydney, Wilton hoped to bring local research workers together. 'An insight into the geological phenomenon of [the infant colony's] several districts', Wilton told the more utilitarian minded, 'would be highly advantageous to the settler, as well as gratifying to the man of science'.[2] The 'sulphureous and aluminous products' of Mt. Wingen were already proving beneficial to 'the cure of scab in sheep' and some settlers, were experimenting with sulphate of lime as a fertilizer. Abroad Wilton was keen to provide support for the Wernerian line in geology and to arouse a deeper interest in Australian phenomena.

Wilton's Quarterly Journal, although ephemeral, provided a much needed outlet for colonial investigators to publish their preliminary findings immediately, before sending their data to the European journals and institutions. Allan Cunningham, for instance, wrote an account of his longest and most important expedition to the Darling Downs (January to August 1827) for the Quarterly Journal and took the opportunity to speculate further on still unresolved problems of inland topography.[3] Edmund Lockyer (1784-1860) wrote on his exploration of the Brisbane River (September-October 1825) and Wilton used the Journal to report on the work of the Agricultural and Horticultural Society.

---

[1] The report, made by William Nicol was published as 'On Fossil Wood from Newcastle, New South Wales', Edin. New Phil. Journ., XIV(1833), pp.155-8, quoted in Branagan, Geology and Coal Mining, pp.40-1. Wilton's later work on the pseudomorph glendonites of Glendon Brook also aroused considerable interest.

[2] Australian Almanack (1832), p.179.

[3] 'The Late Tour of A. Cunningham Esq.', Aust. Quart. Journ., I, No. 1, pp.65-85 and No.2, p.151 passim. Cunningham speculated that no inland river or mountain range would be found, although the interior might 'one day be discovered to be of low depressed surface, subject to frequent, if not in part, to permanent inundation'.

But, much as he desired to promote science, Wilton was rather too partisan in his personal views and philosophy of science. A friend of Samuel Marsden, he defended that clergyman's position in an attack on Douglass and savagely reviewed the second edition of Peter Miller Cunningham's popular Two Years in New South Wales (2 vols, London, 1827).[1] Cunningham (1789-1864) had studied medicine in Edinburgh before commencing his career as a naval surgeon and it was with his geological views that Wilton disagreed most violently. Cunningham's worst offence was to maintain that

> the dissimilarity of the animal and vegetable diluvial remains [in Australia] to what we see in a state of living existence, proves that all the products of the earth were quite different to what they are now.[2]

Only fixed continuous species and the universal uniformity of rock strata would satisfy Wilton. Divorced from Scripture geology was thrown to the catastrophist lions of whom Cunningham was one. Wilton appealed to the writings of William Buckland (1784-1856), first professor of geology in Oxford (1819) and author of the influential Reliquiae Diluvianae (1823). Cunningham, Wilton demanded, must 'expunge his geological errors' from future editions of his book. Wilton was so moved by his admonishment of Cunningham - who had only just returned to the colony - that he commenced a short series of articles on genesis and geology in his Quarterly Journal,[3] hoping to ensure that investigators in Australia did not fall into Cunningham's errors. The geological éminences grises, so far as Wilton was concerned, were Hutton and his disciples.

---

[1] Full title Two Years in New South Wales; a series of letters, comprising sketches of the actual state of society in that Colony; of its peculiar advantages to emigrants: of its topography, natural history etc. etc. After his return to England in 1830 Peter Cunningham wrote two further books on emigration and galvanism. See A.D.B., I, pp.267-8.

[2] Aust. Quart. Journ., I, No. 2, p.127.

[3] Ibid., pp.191-8 and No. 4 (October, 1828), pp.371-7. 'To attempt to explain', Wilton warned, 'the exercise of miraculous power by second or natural causes, is at once the height of folly and the climax of presumption. Instead of indulging in wild and visionary theory respecting the mode of first formations instead of endeavouring to scan Omnipotence, and to explore the depths of infinity, it surely becomes a finite being, whose breath is still in his nostrils, to learn rather than to give implicit credit to the facts, however mysterious, recorded in Scripture, and to bow down with awful submission before that plenitude of power, revealed in its pages'.

There was some response to Wilton's summons to associate to promote science in Sydney Town. In the autumn of 1829 a Literary and Philosophical Society was mooted but never met.[1] Some three months earlier the Australian Phrenological Society had met to hear its first lecture in March 1829,[2] but the promoters on the whole were not encouraged by their reception. One correspondent, 'Habbakuk', roundly condemned these 'incipient bump hunters' and their fatalistic 'science', although he did approve their plans to collect skulls and commence anatomical studies as laid down by Blumenbach and Camper.[3] The Sydney phrenologists were advised to work in secret lest they excite too many susceptibilities in a colony where such 'a heterogeneous mass of crime is collected'. Although the phrenologists defended[4] their plans for lectures, maps of the head, cranial casts of Aborigines and criminals, and a museum of comparative anatomy gamely their society, but not the idea, soon died.[5]

In 1829 Peter Cunningham discovered fossil bones at Holdsworthy Downs[6] and the following year Ranken, through the good offices of Rev. John Dunmore Lang (1799-1878), reported on his examination of the bone caves at Wellington.[7] The last discovery did most to stimulate 'Local interest [in]

---

[1]Sydney Gazette, 6 June and 14 July 1829.

[2]Ibid., 10 March 1829.

[3]Ibid., 26 March 1829. Petrus Camper (1722-89), the Dutch anatomist, did pioneering work in craniology and formulated the idea of 'facial angle'. Blumenbach's collection of skulls at Göttingen was world-famous, forming the basis of his division of man into five distinct races.

[4]They were, they insisted, promoting 'science' and not 'a mere...chimera engendered in the heated brains of German enthusiasts - and unfounded upon reason'. Their models, of course, were the Austrian phrenologists F.J. Gall (1758-1828) and J.C. Spurzheim (1776-1832).

[5]Phrenology in Australia, particularly in the 1840's, is discussed in Nadel, Australia's Colonial Culture, pp.139-42 and Roe, Quest for Authority, pp.161-4.

[6]Sydney Gazette, 14 May 1829.

[7]Ibid., 25 May 1830. The caves had been examined by Hume and Sturt in 1828 but no fossils were discovered then.

the prosecution of geological investigations' which overtook New South Wales from 1830.[1] Ranken's report passed quickly to Jameson in Edinburgh[2] and Thomas Livingstone Mitchell (1792-1855), Oxley's successor as surveyor-general, visited the Wellington limestone caves in June 1830.[3] The paleontologists in Europe were quick to realize the importance of these finds for the current debate on Huttonian geology - soon to be vindicated by Lyell's Principles of Geology (1830-33) - and Wilton's expectations on the value of Australian field investigations for overseas workers were thoroughly confirmed.

But few men of science in New South Wales in 1830 had cause to be proud of the colony's scientific standing. The Agricultural and Horticultural Society's fortunes were waning and news of a successful 'Philosophical Society' in Hobart Town, where a first volume of transactions was reportedly at press, gave cause for rueful reflections and self-examination:

> We blush - we really blush to think how far the younger Colony (Van Diemen's Land) is surpassing us in intellectual enterprises. The inhabitants of Sydney would seem to have nothing to do but balance ledgers, read newspapers, talk scandal, spout politics, eat fat beef, smoke cigars, drink grog; and go to bed, while our neighbours act like men who have to provide food for a mental appetite not less urgent in its cravings than the animal. "Up, Sydney, up!"[4]

But Sydney, it seems, preferred wallowing in material pleasures. Even the temporary sojourn of no less 'a gentleman of superior talents and acquirements' than Dr John Henderson, famed for his 'philosophical research and observation' and as founder of Hobart's flourishing scientific society,[5]

---

[1]Charles Sturt, Two Expeditions into the Interior of Southern Australia, vol. I (London, 1833), p.xxxv.

[2]Lang took the report with him when he sailed for England in 1830. Jameson published it as a communication from Lang in Edin. New Phil. Journ., XXII (1831), pp.364-8. For a full discussion on the Wellington Caves (including a full bibliography) see E.A. Lane and Aola M. Richards, 'The Discovery, Exploration and Scientific Investigation of the Wellington Caves, New South Wales'. Helictite: Journ. of Australasian Cave Research, 2, No.1 (1963), pp.1-53.

[3]Ibid., p.11

[4]Sydney Gazette, 22 June 1830.

[5]Report Agric. and Hortic. Soc., (Sydney, 1830), pp.8-9. Henderson wrote to the society from Emu Plains on 26 June 1830 offering his advice on threshing wheat using bullocks.

did not arouse the colonists from their intellectual torpor. Snubbed, Henderson did not waste his precious time in Sydney. He made for the Wellington caves, examined them and collected fossils for despatch to Buckland and William Henry Fitton (1780-1861) in England.[1] Like his fellow Scot, Mitchell, Henderson was a scientific opportunist, a passing representative of a succession of individualists in whose hands science in New South Wales largely remained for another generation.

---

[1]Henderson to Dumaresq, Wellington, 1 July 1830, in J. Henderson, Observations on the Colonies of New South Wales and Van Diemen's Land (Calcutta, 1832), pp.109-26. Henderson's letter took the form of a detailed report on each of the caves he visited. He makes no mention of Mitchell's and Ranken's visit to the caves which must have coincided almost exactly with his. Lane and Richards, op. cit., were unaware of Henderson's report, which had apparently been commissioned by Darling. Buckland published a short note 'Sur les Ossemens découvertes à la Nouvelle Hollande' in Bull. Soc. Géol. de France, I (1830), p.227.

CHAPTER III

THE VAN DIEMEN'S LAND SCIENTIFIC CIRCLE

When John Henderson disembarked at Hobart Town as surgeon superintendent of the York on 29 August 1829[1] he found some colonists in Van Diemen's Land already making determined efforts to overcome their intellectual isolation. In Launceston Robert Lawrence (1807-33), 'a young man of scientific bent', had begun writing a scientific diary one month before Henderson's arrival.[2] Within a year Lawrence was in correspondence with William Jackson Hooker in Glasgow, who had been trying vainly to find a reliable botanical correspondent in Van Diemen's Land since 1823. Lawrence immediately outlined the difficulties facing him in the colony:

> The principle (sic) obstacles to my becoming scientific are as you may conceive the total want of persons with whom to converse on such subjects; and of Books.[3]

Lawrence's difficulties arose in part from his residing in Launceston, for Henderson, a man of great resource and fertile plans, had no difficulty within several months of his arrival in Hobart in bringing together a large number of 'persons' ostensibly interested in science to provide information for the scientific men of Europe.

Van Diemen's Land had only achieved independence from New South Wales in most areas of administration in 1825. In 1824 Lieutenant-Governor George Arthur (1784-1854) - whom R. C. Gunn later described as 'unfavourable'

---

[1] M. E. Hoare, 'Doctor John Henderson and the Van Diemen's Land Scientific Society', Rec. Aust. Acad. Sci., I, No. 3(1968), pp.7-24. The York arrived with 192 male prisoners. See H.T.C., 29 August 1829.

[2] See T. E. Burns and J. R. Skemp (eds.), Van Diemen's Land Correspondents (Launceston, 1961), pp.5-7. Lawrence arrived in Launceston in 1823. He was the eldest son of William Effingham Lawrence (1781-1841), a friend of Jeremy Bentham,who became a leading businessman and landowner in Tasmania, playing an important role in schemes for educational and other improvement in Northern Tasmania. See A.D.B., II, pp.93-5.

[3] Lawrence to Hooker, 1 June 1830, V.D.L. Correspondents, p.9.

to science[1] - took over the administration of the penal colony, singularly determined to rule it as a gaol.[2] In the late twenties, however, despite the unpromising socio-political ethos of Van Diemen's Land, 'the public institutions which multiplied at this period tended to mitigate the spirit of party',[3] - that same spirit which had proven so inimical to science in New South Wales - and the intellectual life of the colony flourished accordingly.

The Van Diemen's Land Agricultural Society - formed in January 1822 to improve husbandry and keep down sheep stealing[4] - made little contribution to scientific advancement in the colony, although a few highly educated colonists did arrive in 1820s to keep a spirit of intellectual enquiry alive in the main centres. In 1826 William Lawrence proposed plans for a Cornwall Collegiate Institution at Norfolk Plains - 'for the education of youth and the advancement of science' - in which he suggested the commencement of lectures and experiments in physical and natural sciences and the founding of a botanical gardens, a chemical laboratory and a library.[5] Despite a land grant from Arthur to support it William Lawrence's scheme was not successful. But his son, Robert, inherited his father's enthusiasm for scientific enquiry and kept the cause very much alive in the north of the island until his early death in 1833, when Robert Campbell Gunn (1808-81) became the leader of the colony's science. However, the death of the energetic Rev. John Youl in Launceston in 1827 deprived that part of the colony of another figure who would certainly have given impetus to the

---

[1]R. C. Gunn to Hooker, 16 November 1836, ibid., p.59.

[2]A.D.B., I, pp.33-8.

[3]John West, The History of Tasmania, vol. 1 (Launceston, 1852), p.125.

[4]K. Fitzpatrick, Sir John Franklin in Tasmania, p.192 and E.L. Piesse, 'The foundation and early work of the Society; with some account of earlier institutions and Societies in Tasmania', Pap. & Proc. Roy. Soc. Tas. (1913), p.118, suggest the foundation year as 1821. The first president of the society was Edward Lord (1781-1859), the commandant, pastoralist and merchant, who was in the first contingent to settle on the Derwent in 1804.

[5]West, History of Tasmania, vol. 1, p.124 and A.D.B., II, p.94.

Lawrences' schemes to advance science.[1]

In Hobart Town the establishment of a Mechanics' Institute (1826) provided a forum for the colony's few men of scientific bent to expound their learning. Dr James Ross (1786-1838) had arrived in December 1822 with a library worth £100 and all the benefits of his Scottish education.[2] He began a series of lectures on 'natural and experimental philosophy' at the Institute in November 1827.[3] Plans were also laid to set up a museum as 'a general receptacle for the natural history productions of the island'. Dr Adam Turnbull (1803-91), an M.D. from Edinburgh, who had been in the colony since 1825, commenced a series of lectures on chemistry and agriculture in September 1829.

In his first lecture Turnbull pleaded for the more active pursuit of science in Van Diemen's Land,[4] and in his second before a crowded auditorium supported the cause of mechanics' institutes as agents for education in the community.[5] These lectures marked the beginning of an unprecedented public enthusiasm for science in Hobart,[6] an eagerness which Ross encouraged through the columns of his independent <u>Hobart Town Courier</u> (commenced in October 1827).

---

[1] Youl had earlier been a correspondent of the Philosophical Society of Australasia and also received correspondence from Hooker. See Thomas Scott to Hooker, 1 September 1827, <u>V.D.L. Correspondents</u>, p.3.

[2] He was educated at the Marischal College, Aberdeen, graduating M.A. in 1803 and LL.D. in 1818. Ross became an important figure in the colony's newspaper and publishing industry and for his services to colonial education was dubbed the 'Birkbeck of Tasmania' by contemporaries. <u>A.D.B.</u>, II, pp.395-6 and <u>History of Tasmania</u>, vol. I, p.125.

[3] <u>H.T.C.</u>, 17 November 1827. Other lecturers included James Thomson, master of Hobart Town Academy, and another teacher, R.W. Giblin. To improve its facilities the Institute voted £25 for the purchase of books and £25 for apparatus from England to illustrate the lectures.

[4] <u>H.T.C.</u>, 5 September 1829. For Turnbull see <u>A.D.B.</u>, II, pp.541-2.

[5] <u>H.T.C.</u>, 26 September 1829.

[6] The lieut-governor attended a lecture by Ross on 26 October, so confirming 'the increasing favour of the public towards this young but well meant humble institution', <u>H.T.C.</u>, 31 October 1829.

By the autumn of 1830 the Mechanics' Institute was the focus of Hobart Town's intellectual and social life. It boasted a vigorous programme of lectures on astronomy, agriculture, chemistry, mechanics and hydraulics, and mustered eighty strong for the annual meeting in March 1830.[1] For a planner of Henderson's persuasiveness fresh from the outside it was a plum ripe for plucking. Other factors, too, ran in his favour. Hooker's patient efforts to tempt some colonists to collect plants intelligently for him came to the notice of Robert Lawrence, the request having been circulated fairly widely in the colony.[2] Even the lieut-governor had been stirred by the realisation that no major work on the colony's natural history had been undertaken since the French botanists' and Robert Brown's explorations at the turn of the century. In 1828 William Davidson was appointed superintendent of the Hobart Town Botanic Gardens.[3] Outsiders were very interested in the colony, even at Port Louis, Mauritius, from whence information on southern astronomy was solicited in Hobart in September 1829.[4]

---

[1] H.T.C., 27 March 1830 and West, History of Tasmania, vol. I, pp.125-6. West gives an enrolled membership of 200 for 1830. Turnbull's lectures on geology to the Institute argued for the measurement of the geological time-scale from the story of Adam and Eve. H.T.C., 1 May 1830.

[2] Thomas Scott to Hooker, 1 September 1823 and 24 May 1830, V.D.L. Correspondents, pp.3-5 and 7-9. One person on whom W. J. Hooker pinned many hopes was his friend, the adventurer Jorgen Jorgenson (1780-1841), who, after a life of failures and misfortunes was transported to Van Diemen's Land in 1826. In the colony he was soon granted a pardon; undertook exploration in the north and north-west of the island; held various government appointments and wrote furiously on anthropology and other topics, including himself. His character was not highly esteemed by Robert Lawrence or Gunn, although his abilities as an observer and writer were widely recognized. The A.D.B. article (II, pp.26-8) scarcely does full justice to his colonial career. See V.D.L. Correspondents, pp.34-8, 41-2, 50, 56 and 86-8 for his letters to Hooker and relationship with Gunn.

[3] V.D.L. Correspondents, p.3 and Fitzpatrick, Franklin in Tasmania, p.193.

[4] H.T.C., 12 September 1829.

Before embarking for Van Diemen's Land 'with shattered health, and in embarrassed circumstances' from Bengal in 1829[1] John Henderson had led a peripatetic career in the army medical service in India. After being commissioned assistant-surgeon on 3 October 1815 he was first attached to civil stations in the Bengal Medical Establishment at Cawnpore, Kalpi and Aligarh.[2] He then became surgeon to the residents at Haripal, Golaghore and Santipore and was attached to the Cawnpore Levy in 1823-4. Thereafter he was transferred to Aligarh and on 11 June 1826 was promoted to the rank of surgeon in the Bengal Army. In January 1828 he was posted to the 41st Regiment Native Infantry at Mathura and moved with it to Neemuch in 1828. Whilst at Neemuch he obtained leave to go to Australia to recover his health and 'to pave the way for officers from the East Indies, who might desire to form permanent settlements' there upon retirement from the army.[3]

Henderson always showed remarkable versatility in mind and business. In Bengal he engaged in mercantile pursuits and banking; attempted to grow improved cotton strains in Upper India and tried unsuccessfully to introduce the spinning jenny into Aligarh. He was equally unsuccessful in trying to grow indigo. He also traded in ghee ('Indian buffalo milk butter clarified to resemble oil') and tried his hand at catching elephants and supplying horses.[4] On his return to India in 1831 Henderson's career was even more adventurous.

Before reaching Hobart Henderson had already published several scientific papers.[5] In 1816 his paper on 'rheumic acid' was widely noticed in European

---

[1] Asiatic Journal, New Series, XXI (September 1836), p.12. Quoted in D.G. Crawford, A History of the Indian Medical Service, 1600-1913, 2 vols. (London, 1914), vol.I, p.81.

[2] Information in letter Sourin Roy, New Delhi, National Archives of India, to M.E. Hoare, 28 March 1968 and extracts from East India Register and Directory (1817-25) and medical lists and medical list of surgeons of Bengal Directory and General Register (1824-27). I am grateful for Mr Roy's co-operation.

[3] Ibid., J. Henderson, Observations on New South Wales, p.ii, and H.T.C., 20 March 1830.

[4] Asiatic Journal, N.S., XXI (September 1836), p.12

[5] E.g. on the coal measures and strata of the Water of Brora, Sutherland, in Tilloch's Phil. Mag. XXXIX (1812), pp.337-8, and 'Essay on the Smut in wheat', Trans. Highland Soc., IV (1816), pp.205-20.

journals[1] and in 1825 he presented his observations on the luminosity of the ocean to the Medical-Physical Society of Calcutta.[2] Henderson was interested in every branch of natural history and also in anthropology and political economy. A dauntless individual, supremely confident of his own talents and projects, he was not one whit abashed by the difficulties he might encounter from the privilege-conscious coteries in the Australian colonies.

After landing Henderson made 'several short pedestrian excursions' from the settlement before visiting Launceston and returning thence to Hobart via Oyster Bay and Process Plains.[3] Whom he met during his several excursions, whether Robert Lawrence in Launceston, or, later, R. C. Gunn, who arrived in Hobart Town in February 1830, we do not know; Arthur, the career soldier, certainly looked favourably on Henderson's efforts to find land for Indian army officers.[4]

Henderson had assembled enough support two-and-a-half months after first arriving to announce on 12 December 1829 the impending formation of his Van Diemen's Land Scientific Society. Modelled on the literary and scientific societies of Europe, the proposed association was to collect 'useful information regarding the island and its products, so as to promote the prosperity of the colony'.[5] A museum of natural history and an 'Economic or Experimental Garden' for research into the 'properties and uses to which the vegetable products of the island may be applied', and improvements 'which may be adopted in their cultivation' were proposed.

---

[1] The original was in T. Thomson's Annals of Philosophy, 1st Ser, VIII (1816), pp.247-54, and Synopses in Annales de Chimie, N.S., III (1816), pp.406-07 and Schweigger's Journal, XXIV (1818), pp.318-19.

[2] Trans. Med. Phys. Soc. Calcutta, I (1825), pp.107-10.

[3] Observations on N.S.W., p.iii

[4] Ibid., p.iv. Henderson apparently bought a 'valuable' estate, 'Huckemmabad', while in the colony, although one report - presumably his - to the eager officers in India stated that no more good farms were available in Van Diemen's Land. See H.T.C., 20 March 1830, and Hobart Town Almanack (1830). Henderson was assigned an overseer and five convict servants for his 'farm' in the colony. Observations on N.S.W., p.9.

[5] H.T.C., 12 December 1829.

His plans matured, Henderson and supporters waited upon Arthur to solicit vice-regal patronage. Henderson well knew that the venture must succeed socially and politically, holding out some economic incentive before science, however defined by the society, would stand any chance of advancement. The petitioners chose their words to Arthur, the wary administrator, very carefully:

> We intend to collect and publish information respecting the indigenous products of the territory, to register its rise, progress and statistical relations, to consider its soil and climate, to deduce the culture best suited for its fields and gardens, to study its animal, vegetable and mineral riches, and to examine its geological characters, and to investigate its natural capabilities. These subjects deeply affect our best interests, their applications are most extensive, and few of them have been touched upon by former enquirers. We trust therefore that we are guilty neither of presumption nor of rash confidence when we anticipate a wide field for exertion and an abundant harvest.[1]

Correspondence with European and Indian scientific institutions was to be initiated and the society was to 'transmit descriptions and reasonings respecting those curious forms of organization, which have excited so much attention amongst Zoologists'. Arthur, rarely easily swayed by the eloquence of memorialists, conceded that the association 'might probably do a great deal of good, and could not possibly do any harm' in the community.[2] A gubernatorial wink was as good as a nod to Henderson who gained the valuable support of James Ross, a consistent supporter of government, and his Hobart Town Courier. Such a society, thought Ross, echoing Wilton's claims for science in New South Wales, would 'dispel the delusions propagated in Great Britain respecting the conditions and capabilities of the colony'.[3]

The Van Diemen's Land Scientific Society's first office-bearers were announced in December 1829, showing just how socially and politically sensitive Henderson had been in his planning. The society 'ranked among its members all the heads of the departments of the Government, as well as most of the

---

[1] H.T.C., 19 December 1829. Arthur received the deputation on 11 December, and the society was formally founded on 14 December.

[2] Quoted in M.C. Levy, Governor George Arthur: A Colonial Despot (Melbourne, 1953), p.53. See also H.T.C., 23 January 1830.

[3] Ibid., 19 December 1829.

respectable settlers throughout the Island'.[1] Turnbull was secretary and treasurer and the vice-patrons were John Lewes Pedder (1793-1859), the colony's first chief justice, and the uninspiring colonial secretary, John Burnett (1781-1860).[2] Henderson was president, with George Frankland (1800-38), the scientific surveyor-general, and Captain Charles Swanston (1789-1850), like Henderson temporarily on leave from India and looking for opportunity to settle, as vice-presidents.[3] The society's committee of management included Edward Boyd (1794?-1871), deputy surveyor-general; Joseph Tice Gellibrand (1786-1837), the former attorney-general, dismissed by Arthur; William Henry Hamilton (1790?-1870), an efficient public servant high in government's favour; Joseph Hone (1784-1861), attorney-general, and Peter Archer Mulgrave (1778?-1847), superintendent of schools in Van Diemen's Land.[4] James Ross was called to serve on the same committee. Sub-committees were set up to deal with papers, the museum, library and the botanical garden.

Henderson paid no heed to the scientific abilities or training of those he had called together. Few, other than Boyd, Frankland, Ross, Swanston, Turnbull or himself had any professional interest or competence in science. The others, although mostly well-educated, scarcely had any claim to office beyond those of socio-political status.[5]

In mid-January 1830 forty-seven new members were added to the foundation roll of the same number when one hundred 'of the most influential individuals of the colony', Arthur among them, attended the society's first general meeting at the Court House.[6] Henderson delivered the inaugural lecture,

---

[1]Observations on New South Wales, p.v.

[2]A.D.B., I, pp.182-3 and II, pp.319-20.

[3]See H.T.C., 19 December 1829 for the full list of office-bearers.

[4]Others elected to the committee were James Bryant, A. Crombie, William Gellibrand, Samuel Hill, John Russell and the convict engineer, James Alexander Thomson (1805-60).

[5]Frankland was very well qualified, having come to Van Diemen's Land as first assistant surveyor in July 1827, recommended by Hay to Arthur as 'a man of Education and Science', who would also be a useful collector of geological and natural history specimens. Hay to Arthur, 20 May 1826, H.R.A., Ser.III, vol. V, p.234. Because of his determination to pursue science and exploration, sometimes at the expense of other activities at the survey department, Frankland conflicted with Arthur.

[6]H.T.C., 16 and 23 January 1830.

a review of the state of the natural history sciences, 'particularly as regards their nomenclature'. Henderson proposed

> ...an entirely new system for introducing one general and determinate form of expression by which those who collected new plants, animals and other curiosities, though at a distance from each other, might infallibly be enabled to give the same name to their discoveries.[1]

Henderson cited particularly the plight of the isolated collector - the fate of many naturalists in the Australian colonies - who was interested in more than just originating new species ad libitum. For all its erudition Henderson's address was politely received. Frankland, opening discussion on it, carefully reminded the society that scientific research was not the exclusive province 'of a particular class of men who are supposed to devote their time and minds solely to theoretical speculations, unconnected with practical advantages'. Every activity and comfort of man, all 'the principal changes in the relations of the world', Frankland claimed, owed their origin to scientific research and discovery. The very settlement and development of Van Diemen's Land had depended upon scientific advances, particularly in astronomy and navigation. Frankland, citing the advantages which had accrued to India with British colonisation and 'the culture of science', exorted the colonists to strive for the introduction of such a culture into their own 'naturally favoured little island'. Appealing, too, for a study of 'a much wronged people', the Tasmanian Aborigines, Frankland received the immediate support of Joseph Hone.[2]

Following Frankland opinion was divided in the discussion on the merits of Henderson's proposed system of classification. Turnbull pointed out that Lavoisier's revision of chemical names - made in 1783-4 in association with his new chemical theory - 'had given new life to that science'. What Henderson

---

[1]Ibid., 21 January 1830. Henderson gave, too, a geological sketch of the island and surveyed 'the botanical varieties already discovered in this country', suggesting that the society's museum and gardens might be devoted to arranging specimens using his system of classification.

[2]Ibid., Nine months later many of those who listened to this appeal were engaged in Arthur's abortive Black War to drive the Aborigines on to the Tasman Peninsula Five thousand men took part and two Aborigines were caught. Ironically the 'peace-loving' Hone was one of those active in the drive. See West, History of Tasmania, vol. 2, pp.45-7.

had in fact done was to declare 'war against 30,000 arbitrary names of plants received in the nomenclature of botany, and had suggested the substitution of certain syllables and letters, of which might be compounded names expressive of the diagnostic marks of each particular plant'. Turnbull was in favour of experimenting with the scheme on the 'neutral and untrodden ground' of Van Diemen's Land.[1] James Ross, however, spoke against 'speculative schemes and new theories': the learned of Europe had already adopted 'excellent classifications' to which colonial collectors should contribute. Botany, argued Ross, was not an esoteric study:

> ...a moderate acquaintance with the Flora of any Country might easily be acquired, with the help of the beautiful arrangement and classically expressive terms of Linnaeus, in the course of a few months, in a single spring season.[2]

Linnaeus's older, more rigid artificial classification, while still enjoying some vogue in Europe, was being replaced by the 'natural system' of Bernard de Jussieu (1699-1777), a system made public by his nephew Antoine Laurent de Jussieu (1748-1836) in the 1770s and 80s.[3] Robert Brown used the system in 1810 in his Prodromus of Australian and Tasmanian flora. Robert Lawrence, just beginning his collecting and tentative classification of Tasmanian plants for W. J. Hooker, found that only by diligent study of the most recent botanical literature from Europe was he able to acquire competence in the latest methods of the science. Before opening his correspondence with Hooker in 1828, indeed as late as May 1831, he had to rely on an 1806 edition of the Linnean System.[4] R. C. Gunn also required more than a 'single spring season' to master botany. His education required the patience and generosity of Hooker in providing an extensive botanical literature. It is interesting to note that Lawrence in

---

[1] H.T.C., 23 January 1830.

[2] Ibid.

[3] The Jussieu system is discussed in V.D.L. Correspondents, pp.13-15. See also e.g. Charles Singer, A History of Biology, 3rd ed. (London, 1950), pp.190-203.

[4] Lawrence to Hooker, 13 May 1831, V.D.L. Correspondents, p.13. The book Lawrence used was William Turton's second edition of A General System of Nature, (London, 1806).

Launceston was sufficiently impressed by news of developments in Hobart Town to apply for appointment as 'Gardener to the Society'.[1]

When the large Court House gathering adjourned to a banquet at the Macquarie Hotel, the Van Diemen's Land Scientific Society's first 'Labours' were viewed with general satisfaction. Not all the gentlemen, it is true, had followed the sometimes abstruse arguments presented by Henderson, but printed transactions were promised, the lieut-governor was supporting the association and most were prepared to overlook the poor wine and address themselves to the fare, 'so essential for the comforts of Englishmen and philosophers'. Science, it was generally agreed, would soon produce a superior vine for Van Diemen's Land.[2]

The banquet and poor wine produced a taste for more philosophical discussion. 'Botany', ventured a certain Dr Brocke, was 'a simple science, within the reach of the earliest youth': it certainly required no tampering with classification or nomenclature. They then toasted Henderson, 'the Founder of the Society', who announced his imminent return to 'Hindoostan'. Seizing the opportunity Ross soberly reminded the society that education not exclusivism should be their watchword: 'the most deserving settlers [in the colony] are either ploughmen or shopkeepers', and even fee-accepting schoolmasters must find their place in the association which would not be indefinitely sustained by 'gentlemen of independent fortune'. They must 'embrace and constitute the main Society of Van Diemen's Land'; agriculture, commerce and education should engage their attention as priorities.[3]

Never before had men of science in Australia spent so much time debating the state of science in general. Henderson's inaugural lecture was eventually published in two amended parts in his Observations on the Colonies of New South Wales and Van Diemen's Land. His 'Cursory Observations on Natural History connected with New South Wales' were the result of his researches in Tasmania - and later on the mainland - part of which he presented to the

---

[1]Entry in Lawrence's diary for 27 December 1829, V.D.L. Correspondents, p.6. He still had no reply from the society by 11 January.

[2]H.T.C., 23 and 30 January 1830.

[3]Ibid., 23 January 1830.

society in January 1830.[1] They contain notes on botany, meteorology, zoology and anthropology and an outline of the known wind systems of Australia. Henderson included the results of some 'rudely performed' experiments to determine the 'general relationship' between ocean and air temperatures.[2] His remarks on botany were meagre, although he recognized the endemic nature of much of the Australian flora and maintained that any enquiry into the origin - the geographic origin - of plant species was not 'impious', and that the results of such research would not necessarily invalidate any truths of revelation. He examined the theory of seed distribution to islands by ocean currents and migrating birds, and considered the idea that all vegetation was originally propagated on mountain ranges. He leaned to the view that particular plants might be propagated spontaneously from particular soils. Here in crude outline were some of the problems which Joseph Dalton Hooker and Charles Darwin were to consider in the coming years, especially in relation to antipodean plants; problems of phytogeography (plant distribution) and origin of species.[3] Henderson included scattered observations on insects, fish and birds, on Ornithorhynchus paradoxus, and some further notes on the reproductive organs of the kangaroo and the development of the foetus in the pouch. He also wrote briefly on opossums and carnivorous marsupials, about which little was known. His observations concluded with an account of aboriginal rites and customs and some speculation on hybrid human types.

The most esoteric part of Henderson's work was his proposed system of nomenclature. The treatise was not finalised until his return to India in 1831, when he despatched it as a letter to Antoine-Chrysostome Quatremère de Quincy (1755-1849), perpetual secretary to the Institute of France (1815-39).[4]

---

[1] Observations on New South Wales, p.127. The first part of the work is devoted to a study and suggested reforms in the political economy of the colonies.

[2] Ibid., pp.127-30 and table 'Experiments on the Temperature of the Ocean made during a voyage from N.S. Wales to Bengal', (following p.53). Henderson attempted somewhat clumsily to show that atmospheric temperature was not the sole control on sea temperature. The table covered the period 16 January - 21 February 1831.

[3] For some discussion of these problems see W.B. Turrill, Joseph Dalton Hooker: Botanist, Explorer and Administrator (London, 1963), pp.30-42.

[4] 'A Letter on Nomenclature', Observations on New South Wales, pp.155-80. Letter dated Juanpore, 1 November 1831.

Henderson considered it futile to submit his ideas to the Royal Society of London, whose fellows 'have ever evinced a strong disinclination to change, (being) wedded to the opinions of the ancient or great' and requiring more than 'the evidence of truth, unassisted by time, to overcome their firmly rooted prejudices'.[1] France, Henderson believed, would give an 'impartial' hearing to his views.

Henderson had not read the whole of his long logically and mathematically argued treatise to the Van Diemen's Land Scientific Society. Although relying clearly on previous systems of classification Henderson was highly critical of them. In botany, he argued, names were 'completely arbitrary, frequently absurd; and [have] only in rare instances, the most distant reference to the object designated'.[2] There was no absolute or accurate means of systematising the 100,000 known species of plants; taxonomic botany was a chaotic jumble of disconnected and sometimes unimportant data. Personal names and the use of dead languages Henderson attacked as impediments to the advancement of science. Parkinsonia, for instance,

> which now represents a genus of plants, would be otherwise equally well suited as a name for a family of shells, a tribe of insects, reptiles, fish, birds or quadrupeds.[3]

Henderson deprecated artificial systems like the Linnean which selected only the reproductive organs of plants (stamens and pistils) as the criteria for the principal divisions into classes and orders. As one historian of biology writes:

> Linnaeus focused biological interest on classification, especially by external parts. He thus withdrew attention from the intimate structure and workings of the living organism. The search for new genera and species became, for generations, the chief aim of most naturalists to the neglect both of anatomical and physiological studies. The tendency was especially marked amongst botanists, who were esteemed in proportion to the number of flowering plants whose characters they could memorize.[4]

---

[1] Ibid., p.156.

[2] Ibid., p.157.

[3] Ibid., p.160.

[4] Singer, History of Biology, p.195.

'The real study of Botany', Henderson stressed, was physiology, which 'remains almost neglected'. It was, indeed, the Jussieus and later August de Candolle (1778-1841) who developed and popularised the 'natural system' of classification based more firmly on the anatomical and physiological study of plants. Henderson made no direct reference to these systems, although he clearly supported the concept of an ordered affinity of organisms implicit in them.[1] The artificial system favoured the idea of discontinuity in nature.

Henderson's first desideratum was that any naturalist, whatever his location, should be able to assign a place in taxonomy for any natural phenomenon with a minimum risk of error. The name or identification given should depend upon a simple 'chain of ideas' or universally accepted criteria. Henderson argued that the fault of all previous systems lay in their reliance on symmetry and orderliness of arrangement, an ideal which broke down with the discovery of new and exotic species. He proposed a simple mathematical division of all species and a continued division of the number of species known into approximately equal parts, selecting the divisions according to 'permanent and intrinsic qualities' observable in the specimens. The simplest mathematical division by two would produce a single 'line of demarkation' between the classifications. Definitions would depend upon one universally known and accepted criterion, not several, as in existing systems. In this way many of the neutral divisions (e.g. cryptogamia) would be eliminated. Simplification and ease of classification were Henderson's stated aims.

In order to demonstrate his new method he criticised very closely the Linnean System. The considerable numerical disparity between the various divisions was undesirable: confusion and inconclusiveness characterized the lower classification into genera and species.[2] He proposed a code of letters

---

[1]See S.F. Mason, 'Evolution, and the Great Chain of Beings', in A History of the Sciences (London, 1953), pp.265-9.

[2]Henderson attempted the following definition of the prevailing concept of genus: 'a division of the orders or sub-divisions, by means of definitions, constructed without the slightest vestige of regularity, according to the fancy of individuals, who have thus grouped them from some ideal resemblance or dissimmilarity which could be subjected to no established rule', Observations on New South Wales, p.171. For a brief discussion of Henderson's ideas see Gilbert, 'Botanical Investigation in N.S.W.', vol.II, pp.553-4.

to indicate the divisions into orders, families, genera and species, and concluded by giving examples of how to apply the system to botany, mineralogy and zoology.

Henderson's ideas, although virtually replacing 'one esoteric system by another',[1] were not the reasonings of an uninformed dilettante. He was striving to overcome problems which are still not resolved: how to define simply and adequately the innumerable varieties of nature.[2] His approach was partially mathematical and therefore not necessarily simple for the colonial layman to grasp. He was looking for the best of all worlds: the simplicity of an artificial system (utilising one or two recognized criteria) and the ordered sequence of a natural system. His work remained a speculative exercise, the highest level of 'philosophy' to which the Van Diemen's Land Scientific Society was able to aspire.

Soon after the society's convivial gathering the colonial bane of 'party spirit' intruded into affairs. In February Burnett, the querulous colonial secretary, resigned, disagreeing with Henderson's policy of blackballing four candidates for membership.[3] Others, like Ross, rallied behind the president to support his latest brainchild, 'a public seminary of education connected with India'.[4] Henderson planned to establish a number of 'preliminary schools' throughout the colony to provide scholars for a higher 'seminary', where instruction would be given 'in the sciences, as they might exist at that particular period, after having been reduced to a simple and condensed form'.[5]

---

[1]Ibid., vol.II, p.553.

[2]See e.g. Singer, A History of Biology, pp.177-80 and 199-203.

[3]H.T.C., 6 and 20 February 1830.

[4]Ibid., 20 February 1830.

[5]Observations on New South Wales, p.vii. Henderson gives a full account of his seminary proposals in his book, pp.v-vii.

Like many of his schemes Henderson's seminary was still-born, in this case a victim of apathy, over-ambition, 'jealousy and discord, [which] had already made serious inroads into the heart of [the] Society, whose component parts, on account of the generally insulated nature of colonial pursuits, were merely cemented to one another, by motives of selfish interest'.[1] On 13 March the society disassociated itself from the seminary and seven days later Henderson left the colony as a passenger on the Medway.[2]

Even before Henderson departed Burnett and other critics were predicting 'an inglorious death' for the society. The Colonial Times let everyone know where the real trouble lay:

> Whatever ideas of self importance, whatever high and aristocratic notions Dr Henderson may have imbibed under the tropical sun of Eastern possessions, he now, we apprehend, had been taught that it is a plant which does not thrive in the more temperate climate he at present inhabits.....[3]

This Colonial Times waged a persistent campaign against the society and its 'absurd and ridiculous exclusionary principle'. It was a disgrace that these philosophers had not spoken out against the hunting of Aborigines 'like so many wild beasts of prey' instead of squabbling over matters of election and status.[4] Henderson, reflecting later on his difficulties with the society, concluded that he had

> ...merely collected amongst the members a number of spectators: and...few of these were capable, and fewer still were willing, without some personal advantage, to lend their assistance, in promoting the objects of the Institution.[5]

'Whatever his science', West wrote, Henderson was 'disqualified by his censorious dogmatism to rule':

---

[1] Ibid., p.vi.

[2] H.T.C., 20 and 27 March 1830.

[3] Colonial Times, 19 February 1830. The society, it was reported, was 'virtually defunct'.

[4] Ibid., 29 January 1830. The Colonial Times called the society's members 'silly and conceited blockheads'.

[5] Observations on New South Wales, p.v.

> His work (Observations on New South Wales) was an outline of projects, which entered into every imaginable department of political economy, and contemplated a social revolution. On religion his ideas were scarcely Christian: he combined the Brahmin and the Socialist.[1]

The Van Diemen's Land Scientific Society weathered the first attacks. Dr James Scott (1790-1837), a graduate of Edinburgh (M.D., 1815) and colonial surgeon, was elected to the committee of management, bringing the benefits of his scientific background into the society's councils.[2] Just before Henderson's departure the committee received three papers for consideration on the culture of bitter cassava; smut in 'cerealia' - apparently a version of Henderson's earlier published paper on the subject - and 'some strictures' on M.A. Pictet's theory on the 'apparent radiation of cold'.[3]

One of the Colonial Times's main objections to the society was that it seemed to be so much in the government's pocket. The members went some way towards meeting this criticism when Thomas George Gregson (1798-1874), a bitter opponent of Arthur and supporter of free settlers' rights, and William Kermode (1780-1852), a zealous agricultural improver and supporter of the free press, were elected members.[4] The same month a questionnaire was prepared for despatch to settlers in the interior requesting information on resources, soils, population and the 'indigenous esculent production' of

---

[1] West, History of Tasmania, vol. I, p.127.

[2] H.T.C., 20 February 1830. See also A.D.B., II, pp.417-18, and W.E.L. Crowther, 'Practice and personalities at Hobart Town 1828-32, as indicated in the day book of James Scott, M.D., R.N.', M.J.A., I(1954), pp.421-30.

[3] H.T.C., 20 February 1830. The names of the authors are not given. The proferred paper on Pictet's theory of heat was probably by Turnbull. By the end of February the museum boasted among its exhibits two dromeda, one night jar and sundry other birds. Marc Auguste Pictet (1752-1825), the physicist, was professor and later president of the Geneva Academy.

[4] H.T.C., 27 March 1830. For Gregson and Kermode see A.D.B., I, pp.475-6, and II, pp. 49-50. Others elected at this meeting included Roger Henry Woods, principal superintendent of convicts, and William Stanley Sharland (1801-77), surveyor and explorer. The anti-government tone of the Colonial Times's campaign against the V.D.L. Society stemmed from its proprietor, Andrew Bent (1790-1851), an inveterate opponent of Arthur's attempts to muzzle the press. See E. Morris Miller, Pressmen and Governors: Australian Editors and Writers in Early Tasmania (Sydney and London, 1952), esp. pp.81-8 and A.D.B., I, pp.86-7.

each district. Swanston took the society one further step towards agriculture and horticulture with a paper on plant cultivation in new countries.[1]

By April 1830 the society was moribund. Colonists were preoccupied with exterminating the blacks or pondering the new settlement at Swan River, from whence, in the same month, came Matthew Curling Friend (1792-1871), F.R.S., master of the Wanstead, bearing a commission to find correspondents in Van Diemen's Land for some of the leading scientific societies in Britain and, if possible, start a scientific society[2].

Friend's arrival stirred the existing group into convening a meeting at the Waterloo Tavern for 22 May. Friend, a man of respectable scientific standing (F.R.S., 1822), was given a good reception by the society.[3] He was the embodiment of the home scientists' oft expressed 'deep interest' in Van Diemen's Land:

> The great accessions which science might receive from a patient and well sustained investigation of its natural productions, have not escaped their notice. Your country is still a land of mystery, supposed to abound with anomalies, which if verified and ably described, would tend much to illustrate many of the most abstruse and important questions in the history of organic life. The transition forms - the animals intermediate betwixt different orders where the diagnostic marks are indistinct or mixed with each other, are of the utmost consequence in physiology.[4]

---

[1] H.T.C., 27 March 1830.

[2] Friend to V.D.L. Scientific Society, 10 May 1830, H.T.C., 15 May 1830. Friend's credentials were impeccable. He was representing the Royal Society, the Zoological Society, Geological Society, Medico-Botanical Society and the British Museum.

[3] Friend was elected to the Royal Society for his work on nautical and practical astronomy. He received the gold medal of the Medico-Botanical Society in 1827 and, later, recognition from the Royal Statistical Society of France. See A.D.B., I, pp.417-8.

[4] H.T.C., 29 May 1830. Friend was amazed to find the society in existence and thought it had already 'done and attempted more than any young society he had ever known'.

Scientists fervently hoped that Van Diemen's Land would supply some of the missing links in the great chain of being. These were the reasons which had prompted them to commission Friend to form a 'scientific institution' in the colony, for all were 'convinced that observations made upon the spot and by residents could not fail to be more valuable than the hurried and imperfect sketches of the passing traveller, who has not the advantage of repeating his experiments or of patiently abiding their results'.[1]

What exactly did the home societies want from the colonists? Internal and external organs of the local 'anomalous productions' and the crania and placenta of all animals were 'peculiarly acceptable'. The geologists wanted details of the heights of mountains, minerals and the arrangement of strata. 'The Flora of Van Diemen's Land is as yet nondescript' and 'even the learned' did not know 'with sufficient accuracy for scientific purposes' where the island was. Medical men - James Scott was in the chair for the meeting - were exhorted to 'cull the simples of the country'.

Friend chose his next words carefully. The colonists possessed the rich mine of unassayed scientific data and the home scientists the 'greater experience [and] more numerous and better fitted appliances'. Their work, therefore, would be of 'reciprocal benefit', the 'honour and the gain' divided. Friend - perhaps primed about Henderson - exhorted the colonists to 'avoid theories' unless they had ample materials; they must 'shun hypotheses at all times':

> Observe carefully, and carefully mark down that which you observe. Do not be cast down, although occasionally you may appear to do little more than cater for older societies. No discredit will attach to you on this account. The old societies, nay, their most distinguished members - the Davies, the Homes, the Gilberts, the Humboldts and the Cuviers now attempt little more than to

---

[1]The same philosophy had motivated Friend to start 'a very active little society' at Swan River on the way out. See H.T.C., 29 May 1830. In July 1831 a Tasmanian Society 'for the diffusion of useful knowledge' was announced in Launceston by Thomas Wilson, its first secretary. By January 1832 this Society was in the hands of William Lushington Goodwin (1798?-1862), former ship's master and for long a scurrilous journalist in Launceston. When Friend became port officer at Launceston in September 1832 Goodwin, jealous of his appointment, conducted a long feud against him. The society never seem to have met more than two or three times. See Independent, 16 July 1831 and 21 January 1832 and for Goodwin, A.D.B., I, pp.457-58.

"collect" for succeeding ages; to provide against a period when the works of nature have been carefully scrutinized, described and classified....[1]

This encyclopaedic age, Friend predicted, would pave the way for 'a comprehensive survey of creation', the final 'distinct perception of those secondary causes, by means of which, this world and all it upholds exist and have their being'. Eighteen months after Friend delivered his address the Beagle left Plymouth for the Pacific.

Revitalised, the Van Diemen's Land Society acted promptly to implement Friend's suggestions. David Gilbert, P.R.S., the Earl of Stanhope, president of the Medico-Botanical Society, Sir Everard Home, Nicholas Vigors, the zoologists, and John Childern were elected members[2] and an undertaking was given to correspond with their societies. Friend and Thomas James Lempriere (1796-1852), the naturalist and artist, were also elected members.[3]

A number of papers were read to the society soon after Friend's summons to action, including Frankland's account of a 'short tour' to the Macquarie River, a report which confirmed his geological competence and speculated upon the previous existence of interior lakes.[4] Two further papers on

---

[1] H.T.C., 29 May 1830.

[2] Philip Henry, fifth Earl of Stanhope (1805-75); David Gilbert (1767-1839), P.R.S. 1827-30; Sir Everard Home (1756-1832), surgeon and comparative anatomist, who had been assistant to John Hunter; Nicholas Aylward Vigors (1785-1840), zoologist, was instrumental in the formation of the Zoological Society (1826), of which he was secretary until 1833; John George Childern (1777-1852), chemist and physicist, sometime secretary to the Royal Society (1826-7 and 1830-37).

[3] H.T.C., 29 May 1830. Lempriere arrived at Hobart Town in May 1823 and after failing in business entered the Commissariat Department in 1826 after which he was employed in the penal settlements at Maria Island and Macquarie Harbour. He collected for the British 'quinarian' zoologist William Swainson (1789-1855), returning to Hobart Town in 1831, and in 1832 became secretary of the Mechanics' Institute. He played an important part in the colony's science until his departure in 1849. See A.D.B., II, pp.105-06 and G. Whitley, 'T.J. Lempriere, an early Tasmanian naturalist', Aust. Zoologist, XIII, Part 4(1966), pp.350-55, wherein are listed Lempriere's published papers and MS holdings in various libraries relating to his life and career. He died in Aden on 6 January 1852.

[4] H.T.C., 29 May 1830.

entomological subjects were read by Jocelyn Thomas (1780-1862) and Frankland and J. T. Gellibrand addressed the society on the 'natural capabilities of the country in the neighbourhood of the Swan river'.[1]

The enthusiasm of Friend's night at the Waterloo Tavern, however, was ephemeral, an Indian summer during which 'Transactions' were again promised and Turnbull pleaded in vain for subscriptions. Friend left again soon afterwards to finalise his affairs in England before returning to settle at Launceston. In a long paper before the society on immigration[2] in which he attacked the writings and policies of Edward Curr (1798-1850), then chief agent for the Van Diemen's Land Company at Circular Head,[3] Turnbull by introducing politics into the association, sounded its death knell. Turnbull, bitterly opposed to transportation, made his views on that topic clear, too, thus ensuring governmental disapproval for his stand.[4] Soon after the reading of Turnbull's controversial paper Arthur proclaimed the general drive against the blacks and in the fever of the ensuing abortive campaign Henderson's once 'powerful engine', the Van Diemen's Land Scientific Society ran finally out of steam.[5]

Henderson tried too much too soon in Hobart Town. His intentions were good and his enthusiasms unbounded. As one obituarist noted his talents were

---

[1]Ibid. Thomas was colonial treasurer from 1825 until his dismissal for misappropriation in 1832. Gellibrand became interested in the Port Phillip Association and met his death while exploring the hinterland of Port Phillip in 1837.

[2]H.T.C., 28 August and 4 September 1830.

[3]A.D.B., I, pp.269-72. Arthur strongly disapproved of Curr's activities in the north. In 1824 Curr published his Account of the Colony of Van Diemen's Land, principally designed for the use of emigrants (London).

[4]Turnbull consistently maintained his anti-transportation position and was eventually deprived of all his public offices for doing so. He played an active part in the intellectual life of the colony over many years. In his 1830 paper, Turnbull saw Tasmania as the granary or Sicily of the Southern Hemisphere.

[5]Observations on New South Wales, p.iv. The expression was Henderson's. He clearly regarded the society as almost doomed before he left the colony, despite promises to assist it from India. The last traced evidence of any activity was in February 1831, when the museum reported sixty specimens in its possession. See H.T.C., 21, 29 January and 5 February 1831. The society's aims and the maintenance of a museum at the Survey Office were reported annually up to 1834 in Ross's Almanacks. See Ross's V.D.L. Almanack for the year 1834, p.27.

of 'no common order [and were] unremittingly devoted to the public good'.[1] Restless by nature, Henderson had thoughts and schemes which 'flowed too quick upon him to allow him to think as soundly as rapidly' and he perforce became well schooled in the failure of his own projects, both in India and Australia. In New South Wales his star was soon eclipsed, despite the sound work he did and the proposals he made to government.[2] On his return to India Henderson resumed service with native regiments at Agra and Ludhiana, continuing the familiar round of involvement in ephemeral, unsuccessful public and business ventures and in 1835 embarking on a short but remarkable career as an explorer into Kashmir, Ladakh and Yarkund (Turkestan).[3]

Henderson's lack of 'caution and judgment' and his dogmatic determination fanned existing feuds and aroused new antagonisms in suspicious Hobart Town. 'We have never seen any one instance in this Colony', the Colonial Times had warned Henderson at the outset, 'where the utmost indifference and apathy have not been manifested in anything particularly depending upon the public'.[4] For a few months Henderson stayed that 'indifference and apathy' by tapping the public's ephemeral enthusiasm for intellectual pursuits. Had he been less adventurous and more sedentary he might have accomplished more for science. Friend's arrival confirmed the eagerness of European scientists for Tasmanian data and, more important still for the establishment of local science, showed how much reliance and what resources Hooker and other leaders in Britain would place in the hands of trusted colonial correspondents and research workers.

---

[1] Agra Ukhbar, 19 March 1836; death notice on Henderson. Copy in M.L., Sydney and Basser Library, Canberra.

[2] Following his inspection of the caves Henderson applied for government assistance to look for the inland sea west of Wellington. Receiving no promise of aid he decided to proceed independently via the Macquarie River over the Divide to the Hunter and thence to Sydney. Accompanied only by 'a servant, a native of Hindostan' and without map, compass or local guide he made his way through difficult and unexplored terrain. See Observations on New South Wales, pp.viii-xxv.

[3] On this journey Henderson met Baron Karl Hügel (1795-1870), an earlier botanical visitor to Western Australia. Of Henderson's Asian unpublished journals it was later written that they 'would have filled up an important chasm in the Geography of Central Asia'. See Agra Ukhbar, 19 March 1836 and for a summary of Henderson's Indian career, Hoare, 'Doctor John Henderson', Rec. Aust. Acad. Sci., I, No.3 (1968), pp.10-12.

[4] Colonial Times, 1 January 1830.

The year of the Van Diemen's Land Scientific Society's demise, 1831, marked, as Gavin de Beer writes, 'a new chapter in the history of science'.[1] The year of the first British Association meeting was the year of Darwin's departure to look for that 'comprehensive survey of creation' of which Friend spoke at the Waterloo Tavern in Hobart Town. A new era of important, highly scientific British expeditions into Australasian and Pacific waters brought men who were to change the direction of scientific thinking in Europe, men who also found knowledgeable, eager friends and later correspondents among the little groups of scientists in the colonial ports at which they called.[2] The exchange of data, ideas and books between Europe and Australia provided a much-needed stimulus, indeed sometimes a complete education, for the colonists in their isolation.

By the 1830's colonists were growing more scientifically aware: some of them became critical and sceptical of the unheralded and often unknown soldiers of scientific fortune and temporary sojourners - such as John Lhotsky and Henderson - who appeared in the main colonial centres with large plans and larger promises. Gunn, Bennett and other emerging principals in colonial science were now in correspondence with the leading scientists in Europe and were, on the whole, very well-informed about developments there. Never again would a visitor like Henderson, with the best or worst of intentions, rouse colonial intellectuals and men of scientific bent to the same fever-pitch of expectant activity until his claims and credentials were proven. Xenophobia, a suspicion of foreign 'quackery', doctors and titles, became firmly implanted in the minds of the infant scientific communities in Australia. In some instances it was a healthy sign, nipping charlatanism in the bud, but in other cases true science was almost stifled by it, as Ludwig Leichhardt, Gerard Krefft and others were to learn.

---

[1] G. de Beer, Charles Darwin. Evolution by Natural Selection (London, 1963) p.34.

[2] Darwin, for example, spent much time with George Frankland on his visit to Hobart in February 1836, enjoying both scientific and social intercourse. See M. R. Banks, 'A Darwin Manuscript on Hobart Town', Pap. & Proc. Roy. Soc. Tas., 105(1971), pp.5-19.

The scientific circle around the Van Diemen's Land Society did not disintegrate completely. George Frankland arranged for police magistrates in the various districts to receive specimens for the museum in his Macquarie Street office and himself published one geological notice overseas.[1] After his removal to the penal settlement at Port Arthur in 1833 Lempriere continued his correspondence with Swainson and in 1834 the officers of the civil and military establishments there were 'induced by the new and interesting features of that almost unexplored portion of the island' (the Tasman Peninsula) to form a 'little "philosophical society" in order to elicit as far as they can the natural resources of the place'.[2] Dr Cornelius Gavin Casey (1810-96), the surgeon at Port Arthur, found that 'the apparatus and chemical means' he needed for analysing a vein of local copper ore were 'very deficient' so far from civilization. Lead by Lempriere the small group worked steadily away accumulating materials for transmission abroad and awaiting the revival of science in Hobart Town.[3]

In the capital Ross, through his publishing outlets, continually encouraged an interest in science. The arrival in February 1832 of James Backhouse (1794-1869), the Quaker missionary and botanist, was a great boost to the island's scattered workers. Backhouse travelled widely in Van Diemen's Land in 1832-34, visiting, ministering and collecting as he went with his companion George Washington Walker (1800-59).[4] On his travels in the north of the colony Backhouse met Robert Lawrence, Gunn and Dr Joseph Milligan (1807-84), surgeon to the Van Diemen's Land Company's establishment at

---

[1] H.T.C., 5 February 1831 and 'A Notice on Maria Island, on the East Coast of Van Diemen's Land...', Proc. Geol. Soc., II(1836). No details are given in the recent literature on Frankland's museum. See e.g. W. Bryden, 'Tasmanian Müseum and Art Gallery: Historical Note', Pap. & Proc. Roy. Soc. Tas., 100 (1960), pp.21-6 and Whitley's note in Aust. Zoologist, XXIII(1966), pp.352-3.

[2] H.T.C., 2 May 1834.

[3] Charles O'Hara Booth (1800-51), the efficient and humane commandant of the establishment, was a member of the little society and did some important exploration work with Casey. For Booth and Casey see A.D.B., I, pp.125 and 213-4. Some of the results of Lempriere's work are considered in the next chapter

[4] Backhouse, a nurseryman, stayed in the colonies until 1838 gaining admission to every settlement. He made a return visit to Van Diemen's Land in 1837. His botanical collections were highly prized by J.D. Hooker and others. See A.D.B., I, pp.45-6.

Surrey Hills.[1] Since opening his correspondence with Hooker, Lawrence had made considerable progress with his botanical investigations, aided by Hooker's despatch of otherwise unprocurable books. In April 1832 Lawrence introduced Hooker to Gunn, 'a gentleman who has lately acquired a passionate taste for the science of Botany, and who has become an enthusiastic collector' and Gunn opened his own important correspondence with Hooker after only six months of botanical collecting.[2]

Following Lawrence's untimely death in October 1833 Gunn was left as the principal watchdog and promoter of science in the north of the colony. Hooker plied him with books and requests, anxious to add to the materials from Lawrence he had already published.[3] Gunn, now responsible as superintendent for all convicts in Northern Tasmania, was a model correspondent and student to Hooker. Encouraged further by Backhouse's visits, exchanges and correspondence Gunn undertook a comprehensive programme of collecting, exploration and reading and laid out a botanical garden in Launceston. He established contact with Milligan and other interested collectors and scientists in the other colonies and Britain, among them John Lindley (1799-1865), professor of botany at University College, London. In 1834 Gunn widened his interests to include entomology and ornithology and the following year sent Hooker copies of Ross's Almanacks for 1834 and 1835 which contained botanical papers by Backhouse.[4]

[1]Milligan received the diploma of the Royal College of Surgeons of Edinburgh in January 1829 and arrived in the colony in February 1831. For Backhouse's contacts with the Tasmanian workers see Gunn to Hooker, 1 July 1833, 29 June 1835 and 19 June 1837, V.D.L. Correspondents, pp.29-31, 46 and 66. Gunn and Backhouse had a mutually high regard for each other's work. For Milligan see A.D.B., II, pp.230-1.

[2]Lawrence to Hooker, 2 April 1832, and Gunn to Hooker, 18 August 1832, V.D.L. Correspondents, pp.18 and 21-3.

[3]For his Journal of Botany, No.1 (1834), Hooker compiled 'Towards a Flora of Van Diemen's Land' from the descriptions sent to him by Lawrence.

[4]Gunn to Hooker, 30 March 1835, V.D.L. Correspondents, p.41. Ross's Almanack for 1834 contained Backhouse's 'good article' on esculent plants and that of 1835 (pp.60-114) the 'Index Plantarum, or an attempt towards a popular description of some of the most common Indigenous Plants of Van Diemen's Land'. In his preface (p.iv) Ross acknowledged Gunn's co-operation in allowing Backhouse access to his Nottus siccus and descriptions by Hooker, Brown, Sprengel, etc.

Much to the satisfaction of the scientific co-workers in Van Diemen's Land Backhouse's papers were well received by botanists in Europe and Hooker displayed his confidence by immediately republishing the one on esculent plants.[1]

For Gunn - and hence for science in the colony - the link with Hooker was vital. Isolation and the lack of even the most rudimentary materials- such as paper and cork - for collecting and preserving sapped the enthusiasm of the most dedicated workers. Gunn's additional duties as magistrate made his 'time for Botany very limited indeed'. Only Hooker's earlier encouragement when Gunn had had more leisure persuaded him later to continue his 'communications' Without such support he would 'long since have been obliged to give up in despair'.[2] Having access to the best and latest botanical and other scientific literature from Britain and the benefit and discipline of Hooker's 'assistance' allowed Gunn in a relatively short time to develop a keenly critical approach to his studies. Despite the rebuffs he felt Arthur gave him[3]; despite problems of isolation from 'conversable' friends and even with mounting professional and domestic pressures, Gunn's self-education and practical field experience led him to master botany and to become jealous for scientific standards. Gunn learned to be suspicious of colonial scientific 'adventurers' such as the Pole, John Lhotsky, whom he found professing 'to know everything but really quite ignorant',[4] and the indolent, demanding Thomas Keir Short, a gentleman 'decidedly more in the Entomological way than any other', who descended upon Gunn and the colonial authorities with recommendations from Hooker and other great names in 1835, insisting on immediate recognition and recompense for his unrendered scientific services.[5] Gunn found Short

---

[1]V.D.L. Correspondents, p.43 and Hobart Town and V.D.L. Almanack for 1838, preface.

[2]Gunn to Hooker, 30 March 1833, V.D.L. Correspondents, p.41. Despite several communications from Gunn, Lindley proved a poor correspondent.

[3]E.g. in 1834 when he was refused a request for three labourers to establish his 'Botanic Garden' along scientific lines in Launceston. Gunn to Arthur, 10 May 1834, V.D.L. Correspondents, pp.33-4.

[4]Gunn to Hooker, 30 March 1834, postscript dated 16 April 1835. Lhotsky, Gunn observed, was 'assisted by others in his compilations', V.D.L. Correspondents, p.43. For Lhotsky see A.D.B., II, pp.114-5, and Chapter V below.

[5]Short to Hooker, 10 October 1834 and 1836; Gunn to Hooker 25 September 1835, and 16 January 1836, V.D.L. Correspondents, pp.48-54. Short applied unsuccessfully for the vacant position of colonial botanist in New South Wales. He ultimately fleeced Gunn of over £200.

an expensive guest and 'positively more ignorant' of plants than himself.

Gunn's lessons on science and persons professing science stood him in good stead when he was called upon to support Franklin's stand on scientific standards in Tasmania in the 1840s. The contacts with his 'brother magistrate' Milligan and other colonial and overseas scientists equipped him admirably for the role of leadership in the colony's science. When Gunn bowed out at the end of the forties Milligan assumed his mantle of leadership as secretary of the Royal Society of Van Diemen's Land (1848-60).

In 1836 Gunn became police magistrate at Circular Head, where he applied himself to reading Swainson's work and to the deeper study of zoology and conchology.[1] The first number of his manuscript 'Circular Head Scientific Journal' was despatched in June 1836 to his friend Dr James Grant, 'a very clever young medical gentleman',[2] in Launceston. The 'Journal' - which lasted until 1838 - carried a lively correspondence between Gunn and Grant on the birds and mammals of Tasmania and a critical survey of the available zoological literature on Australia. 'We cannot arrive at the truth', Gunn told Grant, 'except by continuous investigation, and the Van Diemen's Land Birds, though very similar to those of N.S.W., may prove quite distinct & most of the specimens described have been from the latter colony'.[3] Van Diemonian scientists now seemed quite prepared to accept and act upon the ideas which overseas zoologists had been suggesting for years: that the island species should receive much closer investigation because of their possible divergence from the mainland ones.

---

[1] Gunn to Hooker, 16 November 1836 and 31 March 1837, V.D.L. Correspondents, pp.58-65. For Gunn's and Swainson's ornithological work see Whittell, Literature of Australian Birds, pp.308-09 and 700-02.

[2] Gunn to Hooker, 31 July 1838, V.D.L. Correspondents, p.79.

[3] 'Circular Head Scientific Journal', I, No.1(21 June 1836), p.4. M.L. MSS 1180, M.L., Sydney. See also the description of the 'Journal' and associated MSS in T. Iredale and G. Whitley, 'The Circular Head Scientific Journal, and other early Tasmanian Natural History Manuscripts', Aust. Zoologist, XIV(1968), pp.257-8, and J.H. Willis, 'Flora of the Nut, with a brief account of botanical investigation in the Circular Head District, Rec. Queen Victoria Mus. Launceston, New Series, No. 21(1966).

While Gunn proclaimed a programme of zoological research from Circular Head a new movement was stirring to reorganise science in the south. In April 1835 the Bothwell Literary Society was founded with Rev James Garrett (1793?-1874), formerly a student at Glasgow University, as secretary. Garrett, a Presbyterian of liberal persuasion and education, was assisted in his efforts to counter the 'apathy to literary and scientific pursuits, which generally pervades the population of a new country' by Dr John Frederick Sharland (1797?-1870). Garrett built up the society's library - the first in any country centre in Tasmania - to 178 volumes by 1837 and organized a varied programme of lectures on anatomy, astronomy, botany, chemistry and optics. It was, Garrett boasted, the only society on the island enjoying the patronage of the new Lieut-governor, John Franklin.[1]

Most members of the Van Diemen's Land scientific circle did not regret the termination of Arthur's 'reign of nearly thirteen years'[2] in October 1836. While the colony had 'certainly attained an almost unexampled degree of prosperity' under him

> To Science he was unfavourable, and less is known of the Nat Hist of V.D.L. in it - than in England. - Many of our animals and Birds will become extinct or nearly so yet no attempt at a Museum, Botanical or Zoological Gardens has been made. - Ground here is valueless comparatively speaking - & Convict labour far from dear yet an immense Govt. Garden and Domain with Supt & labourers were always employed growing cabbages, carrots, & such like for the Governor's table & Horses - not that that could be precisely objected to, but a few pounds employed in collecting Emus, the different species of Kangaroo, Wombat etc., would have been no great matter....Emus are now extremely rare - and in a few years will be quite gone, and no means has been taken in the Colony to domesticate or breed them. - Kangaroo have been killed in tens of thousands for the sale of their skins,[3] & persons may live in V.D.L. for months without seeing one -

---

[1] H.T.C., 29 September 1837; second annual report of the society. For Garrett and Sharland see A.D.B., I, pp.428 and II, p.436. Garrett, who remained secretary of the society until he left Bothwell in 1840, had earlier studied medicine in Glasgow. He built up a good collection of native fauna and gave many of the papers himself.

[2] Jorgenson to Hooker, 28 October 1836, V.D.L. Correspondents, p.56.

[3] Gunn to Hooker, 16 November 1836, ibid., p.59.

Gunn's conservationist concern for Tasmanian fauna was shared by a number of eminent scientists and naturalists who now made their way to the island. Gunn recognised that the advent of the new scientific governor Sir John Franklin in February 1837 should 'alter matters a little'.[1] Indeed Franklin was coming armed with requests from 'men of the greatest eminence in Natural History and Science' in Europe 'to communicate to them information on the subjects of their respective pursuits'.[2] The year after Franklin's arrival Gunn was hailing to Hooker 'a new era' in Van Diemen's Land, where 'science is receiving that attention which in a colony as young as this, when so much is unknown, it deserves'.[3] Henceforth learned societies were to have an unbroken record of work in Australia.

---

[1] Ibid.

[2] The Tasmanian Society, pamphlet, 2pp (3 October 1843), p.1. Copy in M.L., Sydney, MS No. At1; includes an historical sketch of the society.

[3] Gunn to Hooker, 21 April 1838, V.D.L. Correspondents, p.74.

CHAPTER IV

'ALL THINGS ARE QUEER & OPPOSITE'

Sir John Franklin (1786-1847) came to Hobart Town early in 1837 already famed and honoured as an explorer and scientist.[1] Although not fully acquainted yet with colonial ways Franklin knew his official duties would be demanding, and that if he was to satisfy the insatiable desire of his scientific colleagues at home for information from Tasmania he must seek out kindred spirits in the colony and form them into some kind of scientific association.

The task was not hard to achieve. In November 1837 Franklin persuaded his Executive Council to apply to the secretary of state for the colonies, Lord Glenelg, for a 'Colonial Collector' to send specimens of Van Diemen's Land's 'peculiar' fauna to England,[2] and in the same month the 'Natural History Society of Van Diemen's Land' was announced in the press.[3] Although the imperial government objected to spending public moneys on science[4] the Hobart Town rump of the Van Diemen's Land Scientific Society rallied immediately to Franklin's call.[5] The press, united temporarily while the new lieut-governor

---

[1]Franklin had served as a midshipman under his uncle, Flinders, in the Investigator (1801-04), where he learned geography and navigation, the skills which made him successful as a leader of Arctic exploration (1819-22 and 1824-8) and collector of geological, meteorological, magnetical and geographical data. He was elected F.R.S. in 1822, and awarded an Oxford D.C.L. and the gold medal of the Geographical Society of Paris, Fitzpatrick, Franklin in Tasmania, pp.25-208.

[2]Ibid., p.194. Franklin's wording to Glenelg on 'the skeletons, digestive organs of all the quadrupeds, birds, reptiles and fishes peculiar to Van Diemen's Land' seems to have been inspired by the same sources as Friend's address seven years earlier.

[3]Austral-Asiatic (Murray's) Review, 10 November 1837. See also M.E. Hoare, '"All Things are Queer and Opposite": Scientific Societies in Tasmania in the 1840's', Isis, 60(1969), pp.198-209.

[4]Franklin in Tasmania, p.195.

[5]Franklin was elected president and Pedder, vice-president of the new society. The lieut-governor also served on the organizing committee. New blood was provided by Dr E.S.P. Bedford, Rev. John Lillie, Alexander Maconochie and Richard Lewis, honorary secretary and curator. The foundation date of the society is usually given as 1838.

settled in, welcomed this latest society devoted to 'the attainment of a minute and scientific knowledge' of the colony's 'Indigenous production'. Murray's Review, later distinguished for its virulent, unabashed anti-Franklin campaign, wished the foundation well:

> The method of pursuit of science, or nature, by means of societies...is the best that can be adopted. Individual exertion is weak and flickering, owing to want of sympathy, but by the creation of a focus of interest...the exploring or investigating are stimulated and encouraged and solitary lights being collected, the lamp burns less dimly.[1]

There was no doubt about the respectability of this society, whose activities and meetings were to be centred on Government House.[2]

During the first three years of Franklin's administration a number of factors, not the least of which was active vice-regal 'encouragement', combined to ensure the success of most scientific ventures in the colony. Franklin, with his knowledge of scientists and institutions in Britain, and with his proven abilities, brought more than the advantage of status to those organizations which he patronised. Captain Alexander Maconochie (1787-1860), a founder and first secretary of the Royal Geographical Society (1830) and first professor of geography in the University of London, accompanied Franklin to Van Diemen's Land as his private secretary. He helped launch the new society. Maconochie's penchant for penology and subsequent estrangement from Franklin and his advisers led to his dismissal in 1838.[3] Equally unfortunate for science was the early death while surveying the D'Entrecasteaux Channel

---

[1] Murray's Review, 10 November 1837. For Robert Murray (1777-1850) and his relationships with Franklin see Miller, Pressmen and Governors, pp.31-5. A plan was announced to establish a museum at the house of the firm of Joseph and Judah Solomon, merchants in Liverpool Street.

[2] The suggestion to form the Government House meetings into a more formal society came from Lillie, Gunn and Dr Edmund Hobson. See Gillian Winter, '"For the Advancement of Science": the Royal Society of Tasmania, 1843-1885', B.A. Thesis (University of Tasmania, 1972), p.105, note 21. Winter's study is the best recent review of colonial science in Tasmania with, however, the same tendency of other similar studies to dwell on the minutiae of museum and other institutional organisations, often at the expense of science. She does not cite my earlier Isis paper on science in Tasmania in 1840's.

[3] Maconochie held scientific lectures for the vice-regal party on the vessel in which they sailed to Van Diemen's Land. For his dismissal and colonial career see Franklin in Tasmania, pp.47, 125-8, and 152-66 and A.D.B., II, pp.184-6 and the literature cited there.

of Lieutenant Thomas Burnett, the Admiralty hydrographer appointed at Franklin's request to do astronomical and survey work under his direction.[1]

External interests, the lure of Tasmanian natural phenomena and supposed suitability of the colony's situation as a base for observation, also conspired to bring scientists to the colony at a moment favourable to Franklin. In September 1838 John Gould (1804-81), well-known for his illustrated works on European, Asian and Australian ornithology, arrived in Hobart Town accompanied by his wife, the gifted natural history artist Elizabeth Gould (1804-41), and the collector and naturalist, John Gilbert (1810?-45). Gould and his family were speedily absorbed into the congenial domestic and scientific circle of Government House,[2] presided over by that talented and versatile supporter of intellectual and cultural pursuits Lady Jane Franklin (1791-1875). Hobart Town became the principal base for Gould's expeditions to the other colonies. In February 1839, following field work in Van Diemen's Land and while on a short visit to the mainland, Gould wrote to the acting colonial secretary, Matthew Forster (1796-1846), forwarding a list of Tasmanian quadrupeds he required 'for clearing up a mass of confusion which at present exists between the species inhabiting Van Diemen's Land and the Continent of Australia',[3] and in his other capacity as chief police magistrate, Forster instructed his subordinates to give Gould every assistance.

Upon Gould's heels came the Pole, Paul Edmund de Strzelecki (1797-1873), 'a man of Science, and certainly a Gentleman',[4] engaged on his geological survey of eastern Australia. In Tasmania Strzelecki was to earn Franklin's unstinting support for his scientific work.[5] On the other side of the world

---

[1]Burnett was drowned on 21 May 1837. Franklin entrusted to Lempriere the observations on tides and weather which he had promised to send Herschel, 'agreeable to the suggestions' in that scientist's pamphlet, given to Franklin before he left England. Franklin also introduced Beaufort's scale for measuring wind force into the colony. Franklin to Herschel, 30 September 1837, Herschel Correspondence, HS 7/358-61, Royal Society of London.

[2]See Elizabeth Gould's letters to her mother from Hobart Town (1838-39) in A.H. Chisholm (ed.), The Story of Elizabeth Gould (Melbourne, 1944).

[3]Gould to Forster, Sydney, 25 February 1839. CSO 5/190/4603, Tasmanian State Archives, Hobart.

[4]Gipps to La Trobe, 29 November 1839, quoted in Franklin in Tasmania, p.202.

[5]Ibid., pp.203-4.

at the eighth meeting of the British Association at Newcastle in August 1838 a 'Joint Physical and Meteorological Committee' of the Association and Royal Society under Herschel was set up to co-ordinate plans for a naval magnetic expedition to Antarctica, with provision being made for the establishment of observatories in Van Diemen's Land and other territories. In April 1839 James Clark Ross (1800-62) and his trusty 'friend and messmate' Francis Rawdon Moira Crozier (1796?-1848) received their commissions to the Erebus and Terror and in August 1840 arrived in Hobart Town, their 'southern home', bringing with them Lieutenant Joseph Henry Kay (1815-75), Franklin's nephew, who planned to set up an observatory in the settlement.[1]

Meanwhile Gunn had established contact with Government House and accompanied the vice-regal party to visit the Aboriginal settlement on Flinders Island in January 1838.[2] In his letters to Hooker he spoke highly of the Franklins' efforts to promote science.[3] In October 1838 he moved to Hobart Town to take up government appointments and the following year established the Hobart Town Horticultural Society, making himself secretary 'to push it on with plenty of work'.[4] In 1840, relinquishing his onerous magistrate's duties in favour of science, Gunn became private secretary to Franklin and secretary to the Tasmanian Natural History Society, as the 1837 group was by then known.[5]

---

[1]Ross, A Voyage of Discovery and Research in the Southern and Antarctic Region during the years 1839-43 (2 vols., London, 1847), vol. I, pp.xxii-xxvi. For Kay see A.D.B., II, p.34.

[2]Gunn to Hooker, 15 February 1838, V.D.L. Correspondents, pp.70-1.

[3]E.g. Lady Franklin purchased the estate 'Acanthe' at Lenah Valley from her private means and made provision for a museum and botanical garden. Gunn to Hooker, 15 February 1838, ibid., pp.71-2 and Franklin in Tasmania, pp.195-6. In 1838 Gunn, Gould and Lady Franklin went on an expedition to Recherche Bay together.

[4]Gunn to Hooker, 18 February 1840, V.D.L. Correspondents, p.84. In 1838 he was elected president of the Launceston Agricultural Society in absentia. Swanston was first president of the Hobart Town Horticultural Society.

[5]By November 1838 Franklin had drawn six or eight people around him at Government House. Franklin to Herschel, 2 November 1838, Herschel Correspondence, HS 7/358-61, Royal Society of London.

'We are few in number yet', Gunn confided to Hooker in February 1840, 'but we are endeavouring to ferret out the Natural History of this interesting Colony'.[1] Gunn supervised Lady Franklin's botanical garden and extended Backhouse's work on indigenous esculent plants.[2] Hooker continued to give his work a prominent place in the British botanical journals.

The stimulation of regular scientific meetings at Government House still did not compensate Gunn for the 'confinement of a Public Office where you have to work somewhat after the manner of a Horse in a Mill' and where the 'incessant official drudgery...almost knocked Botany out of [his] head'.[3] When opportunity offered on the death of the elder Lawrence, Gunn fled to Launceston to administer his deceased friend's estates and take the lead in science in the town again. The loss of Gunn to Hobart Town, although serious, was not detrimental to the society for, with characteristic resource, Gunn had ensured that the institution was on a firm footing, able to capture the enthusiasm for science which surrounded the first visit of the Erebus and Terror's scientists to the colony in August-November 1840.

Like Gunn, Franklin quickly grew weary of the harrowing business of government, politics and faction, of managing a penal colony with a hostile press and contending with opposition from men of influence, particularly in the 'Arthur Faction' some of whom were in his government.[4] In addition he was quite often faced with vague and conflicting instructions from home. Governor and private secretary welcomed the scientific distractions and exploited them to the full.

---

[1]Gunn to Hooker, 18 February 1840, V.D.L. Correspondents, p.84.

[2]'Remarks on the Indigenous Vegetable Productions of Tasmania available as Food for Man', Tas. Journ. Nat. Sci., I(1842), pp.35-52.

[3]Franklin to Hooker, 6 August 1841 and Gunn to Hooker, 31 October 1841, V.D.L. Correspondents, pp.89 and 91.

[4]The principal opponents to Franklin were John Montagu (1797-1853), colonial secretary, and Matthew Forster, both appointees on Arthur's recommendation.

Gunn went botanizing with the socially shy Joseph Dalton Hooker (1817-1911), Hooker's son who was assistant surgeon and naturalist in the *Erebus*.[1] The expedition's first visit was a great boost to science. Kay landed his instruments and installed them in the speedily erected observatory at Rossbank in September 1840.[2] He joined the Tasmanian Society, whose meetings were attended by the naval officers and expedition's scientists, and read two papers on terrestrial magnetism and the work of the Observatory.[3]

From the outset Franklin involved himself deeply in the observatory's activities, knowing the importance of Ross's magnetic researches from his own Arctic explorations. Disclaiming 'all merit for originality' Kay set forth his plan of work to the Tasmanian Society, reminding the members that

> The history of the magnet may teach us how extremely cautious we should be in denying the value of any research or discovery in nature or in science because its application to useful purposes may not be immediately obvious to us.[4]

In a paper essentially devoted to recent developments in terrestrial magnetism Kay's reminder that European governments were prepared to finance pure science research for its own sake was a godsend for Franklin's efforts to impress the same lesson on the colonists. It was, indeed, fortunate that Ross had chosen Hobart Town as 'the centre of reference for every species of local determination' in the Australian colonies rather than the originally favoured Sydney, 'a station eminently fitted for the determination of all the magnetic elements'.[5]

---

[1] Turrill, *Joseph Dalton Hooker*, p.14. The Gunns, in fact, were 'the only persons I have had to take leave of in Hobart Town', quoted in Leonard Huxley (ed.), *Life and Letters of Sir Joseph Dalton Hooker*...(2 vols., London, 1918), vol. I, pp.107-8.

[2] Ross, *Voyage of Discovery*, vol. I, pp.113-29 and *Franklin in Tasmania*, pp.245-7.

[3] *Tas. Journ. Nat. Sci.*, I, pp.124-5 and 207-24.

[4] Ibid., p.134.

[5] Ross, *Voyage of Discovery*, vol. I, p.xxiv.

Franklin had been well briefed by the home authorities on Ross's expedition and spared no efforts to assist his former colleague in the Arctic. Franklin arranged for Kay's observatory to be sited on sandstone near Government House well away from the bustle of town.[1] Work commenced on the magnetical observations well before schedule and the Rossbank Observatory soon became one important link in the extensive world-wide network conceived by Alexander von Humboldt and other workers in the 1820's. With improvements in the measuring of magnetical phenomena in the 1830's made by Friedrich Gauss (1777-1855) in Göttingen, Humboldt's approach to the British scientific societies to finance observatories in the southern hemisphere had been strengthened and ensured of success.[2]

Much to his annoyance Ross found that Wilkes and D'Urville had preceded him in his exploration in Antarctic waters. Fortunately, acting on intelligence received in Hobart Town, he was able to alter his plans for sailing southwards and so succeeded in reaching Victoria Land on the Antarctic continent.[3]

Franklin mustered his local scientific companions, most of them active in the Tasmanian Society, to assist in the task of taking observations on 'term-days' - necessitating readings every two-and-a-half minutes for twenty-four hours on specified days - for correlation with measurements taken at other stations based upon Göttingen time. While in port Ross and Crozier were regularly at the observatory with Franklin, and after the ships left Kay was joined by Adam Turnbull; Rev. John Phillip Gell (1816-98) a close friend of the Franklins and educational reformer in the mould of his old master, Thomas Arnold of Rugby, and Francis Hartwell Henslowe (1811-78),

---

[1] Correspondence on Rossbank Observatory, File 23, RS 2063/A780, Royal Society of Tasmania, Hobart.

[2] For the development of research in terrestrial magnetism see e.g. Heinz Palmer, Beiträge zur Geschichte der Erkenntnis des Erdmagnetismus (Zürich, 1956). Humboldt also advised the United States Exploring Expedition of Wilkes and the French expedition of Dumont D'Urville, which were in southern waters at the same time as Ross.

[3] Geschichte der Erkenntnis des Erdmagnetismus, pp.195-6 and Ross, Voyage of Discovery, vol. I, pp.108-29. See also R. A. Swan, Australia in the Antarctic: Interest, Activity and Endeavour (Melbourne, 1961), pp.28-30.

Gunn's successor as secretary to the Tasmanian Society and private secretary to Franklin. Kay continued his fundamental work in geomagnetism at the observatory until the Admiralty withdrew its support in 1853. He remained for over ten years at the observatory, sending home his results to Sabine for publication in the Philosophical Transactions.[1] He was elected F.R.S. in February 1846 and remained a prominent figure in the colony's science, giving regular papers on meteorology and magnetism before the Tasmanian and Royal Societies.[2]

With useful papers at his disposal Franklin now determined to make his society something more than a Government House gathering. He authorised the enlightened and able government printer James Barnard (1809?-97) to begin printing the Tasmanian Journal of Natural Science at the society's expense.[3] Barnard, a careful amateur statistician with an interest in many branches of science, had not been a particularly welcome arrival among the established printers in the colony in March 1839 and his alliance with Franklin increased the antipathy.[4] Franklin recognized the need for competent correspondents throughout the colonies and ensured that they were encouraged by election to the society.[5] By 1842 there were more corresponding members (39) than resident members (33) on the society's books and of the latter a good

---

[1]The results are discussed and listed in Alan A. Day, 'The Development of Geophysics in Australia', J. and Proc. Roy. Soc. N.S.W., 100 (1966), pp. 35, 55 and 58. Edward Sabine (1788-1883) was responsible for magnetic observatories in British territories. The most important result of Kay's work was the correlation between sunspots and the 'parallel variation of intensity of magnetic disturbance'.

[2]Kay was the first to conduct regular experiments with the aneroid barometer in Tasmania in 1849. See his paper on the subject in Pap. and Proc. Roy. Soc. V.D.L., I(1851), pp.83-7.

[3]Tasmanian Society Minute Book (3 March 1841 - 14 March 1842), 3 March 1841, MS9102, Royal Society of Tasmania, Hobart. See also Franklin in Tasmania, p.198. The full title of the Journal was The Tasmanian Journal of Natural Science, Agriculture, Statistics, etc.

[4]A.D.B., I, pp.58-9.

[5]E.g. Owen Stanley, Edward Charles Frome (1802-90), surgeon-general of South Australia, Dr William Wyatt (1804-86), an active surgeon, landowner and organizer of scientific pursuits in South Australia, and Dr James Benjamin Harvey of Port Lincoln, were elected on 3 March 1841.

proportion lived out of Hobart Town.[1] Neither status nor position were automatic passports for election to the Tasmanian Society once Franklin had resolved to put science before political expediency. He drew around him only those with a genuine interest in science, seeking out Lempriere at Port Arthur and Milligan at Macquarie Harbour. Correspondents were found in South Australia (including Charles Sturt); New South Wales (Revs W.B. Clarke and C.P.N. Wilton, William S. Macleay and P.P. King); Port Phillip (Edmund Hobson and Superintendent Charles La Trobe) and at the Swan River and New Zealand settlements.[2] Visiting scientific expeditions contributed to the society's work and six papers came from the scientists and officers of the Ross expedition,[3] including Hooker's 'virgin attempt at fossil botany'.[4] Joseph Beete Jukes (1811-69), naturalist to the Fly expedition (1842-46), Strzelecki and Gould sent in contributions to the society. The Tasmanian Journal became the recognized forum for discussing most developments in antipodean science and for letting colonial scientists know what overseas workers were achieving with the specimens and observations sent from their region. Through it the society became a 'national' institution, anticipating by some forty or fifty years the scope and work of the Australasian Association for the Advancement of Science.

---

[1]The following are the comparative figures between resident and corresponding members for three different years:

	Resident	Corresponding
1841	11	30
1842	33	39
1846	32	39

[2]New Zealand members, Matthew Felton, Dr Ernst Dieffenbach, Dr Johnson (all of Auckland), Rev. R. Taylor (Waimati) and William Colenso (Pahia) were first admitted on 5 July 1841.

[3]Hoare, '"All Things are Queer and Opposite"', Isis, 60(1969), p.201. Ross, Crozier and other officers, including Hooker and Robert McCormick, attended meetings of the society during the expedition's second visit (April-July 1841). A great deal of scientific work was also accomplished inland by the expedition's staff.

[4]'On the Examination of some Fossil Wood from Macquarie Plains, Tasmania', Tas. Journ. Nat. Sci., I, pp.24-6, and J. D. Hooker to E. A. Newell Arber, 30 January 1904, in Life and Letters of J. D. Hooker, vol. II, pp.455-6.

Franklin's concept of science was a high one. But try as he might he could not hold out indefinitely against the intrusion of colonial politics into the affairs of the Tasmanian Society. 'All things', someone had noted on the first minute book, 'are queer and opposite'. Blumenbach's Ornithorhynchus paradoxus and 'Quocunque aspicias hic paradoxus erit' seemed an appropriate emblem and motto to adopt for the society. Once the society began to achieve recognition outside the colony Franklin soon found that its standards were an offence to some influential elements in the 'oddly constituted community' of which he was governor.[1]

Because of his liberal views, religious, political and penological, Franklin made enemies among those who wielded power in Van Diemen's Land. His opponents were quick to grasp the possibility that science was a useful cudgel with which to knock Franklin and his government and for charging the Tasmanian Society with intellectual and political 'exclusivism'. When the Arthurites - those who supported the former lieut-governor's rigorous convict and transportation policy - were irrevocably alienated by the dismissal of John Montagu as colonial secretary in January 1842 the Franklins became the butts of increasingly vehement and scurrilous attacks in certain sections of the press.[2]

The trials and public humiliation which Franklin had to endure during the last eighteen months of his government, both from the colonial antagonists and unwittingly from the secretary of state for the colonies, Lord Stanley, might well have undermined the Tasmanian Society had it been built on the sand of mediocrity rather than the rock of scientific excellence. That, of course, was what annoyed Franklin's bitter enemies most of all in their attacks on the society. The body 'calling itself the Tasmanian Literary Society and Scientific Association (which it never did call itself), but better known as the "Mud Fog" Society', wrote Robert Murray ill-informedly when Franklin was recalled, would be sent into liquidation by his successor

---

[1]Franklin to Herschel, 2 November 1838, Herschel Correspondence, Royal Society of London.

[2]Franklin in Tasmania, pp.250-80.

Sir John Eardley Eardley-Wilmot (1783-1847).[1] Although the political malcontents certainly hastened Franklin's removal they were not strong enough to obliterate the healthy legacy of science which he had nurtured in the colony.

During the enthusiasm surrounding Ross's visits the vital decision was taken early in 1841 to bring out a journal containing 'original matter' on Tasmanian science and a miscellany of extracts on scientific developments in Europe and Britain, incongruous though such a decision must have appeared with less than a dozen members in the colony capable of sustaining the journal. The Tasmanian Journal first appeared in August 1841. Edward Abbott, espousing the interests of the private printers, wrote indignantly to Montagu about this 'innocuous production', warning darkly that 'if the Government can be authorised to print a scientific Magazine, they may with impunity put forth a political Newspaper!'.[2] Nothing daunted Henslowe ordered five hundred copies of the first part of the Journal and despatched it all over the world to such 'persons and societies...as appeared likely to take an interest in [the Society's] labours [and] whose co-operation it seemed important to secure'.[3]

The Tasmanian Journal was an immediate success among overseas and colonial scientists because it fulfilled a long-standing need. To the small group waiting anxiously in Hobart Town for news of how their Journal would be received in the outside world, Rev. John Lillie's 'Introductory Paper' on the role of the Tasmanian Society had been a great stimulus to further action.

---

[1] Murray's Review, 20 October 1843. 'Murray', wrote Morris Miller, 'seemed to have had a deep-seated prejudice, almost paranoidal, against men who fostered the study of science in association with a governor's patronage'. See Pressmen and Governors, pp.35 and 208.

[2] Abbott to colonial secretary, 9 September 1841, CSO 8/21/580, Tasmanian State Archives, Hobart, and Despatches to Governor of N.S.W., May-July 1842, MSS A 1288, M.L., Sydney. Abbott was proprietor of the Hobart Town Advertiser. For discussion on the genesis and publication of separate parts of the Journal see N.J.B. Plomley, 'The Tasmanian Journal of Natural Science', Pap. & Proc. Roy. Soc. Tasmania, 103(1969), pp.13-15.

[3] Tasmanian Society, Minutes, 3 March 1841 and 'Report to the Society' by Henslowe, 1 September 1841, Royal Society, Hobart.

Lillie (1806-66), staunch leader of Presbyterians in Van Diemen's Land and a liberal, active supporter of science and education in the colony for the next dozen years,[1] knew the limits of the society. Most members could not aspire to the 'ambitious appellation of philosophers': they were perforce devotees, not experts, 'actively engaged...in professional and other necessary duties, which render it impossible to give more than a limited share of their attention to scientific pursuits'. Distance, Lillie observed, 'a wide separation from the philosophical institutions and men of science in Europe', was the paramount problem they had to face, but the 'very novelty of the objects' on the island indicated a necessary attention to geology, meteorology, botany and zoology. In situ they could study the flora and fauna

> with such details of...economy, habits, geographical distribution, and other particulars, which can only satisfactorily be ascertained and described by those who have had opportunities of examining the individual in its living and natural state.[2]

No more would European scholars need to send out minute instructions to collectors because they were frustrated by ill-prepared specimens.[3] A dried plant specimen, Lillie recognised, told less than a well reasoned description of its natural environment. Darwin, the younger Hooker and others were soon to give the world adequate proof of the advantage of the ecological studies Lillie was advocating. Although Van Diemen's Land would have 'first claim' on the society's resources 'subjects of scientific interest in other countries of Australasia' must be pursued and a service provided for all workers interested in the antipodes.[4]

---

[1]He was president of the Hobart Mechanics' Institute, 1838-54. See Nadel, Australia's Colonial Culture, p.131 and A.D.B., II, pp.118-19.

[2]Tas. Journ. Nat. Sci., I, p.3.

[3]As e.g. Dr (later Sir) John Richardson (1787-1865), the ichthyologist, did to Lempriere for preserving fish specimens. Ibid., II, pp.72-3.

[4]Lillie also outlined the policy of the society for promoting meteorological observations, particularly at Port Arthur, where Lempriere was still working and had earned the highest praise of Ross.

Up to 1849 the Tasmanian Journal faithfully pursued the policy Lillie had outlined. Its 'Miscellanea' included reports on the Daguerrotype - 'one of the most remarkable discoveries of modern times' - a process which greatly facilitated the accurate reproduction of scientific illustrations, and accounts of the Berlin work of Christian Gottfried Ehrenberg (1795-1876) on the microscopic organisms dredged up by the Ross expedition.[1] Richard Owen, working intensively on the osteology of marsupialia and the fossil record of Australia, was comprehensively reviewed in the Tasmanian Journal, which rarely failed to notice any information concerning the large mass of data stemming from the southern hemisphere. The decision to launch the journal in the early 1840s, a time of serious economic depression, could scarcely have been more timely so far as scientific discovery was concerned. Much of the credit for the Journal's universally acknowledged standards and success belonged to Gunn, its meticulous and untiring editor from 1843. In September 1842 he wrote to Franklin deliberately urging him to maintain the Journal's scientific and typographical standards and not sink to the 'miserable blundering style in which the newspapers were got up'.[2]

Lillie was in matters scientific a true disciple of Franklin and Gunn. He stressed from the start that the Tasmanian Society should not strive for popularity. This policy undoubtedly hurt the society's severest critics, who became such because they were excluded. On the other hand, Lillie pointed out, the members of the society could ill-afford to be too esoteric, even though every branch of science was becoming more so with each passing year. 'Unnecessary discussions upon dubious and undetermined questions of theory' were out of place in the context of colonial society: 'a simple exposition of facts' and the collecting and preparation of material for 'future and more advanced inquirers to operate upon' made more sense under the circumstances. That had been Friend's plan for 1831 and the programme of the Philosophical Society of Australasia ten years before. Now, twenty

---

[1]Richardson, Franklin's friend and naturalist on his two Arctic expeditions, and Buckland were in contact with Franklin about the Daguerrotype. Ehrenberg gained considerable experience of exotic fauna during his expedition to the middle east (1820-26) and during his travels with Humboldt in Eurasia. He promoted the study of infusoria and was a pioneer of microbiology and micropalaeontology.

[2]Gunn to Franklin, 19 September 1842, Franklin Papers, Royal Society of Tasmania.

years later, the serious members of the Tasmanian Society - and most of them were that - at last achieved the goals others had been forced by political and geographical circumstances to abandon. In terms of Daniels's framework for American colonial science Australian scientists were now taking a step forward from the fact-gathering to the 'institutionalization' or 'legitimation' stages of development in scientific organisation.[1]

Daniels argues that in the 'practical' American society of the Jackson era and later, scientists often were forced to stress the 'immediate utility of research'. In 1841 Lillie, despite his insistence on high standards, was at some pains to stress the 'highest practical value' of geological and botanical studies in Tasmania, particularly for agriculture. But the arguments for utility were never consistently or persistently pursued by the Tasmanian Society. The colony was well served by horticultural societies and the active Mechanics' Institute: the Tasmanian Society's scientific affairs, however, were wider and more universal than those in which these organisations were interested. Not that most members of the society were ignorant or careless of agricultural improvement. Indeed, with the Australian colonies undergoing severe economic depression between 1840 and 1845, few settler colonists were not in some way beholden to the land. For this reason, Lillie warned, members of the Tasmanian Society must in their Journal present a good image of their country abroad. If the colony were

> sometimes represented...as consisting almost entirely of barren mountains, in which the land available for agricultural purposes has been taken in and cultivated, and where, consequently, increased production is not to be sought for in breaking up new soil and fertilizing the soil already under cultivation.[2]

then investment might dwindle and dry up.

---

[1] Isis, 58(1967), pp.151-66. 'Fact-gathering', Daniels's 'democratic' stage, was still far from passed in Australia but the exclusion of members whose only qualification was political, social or economic rank, a policy the Tasmanian Society was prepared to pursue, marked a clear step forward.

[2] Tas. Journ. Nat. Sci., I, p.6.

'Science', therefore, Lillie argued, 'must point out the practical errors into which men have been betrayed, and...assist them in retracing their steps...and returning to a wiser and more economical employment of their powers'. Each country should strive to freely develop its 'peculiar character or idiosyncracy'. Husbandmen came to Australia from Britain where moisture was abundant and surface drainage 'the great modern improvement in...agriculture'. Their methods, however, were highly inappropriate in the colonies 'where a system of artificial irrigation... is the chief desideratum'. Water conservation, Lillie urged, should be one of the society's highest priorities.

Lillie was a pragmatist, realising as few commentators on the role of science in the Australian colonies before him, the social difficulties and practical problems facing the colonial scientist. Colonists were stubborn, wary of change, unwilling to forget 'their established customs, even when obvious circumstances imperatively require that such a change should be made'. It would take a long time to make progress in adapting 'the alien habits of Colonial communities, like those of Australia, to the peculiarities of their new situation, so as to draw out from it the natural advantages with which it is stored'. Science was one key to overcoming dilatory prejudice and innate conservatism and the study of climates in territories situated in similar latitudes to those of Australian colonies might greatly assist colonists in their drive for the optimum development of Australian resources.

Science, Lillie advocated, must study the diseases of the colonies; see how the European constitution was modified by the Australian environment; predict what 'specific character' of body would emerge and record the long process of transition from the 'European to the Australasian' physical condition of man. There was, too, a moral, religious and intellectual improvement to be reaped from the pursuit of science. With Gunn, Lillie was in complete agreement that

> The situation of the settler in Australia is peculiarly in want of such a stimulus [as the Tasmanian Society]. He is not infrequently a mass of intelligence and education. But living in comparative seclusion, and far removed from the stirring scenes and transactions of European society, his mind is apt to become relaxed, and lose its former tone and vigour; or to be narrowed and contracted by exclusive converse with petty details; or, still worse, to be given up to the sordid passion for accumulating wealth.[1]

[1]Ibid., I, p.13.

Lillie's realistic manifesto for science in the Australian colonies - even allowing for his naive determinism - showed that he had grasped the implications of conflict and tension inherent in colonial society, especially for those bent on intellectual pursuits. His reservations and predictions were amply vindicated in the next ten years in Van Diemen's Land.

Strzelecki complained about the unwillingness of most settlers to accept scientific advice for improving their land, despite the availability of new methods of chemical analysis, agronomy and irrigation from overseas.[1] Only the few, like William Kermode and Hugh Calveley Cotton (1798-1881), deputy-surveyor-general from 1842, evinced much enthusiasm or skill in understanding and implementing improvements in soil and water conservation. In two papers[2] before the Tasmanian Society, Captain Arthur Cotton of the Madras Engineers outlined the known water resources and physiography of Tasmania and pointed to the great advantages of the island's natural lake storages and reliable rivers. He pressed for the establishment of more meteorological stations in the colony to measure the unknown vagaries of climate and to correlate data. 'If artificial means [were] used to supply the deficiencies of summer', he predicted, then the island would support a greater population and greater yields from grains and pastures.[3] He gave minute details of dam construction, water distribution and the economics of irrigation. Cotton travelled widely in the colony examining and advising on various pilot schemes. His ideas on agricultural improvement were closely akin to those of Strzelecki. Interest in irrigation was sustained by H. C. Cotton's activities and proposals as government 'irrigation engineer', although none of his projects came to

---

[1] Strzelecki, <u>Physical Description of New South Wales and Van Diemen's Land</u> (London, 1845), pp.357-462.

[2] <u>Tas. Journ. Nat. Sci.</u>, I, pp.81-93 and 161-87.

[3] Arthur Cotton further predicted the growth of Van Diemen's Land industry and a transport network based upon abundant ore and coal resources and a population of three million. For the contributions on irrigation from both Cottons see Plomley, 'Tasmanian Journal of Natural Science', <u>Pap. & Proc. Roy. Soc. Tasmania</u>, 103(1969), p.15.

fruition.[1] The society was active in publishing meteorological and other data from numerous stations including those at Hampshire Hills and Port Arthur, and Tasmania soon became a leader in meteorological techniques in Australia. John Herschel wrote to Franklin in November 1842 warmly commending Lempriere's weather and tide tables.[2] Statistics was a subject promoted by Rev Thomas James Ewing (1813?-82), whom Franklin made honorary statistician to the government in June 1841.[3]

Applied science, however, was not to be the society's main sphere of activity. Both Ewing and Lempriere were also naturalists, the former producing catalogues of Tasmanian birds and the latter laying the foundation of Tasmanian ichthyology in his correspondence and specimens sent to Richardson. Most of the important work on the island's natural history was still being done in Britain and the society served as an important intermediary between the colonial collector and the European systematic scientists, many of them, like Richardson and Herschel, close friends and associates of Franklin. Richardson, a regular correspondent of the society, was 'particularly desirous of seeing the freshwater fish of Australia' and vexed that 'foreign philosophers [should] express their surprise at the meagreness of our [British] collections', which he compared favourably with those of the Jardin des Plantes in Paris.[4] Many of the best and rarest specimens in the European collections, Richardson complained, had been gathered by French vessels 'on the coasts and the very harbours of the English colonies', which was an affront to British science.[5]

---

[1] A.D.B., I, pp.250-1. Following the depression Cotton, highly regarded by Denison, was re-instated as deputy-surveyor-general but came under severe criticism during a Legislative Council select committee enquiry into the Survey Department in 1852.

[2] Herschel's letter to Franklin of 2 November 1842 was read at the society's meeting on 17 May 1843, Tas. Journ. Nat. Sci., II, (1846), p.78. Franklin's scientific correspondence from Europe was read regularly at the society's gatherings.

[3] Ewing was a corresponding member of the Statistical Society of London. His statistical work was later continued by James Barnard.

[4] Tas. Journ. Nat. Sci., II, p.72.

[5] Richardson was hoping to use colonial specimens at the Haslar Hospital to build up a collection from which to train naval surgeons in comparative anatomy and natural history.

Richard Owen, 'England's foremost student of comparative anatomy and fossil bones',[1] took a deep interest in the palaeontology and zoology of the Australian region, especially in the monotremata, marsupialia and wingless birds. By the 1840's his reputation was well established and Australian correspondents looked to him and Buckland to provide help with their finds. In 1832 Owen had published his first paper on the platypus, joining the controversy which was waged among zoologists for most of the nineteenth century about the taxonomic position of the animal and its method of reproduction.[2] Owen suggested that the platypus was ovi-oviparous. Edmund Charles Hobson (1814-48), a native-born physician and graduate of Erlangen, read a paper to the society in 1839 entitled 'Observation on the Blood of the Ornithorhynchus paradoxus'.[3] Hobson, who had studied anatomy under Robert Grant in London and was acquainted with Owen, reached Hobart Town in March 1839 determined to devote his energies to the study of Australian zoology. He became a close friend of the Franklins, accompanying Lady Franklin on her overland journey from Port Phillip to Sydney in April 1839 and lending Franklin every assistance in his efforts to promote science.[4]

In his paper Hobson discussed the opposing views on the oviparous and viviparous nature of the platypus's mode of reproduction and presented the findings of his microscopic investigations into the animal's blood globules, 'which has long been looked upon as the experimentum crucis'. Hobson tentatively concluded that the Echidna and Ornithorhynchus were viviparous, 'of the Class Mammalia'.[5] Hobson's paper was keenly read in Europe, especially

---

[1] Mason, A History of the Sciences, p.340.

[2] The first published description was in 1799. For a full bibliography and discussion see H. Burrell, The Platypus...(Sydney, 1927).

[3] Tas. Journ. Nat. Sci., I, pp.94-8.

[4] A.D.B., I, p.544 and H.S. Parris, 'From Melbourne to the Murray in 1839', Vic. Naturalist, 66(1949-50), pp.203-10 and for an earlier version of the same diary see Vic. Naturalist, 48 (1931-2), pp.213-21.

[5] Tas. Journ. Nat. Sci., I, pp.94-8. Lady Franklin noted Hobson's findings and the meeting at which he read his paper in her diary. See Franklin in Tasmania, p.198.

by Owen, who was also stimulated by his later work on the large extinct carnivorous marsupials of the Port Phillip District, where Hobson went to settle in 1840.[1]

The Tasmanian Society took an early interest in New Zealand, where opportunities for scientific workers to disseminate their findings were even more limited than in the Australian colonies. Dr Ernst Dieffenbach (1811-55) was the only full-time scientist in New Zealand (1838-41)[2], although important investigations were proceeding under men like William Colenso (1811-99), the missionary-printer and self trained naturalist who travelled widely in the North Island from his base at Pahia, Bay of Islands, opening up the island's flora and fauna to European scientists. Colenso was in correspondence with Allan Cunningham, who visited New Zealand in 1838, and was the main New Zealand correspondent for Owen and Hooker. Lady Franklin visited New Zealand in 1841 and persuaded Colenso to contribute to the _Tasmanian Journal_.[3] For Colenso it was the beginning of a long and fruitful association with colonial scientific societies.

The most important of his earlier papers was on the _moa_, a bone of which Owen received in 1839, concluding that it must belong to 'a struthious bird, nearly if not quite, equal in size to the ostrich'.[4] Apparently unaware of Owen's anatomical deductions, Colenso submitted his 'Account of some enormous Fossil Bones of an unknown species of the Class Aves...'[5] to the Tasmanian Society. Colenso reached the same essential conclusions as Owen and was able to provide more details on the origin and background of the finds. Coming

---

[1] Hobson's particular interest was in the fossil bone discoveries of Mount Macedon.

[2] Dieffenbach was commissioned as part of the New Zealand Company's _Tory_ expedition to communicate on scientific discoveries with British societies. He published the first general scientific account of the country, _Travels in New Zealand_ (2 vols., London, 1843) after returning to Britain in October 1841 when Gipps refused to support a proposal for further scientific exploration in New Zealand.

[3] A.G. Bagnall and G.C. Peterson, _William Colenso_ (Wellington, 1948), p.84.

[4] Ibid., p.465. Owen's paper was published in _Trans. Zool. Soc_., III (1839).

[5] _Tas. Journ. Nat. Sci_., II, pp.81-107. For a discussion of the controversy over priority of discovery and elucidation of the _moa_ see _William Colenso_, op. cit., pp.464-67.

from a man with little formal training, far removed from any scientific circles and with meagre reference material available, Colenso's paper was a remarkable achievement. For a colonial journal it was also a useful and prestigious publication. Owen certainly recognized the merit of Colenso's work and those of his colonial counterparts and valued very highly the intermediary and disseminating role played by the Tasmanian Society. The New Zealand investigators continued to contribute and correspond regularly with the society on all aspects of natural history, particularly botany.[1]

In Hobart Town there was information enough being received to keep the society active and the Journal's standards high. Strzelecki reported on his explorations in Australia and the Pacific - he had sailed as a guest in the Fly; Gould's publications in Britain on Australia's mammals and birds were closely followed; the mainland explorations of Grey, Sturt and others aroused considerable interest and some attempts were made at anthropology. Gell produced a vocabulary of the 'Adelaide tribe' and Rev. T. Dove investigated the moral and social characteristics of Tasmanian Aborigines, even though his evidence was very limited. The return of the Erebus and Terror in 1841 allowed Franklin to solicit papers from the officers and scientific staff of both vessels. Robert McCormick reported on the little-known geology of Kerguelen Island and read a 'sketch of the Antarctic Regions' visited by the expedition, a paper written hastily the day before the vessels left Hobart Town for the last time.

W.B. Clarke, commencing his life-long career devoted to Australian geology, supported the work of the society with an important paper on Carboniferous plants in Tasmania.[2] The debate on the geological succession in Australia

---

[1] See e.g. Colenso's paper on New Zealand ferns and the report on his scientific excursions in the North Island, 1841-2. Tas. Journ. Nat. Sci., II, pp.161-89 and 210-34.

[2] Tas. Journ. Nat. Sci., I, p.242. Clarke was proposed for membership of the society on 14 March 1842 together with Stokes, Rev. Wilston, Governor George Grey of South Australia, Captain Booth of Port Arthur, David Burn (1799?-1875) and others from New Zealand, Tasmanian Society, Minutes.

assumed more importance and vehemence in the 1840's after Murchison and Sedgwick had gone a good way towards erecting an acceptable Palaeozoic succession in Europe (by 1841) and after Jukes, Strzelecki, Clarke and others began to publish their findings in the same decade.[1] In a paper read in January 1843 J. B. Jukes outlined the problems facing workers trying to determine the geological succession in 'distant countries' where,

> The European geologist...must loose his hold of much of his previously acquired knowledge; dismiss from his mind all the arbitrary and minute divisions to which he has hitherto been accustomed, and hold them at bay until he see whether or not they be applicable to the things he is now studying.[2]

Jukes suggested that colonial governments set up scientific geological surveys to avoid squandering money 'by misdirected efforts' speculating for minerals. Jukes, whose own pioneering contributions to Australian geology were no mean ones,[3] forecast the tensions which would arise in the colonies in the coming years between scientific geology and mineral prospecting, when the colonists were often faced with the choice between science and utility. Under Franklin's leadership the importance of geological investigation was recognized by the Tasmanian Society when many of its members combined to subscribe publicly towards the cost of publishing Strzelecki's Physical Description of New South Wales and Van Diemen's Land.[4]

---

[1] T. Vallance and D. Branagan, 'New South Wales Geology - its Origins and Growth', in A Century of Scientific Progress, pp.268-71.

[2] 'A Few Remarks on the Nomenclature and Classification of Rock Formations in New Countries', Tas. Journ. Nat. Sci., II, pp.1-12.

[3] Jukes was naturalist in the Fly from 1842 and took part in the survey on the Great Barrier Reef. His sketch of Australian geology was read to the British Association in 1846 and the following year he published his remarks on N.S.W. and V.D.L. Palaeozoic rocks in Quart. Journ. Geol. Soc., II (1847), pp.241-9. The same year he published his Narrative of the Surveying Voyage of H.M.S. Fly (2 vols London, 1847). See A.D.B., II, pp.29-30.

[4] Franklin contributed £100 of the £400 raised in Tasmania towards Strzelecki's work. The application for assistance was warmly supported by P.P. King. See Franklin in Tasmania, pp.203-04 and for a detailed but not very sympathetic account of Strzelecki's work in Australia, H.M.E. Heney, In a Dark Glass: The Story of Paul Edmond de Strzelecki (Sydney, 1961), esp.pp.63-141. It is doubtful whether a man who could win the friendship and admiration of Franklin and Gunn 'saw himself', as Heney writes, 'as almost alone in the Australian scientific world'. A more correct and balanced view of Strzelecki as a scientist in Tasmania is given by A.N. Lewis, 'Strzelecki in Tasmania', J.R.A.H.S., XXVI(1940), pp.76-7 and L.Paszkowski, 'Charles Darwin and Strzelecki's Book "Physical Description of New South Wales and Van Diemen's Land"', Aust. Zoologist, XIV(1968), pp.246-50.

During 1841-3 the momentum imparted to scientific activity in Hobart Town by the visits of the Erebus and Terror rarely diminished. Captain John Lort Stokes, engaged on his hydrographic work in Australian waters in the Beagle, was in close contact with the society in 1843 with reports on his surveys, and members of a visiting French expedition under Bérard in the corvette Rhin were admitted as corresponding members to the society during their visit in January 1843.[1] Franklin's policy for the Tasmanian Society was uninfluenced by either the irrational fear of foreigners which was rife among men of science in New South Wales or by the jeering cries of 'exclusivism' and jibes about petticoat government hurled with increasing vehemence by political enemies at him and his wife. Finally, under unprecedentedly humiliating circumstances, the secretary of state, Lord Stanley, relying on false allegations made in London by Montagu - who was still smarting under every conceivable grievance since his dismissal as colonial secretary - recalled Franklin in 1843 and sent his successor Lieut-Governor Wilmot, to arrive unheralded in the colony on 17 August 1843.[2]

Franklin attended his last meeting of the Tasmanian Society on 2 August 1843 by which time Gell was secretary. Three weeks later the members paid tribute to their president's zealous promotion of Australasian science in a special valedictory address. Despite the claims of local political pundits the stock of colonial science had never stood higher in the estimation of outsiders or those colonial scientists with any claims to standards.[3] Replying, Franklin promised to further the cause of Tasmanian science in Britain, a promise which he honoured to the full, using his influence tirelessly to support colonial projects and leaving numerous benefactions for science and

---

[1]Minutes, 2 January 1843, Tas. Journ. Nat. Sci., II, p.74 and H.T.C., 6 January 1843. One of the arrivals in the Rhin was Jules-Pierre Verreaux, 'Naturaliste', who was elected a member of the society and spent some years collecting in the colonies.

[2]For the story of Franklin's recall see e.g. Franklin in Tasmania, pp.334-64.

[3]Tas. Journ. Nat. Sci., II, pp.157-9.

education in the colony, including funds for the ill-fated Acanthe Museum.[1]

For two months scientific affairs in Hobart Town were at a standstill while the new lieut-governor's pleasure was awaited. In October 1843 came the fatal split which divided scientific work in Van Diemen's Land between Launceston and Hobart for over five years.

Under Eardley-Wilmot's vice-regal patronage science in the colony languished as fast as it had flourished under Franklin. Wilmot was no scientist, although he was a Fellow of the Royal and Linnean Societies, with wide intellectual interests. Being something of a lawyer he was anxious to put in order all the endowments and privileges attached to his office at a time of financial stricture. The imperial government saw fit to make him responsible for the Botanic Garden in Hobart Town which, under Franklin, had been supported from colonial funds. To cover any loss incurred by the new arrangement Wilmot received a compensatory increase in salary.[2] In September 1843 Wilmot wrote to the secretary of state proposing that the Gardens should be entrusted to a new society 'The Van Diemen's Land Horticultural and Botanical Society', which he would form.[3] He suggested that £400 be granted annually to this body from government funds. To add attraction to his scheme he also asked the Queen's approval to style the society 'The Royal Society of Van Diemen's Land for Horticulture and Botany and the Advancement of Science', a title which provided the best of all possible scientific worlds.

On 3 October, oblivious of Wilmot's plans, the Tasmanian Society met to elect the new lieut-governor as president and to take stock of the situation. The members anticipated the expansion and continuation of the work already commenced under Franklin. They understood that Lord Stanley had instructed Wilmot to give 'every encouragement to the Tasmanian Society'.[4] Since

---

[1]Piesse, 'Foundation and early work', <u>Pap. & Proc. Roy. Soc. Tas</u>. (1913) pp.131-4 and <u>Franklin in Tasmania</u>, pp.195-6.

[2]Piesse, 'Foundation and early work', pp.136-7. See also G. Winter, 'Royal Society of Tasmania', Thesis, pp.8-9.

[3]Wilmot to Secretary of State, 15 September 1843, cited in Piesse, op. cit., p.137.

[4]<u>The Tasmanian Society</u>, pamphlet (Hobart, 1843), p.1.

Franklin's departure the society had resolved to include the promotion of the arts among its objectives. Science would aid the development of the colony's resources and attract attention abroad, but promoting art 'will have an immediate effect upon our social improvement of a more direct and decided character'. Franklin's views of the move are not known. In their review of past work the members showed their awareness of the standing of the institution; it had 'grown from a small private Association into some measure of public recognition and importance not heretofore gained by any similar Association in these Colonies.'[1] Inside two weeks the society was rudely awakened from this complacency.

On 14 October Wilmot summoned the members to meet at Government House. He also invited the Mechanics' Institute and the Horticultural Society. It was round one in his plan to find custodians for the colonial vegetable and flower garden. He outlined his ideas to the mixed and somewhat bewildered company and in deference to the existing society proposed the name of 'The Royal Tasmanian Society' for his multipurpose association.[2] The eight or nine members of the Tasmanian Society present at the meeting, led by Gell, protested at Wilmot's presentation of a fait accompli, maintaining that the proposed new rules and aims had been drawn up without any consultation with them. They had come in good faith to a meeting of their own society only to find themselves overwhelmed by 'the Horticultural Society mustered very strong, with Captain Swanston at their head'.[3] Swanston had been one of Franklin's principal opponents and had little time for Gell or his plans for education and colleges in Van Diemen's Land. Obviously there existed some conspiracy to counter the influence of the Tasmanian Society and so deal one more blow to Franklin's reputation.

---

[1] Ibid.

[2] Launceston Examiner, 21 October 1843.

[3] Murray's Review, 20 October 1843.

The anti-Franklin press gleefully reported the embarrassment of the Tasmanian Society, which was accused of having designs on the government garden and of imagining itself to be 'the depository of all the science in the Island'. But wherever else science may have been safely deposited in Tasmania it was certainly not in Swanston's Derwent Bank.[1] The Horticultural Society, supported by the Arthur faction, was seen by some newspapers as the perfect antidote to the Tasmanian Society for, 'instead of being humbug of the most perfect description [it] is really useful and ornamental to the colony'.[2] When opposed openly Wilmot adjourned the Tasmanian Society sine die, to which many of its members and some visitors reacted by quitting the meeting.[3]

The governor was not deterred by this exodus. He proceeded forthwith to the formation of the Botanical and Horticultural Society 'to develop the physical character of the Island and illustrate its natural history and productions'.[4] Wilmot's powers as president of the new body were quite unlimited. He could appoint the vice-presidents and up to fifty 'Fellows' from 'such persons as he shall deem fit' and he had a council through which he exercised complete control of the society's affairs. Wilmot and his supporters had come to the meeting armed to deal with all contingencies. The new president was able to announce immediately the fifty foundation members of the fellowship and to constitute his council, which included Swanston and some prominent members of the colonial government. John Lillie and Joseph Milligan joined the new institution from the Tasmanian Society but, unlike that association, the new body was bound closely to the government purse and policy. There was one clause which, if pursued, might have served to redeem the Royal Society's standing as a scientific institution. It was required that a paid secretary be appointed with 'a scientific knowledge of the leading branches of Natural History, particularly of Botany and Geology', whose duties were to include the supervision of the Gardens.

---

[1] Swanston, manager of the Bank, was a close friend and business associate of Montagu, who acted as the Bank's representative while in London.

[2] Murray's Review, 20 October 1843.

[3] Ibid., see also G. Winter, 'Royal Society of Tasmania', p.9.

[4] Rules of the Botanical and Horticultural Society of Van Diemen's Land... (Hobart, n.d.(1843?)), p.3. See also 'Rules and Regulations...', MS 9103, Royal Society of Tasmania, Hobart.

Here then was a complete break with Franklin's scheme. Wilmot's society proved more of a gardening and social club than a scientific institution. Whereas the Tasmanian Society never had more than thirty or forty local members the Botanical and Horticultural Society for the Advancement of Science boasted one hundred 'Fellows' within two months of its foundation.[1] Members were interested mainly in the garden and the business was devoted primarily to domestic issues and matters concerning the Gardens' maintenance and improvement.[2] An overture from Gell and the Tasmanian Society 'proposing a junction' of the two societies in March 1844 was brusquely rebuffed.[3] During 1844 attendance at the society's weekly meetings dwindled rapidly and morale wavered. In August proposals were made to approach J.D. Hooker, who was 'understood to have a predilection for a residence in these Colonies for the prosecution of Scientific Objects', to accept appointment as the society's secretary at £300 per annum if government would provide the money.[4] But Wilmot, disenchanted with his own society's image, was in no mood to provide further encouragement. In September Dr George Fordyce Story (1800-85), an Edinburgh graduate in medicine and an energetic naturalist, was appointed secretary at £200 per annum until the position lapsed when the government failed to renew its grant the following year.[5]

On 12 September 1844 the society, with Lillie, an architect of colonial science, in the chair, was informed that Queen Victoria had approved its new name: 'The Royal Society of Van Diemen's Land for Botany, Horticulture and the Advancement of Science'. It was the first Royal Society outside Britain but scarcely in the history of British scientific institutions can so much have meant so little. In January 1845 the secretary announced the abandonment

---

[1]Conditions for election were very liberal. Ladies were eligible and Army and Navy officers on full pay were admitted without ballot. By 2 October 1845 the membership had increased only to 117. 'Rules and Regulations...', ibid.

[2]E.g. the purchase of horses and manure; entrance fees, rights to obtain cuttings and the gardener's working conditions etc. 'Proceedings of the Horticultural and Botanical Society of Van Diemen's Land' (1843-45), Roy. Soc. Tas., Hobart.

[3]Ibid., 7 March 1844. The Tasmanian Society's proposition, it was resolved, was contrary to the fundamental rules of Wilmot's group.

[4]Ibid., 29 August 1844.

[5]Ibid., 12 September 1844 and A.D.B., II, pp.490-91. For the circumstances surrounding Fordyce Story's ~~'s~~ appointment see Winter, 'Royal Society', pp.14-15.

of annual meetings as so few attended and, following Story's resignation, Lillie was elected honorary secretary to conform with Wilmot's desperate plea that his 'learned and Scientific Institution' should have 'a person of superior education and scientific and literary acquirements' at the helm.[1]

Lillie slowly breathed life into the ailing society. In April 1846 he read a paper on Tasmanian eucalypts, the only scientific communication during the first four years of the Royal Society's existence. The principal achievement of those years was the development of the government botanical garden over which F. W. Newman presided as superintendent from 1845 until 1859 with great efficiency. Early in 1847 Lillie pressed for a pursuit of 'the higher objects of the Society as a Scientific Institution' to acquit it from the 'charge of limiting its attention to subservient and comparatively unimportant objects'.[2] Wilmot had received news of his recall in September 1846 and the society took this cue to terminate the association with its unpopular founder, who lingered on in the colony repudiating attacks made on his personal and public life and conduct of affairs.[3]

Science went through a very lean period in Hobart Town after 1843. The Royal Society, although heralded with all the prestige vice-regal patronage could bestow, collapsed as a scientific institution, whereas in 1843 it had been the Tasmanian Society whose 'light' and 'presumptious arrogance' which was supposed to have been 'extinguished...at Government House in the presence of Sir Eardley Wilmot'.[4] To the serious-minded members of the Tasmanian Society the Royal Society was a traversty of science. Gunn predicted that it would quickly 'go to the devil'[5] and in 1844 the Hobart Town Courier

---

[1]Wilmot to Story, 30 September 1845 in 'Council Minute Book', Roy. Soc. V.D.L. (1845-53), Minute for 2 October 1845, MS 9104, Roy. Soc., Tasmania, Hobart. During the lean years from 1843 only Joseph Allport (1800-77), the horticulturalist-solicitor, Burnett, Hone, Lillie and Peter Gordon Fraser (1808-88), colonial treasurer, attended meetings with any consistency.

[2]Report of Royal Society of Van Diemen's Land for 1845 (Hobart, 1846), pp.8-9.

[3]Wilmot died in Hobart on 3 February 1847. Despite his efforts to relieve the colonists' burdens in a time of depression, Wilmot earned their disapprobation because he represented Whitehall and because of his efforts to introduce the probation system into the penal code. His recall was issued on the grounds of unproven but widely circulating rumours of his licentious behaviour.

[4]Murray's Review, 3 November 1843.

[5]Gunn to Hooker, 29 March 1845, V.D.L. Correspondents, p.110.

savagely satirized it as the 'Hypothetic Geoponical Society for raising celery and drawing radishes and conclusions from their own premises, in aid of general science'.[1]

Following Wilmot's rebuffs, the Tasmanian Society did not disintegrate. Gunn, its 'heart and head', watched the Hobart proceedings from Launceston, knowing that the capital was too small to sustain two opposing scientific institutions. Following the débâcle at Government House Gunn drew the Tasmanian Society to Launceston. It was, he told Hooker, 'really dead until I took it in hand...became its Secretary and now have in the press at Launceston! a number of the "Journal"'.[2] Gell formally resigned as secretary to make way for Gunn in June 1844 and the new secretary promptly declared himself a 'republican' in science, although he remained apprehensive of the 'gigantic Royal' and the threat it posed to their unobtrusive efforts in Launceston.[3] Gunn was doggedly determined not to let Tasmanian Journal fall below the previous standards set by the society in Hobart. Despite the small number of men interested in science in Northern Tasmania, a scattered local membership and scarcity of finances, Gunn kept the society active and publishing until 1849 and he did so without compromising any of the reputation of the Journal or the society had won for itself in Hobart.

In the capital Kay, Gell, Henslowe and James Ebenezer Bicheno (1785-1851), F.R.S., the scholarly and scientific new colonial secretary - successor in 1825 to Alexander McLeay, as secretary to the Linnean Society - remained loyal to the Tasmanian Society. Like his friend McLeay, Bicheno was a circumspect public servant serving Franklin, Wilmot and Denison without controversy - although he earned the nickname of 'The Old Hen' from the colonists - and quietly pursuing his botanical and other scientific enquiries. Bicheno and

---

[1] H.T.C., 30 August 1844.

[2] Gunn to Hooker, 2 October 1844, V.D.L. Correspondents, p.103.

[3] Minute of meeting on 4 June 1844, Tas. Journ. Nat. Sci., II, p.317 and Gunn to Bicheno, 26 November 1844, V.D.L. Correspondents, p.112.

others, such as Joseph Allport, Lillie and Milligan, belonged both to the Royal Society and the Tasmanian Society. Charles Joseph La Trobe (1801-75), superintendent of the Port Phillip District and 'a man of a thousand occupations, a geologist, a hunter of beetles and butterflies',[1] was the society's most influential colonial benefactor after Franklin's departure and it was no small satisfaction to Gunn when he was appointed acting lieutenant-governor of Van Diemen's Land in 1846 after Wilmot's dismissal. In Launceston, when Wilmot refused to co-operate further, the Tasmanian Society hoisted its true colours to the mast by electing Franklin president in absentia.

Gunn persuaded M.C. Friend and James Grant, his long-standing scientific correspondent, R.H. Davies, Lieutenant R.H. Breton, F.R.G.S., and Dr William Russ Pugh (1805?-97), Grant's skillful experimental partner,[2] all of whom resided near to Launceston, to form the local nucleus of the society and to become regular contributors to its monthly meetings. Arrangements were made with Henry Dowling (1810-85), the publisher, to print the Tasmanian Journal at the offices of the Launceston Examiner. Gunn, as secretary and editor, received and sent parcels and despatches of scientific materials to all the colonies and read widely in overseas scientific journals, gleaning facts on Australian science for the Journal from every conceivable source.

Volume two of the Journal maintained the standards set in Hobart. Colenso wrote about his botanical researches in New Zealand and Hobson continued to send news of his correspondence and researches with Owen, particularly on the fossil bone discoveries of Mount Macedon, Port Phillip District, and Owen's reconstruction of the large marsupial pachyderm Diprotodon.[3] Through Hobson and the Journal Owen encouraged other colonial

---

[1]Quoted in A.D.B., II, p.89. The words are those of Washington Irving who described La Trobe as 'a complete virtuoso'. On 2 June 1847 the Tasmanian Society received news that La Trobe had started a scientific society 'upon similar principles and with corresponding objects' as theirs at Port Phillip. Tas. Journ. Nat. Sci., III(1849), p.243.

[2]A.D.B., II, p.355. Pugh was an accomplished investigator into medical, pharmaceutical and agricultural problems. His experiments included investigations into the gluten content in colonial wheat and the use of ether as an anaesthetic in June 1847.

[3]For Hobson's contributions see Tas. Journ. Nat. Sci., II, pp.208-10, 311, 344-7 and 460.

workers, assuring them that the Australian 'alluvial or newer tertiary deposits are the grave of many creatures which have not been dreamt of in our philosophy'.[1] Gunn, always on the watch for any comments on the natural history of Australasia, took Professor Hitchcock of Massachusetts to task for speculating that the moas might 'at the present time [be] inhabitants of the warmer climate of New Holland'. The large nests reported by Cook and Flinders on the Australian coasts, Hitchcock had argued, might be those of moas. They were, Gunn assured the ornithological world, 'undoubtedly those of the Icthyiaëtus Leucogaster, Gould, the Sea or Fish Eagle of the colonists - a bird common to all Australia'.[2]

During the Launceston years the Tasmanian Society received more frequent papers on aspects of local natural history, benefitting from Gunn's wide travels in the north of the colony. Algae were sent to Hooker and passed on to Dr William Henry Harvey (1811-58) of Trinity College, Dublin, to describe[3] and Gunn wrote about the shore shells of Tasmania, arguing that they were the kitchen middens of Aboriginal occupation and not evidence of raised beaches.[4] R.H. Davies responded to a questionnaire from the British Association with a paper 'On the Aborigines of Van Diemen's Land'.[5] To his great credit Gunn used considerable discernment in the type of paper he allowed to be published on Tasmanian natural history and other local studies in the Journal.

---

[1]Ibid., p.345. Owen later republished his collected papers on Australian palaeontology as Researches on the fossil remains of the extinct Marsupials of Australia, (2 vols, London, 1877).

[2]Tas. Journ. Nat. Sci., II, p.359. Hitchcock's report was reproduced from the Athenaeum, No.882 (1845), p.359.

[3]Tas. Journ. Nat. Sci., II, pp.377-84 and 421-7 and III, pp.54-61, 153-9 and 209. Articles originally in Hooker's London Journal of Botany (1844). Harvey, a world authority on algae, became professor of botany to the Royal Dublin Society in 1848 and professor at Trinity College in 1856. He collected in the Australian colonies (1854-56). See A.D.B., IV, pp.357-8.

[4]Tas. Journ. Nat. Sci., II, pp.332-6.

[5]Ibid., pp.409-20. Ornithology was Davies's more usual interest.

The Tasmanian Journal mirrored the British interest in Australian exploration to which Sir Roderick Murchison (1792-1871) was giving the lead. Port Phillip was engaging the attention of Van Diemonians interested in both science and commerce. William Westgarth (1815-89), a corresponding member of the society in Melbourne, attempted to demonstrate the essential physiographic contrasts between Port Phillip and the 'general character of the Australian territory...proverbial for extent of area rather than productiveness of soil'.[1] Scientific works on Australia were coming fast off the presses of Europe and the Tasmanian Society eagerly awaited them for review. J.D. Hooker, Gould, Jukes and Strzelecki, the results of years of scientific exploration, were noticed regularly. In the colony itself meteorology and applied science were steadily pursued. Friend reported on his 'improved pluviometer' and Kay described Herschel's actinometer, an instrument for measuring 'the relative powers of the sun's rays' which he considered might be useful for colonial agriculture and the acclimatization of plants.

In December 1844 Gunn reported that Edward Sabine, general secretary of the British Association (1839-52), had written to inform him that

> the Council of the British Association for the Advancement of Science, had unanimously resolved that the Tasmanian Society should be added to the list of public institutions entitled to receive gratuitously the annual volume of the Reports of the British Association.[2]

In 1845 Gunn republished the desultory Report of the Royal Society in the Journal and questioned whether 'so small a community' as theirs could 'efficiently support two scientific societies'.[3] The £400 allowed from 'the funds of the colony' for the Hobart Society was an enticing bait.

---

[1] Ibid., p.403. Much of the stimulus for settlement at Port Phillip came from Northern Tasmania.

[2] Sabine to Gunn, 26 May 1844, quoted in Tas. Journ. Nat. Sci., II, p.319. It had also been resolved to send a complete set of reports of the Association - from the first York meeting of 1831 - to the Tasmanian Society.

[3] Tas. Journ. Nat. Sci., II, p.351.

In 1846, when political circumstances changed, it proved too strong, even for Gunn's 'republican' science. On 26 November, within weeks of Wilmot's removal, he submitted an application to La Trobe on the superintendent's advice 'for a portion of the amount voted for the advancement of science'.[1] Gunn outlined the society's history and achievements, its grievances against Wilmot; the recognition gained from 'learned bodies' and scientists overseas and the state of its membership, 'confined...as much as possible to those who can undertake work for the promotion of scientific knowledge of this Country and especially for the Journal'. They conducted their business, Gunn told La Trobe, 'in a private and domestic way', not courting 'public attention' but serving the best interests of science and the colonies.

La Trobe and Bicheno, through whose hands the correspondence passed, were impressed with Gunn's arguments, particularly when he pointed out that the imperial government had originally sanctioned support 'towards the advanc^{t} of natural science in V.D. Land' in 1843 on the basis of the reports it had received of the Tasmanian Society's work under Franklin. It had never been intended that Wilmot should use imperial funds to start a new scientific society.[2] La Trobe, who had already used his influence privately but unsuccessfully to bring the two societies together, confirmed officially that the Royal Society had not been a good steward of the public funds entrusted to it, having achieved far less 'in the opinion of the scientific world at home' than the Tasmanian Society. He therefore recommended the formation of a 'united society'.[3]

Early in 1847 the Royal Society, eager for amalgamation, made overtures to Launceston but was at first snubbed.[4] No grant was forthcoming from Hobart, and Gunn and his co-workers were unwilling to sacrifice independence and honour to the 'Royal' until that society showed itself worthy of the Tasmanian

---

[1]Gunn to La Trobe, 26 November 1846 and Gunn to Bicheno, 14 December 1846, CSO 11/35-795, Tasmanian State Archives, Hobart.

[2]'Application from the Tasmanian Society for a portion of the amount voted for the advancement of Science', ibid.

[3]Memorandum by La Trobe, 16 December 1846, and note by Bicheno, 15 December 1846, ibid. Bicheno, hoping the 'old jealousy will be extinguished', suggested the title 'Royal Tasmanian Society for the encouragement of Botany, Horticulture and other Science'.

[4]'Council Minute Book' (1845-53), 29 January and 4 March 1847. Bicheno and Lillie led the attempts at reconciliation.

Society. What La Trobe could not achieve at a distance the new lieut-governor, Sir William Thomas Denison (1804-71), F.R.S., set out to accomplish on the spot.

Denison was an experienced army engineer, astronomer and applied botanist, a man with a successful career as a canal builder, educator and constructor of dockyards behind him. He was widely read in natural history, particularly botany, geology and in his favourite 'branch', conchology.[1] A Fellow of the Royal Society, the Geological Society and the Royal Geographical Society, he was in contact with many of the leading figures of science in Britain. Essentially a man of practical interests and improvements, Denison, who had firm ideas on the usefulness of transportation and punishment, arrived in the colonies at a time of great socio-political changes with the discovery of gold; the cessation of transportation to Van Diemen's Land in 1852 and the coming of responsible government. Inexperienced in administration, Denison at first made some gauche decisions but in the end his fourteen years of administration in Tasmania and then in New South Wales were judged successful. As a contributor to colonial science, applied science and improvement his efforts were enduring, although not always highly original.[2]

Political distrust and crises awaited Denison in January 1847 in Van Diemen's Land after the unrest of Wilmot's government, and for some time he ruled without a Legislative Council. Upon becoming president of the Royal Society he immediately displayed a determination to make it 'perform some work', knowing, he maintained, of 'no country which presents a fairer field for enterprise and industry than Van Diemen's Land'.[3] Lillie, the society's secretary, had himself grown disenchanted with the fellowship. In November

---

[1] A.D.B., IV, pp.46-53, and T. Iredale and G.P. Whitley, 'Sir William Denison as a Conchologist', Proc. Roy. Zool. Soc. N.S.W. (1964-5), pp.27-30.

[2] For a study of Denison as an organizer of science see Edward Ling, 'William Denison: Reformer of Colonial Science', B.A. Hons. Thesis (University of N.S.W., 1973).

[3] Denison to Beaufort, 5 February 1849 in Denison, Varieties of Vice-Regal Life, (2 vols, London, 1870), vol. I, p.107. Denison stated publicly in the Council that the Royal Society was not a recognised 'Scientific Institution', Rep. Roy. Soc. V.D.L. for 1847 (Hobart, 1848).

1847 it was first mooted that Joseph Milligan, whose abilities as a geologist impressed Denison enough to trust him with surveys of reported coal deposits in the island, should be appointed full-time secretary to the Royal Society. In May 1848 that appointment was confirmed,[1] and Milligan, a close friend of Gunn, correspondent of the Hookers and men of science at home and overseas, one firmly in the mainstream of scientific thinking,[2] became the ideal partner in Denison's campaign to upgrade science in the Royal Society of Van Diemen's Land.

William Henty (1808-81), secretary of the Launceston Horticultural Society, had written to Milligan in December 1847 suggesting a unification of all scientific and horticultural societies in the colony.[3] By June 1848 the thinking in Launceston had been modified in favour of a 'federal union' of societies in Tasmania, with each maintaining its distinctive character.[4] 'The Transactions of the general Society', Henty observed, 'would be of a popular character, appealing only to Colonial Readers and would rather interfere with the papers of the Tasmanian Society which appeal to English readers'.[5] Gunn's lessons had been well learned in Launceston, whose men of science, while still anxious for government's largesse, were not willing to compromise their earlier stand.[6] Henty was in effect proposing a Tasmanian Association for the Advancement of Science with an itinerant paid secretary and an equable distribution of government funds between the federating societies.

---

[1] 'Council Minute Book', 18 November 1847 and 11 May 1848. At his own request Milligan's initial salary was reduced from £150 to £100 per annum.

[2] Milligan was elected F.L.S. in 1850 for his contributions to botany, geology and palaeobotany.

[3] Henty to Milligan, 23 December 1847, SC-G, Roy. Soc. Tasmania, Hobart.

[4] Henty to Milligan, 2 June 1847, ibid. Notes on the proposed 'union' and 'Council Minute Book', 22 June 1848. The societies and institutions Henty suggested for union were the Royal, Tasmanian, Launceston and Midland Agricultural Societies as well as the Hobart Botanical Gardens.

[5] Overseas 'image' was also important. Many foreign members of the Tasmanian Society, Henty warned, 'would quit them if they were to merge into a mixed Colonial Society'.

[6] 'Council Minute Book', 13 July 1848 and Piesse, 'Foundation and early work', p.150.

By July 1848 Henty's proposals were redundant, rejected as 'impractical' by the Royal Society, which in the same month nominated Gunn for admission to the fellowship under its new rule to admit any member of the Tasmanian Society 'without recommendation and without ballot'. Bedford, Grant, Gell and others soon followed Gunn's lead, satisfied like him with the Royal Society's new management. The Tasmanian Society then ceased its work.[1]

Between Wilmot's dismissal and the effective merger of the two societies in the winter of 1848 the Tasmanian Society climaxed its reporting on and independent contributions to science in Australasia in volume three of the Tasmanian Journal. Accounts were published of Leichhardt's overland expedition from Moreton Bay to Port Essington and on his natural history lectures in Sydney. Sturt's Central Australian explorations (1844-6) and Mitchell's fourth expedition (1845-6) were fully reported together with Hobson's researches in Port Phillip. Gunn's work on the acaciae and Milligan's on Tasmanian palaeobotany set the standards for local contributions and even the legendary bunyip - a 'specimen' from the Murrumbidgee which James Grant pronounced to be the skull of a young camel - was examined, henceforth to be classed, Gunn insisted, 'amongst fabulous animals'.[2]

It was appropriate that the last volume of the Tasmanian Journal, whose inspiration and success owed so much to Franklin and the Erebus and Terror expedition, should contain detailed reports on the results of that expedition. Gunn's synopses and extracts of the home journals were invaluable to colonial workers. But a new trend was also noticeable. Colonial scientists were now less prepared to wait months or years before making their results known through the home journals. Some were even ready to throw down the gauntlet to the stay-at-home arm-chair philosophers in Europe. It was a polite reminder to the more dogmatic at home that men of ability and independent intellectual spirit were astir, even in the 'wilderness' of colonial culture. Partnership, the enlightened realized, had no substitute in the future and was essential to the successful elucidation of Australian phenomena. 'For the present', W.B. Clarke wrote in an article in the Sydney Morning Herald in 1848,

---

[1] See G. Winter, 'Royal Society', pp.19-23.

[2] Tas. Journ. Nat. Sci., III, pp.147-9. W.S. Macleay and La Trobe also published notes on the bunyip. Ibid., pp.275-8 and 326-7.

> it may suffice to say, that although the fossil flora of Australia, unlike its fossil fauna, is more near in resemblance to that of the oolitic beds of Europe, than to that of the true carboniferous rocks, there is no greater discrepancy than now exists between the vegetation of Australia and that of Europe; and it would be curious indeed if the land exhibited the traces of species identical to those of the land of ancient Europe, when it is known that no terrestrial phenomena of that kind are as ubiquitous as those phenomena which depend upon the existence of persistent oceanic temperature.[1]

'It is well known', Clarke continued, calling the palaeontological findings of Frederick McCoy (1817-99), one of Professor Sedgwick's bright stars in Cambridge, into question,

> that living species abound in the waters of Port Jackson, which are more readily comparative with oolitic than with any other fossils, and that some of our living plants and animals are equally comparative with types from the oolitic flora and fauna (though no traces occur in the coal beds): but no one would presume from these facts to declare that the present Australian era is oolitic and not recent.[2]

'I believe', Clarke had told the Coal Inquiry Committee in Sydney, that the coal-bed and closely related fossils of New South Wales are '<u>as old, if not older than the lowest beds of that formation</u>',[3] despite the conclusions McCoy had drawn from the 'more than four thousand specimens and fossils' Clarke had sent to Cambridge. These were the opening shots in a subsequent heated debate on the Australian succession which was continued in the journals of the colonial scientific societies after 1854 when the obdurate McCoy arrived as professor of natural sciences in Melbourne.

---

[1] <u>Tas. Journ. Nat. Sci</u>., III, p.463. Clarke's original article, fully reproduced by Gunn, was entitled 'The Carboniferous formation of New South Wales', <u>S.M.H</u>., 14 November 1848.

[2] <u>Tas. Journ. Nat. Sci</u>., III, p.460.

[3] <u>Tas. Journ. Nat. Sci</u>., III, p.460. McCoy's original findings 'On the Fossil Botany and Zoology of the Rocks associated with the Coal of Australia' was republished (pp.429-44) and later with plates in <u>Pap. & Proc. Roy. Soc. V.D.L</u>., I (1851), pp.303-34. McCoy postulated a younger age for the coal-measures than Clarke.

Clarke's paper was evidence too that the initiative in colonial science was passing back to the mainland. In 1849 the Royal Society began publishing the first parts of its Papers and Proceedings,[1] which clearly bore the stamp of the Tasmanian Journal in its 'Miscellanea' of scientific reports, mostly on natural history, from overseas and other colonies but also displayed the new emphases on utilitarian subjects which Denison brought to the society.

Denison, of course, was moving, although unwittingly at first, with 'the extraordinary character of the times...the all-absorbing nature of the excitement' which, Milligan reported in 1853, 'has pervaded and unsettled all classes of the inhabitants of these colonies'.[2] The Australian gold-fever sapped the Van Diemonians gradually of both the will and means to continue being the repository for Australia's science. For seven years under Denison after 1848 the Royal Society in Hobart continued as the most active scientific institution in the colonies but once the wealth generated by gold attracted scientists to the mainland, particularly Victoria, new scientific organizations and journals ensured that the lead and initiative remained there. Tasmanian interests became, in the main, more parochial.[3]

The society's achievements before Denison departed for Sydney in January 1855 as governor-general of Australia were no mean ones. By the early fifties Milligan had taken the membership to over three hundred. Milligan, with excellent papers on coal resources and geology, and Denison, with a

---

[1]See F. Noetling, 'Notes on the Publications of the Royal Society of Tasmania', Pap. & Proc. Roy. Soc. Tasmania (1910), pp.223-30 and for an uncritical account of some of the papers read before Tasmanian societies, A. Morton, 'Some account of the work and workers of the Tasmanian Society and the Royal Society of Tasmania, from the year 1840 to the close of 1900', ibid. (1900-01), pp.109-26. This article includes a useful analysis by subject of some 606 papers read over sixty years.

[2]Rep. Roy. Soc. V.D.L. for 1852 (Hobart, 1853).

[3]In the light of later research Michael Roe's statement (Quest for Authority, p.157) that the Royal Society of Van Diemen's Land was 'the outstanding learned body in the colonies' needs some revision. Only after 1848 did the society achieve that status but as it was the only active 'learned body' - other than mechanics' institutes or the Australian Museum - it was a status not hard to attain. The Tasmanian Society better deserved the description in the 'forties. See G. Winter, 'Royal Society', esp. pp.31-60, for the decline in the influence of the Royal Society of V.D.L. Winter in her 'synopsis' makes the too generalised statement that 'other Australian societies had international contacts but Tasmania's were more numerous because of its diverse activities'.

dozen or so contributions: extracts and synopses of his and others' work on agriculture, colonial timbers, docks - 'dry, wet and floating' - geology, gold values and the new and desperately urgent colonial theme of sewerage and drainage, were the society's Hobart mainstays. A colonial society, Denison argued, should not merely record 'new facts or observations upon matters connected with the progress of arts' but also 'some of the results of the experience of members as may be likely to prove of practical use to the community'.[1] Gunn had never so argued but he, with his occasional valuable papers on zoology,[2] his F.R.S. in 1854 and his quiet researches and ever eager correspondence at home and abroad was content to retire from public scientific life, lending his support to the Northern Branch of the Royal Society which was started in Launceston in 1853[3] as a mild protest against Hobart dominance, an oft-repeated complaint of Northern Tasmanians.

The Royal Society, boasting four F.R.S.'s in 1850,[4] sustained the loss of Bicheno and Lempriere but not before it had seen a Public Library and the Botanical Gardens firmly established. In the 1850s strenuous efforts were made to secure a permanent museum building and in 1859 the need for a geological survey was recognised with the appointment of Charles Gould (1834-93) as geological surveyor.[5] By 1853 James Sprent (1808-63) had completed his arduous trignometrical survey of the colony and the following year Kay's work - consistently reported before the Royal Society - was terminated.[6] Weather prediction and meteorology had by then become a recognised Tasmanian province and observations were continued by Kay and Pugh with some efforts by Thomas Dobson to correlate data and predict storms and hurricanes.[7]

---

[1] Pap. & Proc. Roy. Soc. V.D.L., I (1851), p.198.

[2] E.g. 'On the Indigenous Mammals of Tasmania', ibid. II, part I (1852), pp.77-90.

[3] William Henty was the organizer of this move, supported by a number of Launceston residents. See 'Minutes of Council Meetings' (1 June 1853 - 23 July 1863), Roy. Soc. Tasmania, Northern Branch, Launceston.

[4] Bicheno, Denison, Friend and Kay.

[5] A.D.B., IV, pp.277-8. Gould, son of John and Elizabeth Gould, was appointed on the recommendation of Murchison.

[6] A.D.B., II, pp.466-7. Kay wrote highly of Sprent's work in his valuable paper 'Observations for Determining the Position of the Magnetic Observatory, Hobart Town', Pap. & Proc. Roy. Soc. V.D.L., II, part II (1853), pp.264-85.

[7] Ibid., II, pp.106-20 and 225-43.

To every scientific endeavour - including the moves to introduce salmon into Tasmania - Denison lent his unstinting support and, where he could, the 'pecuniary' aid of his government. Scientists in Tasmania would henceforth point to developments at home and elsewhere, demanding of Denison's successors financial support for their efforts. In 1853, with correspondents still active in the other colonies and New Zealand, and with Rev. Robert Lethbridge King (1823-97) of Sydney sending his papers on the Entomostraca (Daphniadae) to Hobart, the Royal Society saw continued cause to congratulate itself as the 'means of communication with other Societies and as a focus and organ for the acquisition and distribution of new facts of a scientific character throughout the neighbouring Australian provinces'.[1] 'It is more incumbent upon us, the occupants of a new territory', wrote Milligan, a veteran who remembered former lean times and brave experiments,

> to collect facts for others having more leisure, greater learning, and more numerous and better standards than we have to work upon, than to attempt the elaboration ourselves in the hasty and comparatively crude way our position and means admit of'.[2]

But few philosophers, especially in expansive, confident Victoria, where more full-time scientists were finding secure employment than at any time previously in Australia, had time to listen to such self-effacing arguments on the role of colonial science. In Tasmania the decline of the Royal Society coincided with Milligan's departure on leave to England in 1860.[3] 'The Society', wrote William Archer (1820-74), Milligan's successor as secretary and the scientific colonial who had mixed as an equal with men of science and society in Britain, 'had better close its doors', unless it could attract more interesting papers in the early 1860s. It stood then, in 1861, 'almost degraded among kindred Institutions'.[4]

---

[1] Rep. Roy. Soc. V.D.L. for 1853 (Hobart, 1854), pp.1-2.

[2] Rep. Roy. Soc. V.D.L. for 1850 (Hobart, 1851), p.17.

[3] Milligan never returned to Tasmania. Before his departure he completed his 'most notable work' on Aboriginal languages. See Pap. & Proc. Roy. Soc. Tasmania, III, part II (1859), pp.239-75.

[4] Rep. Roy. Soc. Tasmania for 1860 (Hobart, 1861), p.12. Archer was secretary of the society in 1860-61 before handing over to Dr (later Sir) James Wilson Agnew (1815-1901). Archer was elected F.L.S. and his botanical work highly regarded by both Gunn and Hooker. In January 1861 the Society had debts of over £360 and was five years in arrears with its proceedings. See 'The Society in straitened circumstances, 1862-1870' in Winter, 'Royal Society', pp.46-60.

Gunn and Milligan, two colonial scientists under two scientific governors, Franklin and Denison, proved for over twenty years that high standards could be upheld in colonial science, despite the odds and opposition. A regular journal, they showed, was the lifeblood of a colonial scientific society. 'The earliest of Australian scientific periodicals' - the Tasmanian Journal - wrote one historian in 1913, 'has never since been surpassed in the Southern Hemisphere'.[1] With the active encouragement of their European correspondents eager for new data, these amateurs with uncompromisingly high views of science, particularly natural history, conspired successfully to bring the science of Australasia under one aegis. Their determination transcended the active opposition pressures of even a governor, politicans and finances under Wilmot, whose own Royal Society was too diverse, too cut off from the taproots of both colonial and European science, to succeed at more than collecting. The reorganization of science in Van Diemen's Land under Denison when it came proved a compromise between mediocrity and the Tasmanian Society's higher standards. But Denison's reforms, although arriving too late to epitomize Australian science for more than a few years, showed that colonists were now more mindful of the utilitarian, the practical problems, of their environment. Responsible government implied local control of burgeoning local mineral and auriferous wealth which men now looked to the earth to provide, and their scientists to locate.

Fact gatherers still, leading colonial scientists in the 1840s and 50s in Tasmania nevertheless introduced the highest standards of their home traditions into the colonies. Jealous for those traditions, they were repeatedly accused of exclusivism when they tried to uphold them and, although mindful of and content in their 'dependent' status on European science, they began to seek separate and financial recognition for their efforts from government, began, in effect, to institutionalize their science. Henceforth

---

[1]Piesse, 'Foundation and early work', p.146. The remark is questionable if the high standard of Liversidge's editing for both the Royal Society of N.S.W. and the Australasian Association Reports and also the Linnean Society of N.S.W. Proceedings in the 1870's, 80's and 90's are taken into consideration, but for anything before then it was certainly true.

any government action in science in the colonies usually came under close scrutiny, not only from legislators and electors, but also from an increasingly articulate and confidently competent community of scientists.

Commenting on the proposed closure of Parramatta Observatory in 1849 Denison confided to Admiral Beaufort both the weaknesses and potentialities of colonial science. 'An astronomer in a colony', he observed,

> is a guarantee that a certain amount of science is at the disposal of the Government, and if he be an active and intelligent man, he has it in his power to do a great deal of good, by imbuing others with a taste for scientific pursuits. The great evil of these colonies is the absence of scientific men. Many of the settlers have had some education, but there are but few or none in this colony who can fairly be called men of science, and the consequence is that the half-educated, but with a smattering of knowledge, are able to lead the more ignorant by the nose.[1]

Although somewhat harsh, Denison's view was a realistic one for science in Australia before 1850. The story of organized science in Tasmania in the 1840's was of the struggle between the 'few' men of science and the 'ignorant' or 'half-educated' interlopers, with the honours going undoubtedly to the former. In New South Wales, on the other hand, scientists, divided among themselves, failed to grasp the opportunities offered to organize themselves effectively.

---

[1]Denison to Beaufort, 5 February 1849, <u>Varieties of Vice-Regal Life</u>, vol. I, p.107.

CHAPTER V

AN AGE OF 'INDIVIDUAL ENTERPRISE'

'We are pleased to note', the Sydney Morning Herald, a consistent supporter of science, announced in July 1844, 'that individual enterprise is about to undertake a measure of such deep importance to this and the neighbouring colonies'.[1] The important 'measure' was Leichhardt's expedition to Port Essington (1844-6) from which he returned to a 'Roman triumph' in March 1846, well received in Sydney 'because the good news he brought restored public faith in a colony that was passing through an acute economic crisis'.[2] Leichhardt was living proof that science could prevail over prejudice; competence and determination over cavilling and xenophobia, proof that the colonists' purses were where promising new pastures lay.

For twenty-five years after 1830 men talked much in the parent colony about forming societies to investigate phenomena and resources. Certain experiments were tried but they were ephemeral in the face of an inertia which doused even the most ardent spirits from Jan Lhotsky (b 1800) to Ludwig Leichhardt (1813-48?). 'Foreign litterati', were usually regarded with great suspicion by established men of science in New South Wales, yet it was they, individualists by temperament or of necessity, who did much to advance science.[3]

Lhotsky proclaimed his strident diagnosis of the scientific malaise in 1835:

> It is one of the foibles of our young Colony, that political feelings are mixed with, and influencing private intercourse - nay, interfering with that civility and co-operation which every useful exertion deserves. Whigs and Tories, Radicals and Conservatives, are mingled at home in one common feeling to support arts and sciences; and if the Duke of Wellington were to be personally offended with all that is said against him politically, he could not take in a single one of the English Papers or Periodicals.[4]

---

[1] S.M.H., 25 July 1844.

[2] Aurousseau (ed.), Letters of Leichhardt, vol. I, p.ix.

[3] During the debate on the Leichhardt testimonial in the Legislative Council in June 1846 Deas Thomson, rarely a supporter of foreign scientists hitherto, openly admitted the great debt Australia owed to Strzelecki and Leichhardt.

[4] Lhotsky, A Journey from Sydney to the Australian Alps...(Sydney, 1835), pp.75-6 footnote.

Ten years later, success behind him, Leichhardt had a less political but similar tale to tell:

> We have been bussy (sic) to form a sort of society in Sydney, but I am afraid that we shall not yet succeed; there are many people here who pay attention to natural science, but their endeavours are isolated and they are little willing to combine; they would at least go to no trouble to work regularly and to work together. If we only succeed in meeting from time to time and in conversing on the various ques [tions] of the day or on the objects we have observed, it would necessarily lead to a more satisfactory form of acting. Most of the gentlemen are occupied with their business, which allows them little time for pursuits the advantage of which public opinion is not yet prepared freely to acknowledge.[1]

Lhotsky, the radical, failed to advance: Leichhardt and Strzelecki with better connections and more sensitive to social niceties, overcame most, but not all, suspicions and prospered. In one sense Lhotsky and Leichhardt were both right: science in New South Wales was largely in the hands of a powerful group of 'gentlemen' whose 'political' and personal views and influence dogged the path of any would-be philosopher. At their head stood Lhotsky's 'Tories' and 'Conservatives', personified until 1856 at least by two powerful colonial secretaries: Alexander McLeay to 1837 and thereafter Edward Deas Thomson (1800-79). Both were prominent in decisions affecting science policy - such as it was - and both subscribed to the slowly passing English academic-conservative tradition of science and learning, a tradition bestowing great influence on the gentleman scholar, the patron and the cleric, and shunning the aggressively active 'professional'.

Alexander McLeay and his scientific sons and nephew saw to it that their tradition, a Banksian one, did not die for some forty or fifty years in New South Wales. Wealth, political influence, prestige and their own priceless collections were their main bastions of power. McLeay and his

---

[1] Leichhardt to Gaetano Durando, Sydney, 27 September 1846, Letters of Leichhardt, vol. III, pp.907-8.

circle were proud of their position as old 'Linneans',[1] a colonial remnant of that group who at the turn of the century had dominated scientific affairs in London where news of Australian natural history had impinged upon the European consciousness so richly. These men, later more closely allied with the colony's more influential families, became the scientific 'establishment' in New South Wales: they were at different times the imperatives and impediments by which science flourished or fell. Later, as legislators, lawyers and judges in the colony's official and unofficial scientific affairs, they held a whip hand which they were not slow to use if it suited them.

The Macleays' position did not rest solely upon social status. Alexander, as we have seen, had been a leader of science in Britain and his eldest son, William Sharp Macleay (1792-1865) came to Sydney in 1839 laden with honours and publications as a 'profound' leader in British zoology. Their interests were avowedly 'amateur' but certainly not dilettante: their science, although sometimes pursued at leisure and in 'isolation' from the colonial scientists around them, was not insignificant. It was a family business, 'not less also... a protest against a disposition in some influential quarters in the colonies to believe that money spent on scientific objects is wasted unless, in the absence of directly remunerative results, there should be at least a substantial quid pro quo in the shape of an exhibition or show of some kind....'[2] But, inevitably, the pressure of outside change reached inside the walls of Elizabeth Bay House, the Sydney No. 32 Soho Square - where the Macleays held scientific court for years - from which William John Macleay (1820-91), decidedly more extrovert than his uncle or cousins, emerged to become the most generous patron of science, the founder of scientific societies and

---

[1]The term 'Linneans' was first used by George Bentham (1800-84), the English botanist. See J. Fletcher, 'Society's heritage from the Macleays', Proc. Linn. Soc. N.S.W., LV(1920), p.631, and also his earlier essay on the Macleays in The Macleay Memorial Volume (Sydney, 1893), pp.vii-li. Fletcher (p.xx) eulogises the role in colonial science of the Macleays, men of 'social position... without the least hope of pecuniary emolument', who bestowed patronage as 'a measure of [their] belief in the splendid heritage of work, over and above all that non resident naturalists have done, are doing or may do....'. The Macleay 'circle' included P.P. King, J.V. Thompson, the Macarthurs of Camden and later Deas Thomson, whose second daughter, Susan Emmeline, married William Macleay in 1857.

[2]Macleay Memorial Volume, p.xx.

bequests, that colonial Australia ever knew.[1]

In the thirties and forties the nuclei around which the 'Linneans' and others gathered were the Australian Museum and the Sydney Botanic Gardens. Lhotsky and Leichhardt tried but failed to make their colonial scientific débuts through these institutions. More successful were those who came recommended and tried by the English scientific tradition: Dr George Bennett (1804-93) and Rev. William Branwhite Clarke (1798-1878). Their 'labours' and philosophies were acceptable to the Macleay circle for many years. There was, indeed, a great respect and deference paid in New South Wales to the opinions, commendations and choices of leading scientific men in Britain: the Hookers, Herschels, Murchisons, Owens and Sedgwicks, to take some names at random. Without their approval the scientific laurel rested very uneasily on any head wanting to make a name in the colony. Leichhardt had himself visited W.J. Hooker at Kew in 1841 before setting out for Australia and was told that 'the only people we encourage are those who devote their whole attention to botany'.[2] Embarrassed at being misunderstood by the English, Leichhardt was forced to make his own way at first in the colonies. Jealous of foreign intervention, even C. P. Wilton unfairly attacked Strzelecki's <u>Physical Description of New South Wales and Van Diemen's Land</u> in a Sydney review of 1846.[3]

Because of their self-imposed isolation and introversion New South Welsh scientists were often very jealous of the outsider and 'temporary sojourner' who threatened competition. Such reserve was not, of course, given to visitors like Darwin, Dana, Hooker or Huxley, whose background and traditions were understood, but Lhotsky, Leichhardt, Strzelecki and Samuel Stutchbury (1798-1859) - the third choice geological surveyor appointed in 1850 - were deliberately made unwelcome in some scientific circles. The greatest individualist, Surveyor-General Thomas Mitchell - 'hard working, rude, ill-tempered' - who strove only after 'his own fame', and in so doing 'quarrelled

---

[1] No. 32 Soho Square was Banks's London residence from 1776, 'the change-house of ideas, the council chamber of science where far-reaching schemes were conceived, elaborated and perfected', Cameron, <u>Joseph Banks</u>, p.xviii.

[2] Leichhardt to Durando, September 1841, <u>Letters of Leichhardt</u>, p.378.

[3] <u>S.M.H.</u>, 4 July 1841.

with everyone',[1] ignoring instructions from the highest quarters in Sydney and in London, survived for nearly thirty controversy-ridden years, currying favour with scientific friends in Britain and using the Survey Department to play the influential man of science in the colonies, a role in which he had successfully cast himself in the less competitive days of the late 1820's and the 1830's.

At that period Mitchell had, indeed, been favoured with a renewed productive interest in Australian palaeontology to help him carry off his part. The Wellington bone finds, he proudly told George Ranken in 1833, had put

> Buckland's nose...completely out of joint...their not being those of lions or hyenas is, I find, a fact which is considered in England to entirely upset his theory. And I have now heard from the best authority that the fact of their fossil bones not belonging to animals similar to those now existing has worked a great change in all their learned speculating on such subjects at home.[2]

Charles Lyell, supporting Hutton's ideas in his influential Principles of Geology, wrote that the Wellington finds

> prove that the peculiar type of organisation that now characterises the marsupial tribes has prevailed from a remote period in Australia and that...many species of mammalia have become extinct.[3]

Stimulated by such finds Europe's geologists worked for years relying on Bennett, Clarke, Mitchell, Leichhardt and others to provide the evidence from which to articulate skeletons and erect systems.

---

[1]Darling to Murray and Darling to Hay, 28 March 1831, H.R.A., Ser. I, vol. XVI, pp.125 and 219. See also J. Cumpston, Thomas Mitchell: Surveyor General and Explorer (London, 1954), pp.66-7.

[2]Mitchell to Ranken, 24 July 1833, quoted in Lane and Richards, 'Discovery, Exploration and Scientific Investigation of the Wellington Caves', Helectite, 2(1963), p.17.

[3]Principles of Geology, vol. III, p.143, quoted in Lane and Richards, ibid., p.17.

Left entirely to the Macleay circle science in New South Wales would have remained largely a closed-shop activity. As new arrivals both Bennett and Clarke chafed at their isolation and the aloofness of the tiny scientific establishment. Clarke tried to promote science in the Sydney Morning Herald and the one positive attempt to take science to a wider public, the Sydney Mechanics' School of Arts, fell eventually into the hands of the 'middle-classes'.[1] By the early fifties even Clarke had assumed the stance of a jealous purveyor of geological opinion; unready or unwilling to accept the competition of new workers in the colony. In 1878 he proudly wrote:

> I have never had an hour's assistance in the field from any individual during my thirty-nine years of geological labour.[2]

The absence of a scientific governor, liberal or illiberal, to goad or guide scientists undoubtedly contributed to the organisational inertia. The transition from the age of 'individual enterprise' was marked, indeed, by the determination of Denison in 1856 to form a viable scientific society[3] and set up other scientific institutions in New South Wales. Governors Bourke, Gipps and Fitzroy, although sympathetic, had neither the interest nor personal scientific competence of a Franklin, La Trobe or Denison to formulate a science policy. When occasion demanded they usually deferred in scientific matters to Deas Thomson, the Macleays and their friends.

The rise of legislatures having members interested in scientific affairs brought the debate and ultimately the control of such affairs into the hands of parliamentarians. In 1853 the 'Linneans' of the Australian Museum circle sought and were granted an Act of Incorporation which gave them powerful sanctions over one important area of the colony's science and confirmed their already privileged positions by giving them the status of trustees.[4] The seeds were sown then for the bitter fruits of much future scientific controversy.

---

[1] Australia's Colonial Culture, pp.120-60.

[2] Quoted from Remarks on the Sedimentary Formations of New South Wales (Sydney, 1878), p.24 in James Jervis, 'Rev W.B. Clarke, M.A., F.R.S., F.G.S., F.R.G.S., "The Father of Australian Geology"', J.R.A.H.S., XXX(1944), p.346. Clarke did, however, co-operate closely in the field with many visiting geologists, including Dana and Jukes.

[3] Denison to Murchison, 25 June 1856, Varieties of Vice-Regal Life, vol. I, pp.353-4.

[4] R. Etheridge, 'Australian Museum...', Rec. Aust. Mus., XII, No. 12(1919), pp.367-81.

Lhotsky, the first of the 'foreign litterati' and assailants on colonial scientific complacency, was a 'versatile mind, dreamer, writer of utopistic [works], botanist and naturalist...a talented but unhappy man, bound to fail in his practical achievements which lagged far behind his abilities'.[1] Like Henderson he was an opportunist but lacked the refinements of social grace so necessary to advance. Arriving in Sydney in May 1832 he boasted only the King of Bavaria's generosity and his own large plans and 'foreign' qualifications to commend him for preferment as a colonial scientist.[2] Finding provision for a Colonial Museum in the estimates Lhotsky immediately offered himself to Bourke for the unfilled post of colonial zoologist 'until confirmed or revoked by the Home Government'. Alexander McLeay, expecting a zoologist and botanist to arrive from Britain, ignored Lhotsky's overtures.[3]

But the colonial Whig and brilliant orator William Charles Wentworth (1790-1872) had also scrutinized the colonial estimates and satisfied himself that 'an infantile people' should not be taxed to promote 'Zoology, Mineralogy and Botany' and other philosophical 'gew-gaws'. 'H.M. Ministers', complained Wentworth, are fairly stuffed with birds and rare curiosities', and so encouraged 'certain personages, so long the bane of New South Wales' to maintain an 'influence' at home. Science must be curbed above all for reasons of economy:

> If a Hovell or a Hume or a Sturt or a Lhotsky choose to go a-botanising or geologising...pay their expenses for the time-being and THEN HAVE DONE WITH THEM. But have no hangers-on, no regular ESTABLISHMENTS, NO PERMANENT SALARIED men of science.[4]

---

[1]Vladislav Kruta, <u>K. Počátkům Vědecké Dráhy J.E. Purkyně</u> (Brno, 1964). (<u>Beginnings of the Scientific Carreer (sic) of J.E. Purkyně. Letters with friends from the Prague years, 1815-1823</u>), p.184.

[2]Lhotsky had a doctorate in medicine from Vienna, having received his earlier education in Prague and Berlin. The King of Bavaria's grant had enabled him to undertake biological studies in Brazil before coming to Australia.

[3]Lhotsky, <u>Journey from Sydney to the Australian Alps</u>, pp.57-8; Lhotsky to Bourke, 3 October 1832, quoted in G.P. Whitley, 'John Lhotsky and the Australian Museum', <u>Australian Natural History</u> (September, 1965), pp.92-6, and McLeay to Hay, 5 June 1832, quoted in Gilbert, 'Botanical Investigation in N.S.W.', vol.II, p.457, original in Col. Office, Misc. Letters, N.S.W., 1832, M.L., A2146, p.252.

[4]<u>Sydney Monitor</u>, 19 June, 13 and 20 July 1833 and Whitley, 'Lhotsky and the Australian Museum', pp.93-4.

Passingly popular though they were, Wentworth's views endeared him neither to McLeay nor to Lhotsky sitting in their opposite scientific camps.

Lhotsky, 'a man without future and unconnected with government', was predictably confused by the antics of these English colonists. Three months before Wentworth's outbursts the culture-conscious of Sydney had heard Henry Carmichael (d.1862) deliver his 'Introductory Discourse' to the newly-founded Mechanics' Institute, a project dear to the heart of Governor Bourke and graced by Surveyor-General Mitchell as president. 'If we mean to rise in the scale of nations', Carmichael had emphasized, 'we must possess a literature and science of our own'.[1] Mitchell's own researches were demonstrating the 'vast field' awaiting all men of science in Australia to 'produce ample facts for aiding the speculations of science':

> Had men been accustomed to meet together here, professedly for the purpose of discussing matters of science, and of devising the best modes of multiplying the comforts of society, the various departments of art would have been plied among us with much greater efficiency, and our Colonial Government been saved the trouble and odium of much equivocal legislation. With the aid of science, and under the play of free competition, for instance, the important processes of distillation and brewing would have been on a far different footing... and our agriculturists would have found out remedies for the prevention of scab much more effective and much more appropriate than legislative enactment.[2]

Seeing the support given to the Institute initially Lhotsky naturally assumed that Carmichael's plans had the general approval of the establishment. For that reason he nâivêly pressed home the cause of science in a deluge of lectures, writings and public proposals to develop colonial resources.

---

[1] N.S.W. Magazine, I, No.2 (1833), p.78. Carmichael, protégé of Bourke and J.D. Lang and a graduate of St. Andrews (M.A. 1820), was engaged by Lang as a teacher for the Australian College in 1830. For his career and part in the Sydney Mechanics' Institute see Australia's Colonial Culture and A.D.B., I, pp.210-11.

[2] N.S.W. Magazine, I, No.2(1833), p.81. Carmichael was convinced that the Institute had a part to play in developing mining and manufactures; tanning and leather industries; whale oil; salt curing; the extraction of alkalis from mangroves and so on. Nadel's conclusion that Carmichael placed less importance on the 'general scientific' and manufacturing objectives of the institutes, treating them 'as less important than the restatement of the aims of institutions of the mother country and the emphasis on the social and moral consequences' is open to re-interpretation.

In the face of McLeay's apparent complacency Lhotsky felt he had a strong claim for patronage from the 'Whigs' in the government - including Bourke himself - even if 'Tories' in the civil service, like McLeay, opposed him. What he failed to grasp was that the Mechanics' Institute as constituted was not the province of 'scientists, pastoralists or agriculturists', but of 'society-builders', men who 'generally conceived of colonization less in terms of exploitation of the resources of the land than of the spread of culture and education'.[1]

Lhotsky's frustration at making little headway in his efforts to gain support for his scientific ventures was certainly heightened when he saw how the small establishment treated the right candidate for scientific office fresh from Britain. On his second visit to New South Wales in 1832-3 George Bennett had been disgusted to find 'the majority [of colonists] too thirsty for gold' to care about scientific enterprise.[2] But McLeay, attending Bennett's zoological dissections in Sydney,[3] was impressed enough to support his candidature as colonial zoologist. For one so close to Owen and so well-known in British scientific circles Bennett's colonial success was assured.[4] So, too, was that of Richard Cunningham (1793-1835), who arrived as colonial botanist in January 1833, carrying testimonials from Robert Brown, W. J. Hooker and William Townsend Aiton (1766-1849) of Kew and from his own fastidious brother, Allan - whose uncompromisingly high standards in botanical science were known and respected in Sydney.[5]

---

[1] Australia's Colonial Culture, p.123.

[2] Bennett to Owen, Sydney, 20 February 1833, G. Bennett Papers, Uncat. MSS, Set 361 and 362 (microfilm), M.L., Sydney. Originals in Royal College of Surgeons, London. See also V.M. Coppleson, 'The Life and Times of Dr George Bennett', Bull Post-Graduate Comm. Med. 2, No.9 (1955), pp.207-64.

[3] Bennett to Owen, 4 February 1833, ibid., p.238.

[4] Bennett travelled widely in the Indian Ocean before commencing his medical training at Plymouth, the Middlesex Hospital and the Hunterian School of Medicine under Charles Bell, Herbert Mayo and Caesar Hawkins. He achieved membership of the Royal College of Surgeons in 1828, by which time he was closely associated with Owen. On his second voyage (1828-31) he re-discovered the pearly nautilus and gathered materials for a number of papers on anthropology, botany and zoology, securing election to the Linnean Society and as a Corresponding Member of the recently founded Zoological Society.

[5] Gilbert, 'Botanical Investigation in N.S.W.', vol. II, pp.460-2. Allan Cunningham had prepared the ground well for Richard with a 'Memorandum' to Hay in July 1832 outlining how the Botanic Gardens should be administered on a proper scientific basis.

Lhotsky feigned not to be impressed by the new arrivals and chose Mansfield's New South Wales Magazine (1833-4) to crusade for reforms in colonial science. 'No efforts whatsoever', he complained fatuously, 'are made at present...to extend botanical researches to the more unknown parts of this gigantic continent'.[1] It was indeed, some time before Richard Cunningham could turn from his work upgrading the Botanic Gardens to undertake interior exploration with Mitchell, when he was killed by Aboriginals in 1835. Lhotsky's next scheme was to propose an 'association' to search for minerals. But the idea found little support among the 'illiberal and sordid' populace of the colony. 'Men of science', Lhotsky was advised, would 'earn a claim to future employment' if they could successfully lead an overland party to the Swan River settlements.[2]

Lhotsky received some answer to his appeals for scientific 'intelligence' and specimens in the New South Wales Magazine.[3] In January 1834 he set out at his own expense to ascend the Australian Alps.[4] On this expedition he developed 'the first rudiments of a radical Geology of Australia'; suggested a five-fold ecological classification of vegetation in Eastern New South Wales; defined the natural boundaries of the Monaro; warned against 'genera and species' hunting and restricted himself 'to laying down the simple data, leaving to others, or to a subsequent period, more discursive reasonings'.[5]

---

[1] N.S.W. Magazine, I, No.1 (1833), pp.41-2.

[2] Australian, 9 August 1833.

[3] He supported James King's (1800-57) claim for recognition as discoverer of valuable white sand deposits near Sydney; published lists of Australian minerals; reviewed G. Hassel's Vollständige und neueste Erdbeschreibung von Australien (Weimar, 1825) and established correspondents on the Murrumbidgee and at Yass Plains and Moreton Bay. The Earl of Mountnorris was so stimulated by reading Lhotsky's scientific articles in the N.S.W. Magazine that he authorised his London agents to forward money through Mansfield to enable Lhotsky 'to exert himself with effect in his future researches and collections'. See N.S.W. Magazine, I, Nos 1-3 (1833); Australian, 19 July 1833, and Sydney Gazette, 9 September 1834.

[4] It has been argued that Lhotsky climbed Mt Kosciusko and reached the Snowy River but also, more recently, that he ascended no further than the eastern side of the Kosciusko Plateau near Mt Terrible (possibly Lhotsky's Mt William IV). See D.N. Jeans and W.R. Gilfillen, 'Light on the Summit: Mount William IV or Kosciusko?', J.R.A.H.S., 55(1969), pp.1-18 and A.E.J. Andrews, 'Further Light on the Summit: Mount William IV not Kosciusko', J.R.A.H.S. 59(1973) pp.114-27. No modern author denies his achievements.

[5] Journey to the Australian Alps, pp.5-7, 21 and 76-100. See also Sydney Gazette, 15 April 1834. For a discussion of Lhotsky's zoological work see T. Iredale, 'Lhotsky's Lament', Aust. Zoologist, III, part VI (1924), pp.223-6.

Back in Sydney Lhotsky found in Richard Cunningham a willing partner for working up the botany of his pioneering expedition but McLeay remained aloof when approached about assisting with the entomology.

Lhotsky vented his indignation by hastily writing Journey to the Australian Alps. He attacked all his adversaries, real and imagined, and tauntingly criticised the colonial system of 'favour', the nepotism and preferment in high places: 'even the Whaling Grounds', he would not be astonished to hear, might be 'given away to Cousins, Sons-in-Law etc'.[1]

'I am', boasted Lhotsky, when sore beset by creditors in 1835, 'the only author-explorer New South Wales has possessed since Captain Sturt now four years since'.[2] But even appeals direct to the Colonial Office in London for some financial recognition availed nothing.[3] He had offended grossly against colonial etiquette and news of his unscrupulous conduct preceded him to Van Diemen's Land, where Franklin, a better judge of science than character, employed him to plan coal-lines at Port Arthur alongside Lempriere.[4] Unemployed again by 1837, the volatile Pole lectured, wrote and collected from a precarious Hobart Town base trying to offset his debts by the sale of his natural history collections. When the Legislative Council finally liquidated his debts, Lhotsky sailed for England in 1838, taking a recommendation from Franklin to Murchison. But the latter dismissed him

---

[1] Journey, p.76, footnote. 'Under the greater number of Governors, who have ruled these Colonies until now, every thing was possible with, and nothing at all practicable without favour'.

[2] Monitor, 20 June 1835. With his debts standing at £140, Lhotsky appealed to the creditors not to remove his 'paltry furniture' and informed the public of Bourke's refusal to take his petition for remuneration before the Legislative Council.

[3] Lhotsky to Glenelg, 23 October 1835 and 2 May 1836 and Glenelg to Bourke, 22 April and 10 November 1836. H.R.A., Ser.I, vol. XVIII, pp.407-08 and 586, and Despatches to Governor of N.S.W., A1273, pp.390, 393 and A1274, p.379, M.L., Sydney.

[4] Basil Kendall inserted notices in the press demanding that Lhotsky return the MS of the second edition of Rev. Thomas Kendall's (1778-1832) Grammar and Vocabulary of the Language of New Zealand (London, 1820) which Lhotsky had allegedly purloined. Frankland, the surveyor-general of V.D.L., unsuccessfully recommended Lhotsky for appointment as colonial naturalist in November 1836. Lhotsky was in Port Arthur from 17 February to 2 April 1837. Lhotsky MSS., A577, M.L. Sydney, and A.D.B., II, pp.114-5.

as a 'mad Pole' and Deas Thomson recalled him as 'an errant humbug'.[1]

Defeated and ostracized by those colonists who could recall Barron Field's injunction to guard their scientific birth-right against foreigners, Lhotsky blazed and burdened the path for his countryman, Strzelecki. But there was method in his science, certain biological and geological abilities of no mean order obscured by his fulminating and follies.

Lhotsky's dismissal proved a phyrric victory in colonial science. In July 1835 Bourke received Bennett 'very kindly' for his European honours and publications on Australian natural history gave added credence to the testimonials he bore to Sydney as colonial zoologist.[2] Government, eager to use but not to pay him liberally, set Bennett to examine a virulent disease among sheep, 'our most valuable living animals'. Bourke 'expressed himself much pleased with the report of the Histy, Causes, Nature and Treatment of the Disease' but the £100 salary paid to Bennett hardly sustained his needs. Following R. Cunningham's murder Bennett appealed to Owen to try and secure the botanist's positions and emoluments in Sydney as colonial botanist and curator of the Botanic Gardens.[3]

The choice fell, however, upon Richard's brother, Allan, who returned to Sydney in February 1837 to find himself in the hands of an official

---

[1] Ibid., and Deas Thomson to E. Wise, Barham, 4 May 1863, interleaved in Wise's copy of Journey to Australian Alps C461[-1], M.L. Sydney. Lhotsky's work achieved some recognition when Hooker published 'Some data towards the botanical geography of New Holland', London Journ. Botany, II. (1843), pp.135-41 and a further botanical paper was published in Proc. Linn. Soc., I(1849), p.4. His anthropological papers on Tasmania and the Monaro 'tribes' attracted wide attention.

[2] He was awarded the rarely bestowed honorary gold medal of the Royal College of Surgeons for his contribution to zoology and had published Wanderings in New South Wales, Batavia, Pedir Coast, Singapore and China, being the Journal of a Naturalist (London, 1834) and numerous other medical, botanical, zoological and anthropological papers. See also Bennett to Owen, 16 August 1835, 'Life and Times of Bennett', op. cit., pp.241-2.

[3] Bennett to Owen, 20 October 1835, ibid., p.242. Report on the Epidemic Catarrh Affecting Sheep (Sydney, 1835).

dabbling sub-committee of management under Alexander McLeay which spent much of its time arguing over powers and privileges.[1] In the dying months of Bourke's administration Allan Cunningham, his professional standards as a botanist affronted, refused to remain as 'a mere cultivator of official cabbages and turnips' and resigned his positions 'in disgust' in December 1837, taking the opportunity to let the public at large know his reasons for going. Many sections of opinion were glad of additional opportunity to further discredit Bourke's administration and Cunningham's high claims for science were given a sympathetic press. Sir George Gipps (1791-1847), the new governor, sued for an amicable reconciliation but Cunningham set impossible terms for his own reinstatement. For another decade the Gardens remained neglected as a scientific institution.[2]

At first Bennett, too, had found himself 'almost alone in [his] scientific pursuits' and gained little consolation from his dilatory correspondent, Owen.[3] Bennett's isolation promised to be overcome by the arrival in 1836 of the eminent zoologist, Dr John Vaughan Thompson (1779-1847), deputy-inspector-general of hospitals. Bennett was soon 'on a good acquaintance' with Thompson, discussing the possibilities of examining the marine fauna of Port Jackson.[4] In June 1836 the government set up a General Committee of Superintendence with two sub-committees to administer the Museum and Botanic Gardens. Bennett, his cup overflowing, was made secretary to both committees for this, the first attempt to bring together the colony's leading scientists since the days of Sir Thomas Brisbane.[5]

---

[1]The sub-committee comprised Alexander McLeay, Sir John Jamison, William Macarthur, George Porter, J.V. Thompson, and Robert A. Wauch. Minute Book (1836-63), General Committee of the Australian Museum and Botanical Gardens, 7 June 1836, Australian Museum Library. See Gilbert, 'Botanical Investigation in New South Wales', vol. II, pp.465-7.

[2]Ibid., pp.467-74.

[3]Bennett to Owen, 10 March 1836, Bennett Papers, M.L., Sydney.

[4]Bennett to Owen, 14 May and 7 July 1836, ibid. Bennett always welcomed Owen's rare letters and enclosures as 'an intellectual feast in a country where, altho' scientific subjects are not rare, publications on them are exceedingly so'.

[5]N.S.W. Government Gazette, 15 June 1836, p.451; Etheridge, 'Fragments...', Rec. Aust. Mus., XI, No.4 (1916), pp.72-4 and Bennett to Owen, 7 July 1836, Bennett Papers, M.L., Sydney.

Bennett made plans to correspond with all parts of the world, hoping to see the Australian Museum with improved facilities become an important centre of reference and research. In 1837, as curator and secretary, Bennett published a Catalogue[1] of the Museum's holdings, a useful supplement to the continuing papers, observations and specimens with which he plied Owen and the British journals. But Bennett's energy was scarcely matched by the Museum sub-committee made up of Alexander McLeay, his son George (1809-91) - later to be of considerable assistance to Owen - Charles Sturt, Deas Thomson, P.P. King and J.V. Thompson.

Despite early resolutions to meet regularly both committees lapsed in their intentions. At the first meeting of the Museum sub-committee in June 1836 Bennett was instructed to find correspondents in all the Australian settlements, including Norfolk Island. The members agreed to catalogue their books as a reference pool and Bennett, clearly under the influence of McLeay, was authorised to begin an entomological collection. Government agreed to a request to provide convict labour for the Museum and thereafter the committee left most affairs in Bennett's hands. Only McLeay and J.V. Thompson were regular in attendance at meetings and between November 1836 and September 1837 no proceedings were recorded.[2] Bennett proved a more pliable servant to the Museum group than Allan Cunningham was to the Botanic Gardens sub-committee.

Between 1835 and 1838 politics obtruded into attempts to attain some corporate scientific effort, even at this rudimentary level. Just as McLeay seemed willing to give science in the colony a positive lead he was embarrassed by Bourke's determination to appoint his son-in-law, Deas Thomson, as colonial secretary. With McLeay achieving some popularity for his stand against Bourke's National Schools policy and factions realigning themselves regularly over issues such as immigration, elective government and transportation, few had the time or stomach for scientific endeavours. In January 1837 McLeay reluctantly resigned as colonial secretary and two months later J.V. Thompson's re-organization of the Colonial Medical Department was bitterly attacked by the long-serving James Mitchell (1792-1869), surgeon at the Sydney Hospital. Backed by Bourke, Thompson struck Mitchell from the list of colonial surgeons. Years of litigation,

---

[1] A Catalogue of the Specimens of Natural History and Miscellaneous Curiosities Deposited in the Australian Museum (Sydney, 1837), 71pp.

[2] Minute Book (1836-63), Aust. Museum, Sydney.

petitioning and acrimonious public debate followed.[1]

Divided deeply among themselves over factional and personal issues members of the Museum and Botanic Gardens sub-committees often had their attention diverted from scientific issues. Alexander McLeay, freed from official duties, retreated to his Elizabeth Bay collections, where his eldest son, William Sharp, joined him in March 1839. Following Bourke's appointment of the liberal James Jamison, Wentworth's friend, to the Legislative Council in 1837, P.P. King claimed the seat for himself and took his grievances as far as the Colonial Office. In 1839 King left Sydney to take up appointment as resident commissioner to the Australian Agricultural Company. At Port Stephens he continued his private scientific researches, particularly in meteorology, contributing to overseas journals and the Tasmanian Journal and even printing some of his own papers privately.[2] He was always regarded as a key figure to consult by the Sydney-based, overseas and visiting scientists.

Bennett was bitterly disappointed with the work of the Museum committee before he resigned in 1841 to devote himself to medical practice. John Vaughan Thompson's colonial scientific career fell far short of its promise. Well-known to McLeay from Linnean Society days, Thompson came to Sydney with a European reputation as a fundamental research worker on marine invertebrates. His work on the Cirripedia (barnacles), for example, had corrected the work of no less an authority than Cuvier. His studies 'both modified and extended the concept of metamorphosis beyond the range of entomology', suggesting further fascinating themes for investigation in embryology and parasitism.[3] Although occupying 'an isolated position' in European zoology - he was district medical inspector at Cork (1816-35), where his most important work was done - Thompson's 'extraordinary genius' earned him an important place in the history of zoology in the period between Cuvier and Darwin. 'Probably', wrote the zoologist historian, E.R. Lankester, 'no great naturalist has ever written so little

[1] A.D.B., II, pp.235-8. Mitchell, an innovator of colonial industrial enterprises, became a trustee of the Australian Museum in 1853. In 1833 Mitchell's cultural and scientific connections were strengthened by his marriage to Augusta Maria Scott (1798-1871), the naturalist-artist, daughter of Dr Helenus Scott, father of the Scotts of Glendon and Newcastle.

[2] A.D.B., II, pp.62-3 and Tas. Journ. Nat. Sci., III, pp.465-9.

[3] Singer, History of Biology, pp.495-6.

and that so good'.[1] With the wealth of Port Jackson's marine fauna available Thompson, tragically for Australian science, did nothing. His four Sydney papers on cultivating cotton and sugar-cane published in India[2] were poor consolation to Bennett.

Had he possessed the tenacity of a Gunn or even of the dying Allan Cunningham; had he enjoyed the same official and corporate 'encouragement' as the scientists were simultaneously enjoying in Tasmania, Bennett, with wide colonial contacts, including Charles Coxen (1809-76), Gould, La Trobe and Dieffenbach, might have been able to carry through more vigorously his programme for the Australian Museum and enhanced science in New South Wales by drawing on the combined talent of the committees he served.[3] Some measure of his frustration was evident in a letter he wrote to Owen in August 1839, five months after the zoological giant, W.S. Macleay, arrived in Sydney:

> W.S. McLeay (sic) is here but keeps close - we know not what work he is upon - and I know not if he is of a communicative disposition, but I daresay you [Owen] will have some interesting & valuable papers from him in your part of the world.[4]

W.S. Macleay's influence on pre-Darwinian systematic zoology in Britain was significant: he was a leader in the efforts to restore the zoological sciences to a position of importance in British natural history. England, reformers and critics complained, had lagged for too long behind France.

---

[1] Thompson is rarely mentioned in the Australian literature. He became an assistant-surgeon in 1799, serving in Gibraltar, West Indies and Guinea. In the tropics he made a particular study of land crabs and their metamorphosis and began to publish on zoological and botanical topics. He was elected F.L.S. in 1810. In 1812 he went to Mauritius and Madagascar and studied the dodo. His important work on marine invertebra was done at Cork on the life history of the feather star; polyzoa; cirripedia and crustacea. His fame was established by 1830. See Fletcher, 'Society's heritage', pp.626-7; S.M.H., 26 January 1847; D.N.B., LVI, pp.218-9 and Lankester in Encyclopaedia Britannica (11th ed.), XXVIII, p.1029.

[2] Journ. Agric. and Hortic. Soc. India, I(1842), pp.183-95, 257-62, II(1843), pp.243-5 and IV(1845), pp.143-7.

[3] Bennett pursued a wide-ranging correspondence for the Museum with the Linnean Society, British Museum, Edinburgh Museum and other institutions in Europe and India where the Macleays had good contacts. Letter Book (1837-61), Aust. Museum Library.

[4] Bennett to Owen, 7 August 1839, Bennett Papers, M.L., Sydney. Bennett was already in contact with Gould.

An extended residence in Paris from 1818 had made Macleay an admirer and student of Cuvier, Lamarck and Latreille, the entomologist. Like that of J.V. Thompson, Macleay's earlier career kept him for nearly twenty years out of Britain, mostly in tropical appointments. His interests, however, became more philosophical than descriptive: 'the primary and avowed object of his studies was the pursuit of the natural system'.[1] Access to his father's extensive entomological cabinets, the publication of Cuvier's Règne Animal in 1817 and Macleay's determination to revise Latreille's entomological contributions in this work led directly to his most important scientific treatise Horae Entomologicae (1819 and 1821).

In this and later monographs Macleay developed the principles of his so-called 'Quinary' or 'Circular and Quinary' system of classification, which ideas influenced greatly the work of Swainson, Vigors and other British zoologists. Philosophical theism underlay much of Macleay's thinking. Despite his influence and prestige his ideas were subject to much healthy criticism by contemporaries, who realized or in time came to realize the inherent inconsistencies of his system.[2]

When he returned to England from Cuba in 1836 Macleay was received without question into the highest circles of British science. In September 1837 he was president of Section D (botany and zoology) for the British Association meeting at Liverpool. In 1837-8, before emigrating to Sydney, he made the acquaintance of Edward and James Macarthur and was certainly well versed in colonial politics and science before his arrival. Like Barron Field fifteen years previously, Bennett had every reason to believe in 1839 that William Sharp would provide a much needed stimulus to scientific life in Sydney: he personified the inner establishment of British science. 'But', wrote Fletcher, Macleay's only thorough biographer, his 'limitations'

> as a systematiser - the propounder of principles, and of a system, of classification..., apart from the imperfections of the knowledge of the time, and from the fact that he was a private individual, unattracted to a teaching-institution or a museum, cultivating an

---

[1] Fletcher, 'Society's heritage', p.593.

[2] Ibid., pp.593-600. Macleay, it was thought, was one of the most successful of contemporary writers to bring out the distinction between affinity and analogy in natural history.

> interest in natural-history in his leisure hours, came in no small degree from his English traditions and nurture.... For it was in England, in his day, that the views respecting the significance of the Natural System, which he advocated, chiefly prevailed.[1]

There was little real intellectual stimulus in Sydney Town to pitch against Macleay's philosophical zoology. After his arrival he published only six small papers, some in answer to his disciples and critics, like Swainson.[2] He developed some newer interests in marine zoology and attended to the building up of his entomological collections. During the forties, except for one half-hearted attempt to combine his talents with local men of science, he remained essentially a 'private individual'. He was always 'universally recognised as the leading representative of Zoology in Sydney' but, until Alexander's death in 1848, William Sharp's attendance at Museum and Botanic Gardens committee meetings was sporadic. The Museum's affairs devolved upon McLeay, J.V. Thompson and Rev W.B. Clarke until the colony emerged from the economic depression and retrenchments of the early forties.

W.S. Macleay and Thompson fought shy of publicity and Bennett was too timid to press the cause of science in the colony. Clarke - with a very acceptable geological background under Sedgwick at Cambridge to commend him - came to New South Wales in May 1839 with quite different intentions. His colonial career was devoted to the public promotion of science and dissemination of local knowledge, particularly geology and meteorology, to which he made fundamental contributions. Clarke was W.S. Macleay's junior by only six years but he boasted no comparable scientific reputation before commencing his colonial studies. But his contributions to natural history in the 1830's gained him the support of Sedgwick, Henslow and Murchison and he knew many British scientists from scientific and British Association meetings and contacts in Britain. His modest scientific honours and attainments combined with his ecclesiastical contacts to assure him of a reasonable start, despite his poverty, in New South Wales.

---

[1] 'Society's heritage', p.593.

[2] E.g. 'On the natural arrangement of fishes', Ann. Nat. Hist., IX (1842), pp.197-207, originally published as a letter in Calcutta Journ. Nat. Hist. (1841). Macleay's Sydney papers are discussed briefly by Fletcher, op. cit., pp.606-12.

'Shut up in a corner, neglected so to speak' as headmaster of the King's School, Parramatta (1839-40), and later as a clergyman, Clarke overcame the intellectual barrenness by striking out into his seemingly unpromising environment. An indefatigable geological traveller in Britain and Western Europe in the 1820's and 1830's, Clarke, despite poor health, was soon examining the geology of New South Wales. In December 1839 he met Strzelecki, visited McLeay at Elizabeth Bay and in January 1840 explored the Illawarra with James Dwight Dana (1813-95), geologist to the United States Exploring Expedition under Wilkes.[1] At the end of 1840 he resigned his Parramatta appointment to become paid secretary and curator to the Australian Museum.[2]

The year 1841 held promise of some significant advances in the intellectual life of the now free colony. The Mechanics' Institute had 'a record year not only for membership but also for lectures'.[3] Charles Kemp (1813-64), prominent Anglican layman and journalist, helped found the Church of England Book Society.[4] The same year he purchased the Sydney Herald with John Fairfax. In October 1841 Clarke delivered a two-hour lecture before the Book Society on 'The Legitimate Objects and Benefits of Natural History and Science'. With that propriety due in a lecture graced by Bishop Broughton, Clarke first established 'the utility of scientific pursuits to the promoting of a right knowledge of God, and of genuine religion'. The 'Australian population', he delightedly reported, was

> now beginning to be as much distinguished for the desire of knowledge, or rather a thirst for intellectual display, as previously for the desire of money.[5]

---

[1]Jervis, 'W.B. Clarke', J.R.A.H.S., XXX(1944), p.358 and Ann Mozley, 'James Dwight Dana in New South Wales, 1839-1840', J. & Proc. Roy. Soc. N.S.W., 97 (1964), pp.185-91.

[2]Minute Book (1836-63), Aust. Museum, minute for 4 August 1841.

[3]Australia's Colonial Culture, pp.143-7.

[4]Ibid., pp.85-6. The first general meeting was held on 26 August 1841. The society's library was to contain 'approved Theological Works, in accordance with the tenets of the Church of England, and of Moral, Scientific and Instructive publications not opposed to them'.

[5]S.M.H., 23 October 1841.

With the first number of the Tasmanian Journal 'lying before' him Clarke moved deftly from 'the controversy about scripture, geology and modern observation' to look at the

> condition of Australia and consider the deficiencies with which she is struggling; the want of colleges, the higher schools, the want of libraries, the want of museums, and above all the want of associations of men capable and desirous of mutual assistance in the study of science and nature; I am constrained to think, that, for the present, such societies as this [the Book Society] afford our only hope of better days....

The 'greater progress' in Tasmania might encourage the Book Society and 'kindred confederacies', indeed the community at large, to found

> a society of another kind, one destined not to shed a borrowed light upon ourselves, but to pour forth from us a new beam of intellectual glory upon distant lands.

Stirred by Lillie's address to the Hobart scientists and 'the thunder of applause from the pupils of the Grammar-School' - the bulk of his audience - Clarke, despite a 'severe ophthalmia', warmed to his vision. Australia, 'their singular country', would raise up

> men capable and willing....encouraged by examples further off... to extend her sway in arts, manufactures and science; and from the southern oceans there will arise a constellation of talent and skill that will attract the eyes of even northern observers, and that a new sun will beam upon our present benighted stragglers, in this hitherto unscientific and neglected region.[1]

Not everyone, of course, was a 'benighted straggler'. With a quick review of the work of Gould, Allan Cunningham, T.L. Mitchell, W.S. Macleay - 'one of the first and most celebrated naturalists now living' - and Alexander McLeay - who 'has set the scientific men of Australia a bright example' - Clarke soon exhausted his repertoire of recent biological attainments and talent in New South Wales. In herpetology, marine biology and algacology 'nothing or next to nothing has been scientifically revealed'. Australian rocks might have 'none of the great objects to boast of, which render the rocks of other portions of the globe so instructive and amusing', Clarke

---

[1] Ibid.

speculated with becoming colonial humility, but 'every inch of it, (even the compound streets of Sydney itself), affords much ground for deep and curious research'. Sedgwick, suggesting a geological programme, had dismissed Clarke to Australia with the pregnant question 'have you seen Darwin's theory of coral reefs?'[1] and in the two years since then even the most superficial palaeontological and geological reconnaissances had convinced Clarke of the 'full employment' ahead.

Hoping for some corporate action Clarke advised colonial men of science to 'observe carefully...register correctly; - let theory alone, and search for facts'. Each had a duty to the Australian Museum or any scientific association formed in the colony.

> You may have it in your power to furnish matter to the philosophers of the northern world which will give you a place in their memory and a claim to their respect.

Clarke bemoaned 'want of local periodicals different from mere newspapers' and the demise of the earlier 'philosophical society', despite 'some very distinguished names'. Even the

> only national museum, (so to speak), in the midst of opportunities such as no similar institution in the world can boast, has been neglected by the public, and instead of being a source of instruction, is scarcely an object of general curiosity.[2]

Clarke's administrative lot at the Australian Museum was now shared by an active new committee man, Charles Nicholson (1808-1903), the Edinburgh-trained physician of unusual ability and intellect, who used his growing influence to support Clarke's campaigns to advance science. No less important as allies in the cause were the proprietors of the Sydney Herald.

The same month in which Clarke announced his programme of colonial science, Ludwig Leichhardt was ready to depart England for 'New Holland' after years of careful scientific preparation to take him to 'the interior,

---

[1] Sedgwick to Clarke, 10 December 1838, quoted in Jervis, 'W.B. Clarke', p.366.

[2] S.M.H., 23 October 1841.

the heart of this dark continent'.[1] A lesser man might have been discouraged by his reception in the leading scientific circles of London, which had been cool compared with the enthusiasm and support received from the French savants. But Leichhardt was well read in the social, economic and scientific prospects of Australia and had wisely resolved to progress under a British banner.

Arriving in Sydney on the crest of an emigration wave in February 1842 he made straight to Thomas Mitchell with his all important letters of introduction from Owen. He soon made the acquaintance of Clarke and Nicholson, cheered to find 'a few amateurs of science here and there who began to record observations and to make collections, and whom it may ultimately be possible to encourage into greater and more useful efforts'.[2] No Lhotsky by temperament, determined and optimistic, although quietly critical of the 'comparatively short reconnoitering thrusts'.[3] made by some former scientific explorers in Australia, Leichhardt impressed most of the 'amateurs' with his scientific skills and foresight. Clarke, Robert Lynd, Nicholson and others striving to found a working scientific community in Sydney rendered him the immediate moral support necessary to conquer the indifference and hostility which he met from the Macleay and official circles.

Leichhardt quickly assessed the scientific 'possibilities but few realities' of Sydney Town. The Botanic Gardens were 'decidedly well laid out though... little adapted to scientific study'; the Australian Museum 'was in disorder' and its library 'in some respects well stocked [but] unfortunately not so for

---

[1]Leichhardt to Schmalfuss, 27 September 1841, Letters of Leichhardt, vol.I, p.392. After a peripatetic education in Berlin, England and France (1836-9), mostly accompanied and supported by his friend Dr William Alleyne Nicholson, Leichhardt first resolved to go to Australia early in 1840. He studied further in some of the leading European institutions containing Australian materials, making himself proficient in comparative anatomy, botany, geology, mineralogy, physiology and zoology. In a letter to Humboldt, his idol, on 14 June 1841 he confessed he was concerned by his over-specialisation! For his preparation see Letters of Leichhardt, vol. I (Hereafter the references to the separate volumes of the Letters are omitted.)

[2]Leichhardt to Little, 25 March 1842.

[3]Leichhardt to Schmalfuss, 27 September 1841.

natural science'.[1] 'Zeal is by no means wanting in this young country',[2] wrote Leichhardt to a scientific friend in London. The German saw himself as a sort of colonial De Candolle who

> began to give his lectures on botany in Geneva (and found) extraordinarily little public interest in the subject, yet his own enthusiasm worked such a change over his rapidly increasing audiences that very soon the whole city seemed to have been transformed into a college of botany. In science there have been many such instances of zealous, energetic men drawing those around them into the field of their own efforts, like magnets. If I can't equal them, I should at least keep their example constantly in mind. My general orientation and my acquaintance with nearly all branches of natural science (should) make it easy for me to find out about the dispersed efforts (that are being made) in this colony, which encourages me to think that I might succeed in coördinating them.[3]

As a start Leichhardt offered lectures on botany to the Mechanics' Institute.

In April 1842 he went to Parramatta to discuss science, particularly meteorology, with Clarke. A week later, encouraged by scientific friends, among them the botanical barrack master Robert Lynd (1800-51) - 'dear' to Leichhardt from their 'first interview' because of his 'similarity in habits, in disposition and in love of nature' - applied for the vacant position as Superintendent of the Botanic Gardens caused by the death of James Anderson, 'an ordinary gardener, a man without scientific knowledge'.[4] There was no better person in New South Wales, Leichhardt's friends reasoned, to fill the post which the German, 'his mind teeming with scientific possibilities', was willing to accept, even at a reduced salary of £120, 'for the sake of securing a point of support from which I could make myself better known'.[5]

---

[1] Leichhardt to Little, 25 March 1842 and Leichhardt to Mark Nicholson, 10 April 1842. Most people, Leichhardt reported, did not even know where the Museum was located!

[2] Leichhardt to Little, 25 March 1842.

[3] Ibid.

[4] Leichhardt to William Nicholson, 17 May 1842 and Leichhardt to W.B. Clarke, 16 June 1842.

[5] Leichhardt to W. Nicholson, 17 May 1842.

Gipps, inclined to favour Leichhardt's application, deferred to the Botanic Gardens sub-committee where Alexander McLeay's was still the most influential voice. But McLeay liking neither foreigners nor the governor's party, had his own candidate, Nasimuth Smith, 'a gardener..., competent within his limitations but knowing nothing of botany'. McLeay's 'objections carried the day' even against the Macarthurs - who saw Leichhardt as 'something far superior to a mere Botanical collector' - and the recommendation of the respected botanist James Carne Bidwell (1815-53).[1] But McLeay was unwavering in his antipathy to Leichhardt.

Less than two years later when the superintendency again fell vacant, Leichhardt, one of six applicants, was once more rejected by McLeay's committee which was looking for a candidate with 'considerable proficiency in the Science of Botany'.[2] Another applicant, James Kidd, filled the post until the home scientists could agree on an appointment. Eventually Bidwell was appointed government botanist by FitzRoy in August 1847 but served only until February 1848 when Charles Moore (1820-1905), the choice of Lindley and Henslow, arrived. Moore's unexpected arrival was an acute embarrassment to FitzRoy and the Botanic Gardens sub-committee and also a source of considerable chagrin to W.J. Hooker who had been trying to find his own candidate.[3] Moore was not allowed to forget his innocent intrusion.

Leichhardt's lectures on botany at the Mechanics' Institute - 'an institution of small account' - attracted 25-30 people in July and August 1842.[4] 'The better educated people', Leichhardt observed, 'are very critical' of the School of Arts and the normal programme of lectures offered there.

---

[1]Leichhardt to W. Nicholson, 17 May 1842; Leichhardt to Durando, 23 June 1842 and Macarthur to Hooker, 5 August 1844. Cited in Gilbert, 'Botanical Investigation in N.S.W.', vol. II, pp.481-2.

[2]McLeay to Gipps, 20 July 1844, H.R.A., Ser. I, vol. XXIV, p.723. Gipps had already told Lord Stanley that the Botanic Gardens were 'under the management of a Committee of Gentlemen, who are for the most part unconnected with the Government'. Gipps to Stanley, 20 June 1843, H.R.A., Ser.I, vol. XXII, p.793.

[3]Gilbert, 'Botanical Investigation', vol. II, pp.485-90.

[4]Leichhardt to W. Nicholson, 17 July 1842. The poor attendance, one commentator noted, might lead the lecturer to think 'that there is less taste for scientific pursuits in the colony, than is actually the case', S.M.H., 22 July 1842.

The German, indeed, had no high opinion of them himself. He realised that his own association with the Institute would not impress the Macleay circle. 'I did my very best all round', Leichhardt told one of his friends, 'to encourage an interest in science', regarding himself as 'an itinerant preacher' among the 'better-class homes' he entered. Yet, despite his dedication, Leichhardt confessed, 'there's always been something lacking, something that holds me back from them'.[1] In England Owen forgot him and Hooker, when approached for Australian botanical literature for Leichhardt and Lynd to use in preparing 'a flora of Sidney', held aloof. Lynd remained 'almost the only one not biassed by national prejudice'.[2]

But Clarke, with credentials unquestioned in the highest circles, fared little better with his journalistic assault on scientific complacency. Leichhardt was one who eagerly read his meteorological reports with a critical eye, finding that the clergyman was sometimes 'too confused in his ideas' and manifested an 'extraordinary uncertainty and indecision in his discussions'.[3] In June 1842 Clarke began his series 'Notitae Australasianae' in the Sydney Herald, including a review of W.S. Macleay's notes on Antechinus Stuartii.[4] His aim was to publish 'any information which we may be able to collect from different quarters respecting the natural history of Australia'. The series was a sequel to his lecture and appeal of October 1841. Clarke clung to his resolve. With New South Wales scientists joining the Tasmanian Society as correspondents and the highly informative Tasmanian Journal circulating among them he saw

[1] Leichhardt to W. Nicholson, 17 July 1842.

[2] Leichhardt to W.J. Hooker, 5 September 1842.

[3] Leichhardt to Dove, 27 March 1842 and Leichhardt to W. Nicholson, 24 November 1842. See also Leichhardt to Clarke, 16 June 1842.

[4] S.M.H., 14 June 1842. Anything from Macleay's hand, Clarke noted, 'comes stamped with the seal of authority' and Macleay's summary of Australian natural history showed just how meagre was their knowledge, save for coastal 'birds and phanerogamous plants of certain of its districts'. Macleay's original observations were published in Ann. Nat. Hist., VIII (1842), pp. 241-3 and 337-8.

> no difficulty in forming such a Society if the proper zeal is displayed, and the proper means be taken to carry it into action. Every instance of this out of this colony, makes us regret the more, the apparent luke-warmness exhibited in it, and day by day we feel more constrained to lament the running to waste, so to speak, of Nature's abundance in this wide region, without any effort being made to turn her exuberance to the intellectual profit of the colonists.[1]

Clarke, no avid supporter of the constitutional advances of 1842, found it absurd that at the very time when colonists were making 'their importance as a people, the burthen of petitions, and the ground of Legislative Assemblies, and claims upon the Home Government' all the published information about the colony's natural resources was

> taught by publications which do not belong to it and that the magazines and transactions of the learned societies of Europe and Van Diemen's Land should be the only channels in which the physical history of New South Wales should be conveyed to her students.

Men of science, Clarke warned, would not 'throw their pearls before swine' but would understandably seek outlets where there was 'encouragement'.

> For a long time to come it will be our office to look to foreign, and not to domestic sources, to illuminate us with the light borrowed from our zenith.

New South Wales might well be recognized as 'an enterprising, scheming, ambitious country' but it rated 'a little above zero' in the 'intellectual' scale of nations.[2]

Having decided to appeal to colonial and intellectual chauvinism in his efforts to force some action Clarke chose his evidence carefully. In a review of Gould's Monograph of the Macropodidae or Family of Kangaroos (London, 1841) he revealed that only seven species of kangaroo were represented in the Australian Museum. 'The apathy of the public' led 'foreigners' to conclude that

---

[1] S.M.H., 24 June 1842.

[2] S.M.H., 24 June 1842.

> the study of Natural History is confined to the investigation of wool, and the fattening of beeves, and though kangaroos run wild all about us, he who would ascertain their species or habits must go to the Zoological Gardens of London, or spend twelve guineas with Mr Gould.[1]

Even in New South Wales Clarke's attacks on complacency and his appeals to colonial pride might at any other time have elicited a more positive response. But with the economy sorely depressed and many a personal fortune ruined, Gipps was more bent on retrenchment and conserving funds than upon expanding museums. He attacked Mitchell's Survey Department as 'unscientific' and made it one target of his drastic budgeting.[2] It was not surprising that scientific activists should henceforth tend to stress association as a means of restoring wealth and confidence in the colony by seeking new resources.

By 1842 W.S. Macleay had at last given some thought to the problem of scientific association. His ideas and prejudices were conditioned by his Linnean Society background and colonial sympathies. He wrote to Clarke in 1842:

> ...we want a Scientific Club here for the purpose of recording observations on Australian Natural history, which, in the actual state of things are every day being made only to be forever lost - an Assembly of the genus <u>Ampelis</u> (like Dr Douglas' Philosophical Society), where those who chatter most know the least of the subject they talk about, is of all assemblages of human beings, one of the most odious. But a Society of working bees who would talk only on subjects they had <u>read</u> up and who would record their observations and inferences they might draw from them, would, I think, do great good to the general course of Science.[3]

Douglass, friend of Wentworth and reform, was poorly remembered in Tory circles, but P.P. King, the acceptable colonial, Macleay regarded as essential to the success of any private 'Scientific Club'. It was to be a self perpetuating

---

[1]Ibid., 4 and 16 July 1842.

[2]Ibid., 23 and 27 August 1842. P.P. King defended Mitchell against Gipps's charges of inefficiency, which were repeated and aired regularly by the <u>Herald</u>.

[3]Jervis, 'W.B. Clarke', pp.434-5. 'Chatterers' is the popular name for <u>Ampelis</u>, a genus of insessorial birds (e.g. Bohemian chatterer or wax-wing, <u>Ampelis garrula</u>).

society of gentlemen:

> Our contributions might be voluntary, and entirely devoted to publishing such memoirs as should have been determined by a Council of the Members who might be qualified to be Members by having a Memoir published by the Council....[1]

The shadow of Banks and club science still loomed large in the Macleay's thinking. William Sharp's initiative, seemingly a response to Clarke's campaign, was not followed. Its spirit was alien to the trend of opinion among the little circle of active amateur scientists and their supporters in the colony. The concept was shelved for another twenty years until the Macleays launched their own societies with their own wealth and in their own image.

Clarke, indeed, began campaigning more vigorously for geology, for the study of structures, processes, rock succession and age. 'Geology', he wrote, 'is only a science of probabilities' where the academic and practical man could meet on common ground.[2] Well-diggers, for instance, could send observations on rock bedding and fossils they discovered to the Australian Museum, 'which ought to be the receptacle and storehouse of the products of the colony'. As paid secretary to the Museum committee Clarke was not able to sign articles in which he agitated for more government funds. As a journalist, however, he placed the blame where he thought it lay: with Gipps and government. 'Owing to circumstances put out of the power of the Committee who manage it', the Museum, 'though a valuable institution', was sadly patronised and almost neglected.[3] It was wrong to accuse the scientists of negligence.

Clarke shrewdly realised that he must temper criticism where public opinion was not yet fully convinced of the scientists' claims for funds, and where not all of them spoke as yet with one voice.

---

[1] Ibid., p.435.

[2] S.M.H., 19 October 1842. Clarke commenced a long series of articles on 'Fossil Bones' in October 1842.

[3] S.M.H., 19 October 1842.

Frustrated by his own reception Leichhardt quit Sydney in September 1842 to commence a twenty month 'reconnaissance' of the Hunter, Moreton Bay and northern ranges and tablelands. In so doing he laid the bases of much scientific knowledge in the areas he visited; widened his bush experience and got on closer terms with settlers and scientists outside Sydney.[1]

The Sydney Morning Herald did all in its power to keep science and resource survey before the public.[2] Encouraged in 1843 by the revival of an agricultural society in Parramatta, which was correctly discerned as the beginning of a new interest in corporate action to alleviate the colony's distress, the editors attempted an analysis of the malaise:

> The prominent defect in the community of New South Wales, is the want of union and co-operation. One of our correspondents... observed - rather rudely, but with too much truth - that our population is composed, not of society, but of masses. If the people came more frequently and more closely together, for the purpose of consulting on questions in which their common interests are involved, they would at once add materially to their stock of social enjoyments, and promote the general good of the country.[3]

Perth - whose 'whole population...does not exceed that of one of our Sydney Wards' - boasted a flourishing Agricultural Society, 'a standing reproach to the supineness of the elder colony'.

New resources and pastures might provide the stimulus to economic growth. In September and October 1843 Charles Nicholson chaired a Legislative Council select committee which reported favourably on the feasibility of a government-sponsored overland expedition to Port Essington. The expedition would 'vindicate the community from the charge of supineness on a subject so important to its social and commercial prosperity, and so highly interesting

---

[1] E.g. King, the Scotts and Wilton.

[2] E.g. Clarke's series of articles on the river drainage of N.S.W. (1843) and on meteorology and his review 'Progress of Scientific Enquiry in Australasia', S.M.H., 6 April 1843.

[3] S.M.H., 2 May 1843. See also the leader 'Colonial Resources', S.M.H., 26 November 1842, where the public was urged to form societies in the more populous areas as a means of self-help.

to the cause of science throughout the world'.[1] Mitchell, seeing himself as the leader, alerted Leichhardt to the possibility of appointment as naturalist but Gipps, having no stomach for the expense, referred the matter to London.[2]

Two months later Nicholson was again pleading the cause of science in the Legislative Council on Clarke's behalf, unsuccessfully trying to avoid retrenchment at the Australian Museum.[3] Viewing these setbacks from Canning Downs, where he was searching for fossils and 'schooling' himself for an inevitable 'private expedition', Leichhardt recognised Nicholson as the sole remaining influential voice of science in the colony:

> It is a consolation in all my troubles...[that] the colony and science has you to thank for it, if [the expedition] takes place, and they must acknowledge your good intentions even should it not take place. I hope to see you strifing (sic) one day for a little more liberal endowment of a national museum, though I should not wonder if you thought the Young Pt Philippian Society was healthier and more mindful of such institutions, that the Sydney Society seems to be.[4]

Alarmed by criticism Clarke published a review of the Australian Museum's progress in January 1844. The collections had increased threefold since 1837 and public interest was growing.[5] But the Museum was still 'peripatetic' and must win 'the extended patronage of the Legislature' if it was to serve as 'an institution of incalculable advantage to the rising generation'. Parsimony towards scientific undertakings was no contribution to the 'advancement of Australia':

---

[1]'Report from the Select Committee on the Proposed Overland Route to Port Essington', V. & P. (L.C. N.S.W.), 1843, and S.M.H., 23 and 31 October 1843. The select committee included Lang, Suttor, Macarthur and Wentworth.

[2]Gipps to Stanley, 7 December 1843 and 24 October 1844. H.R.A., Ser. I, vols. XXIII, pp.245-7 and XIV, p.50. See also Cumpston, Thomas Mitchell, pp.170-1. During 1843, before its demise, the N.S.W. Monthly Magazine provided a reasonable coverage of the scientific debate and events in the colony.

[3]S.M.H., 29 December 1843.

[4]Leichhardt to C. Nicholson, 26 March 1844. The reference to awakening scientific awareness in Melbourne was significant.

[5]S.M.H., 4 January 1844. Between March and December 1843 566 visitors inspected the collections which comprised nearly 4,000 items.

> ...birds, beasts, fishes and insects will not come voluntarily and be killed in honour of science, and cannot after death stuff themselves; moreover...minerals and rocks and shells and other curiosities will not collect of themselves and arrange themselves in cases, and ticket themselves for the instruction of colonial youth.

'Suffering from the pressure [of the Treasury's] thumb-screw' the Museum committee was powerless to do more.[1]

Sensing the mood of the times Clarke knew that the Museum supporters must stress the educative and economic as well as the scientific role of their institution and press their cause correspondingly in the corridors of the newly-won legislatures.

In February 1844 an Australian Society of Agriculture and Indigenous Arts was mooted. It was to have four principal sections: chemistry and chemical arts; agriculture and implements; mechanical arts and engineering and natural history and native produce.[2] Each section would have an honorary secretary to co-ordinate the work of branch societies. 'Every reflecting mind', the proposers maintained, would concede that the most recent overwhelming 'calamities' might have been averted by an 'Enlightened Board of Agriculture and Arts'. The Australian Society, mindful of this, would be active in experimentation and in scrutinizing the economic and scientific deficiencies of colonial enterprises.

Faut de mieux the Sydney Morning Herald offered its columns until the society was established:

> To the learned and scientific men of the colony...one short memoir per week, on a subject of colonial interest, would require but the division of labour among fifty-two individuals out of a population not less than one hundred and seventy thousand at the present hour.[3]

---

[1] £600, a portion of an unspent appropriation, had been withheld during 1843. The Museum Minutes for 1843 and 1844 are almost non-existent. The only three persons demonstrating any concern for the institution's affairs by their attendance at occasional meetings were Clarke, A. McLeay and J.V. Thompson.

[2] S.M.H., 22 February 1844. The models were the London Board of Agriculture and Internal Improvement and the Society for the Encouragement of Arts, Manufactures and Science. See also S.M.H., 27 and 28 February 1844, for reactions to the scheme.

[3] S.M.H., leader, 1 March 1844.

With even the School of Arts hard pressed to get lecturers it is difficult to see where fifty-two individuals, 'learned and scientific', could have been found. Nevertheless Archibald Michie (1813-99), witty orator and brilliant lawyer and journalist, was enlisted to promote the Australian Society at a public meeting in June.[1] 'Abstruse science', Michie warned, would not reveal the 'hidden means' of their country, but 'a society of enquiring men', meeting to discuss resources and applied science might.[2] 'Societies have always been, and always must be, more efficient than isolated efforts, for the carrying out of important public objects'. 'In what part of Her Majesty's dominions or of the known world', Michie asked optimistically, 'will you find a larger proportion of talent, learning and general information, than in this colony?'

But 'the fleeting columns of a newspaper' were to be the only outlet for the curious pot-pourri of scientific and pseudo-scientific 'talent' which answered the call of the still-born Australian Society. 'Everyman for himself and God for us all' was the motto New South Welshmen had learned during the depression.[3] The mood was hard to shake off. Plenty of individual - and mostly anonymous - correspondents and lecturers appeared to propound their ideas of aeronautics, perpetual motion, phrenology and other more 'whimsical' sciences[4] but only a few were able or willing to tackle more immediately relevant topics like Liebig's agricultural chemistry.[5]

---

[1]'On the Expediency of Establishing a Society for the Advancement of the Arts, Agriculture and Commerce of the Colony', S.M.H., 4 June 1844.

[2]'Without the aid of science well applied, such a young undeveloped country as this is like a blind giant, with almost unbounded strength, but ignorant in which direction to apply it'.

[3]S.M.H. leader, 10 June 1845.

[4]Rev John Saunders (1806-59), a Baptist minister, attacked Michie's 'whimsical and dangerous science' of phrenology, whilst discoursing on 'aeronautics'. Grayling, lecturing on matter and force in November 1844, proposed a centrifugal submarine railroad from Sydney to London. The ensuing correspondence on all these topics was protracted and heated. See e.g. S.M.H., 25 May, 1 June, 23 September, 20 and 27 November 1844.

[5]Ibid., 8 April, 16 and 18 July and 5 and 8 August 1845.

After twelve months of journalistic debate they were organisationally no further advanced when Michie was summoned once more in August 1845 to re-open the case for an Australian Society, now conceived as a sort of antipodean British Association with branch societies at Port Phillip, Moreton Bay, Adelaide and Perth.[1] Public utilities: gas, lighting, railways, water-supply and sewerage were recurrent themes brought up by correspondents anxious to air their views and complaints as prosperity returned. At least one reader of the Herald, 'Philokum', was grateful for being kept abreast of 'the march of intellect in our native land'[2] in the newspaper's columns, which, for some time to come, were to remain the eyes and ears of science in New South Wales.

In April 1844 Dr William Bland (1798-1868), the inveterate philanthropist and political activist, whose convict background 'exclusivists' remembered, led a move by medical men to form the Medical-Chirurgical Association of Australia. The action, which met immediate opposition, was a response to the increasingly lively public debates on medical standards and ethics.[3] Although the Association quickly faded out, Bland did not abandon his objectives which were realised in 1859 with the formation of the Australian Medical Association.[4] Symptomatic, too, of nascent self-awareness among the professional and semi-professional scientific workers in Sydney as the colony moved towards an economic and intellectual revival was the formation in June 1844 of the ephemeral Pharmaceutical Society of New South Wales.[5]

---

[1]Ibid., 9 August 1845. 'Without physicians', Michie argued, 'men would more easily fall into diseases, and with more difficulty recover from them: and without political economists, and scientific and learned societies, the true principles of trade and commerce would be very slowly, if ever, developed by merely mechanical men of business'. This society, it was proposed, should include a politico-economical committee as well as ones for agriculture and chemistry.

[2]S.M.H., 12 June 1845.

[3]S.M.H., 20 April and 18 May 1844. Bland was elected president and George Bennett secretary-treasurer. Nicholson and Wallace were vice-presidents and the provisional committee included Drs Fullerton, P. Harnett, A. A'Beckett, McKellar, R. Jones, Macfarlane, J. Mitchell and C. Nathan.

[4]Ann Tovell and B. Gandevia, 'Early Australian Medical Associations', M.J.A. I. (1962), pp.757-9.

[5]S.M.H., 15 June 1844. A leading figure in this society's foundation was J.B. Norrie, a regular lecturer at the Mechanics' Institute.

Michie's caustic public comments about local scientists' preoccupations with 'grasshoppers' wings and the trebly hazardous experiments at chemical manipulations' did not go unnoticed at Elizabeth Bay House, the Australian Museum or the School of Arts. Emerging from its cacoon of complacency and financial stringency the Australian Museum, with Clarke administering it and William Sheridan Wall (1815-76) providing expertise as a preserver, became to all intents and purposes a semi-official scientific society, which quickly rewon government's confidence.[1] Robert Lynd, Leichhardt's supporter, commenced work as honorary secretary in September 1845 and gained the active support of his committeemen, Bennett, Clarke, Nicholson, Rev George Edward Weaver Turner (1810-69), a competent botanist and microscopist, Deas Thomson, James Mitchell and the two Macleays.[2] Clarke's persistent campaigning for the Museum and for its permanent housing paid dividends when the legislature voted an unprecedented £5,500 between 1845-9. In September 1847 Turner took over as secretary to the Committee of Superintendence, called to serve during a critical period in the colony's scientific development, when public and parliament had good cause to ask whether scientists were capable of managing their own financial affairs competently.[3]

From 1845 the brighter economic situation, the beginnings of commercial mineral ore exploitation and the partial success of the scientific activists in letting the colonists see that science could be related to their needs, prepared the colony for a greater interest in science. As occasion demanded the Herald was ready, like the British Philosophical Magazine, to record 'any fact scientific in its character, [to be] the very lungs by which science breathes' in New South Wales. That did not mean, of course, that the paper always took the scientists' part indiscriminately. After the Legislative Council voted £3,000 for the Museum, journalistic critics rounded on the Botanic Gardens, which were neglected because 'the Managing Committee did not force a constant attention to the interest of the Gardens as places for the pursuit of science, as well as for the mere idle stroll'.[4] Insult was added

[1]G.P. Whitley, 'William Sheridan Wall and the Australian Museum', Proc. Roy. Zool. Soc. N.S.W. (1965-66), pp.42-4.

[2]Minute Book (1836-63), Aust. Mus., Sydney, minutes for 1845-7.

[3]Ibid., 1848-50; Whitley, 'History of the Australian Museum', Chapter VI, appendices, and Etheridge, 'Fragments...', Rec. Aust. Mus., XII, No.12 (1919) pp.357-66.

[4]S.M.H., 15 May 1845.

to injury when Nicholson, the member for Port Phillip, presented a petition from Melbourne in August 1845 requesting an appropriation for a Botanical Garden there.[1]

Gipps, apologetic to the end about his neglect of scientific affairs, agreed with the critics that 'the term "Botanic Garden" is now almost a misnomer',[2] but left his successor, FitzRoy, to clear up the confusion and appease Hooker, who was pressing for the restoration of the Gardens' 'scientific character'. Looking to their own resources the colonists found and appointed Bidwell, a protégé of P.P. King, causing, as we have seen, some considerable embarrassment when Moore arrived in 1848. Moore's early administration of the Botanic Gardens was one constant war of nerves between himself and the Committee of Management.

Moore, deeply resented by the 'Linneans', who took Hooker's part, was confronted by overt and covert attempts to bridle his freedom of action as a scientific botanist and as director of the Gardens. Moore established botanical lectures in Sydney; rearranged the plants along scientific lines; created a botanical library and improved the services all round.[3] He was a dedicated professional, little impressed by the 'gentlemen' amateurs who wanted to trespass on his field of work. In 1851 the Committee of Superintendence divested itself of responsibility for the Gardens.[4] Power over most scientific affairs had now shifted to the legislature.

In July 1855 a select committee was appointed to enquire into Moore's alleged mismanagement of the Gardens. On that committee sat, among others, George and William Macleay, James Macarthur and P.P. King. Moore faced two months of 'gruelling' investigation during which his integrity and scientific competence were attacked by the 'Linneans'.[5] Gilbert writes of this enquiry

---

[1] Ibid., 27 August 1845.

[2] Gipps to Stanley, 20 January 1846, H.R.A., Ser. I, vol. XXIV, pp.722-3.

[3] Including exchanges and correspondence with other colonies. See Gilbert, 'Botanical Investigation in N.S.W.', vol. II, pp.494-505.

[4] Minutes (1836-63), Aust. Mus., minute of 11 November 1851 and Gilbert, 'Botanical Investigation', vol. II, p.500.

[5] Ibid., pp.507-10 and V. & P. (L.C. N.S.W.), 1855, I, pp.1135-79.

as a confrontation between Moore, the 'appointed professional', and the Macleays, King and, even Nicholson, representatives of 'the new colonial scientific fraternity' who were determined to assert themselves against intruders and a nouveau arrivé like Moore. But there was nothing 'new' about this 'fraternity': it had existed since the 1830's and, by the 1850's, unchallenged, had grown to realise its politico-scientific influence. The select committee, strongly criticising Moore, recommended that three commissioners be appointed to control the director. But Sir William Denison, when asked to implement the committee's findings, refused. Moore 'emerged...from his trial... officially, if not professionally, unscathed',[1] and remained until 1896 at the Gardens, providing valuable leadership in the Sydney scientific community.

In Denison the diverse leaders of science in New South Wales were to find an experienced, determined administrator of scientific affairs, one who helped stay the independent arm of the Macleay circle during the fifties and moulded one section at least of the colony's scientists into the image already well-established in Tasmania, an image which W.B. Clarke, Moore and others welcomed in the Philosophical (later the Royal) Society of New South Wales.

An earnest of future controversies and divisions in the colony's scientific affairs was given in August 1845 during the Legislative Council debate on estimates for a proposed geological survey. Lang, responding to the expansive post-depression mood and the beginnings of mineral exploitation, moved that £250-500 be appropriated for a survey 'as tending to the advancement of science' and for reasons of 'practical utility'.[2] The lack of colonial enterprise in advancing science was a reproach to them all: 'the attainment of political rights went hand in hand with a sincere desire to establish for themselves a character with Europe and the world in the walks of scientific research'. The recent massive Museum appropriation, Lang observed, was the encouraging thin end of a scientific wedge so necessary if they were to educate colonial youth and advance knowledge. Certainly they should not fall behind the U.S.A., where state legislatures authorised geological and natural history surveys. Nicholson and Bland spoke in support of the motion; the first dissenting voice raised was that of Deas Thomson, speaking as colonial secretary.

---

[1] 'Botanical Investigation', vol. II, pp.510-11.

[2] S.M.H., 8 August 1845.

Whatever his 'private inclinations', Thomson, ignoring Lang's arguments, felt bound to stress that 'objects of practical utility' should take precedence 'in the early stages of a country's existence'. The barrister Richard Windeyer (1806-47) claimed that 'it was not their business to pursue abstract science, however delightful the pursuit', and feared that the discovery of minerals would only serve to inflate land prices. A geological survey belonged to the Survey Department as a charge upon the Land Fund.

Replying, Lang spared the government no embarrassment about the 'useless offices', large salaries and little work allegedly done at the Survey Department. Land surveyors were not, he pointedly maintained, geological surveyors, who 'required a different education, [and] a sort of enthusiasm which was rarely to be met at the Survey Department'. Twenty-five years of 'dire experience' in New South Wales had taught Lang how little stomach there was for 'abstract science' and, for that reason, he was ready to stress 'practical utility as well as science' when advocating a geological survey.

Government officials and crown nominees - 'this useless lumber' Lang afterwards called them[1] - were not impressed with the arguments and combined to defeat the motion.[2] The 'conservative' interests in the main were unwilling to condone projects over which they had or deemed themselves to have little control. The Australian Museum, firmly in their grasp, was not one such institution. Emancipist and former radical interests, on the other hand, were inclined to see science as vital to the colony's advancement. For Wentworth at least it was a clear volte-face from the position he had taken in the thirties.

Lang, although 'having no friend distinguished in such [geological] pursuits', nevertheless instanced 'one reverend gentleman who had already rendered important service to the cause of science', one to whom government might ultimately turn for advice. Everyone in the chamber knew that person was Clarke.

---

[1]Quoted in A. Mozley, 'The Foundations of the Geological Survey of New South Wales', J. & Proc. Roy. Soc. N.S.W., 98 (1965), pp.91-110 from A. Gilchrist (ed.), John Dunmore Lang, Chiefly Autobiographical, 1799 to 1878 (Melbourne, 1951), vol. I, p.360.

[2]The voting was 10:15. Supporters of the motion included Bland, Lang, Lawson, Francis Lord, Terence Aubrey Murray (1810-73), Joseph Phelps Robinson (1815?-48), Wentworth and Nicholson. S.M.H., 8 August 1845.

Clarke's circle, including Lynd and Nicholson, had not forgotten their own competent geologist friend, Leichhardt, still in the field. Most had given the German up as lost by the time Lang tried to secure support for a survey. 'Northern exploration', indeed, was again being actively canvassed. The arrival in the colony of copies of Strzelecki's Physical Description, 'a timely serviceable addition to our present imperfect knowledge', provided the scientific activists and reviewers with respectable propaganda for their campaigns. Reviewing Strzelecki's book in a leading article on 16 March 1846, the Herald quoted the words of Professor John Phillips (1800-74), one of the leaders and secretaries in the British Association movement, to confound colonial fainthearts:

> One of the most obviously useful application(s) of science is in the colonies sent forth by a commercial people, and perhaps no more important service could be rendered to Australia than by accurate geological surveys, such as are now proceeding steadily in several of the United States of America.[1]

Phillips, having served under De la Beche (1840-44) well knew the problems facing even the British Geological Survey, where 'the generous self-devotion of individuals' was so important. He recognised, too, that 'even the recommendations of colonial advantage' would not always prize open governmental purses.

Clarke, undisputed as the principal colonial authority on geology, was appalled at the 'British Ignorance of New South Wales' displayed in even some of the mother country's most respected scientific journals.[2] Strzelecki and the 'public spirited' subscribers of Tasmania had shown that science knew no barriers of country or colony and the American experience - dear to colonial radicals in most respects - was of growing concern to Australians interested in the systematic and not simply the ad hoc examination of their resources.[3]

---

[1] S.M.H., 16 March 1846. Phillips (F.R.S., 1834) was secretary to the Yorkshire Philosophical Society from 1825 and played an active part in the first British Association meeting of 1831. He was professor of geology at Kings College, London, from 1834 and in Dublin from 1844. He later succeeded Buckland at Oxford and was keeper of the Ashmolean, 1854-70. In Britain Strzelecki, Jukes and Murchison were busy impressing the importance of a colonial survey upon the imperial government.

[2] S.M.H., 11 February 1846. Clarke, exasperated in New South Wales, had already published four papers with the Geological Society by the end of the 1840s.

[3] Ibid., 16 March 1846.

On 25 March 1846 Leichhardt, disembarking in Sydney from Port Essington 'as one risen from the dead', was most welcome to the science lobby. Jubilantly, Strzelecki temporarily forgotten, the Herald hailed the German's achievements and published the first extracts of his 'modestly written journal'.[1] A campaign began to extract money from the legislature and the public to compensate Leichhardt for his highly successful expedition. Samuel Lyons (1791-1851), the convict turned astute businessman and political agent, a supporter of Bland and Wentworth, threw open his auction rooms for the public meeting called to launch the Leichhardt testimonial. Lang, leading the eulogies, could scarcely recall 'a more interesting occasion during his own acquaintance with the colony'. The achievements of all former explorers, including Mitchell and Sturt, were 'insignificant' compared with those of Leichhardt, the colony's great 'benefactor'.[2]

Mitchell had already started on his fourth expedition, handsomely financed and equipped by the colony to reach Port Essington.[3] With Leichhardt as their inexpensive hero, the old critics of the Survey Department reopened their demands for reform and reorganisation:

> A trigonometrical survey, verified by occasional astronomical observations, is a work upon which the members of the survey department might be very advantageously employed as contributing to the development of the resources in the colony.[4]

No matter what the disadvantages to 'the private interests of any individual' the Survey Department as administered by Mitchell for nearly twenty years must move to accommodate the changing needs of the colony.

---

[1] Ibid., 26 and 27 March. Journal extracts were also published in the Australian.

[2] S.M.H., 30 March 1846.

[3] Cumpston, Thomas Mitchell, pp.170-93. Mitchell received £2,000 for the expedition. He left Sydney in December 1845 and was on the river Narran (Dirranbandi) when Leichhardt reached Sydney.

[4] S.M.H., leader, 'Exploration and Survey', 22 April 1846.

Men were ready to debate science more freely and in a more informed manner in 1846 than ten or twelve years previously, when Lhotsky tried to impress his achievements on the colonists. Leichhardt's successes were a boost to 'national' pride and confidence at a crucial moment of recovery. The most voluble supporters of science included those who had not shunned the German in his obscurity. Leichhardt, self-made as a scientific explorer, the friend of squatters, was showered with such honours as the institution-bereft community could muster. He was elected an honorary member of the School of Arts and even 'the narrow-minded and grudging remarks about the outsider, the fellow of non-British origin', were temporarily silenced.[1] Leichhardt retired to Camden Park, a citadel of colonial influence, to complete the account of his journey. He was received at Government House and grew utterly committed to the scientific ambitions of the little circle of scientific workers who had always supported him. He became fully identified with the colony and sought the valuable professional advice of the influential P.P. King.[2]

The most shamefaced recognition emerged during the Legislative Council debate on compensation for Leichhardt. Charles Cowper (1807-75), a former opponent of the geological survey, 'regretted now, as many others might also, that he had not encouraged instead of throwing cold water on the plans of the traveller'.[3] Deas Thomson ate the most humble pie: foreigners, like Strzelecki and Leichhardt, 'a highly distinguished man of science', he admitted, had done most in recent years to advance Australian science. The German was called to the bar of the house to receive the £1,000 voted for him and his companions. In August he got £100 from the citizens of Port Phillip and the following month £854 of the total of £1,520 raised by public subscription in New South Wales and

---

[1] Leichhardt to Schmalfuss, 18 April 1846, Letters of Leichhardt, vol. III, p.861 and S.M.H., 14 April 1846.

[2] King read and corrected the MS of Leichhardt's Journal of an overland expedition... (London, 1847). Leichhardt corresponded freely with Clarke, Lynd, Nicholson and King on his return.

[3] S.M.H., 10 June 1846.

Moreton Bay.[1] Nicholson, presenting the public testimonial in his capacity as speaker of the Legislative Council, praised Leichhardt's 'scientific eminence', that same eminence which attracted 'the most crowded audience we ever remember seeing gathered in the walls of the theatre' of the Sydney School of Arts.[2] The colonial De Candolle had achieved his purposes.

No scientist had hitherto been so publicly fêted in Australia as Leichhardt. Colonial recognition of a scientist ran for the first time ahead of the honours and medals of the European institutions.[3] Only a few 'narrow-minded jealous persons', among them Mitchell and the Macleays, were piqued or unmoved by his success. Leichhardt's expeditions were always 'my expeditions', planned and controlled by him acting 'on the principles...which were the very essence of my individual character'.[4] But, wrote the German before innuendo and ill-informed criticism transformed his fame into notoriety:

> ...whatever I have done has never been for honour. I have worked for the sake of science, and for nothing else; and I shall continue to do so even if not a single soul in the world pays any attention to me.[5]

Leichhardt, professional in his dedication, was, with Gunn and Clarke, among the most influential figures in colonial-based science in the 1840's. Like them he demonstrated that it was possible for a man of science to establish a reputation in the colonies and contribute unselfishly to the growth of a colonial scientific culture.

---

[1] For details of Leichhardt's testimonials and colonial honours see the note by Aurousseau, Letters of Leichhardt, vol. III, pp.1052-3.

[2] S.M.H., 14 April and 20, 27 August 1846. The lectures were also published in pamphlet form. See Letters of Leichhardt, vol. III, pp.885-908 and 1085, for Leichhardt bibliography.

[3] He was awarded the Patron's Medal of the Royal Geographical Society (1847) and shared the Grand Prix de la Société de Géographie (Paris). Leichhardt's work attracted wide attention in European scientific circles. See Leichhardt Letters, vol. III, pp.971-94, 1062 and 1064.

[4] Leichhardt to W. Macarthur, 15 February 1848.

[5] Leichhardt to Schmalfuss, 22 February 1848.

Leichhardt's successes undoubtedly led to a rapport between some of the 'gentlemen' of the Linnean-Macleay circle and the resource-oriented, intellectually powerful parliamentary activists like Bland, Nicholson and Wentworth. A few gaps had already been bridged by Bennett, Clarke, Turner and others, but for some old divisions were to die hard.

The quest to find a basis for co-operation was not foresaken. A Central Society for the Promotion of Agriculture, Arts, Manufactures and Commerce to co-ordinate the work of similar bodies throughout the colonies and produce a Quarterly Magazine was still-born in September 1845.[1] Twelve months later, with Leichhardt's lectures filling the School of Arts to overflowing, the 'modest' proposal for scientific meetings 'with soirées and conversazione' centred around Clarke, Leichhardt, Lynd and Nicholson also failed.[2] The most positive proof of a desire to co-operate was at the Australian Museum where the Macleays, P.P. King and Deas Thomson began to play a more prominent part alongside other scientific workers.

William Sharp Macleay was the 'president' to whom most Museum scientists deferred after 1848. The technical and scientific services of the Museum in taxidermy, dredging and collecting, were vastly improved and a more substantial scientific library started.[3] The official explorers Mitchell and Edmund Besley Court Kennedy (1818-48), leader of the ill-fated Cape York expedition in 1848, were now expected to support the institution. In 1848, heeding the demands of colonial miners, the Museum moved to acquire a representative mineralogical collection from the British Museum to help in the assaying and recognition of local ores. W. S. Macleay provided the firm leadership necessary when the Australian Museum faced a severe public crisis of confidence over excessive spending and ineptitude on the part of Mortimer Wheeler (1796-1879), colonial architect.[4]

---

[1] S.M.H., 9 September 1845. The moving force was F.H. Statham.

[2] Leichhardt to P.P. King, 19 September 1846.

[3] Minutes (1836-63), Aust. Mus. The Committee of Management in 1849 included Deas Thomson, W.S. and G. Macleay, W. Macarthur, C. Nicholson, P.P. King, Bennett, Mortimer Lewis, Archibald Shanks, Loftus, Mitchell, W.B. Clarke, Rev Robert King, James Mitchell, John Bidwell and Rev G. Turner, secretary.

[4] Minutes, 1848-51 and Fletcher, 'Fragments...', Rec. Aust. Mus., XII (1919), pp.357-67.

Having failed to heed the scientific opportunities pressed upon it in 1845 government ran behind the expansion and demands for scientific investigation made after 1847. In that year Clarke gave important scientific evidence before a select committee on the coal monopoly.[1] In March 1849 FitzRoy, an avowed enthusiast for colonial advancement, belatedly asked Earl Grey for a 'competent Geologist who would be at liberty to devote his time exclusively' to mineral surveys.[2] De la Beche chose J.B. Jukes for the post, but the geologist had scant faith in the permanency of colonial scientific appointments and declined it.[3] The choice fell finally on the third candidate, Samuel Stutchbury, a vertebrate palaeontologist and curator of the Bristol Philosophical Institution.[4]

In April 1847, alerted by the imperial government's concern over the dilapidated state of Parramatta Observatory, Deas Thomson appointed P.P. King to head a commission of enquiry into the records, instruments and condition of the institution. On the commission's recommendation the observatory was closed, the instruments and books stored - King was convinced that they would 'fetch but a mere trifle', if sold by public auction in New South Wales - and Dunlop allowed to resign for reasons of 'health'. Not content to let the matter rest there King pressed in 1848 for the re-establishment of an observatory nearer Sydney to redetermine the colony's longitudes. 'I could advance much stronger arguments', he told Deas Thomson, 'had it not already been decided that science did not

---

[1] V. & P. (L.C. N.S.W.), 1847, 2.

[2] FitzRoy to Grey, 1 March 1849. Paper No. 1 in 'Correspondence relating to Geological Surveys' (March 1849-October 1851), V. & P. (L.C. N.S.W.), 1851, 2.

[3] Ibid. De la Beche consulted P.P. King, who was in England at the time. The second successful candidate, Henry William Bristow, also of the British Survey, ultimately declined the offer for family reasons.

[4] De la Beche considered Stutchbury 'highly qualified for the service [and] perfectly acquainted not only with mineralogy as a science, but also practically with the mode of occurrence of the ores of the useful metals'. De la Beche to B. Hawes, 26 April 1850, ibid., No. 4.

require [an observatory]'.[1] Francis Beaufort, the Admiralty Hydrographer, and George Airey, Astronomer Royal, recommended retaining the astronomical instruments for time-keeping. The issue of establishing an observatory was kept alive until Denison precipitated further action in 1855.[2]

The continued involvement of the men of science at 'home' in the direction of colonial scientific affairs and in the appointment of scientists to new positions inevitably met some resistance. In November 1850 Clarke demeaned himself and the scientific causes for which he had laboured so long by attacking Stutchbury's scientific credibility from the influential 'anonymity' of the Herald's leader columns.[3] Clarke was bitterly jealous of the self-effacing Stutchbury.

Clarke's opposition to Stutchbury came just at the time when so many of the other projects for which he had striven during the forties were coming to fruition. In September 1849 Wentworth successfully petitioned for a select committee to examine 'the best means of instituting a University for the promotion of literature and science', an institution 'accessible to all classes', with four of the five foundation chairs to embrace chemistry; natural history; experimental philosophy and engineering; anatomy, physiology and medicine.[4] Running the gauntlet of committee emendation by more conservatively-minded members, Wentworth's radical proposals were emasculated by the Act of Incorporation passed in October

---

[1] P.P. King to Deas Thomson, 21 December 1848. Correspondence, reports and despatches on the Parramatta Observatory and instruments, 1848-50, reproduced in Russell, 'Astronomical and meteorological Workers in N.S.W.', Rep. A.A.A.S. (1889), Appendices, G-P, pp.80-90. The commissioners were King, J.A. Gordon, commanding engineer, and Richard Rogers, ordnance storekeeper.

[2] Ibid., pp.90-1. Denison, it will be recalled, had complained to Beaufort in 1849, about the run-down of astronomy in New South Wales.

[3] S.M.H., 4 November 1850 and Mozley, 'Foundations of the Geological Survey of N.S.W.', pp.93-4. Dr David Branagan's researches into the life of Stutchbury have shown that he first visited Sydney in 1825, when he dredged for Trigonia. Stutchbury, a correspondent of Buckland, Darwin and Lyell, was appointed to the Bristol Institution in 1831. He worked with Gideon Mantell on vertebrate palaeontology and corrected the work of Owen. Stutchbury learned of Clarke's attacks on him from De la Beche, who sent him cuttings of S.M.H. Information supplied by Dr Branagan.

[4] H.E. Barff, A short historical account of the University of Sydney (Sydney, 1902), pp.3-6 and V. & P. (L.C. N.S.W.), 1849, II. Wentworth favoured the legislation and organisation developed for London University.

1850. William Bland was excluded from the University Senate to which clerics were appointed and British scholars and scientists were commissioned to select three professors in classics, mathematics, and chemistry and experimental physics combined, the first two to 'bring with them the prestige of high Academical distinction at one of the Universities of Oxford or Cambridge'.[1] The London selection committee - including Herschel and Airey - chose Morris Birkbeck Pell (1829-79) as professor of mathematics and John Smith (1821-85) of the Marischal College, Aberdeen, as professor of chemistry and experimental physics.

The University movement was revived by the renewal of old radical alliance between H.G. Douglass and Wentworth after Douglass arrived back in the colony in October 1848. In April 1849 he was appointed honorary physician at the Sydney Infirmary and Dispensary, where medical students were first admitted in the same year. Actively sponsored by Wentworth, Douglass tried to enter political life and soon resumed his former scientific and philanthropic interests.[2] He was the guiding force behind the long-awaited Australian Society for the Encouragement of Arts, Science, Commerce and Agriculture formed under Charles Nicholson's chairmanship in January 1850.[3] The society - popularly known as the Australian Philosophical Society - was hailed as a potentially powerful contributor to colonial culture, an antidote to 'the mere gold worshippers among us'. Roe writes of it as 'a further element in the new faith' of moral enlightenment, expressive of an interest in science and confidence in its efficacy to transform all things'.[4]

Outlining the society's policies, the solicitor and pamphleteer, James Norton (1795-1862) saw it as an expression of confidence in economic and intellectual revival in New South Wales, where men had kicked away the crutch

---

[1] Short historical account, pp.6-18.

[2] K.B. Noad, 'Henry Grattan Douglass', Bull. Post-Graduate Comm. Med., 18, No. 5 (1962), pp.137-47. Douglass, a distinguished practical career behind him in the 1830's, was one of the first teachers of clinical medicine in Australia.

[3] S.M.H., leader, 24 January 1850.

[4] Quest for Authority in Eastern Australia, pp.157-61.

of transportation and were creating free institutions, 'which could alone confer national character and stability on the country of their adoption'. To alleviate economic 'mischiefs', to 'bring to light the resources of the colony' and help create sound scientific, economic and manufacturing bases were the tasks before the members.[1]

The Australian Society achieved a wider cross-section of support than any scientific society, other than the agricultural and horticultural ones, formed since Brisbane's day. FitzRoy became patron; Deas Thomson, president and Nicholson, vice-president. The governing committee included a few unlikely bed-fellows, among them Bland, Alexander Berry, W.B. Clarke, C. Cowper, Revs R.L. King and G. Turner, Sir Thomas Mitchell, Norton, Stutchbury, Francis Merewether (1811-99) and George Kenyon Holden (1808-74).[2] The Macleays and P.P. King, confronted by so much erstwhile radicalism, emancipist sympathies, liberalism and Douglass, held aloof.

Mitchell, surprisingly, delivered no less than three papers on colonial resources and on his 'boomerang propeller', which he went to try and patent in Britain in 1852.[3] Douglass corresponded actively with colonists on local resources, manufactures and crop growing and served on a committee to examine the fisheries.[4] In September 1850 FitzRoy and some forty other members sat through a mammoth meeting which heard seven papers. The most animated discussion arose from Clarke's paper on the distribution of extinct species of struthious birds in Australasia, in which, displaying his world-wide correspondence, the clergyman postulated some interesting ideas on dispersion of bird species and the 'elevation and submergence' of landmasses. Mitchell's lame response relied on a

---

[1] S.M.H., 14 February 1850.

[2] Ford's Australian Almanac (1852), pp.181-2. Douglass originally acted as joint secretary with William Augustus Miles (1798-1851), the intellectually active former commissioner of police, a corresponding member of the Ethnographical Society of London, the Statistical Society and of the Muséum d'Histoire naturelle. See A.D.B., II, p.228.

[3] Cumpston, Thomas Mitchell, pp.209-14.

[4] S.M.H., 5 September 1850 and Correspondence relating to the Society (1849-50), including letters of James King, Douglass and F.M. Stokes, MSS 912, M.L., Sydney.

paper written by Owen in 1844.[1]

The Australian Society lived on in name only after the winter of 1851.[2] Following the gold rush to the Ophir field in 1851 most men, understandably, had a mind, so far as science went, only for the work of the geologists, Clarke and Stutchbury.

Stutchbury, in the field near Bathurst since February 1851, was the first geologist at the finds. But in May an ill-prepared, desperate government chose to accept Clarke as its principal geological adviser and the clergyman insisted on being his own master,

> not bound and shackled by those who will not keep pace...
> whom I must either work for, or yield to, often against
> my own conclusion.[3]

He meant Mitchell and Stutchbury. Clarke was engaged at £300 per annum to survey the southern goldfields between September 1851 and June 1852. He plied government with detailed reports - later collected as Researches on the Southern Gold Fields of New South Wales (Sydney, 1860) - earning government's and the legislature's highest praise and a grant of £1,000. By contrast official treatment of Stutchbury was shabby.[4] He was left 'almost entirely to [his] own resources' in the field from May 1851 to November 1855. He surveyed an area of some 32,000 square miles from

---

[1] S.M.H., 5 September 1850. Owen's paper, 'Report on the Extinct Mammals of Australia...' was first published in Brit. Assoc. Report for 1844, pp.223-40 and extracted in Tas. Journ. Nat. Sci., II, pp.455-6.

[2] The Australian Society was listed in contemporary Almanacs until 1853. No detailed records are extant. W.B. Clarke later attributed the society's inactivity to the gold-fever. See Trans. Roy. Soc. N.S.W., I. (1867), pp.15-17.

[3] Clarke to Deas Thomson, 7 July 1851, cited in Mozley, 'Foundations of the Geological Survey of N.S.W.', pp.95-6. See also Jervis, 'W.B. Clarke', pp.394-8 and Deas Thomson to Clarke, 8 August 1851, 'Correspondence relating to geological Surveys', No. 51, V. & P. (L.C. N.S.W.), 1851, 2.

[4] Deas Thomson complained - under the influence of Clarke - of 'the very meagre and unsatisfactory...the unscientific and unbusinesslike character of the information' supplied by Stutchbury 'on the subject of Gold Discovery' and, Clarke appointed, instructed Stutchbury to return to his 'General Geological Survey'. Thomson to Stutchbury, 26 May and 11 July 1851, ibid., Nos 14 and 18.

Carcoar to Gladstone (Queensland), sending back regular high quality reports which were largely ignored.[1]

Back in Sydney the Museum men sat in peremptory judgment on Stutchbury. His cases of specimens were opened without leave and permission was also refused for him to take fossils and other items from his collections back to Britain when he resigned in 1855.[2] Clarke, the 'gentleman', was fêted; Stutchbury, the servant, undermined.

While gold gripped the popular and commercial imagination the Macleay circle moved quietly to consolidate its powers at the Australian Museum through incorporation. In January 1853 a sub-committee report[3] was presented examining museum administration in Europe and recommending a system of trustees elected on 'scientific and literary merit' with provision for 'family' trustees, 'whenever any remarkably munificent donation or bequest shall have been made to the Museum'. 'Nothing', the committee glibly noted,

> has encouraged liberality towards the British Museum on the part of private individuals so much as their foreknowledge that a member of the donor's family would have the special privilege and power of watching over the manner in which his intentions might be carried into effect.[4]

Here was a bare-faced attempt to assert the influence of Elizabeth Bay House at the Museum.

---

[1] 'Geological and Mineralogical Survey Report No. 16', 20 November 1855, V. & P. (L.C. N.S.W.), 1855, 2, p.1193; Mozley, 'Foundations of the Geological Survey', pp.97-100 and lecture, 'Samuel Stutchbury' by D. Branagan, delivered in the Department of Geology, School of General Studies, Australian National University, April 1973. The report of November 1855 was Stutchbury's last.

[2] Angas to Colonial Secretary, 18 May 1855 and Angas to Stutchbury, 4 June 1855. Letter Book I (1837-61) and Minutes, 8 and 29 May 1852, Aust. Mus., Sydney. See also 'Instructions to the Government Geologist', 26 December 1850, V. & P. (L.C. N.S.W.), 1851, 2.

[3] Minutes, December 1852 - January 1853, Aust. Mus., Sydney. The sub-committee comprised W.S. Macleay, P.P. King and Dr George Witt.

[4] Etheridge, 'Fragments...', Rec. Aust. Mus., XII (1919), pp.368-9.

The Macleays' hold was sealed when the Legislative Council passed the Act to incorporate and endow the Australian Museum in June 1853 and FitzRoy assented the following month.[1] The Act was based on a draft bill drawn up by W.S. Macleay's sub-committee. The twenty-four trustees - twelve elective and twelve official - were given 'absolute control of their own affairs' - including the filling of vacancies among the elected members - powers to dismiss and appoint staff and to introduce and alter bye-laws.[2] In March 1855 George Macleay mooted the subject of bye-laws and the next month they were promulgated and passed.[3] The new bye-laws, as exclusive as the rules of any scientific society, confirmed the powers of the elective trustees over the discipline and dismissal of their own members and introduced a certificate-balloting system for 'honorary correspondents' - for services 'rendered to the Museum, or to the general cause of science'.

The Linnean, gentleman-amateur philosophy of these Museum planners was revealed in their requirements for the first full-time secretary: 'a good share of classical attainments...with a certain amount of enthusiasm in natural history and love of the arts generally'.[4]

George French Angas (1822-86) was secretary at the Museum from 1853 to 1860,[5] but the real conflicts arose only after the early death of his successor Simon Rood Pittard (1821-62), who had been appointed curator,

---

[1]Act 17, Victoria No. ii, 4 July 1853, ibid., p.369 and Minutes, 9 July 1853.

[2]The first elective trustees were Arthur A'Beckett, Bennett, Bidwell, Clarke, P.P. King, R.L. King, W. Macarthur, G. and W.S. Macleay, John Smith, G.E. Turner and G. Witt. Thomas Mitchell, James Mitchell and Deas Thomson sat as official trustees by virtue of their public offices.

[3]V. & P. (L.C. N.S.W.), 1855, I, pp.1183-4. P.P. King and W.S. Macleay sat on the committee which drew up the bye-laws.

[4]Etheridge, 'Fragments', op. cit., p.380.

[5]A.D.B., I, pp.18-19 and Bernard Smith, European vision and the South Pacific (Oxford, 1960), pp.230-2. See also T. Iredale, 'George French Angas: the father of Australian conchology', Aust. Zoologist 12 (1954-9), pp.362-3 and Whitley, 'Conchologists of the past: George French Angas', J. Malac. Soc., 12 (1969), pp.48-60.

a new post carrying full responsibility as chief scientific and executive officer.[1] Pittard's successor was the gifted but temperamental German zoologist Gerard Krefft (1830-81) whose professionalism and personality soon affronted and alienated the Macleay circle. Some of the least disinterested of the trustees conspired to secure Krefft's dismissal in 1874, using their political influence to do so.[2] But as Bennett had hoped originally, the Australian Museum did become a widely-respected centre for biological research, its overseas reputation resting largely on the excellent work of Krefft.

Denison, as we have seen, arrived in time to stifle the 'Linneans' pretensions to control Moore and the Botanic Gardens. The governor-general, quickly demonstrated that he intended being no mere cipher at the Museum. His experience and vantage point in Tasmania had convinced him of the need for a positive scientific policy in New South Wales. Seeing the problems progress was bringing to Victoria Denison's rationale for science remained firmly in favour of balancing theory and practice:

> ...to afford to all persons, and especially those educated at the University, a practical example [through an observatory] of the application of science to the determination of matters beyond the scope of our ordinary or uneducated reason.[3]

Similar considerations lay behind the first attempt to secure an assay office and mint in November and December 1851.[4] With the University

---

[1]The choice of Pittard had rested with Owen and George Macleay. Pittard, formerly an assistant to Owen and Todd, died of consumption on 19 August 1862. See Whitley, 'The History of the Australian Museum', Chapters VI and VII, Basser Library, Canberra.

[2]G.P. Whitley, 'The Life and Work of Gerard Krefft', Proc. Roy. Zool. Soc. N.S.W. (1958-9), pp.21-34.

[3]Memorandum by Denison to Executive Council, 31 March 1855, Correspondence relating to Colonial Astronomer (1855-7), Journ. (L.C. N.S.W.), 1856-7, 2, Reproduced in Russell, 'Astronomical and Meteorological Workers', Appendix Q, p.91.

[4]Wentworth and Darvall were two of the select committee who pressed for an assay office and mint in a minority report. The committee accepted the idea of a mint but rejected the assay office as unnecessary and too expensive. Evidence before the committee by Thomas Hales, an assayer, showed that there were four or five competent assayers in Sydney in 1851, including Henry Flavelle, formerly of the assay office in Dublin. 'Report from Select Committee on the Proposed Assay Office and Mint', V. & P. (L.C. N.S.W.), 1851, 2.

now educating 'colonial youth', however unspectacularly, in certain branches of the sciences, the community must create employment and practical outlets for their skills. Professional 'scientific men', Denison had told Beaufort in 1849, were essential to scientific growth in the colonies.[1] Hence his desire 'to establish an observatory [and connect] it with the trigonometrical survey of the country', both to advance astronomy and meteorology and to attain at least that degree of scientific organisation he had left behind in Tasmania.

Denison quickly secured legislative support for an observatory and himself negotiated with Airey to secure improved instruments and a competent government astronomer. Rev William Scott (1825-1917), a Cambridge graduate, was the first appointee and proved an able organizer of astronomical and meteorological observations inside New South Wales and on an intercolonial basis.[2] As Denison hoped Scott also took a lead in the organized scientific life of Sydney and from 1859 guided the training of Henry Chamberlain Russell (1836-1907), a native-born graduate of Sydney University (B.A. 1859) and assistant at the Sydney Observatory.

After judicious enquiry Denison also moved swiftly to reform the ailing Survey Department under Mitchell. In 1855 a royal commission criticised the maladministration and outmoded technical methods of the Survey, accusing Mitchell of being intransigent to change. For too long imperial and colonial governments had endured his imperious behaviour and unauthorised absences. He had achieved much as an explorer and surveyor but his work was often 'compiled and published, not as a public servant but as a private individual'.[3] Mitchell died of bronchio-pneumonia before suffering the

---

1 Denison to Beaufort, 5 February 1849, Varieties of Vice-Regal Life, vol. II, p.107.

2 Correspondence relating to Colonial Astronomer, Journ. (L.C. N.S.W.), 1856-7, 2. See also Russell, Sydney Observatory: History and Progress, pamphlet (Sydney, 1882), pp.4-7 and H. Wood, 'The Sky and the Weather' in A Century of Scientific Progress (1968), pp.381-3.

3 'Report from the Commissioners appointed to enquire into the Surveyor-General's Department', V. & P. (L.C. N.S.W.), 1855, 2, pp.3-141, p. 11 and Cumpston, Thomas Mitchell, pp.216-22.

humiliation of seeing his life's work aired publicly. Denison for his part was bent on neutralising the influence of individuals in science especially where government money was involved.

The School of Arts, examined by a select committee in 1855, was challenged about a proposal to change its name to the 'Sydney Literary and Scientific Institute', a designation suggested because the School was 'falling virtually...into the hands of a class different from the class by whom it was supported at the outset'. The 'few professional men' who ran the Institute recognised that it was 'taking higher ground than before', although not yet attracting 'gentlemen of a superior class'.[1]

If he was to effectively counter the 'cold wet blanket of pretended sympathy but real indifference' in scientific matters, to overcome too much dependence, for instance, 'upon the geological information in possession of one or two individuals'[2] Denison recognised that the scientific association he wanted must seek its support from the groups which lay between the Mechanics' Institute members and the 'superior' gentlemen of the colony. Once the 'heat of political strife' and electioneering was over Denison called the 'effete' Australian Society together in May 1856, holding its members to an earlier resolution to remodel their affairs. The association which emerged was the Philosophical Society of New South Wales, formed on the tide of a popular enthusiasm for utilitarian improvement 'to receive ...original papers on subjects of science, art, literature, and philosophy'.[3]

---

[1]Only ten per cent of the estimated 1,000 members were 'mechanics', the majority being clerks, shopmen, small tradesmen and others in 'miscellaneous callings'. The main inquisitors were Douglass and George Macleay, who was particularly interested in the rights of 'gentlemen of a superior class'. See esp. the evidence of W.G. Pennington, treasurer, in 'Report from the Select Committee on the Sydney Mechanics' School of Arts Bill with Minutes of Evidence', V. & P. (L.C. N.S.W.), 1855, 2, pp.1031-6.

[2]Denison to Murchison, 25 June 1856 and 4 September 1858, Varieties of Vice-Regal Life, vol. I, pp.354 and 444.

[3]Denison to Murchison, 25 June 1856, ibid. and Minute Book (1856-65), Phil. Soc. N.S.W., minute of 9 May 1856, MS Minute Book in Library, Roy. Soc. N.S.W., Sydney. Denison had originally called the Australian Society together on 30 July 1855. See also W.B. Clarke, Inaugural Address, Trans. Roy. Soc. N.S.W., I (1867), p.17.

The new society attracted many old campaigners in the causes of moral enlightenment and scientific improvement, including Bland, Clarke, Nicholson, Deas Thomson and Turner. The new professors and full-time scientific appointees such as Pell, Smith, Woolley and at the Royal Mint Edward Wolstenholme Ward (1823-90) and William Stanley Jevons (1835-81)[1] willingly supported Denison's concentration on applied topics in the gold industry, utilities - especially water supply and sewers - statistics, transport and weather. Denison unashamedly used his prestige and influence as a scientific governor to press through his reforms, carrying New South Welshmen with him by pointing to Victoria's lead in science and technology[2] and appealing to their British '<u>passion</u> for utility':

> Here, where the hands are so few, and the work to be done so vast, there is especial need for all the assistance science can afford. The country groans at the present time for an engineer that can solve the difficult problem of internal communication, - the auriferous rocks of the interior wait the advent of a chemist who shall break open the locks of their rich treasure house.-[3]

Denison achieved what resource-orientated, economically and utility minded men of science had striven to effect throughout the forties: a scientific association suited to colonial conditions, a society at once broad enough to accommodate diverse interests without earning a reputation for exclusivism and élitism, yet with standards reasonable enough to attract competent, reputable amateurs and professionals, such as Clarke, Moore and Krefft. The Philosophical Society of New South Wales was a nice counter-balance to the élitist science of the Macleay circle later reflected in their own scientific societies, the Entomological and Linnean Societies of New South Wales.

---

[1]Ward was deputy-master and Jevons one of the two assayers at the mint.

[2]Particularly in the establishment of railways and telegraphs, where Victoria was ahead by two or three years.

[3]<u>Sydney Mag. Sci. and Art</u>, I, (1857), p.1.

The various attempts to organise science in New South Wales, 1830-55, were frustrated by long-standing entrenched social, political and personal divisions in the colony, where, until Denison's arrival, gubernatorial influence on science was weak and ineffectual. Two significant figures in British science, W.S. Macleay and J.V. Thompson, failed to fill the vacuum in leadership in the forties. At the Australian Museum and the Botanic Gardens the Macleay circle worked to found scientific institutions in the image of the ones its members knew most intimately in London: the Linnean Society, the Royal Society and the British Museum.

Leaderless and frustrated often throughout a period of hard-won political development and fluctuating economic fortunes, scientists in New South Wales failed to find any enduring basis for co-operation. Some of them, realising that influence in the future must lie with the emerging legislatures, sought and found new allies among the intellectually sympathetic politicians such as Bland, Lang, Nicholson and Wentworth. Clarke and Leichhardt, deeply committed to the material and intellectual advancement of the colony, epitomised the attempts to bridge the gulf between the sciences and a pragmatic community, where honours were bestowed as monetary testimonials rather than by institutional recognition. Despite the organisational inertia a vigorous debate on science and its applications was maintained in the press, in correspondence and in private.

Individual scientists found uncoordinated outlets for their work in the colony's newspapers, the Tasmanian Journal and in a wide variety of overseas journals, when the several attempts to sustain a local scientific publication failed. With the increasing influence of the legislature in scientific affairs, scientific debates and enquiries and the progress and examination of men and scientific institutions could be followed in the parliamentary papers.

In terms of the postulates suggested by Basalla for measuring the advancement of 'colonial' science, New South Wales made some important steps forward. At the Museum more fundamental research was commenced, whether articulating Diprotodon, dredging, preserving or preparing the first memoirs;[1] at the Botanic Gardens the level of scientific activity: acclimatising, collecting, classifying and exchanging intensified as facilities, both technical and bibliographical, were improved. Scientific lectures and training of a more intellectually rigorous standard than those normally offered at the School of Arts were begun at the Gardens, the Australian Museum, Sydney Hospital and the University. Denison's reforms and the establishment of the Sydney Mint increased the small number of professional scientists available for leadership and consultation, and Denison, if it suited his reforming purposes, did not hesitate to appeal to the other colonies for advice and example.[2]

Native-born scientific leaders of the future, such as the astronomers Russell and John Tebbutt (1834-1916) began their scientific apprenticeships without first travelling abroad. Although local scientists exerted or tried to exert more control over scientific employees like Mitchell, Kennedy, Moore, Krefft and Stutchbury, when colonial positions in science were created or fell vacant colonists still appealed to the British scientists to choose men of science from the home tradition to fill them. Voices like that of Clarke, who was bold enough to challenge European savants with his own geological evidence and reasonings, were still rare indeed.

Denison, with his organisational reforms; utilitarian emphases; recognition of the need for professionals to advance colonial science and his appeal for an increased level of scientific instruction was in step, if not ahead, of the demands and needs of the time. New South Wales still lacked the economic-technological base to allow her to overtake Victoria.

---

[1]W.S. Wall prepared the first Museum Memoir in 1851 viz:- History and Description of the Skeleton of a new Sperm Whale lately set up in the Australian Museum...together with an account of a new genus of sperm whales called Euphysetes (Sydney, 1851), 66pp.

[2]When setting up the royal commission into the Survey Department Denison appointed his close friend and former private secretary Andrew Clarke (1824-1902), surveyor-general of Victoria since 1853, to the three-man commission of Clarke, Pell and Capt. John Summerfield Hawkins, R.E.

Scientists remained broadly divided organisationally along the old lines for another twenty years, while the men and institutions emerged which provided a base for the senior colony to carry the Australasian colonies towards a federated science. Throughout that period of preparation the scientific lead was conceded to Victoria, so much better endowed with means, men and vision. In that colony many colonial scientists now preferred - to use W.B. Clarke's metaphor - to cast their scientific 'pearls'.

CHAPTER VI

'PHILOSOPHERS, EVEN AMONG US VICTORIANS'

Charles La Trobe was frankly disappointed with the failure of 'Port Phillippian Society' to sustain the cause of science in the 1840's. Not sharing Gipps's ambiguous attitude towards science the superintendent naturally sought the fellowship of Gunn and other friends in the Tasmanian Society and later held up the reformed Royal Society of Van Diemen's Land as the model for scientists to follow in Melbourne. Edmund Hobson, the able naturalist, shared his palaeontological and physiological work with La Trobe and the small scientific circle in Melbourne. The first long-standing botanical resident in the Port Phillip District, John George Robertson (1803-62), became a correspondent of W.J. Hooker's through his Tasmanian contacts with Gunn.[1] A more controversial botanist of the Melbourne circle was Daniel Bunce (1813-72), another immigrant from Tasmania in 1839, who accompanied Leichhardt part way on the second attempt to cross Australian in 1846, and published extensively on Victorian botany and horticulture.[2] La Trobe himself corresponded widely and supported the Melbourne Mechanics' Institute with gifts to its museum, but, to his great chagrin, even that embryonic institution - founded in November 1839 for 'the promotion of science in the rising colony' and loyally supported by Dr David Elliot Wilkie (1815-85)[3] - deteriorated into a lending library and largely neglected its scientific responsibilities.[4]

---

[1]Robertson managed the Lawrence family estate at 'Formosa', Tasmania, after emigrating from Scotland in 1831. He settled near Casterton, Western District, in 1840, from whence he sent many plants to Hooker. For his relationship with Gunn see e.g. V.D.L. Correspondents, pp.67, 69, 99 and 139.

[2]E.g. Hortus Victoriensis (Melbourne, 1851). Gunn thought poorly of Bunce's work. See A.D.B., I, pp.176-7.

[3]Wilkie, a medical graduate from Edinburgh, was the leading scientific figure in Melbourne before separation. He was a founder of the Mechanics' Institute, organizer of the Port Phillip Medical Association and a close friend of Macadam. See H.B. Graham, 'The Hon. David Elliot Wilkie, M.D., a pioneer of Melbourne', M.J.A., I, No.4(1956), pp.557-65.

[4]The Melbourne Athenaeum, 1839-1939 (Melbourne, 1939) and Jill Lundie, 'The Melbourne Mechanics' Institute, 1839-1872', B.A. Hons. Thesis (Melbourne University, 1955). For a study of the background to the early period see R.M. McGowan, 'A study of social life and conditions in early Melbourne', M.A. Thesis (Melbourne University, 1951).

The medical men, destined for decades to be prominent in the Melbourne scientific community, were the best organised group, founding the Port Phillip Medical Association in October 1846 for 'the promotion of medical knowledge and a more free professional intercourse'. Although interested in scientific papers the doctors soon became embroiled in bitter personal and medical-ethical controversies which hastened the demise of the association in the goldrush turmoil of 1851. Out of the ruins arose the Victoria Medical Association (1852-55) and the Medical Society of Victoria and some valuable experience for the new colony's leading medical men of science, such as Richard Eades (1809-67), William Gillbee (1825-85), Solomon Iffla (1821-87), John Macadam (1827-65) and Wilkie, men of sound medical and associated physical scientific training who took a leading part in the sanitary and scientific debates of the fifties and sixties.[1]

Hobson's death in 1848 was a severe blow to the scientific circle in Melbourne. No mention appears thereafter of the small scientific society La Trobe tried to promote in 1846. With separation came the need to establish the apparatus of colonial government and the ensuing urgency of events on the goldfields and so La Trobe had more than enough to divert his attention temporarily away from scientific associations, although he never lost the conviction that science would play an important part in the future prosperity of the colony.[2] Gold demanded and brought technology; the assayers and analysts, the engineers, geologists, meteorologists and sanitarians to a colony whose resources and possibilities were barely suspected, let alone surveyed, in the 1840's. Gold with its concomitant banes and blessings created such opportunities and wealth for the prosecution of science as Australia had never known before. In the 'rush' more and more colonists looked to 'science'. As one laconic

---

[1]H.B. Graham, 'Happenings of the now long past: the centenary of the Medical Society of Victoria', M.J.A., II, No.7 (1952), pp.213-47.

[2]One of La Trobe's most disastrous early scientific appointments was of William Swainson to report 'on the timber of the colony, chiefly Eucalypti and Casuarineae'. Swainson's 'Victorian Botanical Report' (1853) is described by Maiden as 'unparalleled in the annals of botanical literature ...an exhibition of reckless species hunting'. See the discussion by Maiden in Proc. Linn. Soc. N.S.W., 26 (1901), pp.796-8. and Vic. Naturalist, XXV (1908-9), pp.113-14.

commentator appositely suggested in 1857:

> In all probability the advancement of science in a new country is better obtained by constructing good roads and excellent railways than by setting up telescopes and gazing at the stars.[1]

But, while wealth lasted, Victorians tolerated the pursuit of both pure and applied science. The goldfields and their associated mining activities demanded, indeed, a technology and commitment of unprecedented proportions.

La Trobe faced little opposition when he openly supported science. Scientists, too, after an initial hiatus, were less divided than their colleagues in the other colonies: the needs were too pressing to permit the luxury of long-term divided efforts. There was a 'national' image to create, and science in Victoria, presented with an intellectual and technical competence and manpower from almost every advanced country in Europe and the United States, rose to satisfy the colonists' aspirations and, in so doing, to fill temporarily the vacuum in leadership in the Australian colonies. Scientists were not as hide-bound as their colleagues in New South Wales by entrenched divisions and past failures. The ideas were fresh, the problems virgin and the men untried. Science in Victoria was eminently 'democratic': open to the latest, best and, inevitably, the worst, too, from abroad.

At the beginning of October 1852 'several gentlemen of high geological attainments' led by that versatile man of many parts George Milner Stephen (1812-94), former colonial secretary of South Australia, and the managers of several mining companies met to discuss means for 'developing the latent mineral resources of the Colony'. After reviewing the problems of assaying the meeting resolved that 'the gentlemen present now form themselves into a society to be called "The Royal Geological Society of Victoria"' with Prince Albert as patron and La Trobe as president.[2]

---

[1] Illust. Journ. Australasia, III (1857), p.154.

[2] Argus, 4 October 1852. The object of the society was 'the advancement of geological science in Australia, and the development of the varied mineral resources of the colony'. A Society for the Development of Industrial Resources had begun meeting in 1850 but lost members rapidly during the gold rushes. See Argus, 14 March, 29 July, 2 September 1850 and 23 November 1853.

William Sydney Gibbons was elected secretary and Evan Hopkins, F.G.S., a member of the Royal Geological Society of Cornwall (founded 1815) - on whose advice they relied heavily - was appointed vice-president.

The Argus in its leader of 9 October 1852 cautiously welcomed the society: 'the study of the abstract sciences conduces more to the improvement of the species than is generally imagined, especially in a community such as this, engrossed in the pursuits of active business'. Utility, too, demanded the services of science for coal, gold and agriculture. It was unwise, argued the Argus, to set up an elaborate governing apparatus on the basis of one poorly-attended meeting.[1] Stephens had a geological collection to lend to the society but money was also needed from government to purchase 'foreign and colonial minerals' for the newly-appointed geological surveyor, Alfred Russell Cecil Selwyn (1824-1902).

Stephens led a deputation to La Trobe to request money for a mineralogical cabinet. But the lieut-governor 'eulogized the proceedings of the Royal Society of Van Diemen's Land' and suggested that they devise 'more extended objects....to embrace the whole range of natural history' and achieve something definite before seeking financial aid. Stephens remonstrated that they would impair their vitality by 'amalgamating with older societies' but had no answer to La Trobe's 'somewhat chagrined' rejoinder that specimens he had once personally donated to the Mechanics' Institute were now 'tossed aside' gathering dust.[2]

'Impressed with the necessity of trusting to their own exertions' the members of the Royal Geological Society of Victoria pleaded publicly for a museum of economic geology. After several abortive attempts to

---

[1] Argus, 9 October 1852.

[2] Ibid., 1 January 1853.

convene a meeting the society passed into oblivion late in 1853.[1] But the lessons the assayists and geologists taught were not forgotten. In the Estimates for 1854 £2,000 was set aside for the 'establishment of a Museum of Economic Geology'[2] and Selwyn's Government Geological Survey subsequently began to employ men of the highest scientific calibre and training like George Frederick Henry Ulrich (1830-1901), a distinguished mineralogist, metallurgist, crystallographer and assayist and graduate of the Royal Mining School at Clausthal, one of the best mining schools in Europe.[3]

In 1854 the preliminary steps were taken to realise La Trobe's plea for a society embracing wider scientific objectives. In that year two competing bodies came into existence in a colony still desperately starved of scientific talent, except, perhaps, in the goldfields, and a colony which could ill afford any division of effort, much less any rivalry. The Victorian Institute for the Advancement of Science was founded in July 1854, and the Philosophical Society of Victoria the following August. Adopting the earlier pattern of Van Diemen's Land, where colonial scientists cherished the institutions of the homeland, Victorians were careful to found the new societies on the models they already knew. The Victorian Institute copied the British Association for the Advancement of Science - although there was no talk yet of a peripatetic society - and the Philosophical Institute modelled itself on the Royal Society of London.[4]

---

[1] Argus, 26 January and 17-19 August 1853. See also the note by K.A. Townley, 'A Geological Society in Victoria', J. Geolog. Soc. Aust., 6 (1958), p.201 which refers to the Society's activities in 1853 only. The meeting of 17 August was attended by William Keene (1795-1872), later government geologist and examiner of coal mines in N.S.W.

[2] R.T.M. Pescott, Collections of a Century (Melbourne, 1954), p.4. The geological specimens collected for the Museum of Economic Geology passed to the National Museum in 1854.

[3] E.J. Dunn, 'Biographical sketch of the founders of the Geological Survey of Victoria', Bulletins Geolog. Survey Vic., 23(1910), pp.26-9. See also my article on Ulrich in A.D.B., VI (at press).

[4] For details of these societies see M.E. Hoare, 'Learned Societies in Australia: the foundation years in Victoria, 1850-60', Rec. Aust. Acad. Sci., I, No.2(1967), pp.7-29 and Pescott, 'The Royal Society of Victoria from then, 1854, to now, 1959', Proc. Roy. Soc. Vic., New Series, 73(1961) pp.1-40.

Gibbons, secretary of the defunct Geological Society, was the moving force behind the Institute, which was intended as a medium for the exchange of scientific data and for the development of the colony's resources. Striving to avoid charges of 'abstract science' the Institute adopted broadly utilitarian aims: its papers must capture the interest of the general reader as well as the professional man of science.[1]

The Victorian Institute chose Redmond Barry (1813-80), the colony's arch-patron of intellectual, educational and scientific enterprises, as its first president. With high-flown rhetoric Barry reminded the members that theirs was not an age to tolerate the 'division of acroatic and exoteric learning or recognise barriers within which the uninitiated are not permitted to encroach'. The 'events crowded into the last three years' in Victoria had brought 'many gifted men of cultivated minds, fervid imagination and intrepid temperament' among them, men, who, 'curbed and confined elsewhere by the pressure of surrounding competition', would need outlets for their talents. The Institute must become a centre for 'primary research', a society recognising that 'the philosopher would be helpless without the assistance of the mechanic'.[2]

Accepting Barry's advice the Victorian Institute settled down to ten months of discussion on a wide range of topics. Ferdinand Mueller (1825-96), who had been appointed government botanist in January 1853, became a council member[3] and contributed three papers to the Institute's Transactions.

---

[1] Trans. Vic. Inst. (1854-55), advértisement. The society sought to 'investigate the resources of Victoria; and to contribute to their development and to inquire into the wants of the community with a view to their supply'. The preliminary meeting of the Institute was held on 15 June 1854.

[2] Trans. Vic. Inst., pp.1-14.

[3] The council also included Charles Pasley (1824-90), commissioner of public works, Dr Maund, Gibbons, Frederick Sinnet (1831-66), an engineer and journalist, and Selwyn.

Drawing on recent field excursions Mueller outlined a programme of botanical research among 'the manifold singular productions of our Australian home' and the 'unknown wilderness' of Victoria,[1] a programme which was to occupy him ceaselessly for another forty-two years. Mueller, with the other professionals appointed by La Trobe to scientific offices, brought stability to the Institute's affairs. Andrew Clarke, friend and private secretary to Denison in Hobart since 1849, was invited by La Trobe to replace Robert Hoddle as surveyor-general of Victoria in March 1853. An engineer by profession, Clarke was one of La Trobe's key scientific appointments and played an important part in developing the colony's services and in recognising and selecting men of scientific ability like Robert Brough Smyth (1830-89), the mining engineer and meteorologist, who dominated aboriginal, mining and geological affairs in Victoria in the 1860's.[2] Other active professional scientific officers in the Institute were William Henry Archer (1825-1909), acting registrar-general; M.B. Jackson, engineer to the Melbourne water supply scheme; Dr John Maund (1823-58), an analytical chemist and Charles Pasley, commissioner of public works.

In a paper on microscopic investigation, Gibbons, a public analyst and regular lecturer at the Mechanics' Institute, showed how even 'the ordinary appliances of science [were] difficult of attainment' in Victoria, where 'the student has to resort to expedients varying somewhat from the routine of English and Foreign observers'. Books were rare and the entomologist-microscopist could obtain none of the usual cyanide of potassium for his work. Gibbons was forced to use turpentine or creosote to prepare his insect specimens.[3] When, at the suggestion of John Maund,

---

[1] Mueller, 'Description of 50 New Australian Plants, chiefly from the Colony of Victoria', Trans. Vic. Inst., pp.28-48.

[2] M.E. Hoare, '"The half-mad bureaucrat": Robert Brough Smyth (1830-89)', Rec. Aust. Acad. Sci., II, No.4 (1973), pp.25-40.

[3] Trans. Vic. Inst., pp.104-13.

the Institute formed separate sections - whose titles reflected the pressing problems of the moment - in September 1854, Gibbons was active in the one on microscopy.[1] Later, in 1858, as editor of the Illustrated Journal of Australasia, he vigorously campaigned for a microscopical society 'limited to actual workers'.[2] The Illustrated Journal and the Microscopical Society died together, but the separate study of microscopy was revived in the Microscopical Society of Victoria founded in 1879.[3]

Archer in a paper 'On statistical sanitary processes' outlined the new system of registration he had drawn up for La Trobe, claiming, with some justification, that it was 'more comprehensive in its scope and scientific in its detail than any hitherto carried out in any part of the world'.[4] One third of the twenty printed papers in the Institute's Transactions concerned public works and the economics of those undertakings. Doctors and engineers were well to the fore in these debates and a similar situation pertained in the Philosophical Society over which Andrew Clarke presided.

The foundation of the Philosophical Society of Victoria was more directly related to La Trobe's and Clarke's science policies. La Trobe was influenced by the persistent agitation of the naturalist-zoologist William Blandowski (b.1822), who wanted money to complete his 'Illustrated Natural History of the Colony of Victoria'. Mark Nicholson, Leichhardt's friend, moved successfully in the Legislative Council in September 1853

---

[1] 'Abstract of proceedings', 31 July and 29 September 1854, ibid. The sections formed were sanitary economy; engineering; political economy; chemistry and microscopic investigation.

[2] Illust. Journ. Australasia, IV(1858), p.44. The society had already held three meetings by January 1858. The Illustrated Journal maintained a valuable commentary on science in its section 'Journal of Science and Industry'.

[3] This Society published a Quarterly Journal at intervals between 1879-82. It merged in 1888 into the Royal Society of Victoria (Section D).

[4] Trans. Vic. Inst., pp.20-7. See also A.D.B., III, pp.41-3.

for funds to set up a museum of natural history. Clarke agreed to convene a society to administer the museum and to provide space at the Assay Office.[1] Blandowski was appointed government zoologist on 1 April 1854,[2] and the following month Sigismund Wekey (1825?-89), an emigré Hungarian lawyer, suggested the formation of a Philosophical and Literary Association for the Advancement of Science.[3] Andrew Clarke, ably supported by his close friends Macadam and Wilkie, inaugurated the Philosophical Society on 12 August 1854, reminding the members that 'the sublimity of deductive philosophy' must yield before 'the no less honourable and valuable efforts of the practical experimentalist'. The accumulation of facts was their prime task.[4]

But facts they lacked and, because of that, neither deductive philosophers nor practical experimentalists could agree on major issues.

Before they amalgamated as the Philosophical Institute of Victoria in July 1855, the two scientific societies published thirty-nine papers, of which thirteen were on engineering and related problems of public utilities, and six on meteorology and climate.[5] Victorian quality of life was the most urgent problem facing scientists in Melbourne.

---

[1]Pescott, Collections of a Century, pp.1-16. Details of the organisational background to the formation of the Royal Society of Victoria's forerunners are examined in P.J. Fry, 'The foundation and early history of the Royal Society of Victoria', B.A. Hons. Thesis (Melbourne University, 1955).

[2]Ibid., p.4. For details of Blandowski's Australian career see L. Paszkowski, 'William Blandowski - the first government zoologist of Victoria', Aust. Zoologist, 14, pt 2(1967), pp.147-72.

[3]Argus, 31 May and 2 June 1854. Wekey (more correctly Zsigmond Vékey) was implicated in revolutionary activities in 1848 and later as an exile in London. After arriving in Melbourne he went to the diggings for some months before starting his journalistic lobbying for science. See E.F. Kunz, Blood and Gold. Hungarians in Australia (Melbourne, 1969), pp.100-05.

[4]Trans. Phil. Soc. Vic., I (1854-5), pp.1-4.

[5]The remainder were on natural history (9); physics and chemistry (5); exploration (2); agriculture (2) and miscellaneous (2).

The greatest controversy was over the Yan Yean water-supply scheme, financed early in 1853 to alleviate the acute shortage of water in Melbourne.[1] In December 1854 M.B. Jackson, the official engineer, outlined to the Victorian Institute his reasons for favouring the damming of the River Plenty and its tributaries at Yan Yean. There were, Jackson conceded, many objections to Yan Yean but none from any 'practical man'. For too long practical knowledge and experience had been ignored by Australian engineers and there had been too much meddling by critics ignorant of engineering principles.[2] John Maund's analysis of the Plenty water showed that it was purer than many European sources. Maund favoured Yan Yean if the water could be supplied by gravitational means and the reaction of organic materials on lead pipes avoided.[3]

On 9 January 1855 David Wilkie, an ardent, consistent opponent of Yan Yean, presented 'a very contentious paper' to the Philosophical Society strongly critical of the whole scheme.[4] Professor John Smith of Sydney, 'the highest authority on water analysis in the Australian colonies', Wilkie claimed, favoured the purer supplies from the Yarra, and there were, moreover, no guarantees that supplies would last from Yan Yean. Wilkie's own experiments into the hydrological and climatological factors of Yan Yean strengthened his scepticism. The Philosophical Society, alarmed by the frankness of Wilkie's paper, appointed a committee to enquire into the project.

---

[1] G. Serle, The Golden Age: A History of the Colony of Victoria, 1851-61 (Melbourne, 1963), p.142. The original scheme for Yan Yean was conceived by James Blackburn (1803-54) in 1850-1.

[2] Jackson, 'On water supply to the City of Melbourne', Trans. Phil. Soc. Vic., pp.54-61. Jackson argued that reservoirs would reduce the risk of bush fires and provide water for grain growing under irrigation.

[3] J. Maund; 'The water of the Plenty River', ibid., pp.136-43.

[4] D. Wilkie, 'On the failure of the Yan Yean Reservoir...', ibid., pp.111-64. The printed version of Wilkie's original paper comprehends the arguments he used in reply to his critics and supporters within the society.

Careful consideration was given by the committee to discharge, evaporation and physiographical factors but the local data, it was conceded, were too limited to be conclusive.[1] The committee, indeed, was divided among itself and Clement Hodgkinson (1818-93), dissatisfied with the British literature relied upon to calculate evaporation and discharge rates, resigned and wrote a minority report.[2] There was, he pointed out, no 'certain proportion between rainfall and available supply'. Wilkie's figures for evaporation were too high and the figures supplied by Dr Edward Davy's experiments with small copper vessels to measure evaporation were also unreliable. Only the 'accurate and judiciously conducted observations' currently being conducted by Brough Smyth were in any sense scientific, rendering 'his name our chief authority of the Meteorology of the Colony'. Hodgkinson, himself an experienced engineer, also favoured the less contaminated waters of the Yarra.

Wilkie, too, soon found chinks in the committee's arguments. 'However competent', the remaining commissioners, Acheson and Christy,

> may be to draw up a report on the watershed of English rivers, with the aid of English tables, they cannot be supposed to have much practical knowledge of the rivers of this country, from their comparatively short colonial experience.[3]

---

[1] 'Report of the Commissioners appointed by the Philosophical Society of Victoria to investigate the alleged insufficiency of supply of the Yan Yean Water Works by Dr Wilkie', ibid., pp.186-203. The 'commissioners' appointed were Frederick Acheson, F.C. Christy and Clement Hodgkinson, all engineers, with Wekey as secretary.

[2] Hodgkinson, 'On the probable influence of evaporation upon the quantity of water to be supplied by the reservoir at Yan Yean', ibid., pp.175-87. The committee drew heavily on G.D. Dempsey's Rudimentary Treatise on the Drainage of Districts and Lands, where the results, Hodgkinson argued, were based upon 'a gross mathematical absurdity'. For Hodgkinson see A.D.B., IV, pp.403-4.

[3] Trans. Phil. Soc. Vic., p.137. Wilkie, it should be noted, was a Scot who relied on data from the Clyde basin in drawing up his evaporation rates.

Edward Davy (1806-85), the former assay master and a colonial experimentalist of long-standing, 'our highest meteorological authority',[1] and Blandowski's 'careful geological survey of most of the colony' (sic) provided them, Wilkie maintained, with initial, even if inadequate data. 'Theory, based upon experiments conducted in this colony would possess a scientific interest and value, but otherwise it is practically useless'. Yan Yean and similar projects were really the province of medical men, who, by and large, were the analysts and they, Wilkie claimed, should wrest the initiative for research into evaporation rates, meteorology and physiography from the civil engineers, whose conclusions were usually inadmissible on sanitary grounds.

Wilkie was so provocative because he wanted to sway public and scientific opinion. Acheson and Christy were fully aware that surface run-off was not the sole source of water and they showed that interstitial water (from rock crevices and fissures) provided additional supplies. In March 1855 Brough Smyth wrote to Clarke giving at some length the preliminary results of his researches on the relationship between physiography and climate.[2] Victoria needed, he stressed, an extensive network of meteorological stations. Local (microclimatological) factors were as important in determining climate as latitude:

> The peculiarities in the climate of Australia are owing to distinct characteristics of geological structure and configuration than to the unmodified solar influence.

Smyth warned against over-simplifying readings on evaporation. To be of any value such data must consider temperature, saturation conditions, wind forces; in short, complete daily hygrometric readings were required. Smyth outlined his own hydrological researches into stream run-off and discharge, giving careful consideration to subterranean drainage and to

---

[1]The results of Davy's four-months' research on 'The meteorology of Melbourne' were read to the society. See Trans. Phil. Soc. Vic., pp. 164-75.

[2]Trans. Phil. Soc. Vic., pp.203-21.

geology, and supporting Wilkie's contention that the short periodic rainfall pattern of Australia's climate must be considered as the characteristic of precipitation supply. Only the 'unerring precepts of science', particularly on the goldfields, were valid in studying water supply problems:

> Science, our helper in the humblest as in the greatest things, cannot be despised with impunity; and, whether we consider the effects of its teachings in the abstract, or as applied to practical labours, we are equally persuaded of its high importance.[1]

There could be too much reliance on empirical and practical knowledge in these matters, with obvious disasters.

Recommending that the Philosophical Society reject its own committee's report, Wilkie argued from the same premises as Smyth:

> Theory based upon experiments conducted in this colony would possess a scientific interest and values, but otherwise it is practically valueless.
>
> Speculative philosophers, who embark on abstruse scientific investigations with incorrect or inapplicable data for their guide, will soon find themselves lost in a pathless ocean, without a compass and without a chart.[2]

As editor of the Australian Medical Journal (commenced 1856) Wilkie allowed ample space to the continuing debate on Yan Yean, especially on the organic impurities in the water and dangers of lead poisoning.[3] He was prominent with Macadam, John Smith and the analyst William Johnson in providing evidence to the Legislative Assembly select committee on Yan Yean in 1858-9, when filtration and diversion round the Plenty swamps were recommended to alleviate the high amount of impurities in the water.[4] While many of

[1] Ibid., pp.220-1.

[2] Ibid., p.150.

[3] Aust. Med. Journ., IV (1860), pp.3-6 and 241-51.

[4] V.P.P.(L.A.), I, 1858-9. 'Report from the select committee upon the water of the Yan Yean Reservoir'. Macadam and others also advised government on the Geelong water-supply.

Wilkie's other criticisms were never vindicated he and his associates undoubtedly did a considerable service to science and the community by drawing informed opinion to this important topic.[1]

Water analyses were improved under the very able government analyst, John Macadam, a former chemistry student of Professor Frederick Penny (1816-69) at Anderson's College, Glasgow, and later a student and assistant of Professor William Gregory (1803-58) in Edinburgh.[2] Andrew Clarke was impressed with Smyth's researches and appointed him meteorological observer (later superintendent) at the Crown Lands Office, where between 1856-8 he was allowed full scope to develop a comprehensive meteorological recording network for the colony.[3] Smyth's efficient branch attracted the attention of colonial and British scientists, doing more, Clarke told Redmond Barry in 1859, 'to introduce Victoria to European intellectual men than any other fact connected with the colony'.[4]

Wilkie maintained that more would have been achieved for science if societies had existed two years previously in 1852-3, when Yan Yean first became a major issue. The societies were a recognition of the 'vast importance of cultivating science in this remote corner of the globe'.[5] 'Cultivating science' also led to pride in colonial achievement and a growing unwillingness to brook external 'interference' and untried data.

---

[1] For the role of medical men and others in the general debate on public health, professional recognition and legislation see Eva Slawick, 'Public Health in Melbourne: the hesitant years, 1860-70', B.A. Hons. Thesis, (Melbourne University, 1963).

[2] In her researches on the development of chemistry in Victoria Miss Joan Radford has pointed to the importance of Macadam's background, training and abilities, which made him the foremost analytical chemist in Melbourne. He became 'Lecturer on Chemistry to the Medical Students' at Melbourne University in 1861-2 and trained John Drummond Kirkland (1836-85), the first professor of chemistry (1882-5), who was his assistant as government analyst. See Radford, 'Prospecting for a Professor: Assayers and Analysts in Medicine and Metallurgy: Victoria, 1854-1885', unpublished typescript in possession of author and Miss Radford's forthcoming book on the history of chemistry in Melbourne University. Penny and Gregory had been students of Liebig.

[3] Hoare, '"The half-man bureaucrat"', Rec. Aust. Acad. Sci., II, No.4 (1973). Smyth's three reports were published in V.P.P. (1856-9).

[4] Extract from letter Clarke to Barry, 8 August 1859 in Barry to Smyth, 8 October 1859, R.B. Smyth papers, MS 8781/70, La TL., Melbourne.

[5] Trans. Phil. Soc. Vic., p.164.

The Philosophical Society heard papers on botany from Mueller; lunar physics and optics from Balfour Stewart and on palaeontology and natural history exploration from Blandowski. Blandowski's first succint report of his official expedition to the Mount Macedon, McIvor (Heathcote) and the Goulburn River demonstrated his remarkable versatility in every branch of natural history.[1] Blandowski's work laid a foundation of knowledge on Victorian fauna. He was a prominent representative of an important group of German-speaking naturalists - 'universal geniuses' Lady Denison called them - such as Ludwig Becker (1808?-61),[2] Gerard Krefft and Mueller, middle-Europeans attracted to Victoria by gold, and men who made enduring contributions to Australian science and scientific societies.

While engaged in elucidating the phenomena of their own province, Victorian scientific societies inherited a compelling passion to explore the continental interior and later accepted the challenge to champion exploration of the two adjacent 'unknowns', Antarctica and New Guinea. In September 1854 the Philosophical Society initiated one arm of the movement which ended in the Burke and Wills tragedy of 1861. Wekey, the secretary, prepared plans for 'prospecting expeditions' to examine coal, minerals and 'vegetable' products. A committee comprising Brough Smyth, Mueller, Iffla and Wekey drew up 'instructions' for scientific explorers and wrote memorials to government and parliament appealing for funds.[3] But Sir Charles Hotham (1806-55), the new lieut-governor, who was obsessed with budget balancing, instructed his private secretary J.H. Kay to refuse monies for mineral exploration.[4] Retrenchments were the order of the day

---

[1] Ibid., pp.51-74. Blandowski was also a talented natural history artist.

[2] A.D.B., III, pp.127-8.

[3] 'Proceedings', 10 and 18 September 1854, Trans. Phil. Soc. Vic., pp.iv-v and Pescott, Proc. Roy. Soc. Vic., 73 (1961), pp.7-8.

[4] 'Proceedings', 9 January 1855. 'With regard to coal', the exploration committee was told, 'it is reported that the fields at Western Port are sufficient to last a generation'. Trans. Phil. Soc. Vic., p.ix.

and science proved a vulnerable target. In July 1855 Mueller, granted eighteen months leave without pay to go on Augustus Gregory's North Australia Expedition (1855-6), was elected an honorary member of the new Philosophical Institute, promising to return if the 'more prosperous state of the colony' allowed it.[1]

Mueller's election reflected new policies as the two societies responded to the absurdity of 'apparent if not real rivalry' in a period of financial stringency. At first the more active Philosophical Society was cool towards overtures for amalgamation but, following delicate negotiations and a judicious shuffling of aims, personnel and structures, the bases of union were agreed upon and the Philosophical Institute of Victoria was inaugurated in July 1855. There were few casualties of the merger, despite murmurings of inefficiency from both sides. Wekey, an 'agile acute and active' opportunist, was one of the few: he found himself personally saddled with the debt for publishing the Philosophical Society's Transactions.[2] Scientists and members of both societies were now united to press their claims on a less sympathetic government.

The Australian Medical Journal, reviewing the Transactions of the two amalgamating societies in January 1856, found that on balance they gave 'a very favourable impression of science in Victoria'.[3] Although 'the indifference of the colonists and the apathy of the Legislature' led to the temporary abandonment of schemes for exploration, Andrew Clarke, addressing the Philosophical Institute as its first president, was confident that 'costly experience' would teach Victorians that to ignore the 'admonitions' and opportunities of science 'is to neglect the best source of prosperity'. 'Science', the Philosophical Institute must show,

---

1 'Proceedings', 10 July 1855.

2 'Proceedings', Trans. Phil. Inst. Vic., I (1856), pp.xiv-xxvii and Argus, 8 January 1856. Wekey resigned as honorary secretary on 19 June 1856. He was widely lampooned in the press in 1856 and, following a period on the Otago goldfields, returned to Victoria where he engaged in gold mining. He was convicted of conspiracy in 1871 and returned to Europe in 1876.

3 Aust. Med. Journ., I (1856), pp.57-9.

could not be divorced from 'the practical business of life'.[1]

But during its lifetime, 1855-60, the Philosophical Institute forfeited much of its inherited initiative for scientific activity in Victoria. Commencing as 'an active and virile'[2] organisation it became all too frequently dominated by domestic issues and self-important debates on status. Engrossed in the erection of a 'Temple of Science' (the Royal Society's hall) the Institute earned a poor press at the end of the decade. This gradual decline in the Institute's affairs was of its own making, for science in general in the colony enjoyed a boom under the new scientifically-minded governor, Sir Henry Barkly (1815-98)[3] and governments sympathetic and liberal towards it. Selwyn's Survey, for instance, achieved world recognition with expanded resources and developed into a training 'school' for geologists whose influence and talents were later spread throughout Australasia and the Empire.[4] Brough Smyth, secretary to the Board of Science (1858-60) emerged as an ambitious and efficient scientific civil servant, building on the fine basis laid by Andrew Clarke. Public interest increased, too, particularly in exploration and, because of the government's greater involvement, debates on science moved more into the arena of parliamentary discussion and enquiry.[5]

---

[1] Trans. Phil. Inst. Vic., I (1856), pp.1-10.

[2] Pescott, 'The Royal Society of Victoria', Proc. Roy. Soc. Vic., 73 (1961), p.9.

[3] Full justice has yet to be done to Barkly's role as a supporter and influence on science in Victoria. He was elected F.R.S. in 1864. See A.D.B., III, pp.95-6.

[4] Selwyn himself went to Canada as Director of the Geological and Natural History Survey (1869-94) and Ulrich to Dunedin as Professor of Mining and Mineralogy (1877-1900). Richard Daintree became government geologist for Northern Queensland (1869-71) and C.D.H. Aplin for Southern Queensland during the same period. Charles Wilkinson was appointed geological surveyor in N.S.W. in 1874 and H.Y.L. Brown was government geologist in Western Australia (1870-2) and from 1882 government geologist in South Australia. R.A.F. Murray took over the Victorian Survey on its resumption in 1871. See Dunn, Bull. Geolog. Survey Vic., 23 (1910).

[5] See e.g. the discussion on Brough Smyth's and McCoy's work on parliamentary enquiries and royal commissions into aspects of science and science policy in Hoare, '"The half-man bureaucrat"', Rec. Aust. Acad. Sci., II (1973), pp.29-35.

Reviewing the year of greatest discontent with the Institute's work in 1859, the Australian Medical Journal noted:

> We have formed a Society, with a proper constitution of president, vice-president, treasurer, secretary, committee or council, sections, commissions and the like; we have obtained grants from Government; we have built a hideous but possibly learned-looking structure wherein to hold scientific discussions; we have obtained leave from Her most gracious Majesty to call our learned club 'The Royal Society'; we have gathered thereunto all the learned people in the colony; and we have periodical issues of 'Transactions', wherein very sanguine persons will expect to find much information upon matters relating to all the ologies.[1]

But the published papers

> ...with some exceptions...contain neither facts nor theories which have not been made known to the world before, and the solitary paper of really practical importance (to wit, the 'Drainage of Melbourne') is merely a record of the experiences of others - very creditable as a popular lecture at a Mechanics' Institute, but altogether out of place when included in the archives of a society arrogating to itself the exclusive right to represent the science of a whole country.[2]

Where was the scientific work, the reviewer demanded, to 'promote the material good of the colony' as well as contribute to 'the great commonwealth of science pure and simple?'. While the members of the Institute continued to show that a 'disposition to self glorification is a quality of the whole society' they were

> not likely to contribute to the advancement of true science until they can persuade themselves to exchange the vanity of a frivolous dilettanteism for the genuine, earnest, continuous industry of the true workers in the realms of knowledge.[3]

---

[1] Aust. Med. Journ., V (1860), pp.134-5.

[2] Ibid., p.135.

[3] Ibid., p.136.

Those, too, were broadly the views of Barkly who became president of the Royal Society of Victoria (the Institute's successor) in 1860.[1] Regeneration must come from within.

The Institute's published papers in the final two years of its life merited strong criticism. The real work was achieved not by those who read papers but by a small group of versatile scientists and the committees formed to investigate topics such as acclimatisation, astronomy, exploration, museums, sewerage and resources.

Of the seventy published papers[2] in four volumes of the Institute's *Transactions* one half was devoted to natural history and acclimatisation. The former emphasis on engineering and associated water-supply activities (nine papers) and on chemical analysis, agriculture and resources waned as scientists presented their findings of official commissions and select committees. Some work was siphoned off to newer specialist societies like the Pharmaceutical Society of Victoria (founded 1857)[3] and the medical societies. The growth of interest in astronomy, geophysics and in the associated meteorological functions of the observatories was not fully represented by the eight papers published by the Institute. Of minor importance, too, were the contributions from the University science professors, McCoy and Wilson, who were, however, very active on public bodies and in the science lobby. A series of four papers in 1859 on

[1] See particularly his 'Inaugural Address', *Trans. & Proc. Roy. Soc. Vic.*, V (1860), pp.1-17.

[2] The published papers did not represent the total number read in any one year to the Institute. In 1859, for instance, of twenty-six read, twenty were published. Barkly estimated in 1860 that the Institute heard 100 papers between 1855-9.

[3] One of the mainstays of this society was Joseph Bosisto (1824-98), a chemist and successful investigator into the essential oils of Australian plants. He was also a successful science lobbyist. A detailed study of the Pharmaceutical Society and pharmacy is being prepared by Mr. F.C. Kent of Mentone, Victoria. For an earlier, inadequate account see *Aust. Journ. Pharmacy*, 37 (1956), pp.1342-44.

South American topics earned the deserved derision of the scientific press.[1] John Hood, writing on the drainage of Melbourne but professedly ignorant of any engineering principles, argued on economic and political grounds against capital intensive water supply and drainage projects.[2] Even a promising essay by William Bryson 'On the Resources of Victoria and their Development' was little more than a plea to apply contemporary advances in science to the setting up of a high-principled white civilisation in the Pacific.[3]

In 1855 the Institute inherited responsibility for the Museum collections, then crammed into the Assay Office. Frederick McCoy, professor of natural science at Melbourne University and later director of the National Museum, was anxious, contrary to the Institute's wishes, to remove the Museum to more spacious accommodation under his superintendence at the University. In May 1856 the Institute appointed its own museum committee as a watchdog over the collection. Public meetings were called to air the matter and agitate for housing the exhibits in the Public Library. In the midst of the public debate in July 1856 McCoy decamped clandestinely with the entire collection to the University, where it remained under his control until his death in 1899.[4]

---

[1] Applying the classification used above, the distribution of papers (1855-9) was as follows: natural history and acclimatisation (36); engineering, irrigation etc. (10); astronomy, geophysics, meteorology (8); agriculture and resources (two); exploration (three); physical sciences (two); mathematics (one) and miscellaneous and non-scientific (8). The four papers on South America covered geology, silver mining, domestic animals and native tombs. These last papers, the Aust. Med. Journ. noted, had 'no more right to rank as scientific essays than has a cork-screw to be denominated a surgical instrument because it happens to be in an amputating case'.

[2] Trans. Phil. Inst. Vic., IV (1860), pp.43-60. See also the paper by W. Lockhart Morton, 'Notes of a recent personal visit to the unoccupied Northern District of Queensland', ibid., pp.188-99. Morton attacked the system of tendering runs in Queensland, which he regarded as harmful to the small settler.

[3] Ibid., pp.149-59.

[4] Pescott, Collections of a Century, pp.24-34. McCoy received support in the Institute from his colleague Professor Hearn (1826-88), professor of modern history, literature, political economy and logic. See 'Proceedings', Trans. Phil. Inst. Vic., I, pp.i-xii, and meetings of 20 May, 19 June and 19 August 1856.

William Parkinson Wilson, professor of natural philosophy and mathematics in the University, was very active from the outset as a vice-president of the Institute. 'A temperamental little bachelor' he nevertheless at first provided more tactful, consistent leadership than McCoy in the Institute. In November 1856, following the Museum débâcle, he outlined the action taken in Britain by the British Association and Royal Society to secure a large telescope for investigation of nebulae in the Southern Hemisphere.[1] Melbourne, he stressed, had the perfect atmosphere for such an observatory and the time was ripe to demonstrate to the rest of the world that profits from gold could be turned to promoting science. Wilson's persuasiveness, touching on colonial pride, won him an observatory committee within the Institute charged with pressing Melbourne's claim for a large reflector.[2]

One immediate opponent of Wilson's scheme was Robert Lewis John Ellery (1827-1908), director of the government's small 'primitive' observatory at Williamstown, which had provided data for navigation since 1853.[3] In January 1857 Georg Balthasar Neumayer (1826-1909), a well-qualified astronomer, meteorologist and physicist, arrived furnished with instruments provided by King Maximilian II of Bavaria and ready to begin a magnetic survey of Victoria.[4] An acquaintance of Dove, A. von Humboldt, Lamont and Liebig, Neumayer had gained the support of prominent British scientists at the British Association meeting at Cheltenham in August 1856.

---

[1] 'Report of the steps taken in England to provide a Telescope for observing the Nebulae of the Southern Hemisphere', Trans. Phil. Inst. Vic., I, pp.138-52. The matter was mooted in the late forties and discussed periodically at the British Association meetings in the fifties.

[2] 'Proceedings', 19 November 1856. The committee comprised Andrew Clarke, Solomon Iffla, Professors Hearn and Wilson and Rev. A. Morison.

[3] C. Stuart Ross, 'Our observatory: the story of its establishment', Vic. Hist. Mag., VI (1917-18), pp.134-44 and for Ellery, A.D.B., IV, pp.135-7.

[4] Ross, op. cit., pp.137-40. Neumayer on his first visit to Australia in 1852-4 had been impressed with the opportunities for fundamental scientific research.

Towards the end of 1857 the Institute's observatory committee memorialised government and recommended the setting up of an 'Astronomical, Magnetical and Meteorological Observatory on a scale commensurate with the importance of the colony':[1] imperial government had 'done its part' in Hobart and 'we do not think that the Government of Victoria should withhold its contributions to the great scientific enquiry of the day by neglecting to institute a survey of the colony'. Neither should the King of Bavaria, 'a foreign prince, do the work for us other governments have done for themselves'. Neumayer, who was ready to sell his instruments, was also willing to accept appointment as director of a colonial observatory.[2]

Public reaction to the assumption of an expensive programme of astronomical, magnetical and meteorological surveys was mixed. One critic, asking whether 'Magnetic Observatories...are as useful as necessary', firmly concluded on grounds of colonial and utilitarian expediency that they were not.[3] Gauss, Ross, Sabine and their co-workers had already gleaned adequate data from the southern hemisphere and, presuming Victorians wanted to 'advance the cause of theoretical science', their money could be better used fitting out 'an expedition to the south pole'. These arguments, running directly counter to the observatory committee's findings that 'Australia remains a blank on the [magnetical] map'[4], were the ones initially heeded by the Legislative Assembly, which 'treated Neumayer as little better than an itinerating quack' and refused funds for an observatory.[5] The German residents and scientists in Melbourne, however, raised £500 towards Neumayer's expenses,[6] determined to gainsay a growing

---

1 'Report of the Proceedings of the Observatory Committee of the Philosophical Institute of Victoria', <u>Trans. Phil. Inst. Vic</u>., II (1858), pp.i-vi.

2 At a salary of £600. The Observatory Committee drew up details of staff and instruments needed, recommending a site 'in the western portion of the Royal Park clear of trees on the brow of the hill overlooking Flemington', ibid., pp.iv-vii. An earlier memorial in December 1856 concerning an astronomical observatory had been sympathetically received but no action followed. Ibid., pp.vii-x.

3 <u>Illust. Journ. Australasia</u>, III (1857), pp.145-55.

4 <u>Trans. Phil. Inst. Vic</u>., II (1858), p.iv.

5 <u>Illust. Journ. Australasia</u>, III, p.141. Neumayer asked for £700 for a building and an annual grant of £600 for two to three years.

6 Ross, 'Our observatory...', pp.139-40.

impression that Neumayer was one of those 'soi-disant philosophers' who regularly ran off 'to the antipodes to catch antarctic butterflies'.[1]

Reason fortunately prevailed and Neumayer received official support for his work, commencing his observations on meteorology and navigation in March 1858 and those on terrestial magnetism the following May at the Flagstaff Observatory.[2] Neumayer, a zealous advocate of antarctic exploration, prosecuted his researches as director of the magnetic survey ably and thoroughly, travelling widely throughout the colony and achieving a position of respect and honour within the Melbourne scientific community. The magnetic survey was completed by 1864, when Neumayer left Victoria for Germany, where he eventually became director of the renowned Seewarte in Hamburg, 1876-1903, and hydrographer to the German Admiralty. While at the Flagstaff Observatory he developed Melbourne as a centre for research into the meteorology and navigation of Australian waters, gleaning data from the masters of vessels on a standard form which he issued for their use.[3]

Most of the recommendations from the Institute's observatory committees of 1856-7 were brought to fruition by 1858. The one glaring exception was the proposal for the great reflecting telescope. But the astronomical cause did not die, especially with the growth in means and achievements of Ellery's observatory at Williamstown; the interest aroused by the appearance of Donati's Comet in November 1858[4]; the appointment of a Board of Visitors to the government observatory in 1860 and the merger in 1863-4 of all

---

[1] Illust. Journ. Australasia, III, pp.153-5. The critic of Neumayer's plans argued that British scientists were scarcely interested in Australia and that the telescope would be better sited at Cape Town!

[2] Neumayer, 'Description and system of working of the Flagstaff Observatory', Trans. Phil. Inst. Vic., III (1859), pp.94-103. Telegraphic connection was established immediately with the observatory at Williamstown.

[3] For Neumayer's work as a promoter of antarctic exploration, navigational research etc. see e.g. R.A. Swan, Australia in the Antarctic, pp.34-6.

[4] L. Becker, 'Observations on Donati's Comet, made between Oct. 12th and Nov. 12th, 1858', Trans. Phil. Inst. Vic., IV (1860), pp.9-12 and lithographs.

meteorological and astronomical work under Ellery as government astronomer at the Melbourne Domain Observatory.[1] The Royal Society of Victoria consistently supported Ellery's and the Board's efforts to obtain a large reflector for Melbourne. The long-awaited forty-eight inch reflector, the Great Melbourne Telescope, was finally set up in 1869.

The Institute's involvement in initiating other projects in 1855-6 was less successful. Committees set up to investigate acclimatisation, gold mining and irrigation stimulated useful discussion but pressure of work among the members made the production of reports impossible.[2] Certain recommendations such as one for a Commission on the Mineral Resources of Victoria (chaired by McCoy in 1857) and another on the import of camels - first raised before the Institute by Becker in April 1856 - and advice and queries on other aspects of science were referred to government or brought before the Board of Science, where the influence of McCoy, Mueller, Pasley, Smyth and Charles Ligar, the new surveyor-general, was strong.[3]

Ludwig Becker emerged as one of the Institute's most versatile members.[4] He maintained a world-wide correspondence, writing to Louis Agassiz in U.S.A. and John Gould in Britain with his queries and findings. Becker's papers to the Institute were models of clarity and brevity, taking cognizance of many interrelated problems and phenomena. Writing 'On the Age of the Animal and Vegetable Kingdom of Australia relative to the rest of the World...'[5] he drew on the palaeontological work of Buckland and

---

[1] Trans. & Proc. Roy. Soc. Vic., VI (1865), pp.lxxv-lxxxii. One of the most consistent and influential supporters of the Great Melbourne Telescope scheme was George Frederic Verdon (1834-96), honorary assistant at the Melbourne Observatory, who became secretary to the Board of Visitors and allowed generous support for the Observatory when treasurer under Heales (1860-1). He was elected F.R.S. at the age of 36.

[2] Trans. Phil. Inst. Vic., I, p.xxvi.

[3] See e.g. the two 'Annual Reports' of the Board of Science, V.P.P., 1858-9, II, No.45 and 1859-60, No.48 and Hoare, '"The half-mad bureaucrat"', Rec. Aust. Acad. Sci., II (1973).

[4] His interests ranged from astronomy to zoology and he published eleven papers in the Institute between 1856-9. See A.D.B., III, pp.127-8.

[5] Trans. Phil. Inst. Vic., I, pp.15-18.

Owen and, recognising the need for accurate data on isostatic changes, welcomed the surveyor-general's decision to establish tide gauges in Victoria.

The ubiquitous Blandowski was also prominent in Institute affairs and forthcoming with numerous reports and theories on natural history. By 'some secret influence of the sun', he concluded in one paper in 1855, the Australian fauna tended to increase eastwards whilst human occupance increased westwards.[1] But, whatever his limitation as a theorist, Blandowski was one of the most experienced natural history explorers in Victoria and his advice was often sought. In September 1857 he brought the results of an expedition to the Lower Murray before the Institute.[2] Such a furore was occasioned by the paper that council ordered the withdrawal of the plates and text of part of it from the Transactions, by then already at press. Professor Wilson and Rev John Ignatius Bleasdale (1822-84), 'the outstanding Catholic clergyman in scientific circles',[3] had 'a repugnance to meet Mr Blandowski, as they alleged that that gentleman had made use of the Transactions to disseminate caricatures of [the Institute's] members'.[4] Blandowski's sins, it was alleged, were that he used uncomplimentary phraseology to name new fish species after prominent members of the Institute.

A five-man committee was appointed to redeem the Institute's reputation. Reporting on 14 April 1858 to a packed meeting the chairman, Robert Knaggs, found that Blandowski's only fault was in not seeking permission to 'name certain fishes after certain people'.[5] Bleasdale, Andrew Clarke, Macadam

---

[1] Ibid., pp.50-67. Blandowski drew his startling macroscopic conclusions from evidence he found in the microcosmic 'ecosystem' of Phillip Island, Westernport, Victoria.

[2] 'Recent discoveries in Natural History on the Lower Murray', Trans. Phil. Inst. Vic., II, pp.124-37.

[3] A.D.B., III, pp.183-4. Bleasdale was a founder member of the Microscopical Society.

[4] Argus, 25 March 1858 and 'Proceedings', 2 September and 21 October 1857 and 24 March and 14 April 1858, Trans. Phil. Inst. Vic., II, pp.xxxix-xliv and III, pp.iii-vi. See also Collections of a Century, pp.10-15 and N.A. Wakefield, 'Mammals of the Blandowski Expedition to North-Western Victoria', Proc. Roy. Soc. Vic., New Series, 79, part 2 (1966), pp.371-91.

[5] Argus, 15 April 1858.

and Wilson were astounded at the committee's defence of Blandowski. Finding his name connected 'with something [as] loathsome and vile' as a fish, Rev Bleasdale claimed the protection of his cloth: 'when it is a question of honour and respect, the home practice is a sound one - to treat clergyman as ladies'.[1] Wilson put forward more scientific objections: 'Mr Blandowski had sent descriptions of fish which were no descriptions at all, and would literally damn the Institute as a scientific body in the eyes of every institution in Europe'.[2]

Blandowski, gesticulating meaningfully and ridiculing his opponents throughout the debate, defended himself stoutly but the Institute overwhelmingly rejected its committee's findings and moved to reinstate Bleasdale and Wilson. Government demanded that Blandowski hand over his natural history specimens to the National Museum and charged the Board of Science with responsibility for receiving them. Blandowski procrastinated for months and finally quit Melbourne in March 1859, taking with him most of his collection upon which he eventually published several scientific papers in Germany, from where he continued his vendetta with McCoy.[3] Mueller, addressing the Institute as president in 1859, reminded Victorian scientists of the real debt they owed Blandowski 'as a founder and most active member' of their Institute.[4]

Mueller's return to the Institute from Gregory's successful northern expedition in January 1857 provided a much needed lift from the pedestrian level to which scientific enquiry and debate had sunk. Only Becker, Blandowski and Smyth had provided any real sparkle and originality in his absence. The engineers, like Thomas Rawlinson, with his reminder that

---

[1]Bleasdale to W. Stawell, president, 24 March 1858, holograph letter, Roy. Soc. Vic. Library, Melbourne.

[2]Argus, 15 April 1858.

[3]Collections of a Century, pp.17-20 and Paszkowski, 'William Blandowski', Aust. Zoologist, 14 (1967), pp.147-72.

[4]'Anniversary Address', 28 March 1859, Trans. Phil. Inst. Vic., IV, pp.5-6. The address was delivered eleven days after Blandowski left Melbourne under threat of legal action to deliver up his specimens.

Yan Yean was a 'curse' without a sewerage system; Acheson extolling the vast future of water power in Victoria, and Christy - whose experience was admittedly 'confined to the flooding of water meadows in England' - demanding that Victorians look to irrigation, kept former issues alive and started new follies. Mueller, bringing home the fruits of tropical researches and the 'recent contributions of some scientific friends',[1] also reported 'On the General Introduction of Useful Plants into Victoria' and touched on the growing mania for acclimatisation, a cause being loudly espoused in Victoria by Edward Wilson (1813-78), the journalist reformer. 'No naturalist nor scientific in any other way' Wilson nevertheless reported on the introduction of songbirds and efforts to transfer Murray cod from Murray tributaries to the Yarra. Man, Wilson felt, should intervene at will in the economy of nature, whose phenomena were profuse and varied but whose distribution was so very erratic. With 'a virgin country, an Italian climate, and British institutions to lend force and intelligence' to the colonists' efforts, the balance of nature, Wilson enthusiastically pledged, could be swung in everyone's favour.[2]

Wilson called for prompt legislative action to implement his schemes. The colony needed a department of agriculture and experimental farms and the Institute must set up committees to watch how government spent the appropriations for introducing animals. He for one had no intention of residing in a 'country half supplied with the requirements of civilisation'.[3] Wilson promptly got his committees on acclimatisation within the Institute, although they were never very active.[4] The Board of Science dealt with some of the questions raised by Wilson, and the Zoological Society, founded

---

[1] Co-workers in botany such as Walter Hill of Brisbane and Charles Stuart on the alpine flora of Tasmania and Mueller's 'zealous assistant', Carl Wilhelmi. Wilkie and Macadam were both commemorated by Mueller. See Trans. Phil. Inst. Vic., II, pp.62-77.

[2] Trans. Phil. Inst. Vic., II, pp.23-34.

[3] E. Wilson, 'On the introduction of the British song bird', Trans. Phil. Inst. Vic., II, pp.77-88. Wilson confessed that he found science had 'a sort of pedantry which is liable to lend itself to obstruction'.

[4] The Murray Cod and song bird committees, appointed in 1857-9, never reported in detail.

in 1857 and financed liberally by government, began introducing exotic fauna. The acclimatisation movement was revitalised by Wilson in 1861 when he founded the Acclimatisation Society of Victoria and incorporated the Zoological Society into it.

Mueller's return from inland exploration and the wealth of researches he shared with the Institute provided fuel to revive interest in exploring expeditions.[1] Victorian 'nationalism' and the shadow of Leichhardt loomed large in the debates on exploration. 'Victoria alone', Wilkie complained, 'had hitherto seemed to forget the claims of science and the future interests of Australia, but ought, from her unexampled wealth, and her large and rapidly increasing population, to take the lead in geographical discovery.[2] Wilkie, Macadam and Mueller were very active on the Institute's exploration committees and also in the spontaneous public movement which grew out of these first proposals.

Disagreement was most heated over possible routes to follow, never over the desirability of Victorian expeditionary enterprise. Plans for a Victorian expedition were motivated by 'scientific curiosity, commercial initiative, intercolonial rivalry, and sporting excitement'.[3] Wiser voices of reason, including those of Barkly and A.C. Gregory, were raised to sound the dangers of separate action by any one colony. Gregory, seen by many as the ideal leader for an expedition, wrote to the Institute in November 1857 giving the prescient warning that Australian explorers should await

> ...the sure but slow development of Australian geography, which must result from a steady adherence to the system of keeping our explorations 400 or 500 miles ahead of the settlements and gradually reducing the limits of the Australian terra incognita, or else resort to the very doubtful, but, if successful, more brilliant mode of making energetic endeavours to accomplish the result without delay. Prudence would teach us to pause where

---

[1] See e.g. Mueller's paper 'An historical review of the exploration of Australia', Trans. Phil. Inst. Vic., II, pp.148-68.

[2] 'Proceedings', 11 November 1857, ibid., pp.xlvi-xlvii. See also Argus, 1 September 1858. Stawell argued at a public meeting that Victoria could not afford to fall behind either N.S.W., where Denison was providing a lead, or South Australia, where Benjamin Herschel Babbage was already in the field.

[3] The Golden Age, p.367. See also Margaret M. Muller, 'The Background to the Burke and Wills Expedition of 1860', B.A. Hons. Thesis, (Melbourne University, 1958).

undue haste may prove disastrous.[1]

Determined planners in the Institute unsuccessfully proposed a lightly-equipped pilot survey to examine country beyond the Murray while funds were assembled and government's approval won for more ambitious explorations to seek links via the Gulf of Carpentaria. Petitioned in 1858 the Haines Government suggested that the Institute await colonial federation and attempt 'exploration of the interior by a combined effort'.[2] But James Bonwick (1817-1906), Wilkie and other active campaigners in the exploration committee appealed to the press and public in the name of commerce and science. The businessmen of Melbourne, railed the Argus, 'seem to be unaware of the axiomatic truth that every discovery of science possesses an economic value'.[3] The verbose, philanthropic Dr Thomas Embling (1814-93) weighed into the debate, commending camels and a long-distance northern telegraph as co-essentials for exploration.[4] Chief Justice William Foster Stawell (1815-89), the eminently unscientific president of the Institute (1858-9) - he thought scientific societies should exist to promote 'social intercourse'[5] - chaired a public meeting at which the modus operandi of an expedition was debated.[6] Mueller drew on Blandowski's charts to indicate the best areas for exploration and supported moves to get a party into the field early in 1859. Wilkie and Macadam were appointed secretary and treasurer to the public committee charged with raising funds. Thereafter, despite warnings from Gregory about hasty action, the Philosophical Institute, became inextricably involved in the popular exploration movement.

---

[1] Trans. Phil. Inst. Vic., II, pp.xii-xvii.

[2] 'Second Report of the Exploration Committee', Trans. Phil. Inst. Vic., III, pp.xxxii-xxxiii. The colonial treasurer, C.H. Ebden, also supported intercolonial co-operation.

[3] Argus, 1 September 1858.

[4] Ibid., 10, 31 August and 7 September 1858. On 20 July 1859 the Institute met especially to discuss the problems and possibilities of a transcontinental telegraph, Trans. Phil. Inst. Vic., IV, p.xvii.

[5] 'Anniversary Address', 12 April 1858, Trans. Phil. Inst. Vic., III, pp.1-6.

[6] Argus, 1 September 1858.

The outcome was the Burke and Wills 'continental crossing' of 1860-1, in whose planning and aftermath many of Victoria's leading men of science expended years of energy and heartburn. The expedition, conceived by scientists, added, Kathleen Fitzpatrick boldly notes, 'almost nothing to scientific knowledge of the continent'.[1] 'Victorian vainglory determined the selection of Burke as leader of the expedition and it was a sentiment unworthy of a scientific society':

> But scientific societies do not exist in a vacuum, but in communities, and scientists are also citizens, subject to the influences which play upon all members of the community.[2]

The Philosophical Institute and the Royal Society of Victoria tried to 'serve two masters'; on one side was the popular claims of Victorian pride, colonial success and 'artful cupidity' and, on the other, the cause of science. It is questionable, however, whether 'putting scientific knowledge last' led irrevocably to the tragedy for, whatever Burke's low credentials as a leader and scientist, the choice of Ludwig Becker as a member was sound and wise; he needed no 'instructions', late or early, from Macadam to know how to write scientific reports. The records show that, however dilatory men of science were in Melbourne, men of science with the impossible Burke in the field were dedicated to their cause.[3] Any society, however, which allowed a Stawell to influence its plans for scientific exploration and ignored an explorer like Gregory, deserved and earned the chastening nemesis of neglect.

---

[1] K. Fitzpatrick, 'The Burke and Wills Expedition and the Royal Society of Victoria', Hist. Studies Aust. N.Z., 10 (1963), pp.470-8. Fitzpatrick's studies of the expedition, although the most discerning among an extensive serious and popular literature, over-emphasize the non-scientific outcome of the enterprise. Harrassed organisers, like Macadam, were more concerned with defence, self-justification and eulogizing Burke and Wills so that the collections and observations were neglected by those who would have been first to publish them if success and not tragedy had attended the expedition. See e.g. J.H. Willis, 'The Botany of the Victoria Exploring Expedition...etc', Proc. Roy. Soc. Vic., 75, part 2 (1963), pp.247-68.

[2] Fitzpatrick, op. cit., p.478.

[3] See the scientific papers, instructions and reports of the expedition and Royal Society's exploration committee, especially those of Becker (H16187), in La TL, Melbourne. Margaret Muller also concluded somewhat too sweepingly that 'Wills proved to be the only capable and faithful scientific officer on the team'. See 'Background to the Burke and Wills Expedition', op. cit., p.36, footnote.

The blight of numbers and the head-turning of popularity were rife within the Institute as early as 1857-8. In March 1858 the members rejected the energetic scientific professor Wilson in preference to the socially respectable and influential Stawell as president. Although boasting 236 members by the end of the year, council reported that the Institute had not 'done as much for science as might have been expected by so large a body'.[1] Bleasdale was appalled by 'the large amount of talent lying dormant, or nearly so' among them and moved successfully to form sections to embrace different branches of science.[2]

A further sign that British Association 'thinking' and responses were in vogue to counteract the discontent was George Verdon's unsuccessful attempt to find a basis to 'organize a system of combined action amongst all the Scientific Societies throughout the Colony'.[3] The possibility of branch meetings in provincial centres like Geelong was also mooted.[4]

Verdon's plan, like that of William Henty ten years before in Tasmania, comprehended a wide range of scientific and quasi-scientific organisations, including mechanics' institutes. Some commentators were justifiably sceptical about the scheme because of an 'inherent spirit of antagonism' among 'the ruling bodies of societies'.[5] In the end Victorians, like their British cousins, preferred diffusion and independence in their scientific organisations.

---

[1] Trans. Phil. Inst. Vic., III, pp.xxxi-xxxiii.

[2] 'Proceedings', 7 July 1858, ibid., pp.xi-xiv and xli-xlii. The sections recommended were A. Physical, astronomical and mechanical science, including engineering; B. Chemistry, mineralogy and metallurgy; C. Natural history and geology; D. Medical and microscopical science, including physiology and pathology; E. Geography and ethnology; F. Social science and statistics and G. Literature and fine arts, including architecture. The experiment lapsed until 1879 when Ellery and Kernot revived Section A, which functioned successfully in the eighties. In 1880 Sections B, C and D were amalgamated without success.

[3] Meeting of 5 August 1857, Trans. Phil. Inst. Vic., II, p.xxxix.

[4] Argus, 8 July 1858.

[5] Illust. Journ. Australasia, III, p.140.

In 1857 the acclimatisers, with strong government financial backing, launched the Royal Park Zoological Society, originally conceived, the Illustrated Journal scathingly observed, as an Ornithological Society 'to put up poultry shows' and introduce song birds. Such an experiment constituted an 'injury to science'.[1] But Edward Wilson's arguments were persuasive and won the support of many influential figures, including W.H. Archer, Embling, McCoy, Mueller and Barkly, who associated closely with him in founding the Acclimatisation Society of Victoria - building on the Zoological Society - in 1861.[2] By 1857 an Institute of Architects and a Society of Mining Mechanical Engineers and Mining Surveyors were also meeting to further the aims of their professions and the latter to secure 'a systematic and useful application of engineering science to the development of our mineral resources'.[3] With the appointment of Brough Smyth, a professional mining engineer, as secretary for mines in 1861 the interests of the practical and professional miners were well protected. Smyth was soon to show before the Royal Mining Commission of 1862, and consistently thereafter in alliance with McCoy, that his sympathies lay with the economic search for and exploitation of mineral resources rather than with a thorough systematic geological survey of the sort Selwyn was pursuing.[4]

---

[1]Ibid., p.237. £10,000 was voted for agriculture, acclimatisation, a model farm and for distribution among 'societies for improvement'.

[2]Rules and Objects of the Acclimatisation Society of Victoria, with the Report adopted at the First General Meeting... (Melbourne, 1861). See also Letters and Minute Book (1862-85) of the Royal Park Zoological Society (later Acclimatisation and Zoological Society of Victoria), MSS A.345, M.L., Sydney; William Westgarth, The Colony of Victoria... (London, 1864), pp. 371-84 and Argus, 25 November 1862.

[3]Illust. Journ. Australasia, III, pp.189 and 236-7. The Mining Institute of Victoria began to issue Transactions in 1859 edited by the versatile civil and mining engineer, Jacob Brachē (1827-1905), who had gained support from Selwyn and Ligar and Barkly for the Institute in 1857. See A.D.B., III, pp.212-3.

[4]See e.g. Smyth's evidence before the Commission on 9 and 12 December 1862, V. & P. (L.A. Vic.), 1862-3, 10, pp.412-7 and Appendix II, pp.487-8. The relationship of McCoy, Smyth and Selwyn is discussed more fully in Hoare, '"The half-mad bureaucrat"...'.

At their anniversary meeting in March 1859 the members of the Philosophical Institute, heeding the plea of one ardent reformer, Professor Martin Howy Irving (1831-1912), rejected Stawell in favour of the somewhat reluctant Mueller as president.[1] Demonstrating a commendable tolerance of ability rather than nationality the Institute also elected Becker and Neumayer to its council and rejected attempts by the individualists McCoy and Blandowski to regain office.

Mueller and Neumayer, with their world-wide correspondence and broad competence of interests, epitomised the outstanding success of the Institute in maintaining relations with overseas scientists and societies. One result of the correspondence was the Royal Society's unrivalled library of foreign scientific literature. By 1860 the Institute was in correspondence with seventy-six societies at home and overseas. In the same year the Royal Society of Victoria's secretary, Macadam, was elected a corresponding member of the Imperial Geological Institute in Vienna, and the Royal Society itself widened the scope of its own overseas and honorary fellowship.[2]

Mueller, himself, was not immune from the general euphoria surrounding the opening of the society's 'hall of science' early in 1860. All Victorian scientists, he stated, must capture the vision of Humboldt, 'the Aristotle of this century', and proclaim the ascendancy of science 'over almost every branch of industry'.[3] Unquestionably Victoria was the leader of science in Australia but, as Barkly, Mueller and others stressed repeatedly, not all of the colony's best efforts in science found a place or even a peep of expression from within the Royal Society.

---

[1] Trans. Phil. Inst. Vic., IV, pp.iii-iv.

[2] Professor W.K. von Haidinger, director-general of the Austrian Geological Survey, was elected an honorary member with John Smith of Sydney in 1860. The previous year Denison and H.R. Goeppert had been similarly honoured.

[3] Mueller's address on the inauguration of the Royal Society's hall, 23 January 1860, Trans. Phil. Inst. Vic., IV, pp.204-10.

Selwyn and his officers, for instance, evinced very little interest in the society's affairs[1] and in July 1863, following an abortive attempt to introduce reforms and force the resignation of some office-bearers - a measure for which he gained wide initial support - the powerful Brough Smyth resigned pointedly as secretary at a time of deep financial and corporate crisis over the Royal Society's future role in Victorian science.[2] Indeed, following the Burke and Wills episode, when the Royal Society's part in the planning and execution of the expedition became fully identified in the public's mind with its failure, Archer, Irving, Smyth and others pressed home their bitter attacks on the society's leadership, particularly of Macadam. After 1862-3 there was a sizeable exodus of prominent members,[3] leaders in colonial science whose loss was irreplaceable.

But that very pride in colonial achievement which had led to Burke and Wills and subsequently blunted the work of the Royal Society for nearly a decade was not misplaced when measured by the standards of actual scientific accomplishments in Victoria itself. Selwyn's 'school' of geology flourished; Mueller's botanical and Bosisto's phyto-chemical work gained wide recognition and the achievements of Ellery, Neumayer and Smyth - all of whom earned their scientific reputations in Victoria - in astronomy, meteorology and terrestial magnetism were significant. McCoy, too, laid the groundwork of Victorian palaeontology, and analytical chemists and medical sanitarians with the foresight of Dr William Thomson (1819?-83) ensured that Victorian science was kept abreast of the latest theory and discovery in the aetiology and control of disease.[4] Ellery and other

---

[1] Aplin and Ulrich were exceptions, although their presence was never dominant within the Society.

[2] Council Minute Book (1854-88), Roy. Soc. Vic., 1 and 22 June and 13 and 17 July 1863. Barkly intervened personally but in vain to get Smyth to reconsider his decision. See Barkly to Smyth, 14 July 1863, Smyth papers, La TL, Melbourne.

[3] Smyth's name was removed in a roll revision of 5 March 1866 and Christy and Ulrich were considerably in arrears in January of the same year.

[4] See B. Gandevia, 'William Thomson and the history of contagionist doctrine in Melbourne', M.J.A. I (1953), pp.398-406.

workers, making full use of their inventive genius, applied the latest advances in telegraphic communication and in the measurement and observation of scientific data to their work. The new techniques in photo-lithography invented by John Walter Osborne achieved wide use and recognition at home and abroad.[1]

In classical colonial fashion it was the scientific governor, Barkly, whose harsh, realistic words kept the Royal Society's philosophical head out of the clouds and its feet on the ground. Twenty-five years before the event he recommended the founding of an Australian Association for the Advancement of Science.[2] Eschewing 'the trivial nature of some of the topics brought forward' in the Royal Society in the past, scientists must press for a science policy; assert their growing specialisms; regain an initiative with government and improve public relations. A mining economy needed more texts and research on economic geology and mining.[3] 'Scorners and practical men', Barkly insisted, could be silenced or satisfied by results such as those obtained by Matthew Fontaine Maury (1806-73) for navigation on the Europe-Australia run.[4]

'As the wealthiest and most civilised of the communities in Australia' Victorians had inherited the right and means to lead in science. 'Universal science', Barkly reminded the society, had died with Humboldt; the age of the specialist and divisions of labour in science and technology was upon them. Barkly, a man of vision, summarised the state of Victorian science in a remarkably apt metaphor:

---

[1] Osborne, 'On a new photo-lithographic process', Trans. Phil. Inst. Vic., IV, pp.172-83 and McCoy's presidential address, 24 April 1864, Trans. & Proc. Roy. Soc. Vic., VI (1865), p.lxxxix. One further patent to achieve success was Julius Dahlke's water purification filter which 'would remove acetate of lead, and some other salts from solution without chemical action'. On investigation Newbery corroborated Dahlke's claims, ibid., VIII (1868), pp.289-94 and 300-01.

[2] Barkly, 'Inaugural Address', 10 April 1860, Trans. & Proc. Roy. Soc. Vic., V (1860), pp.1-17.

[3] The sort of works, for instance, that W.B. Clarke was writing in N.S.W. in Researches on the Southern Gold Fields... (1860).

[4] Trans. & Proc. Roy. Soc. Vic., V, pp.9-11. For Maury see G. Blainey, The Tyranny of Distance (Melbourne, 1966), pp.181-2 and H. Wexler and others, Antarctic Research: The Matthew Fontaine Maury Symposium (Washington, 1962), pp.1-3.

> Our present position [in 1860] in regard to scientific researches strikes me as not very dissimilar to that of some quartz-crushing Company on our gold fields, possessing stacks of auriferous stone ready to yield untold treasures, together with a first-rate battery of stampers, but begrudging the fuel ready for working the steam engine by which the battery is to be driven.[1]

Barkly, of course, was expressing one important mood of the moment when he called for a greater emphasis on technological and scientific research.[2] By the late fifties alluvial mining was waning and deep lead and quartz mining demanded a massive reorientation in capital investment and technology. The new trends prompted some leaders of science with an economic-practical orientation like Smyth to recommend the importance of 'scientific education' in schools of mines, museums of technology and the adoption of an overtly utilitarian policy in science.[3] The Royal Mining Commission of 1862, which accepted these ideas without undue equivocation, marked, Murray-Smith writes, a 'change-point' in Victorian economic and technical development.[4] The University, responding to the same thinking, began teaching engineering in 1861, albeit not with overwhelming initial success.[5]

Although the claims for a technically based scientific training ran ahead of what industry and government were wholeheartedly prepared to support in the early sixties,[6] ten years later the reformers gained some of their objectives: schools of mines at Ballarat (1871) and Bendigo (1873)

---

[1] Trans. & Proc. Roy. Soc. Vic., V, p.9.

[2] See also the remark made by Barkly as early as 1857 when opening the Castlemaine Mechanics' Institute: 'There is no pursuit in which science may be of so much advantage as in gold mining'. Quoted in S. Murray-Smith, 'A History of Technical Education in Australia...', vol. I, p.104.

[3] Evidence before Royal Mining Commission, V. & P. (L.A. Vic.), 1862-3, 10, pp.412-7.

[4] 'History of Technical Education', vol. I, pp.104-11.

[5] Ibid., p.119 and Blainey, Centenary History of the University of Melbourne, pp.22-4. The engineering class was reduced to one student by 1866. One of the first graduates in engineering was William Kernot.

[6] 'To some extent technical education was wanted before it was needed, the ideas ran away with the spoon.... This is what we are trying to say when we warn against the acceptance of too neat a correlation of economic and institutional outcome', Murray-Smith, op. cit., vol. I, p.173.

providing the rudiments of a curriculum in assaying, chemistry, metallurgy, mathematics and practical mining[1] and, in Melbourne itself, the Industrial and Technological Museum (opened in September 1870) offered more exacting courses in chemistry, metallurgy and mineralogy under the very able Harvard and London School of Mines trained analyst, James Cosmo Newbery (1843-95) and George Ulrich, lecturer in mineralogy.[2] From the University schools came other graduates in science like William Kernot (1849-1909), John Drummond Kirkland and Frederic Joy Pirani (1850-81) to take their place in scientific leadership, research and teaching in Victoria in the seventies and eighties.

The emergence of a home-spun scientific culture and interest in technology, however rudimentary and however limited some of the personnel involved, further bespoke a sense of 'national' pride. Very few of the scientists who emerged in Victoria in the late fifties and sixties were 'temporary sojourners': most were committed to the colony's future.

Mueller began his Fragmenta Phytographiae Australiae in 1858,[3] seeing it as a working basis for his long-intended flora of Australia. He was critical of his predecessors' work, including that of Brown and Cunningham, and also of his friend J.D. Hooker's Flora Tasmaniae (1855-60). Elected F.R.S. in 1861, Mueller considered himself as well qualified as any living botanist to write Flora Australiensis and never reconciled himself fully to the choice of the distinguished British botanist George Bentham (1800-84) as principal author. It required all the friendly, cajoling persuasiveness of the Hookers to draw from Mueller his full co-operation and grudging willingness to renounce his own ambitions. Even then Bentham was critical of the German's continued determination to publish botanical papers abroad and severely piqued by Mueller's expert strictures on Flora Australiensis

---

[1] Ibid., pp.197-221. Radford has shown that the analytical chemistry course at Ballarat under Joseph Flude was more advanced than has previously been thought. Radford, 'Prospecting for a professor...', op. cit.

[2] Warren Perry, The Science Museum of Victoria... (Melbourne, 1972), pp.7-19.

[3] 12 vols, 1858-82.

as each volume appeared.[1] Divorced in his 'isolated' colonial position from what Basalla calls the 'Invisible Colleges' and 'continuing mutual education' of the European scientists - in this case those of Kew - Mueller nevertheless produced researches to 'challenge or surpass the work of European savants'.[2] 'As an officer of the Australian Government, under whose general range of duties, issue of a work on the plants of this great land naturally ought to come', Mueller was jealous for his reputation in Victoria as well as in Europe. In Australia his apparent subordination to Bentham 'generally left...the impression on the public mind that [Mueller] was unqualified to deal with such a task'.[3]

In 1862 the Royal Society of Victoria was divided over the two Cranbourne meteorites, the smaller of which had been sent to Britain for examination and exhibition. Scientists in Melbourne were anxious to obtain sections from the 'Bruce' meteorite in their care. Barkly referred the matter to Neville Maskelyne, Murchison and Owen in London, confident that 'it would seem almost selfish to seek to anticipate on these distant shores their experiments' on the aerolites.[4] The British scientists planned to send the smaller one back to Melbourne with casts in exchange for the larger one in Victoria and opposed its being cut. Brough Smyth, Macadam and others led a determined attack on this policy, believing that the colony should retain all its meteorites.[5] 'I am proud

---

[1]See e.g. Bentham to Mueller, 12 February 1863 and Bentham to Mueller, 24 November 1864 and 26 February 1865, quoted in C. Daley, 'The History of Flora Australiensis', Vic. Naturalist, XLIV, Nos 5 and 6 (1927), pp.130-1 and 153-5.

[2]G. Basalla, 'The spread of western science', Science, 156 (1967), pp.614-8. Writing to Mueller on 24 May 1861 J.D. Hooker assured him that the Kew botanists thought highly of his 'labours...but we are not going to lose sight of justice to your predecessors, whose claims you naturally think so lightly of, in comparison to your own, because in your isolated position you cannot avail yourself of them, or feel or know the opinion that is formed of them in this country'. Quoted in Daley, Vic. Naturalist, XLIV, No.4 (1927), p.95.

[3]Mueller to Oliver, Christmas, 1863, Vic. Naturalist, No.5 (1927), p.133.

[4]'Annual Address', 24 April 1862, Trans. & Proc. Roy. Soc. Vic., VI (1865), pp.xxii-xxiv.

[5]Correspondence published in 'Proceedings', ibid., p.xxiii. See also Examiner, 13 September 1862.

certainly to think', Barkly conceded, 'that there are in this country young men so eminent in the study of magnetism, of mineralogy, and the other sciences involved, as to be capable of satisfactorily investigating the properties and the origin of such phenomena...'.[1]

That was precisely Mueller's point and the growing feeling of a number of Victorian and Australian scientists during the sixties and seventies. The Royal Society of Victoria, despite its many domestic problems, attracted the interest of scientists in the other colonies because it showed determination to try and publish regularly; press hard the cause of science and air scientific debates openly, however controversial. W.B. Clarke and McCoy in their long and sometimes bitter debate on the age of the Australian succession, particularly of the coal measures, used the Royal Society's Transactions to gain a wider colonial audience for their opinions and researches.

Clarke, like Mueller, did not baulk at challenging the opinions of the 'home' scientists and when his chief opponent, McCoy, brought the debate to Victoria he gladly accepted the opportunity offered. The fiercest exchange was before the Royal Society of Victoria in 1860-1, when Clarke questioned as 'anything but philosophical' McCoy's determination of a Jurassic period based on the fossil fern *Taeniopteris*.[2] McCoy, stung by Clarke's censure of his so-called 'unsound...dogmatism [based] on insufficient evidence' hastened to defend his erection of a Mesozoic era for Australia. The coal measures, McCoy claimed, were Jurassic, not Carboniferous: '*all the evidence*, as far as it goes is in my favor, but wherever of a distinctive nature is against my opponent'.[3] Clinging tenaciously to their divergent viewpoints McCoy and Clarke claimed the loyalty of their fellow-scientists: Barkly, Selwyn and the Royal Society rallied partially to McCoy, and Clarke was supported by Richard Daintree

---

[1] *Trans. & Proc. Roy. Soc. Vic.*, VI, p.xliii. The large meteorite finally went to the British Museum and the smaller to the National Museum, Melbourne.

[2] 'A Communication from the Reverend W.B. Clarke...on Professor McCoy's "New Taeniopteris" from the Coal-bearing Rocks of the Cape Paterson District...', *Trans. & Proc. Roy. Soc. Vic.*, V (1860), pp.89-95.

[3] Ibid., p.102.

and Jukes. Emerging from the heady heat of personal polemics, Clarke summarised in 1861 the real differences between them:

> Strictly speaking the existence of Mesozoic formations has not been disputed by me; all that my proposition amounts to is the denial that the coal beds of New South Wales are Oolitic, and that up to a certain date (August 1860) no one had detected a jurassic fossil in any part of Australia.[1]

Both were correct in parts of their reasoning. McCoy did important pioneering work for Mesozoic geology and Clarke in elucidating the coal-measures and Palaeozoic succession. When prepared to retreat from the dogmatism characteristic of colonial science both contributed significantly to the geological debate; attracted the close attention of geologists abroad and stimulated important work within Australia.[2]

Rev Julian Edmund Tenison-Woods (1832-89), a founder of geology in South Australia, one of the most prolific contributors to Australian geology and natural history from the mid-fifties and later one of the most penetrating commentators on the problems of organised science in the colonies, was attracted to the Philosophical Institute in 1858.[3] He took a close interest in the society's affairs and, although critical of the organisation of the Burke and Wills expedition in his History of the Discovery and Exploration of Australia (2 vols, 1865),[4] was invited

---

[1] Clarke, 'On the Carboniferous and other Geological Relations of the Maranoa District in Queensland...', ibid., VI (1865), p.32. For further papers in the debate see Trans. & Proc. Roy. Soc. Vic., V, pp.209-17 and VI, pp.27-31 and 42-6. For Barkly's stand see ibid., VI, pp.xxi-xxv.

[2] See e.g. Thomas Harrison, 'Notes on the Geology of Hobart Town', ibid., pp.131-7 and Barkly's summary of 1862, ibid., pp.xl-xli. Charles Gould, the Tasmanian geological surveyor, was present at one of the debates on the age of coal-measures in April 1862. For a recent summary of the debate see e.g. Vallance and Branagan, 'New South Wales Geology - its origins and growth', in A Century of Scientific Progress, pp.269-72.

[3] See his papers on metamorphic and Tertiary rocks in S.A. and Victoria in Trans. Phil. Inst. Vic., II, pp.168-76; III, pp.84-94 and IV, pp.169-72. Woods's Geological Observations in South Australia appeared in London in 1862, 'written as much for circulation in the Colonies as for home'.

[4] See esp. vol. II, pp.347-408. The Royal Society was very sensitive at the time to this criticism. Woods was prominent in the scientific community of South Australia.

to address the Annual Conversazione in March 1867. Woods set out to destroy the 'graceful theory of Mr Darwin' on the universality of glacial action in geological times, questioning whether Australia or the southern hemisphere had ever experienced a glacial epoch.[1] He drew an immediate response from Julius Haast (1822-87), provincial geologist of Canterbury, New Zealand, and expert field worker on New Zealand glaciation. Haast advised Australian workers to examine the Australian Alps and other formations more closely,[2] advice which Professor Ralph Tate (1840-1901) in South Australia and James Stirling (1852-1905) followed profitably in the seventies and eighties.[3]

But, all this intercolonial and international co-operation notwithstanding, the pursuit of science, as Mueller conceded, still had many drawbacks 'in our yet limited and struggling communities'.[4] George Britton Halford (1824-1910), from 1863 the first and for many years only medical professor in the University of Melbourne's long-awaited medical school, and an experimental physiologist of great promise before he left London, forsook a potentially brilliant medical career in Europe to found one of the Empire's best medical schools.[5] In the colonies Halford remained active as an anatomist and physiologist and soon became well-known as a policy-maker, reformer and teacher in colonial science and organisations. Yet he was never surrounded by the men or means to stimulate his mind to the highest levels of which it had been capable in Europe. Halford's

---

[1] 'On the Glacial Period in Australia', Trans. & Proc. Roy. Soc. Vic., VIII (1868), pp.43-7.

[2] 'Notes on Rev. J.E. Tenison-Woods' paper...', ibid., pp.273-8. Haast was elected F.R.S. in 1867 for his New Zealand work, the year after James Hector (1834-1907).

[3] See e.g. Stirling's papers on the Australian Alps, their physiography and glaciation, Trans. & Proc. Roy. Soc. Vic., XVIII (1882), pp.98-110 and XXII (1886), pp.20-34. Stirling, a pioneer of Australian Alpine botany, was a protégé of Howitt.

[4] Mueller to Oliver, 1863.

[5] A.D.B., IV, pp.321-2; Blainey, Centenary History of the University of Melbourne, pp.25-35 and University of Melbourne Medical School Jubilee (Melbourne, 1914), pp.6-19. Eades, Macadam and James Edward Neild were all associated with the medical school.

so-called 'trifling arguments on comparative anatomy' against Charles Darwin and Thomas Henry Huxley and his long, honest attempts to find an antidote for and comprehend the physiology of snakebite poisoning were the mainsprings of his writings and researches in Victoria.[1]

During an interregnum of uncertainty from 1862-6 when Barkly left, numbers fell drastically, government withdrew its financial support and criticism was rife, the Royal Society of Victoria survived because it was not deserted by a determined core of leaders, including Bleasdale, Ellery, McCoy and Mueller, who tore off 'its adventitious swathings and trappings'[2] and pleaded science instead of the former popularity. In July 1866 Ellery entered upon his nearly twenty years of optimistic and realistic presidency.

Before him only Clarke and Gunn among working scientists had pleaded the cause of colonial science with the same dedicated, consistent grasp of what was achievable in Australia. Ellery espoused Halford's appeal for more natural philosophy and chemistry in the University medical courses; defended and improved the Great Melbourne Telescope when its defects aroused intense criticism; attacked reductions in governmental spending on science in 1869-70 and encouraged advances in any practical and economic application of science like those in the preserved meats and wastefood and animal refuse disposal industries made by the chemist George Foord. During Ellery's presidency - when he alone read forty-five papers and made lucid, comprehensive annual reports on recent advances in colonial and overseas science - the important analytical work of Newbery; the development of the germ-theory and its implications and applications to the colonial setting; the technical and chemical problems of gold mining, assaying and extraction were among the topics to come regularly before the Royal Society. Ellery used his office to appeal for colleges of agriculture and forestry. His own twenty years of independent labours as an astronomer, meteorologist and magnetical and geodectic surveyor earned him election as

---

[1]See <u>A.D.B.</u>, IV, p.322 and literature on Halford cited there. Much of his research first went before the Royal Society.

[2]Bleasdale, 'Anniversary Address', 4 May 1865, <u>Trans. & Proc. Roy. Soc. Vic.</u>, VII (1866), pp.6-7.

F.R.S. in 1873. Under him, a perfect appraiser of the balance between practical, technical and theoretical in colonial science, Victorian science recovered its self-respect and the Royal Society soon began to contribute once more to 'promoting our advancement as a people...and raising the estimate of the intellectual status of this colony in the minds of the intelligent in other parts of the world'.[1]

In the decade 1860-9 the Royal Society published 118 abstracts and papers, of which thirty-four dealt with geological topics and twenty-three with physiology and zoology. Engineering and allied subjects, so prominent in the fifties, attracted only eight papers, although the observatory disciplines: astronomy, meteorology and magnetism (seventeen papers) and physics and chemistry (twelve) continued to occupy their former position on the middle-range of interests.[2]

In the ensuing ten years, 1870-9 - during which time the Great Melbourne Telescope came into operation; academic engineering was revived by Kernot and meteorological research promoted by Ellery - among the 144 published titles and papers, there was a pronounced swing back to engineering (33 papers); physics and chemistry (36) - including reports and research on sound and related problems in telephonics and the telegraph - astronomy (27), meteorology and geophysics (fifteen).[3] With A.W. Howitt

---

[1]'Anniversary Address', 26 March 1868, Trans. & Proc. Roy. Soc. Vic., IX (1869), p.20. Jillian Roe in her chapter 'The Scientific Attitude' in 'A decade of assessment' gives scant recognition to the scientific work of men like Foord, Newbery and Stirling. Her standards of excellence are those of William Sutherland (1859-1911) and, hence, Ellery and Kernot are relegated with McCoy and Mueller to a second rank. 'In this context, light bulbs and sewerage were inevitably more important than the discovery of gallium', ibid., p.339.

[2]The detailed break up was: anthropology (two); astronomy (four); botany (six); engineering (eight); exploration (two); geology (34); meteorology (13); physics and chemistry (twelve); zoology (23); mathematics (two) and microscopy (five) and miscellaneous (seven).

[3]The remainder of the papers were represented by anthropology (three); botany (four); mathematics (four) and microscopy and miscellaneous (eight).

only just beginning his work, geology occupied in the seventies a less prominent position (nine papers) than before and zoology and physiology were also less popular (five papers).

In the eighties, before the Royal Society commenced publication of its new series of Proceedings in 1888, the former interest in engineering was retained (34 papers) but there was a marked growth once more in geology (21), zoology (27) and botany (17) with physics and chemistry (19) retaining their importance.[1] In the eighties the establishment of the Port Phillip Biological Committee and a new biological laboratory at the University, where Baldwin Spencer (1860-1929) and his associates were particularly active, papers of a high quality in the rapidly developing fields of marine biology, bacteriology and parasitology were published by the Royal Society of Victoria.

By the early seventies Ellery was ready to venture positively into the area of intercolonial scientific co-operation: to support the movement towards a federated science. Although the initiative in scientific leadership passed back to New South Wales in the mid-seventies Victoria's role in the moves to federate science remained vital. The Burke and Wills Expedition, indeed, had already proven the value of co-operative effort in the numerous search expeditions.

From the fifties through to the seventies Victoria passed rapidly from a primitive scientific culture towards a reasonably advanced 'colonial' phase of science, as suggested by Basalla. The cultural backgrounds and previous attainments of the man-power received into the colony and the wealth generated by gold stimulated and favoured scientific growth and ensured a reasonable level of government involvement in science. Colonial 'nationalism' and a justifiable pride in socio-economic achievements gave impetus to embryonic science policies. The new mood motivated Burke and Wills and influenced Mueller and Smyth to challenge the hold of European

[1] Between 1880-7 155 papers were published or abstracted. The remaining distribution was as follows: anthropology (three); astronomy (eight); exploration (one); mathematics (four) and microscopy and miscellaneous (eight).

scientists in the colonies. Popularity also crept in, sometimes to the detriment of scientific standards, but the same expansion brought corresponding recognition, exchanges and a flood of scientific literature - some useful, some useless - from overseas and the other colonies. As never before in Australia there was a commendable tolerance of the many scientists who came from non-British scientific traditions and an unusual official liberality towards scientific spending under La Trobe and Barkly.

Men acquired, therefore, more knowledge about a single Australian province inside twenty to thirty years than had ever been gathered before within a comparable area. Practically the responses in engineering, chemical analyses and the sanitary sciences, for example, were commendable: taxonomically the gains were also huge, as they were in other areas of data assembly; in astronomy, geophysics, meteorology and geology. In the latter subject Victoria excelled with its superbly organised survey and associated training and personnel. Although theory did not abound the exact sciences were not neglected and the very awareness and receptivity of Victorian scientists with their scientific libraries and regular European journals ensured that the colony kept abreast of overseas advances in medicine, physics, chemistry, physiology and sanitary science, to name but a few.

But as society settled down and the representatives of science had their misfortunes and failures; as 'practical' men came to question more the 'results' of 'scientific' men, to demand instant solutions for immediate problems, science lost some of its sheen. Government withdrew its sometimes ambiguous support and held its own employees like Mueller and Selwyn more strictly in rein. The Royal Society, largely for reasons of its own folly, earned government's temporary disapprobation whilst quasi-scientific groups, like the Acclimatisation Society, knew official favour. Foresight in the fifties assured, however, that from the observatories and University classes came men of local training and experience who could lead science in the future. Such were Ellery and Kernot. Scientists, as Mueller feared, lost ground socially and professionally in the sixties and seventies. Few students took advantage of the schools of mines or University courses in science and engineering to the extent the planners had predicted. Quiet work in new avenues of research went on in the laboratories of Bosisto, Newbery and Mueller as old world analyses were applied to new-world plants and problems. Only the Pharmaceutical Society worked steadily towards its avowed scientific and professional goals, while other specialist and professional groups, too early planted, succumbed. Technology and inventiveness were not entirely static or dormant but the chief exponents were individuals with no large industrial base and new advances had to await the base-metal industries of the nineties. The Royal Society, the colony's principal scientific society, survived because it was ready to adapt, ready to accept the leadership of Ellery, a latter-day Joseph Banks in Victorian science.

As one commentator whimsically observed:

> Philosophers exist even among us Victorians who are so extremely matter-of-fact, plain-spoken, and practical a people. It is true that, unlike the Laputans, we are not all philosophers; we do not so completely abandon ourselves to the mysteries and speculations of abstract science as to forget the common affairs of life, and require to be whacked on the head now and then with inflated bladders in order that we may not be entirely removed from the contemplation of mundane matters. Nevertheless philosophy has its worshippers, and wise men meet in solemn conclave to discuss learnedly such subjects as the vulgar mind considers not.[1]

---

[1] Aust. Med. Journ., V, p.134.

CHAPTER VII

'WHAT SCIENCE HAS DONE FOR VICTORIA...SCIENCE WILL DO FOR QUEENSLAND'

The setting up of centres of scientific research and bases for exploration close to any vast and unexplored territory prepared the way, particularly under conditions of what Basalla calls 'colonial science', for the emergence of those centres as jumping-off and collecting points for further scientific activity in the unknown regions. As we have already seen in the cases of Sydney and Hobart the small scientific associations and departments which arose in those centres readily and formally accepted responsibility for areas immediately adjacent to them and even as far away as New Zealand, New Guinea and Antarctica. The Port Phillip District, first examined scientifically from overland expeditions by Hume, Hovell, Mitchell, Strzelecki and their successors, eventually emerged itself as a base from which scientific exploration could be prosecuted successfully.

In a similar way the scientific possibilities of south-east and later much of the territory which became modern Queensland were first revealed by explorers based in the older settlements, men like Allan Cunningham, Oxley and Leichhardt.[1] Exploration from the sea by scientists such as J.B. Jukes and his assistant, John MacGillivray (1821-67), in the *Fly* (1842-5) and before that the expeditions of the *Beagle* (1837-41) and *Rattlesnake* (1846-50) contributed a good store of knowledge to the outside world about Queensland. But it was not until the Moreton Bay District and surrounding areas were officially thrown open to free settlement in the 1840's that anything but the most rudimentary approach to understanding the new territories was made by men of science based in the future colony's major centres of population.[2]

---

[1] See J.G. Steele (ed.), *The Explorers of the Moreton Bay District (1770-1830)* (St Lucia, 1972). Cunningham published his early reports in *Journ. Roy. Geog. Soc.* (1832) and *Proc. Geolog. Soc. London* (1838). On a brief visit to Brisbane in 1828 Charles Fraser laid out a botanical garden.

[2] Edmund Lockyer, despatched to the Brisbane River in 1825 to report on 'the animals, birds, minerals and natural productions', published some results in *Aust. Quart. Journ.* I, No.3 (1828) and Charles Fraser published a paper in the *Botanical Miscellany* of 1830 but during the 1830's scientific knowledge of the region grew only very slowly.

The botanist J.C. Bidwell commenced his Queensland studies in 1840 and, following appointment as commissioner of crown lands at Wide Bay in 1848, laid out a botanic garden at Tinana Creek (now in Maryborough).[1] In January 1843 Darwin's 'good friend' in the Beagle, John Clements Wickham, became police magistrate and senior government officer in Moreton Bay. 'A man of scientific and observant mind', Wickham gained the support of settlers to complete the survey of Moreton Bay in 1846-7[2] and in 1847 himself published meteorological observations for Brisbane Town, continuing them up to 1850.[3]

As we have seen earlier it was Leichhardt with the active support of northern squatters who accomplished most for scientific exploration in the 1840's. By 1850 his work and that of Kennedy, Mitchell, the naval surveyors and their respective scientific assistants had outlined possibilities for future research. Indeed the decade before separation from New South Wales in 1859 was characterized by a continuing interest in the exploration of tropical Australia. Consulted by imperial government on the feasibility of such enterprises, J.L. Stokes, backed by Charles Sturt, 'unquestionably' recommended Moreton Bay as the base for an expedition.[4] A.C. Gregory commenced his North Australian Exploring Expedition (1855-6) from Brisbane with a scientific staff which included Mueller as botanist, and harvested on this 'extraordinary journey' enough scientific and geographical knowledge for J.D. Hooker to describe it as 'second in point of interest and extent

---

[1] See A.D.B., I, pp.98-9.

[2] W. Coote, History of the Colony of Queensland...(Brisbane, 1882), vol. I, p.144. See also A.D.B., II, p.597.

[3] Observations had been commenced in 1840. See Moreton Bay Courier, 23 January 1847.

[4] 'North Australian Exploring Expedition. Copy Correspondence', V. & P. (L.C. Vic.), 1854, I, and 'Papers relating to an expedition recently undertaken for the purpose of exploring the Northern portion of Australia', Paps presented to both Houses of Parl... (London, 1857).

of unknown country traversed to Leichhardt's only'.[1] Following the expedition Gregory was commissioned by the New South Wales Legislative Assembly to lead a search along the Warrego, Barcoo (Cooper's) and Strzelecki Creeks for Leichhardt, and in 1859 was appointed commissioner for crown lands and surveyor-general in the new colony of Queensland.[2] Gregory became one of the most powerful public servants in Brisbane and a major figure in the capital's scientific community.[3]

In Brisbane the small pre-separation scientific circle was centred on the Brisbane Hospital. Dr David Keith Ballow (1809-50), an Edinburgh trained surgeon, practised at the Hospital from 1837 to 1850 and collaborated with John Vaughan Thompson of Sydney in the successful cultivation of sea-island cotton. Cotton acclimatisation experiments were continued by Dr William Hobbs (1820-90), another Hospital surgeon and professional sanitarian, who came to occupy an important place in the Brisbane scientific community as an experimentalist and doctor.[4]

Dr Frederick James Barton (d.1863), who succeeded Hobbs as surgeon at the Hospital, combined his interests in medicine and meteorology to deliver one of the first scientific lectures in Brisbane in August 1845. Barton had found that 'ague, continued fever, chronic rheumatism and influenza' rated high among the ailments he treated, 'the first two being caused by the exhalations of vegetable miasma, the next by undue exposure to wet and night air'.[5] Many of the scientific meetings which were held

---

[1]'Introductory Essay', Florae Tasmaniae, p.cxxiii. Reports on scientific aspects of the exploration appeared in Journ. Roy. Geog. Soc., XXVIII (1858), pp.1-153 and Quart. Journ. Geolog. Soc., XII (1856), pp.283-8.

[2]Following his survey of Queensland's southern boundary.

[3]Like Mitchell in N.S.W., however, Gregory was not the most meticulous or successful of administrators. See A.D.B., IV, pp.293-5.

[4]For Ballow see A.D.B., I, p.51 and for Hobbs, IV, pp.402-3. Hobbs was a member of the Medical Board from 1860-88 and as a member of parliament (1861-80) saw several health measures through to the statute book.

[5]Quoted in E.S. Jackson, 'Historical notes from the records of the Brisbane Hospital, 1850-70', M.J.A., I, (1923), pp.281-6. See also J.D. Lang, Queensland, Australia; a highly eligible field for emigration and the future cotton field of Great Britain second ed. (London, 1864), pp.256-7.

in the rooms made available at the Brisbane Hospital by Barton as resident surgeon (1851-63) were devoted to sanitary and health problems associated with the peopling of a deleterious climate by Europeans.

Even before Queensland was proclaimed as a sovereign entity in London a small group had begun meeting in Brisbane as early as March 1859 to discuss 'scientific subjects, with a special reference to the natural history, soil, climate and agriculture' of the colony.[1] Barton was host, assisted by the versatile Silvester Diggles (1817-80), an entomologist and ornithologist, who lectured in natural history at Brisbane School of Arts and Sciences (founded 1849).[2] Among the five founder members of the Queensland Philosophical Society was Walter Hill (1820-1904), who had been appointed superintendent of the Botanic Gardens in Brisbane in 1855, a post he occupied with practical proficiency until 1881, contributing greatly to the botanical exploration and acclimatisation of plants in Queensland. Charles Tiffin, clerk of works for Moreton Bay since 1858 and later colonial architect, was another founder member with Rev George Wight, a Congregational minister and co-founder in 1860 of the 'fearless independent' Queensland Guardian, which for some years was the Philosophical Society's mouthpiece.[3]

With few formal trappings the society met fairly regularly until the first election of office-bearers in August 1862, and in those three years achieved a small respectable growth, recording eighteen members by the end of 1860. Respectability was enhanced by the election of Gregory and the squatter-naturalist Charles Coxen (1809-76), member for Northern Downs in the first parliament and moving force behind the establishment

---

[1]First report of the Queensland Philosophical Society, 2 December 1862, Trans. Phil. Soc. Qld., I (1859-72) and Queensland Guardian, 4 December 1862. There is no consecutive pagination in the Trans. Phil. Soc. Qld.

[2]Moreton Bay Courier, 16 April and 27 July 1859.

[3]Members Book (1859-63), Queensland Philosophical Society; Wight, Barton, Diggles, Hill and Tiffin (in that order) entered their names on 5 July 1859. For biographical and other details of the early society see Elizabeth N. Marks, 'A history of the Queensland Philosophical Society and the Royal Society of Queensland, 1859 to 1911', Proc. Roy. Soc. Qld., LXXI, No.1 (1959), pp.17-42.

of the natural history collections in 1855 which grew into the Queensland Museum.[1] The older medical establishment was represented in the society by Kearsey Cannan (1815-94) and Barton and the more radical elements in the new colony by William Brookes (1825-98), the anti-Kanaka crusader, and William Coote (1822-98) an architect and engineer. Clergymen among the earliest members included Revs John Bliss and Robert Creyke, deputy-registrar-general. In its earliest years the Queensland Philosophical Society was open to a wide cross-section of Brisbane's intellectual, commercial and public life. Ultimate respectability came with the willingness of the governor, George Ferguson Bowen (1821-99), to accept the position of president in 1862.[2]

Under Barton and Coxen the Philosophical Society's 'chief efforts... were first directed to the furtherance of the study of meteorology and the establishment of a museum'.[3] The colonial government provided £100 per annum for the museum and members dipped into their own collections to provide items and specimens for it.[4] Between 1859 and the end of 1862 twenty papers were read before the society and thirty-nine essays were subsequently collected into the first volume of Transactions issued in 1872.[5] Of this number ten papers dealt with climatic and medico-sanitary topics. Two subsequent volumes of Transactions (1873-77 and 1878-82) contained only fifteen papers out of a total of twenty-six recorded as having been read.[6] The clear bias of the Philosophical Society's interests lay towards natural history. Of fifty-four published papers,

---

[1] G. Mack, 'The Queensland Museum, 1855-1955', Memoirs Qld. Mus., 13, No.2 (1956), pp.107-24 and A.D.B., III, pp.487-8.

[2] Members Book, entries 1859-63. The first office-bearers were Barton, secretary; Coxen, vice-president; Alexander Raff, treasurer and Bliss, Creyke, Diggles and the naturalist H.C. Rawnsley as councillors. Trans. Phil. Soc. Qld., I, Annual Meeting, 2 December 1862. By November 1863 the society had registered 37 members.

[3] J. Bancroft, Presidential Address, Proc. Roy. Soc. Qld., II (1886), p.67.

[4] Coxen and Rawnsley were particularly generous with natural history exhibits, and Tiffin donated a microscope.

[5] Of the 20 papers read before 1862 only 11 were included in Transactions.

[6] Minute Book (1868-83), Queensland Philosophical Society, and Trans. Phil. Soc. Qld., I-III.

twenty-eight dealt with botany and geology (six each), zoology (thirteen) and acclimatisation of crops (three). Lacking an industrial base and significant government investment in those scientific organisations such as the bigger colonies supported, early Queensland scientists could not develop the same range of interests as, for example, did their Victorian colleagues in astronomy, terrestial magnetism, geology and the applied and physical sciences. Only meteorology flourished early in Queensland. Yet, despite smallness and remoteness from the greater happenings of even colonial science, Queensland's men of science were not ignorant of outside developments nor did they neglect their considerable local responsibilities.

At separation the sanitary condition of Brisbane was 'primitive in the extreme, and the methods employed constituted both a nuisance to the residents and a danger to health'.[1] Achieving municipal status in 1859, Brisbane boasted neither the resources nor expertise to cope with even the rudiments of drainage, water-supply and sanitation at a time of rapid urban growth.[2] The problem of the disposal of waste and effluent and the dispersal of noxious fumes and other substances became more acute as areas of disagreement - and hence of non-co-operation - grew between central government and Brisbane urban authorities.[3]

In 1859 Tiffin presented his ideas to the Queensland Philosophical Society on 'the artificial providing of pure air round, and in the permanent tents of our modern huge encampments'.[4] Ventilation, Tiffin's principal concern, must provide for the dispersal of unhealthy gases, and supply

[1] G. Greenwood and J. Laverty, Brisbane 1859-1959: A History of Local Government (Brisbane, 1959), pp.80-1.

[2] In 1865 Bowen recalled that on his arrival in 1859 Brisbane had been 'little more than a village of wood, with scarcely five thousand inhabitants' and six years later had become 'a flourishing city of brick and stone with fully twenty thousand inhabitants', Bowen to Cardwell, 2 July 1865, quoted in J. Laverty, 'History of Municipal Government in Brisbane, 1859-1925...', Ph.D. thesis (Univ. of Qld, 1968), p.77, which also see (esp. pp.21-38 and 50-126) for the response to Brisbane's early sanitary problems.

[3] 'The Organization of Municipal Government, 1859-1879', ibid., pp.127-81.

[4] 'On the ventilation of buildings', Trans. Phil. Soc. Qld., I.

'pure untainted air', either hot or cool, according to prevailing conditions. The 'noxious and unfavouring gales' emitted by Brisbane's four 'boiling down places' and the habit of leaving nightsoil to evaporate earned Tiffin's particular censure. Well-read in the European literature on sewage disposal and purification,[1] Tiffin demanded more stringent sanitary and building regulations. Recent studies in New South Wales, he warned, had 'gravely [set] forth that most of the degradation, illness and misery of those [working] classes arise from the ill-ventilated drains, neighbourhoods and dwellings where they reside...'[2] Classical, Chadwickian sanitary reform, so readily espoused in Europe by engineers, medical men, statisticians and social philosophers, now found its champions in Queensland.[3]

In May 1861 Creyke, utilising Barton's meteorological records, attempted to find correlations between population trends, climate and disease in Brisbane.[4] The previous August, Barton, in a paper on the classically-accepted environmental effects of climate - 'the prevailing state of the atmosphere of any region, with respect to heat, cold, moisture, winds and impregnation with electricity and ozone' - had outlined his experiments on measuring ozone, using Moffat's methods, hoping to shed some 'light upon the origin and history of diseases' by expanding on the discoveries made

---

[1]He drew, for instance, from Angus Smith's work on the comparative amounts of animal and vegetable matter in the air of given localities, and on experiments by the chemists Edward Frankland (1825-99) and August Wilhelm Hofmann (1818-92) for the London Metropolitan Board of Works to deodorize sewage.

[2]The Australian Medical Association (formed in 1859) was concerned with the drafting of medical legislation in N.S.W. and paid special attention to the 'sanitary condition of the working classes'. See 'Water Supply to Sydney (Petition from Certain Members of the Australian Medical Association respecting water supply through iron pipes)', 6 May 1861. Journ. Leg. Counc. (N.S.W.), 7 (1861), p.627.

[3]For background to the public health movement see e.g. R.A. Lewis, Edwin Chadwick and the Public Health Movement, 1832-54 (London, 1952) and R.H. Shyrock, The Development of Modern Medicine: An Interpretation of the Social and Scientific Factors Involved (London, 1948), esp. 'Medicine and the Public Health Movement, 1800-1900', pp.176-204 and 'The Triumphs of Modern Medicine, 1870-1890', pp.224-8. See also Laverty, 'History of Municipal Government in Brisbane, p.115.

[4]'Public Health in Brisbane', Trans. Phil. Soc. Qld., I. Paper read 7 May 1861.

by Christian Friedrich Schönbein (1799-1868) and others in Europe.[1] Admitting the inadequacy of his statistical records, Creyke nevertheless presented damning evidence in support of Barton's and Tiffin's pleas for more stringent 'sanitary regulations': he showed that twenty-eight per cent of Brisbane's deaths were from 'zymotic diseases'. Analysing his monthly tables for 1860, Creyke concluded that there was

> a great connection between the electrical state of the atmosphere and health. Whether science will enable men to overcome the want of electricity in the atmosphere remains to be proved. Inasmuch as the earth is the great attractor and reservoir of electricity, it seems it would be impossible, by any human contrivance, to charge the atmosphere with it, and perhaps it may well be the will of Deity to shew men that, although they can do much to prevent disease and sickness, there are some elements they cannot control, there are some difficulties which they cannot overcome.[2]

But Brisbane's clergyman-statistician was not wholly deterred by the fatalistic force of his teleological beliefs:

> Electricity may baffle us, but procuring an abundant supply of water, the construction of good drains, and the proper ventilation of buildings are easily to be obtained.

Engineers, sanitarians and medical men heartily agreed here but the limitations soon proved to be human, fiscal and political, not divine or electrical. Whilst administrators squabbled over funds and areas of competence Brisbane's population grew from 6051 in 1861 to 12,551 in 1864 and by 1868 had reached 14,265.[3] In 1864 the registrar-general bluntly reported that Queensland's high mortality was 'bound up with bad drainage and ineffective methods of disposal of rubbish in the towns'.[4]

---

[1] 'Lecture on Climate', ibid. Read 7 August 1860. See also Moreton Bay Courier, 30 August 1860. Some of Barton's data were taken from his lecture of 1845, although he now showed a close acquaintance with the meteorological work of Scott and Jevons in Sydney and of the Melbourne Observatory.

[2] Ibid.

[3] Greenwood and Laverty, Brisbane 1859-1960, p.139. See esp. pp.174-95 for the measures taken to combat Brisbane's sanitary problems.

[4] Ibid., p.181.

Pressed hard by public opinion to implement 'proper sanitary regulations and appliances which experience, in older communities, has shown to be so effective, and which even in this beautiful climate we cannot dispense with', government appointed a Central Board of Health which reported that nearly fifty per cent of Queensland's infants died before attaining five years of age.[1] But a Health Act was not passed until 1872 and in Brisbane itself the official response was piecemeal.

William Coote, arriving in 1860 to work for the Moreton Bay Tramway Company, brought the benefit of his experience in Tasmania and Victoria and the convictions of his own high sense of professionalism and radicalism to the Philosophical Society's sanitary debate.[2] In June 1861 he launched a frontal attack on the sanitary procrastination, demanding that drainage and sewerage systems should not be combined simply for the sake of economy.[3] It was a modern misfortune that society usually waited 'until the soil is permeated with noxious gases, and then established a sanitary commission, often composed of very unscientific members, by whom much twaddle is talked, and more money wasted'. Brisbane's cesspools were contributing 'largely to the promotion of malaria, fever, and the incomes of doctors and undertakers', with seepage from them contaminating wells and tanks. An immediate survey of Brisbane's terrain was vital before constructing a drainage scheme - 'the carrying off of surplus water' - and a separate sewerage scheme - 'the conveyance of sewage to some fixed reservoir or outlet, where it will cease to be a nuisance'. Coote contended that the cartage of human waste in fluid form was more economical than pulverization and deodorization and that discharging sewage into tidal rivers was a better means of disposal. The ideal, of course, was the expensive construction of a fully sewered water-closet system, but the costs proved prohibitive for another fifty years.[4]

---

[1]Quoted and discussed in Laverty, 'History of Municipal Government', pp.209-15. See also Brisbane Courier, 16 September 1864 and V. & P. (L.A. Qld.), 1865, pp.1313-5.

[2]Coote joined the society on 5 February 1861. For his career see A.D.B., III, pp.456-7 and A.A. Morrison, 'William Coote', J. Roy. Qld. Hist. Soc., 5, No.4 (1956), pp.1218-32. Coote was trained as an architect and civil engineer.

[3]'On the Sewerage of Towns', Trans. Phil. Soc. Qld, I.

[4]For a full discussion on sanitation and hygiene in Brisbane at this period see Enid Barclay, 'Fevers and Stinks': Some problems of Public Health in the 1870's and 1880's', Queensland Heritage, II, No.4 (1971), pp.3-12.

Coote's forthright condemnation before the Philosophical Society of the 'huddling together of apartments on the English model in a square box form' and of 'the detestable terrace system, which ought to be forbidden by municipal enactment'[1] heralded him as a fearless campaigner in public causes and a nice appraiser of colonial requirements.

In the long wrangle between central and local governments over the Enoggera Water Works scheme - opened in 1866 to supply Brisbane - Coote, supporting the Brisbane Council, and Gregory, defending the Queensland government's interests, came out on opposite sides in the public debate.[2] At the end of the seventies, when increased pressure of population necessitated a search for new sources of water supply, Gregory again sparked off a considerable debate before the Philosophical Society by suggesting the damming of Moggill Creek, south-west of Brisbane.[3] Dr Joseph Bancroft (1836-94), adopting the medical viewpoint, stressed the need to purify water by aeration through a system of several small reservoirs, where the 'odours' could be caught. Replying, Gregory admitted playing down the danger of impurities but argued that the use of kaolin or lime should mitigate the problem.[4] Bancroft, understandably, was far from satisfied and persuaded the society to recommend to the Central Board of Health the erection of 'reservoirs for aerating and purifying by subsidence... at an elevation as near to the city as possible'.[5] In the eighties the appointment of John Baillie Henderson (1836-1921) as government hydraulic engineer following his investigation of urban water resources greatly

---

[1]'The Influence of Climate on Domestic Architecture'. Trans. Phil. Soc. Qld, I. Read 4 November 1862. Space and shade, Coote cogently argued, would govern the evolution of house-types in Queensland. Coote designed some important public buildings in Brisbane, including the Town Hall.

[2]Laverty, 'History of Municipal Government', pp.152-6 and 223-6 and Greenwood and Laverty, Brisbane, pp.185-92.

[3]'A Supply of Water to the City of Brisbane', Trans. Phil. Soc. Qld, III. Read 8 August 1878. Gregory rejected the Logan, Kedron Brook and South Pine rivers as sources of supply.

[4]Minute Book (1868-83), Queensland Philosophical Society. Minutes for 8 August and 10 October 1878.

[5]Ibid., 14 November 1878.

assisted Queensland's control and use of water supplies. In the same period work was begun on the Gold Creek Reservoir, on a tributary of Moggill Creek.[1]

In 1866 Charles Tiffin, in a paper attacking pollution by 'organic effluvia', reported to the Philosophical Society on

> the determination arrived at by the scientific men last year, that rinderpest was conveyed in the air - so likewise cholera, and fevers, consumptions, and scrofulous diseases are propagated by the agency of the atmosphere.[2]

Any measures, he maintained, to reduce 'volatile organic matter' issuing from carcasses, cesspools, swamps and open drains were welcome. One of Tiffin's remedies, tried by his own patient experimentation, was the earth closet. Tiffin was well-read in the burgeoning European literature 'to get rid of the faecal emanations about towns': on pneumatic waggons, deodorants, charcoal filters, ventilating shafts and the Prince Consort's attempts to relieve 'stinks' at Windsor Castle.[3] In Australia's climates, he concluded, the earth closet was the most economical and acceptable method to combat 'the direful consequences of vitiated air'. George Suter, a fellow-architect, was so appalled at Tiffin's suggestions - and, incidentally, so wedded to the conventional cesspool - that he proposed that 'any person advocating the earth closet [where] there is the least attempt at a water supply should have his head shaved'.[4] But the merits

---

[1]Laverty, 'History of Municipal Government', pp.406-9. For Henderson see A.D.B., IV, p.377.

[2]Tiffin, 'On the Use of Earth Closets as a means of Preventing the Vitiation of the Air', Trans. Phil. Soc. Qld, I. Tiffin drew liberally on the European work of Robinson, Zimmermann and Vauquelin on air pollutants to argue some of the points made in his paper.

[3]'So much alive are the chemists and sanitary reformers to the baneful influences of accumulations of alvine excrementatious matters, and so well aware of the inefficiency of the ordinary systems of underground drainage to abate the evils that arise from them, that they have from time to time adopted schemes for deodorizing and utilising sewage matters, backed by the strongest scientific evidence and, rendered attractive by prospects of profit as the most powerful arguments with a world bent on the acquisition of "filthy lucre'". Ibid.

[4]Suter, 'The Construction and Arrangement of Hospitals', Trans. Phil. Soc. Qld, I. Tiffin had left his earth closet at the Brisbane Hospital for a 'fair trial'.

of Tiffin's arguments were widely accepted in Queensland and, following the introduction of the Health Act of 1872, the Brisbane Council began enforcing the use of earth closets and their use remained common well into the twentieth century.[1]

Although the Queensland Philosophical Society made valuable contributions to the sanitary debate in the 1860's and 1870's it was the study of natural history in its various branches - particularly under Coxen, Diggles and Gregory - which remained the characteristic activity of the association for over twenty years.

Gregory, who read widely in Darwin and other contemporary authors, presented a paper on northern geology based upon his earlier Exploring Expedition.[2] Gregory's researches led him to seek correlations between the subsidence of valleys in Australia's Eastern Highlands and the massive coral formations of the offshore Great Barrier Reef. 'It would appear', Gregory wrote,

> that Australia is the oldest persistent continent in the world, as every other country exhibits unmistakable evidence of one or more submergences since the new red sandstone period, and it is a remarkable coincidence that the existing animal and vegetable kingdoms in Australia approximate more closely to the flora and fauna of past ages, than those which now exist in any other country.

Charles Coxen, in a paper on living and extinct marsupials, presented ideas very much in agreement with those of Gregory. Diggles, who ably demonstrated his skills in microscopy to the society, made his particular contributions in entomology and ornithology.

The prospect at the end of 1862 of the well-known explorer William Landsborough (1825-86) revisiting Queensland - 'the scene of his successful and triumphant exertions on behalf of science and civilisation' - following his north-south crossing in search of Burke and Wills, made the Philosophical

---

[1] Brisbane, 1859-1959, pp.183-5 and Laverty, 'History of Municipal Government', pp.211-9 and 406-14.

[2] 'Geology of Northern Australia', Trans. Phil. Soc. Qld, I. Read July 1861(?).

Society painfully aware of its precarious social position. Seeing that they were anxious to lead the Brisbane welcome to Landsborough, Coote cautioned members to proceed circumspectly 'lest their weakness [numerically] should become conspicuous'. A joint reception with the Acclimatisation Society of Queensland, 'the only other Society established for scientific purposes in the colony', would help mask their embarrassment.[1] Inaugurated in August 1862 with thirty-five members at the suggestion of Governor Bowen, the Acclimatisation Society had enjoyed the immediate support of prominent citizens, including the Premier, Robert Herbert (1831-1905), president, and the President of the Legislative Council, Maurice O'Connell (1812-79), who became a council member. As Cannan, Coxen, Hill and Gregory from the Philosophical Society occupied executive office in the new society, Coote and Wight strongly pressed home the need for the older association to co-operate with the Acclimatisation Society rather than fragment their efforts.

It proved wise advice, for under the active leadership of Lewis Adolph Bernays (1831-1908), Clerk to the Queensland Legislative Assembly, the Queensland Acclimatisation Society grew to be one of the largest and most active in the Australian colonies. By May 1863 the membership had risen to seventy-four; correspondence had been established with overseas societies; government, when approached, had granted land and other favours, and Diggles, Henry Charles Rawnsley (d.1872), the ornithologist, and others among the Philosophical Society's members had become active in the cause of acclimatisation.[2]

In its first submission to parliament for assistance the Acclimatisation Society argued that Queensland, 'possessing a variety of climate and soil, is better adapted to the purposes of acclimatisation than perhaps any other country in which a similar association has been established'.[3] Bernays,

---

[1]Annual Meeting, 2 December 1862, Queensland Guardian, 4 December 1862 and Trans. Phil. Soc. Qld, I.

[2]First Annual Report of the Queensland Acclimatisation Society, Brisbane Courier, 14 May 1863 and Minute Book, Vol. I (1862-5), OM 66/24 Q1, Oxley Library, Brisbane. Coxen was first vice-president. Hill kept animals for the society at the Botanic Gardens.

[3]Minute Book, vol. I, frontispiece.

with a strong personal bias towards economic botany, soon found himself with the secretary and the 'languid and intermittent' help of 'a few gentlemen interested in acclimatisation' at the head of the society's policies and destinies.[1] Accepting the challenge Bernays published a number of essays on economic botany, and the Queensland government, 'lacking any agricultural department of its own..., turned frequently for assistance and advice' to the Acclimatisation Society.[2] In his capacity as governmental adviser Bernays wrote widely on forestry conservation, acclimatisation and economic tropical botany.[3]

William Brookes, combining radicalism with acclimatisation and his own aspirations for Queensland's development, argued before the Philosophical Society in 1860 for the large-scale introduction of cotton growing into the colony combined with a policy of white immigration to provide the necessary labour. True to the political philosophy of his Manchester Athenaeum background, Brookes pleaded for small cheap holdings for these immigrants; the abolition of squatter monopolies and the mass production of cotton to supply the British mills to help deprive the slave-owners of the southern United States of their livelihood. Cheap land would lead to 'religiousness, public spirit and virtue, the arts and sciences' in the 'congenial atmosphere' of Queensland and by initiating and supporting the policy, the Philosophical Society 'would have accomplished no trivial end, nor could it be said, even supposing little else accomplished, that it had been instituted in vain'.[4]

---

[1]Unidentified press-cutting of 1880 in papers of Acclimatisation Society, OM 66/24, Oxley Library.

[2]Press-cuttings from Courier and Telegraph, 29 August 1908, in Minute Book, vol. V (1907-09), minute of 4 September 1908. Bernays was behind the formation of the Queensland Herbarium, the Kamerunga State Nursery and the Forestry Department. See also A.D.B., III, p.149.

[3]His works included The Olive and its Products (Brisbane, 1872) and Cultural Industries for Queensland (Brisbane, 1883).

[4]W. Brookes, 'Cotton and Queensland', Trans. Phil. Soc. Qld, I. Read 3 July 1860. Brookes, citing the freedoms of other parts of the U.S.A., 'the infant Hercules' attacked the work of theorists who chose Australia 'as the licensed ground' on which to play their 'silly games'. For Brookes see A.D.B., III, pp.246-7 and W.O. Lilley, Life of the Hon. William Brookes (Brisbane, 1902).

Some of Brookes's hopes were realised when cotton growing and immigration increased during the boom of the 1860's. Although Brookes, during his active political campaigning against Kanaka immigration, let his association with the society lapse, J.W. Strachan did not hesitate to use it as a forum in 1867 for advocating the desirability of white over coloured labour in the sugar industry.[1]

In December 1863, mindful of the need for reform, the Philosophical Society reorganised itself drastically. After five years, suggested the new secretary, John Bliss optimistically, the society could be 'safely looked upon as one of the permanent institutions of the colony', despite the sobering reality that 'in a population so small and widely scattered the number of persons likely to take an active interest in its proceedings must necessarily be limited'.[2] Support, it was true, had been forthcoming from societies in the other colonies and the society had attracted the interest of influential men like Redmond Barry in Melbourne.[3] In March 1863 the general superintendent of telegraphs, J.J. Austin, reminded the society of the importance to science of links with the outside world and advanced strong arguments for Queenslanders to agitate for the building of a continental telegraph line across their territory to give them the advantage of being the first major link in the Australian network.[4]

The previous month the eminent mathematician, James Cockle (1819-95), had arrived in Queensland to take up appointment as chief justice.[5] Cockle, viewing the scientific scene in Brisbane, quickly determined that reforms and new rules based upon the Cambridge Philosophical Society, of which he had been a member since 1856, were needed in the Queensland Philosophical Society. Within a few months Governor Bowen resigned as

---

[1]'Sugar Cultivation in Queensland', ibid. I. Strachan described the successful use of steam tractors on his Cleveland estate. The Polynesian Labourer's Act, the first attempt to regulate Kanaka labour, was passed in 1868.

[2]Annual Report and meeting of 1 December 1863, Queensland Guardian, 2 December 1863.

[3]Barry wrote to the society on 27 October 1863 suggesting that it lead the campaign for a public library in Queensland, ibid.

[4]'The Anglo-Australian Telegraph', Trans. Phil. Soc. Qld, I. Read 3 March 1863.

[5]A.D.B., III, pp.335-6.

president in favour of Cockle to allow him to implement the changes.[1]

By the end of 1863 the society and Queensland science in general stood desperately in need of the scientific eminence and guidance Cockle could offer. Barton, whose 'patience and solicitude' had sustained the foundation years, died in 1863 - during which year only four papers had merited publication - and government withdrew its meagre £100 grant. With Barton's death the official meteorological work, although assigned to the telegraph office, suffered through neglect, and government was slow to heed the Philosophical Society's complaints about the 'utter inutility of only two [meteorological stations] in a territory the extent of Queensland'.[2] Tiffin zealously called upon the 'truly scientific men in Queensland' to forsake their modesty and anonymity. 'Some tyro' must 'step into the arena...in order that [the] Society may not languish and disappear completely, after so patient a growth'.[3] Arguing floridly in favour of a Queensland geological survey and museum, Tiffin brought the question of science back down to local practicalities:

> The great question of how soon the bounteous earth we inhabit shall be made to yield up the rich treasures that lie buried in her bosom, depends quite as much, and we shall not go far wrong in saying even more, upon the conquests of science than upon the extent of mere human power we import from the mother country.[4]

---

[1]Bowen became patron. See Guardian, 2 December 1863.

[2]Meeting of 3 November 1863. See also N. Bartley, 'Comparative Meteorology', read 5 January 1864, Trans. Phil. Soc. Qld, I. E. MacDonnell was later appointed government meteorologist and private observers were active at Maryborough, Warwick and Somerset (Cape York) by 1864-5. A.C. Gregory had suggested the use of the telegraph for weather prediction in Queensland as early as 1859. Regular readings over a wider range of localities did not commence until 1870.

[3]Tiffin, 'Of some of the Economic Uses of the Trappean Rocks around the District of Brisbane', Trans. Phil. Soc. Qld, I. Read 3 November 1863.

[4]Ibid. 'No country', Tiffin maintained, could 'vie with [Queensland] in the variety and value of its strata and of its physical conformation generally'.

Cockle was no tiro when he took over the Queensland Philosophical Society and no one even remotely interested in the science of the colony, either inside or outside the society, could ignore the stance he took. Between 1848-63 Cockle had published widely on mathematical subjects in Britain and in 1854 had been elected a fellow of the Royal Astronomical Society.[1] A graduate from Cambridge in mathematics (M.A. 1845) Cockle was widely respected among mathematicians and scientists in Britain and had an intimate knowledge of scientific life there.

Cockle's main work on the theory of differential equations was 'marked by originality and independence of mind'. His interest in the higher equations centred on 'solving the quintic', of 'expressing a root of the general equation of the fifth degree by a finite combination of radicals and rational functions'.[2] Although unsuccessful in his primary objective, Cockle did open up new lines of investigation and stimulated the work of his eminent Cambridge contemporary, the mathematician Arthur Cayley (1821-95).[3] Cockle demonstrated important relationships and analogies between algebraic and differential equations and was the first to discover and develop the properties of the coefficients of linear differential equations called criticoids or differential invariants. The best assessment of Cockle's mathematical work was given on his death by his friend, Rev R. Harley, who described it as 'eminently initiatory':

> He started theories, but left others to elaborate and perfect them. Of his eighty or ninety papers given to the mathematical world, many are in no doubt slight and fragmentary; but there are few, even amongst the shortest and least complete, which do not contain valuable and original suggestions. Ideas struck out by him have taken root in other minds and borne fruit.[4]

---

[1] He later served as a councillor of the Astronomical Society (1888-92) and was president of the London Mathematical Society (1886-88). His pre-Australian work appeared in a variety of journals, including Messenger of Mathematics; Quarterly Journal of Mathematics and Proceedings of the Manchester Literary and Philosophical Society. In his career he published over eighty papers.

[2] Obituary notice on Cockle, Proc. Manchester Lit. & Phil. Soc., 9 (1894-5), pp.214-18. See also the notices in Proc. London Math. Soc., 26 (1894-5), pp.551-4 and Proc. Roy. Soc. London, 59 (1895-6), pp.xxx-xxxix.

[3] After Cambridge (senior wrangler, 1842) Cayley pursued a legal career in London before taking the newly-established Sadleirian chair in pure mathematics at Cambridge in 1863. He was president of the British Association in 1883.

[4] Proc. Manchester Lit. & Phil. Soc., 9 (1894-5), p.222.

In his first presidential address to the reformed Queensland Philosophical Society, Cockle commended the fusion between theoretical and practical in the association's endeavours, the same ideal which he professed to see in Tiffin's and Austin's earlier papers on geology and a continental telegraph. 'Let us, however, be cautious', he pleaded, 'lest we allow results like these to demand in all cases some immediate practical deduction from scientific labours'.[1] The 'mission' of their association was to 'promote the spread of knowledge of all kinds', either by original research or from secondary sources.

Cockle remained president until 1878, and his first years of office, despite pressing judicial duties, were models of active involvement. On 8 May 1865 - the year he was elected F.R.S. - Cockle presented his first short mathematical paper to the Queensland Philosophical Society,

> an *a priori* demonstration that the general linear differential equation of the second order is absolutely insoluble by any finite formula involving only algebraical, exponential, logarithmic or trigonometrical expressions, or indeed any expressions whatever capable of being derived by indefinite integration from algebraical or exponential functions: and this impossibility subsists even though the derived functions be supposed to be affected in any way whatsoever, by signs of indefinite integration.[2]

The following April came a paper 'on the fundamental principles of hydrostatics' in which Cockle questioned 'certain conclusions arrived at in the last thirty years', conclusions which necessitated 'attributing to the ideal fluid a property in no degree essential to the mathematical theory of fluids and not as yet shown to be possessed by any fluid which we meet in nature'. Demonstrating a close knowledge of European work on fluid equilibrium, Cockle questioned the need to frame a hypothesis on the

---

[1] *Guardian*, 2 December 1863.

[2] 'On Linear Differential Equations', *Trans. Phil. Soc. Qld*, I.

constitution of fluids 'in order to establish the science of hydrostatics'.[1]

Under Cockle's leadership membership of the society doubled during 1864. The advancement which the chief justice valued most, however, was in the nature of the papers read. 'In a country where but little exists to remind [colonists] of those halls and schools in which learning and science are cherished at home' the Queensland Philosophical Society, Cockle observed,

> seeks not merely to receive, to read and register the communications, however interesting, of its members, but it also seeks by discussion to further the ends of research, and more than that to give to research a tone and direction.[2]

In a modest way Cockle persuaded the members to branch out in this new direction. In April 1864 W.M. Boyce's paper 'on coral islands' touched upon Darwin's theories of coral formations and coastal subsidence, suggesting that 'the residents of our Northern ports' provide data to confute or confirm the 'learned' naturalist's hypotheses. Rawnsley and Wight immediately opened an animated debate on the paper, asserting that the north-east coast of Australia was rising, 'which fact seemed rather to militate against a portion of Mr Darwin's theory of coral formations'.[3] Sensing a fruitful controversy Cockle persuaded another of the debaters, Diggles, to prepare a paper on 'Thoughts suggested by the theory of Mr Darwin'.

---

[1]He concluded that:

> the fundamental principles of hydrostatics viz. the equality of fluid pressure at any point of a fluid in all directions, is unshaken, save in a certain case of the equilibrium of a perfectly continuous liquid; and that, in as much as the existence of such a liquid is hypothetical only, the exception to the universality of the fundamental principles of practical hydrostatics is likewise hypothetical only, and I also conclude that, if a fluid consist of discrete particles, then an equilibrium, stable or unstable, in which the recognized laws of fluid pressure do not hold, is not even theoretically possible.

Trans. Phil. Soc. Qld, I. Cockle read a second paper in 1866 on corresolvents.

[2]Annual report, meeting and presidential address, 12 December 1864. Trans. Phil. Soc. Qld, I.

[3]The paper and discussion took place on 25 April 1864. Trans. Phil. Soc. Qld, I. Boyce had seen service with Captain Moresby in Indian waters and had there developed a close interest in zoophytes and coral formations.

Diggles, sincerely religious, made an honest intellectual attempt to come to terms with Darwin's 'favourite theory'.[1] For Diggles the active pursuit of natural history presented no barrier to religious belief but the denial of 'divine interference', the acceptance of 'chance', certainly did. The gathering of more accurate data with increased specialisation in natural history would, Diggles suggested, yield only marginal gains for Darwin, 'and only in such cases where naturalists have fallen into the error of calling varieties species'. Nature knew no confusion only order and design and the introduction of new species into an environment was part of a determined balance:

> That a battle thus begun should end in the development of new species, because the stronger outlived the weaker, I fail to see, though by this means an idea can be formed of the manner in which many creatures have become extinct.... The manner in which every living creature is fitted to its place in the great machine of nature is beautiful to behold.

Why, Diggles asked, if transmutation took place, were there no 'intermediate forms' in the rich Lias and Oolite beds, for example? Diggles supported the idea of 'independent creations' and, coming nearer home, strongly attacked Darwin's 'good use of anomalous forms in confirmation of his favourite doctrine'. How, he wondered, could the naturalist explain an arboreal kangaroo?

Diggles's orthodoxy - 'the perfect adaptation of everything to its peculiar sphere, in the economy of nature must be admitted on every hand' - 'gave rise to a very animated and interesting conversation' at the home of William Pettigrew (1825-1906) and gained approval as 'a remarkable example of the application of the notion of final causes', especially from Cockle, who was also a convinced Christian.[2]

---

[1] 'It might be argued that the view held by Mr Darwin has a tendency to lead men to materialism, or to acknowledge nature as the author of everything; and I think not without good reason, though the author disclaims such an idea'. Queensland Guardian, 21 September 1864.

[2] Guardian, 21 September and 13 December 1864. See also Trans. Phil. Soc. Qld, I. Others present at the debate on Diggles's paper included Bliss, Coxen and Wight.

Although Cockle kept theoretical discussion alive and some interest was evinced in such subjects as spectrum analysis and 'the wave-line principle in shipbuilding' - a paper read by Pettigrew - it was clear, even in the sixties, that the most fertile talent lay with Coxen, Diggles, Rawnsley and others in natural history and geology.

Members of the Philosophical Society craved the same scientific facilities as Melbourne and Sydney. The arrival from 1865 onwards of 'a few scientific periodicals...by every mail' helped relieve the isolation but the cramped museum housed in the windmill in Wickham Terrace, Brisbane, was held up as a shabby sign of the government's apathy. The only test for admittance to the Philosophical Society was 'a desire to co-operate in the communication and diffusion of information'. 'Australia', Cockle observed, 'affords fields of investigation and discovery such as those the most favourably situated in older countries would strive after in vain', but if 'universal knowledge' eluded them they must seek 'universal scientific toleration'.[1]

In 1866 a severe economic recession following the post-separation boom left the Philosophical Society even more despondent about any hope of government support. 'Most of the papers', the secretary reported in 1866, had 'a direct reference to the settlement of a European population on the Australian soil, and the adaptability of European inventions to our present circumstances',[2] but their publication and discussion was small consolation to men like Tiffin and Suter who saw their schemes retrenched by government. Equally disheartening, but soon forgotten, was Coxen's brief review of the Queensland Aboriginals' decline in numbers and culture since their first contacts with Europeans.[3]

---

[1] Presidential Address, 1865, Queensland Guardian, 13 November 1865.

[2] Annual Report for 1866. Presented 31 December 1866, Trans. Phil. Soc. Qld, I.

[3] 'On some of the laws and customs of that section of Australian aborigines, known as Kommillaroy', ibid. Read 2 June 1866. In 1864 the secretary had strongly recommended studies of the Queensland Aboriginals. There is no evidence that Amalie Dietrich (1821-91), the naturalist and collector, had any close dealings with the society after her arrival in Brisbane in 1863.

The announcement of payable gold at Cape River in June 1867 and then at Gympie (Nashville) on the Mary River the following September, rescued the colony and its science from the doldrums. In January 1867, desperately needing some immediate economic results, government, after previously ignoring Coxen's and Tiffin's suggestions for a geological survey, offered £3,000 for the discovery of payable gold. In Sydney W.B. Clarke, astounded at these ad hoc measures, used information supplied by Richard Daintree from North Queensland to support on scientific grounds the establishment of a Queensland survey modelled on that of Victoria. In January 1868 the squatter parliamentarian and enthusiastic advocate of public works, William Henry Walsh (1825-88), moved successfully in the Legislative Assembly for the setting up of a survey as suggested by Daintree.[1]

Meanwhile the Philosophical Society had conducted its own campaigning. In May 1867 just before gold fever overtook the colony, Wight, at the special request of the society, read a paper outlining the economic advantages of appointing 'a practical geologist'. Few other sciences had 'so universally risen in favour on the acknowledged ground of its high economic value' as geology. 'National utility', Wight argued, had been served by an alliance between capital and the British Geological Survey to develop resources in the home country. 'The institutions of the mother country [springing] up in countries of British origin, characterised by British spirit and energy', were now bringing similar advantages to other Australian colonies and Queensland should follow their example.[2]

Wight optimistically predicted that Queensland might one day supply 'fuel for the consumption of millions of people for countless generations': the colony was 'a mine of untold value', wide open to 'men of enterprise and capital':

---

[1] W.B. Clarke, 'On the auriferous and other metalliferous districts of North Queensland', Proc. Roy. Soc. N.S.W., I (1868), pp.42-57 and G.C. Bolton, Richard Daintree: A Photographic Memoir (Brisbane, 1965), pp.11-14. See also Ann Mozley, 'Richard Daintree: First Government Geologist of Northern Queensland', Queensland Heritage, I, No.2 (1965), pp.11-16.

[2] 'On the appointment of a Government Geologist for Queensland', Trans. Phil. Soc. Qld, I. Read 10 May 1867. Internal evidence suggests that Wight commenced work on the paper in February 1867, soon after the government offered its reward for gold discovery.

> ...scientific men who have only partially examined and studied our mountain systems, and the old miners from the south, who look upon matters with a practical eye, agree in declaring, that unless nature belies herself, the auriferous deposits in this country are both extensive and rich.[1]

Rewards and incentives offered for discovering gold and oil-bearing shales were no substitute for 'competent men of science to survey geologically'. Britain and Victoria must be the models in the efforts by Queensland's scientists to relieve 'depression and distress in the community':

> ...what science has done for Britain, what science has done for Victoria, science will do for Queensland. The Government must be sure, however, that they obtain true and cleared-eyed science, not the old fogyism of departed theories.[2]

Richard Daintree's decision to leave the Victorian Geological Survey and take up squatting on the Burdekin in 1864 had important long-term results for settlement in North Queensland and for the general scientific effort in the colony. Daintree had served under Selwyn for nearly ten years, gaining invaluable professional and field experience, supplemented by some formal training in assaying and metallurgy at the London School of Mines in 1856-7. A close supporter and tireless correspondent of W.B. Clarke, Daintree soon recognised the mineral potential of North Queensland and, unsuccessful as a squatter, offered himself to government in February 1866 as a geological surveyor. But successive unstable

---

[1]Ibid. With foresight Wight predicted the profitable exploitation of copper in Queensland. Since the work of Clarke and Stutchbury in the fifties very little geological investigation had taken place in Southern Queensland.

[2]Ibid. Wight had his own theories, however, about 'the vast accumulations of rocky materials with which the geologist has made us familiar'. They furnished 'perhaps, the grandest commentary on the Bible designation of the Great Creator "THE ANCIENT OF DAYS"'.

Queensland governments shied away from the responsibility until Daintree chose to reveal the fruitful findings of his geological research. Then the strong alliance between himself and W.B. Clarke, together with the support of scientists, certain political interests and public opinion in general in Queensland forced the issue through.[1]

Daintree's proposals were for two divisions of the Geological Survey between North and South Queensland. In 1868 Charles D'Oyly Aplin, another of Selwyn's men from Victoria, was appointed geologist for the southern division[2] and Daintree for the northern. Both were subjected to constant official pressure to produce payable 'results' between 1868 and 1870. Their thorough surveys made substantial contributions to general geology[3] and Daintree's work undoubtedly sped development in tropical Queensland, especially when gold was discovered on the Gilbert (1869) and Etheridge Rivers (1869-70). But the Liberal ministry of Charles Lilley, which assumed office in November 1868, was bent on retrenchment and hardly satisfied even with tangible gold finds. The Survey, despite delaying tactics in parliament, was starved of funds and abolished in 1870.[4]

From London, where he went to supervise Queensland's contribution to the Exhibition of Art and Industry in 1871, Daintree continued - from 1872 onwards as agent-general - to support the scientific effort in Queensland until his death in 1878.

---

[1]Bolton, Richard Daintree, pp.11-16 and A.D.B., III, pp.1-2.

[2]J.T. Woods, 'C. D'Oyley H. Aplin, first government geologist for the southern district of Queensland', Memoirs Qld Mus., 14, No.4 (1964), pp.109-14.

[3]Reports were published in Votes and Proceedings of the Queensland Legislative Assembly (1868-70). See also Queensland Parliamentary Debates (1868-70) and Daintree, 'On the general geology of Queensland', Quart. Journ. Geolog. Soc., 28 (1872), pp.271-360.

[4]Bolton, Richard Daintree, pp.16-20. It was not resumed until 1875 when Gregory took over responsibility for South Queensland.

During the gold excitement of 1867-8 the Philosophical Society's affairs languished temporarily.[1] After taking over as secretary Suter quickly revived the proceedings by gaining the co-operation of Aplin and Daintree.[2] Surprisingly Cockle now became one of the weakest links in the society. Although elected president each year until he left Queensland in 1878 his attendance and support were sporadic. Indeed he henceforth preferred overseas or other colonies' journals for publishing his scientific papers.

After 1869 leadership of the Philosophical Society fell to Coxen, Diggles, Pettigrew, Suter, Wight and Dr John Neill Waugh (1818-1900). Diggles took over the curatorship of the Museum whose promotion was pressed unremittingly by the society upon government until £11,000 was voted for a building and a Board of Trustees appointed with Coxen and Gregory as members in 1875-6.[3] In May 1869 Wight and Alexander Raff led the Society's attack on government's decision to abandon the Geological Survey. Only by employing 'men of competent scientific attainments', they claimed, could Queensland's extensive mineral wealth be adequately assessed; the geological maps and reports already to hand more than justified the expense involved.[4] But the Society's pleas fell on unresponsive ears.

During a period of governmental apathy, waning vitality and considerable self-criticism in the seventies Coxen and his fellow members showed themselves obstinately determined not to let Cockle shirk his responsibilities as president and erstwhile reformer. In 1870 the mathematician conceded - albeit with little enthusiasm - that the 'wider [the] scope of [their]

---

[1]No regular meetings are recorded from June 1867 to March 1868, although four papers were read in 1867. Bliss, the secretary, seems to have got into difficulties with both finances and property belonging to the Society. See Minute Book, 5 June 1868.

[2]Aplin attended his first meeting in July 1868 and Daintree lent his specimens and support towards building up the Museum. Minute Book, 3 July and 2 October 1868.

[3]The society spent money on a collection of Cape York birds in 1869 and assembled many more items before responsibility was assumed by government. See Mack, Memoirs Qld. Mus., 13,(1956), pp.109-10.

[4]Minute Book, 21 May 1869. Three resolutions were published and sent to the minister of lands.

activities the better' and that the members should draw no 'subtle lines between art, literature, science and philosophy'. There was, indeed, talk of transforming the society into a literary and philosophical association and of giving up the scientific ghost completely.[1] Encouragement, however, continued from abroad - particularly through John Douglas (1828-1904), emigration agent and agent-general in London (1869-70) - and from W.B. Clarke in Sydney.[2] The 'viscissitudes' of the Philosophical Society were compared with those of 'the early days of a similar institution in New South Wales'.[3]

The most demoralising experiences for the members came from the constant rebuffs dealt by government and by the public's apathy. An appeal published by the society from George Rolleston, professor of anatomy and physiology at Oxford, for 'some additional data as to the vexed question of the affinity of the Australian or his non-affinity with the Papuan stock' and for other scientific 'Desiderata from Queensland' met with little response.[4] Even the benign influence of W.H. Walsh as minister for lands and public works (1870-73) could not stay government's demand that all the mineralogical and geological specimens presented to the society by Aplin and Daintree must be handed over for a new geological museum at Parliament House.[5] The same year the colonial secretary, H. Massie, at first refused to assist the society in sending an observer on the Eclipse Expedition to Cape York after Ellery had written from Victoria proposing Queensland's active participation.[6]

---

[1]Presidential Address, 13 January 1870 and Trans. Phil. Soc. Qld, I. Cockle cheerfully admitted that he would have preferred to hand over his responsibilities to Coxen.

[2]Minute Book, 17 February; 14 April; 14 July and 21 July 1870.

[3]Letter from Phil. Soc. Qld to Douglas, 26 November 1870, Minute Book and Presidential Address, 25 January 1872, Trans. Phil. Soc. Qld, I.

[4]Minute Book, 21 July and 15 December 1870.

[5]Ibid., 6 July, 8 August and 7 September 1871. Aplin was given charge of the museum.

[6]Ellery to Phil. Soc. Qld, 22 April 1871 and Massie to Phil. Soc. Qld, 22 May 1871, Minute Book, 11 May and 1 June 1871.

Some months later the decision was reversed, but Diggles went as government representative and not as the nominee of the Philosophical Society.[1]

Diggles was perhaps the most embittered of the society's members about government's neglect of science in Queensland. His own 'outstanding publication' The Ornithology of Australia (21 parts, 1865-70) - a work on which he 'had expended years of labour' - although completed, still lay two-thirds unpublished in 1876. Diggles complained bitterly to the society about it:

> By dint of perseverance, borrowing specimens from collectors and museums and every available quarter I have at length possessed myself of a mass of material second only to the work of Mr John Gould. With few unimportant exceptions, scarcely amounting to a dozen, the whole of the birds of Australia have passed through my hands.[2]

Diggles, whose own funds were exhausted by his scientific work, was ill-rewarded by government for his diligent promotion of entomology and ornithology. An ardent protectionist, supporter of the Museum and active scientific correspondent, he worried himself to an earlier grave, especially over the official neglect of his 'good synopsis of the avi-fauna of this continent'.[3] The naturalists of the Philosophical Society, who carried off one notable victory with the foundation of the Queensland Museum, were also deeply disappointed by government's refusal to support a systematic survey of the rich fossil remains in Queensland.[4]

---

[1] Diggles read his report on the expedition to the society on 22 February 1872, Trans. Phil. Soc. Qld, I.

[2] Minute Book, 4 August 1876.

[3] Ibid., 4 August and 7 September 1876. The Philosophical Society offered its moral support but that availed nothing with government. For Diggles's work see also E.N. Marks, 'Silvester Diggles - a Queensland naturalist one hundred years ago', and 'Notes on Diggles "Ornithology of Australia"', Qld Naturalist, 17 (1963), pp.15-25 and (1965), pp.99-102. The original plates and MSS of Ornithology of Australia are in Mitchell Library. Four of the nine papers in Trans. Phil. Soc. Qld, II, were by Diggles on ornithology.

[4] See George Bennett junior's paper 'Notes on rambles in search of fossil remains on the Darling Downs', Trans. Phil. Soc. Qld, II, and the discussion, Minute Book, 10 December 1875. Bennett was the son of Dr George Bennett of Sydney.

Necessary and commendable though the efforts of the naturalists, Bennett, Coxen, Diggles and others were in preventing the complete collapse of the Philosophical Society during the 1870's, there was nevertheless an underlying sense of frustration that more should have been emanating from the society to convince government that it was a horse worth backing. Some members recalled the earlier lively sanitary debates as an example of real vitality. The appointment of a government analyst, K.T. Staiger, and the employment in 1875 of Frederick Manson Bailey (1827-1915) - colonial botanist from 1881 to 1915 - by the Board investigating diseases in plants and livestock were unmistakable indications of how favourably the authorities viewed practical science.[1] The publication of Bailey's Handbook to the Ferns of Queensland (1874), as Hermann Schmidt pointedly told the Philosophical Society, was tangible evidence of progress. Clearly Bernays and the Acclimatisation Society were now more prominent in the government favour and the public eye than the older society could hope to be under its present management.

A move by B. L. Barnett to adopt 'some system...to make the society's labours more practically useful' proved abortive in 1871[2] but, four years later, 'the majority of members' took up arms, concluding with tardy self-righteousness, that 'the little interest taken in the Society by Sir Jas Cockle as President...was inimical' to its well-being. In March 1875 the secretary, Donald Cameron (1838-1916), a prominent educationist, and Bancroft were deputed to flush out Cockle and 'ascertain whether, if elected President for the next term, he would fulfil the duties of the station'.[3]

---

[1]Bailey, later a prominent leader of Queensland science, became keeper of the Herbarium attached to the Museum in 1874. He came to Brisbane in 1861 as a nurseryman and exporter of plants after experience in South Australia and New Zealand. His father, John (1800-64), was colonial botanist in South Australia (1839-41). See A.D.B., III, pp.73-4 and the articles therein cited.

[2]Minute Book, 28 September 1871.

[3]Annual Meeting, Minute Book, 11 March 1875. For Cameron see A.D.B., IV, pp.337-8.

But, when even that plan failed to draw Cockle and no action ensued to revitalise the association, Thomas Harlin of the Brisbane Grammar School, the vice-president, was hard put to stave off moves to increase the 'Sociability of the Society' by instituting a regular round of meetings in members' houses, where science would have fallen easy prey to socialising.[1]

Harlin and Bancroft, whose joint task it became to suggest ways of improving the Philosophical Society's image and mode of working, were powerless to prevent a close-down for five months in 1875.

Increasingly during the seventies Joseph Bancroft, at times highly sceptical of non-utilitarian science, found himself cast in the role of leader and principal mediator in the society's domestic affairs and in its dealings with government.[2] Coxen's death in 1876 and Cockle's departure in 1878 confirmed the position which, despite a certain personal reticence, Bancroft's status as the leading medical and experimental scientist in Queensland could no longer deny him within the ailing Philosophical Society.

Following a sound medical training in Manchester,[3] Bancroft furthered his deep interest in experimentation and careful scientific observations as a member and later president of the Nottingham Naturalists' Society before migrating to Brisbane in 1864. Entry into the scientific life of Brisbane followed naturally, and he joined the Philosophical Society in 1866, and the following year became visiting and then resident surgeon (1868-70) at the Brisbane Hospital. In the tradition of a Gunn, Mueller or W.B. Clarke, Bancroft identified himself fully with colonial science.

---

[1]Minute Book, 20 May 1875. One paper by Harlin's colleague, Hermann Schmidt, 'Botany in Schools', made some useful suggestions on teaching science in schools. Although members found good reason to question certain of Schmidt's botanical observations, his plan for a society to collect plants around Brisbane aroused some support and useful discussion on the place of informal science in Brisbane society.

[2]He was, for instance, one of the delegates sent occasionally to Cockle to prompt him into action, and was usually prominent in scientific deputations to government, especially concerning the museum.

[3]Bancroft graduated M.D. from St. Andrews in 1859.

He was, as one medical contemporary wrote, 'just the man for a new country.[1]

With an astute experimental and analytical mind untrammelled by theory, Bancroft brought a much-needed dimension to Queensland's science. He represented 'in the highest degree the combination of observant field naturalist and critical experimental biologist'.[2] He was at once the antithesis and complement to Cockle as a practitioner and organiser of science.[3] Bancroft was at first naturally reluctant to usurp Cockle's role of formal leadership in the 1860's and, even much later, when only reputation kept the mathematician in the presidential chair, Bancroft preferred to discharge his obligations to the society more as an experimentalist. His first papers on the tick, sheep scab, snake poisoning and coccus insects demonstrated the practical local use to which he turned his talents.[4] During the 1870's however, he acquired both a colonial and international reputation as a sanitarian, parasitologist, pharmacologist and leprologist and became particularly well-known for his work on native plants - especially on pituri in conjunction with Mueller[5] - and on the filariasis worm.[6] He also carried out successful experiments on cereal and fruit hybridization and on preserving meats. During a visit to Europe in 1877-8 Bancroft lectured

---

[1]Robert Scot Skirving, quoted in E. Ford, 'The Life and Influence of Joseph Bancroft, M.D.', *M.J.A.* II (1961), pp.153-70. Ford's is the most complete of the several accounts on Bancroft.

[2]Marks, *Proc. Roy. Soc. Qld*. LXXI (1959), p.23.

[3]For short studies of Bancroft the experimentalist see Ford, op. cit., pp.155-63 and E.H. Derrick, 'The Bancroft Oration: the spirit of the researcher', *M.J.A.*, II (1948), pp.621-7.

[4]*Trans. Phil. Soc. Qld*, I. Read 1866-9. Bancroft attributed scab to a parasitic insect and suggested in 1867 that 'many contagious diseases have a spontaneous origin, or what appears to be spontaneous to our present knowledge, but, in the case of scab, the fact holds good, *omne vivum ex ovo*'.

[5]Important papers on pituri (*Duboisia hopwoodii*) were read before the Philosophical Society in 1872, 1877 and 1879.

[6]This, perhaps his most important work, was reported by Thomas Spencer Cobbold (1828-86), the English parasitologist, in the *Lancet* in July 1877, when the name *Filaria bancroftii* was suggested. See Ford, *M.J.A.* II (1948), pp.157-9 and bibliography.

and reported widely to leading scientists on his researches, which had attracted much attention beyond Australia. In his work on leprosy Bancroft generously paid tribute to the careful recording of his predecessor, Barton, at the Brisbane Hospital.[1]

Bancroft's attendance at meetings of the Philosophical Society, even in its leanest years, were consistent. His reluctance to take a more open part in organisation may have stemmed in part from the failure in 1871 - largely for the usual reasons of medical ethics - of Queensland's first medical society, of which he had been secretary.[2] In 1876, when Gregory, James Thorpe, the amateur meteorologist, Waugh and Staiger - for whose work as a pharmaceutical chemist and analyst Bancroft had a high regard - showed some determination to make the Philosophical Society more active in practical research and experimentation they found a willing ally in Bancroft.

A paper by Thorpe, the society's secretary (1874-7), calling for a greater Queensland commitment to meteorology,[3] prompted Bancroft to recommend that the society should try to persuade the Postmaster-General, Charles Mein (1841-90), to seek advice from the Sydney Observatory on the establishment of astronomical and improved meteorological facilities in the colony. An observatory lobby within the society soon began to press for the purchase 'for the public service' of Captain H. O'Reilly's small private local observatory and the appointment of 'a competent head' to obtain the 'official true time daily' for Brisbane.[4] Such measures it was argued, would serve to bring Queensland in line with 'its sister colonies'.

---

[1]See Bancroft's review of his own papers to the Philosophical Society in Proc. Roy. Soc. Qld, II (1885), pp.67-71.

[2]Ford, op. cit., p.168. Another unsuccessful attempt was made to form a medical society in 1882 but the enduring Medical Society of Queensland was not formed (with Bancroft as president) until 1886.

[3]J. Thorpe, 'A Plea for Meteorlogical Stations', Minute Book, 6 October 1876.

[4]Ibid., 30 November 1876 and 4 January 1877. Thorpe was appointed to report on O'Reilly's instruments which included two clocks (sidereal and meantime), a transit and an equatorial telescope. See also Annual Report for 1876 in Trans. Phil. Soc. Qld, II.

The Philosophical Society's deputation to government received the promise of better meteorological facilities but no hope for an official astronomical observatory.[1]

The prospects for some revival in the physical sciences attracted Cockle to deliver his last presidential address in January 1877, in which he showed that his familiarity with overseas science had in no way diminished. He was, for instance, in correspondence with Cambridge scientists concerning the atomic theory and his own work on fluids.[2] Demonstrating his breadth of interests at the moment of revival, Bancroft described his recent researches into the 'mammary glands' of the echidna and underwrote his belief that the Philosophical Society, 'being on the spot' had more opportunities of solving the question of the mode of generation among the monotremata 'than savants at home and on the Continent could possibly have'.[3] It was a timely reminder from Bancroft to the naturalists that they still had important problems to resolve.

While Bancroft was abroad in 1877-8 the revival in the society continued, and in June 1878 Cockle was honourably farewelled with a conversazione at which the microphone, telephone and electric light were demonstrated.[4] After Cockle's departure Gregory became president and Pettigrew suggested a new scheme to broaden the society's influence and increase interest by devoting each alternate meeting to one 'definite subject' chosen from a wide range of scientific interests, including astronomy, botany, geology, meteorology and climatology, forestry conservation and sanitary science. But these proposals met with immediate opposition from Waugh, who complained that their affairs would sink to the level of a mere debating society, and from Gregory and the new vice-president, William Nisbet, Queensland's engineer of harbours and rivers, who both

---

[1]Minute Book, 11 July 1878. Report for the years 1877-8.

[2]Presidential Address, 25 January 1877. Trans. Phil. Soc. Qld, II. Cockle's earlier paper on hydrostatics had attracted immediate attention overseas. As a clear concession to Cockle the Society elected Rev Robert Harley, F.R.S. of Middlesex and Dr John Cockle of West Mousley, Surrey, as the first corresponding members. Castlenau was also elected the same year.

[3]Minute Book, 1 March 1877. See Bancroft's later report 'On the mode of birth of the Kangaroo, communicated by the Hon. L. Hope, with remarks on the Echidna and Platypus', Trans. Phil. Soc. Qld, III. Read 22 June 1882.

[4]Minute Book, 26 June 1878.

favoured deferring scientific discussion of papers until later meetings.[1] In a lively debate on the future and facilities of the society Gregory reminded the members that they now had to contend with an Institute of Surveyors in Brisbane and that rivalry and duplication of effort were undesirable.[2]

Between August and October 1878 the society conducted its controversial debate on Gregory's water-supply scheme, in which Mein, Nisbet and others took issue over the president's recommendations. In November 1878 Bancroft, Staiger and Waugh summoned a special meeting to receive Rev Julian Tenison-Woods and listen to his censure on the state of science in Queensland. The Queensland Philosophical Society, Woods observed, 'was not taking its proper position and was to a certain extent in the shade'.[3] In a perceptive exposé of the state of science in the Australian colonies, Woods stated that in his opinion the initiative now lay once more with scientific reformers like Archibald Liversidge and the Linnean Society of New South Wales in Sydney.

'Scientific people want publication promptly', Woods told an association which had erred greatly in this regard, 'otherwise they may find priority of mention or discovery given to others'. The Philosophical Society of Queensland would only achieve permanent success by getting a government grant; drawing up a new and workable set of rules; increasing the financial, corresponding and honorary membership - preferably from among 'the writing men' of the other colonies - and by publishing regular Transactions to

---

[1]Ibid., 11 July 1878. The ensuing month the Society agreed to the following subject areas for regular discussions:- a) astronomy, meteorology, physics, mathematics and mechanics; b) chemistry, mineralogy and their applications to the arts and agriculture; c) geology and palaeontology; d) botany and zoology, including entomology and microscopical science; e) geography and ethnology and f) medical, social, sanitary and statistical subjects.

[2]Waugh sparked off an animated discussion on the society's neglected books which Nisbet suggested government might use as the basis of 'a first class technical library for Brisbane'. Ibid.

[3]Minute Book, 25 November 1878. Only eight members attended the meeting.

encourage research and correspondence.[1] Nisbet heartily agreed with their visitor's strictures on the society and ventured to suggest that it was now a disgrace to Queensland's science. Even the library, Woods pointed out, was of 'no value to the student'. Bancroft, Gregory, Nisbet, Thorpe and Waugh were appointed to act immediately on Woods's suggestions.

The committee took four months to present any proposals for reform, and even then the only new measure provisionally accepted was a change of name to the Royal Society of Queensland![2] By June 1879, when the members met to discuss what support they might give to the forthcoming Social Science Congress in Melbourne, no firm action was pending concerning either reforms or a change of name.[3] During 1879-80 efforts to establish sectional meetings failed, even after a second visit from Woods to lecture on the geology of North Queensland, where Robert Logan Jack (1845-1921) had been appointed geological surveyor in 1876.[4] Woods, indeed, exercised a considerable influence on science in Brisbane at this time, for it was on his recommendation in 1882 that Charles Walter De Vis (1829-1915), a prolific zoological and palaeontological writer, was appointed curator at the Queensland Museum in succession to William Aitcheson Haswell (1854-1925), the well-qualified and promising young Edinburgh-trained natural scientist who left Brisbane for Sydney at the end of 1880 after less than a year in

---

[1]The present uncertain irregular publication of the Society, Woods observed, was 'not of such a practical character as might be'. Ibid.

[2]Minute Book, 13 March 1879. The society rejected a suggestion to introduce associate membership.

[3]Ibid., 5 June 1879. By the end of 1879 only the new rules had been drawn up. Under these Diggles and F.M. Bailey were considered for election as honorary corresponding members in 1880.

[4]Woods, 'Geology of Northern Queensland', <u>Trans. Phil. Soc. Qld</u>, III. Read 20 December 1880. Jack was appointed Queensland government geologist in 1879 and served until 1899. He collaborated with Robert Etheridge on the publication of <u>The Geology and Palaeontology of Queensland</u> (3 vols, Brisbane 1892) and made fundamental and important contributions to the understanding of Queensland structures and mineral deposits. See <u>A.D.B.</u>, IV, p.466.

Queensland.[1]

During two years of organisational uncertainty, 1879-81, it fell to Bancroft, Bailey and Thorpe to keep the cause of scientific research alive,[2] while Bancroft, Pettigrew, Nisbet, Thorpe and Waugh strove gamely to try and resolve the organisational inertia. In 1881-2 the society suffered the loss of its permanent meeting rooms when the old Museum building was demolished and members had to rely upon the good offices of De Vis for storage and meeting facilities.[3] After the election of Bancroft as president in June 1882 few formal activities took place until the following May, when opinion was canvassed about the possibility of disbanding and forming a new society.[4]

In August 1883 Bancroft frankly conceded that the society's work was finished and that because of widespread objections to the term 'philosophical' they reconvene as a naturalists' society. William Pettigrew was a lone dissenting voice at the meeting which approved the change in the Philosophical Society's name to the Natural History Society of Queensland.[5]

Within a month the new-styled association was dead. On 20 September 1883 Gregory chaired a well-attended, separately convened, meeting at the Queensland Museum at which Bancroft, De Vis and Henry Tryon (1856-1943), assistant at the Museum, and three others were deputed to draw up rules for a Royal Society of Queensland 'for the furtherance of Natural Science and its application'.[6] Following negotiations between representatives of the

---

[1]De Vis, a graduate of Cambridge, had formerly been curator of the Queen's Museum, Rochdale, Lancs, and librarian at the Rockhampton School of Arts. Before going to Brisbane he published on Queensland geology and ornithology. See A.D.B., IV, pp.63-4. For Haswell's career see H.J. Cambage's 'Memorial Notice', Proc. Linn. Soc. N.S.W., LIII (1928), pp.485-98. Woods himself had lived for a year in Brisbane in 1873.

[2]With papers on the pituri group of plants, solanums and Brisbane's meteorology. See Trans. Phil. Soc. Qld, III.

[3]Minute Book, 1 June 1882, secretary's memorandum.

[4]Ibid., 17 May 1883.

[5]Minute Book, 23 August 1883.

[6]Minute Book (1883-97), Roy. Soc. Queensland, vol. I, 20 September and 11 October 1883 and Courier and Telegraph 21 September 1883. See also 'Rules' and Inaugural Address by Gregory in Proc. Roy. Soc. Qld, I, part one (1884), pp.viii-xi and 3-7.

new Royal and former Philosophical Societies, agreement was swiftly reached to transfer the latter's assets to the Royal Society in October 1883, and the following month the Royal Society elected its first officers with Gregory as president and Bancroft as vice-president.[1]

Bancroft wisely terminated the existence of the Queensland Philosophical Society in 1883 when it had outrun its usefulness. The Royal Society of Queensland perpetuated the natural history and other traditions of the older association during the eighties and nineties with unparalleled vigour and productivity. Able to draw on a broader basis of active and mostly younger scientific talent, which included Bailey, Bancroft and his son, Thomas Lane (1860-1933), De Vis, Jack, John Shirley (1849-1922), inspector of schools from 1879, and Tryon - who became government entomologist in 1894 - the Royal Society reaped the benefit of the Philosophical Society's patient sowing and lobbying for improved facilities in science during twenty years of governmental parsimony. Beyond that the Royal Society also attracted workers like Bernays and Rev Benedict Scortechini (d.1886) - 'a leading spirit in the formation' of the Royal Society of Queensland - who had both chosen to work productively outside the moribund Philosophical Society during the 1870's.[2]

The Royal Society of Queensland was built in the image of the Linnean Society of New South Wales whose activities many Queensland scientists supported. The Royal Society's success closer to home, although challenged by the Natural History Society of Queensland - formed in January 1892 with Tryon taking a prominent part[3] - and the Philosophical Society of North

---

[1]Minute Book, Queensland Philosophical Society, September-October 1883 and Minute Book, Roy. Soc. Queensland, vol. I, 26 November 1884. See also E. Marks, Proc. Roy. Soc. Qld, LXXI (1959), pp.28-30.

[2]Scortechini was in Queensland from 1871 and worked closely on its botany with Bailey and Mueller. He published with the Linnean Society of N.S.W. He went with Woods in 1884 to investigate the botany of the Straits Settlements where Woods studied the geology. See Tryon's obituary notice in Proc. Roy. Soc. Qld, IV (1887), pp.2-8.

[3]The society was started because of disenchantment with the Royal Society's Field Naturalists' Section (formed in October 1886). A Natural History Society was already operating in Rockhampton. See Minute Book (1892-96), Nat. Hist. Soc. Qld, January 1892, MS OM 68-15, Oxley Library, Brisbane.

Queensland - founded in the late 1880's - depended upon those reforms Woods had outlined in 1878: a regular journal with contributions from every quarter and a more liberal fiscal attitude towards science from government through the opportunities afforded to full-time scientists in its employ.[1]

These scientists, following Bancroft's lead, were soon called upon to play their active part in the federation of science in Australia. In the eighties and nineties Queensland science, lacking all the advantages of either Victorian science - which had been for so long the ideal goal to which to aspire - or the reforms and expansion of science in New South Wales, lacking even the consistent scientific support of a governor or ally in government, contributed to Australian science the strengths of its medical men, natural historians, acclimatisers and geologists, disciplines in which its scientists were prominent. Being the first truly 'colonial' outreach of Australia's oldest scientific centre, Sydney, Queensland, unlike Victoria - where scientific expansion had been rapidly and artifically induced by gold - had perforce to pass slowly and painfully through the frontier, 'phase-one', factgathering stage of scientific development before emerging to assume its place in the intercolonial science organisations of the late 1880's and 1890's.

Reviewing the problems facing science in Queensland in 1885, Bancroft, the Royal Society of Queensland's second president, did full justice to the colony's founders of science. Their independent critical spirit, he maintained, must be kept alive: criticism of pollution - 'we see tanneries and felmongeries pouring their filthy water direct into what were some years ago lovely streams' - their attacks on disease and contagion; their discontent over inadequate scientific legislation, education and public utilities and their singular devotion to examining the properties of Australian plants and animals both as sources for drugs and food supplies as well as for determining their intrinsic place in taxonomy and evolution.

---

[1]E.g. Bailey, De Vis, Jack, Shirley and Clement Lindley Wragge (1852-1922), government meteorologist from 1887 to 1903.

To achieve all these goals Queensland's scientists needed one more institution:

> As our education improves so may we expect our water supply. We can wash and then be clean; and to a better education a teaching university is necessary; where the arts and sciences of civilisation may have a home.... [A university] under the eye of Parliament would not languish for want of the needful pecuniary support.... The Botanic Gardens [provide] room... for all needful adjuncts in zoology and botany, for the building of aquaria, for the study of mining, engineering, and mechanics. Given education all things are possible....[1]

In Victoria and New South Wales, to which the best of Queensland's scientists still had to look, all these things were coming to pass. In Queensland, although anticipated in scientific societies and meetings, they had to await the expansion of another thirty years.

---

[1]Presidential Address, 24 July 1885, Proc. Roy. Soc. Qld, II (1886), pp.67-76. The model was clearly Victoria. De Vis and Saville-Kent returned to the theme of universities and biological stations in later presidential addresses. See Elizabeth Marks, Proc. Roy. Soc. Qld, LXXI (1959), p.41.

To achieve all these goals Queensland's scientists needed one more institution:

> As our education improves so may we expect our water supply. We can wash and then be clean; and to a better education a teaching university is necessary; where the arts and sciences of civilisation may have a home.... [A university] under the eye of Parliament would not languish for want of the needful pecuniary support.... The Botanic Gardens [provide] room... for all needful adjuncts in zoology and botany, for the building of aquaria, for the study of mining, engineering, and mechanics. Given education all things are possible....[1]

In Victoria and New South Wales, to which the best of Queensland's scientists still had to look, all these things were coming to pass. In Queensland, although anticipated in scientific societies and meetings, they had to await the expansion of another thirty years.

---

[1]Presidential Address, 24 July 1885, Proc. Roy. Soc. Qld, II (1886), pp.67-76. The model was clearly Victoria. De Vis and Saville-Kent returned to the theme of universities and biological stations in later presidential addresses. See Elizabeth Marks, Proc. Roy. Soc. Qld, LXXI (1959), p.41.

CHAPTER VIII

TOWARDS A FEDERATED SCIENCE

The spirit of scientific reform and co-operation engendered by Denison in Australia in the 1850's marked an important step towards the ideal of a more formalised intercolonial association in science, an ideal which men of science had come close to realising in Franklin's Tasmanian Society and the Tasmanian Journal in the 1840's. At the more informal level of scientific correspondence a lively exchange and dissemination of information had long existed between the colonies and Europe, and among the colonies themselves. Antipodean workers of any standing usually found British and European journals willing to publish their reports, notices and findings respecting peculiarly Australasian themes in geography, geology, natural history, medicine and the wider subjects of southern astronomy, terrestial magnetism, climate and meteorology. Within Australia itself, as we have seen for New South Wales and Tasmania in the 1840's, and particularly for Victoria and Queensland in the fifties, sixties and seventies, scientists and scientific associations increasingly turned their attention to problems of agriculture, drainage, water-supply, sewerage, irrigation, mining technology and other calls which the advances of civilisation, primary and secondary industry and commerce made in those respective colonies. As long as the numbers engaged either full-time or as amateurs in science remained relatively small it proved difficult to sustain even the most widely-based of philosophical societies. However, greater specialisation, incipient professionalism, improved communications, the continued popularity of international and colonial exhibitions, advancing technology and the increasing needs to provide continent-wide coordinated responses to such disparate problems as disease control; sanitation and quarantine; weather prediction; eclipses; time-keeping and longitude measurement, provided scientists with the opportunities to be among the first in Australia to combine their efforts successfully on a federal basis.

The more traditional external influences on colonial science also contributed to this movement towards federation. Apart from Denison's initial promotion of the idea of a Flora Australiensis, the visit of H.M.S. Challenger in 1874 undoubtedly did much to rekindle a lively wider and more popular and serious interest in Australian natural history - particularly in marine zoology and biology - and led to the founding of the important Linnean Society of New South Wales.[1] The following year, addressing the Biological Section of the British Association, P.L. Sclater, the eminent British zoologist, stated:

> That we know more of the fauna of Australia than of other English colonies in other parts of the world is certain.[2]

The interest in Australian natural phenomena culminated in the important discoveries on the monotremata made by the visiting Cambridge embryologist Richard Hay Caldwell in 1883-4. By the eighties association for scientific purposes was part of a popular movement, one corollary of which was an aspiration for more formal intercolonial organisations, particularly in anthropology, geography, geology, meteorology, natural history and the more general approach to science represented in the Australasian Association for the Advancement of Science (A.A.A.S.) formed in 1886-7.

The principal architect in this successful movement to federate science in Australia was Professor Archibald Liversidge (1847-1927) of Sydney University, who strove during the 1870's and 1880's to build within the Royal Society of New South Wales a respectable base from which to prosecute his plans. Liversidge combined high professional standards in chemistry, geology and mineralogy with a great organisational acumen and ability to interpret the popular mood supporting science on the grounds of economic, political and 'national' expediency. Liversidge was to receive necessary backing in the other colonies from men of similar abilities and vision like Bancroft, Ellery, Mueller, Russell and Tate.

---

[1] D. Branagan, 'The Challenger Expedition and Australian Science', Proc. Roy. Soc. Edinburgh, 73, No.10 (1971-2), pp.85-95.

[2] Quoted in Ralph Tate's Anniversary Address to the Philosophical Society of Adelaide, October 1878, Trans. & Proc. Phil. Soc. Adelaide, 1 (1878), p.13.

Denison's Philosophical Society of New South Wales and the Australian Horticultural and Agricultural Society, which he reorganised and led at the same period, soon promised those opportunities for science and improvement for which reformers in New South Wales had fought so long before 1856. The Sydney Magazine of Science and Art (commenced in 1857) was launched expressly to provide outlets for both societies' transactions.[1]

The Philosophical Society of New South Wales was active from May 1856 until October 1865, during which period ninety-one papers were presented. Of these thirty-one dealt with utilities -transport, communications, sanitation and public works - and eleven with physical and chemical problems, including analyses.[2] Nine papers in astronomy and five in meteorology expressed the interest taken by Scott, Tebbutt and Jevons in the society's affairs, and mathematics and statistics (eight papers) were also reasonably well represented. By comparison with the work of earlier philosophical societies in the other colonies the Philosophical Society of New South Wales took little interest in natural history. In zoological and related areas only eight papers were read and even geology (four) and botany (two) were poorly represented.[3] The Australian Museum and the Sydney Botanic Gardens did, of course, attract a number of workers whose efforts might otherwise have been confined solely to the Philosophical Society, although both Moore and Krefft played a prominent part in the society's affairs, whereas the Macleay circle, by and large, did not.

---

[1] 'Preface', Syd. Mag. Sci. & Art, I (1857-8). The Australian Floral and Horticultural Society (1836-48) had ceded place to the Australasian Botanic and Horticultural Society in 1848, uniting in December 1856 with the Horticultural Improvement Society of New South Wales to form the Australian Horticultural and Agricultural Society. See Maiden, 'Contributions to a history of the Royal Society of New South Wales', Journn. & Proc. Roy. Soc. N.S.W., LII (1918), pp.228-52.

[2] Minute Book (1856-65), Philosophical Society of N.S.W., in Library of Roy. Soc. of N.S.W., Sydney.

[3] Other groupings of papers included medicine (three); microscopy (three); resources (three); exploration and anthropology (one each) and a miscellaneous group including papers on philosophy.

Interest in such problems as public health, water-supply and water contamination was no less intense among the members of the Philosophical Society of New South Wales than in Victoria and Queensland in the fifties and sixties. Granted the opportunity, activists like Isaac Aaron (1840-77) - the radical medical practitioner appointed health officer by Sydney City Council in April 1857[1] - Bland and Charles Rolleston, the registrar-general, pressed home long-standing appeals for improved sanitary conditions and legislation.[2] John Smith, professor of chemistry at Sydney University, was called upon to investigate problems of lead poisoning, and, after making his own careful analyses and experiments, suggested adopting filtration of water through sand as successfully tried by Professor Thomas Clark (1801-67) of Aberdeen.[3] Bland, with characteristic candour, reminded medical men, scientists and legislators that proper internal sanitary arrangements were more important than quarantine measures. After 1859, when the chemist Carl Adolph Leibius (1833-93), a former assistant to A.W. Hofmann in London, joined the society, Jevons, Smith and others with a deeper interest in chemical problems - particularly the analyses of gold and food - found an active ally, who in time became a respected, long-standing office-bearer in the Philosophical and Royal Societies of New South Wales.[4]

---

[1] Aaron had had extensive experience of disease and sanitation in England. From August 1846 to December 1847 he edited the Australian Medical Journal and was trenchantly critical of medical practices in Sydney. He helped revive the Philosophical Society in 1856 and was sometime secretary of the Australian Medical Association (1858-69) and editor of the N.S.W. Medical Gazette (1870-5). See A.D.B., I, p.1.

[2] A sanitary committee was formed on December 1856 'to collect, as far as is practicable, information as to the social economics and statistics of Sydney'. Minute Book, 10 December 1856. See Aaron's, Bland's and Rolleston's papers in Syd. Mag. Sci. & Art, I, pp.37-43; 55-8; 193-9. Rolleston published regular statistics on the 'Health of Sydney'.

[3] 'On the action of Sydney water upon lead', ibid., pp.104-6. Denison later instructed the City Engineer, E. Bell, to bore holes in the sand of the Lachlan Swamp (Sydney's main water supply hitherto) to determine the rates of filtration of water through sand. See Syd. Mag. Sci. & Art, II, pp.73-4.

[4] He was joint secretary (1875-86) and president (1890-1) of the Royal Society. For his grasp of developments in colonial science see his Anniversary Address, 6 May 1891, Journ. & Proc. Roy. Soc. N.S.W., XXV (1891), pp.1-46.

Leibius, assistant and later senior assayer at the Royal Mint, was typical of the young men who rallied to the cause of science at Denison's behest and supported his reforms. Indeed such men were the epitome of those reforms. Denison's own initial papers on railroads for the colony started a protracted, controversial debate on gauges, economics, sources of motive power and other aspects of railway and communications policy, with Frederick Peppercorne, a civil engineer of Richmond River, strongly advocating horse-drawn traction and Professor Morris Pell of Sydney University arguing passionately - and largely for reasons of political economy - that railways would retard colonial development.[1] The Sydney Magazine, inviting debate and correspondence, was soon reporting on an amazing variety of colonial innovations and inventions in such areas as agriculture and meteorology and in the proving and testing of colonial resources, especially timber and iron.[2]

With such practical fare the Philosophical Society and Denison's other scientific associations prospered as no others had before in New South Wales. In 1856 the Philosophical Society had nearly 180 members and horticultural and agricultural societies, encouraged by the higher scientific output of the parent body in Sydney, became active in Cumberland, Argyle and the Illawarra. When interest wavered for a moment or government proved less generous than anticipated, Denison and his associates appealed to the example of 'our...far more liberal...neighbours...in Victoria' and to the leadership of South Australia in mechanical invention. Some colonial scientists, agriculturalists and improvers were inclined to turn, indeed,

---

[1]See Syd. Mag. Sci. & Art, I, pp.9-13; 62-9; 75-6; 78-83; 124-30 and 139-40. The Magazine published its own ideas on a patent suspended horse-drawn railway for cheap internal communication.

[2]See e.g. Jevons, 'On a Sun-Gauge, or New Actinometer'; J.H. Thomas, 'The Iron-making Resources of New South Wales'; reports on Lewis Markham's reaping machine and husbandry experiments etc. and on experiments on colonial timbers made at the Mint under the supervision of Ward and Trickett, Syd. Mag., I, pp.58-62; 101-04; 147-52 and 258-63. John Wheatley Giles, after exhibiting his model prototype of a steam plough in N.S.W., left for Europe 'carrying ...influential letters of recommendation from leading scientific men' for his patent, ibid., pp.266-9.

to the North American journals and experiences for inspiration to solve their own problems.[1] 'An examination of the course of study pursued in the educational establishments of America' showed, for instance, that 'the physical sciences take a much higher rank than in our own universities and schools'. New South Welshmen should regret, complained one Sydney Magazine editorial, 'the immense amount of time and energy that is spent on classical studies' and appoint lecturers in agriculture, botany, geology, mineralogy and 'the Mechanical Sciences, including the Steam Engine, and all possible combinations of constructive mechanism' to their own University.[2]

Premature though this advice was Sydney University proved nevertheless to be one institution which provided a reservoir of leadership for colonial scientific associations and further reforms in the seventies and eighties.[3]

'By 1855', writes J. Gentilli, 'an autonomous Australian outlook had already evolved' among the colonies' climatological and meteorological workers, 'a new vitality was stirring the colonists, a new sense of responsibility prevailed in every field of activity.'[4] Arriving in New South Wales in November 1856, Denison's new government astronomer, William Scott, soon joined the Philosophical Society and became a councillor in May 1857. In October 1857 he presented his first paper, a review of

---

[1]See e.g. W.G. Pennington's paper on financing railways and reports on the receipt of American journals, Syd. Mag. Sci. & Art, I, pp.75-6 and 226, and for reports on Canadian experiments with the telegraph in weather prediction and on stamping machines in U.S.A., ibid., II, pp.16 and 42-3.

[2]Ibid., I, pp.119-20.

[3]The Sydney Magazine later returned to the question of reforms within the University when it suggested the establishment of a school of mines with a practical mining engineer at its head and professorships in geology and mineralogy. See Syd. Mag., II, pp.69-70. That was in 1858.

[4]'History of Meteorological and Climatological Studies in Australia', Univ. Studies in History, V, No.1 (1967), p.56.

meteorological facilities in New South Wales.[1] Scott set about establishing twelve meteorological stations in widely separated, topographically varied localities as part of a New South Wales network.[2] At the same time he supervised the building and equipping - albeit inadequately with the limited instruments available - of the Sydney Observatory for astronomy, timekeeping and meteorology.

In his first paper on meteorology before the Philosophical Society, Scott trod warily on ground where well-known workers like Clarke and now Jevons had shown the way. What he had already read, seen and discovered impressed Scott:

> In the first place let me congratulate this society, and the colony in general, on what I believe to be the fact, namely, that the important work of registering meteorological phenomena has been entered upon more systematically by the governments of this and the adjoining colony (Victoria) than by any of the governments of Europe.
>
> In other countries the work is being performed by individuals, by societies, in private houses, and in disconnected observatories; but in Australia it is a national undertaking; and not only so, but I am glad to be able to state of the Australian colonies, so far as my own limited observation can be relied on, that although they do not at present possess a very formidable army of philosophers, although from peculiar and well known courses (sic) they are somewhat in arrears in the education of their inhabitants, yet there does seem to exist, amongst a great number of those inhabitants, an intelligent desire for the promotion of science, far more than I have met amongst persons of the same class in England.[3]

After less than a year in Australia Scott was at considerable pains to advocate local experiments and, where necessary, the modification of

---

[1] 'On the Meteorology of New South Wales', Syd. Mag., I, pp.128-30 and Minute Book, 14 October 1857.

[2] Two stations were in Queensland (at Brisbane and Rockhampton) and others at Albury, Armidale, Bathurst, Casino, Cooma, Deniliquin, Goulburn, Parramatta and Sydney.

[3] Syd. Mag., I, p.129.

equipment for investigating local phenomena.[1]

Within a year of his arrival in 1854 Jevons, who joined the Philosophical Society in June 1856, had embarked upon the programmes of independent climatological research which Scott found so necessary. Two months after Scott's paper John Smith read Jevons's 'On clouds and their various formations, and producing causes' to the society in which he rejected inter alia the theory that electricity was an active agency in the production and modification of clouds.[2] Already well-known for his regular meteorological reports in the Sydney Magazine and Henry Parkes's Empire - for which he acted as meteorological observer - Jevons's views were widely and 'highly esteemed'. Great was the interest, therefore, when Scott, in a letter to the Sydney Magazine, challenged the originality of Jevons's ideas on clouds and pointed to the same findings by Kämtz and Schubler over twenty years earlier.[3] Replying logically and cogently to Scott's hasty criticism, Jevons, well-informed in the field, invited the government astronomer to read his paper more carefully before saddling him with a 'charge of plagiarism'.[4] Somewhat stunned by Jevons's 'seemingly angry letter' Scott hastened to reply, absolving himself from any desire to undermine Jevons's 'highly ingenious...perfectly original' investigations and pleading for a laying aside of 'personal feelings altogether...in all discussions on scientific questions...[by giving] our opponents credit for good intentions and truthfulness'.[5]

---

[1]See e.g. his criticism of evaporation experiments in inland Australia and scepticism about the value of twelve Daniell's hygrometers despatched from England: 'these, I fear, will be of very little service to us, for when the air has been very dry, I have found it sometimes impossible, partly owing, perhaps, to the inferior quality of the aether, to obtain the deposit of dew on the bulb', ibid., p.130.

[2]Clouds, Jevons concluded, 'are solely determined by simple dynamical causes, or, in other words, by the motions occasioned by gravity among bodies of air differing in specific gravity', Syd. Mag. I, pp.163-76. For Jevons's meteorological and other work in Australia see 'Jevons in Sydney' in J.A. La Nauze, Political Economy in Australia (Melbourne, 1949), pp.26-44 and the 'Biographical Introduction' by Rosamond Könekamp in R.D. Collison Black and R. Könekamp (eds), Papers and Correspondence of William Stanley Jevons, vol. I (London, 1972), pp.1-52.

[3]Syd. Mag. I, p.264. Letter dated Observatory, Sydney, 3 May 1858.

[4]'Rev. Mr Scott's Criticisms', Jevons to Editor, 23 June 1858, ibid., II, p.17.

[5]Scott to Editor, 7 July 1858, ibid., p.35.

Reticent in open debate, Jevons nevertheless used his pen effectively to express strong views on social and economic issues in New South Wales, particularly on what he, like Pell, saw as the absurdity of developing a non-remunerative railway system.[1] Intensely interested like his fellow members in the Philosophical Society in the sanitary state of Sydney, Jevons brought the detached probing mind of the competent natural scientist and assayer to his highly original urban study of that city.[2]

Jevons's most significant contributions to scientific development in the antipodes were his long papers on the climate of Australasia published in 1859[3], 'the first integrated and comprehensive review of climatological knowledge for Australia and New Zealand'.[4] Jevons, with the same scientific interests as his friend W.B. Clarke - whose candidature for election to the Royal Society of London he later supported - restored the vision of continental co-operation in meteorology to the thinking of scientific workers in New South Wales at the very time when A.C. Gregory was suggesting the use of the telegraph for transmitting weather observations around Australia to the Philosophical Institute of Victoria.[5]

---

[1]La Nauze, op. cit., pp.31-3 and Papers and Correspondence, vol. I, pp.25-7.

[2]La Nauze, pp.30-7. Jevons's MSS on Australian cities were never published in full. His Australian writings are listed in full by La Nauze, pp.39-44 and a few additions are made in footnotes to his recently published Papers and Correspondence, op. cit., vol. I, and vol. II, ed. R.D. Collison Black (London, 1973).

[3]Principally 'Some data concerning the climate of Australia and New Zealand' in James Waugh's Australian Almanac for the Year 1859, pp.xv-xvi and 47-98 and 'Meteorological Observations in Australia', Syd. Mag., II, pp.161-7 and 173-81.

[4]Gentilli, 'History of Climatological and Meteorological Studies', pp.57-8. For further discussion of this important work see La Nauze, op. cit., pp.28-30 and Russell, 'Astronomical and Meteorological Workers', pp.74-5.

[5]'Some interesting facts founded on Barometrical Observations', letter, Gregory to Mueller, Sydney 15 December 1858, Proc. Phil. Inst. Vic., IV (1860), p.14 (includes graph of barometrical observations from Adelaide, Melbourne, Parramatta and Cape Moreton). See also Gentilli, op. cit., pp.56-7. Gregory's communication was read on 30 March 1859.

Finding his 'education...checked, and irretrievably deferred' by prolonging his stay in Sydney, Jevons resigned his lucrative, undemanding Mint post at the end of 1858. Despite his achievements in the colonies - 'Australia', the Sydney Magazine lamented, was to lose a 'laborious and unassuming yet most promising natural philosopher'[1] - Jevons, his formal education incomplete, rightly felt that 'a change of life from easy to hard and busy, from Sydney to London', would provide 'a better knowledge of the world both physical and human, the mixture upon which enlightened men and great objects' thrived[2] and upon which, when his education was formally completed at the feet of gifted and admired teachers like Augustus de Morgan, the mathematician, Jevons built a brilliant career in economics, logic and mathematics in London and Manchester.[3]

It seemed paradoxical, perhaps, that Jevons, a most successful scientific 'temporary sojourner', should not have found the intellectual stimulus he needed at the dawn of Denison's scientific reformation in Australia and New South Wales. But, as the Sydney Magazine sadly noted in March 1859, 'it is a frequent subject of remark in this colony that societies for the promotion of either science or art fail, after a very few months or years, to sustain the interest with which they commenced'.[4] Denison's societies, for all the leadership, experiments and encouragement he gave, succumbed slowly to the same fate after his departure at the end of 1860.[5]

---

[1] Syd. Mag., II, p.161. 'We fear', the Editor noted, 'that it will be long ere we shall find another observer so industrious, so talented, and so modest'.

[2] Jevons to Lucy Jevons, 9 July 1858, Papers and Correspondence, vol. II, pp.331-3.

[3] See Rosamond Könekamp, 'William Stanley Jevons (1835-1882): Some biographical notes', Manchester School, 30 (1962), pp.251-73.

[4] Syd. Mag., II, p.189.

[5] Ibid., pp.211-2. Annual Meeting of May 1859. The suggestion was Denison's.

The usual palliatives of conversaziones, practical demonstrations, exhibitions and the formation of sectional groupings for topics such as microscopy were, it is true, tried with some passing success within the Philosophical Society of New South Wales to try and stave off the decline, but long-term interest was barely maintained. The Sydney Magazine, a brave practical experiment, became unprofitable when the 'constant attention to business...characteristic of colonial life' proved 'very unfriendly to the development of a taste for science, literature and art'.[1] Even Scott, so hopeful at first but later frustrated for want of the necessary new equipment for his astronomical observations, had to rely on an old faulty transit instrument from Parramatta Observatory, and had little of value with which to observe Donati's comet in 1858. That embarrassment and the excellent widely acclaimed private astronomical work of the youthful John Tebbutt at his Windsor observatory - especially the discovery and description in May 1861 of the comet subsequently named after him - induced parliament to be more generous to the Sydney Observatory and equip it more substantially for Scott's successors, George Roberts Smalley and H.C. Russell, government astronomer from 1870.[2]

So long as Denison, the scientific 'leader in chief', remained in control of the Philosophical Society, former leaders of science in New South Wales like Clarke seemed reluctant to assume more than a token position of prominence. Clarke certainly played his scientific part along with Bland, Deas Thomson and others, but the Macleay circle gave the Philosophical Society no more than nodding approval.[3] With Denison's departure Clarke and Deas Thomson shared the leadership since the new governor, Sir John Young (later Lord Lisgar) (1807-76) and the Philosophical Society's president, was no organizer of science.

---

[1] Syd. Mag., II, p.iv.

[2] Russell, Sydney Observatory (Sydney, 1882), pp.5-9. Scott resigned in 1862 and Smalley, following some years of experience at the Cape, was appointed on the recommendation of Airey. Smalley introduced the long-awaited trigonometrical survey to N.S.W.

[3] William Macleay attended the occasional meeting e.g. on 4 July 1860, when he exhibited natural history specimens.

Under Denison the way was firmly pointed towards an intercolonial effort in science. The physical scientists, the astronomers, chemists, meteorologists and physicists, also came more into prominence and represented in their work one positive thrust towards closer intercolonial co-operation. Tebbutt, for instance, became a most active contributer to the Philosophical Society and with Scott, Smalley and Russell raised the status of the observatory sciences to a new level of efficiency in the parent colony. Denison's interests were, it is true, wide enough to embrace natural history and he was tireless in his efforts to secure the British scientific societies' and imperial and colonial governments' support for a 'Natural History of the British Colonies', for which 'competent persons' within each colony were to be employed at local expense to prepare and collate the work with the aid of British scientists, an idea which, in principle, had already received the support of the Hookers, Owen and other influential home figures.[1]

Just prior to leaving Sydney, Denison attended the popular zoological lectures of the new curator, Simon Rood Pittard, at the Australian Museum, where he applauded Owen's former pupil's stand against the 'hypotheses', the 'great mistake of Darwin & Co.'[2] But, following Pittard's early death from tuberculosis, the work at the Museum devolved on to the able shoulders of Gerard Krefft - assistant curator since June 1860 - who was formally appointed curator in May 1864 after considerable wrangling between the trustees and government over who was responsible for the curator's terms of appointment.[3] Krefft had little time for those of the trustees who used their position at the Museum to build up their own private collections and, fiercely independent and jealous for the Museum's scientific reputation - he was also an ardent Darwin supporter - was not prone to keep his opinions private. Pursuing a more vigorous and widely-acclaimed policy of scientific publication and research than any of his predecessors at the Museum, Krefft

---

[1]Denison to E. Bulwer Lytton, 20 June 1859 and Denison to Murchison, April 1860, Varieties of Vice-Regal Life, vol. I, pp.455-6 and 479. See also J.D. Hooker's memorandum of 14 May 1859, Miscellaneous Correspondence (MC.6.25), Roy. Soc. of London and Daley, 'History of Flora Australiensis', Vic. Naturalist, XLIV, No.3 (1927), pp.72-4. The visit of the Austrian Novara scientific expedition to Sydney in 1858 was a great boost to local natural history, particularly at the Australian Museum.

[2]Denison to Lady Charlotte Denison, Sydney, 5 November 1860, Varieties, pp.494-7.

[3]Whitley, 'History of the Australian Museum', Chapter VI, B.L., Canberra, and Etheridge, 'Fragments', Rec. Aust. Mus., XII, No.12 (1919), pp.387-9.

aroused the bitterness and resentment of many trustees, particularly those of the Macleay circle, to whose direction he refused to bend but whose opposition did not thwart the German's ten-year drive to make Australian-based zoological research known throughout the wider scientific world overseas.

On Denison's departure William John Macleay (1820-91), nephew of Alexander and most enlightened and generous of the Macleay scientific benefactors, became chairman of the Museum's Board of Trustees in 1861, setting the stage for what Fletcher describes as 'a most important... decade...in the annals of Australian Biology'.[1] It was a decade at the end of which, after the revival of old divisions, the scientific community in New South Wales finally settled to the task of leading the Australian colonies towards a more unified organisation of science.

Even within the Philosophical Society the gradual return to dominance in the biological sciences became noticeable. Krefft was elected a member in July 1862. Under William Macleay's chairmanship in May 1863 Krefft and Moore were both elected councillors, with Clarke and Deas Thomson retaining the leadership as vice-presidents, the most important offices in the absence of a scientific president. Krefft read four papers to the society between his election and its dissolution in 1866, giving some early indications of his forthcoming fundamental contributions to Australian zoology, particularly herpatology and icthyology.[2] Moore and Clarke also became more frequent contributors on botany, geology and meteorology. But even the infusion of Russell's and Smalley's enthusiasm into the society's affairs; the regular participation of Tebbutt and competent contributions from William Keene, Leibius, Pell, John Smith and the promising young local-born zoologist Edward Pearson Ramsay (1842-1916), could not disguise the run-down of the Philosophical Society as a viable scientific association.[3]

---

[1] Macleay Memorial Volume, p.xxiv.

[2] Minute Book, 1862-6. Two of the papers were on snakes and a new species of fish; one on the anthropology of the Lower Murray and Darling and another on Krefft's earlier zoological work in the same area under Blandowski in 1857. Krefft had begun publishing in Proc. Zool. Soc. Lond. in 1858.

[3] An evening conversazione in December 1863, graced by the governor and 'several leading members', was 'devoted more to pleasure and intellectual recreation than to matters of a graver nature...', Minute Book, 16 December 1863. For the society's last papers (1862-5) see Trans. Phil. Soc. N.S.W. (1866).

Between September and October 1865 W.B. Clarke presided over the demise of the Philosophical Society whose decline had arisen 'not from a general indifference to Art and Science', but from the flight of those

> deterred from taking a direct interest in its proceedings by the conviction that the subjects discussed are of that abstruse and abstract character that few have had time or opportunity to study; and that there are no general nor useful results to be derived from it.[1]

For many, however, dissatisfaction with the Philosophical Society lay in its too pronounced preoccupation with non-biological sciences, a preoccupation which seemed to ignore the valuable zoological collections at the Australian Museum and Elizabeth Bay House.[2]

In April 1862 a preliminary meeting held under the chairmanship of William Macleay led to the inauguration of the Entomological Society of New South Wales. The original membership totalled twenty-five, including a council of six with Macleay as president; Dr James Charles Cox (1834-1912) as secretary and E.P. Ramsay - later curator of the Australian Museum (1874-94) - as treasurer.[3]

As W.S. Macleay's health declined his nephew, William John, willingly assumed the mantle of family leadership, both in the new society and at the Australian Museum.[4] Heir to the incomparable Macleay collections, he himself became a prolific naturalist and devoted some of his inherited wealth to employing collectors like George Masters (1837-1912) to build up the Museum and Macleay holdings, especially in entomology. The Entomological Society was cast in the Macleay family image: an association offering 'social intercourse' for 'all who are interested in the Science of Entomology' and providing an opportunity for publishing such papers

---

[1]'Report of the Committee of the Philosophical Society appointed by the Council, July 25th 1865, to consider...altering the title of the Society to that of "The Royal Society of New South Wales"', Minute Book, 11 October 1865.

[2]Macleay Memorial Volume, p.xxvi.

[3]Trans. Entomological Soc. N.S.W., I (1862-66), pp.i-ii and vi.

[4]W.S. Macleay had declined nomination as the Entomological Society's first president. The first council comprised W.J. Macleay, Cox, Ramsay, W.J. Stephens and R.L. King.

'as might be deemed worthy' of the members' 'sanction'.[1] The two published volumes of the society's Transactions (1862-66 and 1867-73) contained thirty papers of which Macleay (eleven papers), R.L. King (ten) and Alexander Walker Scott (six) contributed all but three.[2] As Fletcher notes these papers represented 'the first important contribution from local workers to a knowledge of Australian Entomology' at a time when scientists were turning more positively to the long-neglected field of invertebrate zoology in Australia.[3]

At the Australian Museum Krefft, whose interests and competence were mainly in vertebrate zoology - especially reptiles - at first gave the Entomological Society all the support he could. He was elected a councillor in 1863 and secretary in March 1866.[4] W.S. Macleay had unsuccessfully opposed Krefft's appointment as assistant curator in 1860, and thereafter relations between Krefft and certain of the Macleay circle trustees became increasingly strained, especially with the appointment of Masters as assistant curator at the Museum in June 1864. Macleay and his friends demanded a good deal of Masters's time for their own collecting causing Krefft to question more and more these private arrangements.[5] Masters, in fact, became one of the most frequent exhibitors before the Entomological Society.[6]

---

[1] 'The President's Address', 30 January 1863, Trans. Entomol. Soc. N.S.W., I, pp.xii-xvi.

[2] The three remaining papers came from H.L. Schrader, Krefft and the solicitor, Henry Burton Bradley (1815-94).

[3] Macleay Memorial Volume, pp.xxv-xxix. R.L. King, P.H. MacGillivray and Swainson had, it is true, laid important foundations with papers on entomostraca, mollusca and polyzoa.

[4] Trans. Entomol. Soc. N.S.W., I, pp.xi and lvii.

[5] Holograph statement of his case by G. Krefft (circa 1874). Typescript copy in B.L., Canberra, MS 21.

[6] G.P. Whitley, 'George Masters, naturalist', Aust. Zool. 16, part 2, (1971), pp.25-32.

In Krefft's own opinion it was his very professionalism as author, collector and curator which aroused the fiercest antagonism of the amateur Macleay circle. Krefft's work made him a 'name in the World, and the Australian Museum of Sydney became a household word in every quarter of the Globe'.[1] By 1874, the year of his downfall at the Museum, Krefft's list of publications and projects was impressive, embracing work on palaeontology, herpatology, ornithology and icthyology - including his most important researches on the Queensland Lungfish, Ceratodus forsteri - and among his correspondents in Britain were Darwin, Owen and A. Günther.[2] Krefft became less and less accommodating to 'the slow-going bug and beetle hunters, who thought that true science consisted in keeping a lot of these insects in applepie order' and finally refused the Entomological Society permission to meet at the Museum.

Krefft brought Macleay's 'hobby to grief' and earned the implacable opposition of men like Dr Haynes Gibbey Alleyne (1815?-82), an influential member of the Medical Board, Cox, E.S. Hill, Masters, Captain Arthur Alexander Walton Onslow (1833-82), grandson of Alexander McLeay and son-in-law of James Macarthur, A.W. Scott and even Ramsay and more lowly members of the Museum's staff, some of whom conspired to undermine the German.[3] George Bennett, Clarke and, before their deaths, R.J. Want and Rev G.E. Turner were sympathetic to Krefft, recognising the important contributions he had made to Australian science and that 'it would be difficult to find a Curator to work like' him.[4]

The Macleay circle's 'entomological science' Krefft compared disparagingly with 'postage stamp collecting':

---

[1]Krefft's statement, op. cit. Günther was Keeper of Zoology at the British Museum (1875-95).

[2]Whitley, 'Life and Work of Gerard Krefft', Proc. Roy. Zool. Soc. N.S.W. (1958-9), pp.21-34 and Whitley, 'Gerard Krefft... and his Bibliography', ibid., (1967-8), pp.38-42.

[3]Krefft's statement.

[4]Bennett to Owen, 3 September 1873, Bennett Letters, M.L., Sydney.

> ...if one forgets to observe the metamorphoses of insects and neglects to study those which are useful or dangerous to man and his cultivated plants or domestic animals..., it stands to reason that a simple accumulation of bugs, beetles, butterflies and cockroaches without explanation is about as good a vehicle to education and perhaps less so that the "dressed" window of any large grocery establishment.[1]

Trumped up charges, the use of parliamentary privilege by some trustees to enquire into Krefft's administration of the Museum and, finally, his forced and illegal ejectment in 1874 from the post of curator brought matters between Krefft and his opponents to a head.[2] Morally vindicated by legal and parliamentary compensation - Henry Parkes was sympathetic to his cause but not his insubordination and indiscretion - Krefft, like Lhotsky and Moore before him, nevertheless paid a dear price for his outspokenness and for asserting his professional independence against the scientific establishment and vested interests of Sydney.[3]

As we have seen, by no means all those devoting any attention to scientific pursuits in New South Wales had either by inclination or tradition given support to the Macleay circle or to its concept of gentlemen-amateur science. In 1860-1 for example, George Bennett and others formed the Acclimatisation Society of New South Wales which was an immediate popular success,[4] attracting a grant of £1,000 from government and building up a wide-spread international correspondence.[5] While some

---

[1]Krefft's statement.

[2]'Report from the Select Committee on the Sydney Museum', V. & P. (L.A. N.S.W.), 1873-4,5, pp.819-942; Minute Books (1863-1874) and (1874-1879), Australian Museum, and Krefft's statement.

[3]Krefft to Parkes, 23 July 1874, Parkes Correspondence, A890, p.360, M.L., Sydney. Krefft was granted £250 in settlement of his claims for wrongful dismissal and a further £1,000 from parliament.

[4]Bennett to Owen, 20 November 1861, Bennett Letters, M.L., Sydney.

[5]Annual Reports Acclim. Soc. N.S.W., 1-7 (1862-68). Bennett was secretary and 'genius' of the Society from 1863 to 1871. See Coppleson, 'Life and Times of Bennett', Bull. Post-Graduate Comm. Med., 2 (1955), pp.220-1.

willingly wished the Philosophical Society of New South Wales good riddance in 1865, many, especially those like W.B. Clarke, who had fought long and hard for the advancement of science in New South Wales, were loathe to see the gains it had made lost completely. For that reason the plan by George Smalley and Edward Bedford - formerly a prominent member of the Royal Society of Tasmania and of the medical community in Hobart - to continue the association as the Royal Society of New South Wales were readily accepted and the new society commenced its work in May 1866.

Although started at a time of marked resurgence of interest in intercolonial co-operation in the exhibitions movement of the period,[1] the Royal Society of New South Wales had to struggle hard over the next ten years to assert itself as one acceptable leader of science in New South Wales and Australia, preparing the way for those reforms and advances under Liversidge which made it the platform from which to launch the Australasian Association. Henceforth the era of vice-regal bolstering and leadership in science waned noticeably and scientists themselves had to provide the initiatives and lobbying to sustain their associations and activities in an increasingly critical and demanding, yet not always unsympathetic, social milieu. Colonists, reading papers and magazines replete with scientific reports and advances in Europe and U.S.A.,[2] required intelligent, relevant and adequate responses from those who professed to be scientists among them. In the 1870's and 80's colonial science became recognisably more assertive than at any period hitherto and a number of its leaders like Clarke, Ellery, Liversidge, McCoy, Mueller and, in New Zealand, Hector and von Haast, earned well-deserved and coveted recognition from the established, home scientific tradition by election to the Royal Society of London, honours which were widely reviewed and

---

[1]'Various Scientific matters', Clarke noted in July 1867, were regularly 'brought under public notice by the N.S.W. Commissioners of the Intercolonial and International Exhibitions of 1867', Trans. Roy. Soc. N.S.W., I (1867), p.19.

[2]The preliminary studies by Wallace Kirsop on the libraries and reading habits of intellectuals and professional men in nineteenth-century Australia promise to give a more adequate picture than hitherto of this facet of Australian intellectual history. See e.g. his two recent papers 'W.E. Hearn's Library', La Trobe Library Journ., 3,No.12 (1973), pp.73-82 and 'Scientific Culture in Melbourne 1851-1900: the Evidence from Library Catalogues', Papers Presented at the Annual Conference of the Australasian Assoc. Hist. Phil. of Science (Melbourne, August, 1973), pp.47-57.

publicised in the colonies.[1]

The ageing, ailing Clarke, repeatedly recalled as senior vice-president of the Royal Society of New South Wales to assume a position of leadership between 1867 and 1878, warned the society at the outset of the herculean tasks before it. Scorning the idea being put abroad in the sixties that colonial scientists should establish their own equivalent of a Royal Society Fellowship (F.R.S.), Clarke reminded New South Wales scientists that they must 'win [their] spurs' before wearing them, and produce more 'working bees', although the 'philosophical drones cannot be dispensed with, since they bring in as much material support in one way, as do those who are foraging in the fields of research'.[2] The contemporary material prosperity was no guarantee of support from the general populace, 'whose leisure is generally given to the frivolities of ephemeral excitement or whose mental occupation is only exercised by sensational novels or a railway literature', and, as so often before, the society's members would have to remain a 'zealous minority', facing prejudice from within the divided ranks of the colony's scientific men - particularly from the 'aloof' Entomological Society circle - and hoping for more support from the University men and other professionals, like the obliging Krefft who became custodian of the Royal Society's meagre library of journals, books and memoirs.[3]

'Prosperity', as Professor John Smith, a keen supporter and later president of the Royal Society noted in 1881, 'did not come with a rush to the new organization',[4] and what advances there were,- including the regular but 'rather pretentious'[5] Transactions from 1867 to 1875 - depended

---

[1]See e.g. the detailed reporting on Clarke's election (1876), Journ. Roy. Soc. N.S.W., X (1876), p.4 and XII (1878), pp.1-2 and for Russell's election, S.M.H., 15 July 1886.

[2]Inaugural address, 9 July 1867, Trans. Roy. Soc. N.S.W., I (1867), pp.8-9.

[3]Ibid., pp.10-27.

[4]See Smith's Annual Address and historical review of the Society, 4 May 1881, Journ. & Proc. Roy. Soc. N.S.W., XV (1881), pp.2-10 and S.M.H., 5 May 1881.

[5]The words of A. Liversidge in his brief history of the Royal Society in Nature, 23 June 1910, pp.502-3.

heavily upon those very people whom Clarke - apart from himself - predicted the society must lean: the University teachers, Liversidge, Pell, John Smith and Alexander Morrison Thomson (1841-71), reader in mineralogy and geology at Sydney University from 1866; the astronomers and meteorologists, Russell, Scott, Smalley and other full-time men of science, including Krefft, Leibius, Moore, Rolleston and Dr Horatio G.A. Wright (d.1901), a medical practitioner, men to whom in the main the Macleay circle doors remained shut or whose interests were not in natural history. Only Alleyne and E.S. Hill of the more prominent anti-Krefftian faction rose to temporary office within the Royal Society,[1] where the principal emphases, not surprisingly, were on the astronomical, mathematical and meteorological sciences and - under Clarke, Leibius, Liversidge and Thomson - on geological, mineralogical and palaeontological topics.[2] By the 1870's Clarke could rightfully consider himself the clearing-house of Australian geological enterprise, a position he had deliberately cultivated for nearly forty years.[3] Leibius, in whom 'thoroughness and straightforwardness in everything he undertook were strong characteristics',[4] shared with Liversidge a deep practical and research interest in chemistry - both had close professional ties with

---

[1]Alleyne was on the council in 1867 and Hill in 1872, where Moore and Krefft were active from the outset.

[2]In the ten years 1867-76 just under ninety papers were published in the Transactions of which twenty-five were on geology, mineralogy and palaeontology; eighteen on observatory sciences (i.e. astronomy, meteorology, and the use of the telegraph); seven in mathematics and statistics; seven in chemistry; and only four in zoology and five in wider botanical subjects. Eight meetings during 1870 were devoted to a controversial discussion on the Water Commissioner's plans for extra supplies to Sydney. See Trans. Roy. Soc. N.S.W., IV (1870) and for Smith's summary of the debate, V (1871), pp.1-14.

[3]See e.g. his Anniversary Addresses of 12 May 1869; 25 May 1870; 22 May 1872; 25 June 1873 and 17 May 1876, ibid., III (1869), pp.4-9; IV (1870), pp.2-6; VI (1872), pp.35-38; VII (1873), pp.15-16 and IX (1875), pp.52-3. He was consulted regularly by geological correspondents in every colony and recommended the appointment of geological surveyors to both Queensland and Western Australia. In 1869 Selwyn, finding Clarke disappointed with the break-up of the Victorian Survey, visited N.S.W. to consult with the clergyman-geologist before leaving for Canada, and in 1875 Clarke gave his stamp of approval to the new Geological Survey of N.S.W. under C.S. Wilkinson, one of Selwyn's former officers.

[4]Obituary of Leibius, S.M.H., 20 June 1893.

the Chemical Society of London - and an organisational, business and public relations acumen in science which few scientific men of the period in colonial Australia rivalled. As John Smith, their fellow chemist, recognised, it was 'to the enlightened zeal and indefatigable labours of those gentlemen' - joint honorary secretaries together from 1875 - that the Royal Society largely owed its growth and prosperity in the late seventies and during the eighties.[1]

Even before the arrival of Liversidge as reader in geology in the University of Sydney in 1872 - he was appointed professor of geology and mineralogy the following year - Clarke, Smalley and Smith were beginning to see the Royal Society as an agent in colonial scientific co-operation.[2] Clarke, vain as ever about his former 'single-handed labours' in Australian geology, nevertheless shared his advice and knowledge widely in the last years of his life. As the undisputed senior scientific office-bearer of the Royal Society he took pride in attracting mathematical papers from Cockle and other workers outside New South Wales and readily acknowledged and expertly reviewed the wider work of Krefft, 'the able Curator of the Australian Museum', whose evolutionary views Clarke certainly did not share but whose contributions to zoology and his own field of palaeontology he unstintingly praised.[3]

The Australian Eclipse Expedition of November and December 1871 to the Claremont Group, off Cape Sidmouth in North Queensland, was the first attempt at intercolonial scientific co-operation on a grand scale. Initiated by Ellery and Wilson in the Royal Society of Victoria, and backed by Edward Sabine in Britain, the Royal Society of Victoria's Eclipse Committee gained financial and professional support from governments, societies and scientists in New South Wales, Queensland, Victoria and South Australia. As Ellery reminded the Royal Society of Victoria in August 1871, intercolonial observations on solar phenomena could place Australia 'still higher than her already well-recognised position as a contributor to the

---

[1]Presidential Address, S.M.H., 5 May 1881.

[2]In his opening address in June 1868 George Smalley, for instance, suggested that the Society carry out the motto of 'Advance Australia' among the colonies' scientific societies and also put forward suggestions for decimal coinage and the greater involvement of women in science, two causes which Liversidge later espoused with great vigour. Trans. Roy. Soc. N.S.W., II (1868), pp.1-12.

[3]Ibid., III (1869), pp.1-22 and IX (1875), p.7.

world's scientific advancement'.[1] It was certainly no fault of the expedition's organisation that the total eclipse of 12 December 1871 was so obscured by a complete cloud cover and torrential rain that 'the last thin crescent just before totality' was the meagre sum of their solar observations. Afterwards the Governor Blackall's scientific party was well received on its return to Brisbane, Sydney and Melbourne, and the lessons in scientific co-operation which Ellery and Russell had taught were not forgotten in the 70's.[2]

Ellery, using the prestige of presidential office in the Royal Society of Victoria, successfully revived A.C. Gregory's earlier ideas on intercolonial telegraphic co-operation and spearheaded a campaign for priority use by scientists of the public wires to disseminate their data:

> The great requirement is an intercolonial agreement upon one uniform plan of observations to be systematically carried out by selected stations, the establishment of a headquarters in each colony, and an authorised use of the various intercolonial telegraph lines and cables for transmission of weather telegrams.[3]

With even greater opportunities pending with the Venus transit of 1874, Ellery ensured that he had powerful professional and scientific support outside Victoria by agreeing on his intercolonial meteorological and astronomical strategies with Russell in Sydney and the influential Charles Todd (1826-1910) in South Australia.[4]

---

[1]Anniversary Address, 14 August 1871, Trans. & Proc. Roy. Soc. Vic., X (1874), pp.xxxix-xl.

[2]For reports on the expedition see Trans. & Proc. Roy. Soc. Vic., X, pp. lix-lxii and S. Diggles, 'A Short Account of the Trip to Cape Sidmouth in the Governor Blackall S.S.', Trans. Phil. Soc. Qld, I. The Queensland Philosophical Society had represented the Eclipse Committee's case very strongly to its own somewhat sceptical government. The naturalists, of course, brought home more satisfactory results than the astronomers.

[3]Anniversary Address, 8 August 1873, Trans. & Proc. Roy. Soc. Vic., XI (1874), p.xix.

[4]Ibid., XI, pp.xix-xxiii and XII (1876), pp.xvi-xx. The N.S.W. government had already granted Russell £1,000 towards its own Venus transit effort and Todd was promised a similar amount in South Australia. Todd became post-master-general in 1870, still retaining his post as government astronomer.

In 1875-6, following a health-consuming period of intensive work, Ellery was forced to convalesce in Europe. Characteristically he used the opportunity to study the state of organised science in Europe and returned to Australia determined to see through his earlier plans, and build upon the experiences gained by the observatories and supporting stations in the 1874 transit.[1] In May 1877 he outlined a programme for the 'truly scientific meteorologist', supporting Russell's pleas for a systematic, properly documented study of the laws of Australian climate by launching a meteorological 'blockade on a large portion of the continent'.[2] Going further Ellery affirmed that meteorology could not begin to rank as a science until it embraced a much more competently ordered body of standardised empirical and theoretical data. The European meteorological congresses and the work of the federal meteorological survey in U.S.A. might provide starting models for Australia, but only experienced local workers could decide on the best strategy to adopt for determining general and localised laws of climate and meteorology over the continent.

Accordingly, at the beginning of 1877, Ellery, in consultation with Russell and Todd and the various colonial telegraph departments, initiated 'a system of Australian weather telegraphy' embracing Port Darwin and the three colonies of South Australia, Victoria and New South Wales.[3] Ellery, although certainly not unmindful of the immediate popular interest, nevertheless saw the theoretical side as one of the main aims of the exercise. Although Western Australia and other colonies joined the link-up, 'the precedence and prompt despatch' of weather data granted in U.S.A and Europe was not at first so readily available on the colonial wires.[4] But overseas astronomers and meteorologists now began to press for scientific information via the telegraph and to demand Australian telegraphic facilities for the second Venus transit of 1882. Russell, viewing

---

[1]Anniversary Address, 10 August 1876, Trans. & Proc. Roy. Soc. Vic., XIII (1878), pp.xiv-xvi.

[2]'The Present State of Meteorology', ibid., XIV (1878), pp.10-19.

[3]Ibid., p.17.

[4]Ibid., XV (1879), pp.xiii-xviii; XVII (1881), p.xv and XIX (1883), p.xx.

developments from the vantage point of Sydney, concluded that the weather data published daily in that city benefited so much from the new system that Australia could justifiably claim one of the most efficient and advanced systems for its size anywhere in the world.[1]

In 1879, taking advantage of the first Australian International Exhibition in Sydney, Russell convened an Australasian Meteorological Conference, 'with the view to bringing about more complete co-operation in the study of Australian meteorology'.[2] The conference, attended by Ellery, Russell, Todd and Sir James Hector as Inspector of Meteorological Stations in New Zealand, drew up comprehensive recommendations on standardising instruments, stations, telegraph reports and the establishment of high-level meteorological observatories.[3] In April 1881 the same four met for a second conference at the Melbourne International Exhibition (1880-81), agreeing to widen their terms of reference to include New Caledonia and Fiji and bring more pressure to bear upon the least co-operative governments like Queensland.[4]

Clement Wragge, a great individualist and highly competent meteorological planner, established two meteorological stations - the Torrens Observatory at Walkerville and the second on Mount Lofty - in South Australia in 1884, adopting standards laid down by the Royal Meteorological Society in Britain. Under the influence, too, of Ralph Abercromby, the British meteorologist who visited Adelaide in 1886, Wragge inaugurated the Meteorological Society of Australasia at the Public Library, Adelaide, in May 1886. Appalled by the 'great lack of system' in meteorology outside South Australia, Wragge proposed that the new association strive for uniformity in equipment, data-collecting and publishing and in the training of observers. 'As in politics, so in science', he observed to the

---

[1]Anniversary Address, 2 May 1877, J. & Proc. Roy. Soc. N.S.W., XI (1877), pp.13-16.

[2]S.M.H., 15 June 1886 and Trans. & Proc. Roy. Soc. Vic., XVIII (1882), pp.xiv-xvii.

[3]C. Todd, 'Meteorological Work in Australia: a review', Rep. A.A.A.S., V (1893), pp.254-8.

[4]Ibid., pp.258-9. It was also agreed to adopt isobars for Australian weather maps and to purchase a complete set of standard equipment to share between the principal observatories in Adelaide, Melbourne, Sydney and Wellington.

foundation members, 'we desire federation'.[1]

The Meteorological Society, gaining notable support in South Australia and from the other colonies,[2] published its Minutes of Proceedings only until 1887, after which it did not long survive Wragge's removal to Queensland as government meteorologist. In September 1888 a third Australasian Meteorological Conference was held in Melbourne attended by a representative from every Australian colony and New Zealand, and a daily exchange of weather telegrams was finally secured for Australasia.[3] Co-operation among astronomers and meteorologists continued in Section A of the Australasian Association, preparing the way for the Commonwealth Bureau of Meteorology (1907) under H.A. Hunt.[4]

The visit of the well-equipped and well-staffed survey vessell H.M.S. Challenger to Sydney between April and June 1874 proved a major stimulus to colonial science. 'The naturalists' of that famous expedition, Krefft wrote soon afterwards, 'thoroughly appreciated' what he had 'done for science' and 'put the finishing touch on the Entomological Science' of the Macleay circle.[5] Out of the scientific discussions and excursions conducted among local scientists and those of the Challenger arose the idea to found a 'Society of Natural History' in Sydney, 'embracing all branches of Natural History and, issuing a Monthly Magazine'.[6] W.B. Clarke studied the work of the visiting expedition closely and he, William Macleay and their associates were invited to dredging and collecting parties, activities which Macleay and his friends and employees like Masters - since January 1874 curator of the Macleay Museum - and the

---

[1] Meteorological Society of Australasia: history, rules, regulations and list of members (Adelaide, 1886), pp.1-5.

[2] The president was Henry C. Mais, engineer-in-chief of South Australia and other office-bearers included Clement Sabine, Charles Todd and Wragge. Honorary members included Ellery, Russell and the Tasmanian government meteorologist, Captain Shortt.

[3] Todd, 'Meteorological Work in Australia', Rep. A.A.A.S., V, p.259.

[4] Gentilli, 'History of Meteorological and Climatological Studies in Australia', Univ. Studies in Hist., V (1967), pp.72-9.

[5] Krefft's statement.

[6] Extract from William Macleay's diary for 15 December 1874, quoted in A.B. Walkom, The Linnean Society of N.S.W.: Historical Notes of its First Fifty Years (Sydney, 1925), p.10. See also T.S. Dixon, Presidential Address, 30 March 1904, Proc. Linn. Soc. N.S.W., XXIX (1904), pp.6-10.

conchologist, John William Brazier (1842-1920), were already actively promoting on Port Jackson, along the coast and in the interior.[1]

Thomas Stackhouse and Dr Alleyne capitalised on the intense interest of the time to convene a meeting at the end of October 1874 which resolved itself into the Linnean Society of New South Wales.[2] The new society wisely elected William John Macleay as president and some of his closer friends, including William Macarthur, Alleyne, William John Stephens (1829-90) and Burton Bradley became principal office-bearers. From the outset Macleay took a personal interest in the organisation and financing of the Linnean Society and, so endowed, it flourished as the leader of natural history research in Australia.

Soon after the Linnean Society's foundation Macleay led and equipped the Chevert scientific expedition to New Guinea from May to December 1875, thus responding to the commercial and intellectual appeal of a country to which Australian scientists were to give much attention over the next twenty or so years.[3] Macleay gave Linnean Society workers access to the numerous Chevert specimens and the first volume of the Society's Proceedings contained numerous taxonomic papers and other observations from Bradley, Brazier, Macleay, Ramsay and others. 'Unquestionably', Professor Stephens recalled in 1890, 'to that expedition and its results' the Linnean Society 'owes its early and vigorous growth'.[4]

The growth of the Linnean Society to the status of a national association for the promotion of all branches of natural history was achieved within five years. Macleay, setting forth the Linnean Society's programme of uncompromisingly high scientific research in natural history in 1876,

---

[1]MacMillan, A Squatter went to Sea, pp.17-42 and Fletcher, 'Society's Heritage from the Macleays, part II', Proc. Linn. Soc. N.S.W., LIV (1929), pp.220-38.

[2]Dixon, op. cit., pp.6-10 and Macleay Memorial Volume, p.xxxi. The name Banksian Society was contemplated but later dropped.

[3]For details of the expedition see e.g. Fletcher, 'Society's Heritage', II, Proc. Linn. Soc. N.S.W., LIV (1929), pp.242-8 and MacMillan, A Squatter went to Sea, pp.58-154.

[4]President's Address, 29 January 1890, Proc. Linn. Soc. N.S.W., XIV (1889), p.1299.

criticised the Royal Society of New South Wales for mixing 'scientific papers' with those 'not of a scientific character, and possessing no interest except of the most local kind':

> The publications of its proceedings also have not been conducted with the celerity and regularity to be expected from a society not deficient in point of means, and it is that irregularity and uncertainty in publication which makes it as a society useless as a record of zoological, botanical, or geological discovery.[1]

'In the present state of Natural History in Australia', continued Macleay, who had deep reservations about 'the speculative works on natural science lately published' by Darwin, Haeckel, Huxley and others, colonists should confine their 'attention to observing, cataloguing and describing', leaving 'the synthetical work to the legion of writers who aspire to what is foolishly called "high science"'.[2]

At the Royal Society of New South Wales which was basking in the success of recent reforms and growth and a vastly improved Journal and Proceedings edited by the energetic Liversidge, Macleay's sniping - thoroughly justified in most respects - was not seen as a renewal of old divisions. 'I look with no jealousy on the success of other Societies', announced W.B. Clarke publicly, although he did warn that 'a multiplication of Associations in a limited population only tends to the weakness of all'.[3] They might well, Clarke suggested, look to New Zealand for an example, where all the former provincial scientific societies had been 'consolidated in the comprehensive New Zealand Institute', set up in 1867.[4]

Because the Sydney Linnean Society pretended to be more than a New South Wales scientific association and attracted the support of leading biological and geological scientists throughout the Australian colonies,

---

[1]Chairman's Address, 31 January 1876, ibid., I (1875-6), p.85.

[2]Ibid., pp.93-5.

[3]Anniversary Address, 17 May 1876, J. & Proc. Roy. Soc. N.S.W., X (1876), p.10.

[4]Ibid., p.10. See also C.A. Fleming, 'The Royal Society of New Zealand - a Century of Scientific Endeavour', Trans. Roy. Soc. N.Z., 2, No.6 (1968), pp.99-114.

including Count Castlenau (1810-80)[1] and Mueller in Victoria; F.M. Bailey, De Vis and Scortechini in Queensland; Ralph Tate in South Australia and Haswell, Stephens, Wilkinson and Dr William Woolls (1814-93), schoolmaster, poet and later a prolific botanist, in New South Wales, it throve. It throve, too, on Macleay's generosity in paying the heavy bills for secretarial work, publications and meetings. But, in his benevolence, Macleay did not lay the dead hand of family control on the Linnean Society and it elected its own independent officers who could nevertheless encourage papers in the sure knowledge that funds were available for immediate publication. But they deluded themselves, claimed the ubiquitous hardworking Tenison-Woods, one of the best informed of colonial scientists, to believe that science would ever be 'popular' in the colonies, despite the public journals so 'profuse in their references to the scientific tendencies of the age'. Everyone wanted 'science' and gave it nodding support, but few could or would be practitioners:

> The circumstances of young colonies are so peculiar and exceptional that it would not be fair to compare our literature with those of any old established country. Of course we would suffer much by the comparison. Our habits are not those of a studious people. Men of real learning have no place amongst us, and are consequently rarely to be found. That is why, perhaps, so much of the public utterance of our speakers are greatly below the standard in breadth and depth.[2]

Refreshing self-criticism and a steady application to the scientific tasks in hand with whatever resources available - and the circle was not quite as circumscribed as Woods claimed - characterised the Linnean and Royal Societies of New South Wales in the late 1870's. Much science in the past and present, Woods wrote, was delayed by the 'jealousies and bitterness of scientific men'.[3] The ability to forget the past would carry colonial science towards the goal of co-operative 'federation', which Liversidge

---

[1]Francois Laporte, Comte de Castlenau, was a much-travelled entomologist, icthyologist and general naturalist who took up residence as Consul General of France in Melbourne in 1862. A close associate of Mueller he took an active interest in the scientific life of Melbourne. For his work and publications see Whitley, 'Francois Laporte, Count Castlenau (1810-1880)', Aust. Zoologist, 13, part 2 (1965), pp.93-102.

[2]President's Address, 28 January 1880, Proc. Linn. Soc. N.S.W., IV (1879), pp.471-5.

[3]Ibid., p.477.

Woods and others with a less vested stake in the colonial past, saw as an ideal.

By the end of 1880 the Linnean Society had published nearly 250 papers as well as its invaluable annual reviews of publications on Australian natural history. 'We owe more to the Linnean Society within the last few years', observed Woods in January 1881, 'than to all that has previously been accomplished' in Australian natural history.[1] Nothing escaped the scrutiny of the Linnean Society's widely-read presidents, Cox, Macleay, Stephens, Wilkinson and Woods. When the much-travelled Nicolai Nicolaevitch Miklouho Maclay (1846-86) arrived in Sydney in 1878 determined to promote the scientific schemes he had shared in Europe with Ernst Haeckel, Anton Dohrn and others he received a sympathetic hearing from the Linnean Society.[2] Under Macleay and Cox the overseas advances in bacteriology and embryology were kept before the society and encouragement was given for the more active promotion of science at secondary and tertiary levels. The work of the Austrian naturalist Robert von Lendenfeld in the Australian Alps, of W.H. Caldwell on monotremata and of William Farrer on wheat hybridization for instance, was supported and noticed by the Linnean Society, which by its tenth anniversary in 1884 had published over five hundred scientific papers.

Liversidge watched the success of the Linnean Society with interest. In 1876 he led moves to establish seven sections within the Royal Society of New South Wales, one of which, the section on sanitary and social science, recommended that the society pressure government for better health and sanitary legislation.[3] In 1877, reviewing a vastly improved correspondence

---

[1] Ibid., V (1880), p.648.

[2] Maclay, 'Proposed Zoological Station for Sydney', ibid, III (1878), pp.144-50 and Frank S. Greenop, Who Travels Alone (Sydney, 1944), pp.157-67.

[3] J. & Proc. Roy. Soc. N.S.W., X (1876), pp.258-66 and 285-313. The sections were A: Astronomy and Physics; B: Chemistry and Mineralogy; C: Geology and Palaeontology (later amalgamated with B); D: Zoology and Botany, including Entomology; E: Microscopical Science; F: Geography and Ethnology; G: Literature and Fine Arts, including Architecture; H: Medical Science and I: Sanitary Science. Liversidge was active as a leader in sections B and E.

and exchange system which refurbished the society's library with overseas journals each year, Russell observed that the association had assumed in New South Wales 'the position held by the Smithsonian Institution in America'.[1]

In 1878-9 Liversidge was in Europe where he attended to New South Wales's interests at the Paris Universal Exhibition and was a vice-president of the International Geological Congress held there after the Exhibition.[2] He also used the time to visit scientific museums and institutions in Europe, gaining more ideas for reforms and expansion in Australia. In March 1879, just before leaving London to return to Sydney, Liversidge wrote to the Royal Society of London outlining the role, as he saw it, of the Royal Society of New South Wales:

> One of the main objects of the Sydney Society is to serve as a central institution for the exchange of scientific publications between Institutions in Australia and those in foreign countries.[3]

Back in Sydney the Royal Society, in Liversidge's absence, continued its growth and by 1878 had achieved a membership of 400 and a government grant for publications. In the same year W.B. Clarke, 'one of the steadiest friends' of the Royal Society, died working to the last on his geological researches.[4] The members moved immediately to secure local recognition for his 'distinguished services..., not only to these colonies but in the cause of science' and to 'call for some special recognition throughout the Australian group'.[5] An Australasia-wide appeal realised funds to provide

---

[1]Ibid., XI (1877), p.4.

[2]S.M.H., 3 May 1878 and 22 July 1879, Liversidge Papers, Sydney University.

[3]Liversidge to secretaries, Roy. Soc. London, 24 March 1879, Liversidge Papers, Sydney University. Liversidge used his time in Britain to select books and instruments for the Royal Society of N.S.W. See e.g. 'Proceedings', 6 November 1878, J. & Proc. Roy. Soc. N.S.W., XII (1878), p.187.

[4]He completed the fourth edition of Remarks on the Sedimentary Formations of New South Wales (1878) two weeks before his death on 15 June 1878.

[5]'Proceedings', 3 July 1878, J. & Proc. Roy. Soc. N.S.W., XII (1878), pp. 176-9.

an annual medal for 'men of science who have made valuable contributions to our knowledge of the Geology, Mineralogy, or Natural History of Australasia'.[1] It is a measure of colonial science at the end of the 70's that the Royal Society of New South Wales, by then recognised as the 'senior' scientific association, chose Owen (for palaeontology in 1878); Bentham (for botany in 1879) and Huxley (for natural history in 1880) before turning to McCoy in 1881 and Mueller in 1883 as the first Australian recipients of this, the first high honour bestowed by Australian science.[2]

Liversidge returned to Sydney well before the opening of the International Exhibition in September 1879 and judged that the time was ripe to seek support for an Australasian Association. In Paris, as representative for Australia at the International Geological Congress, he had been charged with responsibility for forming a regional committee to co-ordinate geological research and nomenclature. In his report to the Royal Society of New South Wales on the Paris meetings Liversidge suggested that the opportunity should be taken at the forthcoming Exhibition instead of a geological conference to convene 'some special meetings, at which papers could be read and discussed, after the model of the British Association.[3]

The astronomers and meteorologists, as we have seen, took Liversidge's views more seriously than other scientists, although the presence of von Haast, Hector and other eminent Australasian scientists at the Royal Society's meetings and conversazione in October 1879 proved that inter-colonial scientific meetings would even then have been possible. Charles Moore gave Liversidge support, especially for botanical meetings, but few others did. In 1879 Miklouho Maclay, dissatisfied with the progress made by the Sydney scientific societies towards founding a zoological station, read a second paper to the Linnean Society on the subject. He again stressed the scientific value of such institutions, citing the experiences gained by Dohrn at the first zoological station established at Naples in

---

[1]J. Smith, Anniversary Address, 4 May 1881, ibid., XV (1881), p.16.

[2]Other recipients to 1890 were J.D. Dana (1882); A.R.C. Selwyn (1884); J.D. Hooker (1885); L.G. de Koninck (1886); J. Hector (1887); J.E. Tenison-Woods (1888); R.L.J. Ellery (1889) and George Bennett (1890).

[3]Liversidge, 'The International Congress of Geologists, Paris, 1878', J. & Proc. Roy. Soc. N.S.W., XIII (1879), p.41.

1865. Maclay considered it a point of honour that Australia, with its abundant marine life and land fauna, should have such a station: 'the actual foundation [would] afford a good test of the degree and intensity of scientific life in Australia - at least in Sydney'.[1]

Haswell and others in Sydney had seriously been trying to promote the station and government did grant a site in 1879 at Watson's Bay but no real progress was made towards a building until Maclay returned from Brisbane in 1881 to take the matter in hand himself. While in Melbourne in April 1881 he secured the support of McCoy, the Royal Society of Victoria, and three other scientific societies in the city towards 'the establishment and maintenance of a zoological observing station in Sydney' and also the promise of full co-operation from the Victorian government.[2] Two months later the Royal Society of New South Wales responded to a similar plea for support from its president, John Smith, and sufficient funds were found to match a New South Wales government grant of £300 and get the station under way.[3] After Maclay was the only one to use it with any consistent profit the government resumed it again for defence purposes in 1886.[4]

---

[1]Maclay, 'The proposed zoological station at Sydney', Proc. Linn. Soc. N.S.W., IV (1879), p.106. The principal aims of such stations were to study the anatomy, embryology, histology and, if possible, the physiology of organisms in situ. Similar stations were quickly established by Agassiz in New York, at Trieste, Jersey and in Holland, and Maclay made plans himself to set one up at Jahore, Malaya.

[2]Special meeting, 6 April 1881, Trans. & Proc. Roy. Soc. Vic., XVIII (1882), p.130; Southern Science Record, I (1880-1), pp.89-92 and Greenop, Who Travels Alone, pp.182-5.

[3]J. & Proc. Roy. Soc. N.S.W., XV (1881), pp.16-20 and 338; 'List of Subscribers', Liversidge Papers and Greenop, op. cit., pp.186-8 and 216 passim. Maclay worked at the station when he was in Sydney between 1881 and 1887 and published some of the results of his work in Proc. Linn. Soc. N.S.W.

[4]An 'Australian Biological Association' was mooted at one stage to support the station and the N.S.W. government did appoint J.C. Cox, Edward Coombes, W.A. Haswell, Liversidge, Maclay, James Norton and E.P. Ramsay as 'trustees' to administer the institution. Inaccessibility from Sydney was one reason why the station was so little used. See cuttings and documents relating to it in Liversidge Papers, Sydney University.

In the early eighties Victorian scientists temporarily seized the organisational initiative from Liversidge and the Sydney scientific associations. Events in Melbourne and Victoria gave the lie to Woods's belief that science would not be 'popular' in the colonies for it was on the tide of a popularising movement that federal associations grew and were nurtured in the eighties.

As president of the Royal Society of Victoria Ellery encouraged the growth of specialist sections within the society for astronomy, chemistry, engineering, mineralogy, microscopy, and physical geography. But the diffusion of scientific effort by the formation of separate and very successful specialist and general associations outside the Royal Society was greeted with less enthusiasm.

Essentially the problem was the same as in New South Wales: biological scientists in particular were dissatisfied with the concentration on physical, engineering and applied scientific problems, a situation which Ellery's own leading and pronouncements had only tended to exacerbate in the seventies.[1] The success of the Microscopical Society of Victoria since its foundation in 1873 under 'that veteran and never-tiring microscopist', Dr Thomas Shearman Ralph (1813-91), was proof that sufficient interest existed to maintain a specialist Society with somewhat narrower aims. Men of science in Melbourne readily granted the Microscopical Society a respected place in the scientific community when it began publishing its Journal in 1879 and when Ralph instituted classes in microscopy. In 1880 it was invited to contribute to the International Exhibition in Melbourne.[2]

---

[1]See e.g. his statement in his address of September 1879: 'The achievements and acquisitions of the exact sciences, as a rule, I believe, appeal more readily to the interest and attention of the many than do the discoveries, improvements, and applications of the less exact ones', Trans. & Proc. Roy. Soc. Vic., XVI (1880), p.xxi. McCoy and Mueller were perhaps the two most noticeable absentees from the society's councils at this period.

[2]Annual Address of the president, 30 October 1879, J. Microscop. Soc. Vic., I, No.2 (1880), pp.34-41; Trans. & Proc. Roy. Soc. Vic., XVII (1881), p.xvi. The society's Minute Book from May 1873 to July 1886 is deposited in the Royal Society of Victoria Library, Melbourne. The Journal lasted until April 1882.

Ralph's microscopical enthusiasm attracted men as prominent as Bosisto, Francis G.A. Barnard (1857-1912), a pharmacist and keen naturalist, E. and A.W. Howitt, P.H. MacGillivray, McCoy, Tenison-Woods and J. Bracebridge Wilson (1828-95), an active algologist and naturalist of Geelong.[1] In May 1880 many members of this same group inaugurated the Field Naturalists' Club of Victoria under McCoy's presidency.[2] Like the Microscopical Society and the Linnean Society in Sydney the new association placed great importance on field excursions, education and prompt publication. The Naturalists' Club was unashamedly popular and actively canvassed for members through the colony's mechanics' institutes and libraries and by May 1881 had a membership of 120.[3]

But popularity and amateurism were tinged very deliberately with McCoy's professionalism and the sensible recognition that the colonial scientific establishment - at least in the realms of natural history - would enhance the Field Naturalists' Club's prospects. Hector, A. Howitt, W. Macleay, Ramsay, Tenison-Woods and Frederick George Waterhouse (1815-98), curator of the South Australia Museum, were soon enrolled as honorary or corresponding members.

The movement quickly spread and Field Naturalists' Clubs were commenced in Geelong in June 1880 - with Bracebridge Wilson as president - and in Sydney in February 1881.[4] In October 1883 Tate led moves to establish a Field Naturalists' Section within the Royal Society of South Australia.[5]

---

[1] J. Microscop. Soc. Vic., I, No.3 (1880), p.77. By May 1880 the Society had about eighty members. Rev. J.J. Halley (1834-1910) and J.R.Y. Goldstein were very active as committee members of the Society.

[2] Southern Science Record, I, pp.11-12. Halley was elected a vice-president; E. Howitt treasurer; and Dudley Best, the amateur entomologist, as the Club's first secretary.

[3] Ibid., pp.99-107.

[4] Ibid., pp.13, 63, 93 and 121-6. A Dunedin Field Naturalists' Club also started at this time.

[5] Trans. and Proc. Roy. Soc. S.A., VI (1882-3), pp.184-5 and Southern Science Record, III (1883), pp.274-6.

The new movement also gained considerable impetus in other provincial centres like Bendigo where P.H. MacGillivray inaugurated the Bendigo School of Mines Science Society in June 1881 for the 'study of Natural and Physical Science';[1] in Ballarat where the Field Club Science Society was started in 1882 and even in suburban Melbourne where the Collingwood Microscopical Society commenced in 1882.[2]

One of the most important benefits to flow from the new popular movement for intercolonial science was the Victorian naturalists' support for the Southern Science Record, advertised as 'a journal of science for Australia and New Zealand',[3] which published regular reports on the proceedings of the older and newer societies as well as original papers and notes from a number of authors, including J. Bancroft, Dudley Best, F.C. Christy, Mueller and Tenison-Woods. For the first time the work of societies in New South Wales, South Australia, Tasmania, Victoria and, sometimes New Zealand and Queensland, was reported in a regular monthly scientific journal.

Although the Record studiously sought 'to embrace scientific articles of every description' it singularly failed to attract the physical or applied scientists. By the end of 1883 the Record had lost the support of the Naturalists' Club in Victoria which began to issue its own journal, the Victorian Naturalist, and continued to enjoy popular support.[4]

At the Melbourne International Exhibition of 1880-1 a widely supported Social Science Congress and the meteorologists' conference had shown what was possible in the sphere of intercolonial co-operation. But Ellery, whilst conceding the important work of the Pharmaceutical Society of Victoria in obtaining and administering a Pharmacy Act for the colony,[5] nevertheless deeply regretted the proliferation of scientific associations in Melbourne:

---

[1] Southern Science Record, I, pp.153-6 and 163.

[2] Ibid., III (1883), p.24 and Trans. & Proc. Roy. Soc. Vic., XIX (1882), p.xiii.

[3] Southern Science Record, I, p.1.

[4] The Record continued under other titles until 1886.

[5] Trans. & Proc. Roy. Soc. Vic., XVIII (1881), pp.xvi-xvii and XIX (1882), pp.xii-xiv. See also 'Foundation of the Pharmaceutical Society of Victoria', Aust. Journ. Pharmacy, 37/1956, pp.1342-44.

> I think it is a matter for regret, for our community is not yet large enough to maintain, in an effective state, a number of scientific societies. Unity is strength; and if all interested in the progress of science, or engaged in her various byways, were to unite together, not only would more useful work be done, but the work would be more valuable on account of being subjected to wider criticism.[1]

By 1883 Ellery faced the same dilemma as Sir Joseph Banks and the Royal Society of London earlier in the century: 'the fact is that it is the rule to form new societies' for the whole range of scientific researches 'rather than carry them out in connection with the older Society'.[2]

In Sydney, where the press was praising the 'life and vigour' of the New South Wales scientific community and its publications,[3] Liversidge knew how to turn the popular science movement to advantage. Since the successful Exhibition of 1879 the Sydney scientific associations had found strength in rapprochement rather than competition. The Exhibition Building, which housed the Linnean Society's valuable library, was completely destroyed by fire in 22 September 1882. It had also housed W.B. Clarke's manuscripts, maps, library and specimens - purchased by government for £7,000 - the Mining Department's fossil, mineral and rock collection built up by Wilkinson, and the exhibits of the Technological Museum arranged by Hunt, Liversidge and A. Roberts.[4] The Royal Society of New South Wales responded immediately to this 'great calamity' in colonial science, generously putting its rooms and library at the disposal of the Linnean Society, and there were immediate 'universal and sincere' offers of assistance from societies in Victoria, South Australia, Tasmania and New Zealand. The Sydney losses were seen as important Australian losses, as indeed they were.[5]

---

[1]Anniversary Address, 14 September 1883, ibid., XX (1883), pp.xxvi-xxvii.

[2]Ibid., p.xxvi.

[3]See e.g. the review of J. & Proc. Roy. Soc. N.S.W., XVI (1882) in S.M.H., 14 November 1883.

[4]Proc. Linn. Soc. N.S.W., VII (1882-3), pp.678-80. The Linnean Society's library was valued, 'irrespective of that portion which it will be difficult ever to replace', at £3,000.

[5]Ibid., and 'Proceedings', 4 October 1882, J. & Proc. Roy. Soc. N.S.W., XVI (1882), p.255 and XVII (1883), pp.15-16.

On 2 April 1883, two days before the widely popular annexation of south-eastern New Guinea by Queensland on the orders of the Premier, Sir Thomas McIlwraith(1835-1900), a meeting was held in Sydney to hear E. Martin La Meslée, a member of the Paris Geographical Society, advocate the formation of a 'Federal Geographical Society of Australasia' to embrace the collection of data in 'the whole domain of commercial, political and natural sciences' of Australasia, New Guinea, Polynesia and Antarctica.[1] As Aurousseau has shown the Royal Geographical Society of Australasia - as the association was eventually called - owed its genesis as much to the public concern with French and German activities in the Pacific as to the Sydney geographers' and scientists' disenchantment with the defunct Section F (Geography and Ethnology) of the Royal Society.[2]

There was considerable opposition from some former members of the Royal Society's geographical section, members like the influential Frederick De Faur (1832-1915), to aligning the new movement with the Royal Society, and adequate support for an independent association was forthcoming from men like Maclay, Professor Stephens, Tenison-Woods and Rev. J. Ferriss, who, expressing the incipient nationalism of the day, demanded that the new society be 'independent and Australian'.[3] Political overtones apart, proponents of the Geographical Society were made aware of the volumes of unsystematised records of explorers in the departments of the surveyors-general in every colony and that in these and in the encouragement of exploration in the vast geographical region defined as their special responsibility, there was work enough to occupy an active branch of the Society in each colony. 'Japan, the Congo and various out-of-the-way places of far less importance than Australasia', La Meslée told the first general meeting of the society, 'were very much better known in the old

---

[1]'Preliminary Meeting', Proc. Geog. Soc. Australasia (N.S.W. & Vic. Branches), I (1883-4), p.vii.

[2]M. Aurousseau, 'Notes on Geographical Associations formed in Australia', unpublished roneoed notes, March 1960, revised April 1961. Copies in author's possession. The reason usually given for the formation of the Society is the failure of the Royal Society's geographical section.

[3]Proc. Geog. Soc. A'asia, I, p.x.

world than we were'.[1]

Seven to eight hundred people attended the inaugural meeting of the Society in June 1883, when discussion on annexation and exploration of New Guinea dominated the proceedings, with Du Faur launching a New Guinea Exploration Fund:

> The annexation of New Guinea a few weeks subsequently to the establishment of the Geographical Society of Australasia being mooted, is surely as great a piece of luck as ever attended the cradle of an infant scientific Society and it will be our fault if we do not "take the tide at the flood".[2]

In 1885, the Geographical Society despatched an expedition to the Fly and Strickland Rivers under H.C. Everill supported by generous grants from several colonial governments.[3]

In August 1883, stimulated by events in Sydney, the first meeting of the Victorian Branch was held with McCoy and Mueller taking a prominent part in the early proceedings. Cosmo Newbery strenuously tried to obtain a merger with the Royal Society of Victoria but the move was narrowly defeated.[4] Later the Victorian Branch did much to promote interest in Antarctic Exploration, particularly under Mueller's leadership.

The 'thrilling atmosphere' of federation talk continued with the intercolonial conference on the annexation of New Guinea held in Sydney in November and December 1883.[5] In December 1884 an inter-provincial

---

[1] The authoritative geographical journal Petermann's Mittheilungen, La Meslée claimed, had a better grasp of Australasian geography than the British and colonial geographers: 'more is known about Timbuctoo, the Congo and the negro lands of Central Africa than about Australasia', Proc. Geog. Soc. A'asia, I, pp.xiii-xvi. Stephens offered his own definition of Australasia: 'the Australian region as defined by W. Wallace shall be recognised by this Society as the space within which the operations shall be concentrated', quoted in Branagan, 'Words, Actions, People...', J. & Proc. Roy. Soc. N.S.W., 104 (1972), p.135.

[2] Proc. Geog. Soc. A'asia, I, p.24.

[3] Records of the expedition (ML.MSS 1090) are in M.L., Sydney. Among the scientific personnel was Walter Froggatt (1858-1937), the entomologist later prominent in Linnean and Sydney scientific affairs.

[4] Proc. Geog. Soc. A'asia, I, p.107 passim.

[5] Britain annexed the south coast at Port Moresby in November 1884, ten days before the Germans proclaimed their protectorate in the north.

geographical conference in Melbourne 'took the first step in establishing the priority of native place-names in international usage', and the following year branches of the Geographical Society were formed in Queensland (in July) and South Australia (in October).[1] Queensland, whose government was most anxious for federation, was prepared to forego some autonomy in favour of 'federation in geographical science [as] the one step necessary to ensure progression and harmony in the field of labour'.[2] In South Australia enthusiasm and popular support ran at the same high level, especially when it was agreed that all the branches would have the 'utmost possible independence'.[3] Although a great deal of progress was made in 1885-7 towards agreeing on a federal constitution - the 'Royal' style was granted in October 1886 - the Geographical Society of Australasia never gained any real impetus as a viable intercolonial association.[4] As independent associations the Victorian and New South Wales Societies were largely ineffectual by the end of the century, and the former was incorporated into the Royal Historical Society of Victoria in 1921. The Queensland Branch survived to make some rare and notable contributions to the geographical sciences among a generally mediocre collection of more modern papers, but the South Australian Branch, enjoying influential support from the outset, played a consistent and fundamental part in the opening up of unexplored parts of the colonies - beginning with the Elder Expedition of 1891-2 - and in the present century by taking a lead in South Australian research into geographical and historical affairs.[5]

---

[1]Aurousseau, 'Notes on Geographical Associations', pp.2-3.

[2]Proc. Roy. Geog. Soc. A'asia (Queensland), I (1885), p.8. A.C. Gregory read the inaugural address of the society in December 1885 and became its first president.

[3]Proc. Roy. Geog. Soc. A'asia (S.A.), I (1885-6), pp.9-16.

[4]Aurousseau, op. cit., p.2. See also 'Second Interprovincial Geographical Conference', 7 September 1887, Proc. Roy. Geog. Soc. A'asia (S.A.), II (1890), pp.xvi-xxi.

[5]Aurousseau, 'Notes', pp.2-4.

The initial successes of the popular scientific movement in the mid-1880's tempted other specialist groups to set up intercolonial associations. In March 1885 the Geological Society of Australasia was founded on the instigation of Robert Litton of Melbourne. Litton, a man of grandiose aims and many parts, enrolled McCoy and Mueller as vice-presidents and sought members in the other colonies and overseas.[1] Litton edited the short-lived Australasian Scientific Journal (1885) and the Society's Transactions (1886-92), which contained contributions from geologists as important as Hutton, James Stirling and the rising young Tannant William Edgeworth David (1858-1934), assistant geological surveyor in New South Wales and from 1891 professor of geology and physical geography at Sydney University.[2] Although many local geologists initially withheld their support from the Geological Society, by 1890 it had appointed David and W.H. Rands as regional representatives for New South Wales and Queensland respectively, and boasted a membership of just over one hundred.[3]

In the 1890's the Geological Society under Stirling adopted a much more professional constitution and posture, using the Australian Mining Standard as its official journal. It retained some coherence until 1905 despite powerful competition from the Australian Institute of Mining Engineers (later the Australasian Institute of Mining and Metallurgy) formed at Broken Hill in 1893 during the mining boom.[4]

---

[1] Litton was honorary secretary and Jonas Felix Levien, minister of mines in the Berry-Service government (1883-6) was president. See List of Members of the Geological Society of Australasia (for 1885). Also a Catalogue of Works in the Library of the Society (Melbourne, 1886).

[2] J.M. Dickins and Cecily Finlay, 'Geological Society of Australasia (1885-?): an historical note', J. Geolog. Soc. Aust., 6, part 1 (1958), pp.53-4. For David see e.g. M.E. David, Professor David.... (London, 1937) and D. Branagan (ed.), Rocks - Fossils - Profs (Sydney, 1973), pp.13-27.

[3] Ibid. and Branagan and Vallance, 'The Geological Society of Australasia (1885-1905)', J. Geolog. Soc. Aust., 14, part 2 (1967), pp.349-51. Attempts to form branches in South Australia (1885) and Western Australia (1895) were unsuccessful.

[4] Ibid., p.350. Both the Geological Society and the Institute used the Australian Mining Standard (started in 1888) as their official journal.

Despite set-backs to his plans with the further fragmentation of scientific effort in Sydney and the loss of ground in the Royal Society to the Geographical Society, Liversidge worked determinedly in the early eighties towards his avowed goal of scientific federation. A persuasive man and excellent organiser, Liversidge pressed for reforms in university and secondary science teaching and the setting up of a technological museum in New South Wales, and cultivated privately and from within the Royal Society his links and influence with colonial scientists throughout Australasia, including Haast, Hector and Kernot.[1] Since 1877 Liversidge had ensured that regular reports on colonial scientific developments - particularly on the work of the Royal Society of New South Wales - had appeared in Nature. Certain of his own base of support within the Royal Society for an Australasian Association, Liversidge was astute enough to appreciate that the impetus must come from the principal colonial scientists and their associations; from within the popular science movement of the period and from the established science tradition in Britain and Europe.

Curiously enough it was the combined influence of the European traditions; of the continuing interest in unresolved problems of Australian zoology; of the popular receptivity for science and federation in the eighties and of his own standing in Australian science which gave Liversidge the opportunities in 1884-6 to successfully lay plans for an Australasian Association.

William Hay Caldwell came to Australia late in 1882 as first holder of the Balfour Studentship, named in memory of his former teacher at Cambridge University, the brilliant young embryologist and evolutionist Francis Maitland Balfour (1851-82), whose work Treatise of Comparative Embryology (2 vols, 1880-81) - dealing with the evolution of the egg and embryo in vertebrate and invertebrate animals - won immediate contemporary acclaim. Balfour had occupied one of the two places allocated to Cambridge University at Dohrn's Naples zoological station, where he commenced his independent research career.

---

[1] Correspondence, presscuttings and reports, Liversidge Papers, Sydney University. He published Report upon Certain Museums for Technology, Science and Art in 1880, and two years later was appointed dean of the newly established Faculty of Science in Sydney University, a position he retained until 1904. For Liversidge at Sydney University see Rocks - Fossils - Profs, pp.5-6.

While studying under Balfour in 1881 Caldwell was asked to consider going to Australia to attempt to clarify the embryology of the marsupials, monotremes and ceratodus.[1] The Balfour award subsequently enabled him to come to Eastern Australia. There was no more critical or interested observer of Caldwell's work in Australia than George Bennett, still labouring to elucidate after over fifty years personal work the same problems which drew Caldwell to the continent. Bennett was firmly convinced that the monotremes were "ovoviviparous".[2] In April 1884, after working principally on the kangaroo, Caldwell went to the Burnett River, Queensland, to study the monotremes and ceratodus more intensively. On 29 August, having found the eggs both in the platypus and echidna, Caldwell sent a cryptic telegraphic summary of his work to Liversidge for transmission to the British Association, then meeting in Montreal. The message 'Monotremes oviparous, ovum meroblastic' took the Montreal meeting by storm in September 1884 and the immediate suggestion was made to hold a future meeting of the British Association (B.A.A.S.) in Australia.[3]

With great sense of occasion, seeing the previously sceptical Bennett's enthusiasm for Caldwell's discoveries,[4] Liversidge appealed through the press for a sensible use of the opportunity. Premier James Service, sensing honours for Victoria, had telegraphed Britain inviting the B.A.A.S. to meet in Melbourne but Liversidge knew that, despite the attractions of Australasia, 'comparatively few [scientists] could afford the time and money to come out here'.[5] Only fifty members of the British Association, Liversidge estimated, would come to Australia. A much better solution would be to prepare the way

---

[1] Caldwell, 'On the development of the Monotremes and Ceratodus', J. & Proc. Roy. Soc. N.S.W., XVIII (1884), pp.117-22.

[2] See Bennett to Owen, 10 February and 10 September 1884, Bennett Papers, M.L., Sydney.

[3] Burrell, The Platypus...(Sydney, 1927), p.45. Caldwell's fullest account of his work was 'The Embryology of Monotremata and Marsupialia, Part I', Phil. Trans. Roy. Soc. London, Series B vol. 179 (1887), pp.463-86.

[4] 'It is very gratifying to have so qualified a man in Australia, capable of following up in a proper scientific manner the investigation of these difficult and intensely interesting subjects and able to devote the whole of his time to its attainment.... The problem of the Monotremes will be solved during our life time', Bennett to Owen, 10 September 1884, Bennett Papers, M.L., Sydney.

[5] S.M.H., 16 September 1884 and Telegraph, 15 October 1884.

for 'intended scientific guests' and

> as a preliminary step...try to bring about a federation or union of the members of the various Scientific Societies in Australia, Tasmania and New Zealand, into an Australasian Association for the Advancement of Science on the lines of the British Association, with a view to holding the first general meeting in Sydney, on the hundredth anniversary of the Colony, when there will probably be an International Exhibition to celebrate the event. With the combined attractions we might hope to gather together a very fair number of scientific visitors to take part in the proceedings.[1]

Receiving a favourable response Liversidge stage managed Caldwell's return to Sydney for further laboratory work and arranged for him to present his preliminary findings to a special meeting of the Royal Society of New South Wales in December 1884.[2] The same month Caldwell also exhibited specimens before the Linnean Society.[3] In Britain, too, the colonists were gratified to learn, their 'anomalous' animals had attracted the attention of scientists, even meriting a leader in The Times.[4]

In May 1885 Liversidge was elected president of the Royal Society of New South Wales, leaving the way clear for him to press on with his earlier proposals. In England T.H. Huxley, in his anniversary address to the Royal Society in November 1885, spoke about the sort of reforms and plans for science organisation and teaching dear to Liversidge's heart.[5] For the wider task of intercolonial scientific union Huxley's suggestion of an association, perhaps through the Royal Society of London, of 'all English-speaking men of science' particularly suited Liversidge's purposes. Huxley certainly saw no obstacles to the desired end:

---

[1] Ibid.

[2] Eighty people attended the meeting on 17 December, including Bennett. See J. & Proc. Roy. Soc. N.S.W., XVIII (1884), pp.117-22 and 138-41. See also S.M.H., 6 November and 18 December 1884.

[3] Proc. Linn. Soc. N.S.W., IX (1885), p.1217.

[4] On 4 September 1884. See Telegraph, 15 October 1884.

[5] E.g. the need for greater emphasis on a science and 'modern subjects' curriculum at the expense of classical languages, and the need for more experimental work at secondary level. Liversidge quoted extensively from Huxley's address in his own presidential address of 5 May 1886, J. & Proc. Roy. Soc. N.S.W., XX (1886), pp.20-30.

> Whatever may be the practicability of political federation for more or fewer of the rapidly growing English-speaking peoples of the globe, some sort of scientific federation should surely be possible.[1]

Liversidge clearly saw problems of status and scientific standards being raised in any scheme to place colonial and American scientific associations on a par or even in a less formal associate relationship with the 'grand old parent Society'. Some standards of excellence still must apply to the colonies, where 'any one who does good work [was] usually duly acknowledged by election to the Fellowship of the Royal Society'.[2]

Liversidge's positive answer was still an Australasian Association, governed by a general council, with delegates from each colonial scientific society on a proportionate membership basis, and with local and sectional committees to undertake the necessary organisation. Liversidge's information showed that there were twenty-five to thirty 'recognised Scientific Societies' in the Australasian colonies with a membership of 2,500-3,000.[3] In his proposals Liversidge adhered closely to the British Association models and aims. 'There is no doubt' he claimed,

> that a meeting of the kind held during the centennial year would confer great benefit on the Colonies and convey much instruction to our visitors. It would afford a unique opportunity for the exchange of ideas and information; and it would not only have an immediate beneficial effect, but would permanently raise the high-water-mark of thought in all the Colonies, and especially in connection with scientific matters. It would tend to stimulate all classes, and disseminate a taste for all branches of knowledge.[4]

---

[1]Ibid., p.30 and Proc. Roy. Soc. London, 39 (1885), p.282.

[2]J. & Proc. Roy. Soc. N.S.W., XX (1886), p.31. In 1886 the resident Australasian F.R.S.'s were Ellery, Hector, Haast, Liversidge, McCoy, Mueller and Russell. Russell had been elected F.R.S. in 1886, proposed by the six listed above.

[3]Ibid., pp.36-7. Liversidge's definition of 'science' in this context was anything from astronomy and anthropology to zoology, including 'economic science'; medical and sanitary science; literature and fine arts and social science.

[4]Ibid., p.40.

It would, in short, be a marriage of popular and academic science.

His case stated, Liversidge moved promptly to implement it. In June 1886 he gained the support of the Royal Society's council to circularise other colonial societies, asking them to nominate delegates to meet in Sydney with their representatives, Liversidge, Charles Kinnaird Mackellar (1844-1926), Rolleston, Russell and Wilkinson, to discuss the preliminary organisation of the Association.[1] To add weight and credibility to the proposals Liversidge's presidential address was widely distributed in pamphlet form; six thousand circulars sent throughout Australasia stressing that 'no interference with the ground occupied by other Institutions' was envisaged, and the Royal Society immediately applied to the New South Wales government for 'pecuniary aid to promote the advancement of Science, as is done elsewhere'.[2]

In Melbourne, Kernot, president of Victoria's Royal Society, gravely concerned about 'the extraordinary ignorance of science shown by persons considered well educated', offered Liversidge immediate assistance.[3] Although Victorians were deeply involved in their 'Antarctic fever' with plans to explore and annexe parts of that continent under the auspices of the first Australian Antarctic Committee - a joint committee of the Royal Society and Geographical Society of Australasia (Victoria Branch) - leaders of the Antarctic movement like Ellery, Kernot, Mueller and J.J. Wild came to see in Liversidge's Association 'a valuable means whereby its aims could be explained to Australian scientists generally'.[4] Kernot welcomed the possibility of 'an Australian (sic) Association' and did 'not in the least grudge Sydney the honour of holding the first session'.[5]

---

[1] 'Appendix to President's Address', Rep. A.A.A.S., I (1888), pp.15-17 and Minute Book of Australasian Association (1886-1907), MSS.988/1, M.L., Sydney.

[2] 'Preliminary Circular' and letter, July 1886 and Liversidge to Sir P.A. Jennings, Premier of N.S.W., August 1886, Rep. A.A.A.S., I, pp.17-18 and Minute Book, op. cit.

[3] Kernot to Liversidge, Melbourne University, 19 July 1886, Liversidge Papers, Sydney University.

[4] Swan, Australia in the Antarctic, pp.45-61.

[5] Kernot to Liversidge, 19 July 1886.

In Queensland the Royal Society 'warmly approved' Liversidge's proposals and Henry Tryon was appointed to represent their interests at the Sydney meeting.[1] The Queensland Branch of the Geographical Society sent its active founder James Park Thomson (1854-1941) and the New South Wales Branch was represented by its president, Sir Edward Strickland.[2] Although Liversidge cast his net wide in New South Wales, approaching newly-formed professional groups like the Engineering Association of N.S.W,; the Institute of Architects of N.S.W. and the Institute of Surveyors, none of their delegates turned up at the preliminary meeting held on 10 November 1886.[3] Professor Stephens and Joseph James Fletcher (1850-1926), the new director and librarian, represented the Linnean Society, which was a keen supporter of science federation and the Zoological Society of N.S.W. (established in 1879) chose the aged Dr Arthur Todd Holroyd (1806-87) to represent its interests.

Of the ten societies approached in New Zealand only three nominated delegates[4] and none were appointed at all from the three associations, including the Royal and Geographical Societies, to whom Liversidge appealed in South Australia. He fared little better in Tasmania, where, although the Royal Society was enjoying renewed prosperity under James Agnew (1815-1901) and Alexander Morton (1855-1907), the small scientific community's principal efforts were being thrown behind the Royal Society's campaign to gain government support for Antarctic exploration.[5] Neither South Australia nor Tasmania came to the Sydney meeting in 1886.

---

[1]Minute Book, Roy. Soc. Qld, vol. I, 30 August and November 1886.

[2]Rep. A.A.A.S., I, pp.19-21.

[3]Ibid., p.20. The engineers appointed A.C. Mountain and G.A. Key as their delegates and Thomas Rowe was deputed to represent the architects. The surveyors simply did not reply to Liversidge's circulars.

[4]S.H. Cox attended the preliminary meeting on behalf of the Nelson Philosophical Society and the Philosophical Institute of Canterbury; Tenison-Woods was appointed by the Otago Institute but did not attend.

[5]Pap. & Proc. Roy. Soc. Tas. (1886), pp.xxv-xxxix and 141-55 and (1887), pp.xxv-xxvii. Although the society appointed two delegates, James Barnard and Bishop Sandford, neither went to Sydney.

Initial support for the Australasian Association would have been very thin indeed outside Queensland and New South Wales but for Kernot's decision to press on with his support even in the face of the Victorian 'Antarctic fever'. Kernot and K.L. Murray went to Sydney as joint representatives of the Royal Society and the Victorian Engineers' Association, and Robert Litton attended from Victoria on behalf of the Geological and Historical Societies of Australasia.[1] In the end Liversidge brought together sixteen delegates representing thirteen scientific associations out of the thirty-three approached in Australia and New Zealand.[2]

The first meeting framed the Association's provisional rules; made plans for the Sydney congress in 1888 and launched a public appeal for members.

In 1887 a lesser spirit than Liversidge would perhaps have been daunted by the slow response and competitive activities of the other colonies' societies. In South Australia the Royal Society attempted to organise its own informal scientific meetings in conjunction with a 'Studical Congress' in August,[3] and the following month a second interprovincial geographical conference was held in Adelaide, attracting delegates from New South Wales, Victoria and the host colony and addressing itself to problems of Antarctic, New Guinea and Central Australian exploration, as well as Australian nomenclature.[4] In Hobart the Royal Society of Tasmania paused in its Antarctic campaign to endorse a Canadian proposal for American and British geologists to form some sort of 'English-speaking scientific federation'.[5]

---

[1] Rep. A.A.A.S., I, pp.19-21. W.J. Conder and W.H. Nash attended for the Victorian Institute of Surveyors.

[2] W. Woolls (Field Naturalists' Club of Victoria) and Albert Le Souef (Zoological and Acclimatisation Society of Victoria), although appointed, did not attend.

[3] 'Scientific meetings at Adelaide', Pap. & Proc. Roy. Soc. Tas. (1887), p.xxxiv.

[4] Proc. Roy. Geog. Soc. A'asia, II (1887-8), pp.xv-xxi

[5] 'Scientific Federation', Pap. & Proc. Roy. Soc. Tas. (1887), pp.xxxv-xxxvi.

In Victoria, the Antarctic Exploration Committee, its submissions to imperial and colonial governments complete, waited confidently for funds to send out an expedition. But the British, despite the colonists' cogent economic, political and scientific arguments in favour of a complicated, multi-purpose Antarctic expedition which - in true colonial fashion - mixed commerce with science, refused any money. The imperial authorities assessed 'that a large and properly equipped scientific expedition was beyond the resources of the colonies'.[1] At this crucial point supporters of the Antarctic movement saw great merit in seeking their ends within Liversidge's accommodating Association.

In March 1888 the Association's first office-bearers were elected in Sydney by the delegates of the adhering Australasian scientific associations. Russell became first president and Liversidge and Bennett joint honorary secretaries.[2] The last two were a representative union between the great amateur naturalist tradition of the pioneering years and the professional - and mostly physical scientists - who now were the scientific backbone of the older societies and hence of the Australasian Association.

Between March and August 1888 the Association's first council met regularly to appoint sectional officers, receive papers and plan for the congress. The delicate task of selecting sectional presidents involved a sharing of the honours as widely as possible between the various colonies. Ellery (Section A: astronomy, mathematics, physics and mechanics); Kernot (Section J: architecture and engineering) and the competent government statist, Henry Heylyn Hayter (1821-95) (Section F: economic and social sciences and statistics) came from Victoria; J. Bancroft (Section H: sanitary science and hygiene) and R.L. Jack (Section C: geology) from Queensland; Professor Edward Vaughan Boulger (b.1846) (Section I: literature and fine arts) and Tate (Section D: biology) from South Australia; Professor J.G. Black (Section B: chemistry and mineralogy) from Otago, New Zealand, and from Western Australia, the Surveyor-General, John Forrest (1847-1918) (Section E: geography). Only the earnest but somewhat eccentric philanthropist

---

[1] Swan, Australia in the Antarctic, p.59.

[2] Rep. A.A.A.S., I, p.9.

and amateur anthropologist, Dr Alan Carroll (d.1911), hailed from New South Wales, the host colony.[1]

The congress in late August and early September 1888 was the most significant scientific conference yet to assemble in Australia, its 820 members representing perhaps the most comprehensive cross-section of scientific and intellectual interests in the Australasian colonies. Public interest ran high, fanned by good publicity. Although other concessions were made to popular science in the provision of two 'popular lectures' by Hector and Baldwin Spencer and some less scientifically exacting excursions, those most deeply involved in the Association's organisation brought to it the skills and dedication of their professional and specialist disciplines. Among the recently-appointed professors who attended, for example, were William Henry Bragg (1862-1942), professor of mathematics and physics in Adelaide; Edgeworth David; David Orme Masson (1858-1937), professor of chemistry in Melbourne; Baldwin Spencer and Richard Threlfall (1861-1932), professor of physics in Sydney. These five all left their marks on Australian scientific teaching, research and organisation over the next three to four decades. By 1890, when the Association met for the second time in Melbourne, they were recognised leaders and opinion-makers in Australian science.[2]

Liversidge, with his thorough grasp of colonial realities, ensured that the long-established men of colonial science were also won for the Association. Mueller was president in 1890 and Agnew, J. Barnard, Bancroft, Bosisto, C. Moore, De Vis, Ellery, Haswell, Howitt, Russell, Stirling, Tate, Bracebridge Wilson, C.S. Wilkinson, Tenison-Woods, to name a few prominent men from each colony at random, all gave active support and allegiance to the Association.

---

[1]Carroll was the founder and organiser of the Anthropological Society of Australasia in 1895. Historians of anthropology speak disparagingly of this society when comparing its work - essentially Carroll's - with that of contemporary anthropologists like L. Fison and Howitt. Records, presscuttings and some correspondence of the society are deposited under MS 26 in B.L., Canberra.

[2]For the sort of immediate grasp of outside events and advanced theories in science which A.A.A.S. promulgated through its meetings and the new generation of professors see J.A. La Nauze, '"Other Like Services": Physics and the Australian Constitution', <u>Rec. Aust. Acad. Sci.</u>, I, No.3 (1969), pp.36-44. Threlfall at the 1890 meeting drew attention to Heinrich Hertz's work on electro-magnetic waves.

In the first choice of special committees to investigate specific problems and areas of study the Association displayed a commendable contemporary relevance and awareness. Fourteen such committees were established to examine conditions of labour and strikes; the sanitation of towns; Australasian biological and geological bibliography, mineral censuses, seismological phenomena, glacial evidence, chemical science; the re-establishment of an Australasian biological station and Pacific and Australian anthropology. The expert services of the colonies' foremost scientists were thus made collectively available for the first time to help tackle problems over a wide spectrum of interests.[1]

John Forrest, addressing the geographical section as president on 30 August 1888, made the strongest appeal for federating science. Exploration; 'the conservation of water for irrigation of the soil' and the 'systematic and careful survey of the mineral character of the continent' all demanded a united effort in science, pure and applied. Such co-operation, Forrest stressed, implied federation on an economic and political basis:

> ...if at one moment I have treated of early travel, at another of future scientific research, at another of the conservation of water and the irrigation of the soil, while at another time I have touched upon the subject of Australian federation, it is because I consider the term geography covers a very wide area, and embraces or is allied to so many questions of great importance to us, and in which colonial history and colonial enterprise are connected...[2]

In January 1891, Sir James Hector, addressing the Association as president at the third meeting in Christchurch, took up the same theme. Scientific effort was now necessarily an intercolonial effort and Liversidge's Association was 'the first truly effective step towards Federation which has yet been achieved'. 'Politicians', Hector stressed, 'should take this well to heart'.[3]

---

[1]Rep. A.A.A.S., I, pp.xxxiii-xxxiv. Not all of the committees functioned smoothly but some were very diligent in their reporting, despite the geographical separation of the experts appointed. See e.g. Rep. A.A.A.S., II (1890), 'Reports of Committees', pp.203-360 and 693-708.

[2]Rep. A.A.A.S., I, p.359.

[3]Rep. A.A.A.S., III (1891), p.4.

BIBLIOGRAPHY

Note on Sources In the following Bibliography only those primary sources which touch directly on scientific associations in Eastern Australia (1820-90) or the principal figures who founded and sustained them are listed in any detail. The scattered nature of many of the manuscripts, especially where they are inadequately housed by the societies themselves, necessitates a fuller listing of the sources. Ann Mozley's A Guide to the Manuscript Records of Australian Science (Canberra, 1966) gives a good picture of the sources available in the field as a whole, particularly of individual scientists and of institutions and associations after 1890. My earlier essay 'Some primary sources for the history of scientific societies in Australia in the Nineteenth Century' (Rec. Aust. Acad. Sci., II, No. 4 (1969), pp.71-6) outlines the scope of materials available in the period under review and a more recent unpublished paper to the Library Association of Victoria, 'Where have all the scientific manuscripts gone?', explains the problems of locating and preserving scientific MSS in Australia. The unpublished studies listed below dealing with particular aspects of intellectual and scientific history in the various colonies cite in some detail the local sources available for the study of individuals or separate disciplines (e.g. L. Gilbert on botany in N.S.W.). The following Bibliography is, therefore, not a complete resource tool for the study of science in nineteenth century Australia.

Many of the serials and monographs listed are available in the Basser Library, Canberra.

ORGANISATION OF BIBLIOGRAPHY

A. UNPUBLISHED SOURCES

1. Papers, Correspondence and Minutes
2. Unpublished Theses
3. Unpublished Essays

B. PARLIAMENTARY PAPERS

C. NEWSPAPERS, JOURNALS AND PERIODICALS

1. Almanacs, Newspapers and General Periodicals
2. Scientific Periodicals and Reports (Australian)

D. CONTEMPORARY WORKS

E. SECONDARY SOURCES

Abbreviations of Repositories

B.L., Canberra	Adolph Basser Library, Australian Academy of Science, Canberra.
La T L., Melbourne	La Trobe Library, Melbourne.
M.L., Sydney	The Mitchell Library, Sydney
N.L., Canberra	National Library of Australia, Canberra.
T.A., Hobart	Tasmanian State Archives, Hobart.
V.A., Melbourne	Victorian State Archives, Melbourne.

A. UNPUBLISHED SOURCES

1. Papers, Correspondence and Minutes

Acclimatisation Society of Queensland. Minute Books (1862-5; 1880-6; 1895-1901); press-cuttings, projects etc. (one vol. 1865-70); cuttings and miscellaneous papers (one vol. 1875-79), OM 66/24 Q1, Oxley Memorial Library, Brisbane.

Allport Collection. Correspondence (1860-77) on science and acclimatisation in Tasmania, Allport Library and Museum of Fine Arts, Hobart.

Anthropological Society of Australasia. Correspondence and papers (1885-1911), MS 26, B.L., Canberra.

Archer, W. Journals (esp. 1859-61). Archer Papers, University of Tasmania, Hobart.

Australasian Association for the Advancement of Science. Records (1886-1961), 101 vols, esp. Minute Book (1886-1907); press-cuttings (1888-1928) and minutes of sections, M.L. MSS 988, M.L., Sydney. See also Liversidge, A.

—— South Australian Committee. Minute Book (1888-93), D 4400, Public Library of South Australia.

Australian Museum (Sydney). Minute Books (1836-63; 1863-74; 1874-9); holograph letters from scientists (1883-1914); Letter Book (1837-61), Australian Museum Library, Sydney. See also Krefft, G; Ramsay, E.P. and Whitley, G.P.

Australian Society for the Promotion of Arts, Manufactures and Agriculture. Papers (1849-50), inc. letters of James King, F.M. Stokes and T. Scott, ML MSS 912 and H.G. Douglass to L.E. Threlkeld, A.382, pp.65-6, M.L., Sydney.

Banks, Joseph. Banks Papers inc. Correspondence (1789-1818), Microfilm, NL, G026, Canberra, originals in Sutro Collection, California.

Bennett, G. Letters (1834-66) and documents from the Owen Archives, Royal College of Surgeons, England, British Museum (Nat. Hist.), Kew Gardens etc., typescript and photoprints, Uncat. MSS, ML. Set 361 and 362 and A05, Ag7 and A90; also as microfilms FM3/237-8 and 228, M.L., Sydney.

Botany and Science. Correspondence relating to Philosophical Institute of Victoria (1856); Zoological Society (1857); G. B. Neumayer and Mueller. Boxes 924-29, V.A., Melbourne.

Brisbane, Sir T.M. Papers and Correspondence (1812-30) with Goulburn, Robert Knox, Dr Bruntly, Dr Cooper, and others; 'Statement of Circumstances as Governor of N.S.W.' (1825); Addresses to Brisbane; two extracts of Brisbane's statements concerning Sir John Jamison (1823); four letters Bathurst to Brisbane (1815-24) and five letters Brisbane to Bathurst (1823); 21 letters of Brisbane to Bruce and others on scientific matters (1823-4); letters and despatches re Brisbane's recall (1825-30); autobiographical extract on Parramatta Observatory, Nan Kivell Collection, NK 6787, N.L., Canberra.

—— Letters from Parramatta re observations (1822-5) and correspondence concerning Rümker (1828-31), A.P. 115, a-j and D.M. 4, 65-111, Royal Society of London.

Chief Secretary's Collection (Vic.) (1860-3), inc. Correspondence of the Board of Science, Observatory (esp. Reports of Board of Visitors, 1862-3) Great Melbourne Telescope, one box, 954, V.A., Melbourne.

Circular Head Scientific Journal. Xerox copy of original MS (1836) and associated correspondence. ML MSS 1180, M.L., Sydney.

Clarke, W.B. Correspondence, records, notebooks, press-cuttings and diary (1839-78), M.L. and Dixson Library, Sydney.

Denison, Sir William. Correspondence concerning proposal for a colonial work on natural history (1858-9), includes corresp. of J.D. Hooker, Miscellaneous Corresp. M.C. 6. 22-5, Roy. Society of London.

Franklin, Sir John and Lady Jane. Correspondence and reports (1840-44); journals and diaries (1838 and 1843); Roy. Soc. Tasmania, Library, Hobart.

—— Correspondence with J. Herschel (1837-8), Herschel Correspondence, HS. 7/358-61, Roy. Society of London.

——Papers (1800-1916) with those of J.P. Gell Microfilm, G.578, N.L., Canberra.

—— Diaries and letters (1837-59), MS 114, N.L., Canberra.

Further papers are held in M.L., Sydney; State Library of Victoria and T.A., Hobart.

Geological Survey, Victoria (1858-61). Correspondence of McCoy and Selwyn, one box (118), V.A., Melbourne.

Gould, J. Correspondence of John Gould with Franklin, J. Gilbert, E.P. Ramsay and others (1838-84), MSS 454 and 587, N.L., Canberra.

—— Letter Gould to M. Foster, colonial secretary re zoological collecting in Tasmania, CSO 5/190/4603, T.A., Hobart.

Gunn, R.C. Correspondence and notes, mostly zoological, journals etc. (1836-8), NL MS 2036/1-5, N.L., Canberra.

—— Correspondence and scientific papers (1832-72), including MS papers received for Tasmanian Journal, 8 vols, A246-253 and A316, M.L., Sydney.

—— Correspondence (1848-70), MS Q167, Dixson Library, Sydney.

Krefft, G. Holograph statement by Krefft of his case against the Trustees of the Australian Museum, typescript copy of original (in possession of G.P. Whitley), MS 21, B.L., Canberra.

—— Papers and Correspondence, esp. Notebooks (1867-74), B136-9; 8 vols of papers, MSS and correspondence (1856-82), A261-8, letters to and from H. Parkes (1872-6), Parkes Correspondence, vols 20 (A890) and 48 (A918); letters and testimonials from men of science (1858-74), A1537-3, M.L., Sydney.

Lhotsky, J. Correspondence with Colonial Office (1835-6) in Despatches to Gov. of N.S.W., A1273, M.L., Sydney.

—— Lempriere's diary comments re Lhotsky in A577, M.L., Sydney.

—— Letter to Rev. J.D. Lang (1861), A2227, M.L., Sydney.

Linnean Society of London. Records relating to Australia (1782-1869), microfilm, G1102, N.L., Canberra and FM 4/2699 and 2700, M.L., Sydney.

Liversidge, Prof. A. Papers, correspondence and records, esp correspondence and cuttings relating to A.A.A.S., science in N.S.W., the University of Sydney and various governmental and private scientific institutions and scientists in Australia, 15 files, 4 boxes, 12 bound photograph vols, Archives of Syd. Univ. See also Australasian Association for the Advancement of Science.

McCoy, Sir F. Correspondence (1841-92), ML MSS A645, M.L., Sydney.

—— Correspondence (1858-99) as director of the National Museum, Melbourne, National Museum of Victoria.

Macleay, W.S. Papers from Scientific Societies, inc. correspondence from his pre-Australian career in Macarthur Papers, A4311, M.L., Sydney.

Maitland Scientific Society. List of members and addresses (1887-91), ML MSS A7147, M.L., Sydney.

Mechanics' Institute, Launceston. Minute Book (1842-7); newspaper cuttings, Public Library, Launceston.

Microscopical Society of Victoria. Minute Book (1873-86), Library, Roy. Soc. Vic., 9 Victoria Street, Melbourne.

Mitchell, Sir T.L. Papers and Correspondence, esp. 'On the Boomerang Propeller'; lecture to Australian Society (1850), Corresp. vol. 7, A295, pt 2; letters Mitchell to Buckland and Owen (1840-42), Am, 50/13 and 50/22, A293, pp.285-6; letter to Murchison (1853), A294; Owen to Mitchell (1838), A295, p.5, Mitchell papers and Correspondence, M.L., Sydney.

Museum and Observatory (Melbourne). Papers (1860-63), inc. corresp. of McCoy and Neumayer, one box, 953, V.A., Melbourne.

Natural History Society of Queensland. Minutes (1892-6); newspaper cuttings, miscellaneous papers, OM 68-15, Oxley Memorial Library, Brisbane.

Owen, Sir R. Miscellaneous Correspondence (1838-84), chiefly with T.L. Mitchell and Parkes, A293-95; A297; Ag12; Macarthur Papers, vol. 40, A2936; A890; A18 and A19; Parkes Correspondence, vol. 45; A915; A926 and A987, M.L., Sydney.

Philosophical Society of Australasia. Minute Book (1821-2), ML MSS D142, M.L., Sydney.

Philosophical Society of N.S.W. Minute Book (1856-65); one volume of newspaper cuttings, reports, papers and debates, Library, Roy. Soc. N.S.W., Science House, Sydney.

Queensland Philosophical Society. Minute Book (1868-1883) and Members' Book (1859-77); Books Borrowed (1870-82), deposited in Geology Dept., Queensland University with papers of the Roy. Soc., Queensland.

Ramsay, E.P. Letters and papers (1860-1912), 7 vols, ML MSS, 562 and 563.

Royal Geographical Society of Australasia - N.S.W. Branch. Records (1883-1907), including minute books, letter books, catalogue of library periodicals and minutes of exploration committees, ML MSS 774, M.L. Sydney.

For further records of this Society's branches see Aurousseau, M, under 'Unpublished Essays of later authors'.

Royal Park Zoological Society. Letters and Minute Book (1862-85), ML MSS A345, M.L., Sydney.

Royal Society of N.S.W. Newspaper cuttings (1875-86); letter books from 1875; select inwards correspondence; Council general minute book; sectional books, Library of Roy. Soc. N.S.W., Sydney.

Royal Society of Queensland. Minute Books (1883-9); 1889-97, including minutes of the Antarctic Expedition Committee and public lectures committee); Correspondence Copy Book (1883-90), deposited in Geology Dept., Queensland Univ.

—— Field Naturalists' Section. Minute Book (1886-92), Queensland Herbarium Library, Indooroopilly, Qld.

Royal Society of V.D.L. (later Tasmania). Proceedings of Horticultural and Botanical Society (1843-5); Council and General Minute Books (1845-53, 1853-63); Minutes of meetings, mostly newspaper extracts (1861-7 and 1878-85); Minutes of Physical, Mathematical and Mechanical Section (1863-5); Letter Books (1844, 1860-73, 1874-85 and 1885-1905); Correspondence concerning Australasian Antarctic Expedition (1886-90); File on Rossbank Observatory (including correspondence), Library, Roy. Soc. Tasmania, Hobart.

—— Correspondence concerning the Society (1845-6), CSO 8/188-3196, 8/171-2547; CSO 11/35-795, T.A., Hobart.

Royal Society of Tasmania (Northern Branch). Correspondence concerning its formation (1921), Queen Victoria Museum, Launceston.

Royal Society of Victoria. Council Minute Book (1854-88), includes minutes of Victorian Philosophical Society; 25 vols of miscellaneous records, minutes, catalogues, financial records and correspondence, Library, Roy. Soc. Vic., Melbourne.

Rümker, C.C.L. Correspondence with Dr John Lee (1840-3), in John Lee Correspondence (Hartwell Papers), County Record Office, Bucks, England. Microfilm G204, N.L., Canberra.
See also Bergman, G.

Sabine, Sir Edward. Correspondence with Brisbane, J. Kay, C. Pasley, Rümker, W. Scott, W.P. Wilson etc. concerning astronomical matters in Australia, Sabine Corresp. Roy. Soc. London.

Societies and Institutions (1854), one box (410), V.A., Melbourne.

Smyth, R. Brough. Correspondence, notes and papers (1856-89), MS 8781/70, La TL., Melbourne.

Tasmanian Society. 'Minutes of "The Society"' (1841-2); transcription of report by F.H. Henslowe, secretary, (September 1841); list of members receiving Journal; miscellaneous correspondence (1843-4); one file of papers in Franklin Collection containing correspondence and reports (1841-2); List of Members (1842); Correspondence on a 'United Society' (1847), Library, Roy. Soc. Tasmania, Hobart.

—— Official Correspondence concerning printing of the Tasmanian Journal (May - July 1842) in Despatches to Gov. of N.S.W., ML MSS A1288, M.L., Sydney and E. Abbott to Montagu on the same subject, 9 Sept. 1841, CSO 8/21-520, T.A., Hobart.

Thompson, J.P. Papers and letter book (1891-95) relating to Royal Geographical Society of Australasia (Queensland Branch), OM65-21, Oxley Mem. Library, Brisbane.

Thomson, E.D. One letter, Thomson to Justice Wise, Barnham, 4 May 1863 interleaved in Wise's copy of Lhotsky's Journey to the Australian Alps, C461-1, M.L., Sydney.

Victorian Exploring Expedition. Records, correspondence, despatches, field notes etc. (1857-75); minutes of Royal Society (1857-62), esp. 'Instructions for the Geologist and Zoologist and the Botanist attached to the Victorian Leader's Copy' (H16181); 'Instructions to...Burke' (H16169); Becker's, Beckler's Wills's reports (H16187-8; 91-3; 98-9; 16210-11), La TL., Melbourne.

Watson's Bay Marine Biological Station (Sydney). Papers, records and correspondence (1876-84), Archives, Syd. Univ.

2. Unpublished Theses

Couch, B.V. 'The administration of Thomas Mitchell, 1826-37. A study of the man and his contemporaries', M.A, Univ. Syd., 1963.

Croydon, Marilyn. 'Melbourne and its cultural life in the sixties', M.A., Univ. Melb., 1953.

Fry, P.J. 'The foundations and early history of the Royal Society of Victoria', B.A., Univ. Melb., 1955.

Gilbert, L. 'Botanical Investigation of Eastern Seaboard Australia, 1788-1810', B.A., Univ. New England, 1962.

—— 'Botanical Investigation of N.S.W., 1811-1880', Ph.D., Univ. New England, 1971.

Johnson, R.I. 'The history of the Sydney Mechanics' School of Arts from its foundation in 1833 to the 1880's', M.A., A.N.U., 1968.

Laverty, J.R. 'The history of municipal government in Brisbane, 1859-1925. A study of the development of metropolitan government in a context of urban expansion', Ph.D., Univ. Queensland, 1968.

This work cites a number of useful dissertations and theses on topics relating to the cultural, industrial and amenities development of Brisbane and Queensland.

Ling, E. 'William Denison, reformer of colonial science', B.A., Univ. N.S.W., 1973.

Lundie, Jill. 'The Melbourne Mechanics' Institute, 1839-1872', B.A., Univ. Melb., 1955.

McGowan, R.M. 'A study of social life and conditions in early Melbourne prior to Separation, 1836-1851', M.A., Univ. Melb., 1951.

Muller, Margaret K. 'The background of the Burke and Wills Expedition of 1860', B.A., Univ. Melb., 1958.

Murray-Smith, S. 'A history of technical education in Australia, with special reference to the period before 1914', Ph.D., Univ. Melb., 1966.

O'Connor, D.J. 'The Royal Australian Chemical Institute, 1917-1967', M.Ec., Univ. Syd., 1968.

Roe, Jillian I. 'A decade of assessment: being a study in the intellectual life of the city of Melbourne between 1876 and 1886', M.A., A.N.U., 1965.

Slawick, Eva. 'Public health in Melbourne: the hesitant years, 1860-70', B.A., Univ. Melb., 1963.

Smith, F.B. 'Religion and Freethought in Melbourne, 1870 to 1890', M.A., Univ. Melb., 1960.

Winter, Gillian. '"For the Advancement of Science": the Royal Society of Tasmania, 1843-1885', B.A., Univ. Tasmania, 1972.

3. Unpublished Essays by later authors

Aurousseau, M. 'Notes on Geographical Associations formed in Australia', mimeographed copy (8pp) dated April 1961, a reissue of a similarly titled paper of March 1960. Copies in possession of M.E. Hoare.

Australian Botanists. Typescript bio-bibliographies of over 400 Australian botanists prepared by Ruth Roberts and Margaret Whitton for Rachel MacMasters Miller Hunt Botanical Library, Pittsburgh, Pennsylvania, MS 64/1-3, B.L., Canberra.

Bergman, G.F.L. 'Christian Carl Ludwig Rümker (1788-1862), Australia's first government astronomer', copy of orig. typescript, MS 50, B.L., Canberra.

Hoare, M.E. 'Science in Australia, 1820-1860', typescript, 40pp; 'One hundred years of science in Australia, 1788-1888', typescript, 40pp; 'Unity amid diversity: corporate science in colonial Australia', typescript, 22pp, copies in B.L., Canberra.

Radford, Joan. 'Prospecting for a Professor: Assayers and Analysts in Medicine and Metallurgy Victoria, 1854-1885', typescript, 50pp, copy in possession of M.E. Hoare.

Whitley, G.P. 'The History of the Australian Museum', typescript, 359pp plus Appendices in G.P. Whitley Papers, MS 21/1-3, B.L., Canberra.

B. PARLIAMENTARY PAPERS

Reports of many scientific debates appeared in the regular press. Only those referred to in detail are listed here.

New South Wales

Votes and Proceedings of Legislative Council

1843. 'Report from the Select Committee on the Proposed Overland Route to Port Essington'.

1851, II. 'Report from the Select Committee on the Proposed Assay Office and Mint'.

—— Correspondence concerning Geological Surveys (March 1849 - October 1851).

1855, I. 'Geological and Mineralogical Survey'. Report No. 16 (20 Nov. 1855). Stutchbury's last report (p.1193).

—— Denison to L.C. re. astronomical observatory (p.38).

—— Bye-Laws of the Australian Museum (pp.1183-4).

—— 'Report from the Select Committee on the Management of the Botanic Gardens' (pp.1135-79).

1855,II. 'Report from the Commissioners appointed to enquire into the Surveyor-General's Department' (pp.3-141).

—— 'Report from the Select Committee on the Sydney Mechanics' School of Arts Bill' (pp.103-6).

Journal of the Legislative Council

1856-7, II. 'Colonial Astronomer': Correspondence re. the appointment of (Oct. 1855 - Feb. 1857).

Votes and Proceedings of the Legislative Assembly

1873-4, V. 'Report from the Select Committee on the Sydney Museum, together with Proceedings of the Committee, Minutes of Evidence and Appendix' (pp.819-943).

1875, IV. Gerard Krefft's Petition, Correspondence respecting his dismissal as Curator of the Australian Museum (pp.259-329).

Victoria

Votes and Proceedings of the Legislative Assembly

1856-7, IV. 'Second Meteorological Report' (No. 58a).

1858-9, II. 'Third Meteorological Report'.

—— Board of Science: First Annual Report (No. 45).

1859-60, IV. Board of Science: Second Annual Report (No. 48).

1862-3, III. 'Report of the Royal Mining Commission of Victoria' (No.10, pp.397-418).

1880-1, IV. 'Minutes of Proceedings of the Intercolonial Meteorological Conference held at Melbourne' (21-27 April 1881) (No. 99).

C. NEWSPAPERS, JOURNALS AND PERIODICALS

1. Almanacs, Newspapers and General Periodicals

Agra Ukhbar (Agra, India). 19 March 1836. Death notice of John Henderson. Copies in B.L., Canberra and M.L., Sydney.

Argus (Melbourne). 1850-90.

Austral-Asiatic (Murray's) Review (Hobart). 1837 and 1843.

Australian (Sydney). 1828; 1833-6. Copies in N.L., Canberra and Public Library, Sydney.

Australian Almanack (Sydney). 1830-32.

Australian Magazine (Sydney). 1821. One volume published only. Copy in N.L., Canberra.

Australian Quarterly Journal of Theology, Literature and Science (Sydney). 1828. One volume published in four parts (Jan. - Oct. 1828). Copy in N.L., Canberra.

Brisbane Courier. 1864-80. Superseded the Courier.

Colonial Times (Hobart). 1830.

Courier (Brisbane). 1861-4. Superseded the Moreton Bay Courier.

Ford's Australian Almanac (Sydney). 1852-4. Continued under other titles, Waugh and Cox's Australian Almanac (1855-6); J. Cox and Co's Aust. Almanac (1857-8) to Waugh's Aust. Almanac (1858 onwards).

Hobart Town Almanack. 1830-2 and 1835-8. James Ross published several Almanacs and Annuals with different titles between 1830-8, e.g. Hobart Town and V.D.L. Almanack for 1838, in which appeared some scientific papers.

Hobart Town Courier. 1827-50.

Illustrated Journal of Australasia (Melbourne). Vols I-IV (1856-8).

Independent (Launceston). 1831-2.

Launceston Examiner. 1843.

Moreton Bay Courier (Brisbane). 1846-61.

N.S.W. Magazine (Sydney). Vols I and II (1833-4). Published between August 1833 and October 1834. Copy in N.L., Canberra.

N.S.W. Monthly Magazine or Journal of Politics, Literature, Science and the Arts (Sydney). One vol. 1843. Copy in N.L., Canberra.

Queensland (Daily) Guardian (Brisbane). 1860-6.

South Asian Register (Sydney). 1827-8.

Sydney Gazette. 1820-42.

Sydney (Morning) Herald. 1840-90.

Sydney Monitor. 1833.

Telegraph (Brisbane). 1872-80.

V.D.L. Almanack (Hobart). 1831 and 1834. See also Hobart Town Almanack.

2. Scientific Periodicals and Reports

(For ease of reference the publications of the principal societies are listed under the name of the Society not by the title(s) of the periodicals. Only Australian serials are listed, usually only for the period under review).

Adelaide Philosophical Society. Annual Report and Transactions (1853-72).

Acclimatisation Society of N.S.W. Annual Reports (1862-8).

Agricultural and Horticultural Society of N.S.W. Reports (1829-30). Copies in N.L., Canberra.

Australasian Association for the Advancement of Science. Reports (1888-92), continuing.

Australasian Chemist and Druggist. Vols 1-8 (1879-85). Supplement to Chemist and Druggist (London).

Australasian Journal of Pharmacy (Melbourne). Vols 1-34 (1886-1919).

Australian Medical Journal (Melbourne). Vols 1-23 (1856-78) and New Series 1-17 (1879-95), particularly vols 1-5 (1856-60).

Australasian Scientific Magazine (Melbourne). One vol. (1885).

Botanical and Horticultural Society of V.D.L. Rules (Hobart), n.d. (1843).

Entomological Society of N.S.W. Transactions. Vols I - II (1864 and 1873).

Field Naturalists' Club of Victoria. Annual Report (1884-91).
Victorian Naturalist. Vols I-VI (1884-90).

Field Naturalists' Society of N.S.W. Annual Report (1890-91).

Geological Society of Australasia. Transactions (Melbourne). One vol., 6 parts (1886-92). Copy in N.L., Canberra.

Linnean Society of N.S.W. Proceedings. Vols I-XVII (1877-92), continuing.

Meteorological Society of Australasia. History, Rules and Regulations... (Adelaide, 1886). Copy of pamphlet in N.L., Canberra.

_____ Minutes of Proceedings. Vol 2 (1886-7). Copy in Public Library of S.A.

Microscopical Society of Victoria. Journal. 2 vols (1879-82) in 5 parts.

Natural History Society of Queensland. Transactions. One vol. (1892-4).

Philosophical Institute of Victoria. Transactions. Vols I-IV (1856-60).

Philosophical Society of N.S.W. Transactions. One vol. (1862-5). Earlier papers were published in Syd. Mag. Sci. & Art.

Philosophical Society of North Queensland. Proceedings. Vols 1-5 (1884-8). Copy in N.L., Canberra.

Philosophical Society of Queensland. Transactions. Vols I-III (1859-82).

Annual Reports also form part of the Transactions which have no continuous pagination.

Philosophical Society of Victoria. Transactions. One vol. (1854-5).

(Royal) Geographical Society of Australasia. Proceedings (N.S.W. & Vic. Branches), 1883-4.

_____ Transactions and Proceedings (N.S.W. Branch), 1885.

_____ Transactions and Proceedings (Vic. Branch), 1885; 1886-1901.

_____ Proceedings and Transactions (Qld. Branch), 1885-99.

_____ Proceedings (S.A. Branch), 1886-90, continuing.

For details of the publications of the Roy. Geog. Soc. A'asia see M. Aurousseau, 'Notes on geographical associations...', unpublished mimeograph, April 1961, under 'Unpublished Essays'.

Royal Society of New South Wales. Transactions. Vols I-X (1867-77).
_____ Journal and Proceedings. Vols XI-XXIV (1878-90), continuing.

Royal Society of Queensland. Proceedings. Vols I-V (1884-8), continuing.

Royal Society of South Australia. Transactions. Vols I-XIV (1877-91), continuing.

Royal Society of Tasmania. Annual Reports. 1856-7; 1859-62; 1863-6.
_____ Papers and Proceedings. Vol. III part 2 (1859), continuing Pap. & Proc. Roy. Soc. V.D.L.
_____ Monthly Notices of Paps and Procs of Roy. Soc. Tas. 1863-75.
_____ Papers and Proceedings.... 1876-90.

For the complicated titling, numbering and pagination of the publications of Roy. Soc. V.D.L. and Tasmania see F. Noetling in Pap. & Proc. Roy. Soc. Tas. (1910), pp.223-30.

Royal Society of V.D.L. Reports. 1845-55.
_____ Papers and Proceedings. Vols I-III in 7 parts (1849-55).

Royal Society of Victoria. Transactions and Proceedings. Vols V-XXIV (1860-88). Continued from Trans. Phil. Inst. Vic.
_____ Proceedings. New Series, vols I-IV (1888-91), continuing.
_____ Transactions. Vols I-II (1888-92), continuing.

Sydney Magazine of Science and Art. Vols I & II (1857 and 1859).

Sydney Mechanics' School of Arts. Annual Report. 1837-40.

Southern Science Record (Melbourne). Vols I-III (1880-83). Continued as Southn Sci. Rec. and Mag. of Nat. Hist., New Series, vols I & II (1885-6).

Tasmanian Society. The Tasmanian Society (Hobart). Prospectus 2pp, 1843. Copies in M.L., Sydney and Roy. Soc. Tas., Library, Hobart.
_____ Tasmanian Journal of Natural Science, Agriculture and Statistics, etc. (Hobart and Launceston). Vols I-III (1842-49). Copies in B.L. and N.L., Canberra.

Victorian Institute for the Advancement of Science. Transactions and Proceedings. One vol. (1854-5).

Zoological and Acclimatisation Society of Victoria. Proceedings. Vols 1-5 (1872-8).
_____ Rules and Objects (Melb. 1861).
_____ Annual Reports (1861-1938)

D. CONTEMPORARY WORKS.

The papers of scientists in scientific journals and other serials are excluded from this list, as are those contemporary articles which review the history of science or scientific institutions (e.g. obituaries and presidential addresses). Where appropriate these are listed in the following section E.

Babbage, C. Reflections on the decline of science in England and on some of its causes. London, 1830.

Backhouse, J. A Narrative of a visit to the Australian Colonies. London, 1843.

Bennett, G. Wanderings in New South Wales...being the Journal of a Naturalist.... 2 vols, London, 1834.

—— A Catalogue of the Specimens of Natural History and Miscellaneous Curiosities deposited in the Australian Museum. Sydney, 1837.

—— Gatherings of a Naturalist in Australasia.... London, 1860.

—— Acclimatisation: its eminent adaption to Australia: a lecture delivered in Sydney. Melbourne, 1862.

Bentham, G. Flora Australiensis: A Description of the Plants of the Australian Territory. Vols I-VII, London, 1863-78.

Bland, W. (ed.). Journey of Discovery to Port Phillip, New South Wales, by Messrs W.H. Hovell and Hamilton Hume in 1824 and 1825. Sydney, 1831.

Brewster, D. 'Charles Babbage, Reflections on the decline of science in England', Quarterly Review, XLIII (1830), pp.305-42.

Brown, R. Prodromus Florae Novae Hollandiae et Insulae Van Dieman... (1810) and Supplementum primum (1830). (introd. by W.T. Stearn). New York, 1960, in series Historiae Naturalis Classica, VI.

Clarke, W.B. Researches on the Southern Gold Fields of New South Wales. Sydney, 1860.

—— Remarks on the Sedimentary Formations of New South Wales. Fourth ed., Sydney, 1878.

Cunningham, P. Two Years in N.S.W., a series of letters, comprising sketches on the actual state of society in the Colony; of its peculiar advantages to emigrants; of its topography, natural history etc. etc. 2 vols, London, 1827.

Darwin, C. A Naturalist's Voyage Round the World. London, 1839.

Debenham, F. (ed.). The voyage of Captain Bellingshausen to the Antarctic Seas, 1819-1821. 2 vols, London, 1945.

Denison, W. (ed.). Varieties of Vice-Regal Life. 2 vols, London, 1870.

Etheridge, R. and Jack, R.L. The geology and palaeontology of Queensland and New Guinea. Brisbane, 1892.

Field, B. (ed.). Geographical Memoirs on New South Wales.... London, 1825.

Granville, A.B. The Royal Society in the Nineteenth Century, being a Statistical Summary of its Labours during the last thirty-five years. London, 1836.

Harvey, W.H. Memoir of W.H. Harvey, M.D., F.R.S. ... late Professor of Botany, Trinity College, Dublin, with selections from his journal and correspondence. London, 1869.

Henderson, J. Observations on the Colonies of New South Wales and Van Diemen's Land. Calcutta, 1832.

Hooker, J.D. Flora Tasmaniae. London, 1860.

Huxley, L. (ed.). Life and Letters of Sir Joseph Dalton Hooker. 2 vols, London, 1918.

Jukes, J.B. Narrative of the Surveying Voyage of H.M.S. Fly. 2 vols, London, 1847.

—— A Sketch of the Physical Structure of Australia. London, 1850.

King, P.P. Narrative of a Survey of the Intertropical and Western Coasts of Australia. Performed between the years 1818 and 1822. 2 vols, London, 1827.

Lang, J.D. An Historical and Statistical Account of New South Wales.... Third ed., London, 1852.

—— Queensland, Australia, a highly eligible field for emigration and the future cotton field of Great Britain. Second ed., London, 1864.

Leichhardt, L. Journal of an Overland Expedition in Australia, from Moreton Bay to Port Essington..., during the years 1844-1845. London, 1847.

Lhotsky, J. A Journey from Sydney to the Australian Alps.... Sydney, 1835.

Liversidge, A. Report upon certain Museums for Technology, Science and Art. Sydney, 1880.

Macadam, J. (ed.). Victorian Government Prize Essays. Melbourne, 1861.

McCoy, F. Prodromus of the Palaeontology of Victoria. Decades 1-7, Melbourne, 1874-82.

—— Prodromus of the Zoology of Victoria. 2 vols (decades 1-20), Melbourne, 1878-90.

—— On the Formation of Museums in Victoria. Melbourne, 1857.

Mitchell, T.L. Three Expeditions into the Interior of Eastern Australia.... Second ed., 2 vols, London, 1839.

—— Journal of an Expedition into the Interior of Tropical Australia.... London, 1848.

Mueller, F. von. Fragmenta Phytographiae Australiae. 11 vols, Melbourne, 1858-82.

Oxley, J. Journals of Two Expeditions into the Interior of New South Wales. London, 1820.

Owen, R. Researches on the fossil remains of the extinct marsupials of Australia. 2 vols, London, 1877.

Ross, J.C. A Voyage of Discovery and Research in the Southern and Antarctic Region during the years 1839-43. 2 vols, London, 1847.

Rümker, C. On the most effective means of encouraging scientific undertakings .... Hamburg, 1831.

Russell, H.C. Climate of N.S.W.: descriptive, historical, and tabular. Sydney, 1877.

——(ed.). Observations on the Transit of Venus, 9 December 1874, made at stations in N.S.W. Sydney, 1892.

Smyth, R.B. The Gold Fields and Mineral Districts of Victoria. Melbourne, 1869.

—— The Aborigines of Victoria. 2 vols, Melbourne, 1878.

Stokes, J.L. Discoveries in Australia with an account of the Coast and Rivers explored and surveyed during the voyage of H.M.S. Beagle in the years 1837-43. London, 1846.

Strzelecki, P.E. Physical description of New South Wales and Van Diemen's Land. London, 1845.

—— Gold and Silver: a supplement to Strzelecki's Physical Description of New South Wales and Van Diemen's Land. London, 1856.

Sturt, C. Two Expeditions into the Interior of Southern Australia.... 2 vols, London, 1833.

Tebbutt, J. The Sydney Observatory and the Sydney Morning Herald. A Plea for Astronomy in New South Wales. Pamphlet, Sydney, 1891.

—— On the Progress and present state of astronomical science in New South Wales. Sydney, 1871.

Tenison-Woods, J.E. A History of the Discovery and Exploration of Australia .... 2 vols, London, 1865.

Wall, W.S. History and Description of the Skeleton of a new Sperm Whale lately set up in the Australian Museum.... Sydney, 1851.

Watson, F. (ed.). Historical Records of Australia. Series I. Governors' Despatches to and from England, 1788-1848, vols I-XXVI. Sydney, 1914-25.

West, J. The History of Tasmania. 2 vols, Launceston, 1852.

E. SECONDARY SOURCES

Abbott, W.E. Mount Wingen and the Wingen Coal Measures. Sydney, 1918.

Abbetti, G. (trans. Betty Burr Abetti). The Story of Astronomy, London, 1954.

Albiston, H.E. 'Veterinary Education in Victoria', Aust. Vet. Journ. (September, 1951), pp.253-7.

Allen, H.B. and others. University of Melbourne Medical School Jubilee, 1914. Melbourne, 1914.

Anderson, C. Bibliography of Australian Mineralogy. Sydney, 1916.

Andrews, A.E.J. 'Further Light on the Summit: Mt William not Mt Kosciusko', J.R.A.H.S., LIX (1973), pp.114-27.

Ardrey, R. The Territorial Imperative. New York, 1966.

Aurousseau, M. (ed.). The Letters of F.W. Ludwig Leichhardt. 3 vols, Cambridge, The Hakluyt Society, 1968.

Australian Dictionary of Biography. (ed. D. Pike). Vols I-IV, Melbourne, 1966-72,

Australian Encyclopaedia. 10 vols, Sydney, 1965.

Bagnall, A.G. and Peterson, G.C. William Colenso. Wellington, 1948.

Banks, M.R. 'A Darwin Manuscript on Hobart Town', Pap. & Proc. Roy. Soc. Tas., 105 (1971), pp.5-19.

Baracchi, P. Victorian Meteorological Statistics.... Melbourne, 1919.

Barclay, E. 'Fevers and Stinks: Some problems of Public Health in the 1870's and 1880's', Qld Heritage, 2, No.4 (1971), pp.3-12.

Barff, H.E. A short historical account of the University of Sydney, Sydney, 1902.

Barlow, Nora (ed.). Charles Darwin and the Voyage of the Beagle. London, 1945.

Basalla, G. 'The Spread of Western Science', Science, 156 (1967), pp.611-22.

Bates, R. Scientific Societies in the United States. Second ed. New York, 1958.

Beale, E. 'Edmund Besley Court Kennedy', J.R.A.H.S., XXXV (1949), pp.1-25.

Bergman, G.F.L. 'Christian Carl Ludwig Rümker (1788-1862), Australia's First Government Astronomer', J.R.A.H.S., XLVI (1960), pp.247-89.

Bernays, C.A. Queensland Politics During Sixty Years. Brisbane, 1919.

Bischoff, C. The Hard Road, the Life Story of Amalie Dietrich, Naturalist, 1821-1891 by her daughter. London, 1930.

Blainey, G. A Centenary History of The University of Melbourne. Melbourne, 1957.

—— The rush that never ended. A history of Australian mining. Second ed., Melbourne, 1969.

Blair, D. Cyclopaedia of Australia.... Melbourne, 1881.

Bolton, G.C. Richard Daintree: A Photographic Memoir. Brisbane, 1965.

Branagan, D.F. 'The Challenger Expedition and Australian Science', Proc. Roy. Soc. Edinburgh, 73, No.10 (1971-2), pp.85-95.

—— 'Words, Actions, People: 150 Years of Scientific Societies in Australia', J. & Proc. Roy. Soc. N.S.W., 104 (1972), pp.123-141.

—— Geology and Coal Mining in the Hunter Valley 1791-1861. Newcastle History Monographs, No. 6, Newcastle, 1972.

—— Rocks - Fossils - Profs: Geological Sciences in the University of Sydney, 1866-1973. Sydney, 1973.

Branagan, D. and Vallance, T. 'The Geological Society of Australasia (1885-1905)', J. Geolog. Soc. Aust., 14, part 2 (1967), pp.349-51.

Brodsky, I. Dr David Ramsay. Sydney, 1960.

Brown, J. Macarthur. 'Doctor Douglass and Medical Sociology', M.J.A., I (1943), pp.455-62.

Browne, W.R. and Browne, I.A. 'The Royal Society of N.S.W.', Proc. Roy. Aust. Chem. Inst., 28 (1961), pp.100-09. Also issued separately with Addendum. Sydney, 1961.

Bryan, W.H. 'Samuel Stutchbury and some of those who followed him', Qld Govt Mining Journ., 55 (1954), pp.641-6.

Bryden, W. 'Tasmanian Museum and Art Gallery: Historical Note', Pap. & Proc. Roy. Soc. Tas., 100 (1960), pp.21-6.

Burns, T.E. and Skemp, J.R. (eds). Van Diemen's Land Correspondents...1827-1849. Launceston, 1961.
Contains letters and extracts of letters from prominent Tasmanian scientists, particularly R.C. Gunn.

Burrell, H. The Platypus: its discovery, zoological position, form and characteristics, habits, life history, etc. Sydney, 1927.

Callaghan, F.R. Science in New Zealand. Wellington, 1957.

Cambage, R.H. 'Biographical sketches of some of the members of the Philosophical Society of Australasia', J. & Proc. Roy. Soc. N.S.W., LV (1921), pp.xxxiii-xli.

Cameron, H.C. Sir Joseph Banks.... The Autocrat of the Philosophers. London, 1952.

Cardwell, D.S. The organisation of science in England. London, 1957.

Chadwick, C.E. 'A short history of the Entomological Society of Australia (N.S.W.)', J. Ent. Soc. Aust. (N.S.W.), 2 (1965), pp.50-1.

Chisholm, A.H. (ed.). The Story of Elizabeth Gould. Melbourne, 1944. Includes letters of the Goulds.

—— Strange New World: the adventures of John Gilbert and Ludwig Leichhardt. Sydney, 1955.

Cilento, R. (ed.). Triumph in the Tropics: An historical sketch of Queensland. Brisbane, 1959.

—— Medicine in Queensland. Brisbane, n.d. Monograph from two articles in J. Roy. Hist. Soc. Qld, 6, No.4 (1961-2), pp.866-941.

Clark, C.M.H. A History of Australia. 3 vols, Melbourne, 1962, 1968 and 1973.

Clarke, W.B. Inaugural Address to Roy. Soc. N.S.W., containing an historical account of the society, Trans. Roy. Soc. N.S.W., I (1867), pp.1-27.

Clune, F. Overland Telegraph. Sydney, 1955.

Collison Black, R.D. Papers and Correspondence of William Stanley Jevons. 2 vols, London, 1973. Vol. I: (eds R.D. Collison Black and Rosamond Könekamp) Biography and Personal Journal and Vol. II: (ed. R.D. Collison Black) Correspondence 1850-1862.

Colliver, F.S. 'An author index for the Proceedings of the Royal Society of Queensland, 1884-1959, and the Transactions of the Queensland Philosophical Society, 1859-1882', Proc. Roy. Soc. Qld, LXXI (1959), pp.65-101.

Coppleson, V.M. 'The Life and Times of George Bennett', Bull. Post-Graduate Comm. Med. Univ. Syd., II, No. 9 (1955), pp.207-64.

Coote, W. History of the Colony of Queensland from 1770 to the close of the Year 1881. 2 vols, Brisbane, 1882.

Crawford, D.G. A History of the Indian Medical Service, 1600-1913. 2 vols, London, 1914.

Crowther, W.E.L. 'Some aspects of medical practice in Van Diemen's Land', M.J.A., I (1935), pp.511-19.

—— 'Dr E.S.P. Bedford and his Hospital and Medical School of Van Diemen's Land', M.J.A., II (1944), p.25.

—— 'Practice and personalities at Hobart Town, 1828-32, as indicated in the day book of James Scott, M.D., R.N.', M.J.A., I (1954), pp.421-30.

Cumpston, J.H.L. Thomas Mitchell: Surveyor General and Explorer. London, 1954.

—— The Inland Sea and the Great Rivers: the story of Australian Exploration. Sydney, 1964.

Cumpston, J.S. Macquarie Island. Melbourne, 1965.

Currie, G. and Graham, J. The Origins of C.S.I.R.O: Science and the Commonwealth Government, 1901-1926. Melbourne, 1966.

Daley, C. 'Baron Sir Ferdinand von Mueller...', Vict. Hist. Mag., X (1924), pp.23-75.

—— 'The history of Flora Australiensis', Vic. Naturalist, XLIV (1927), pp.63-74; 91-100; 127-38; 153-65; 183-7; 213-21.

—— 'Fifty Years of Science', Vic. Naturalist, XLVIII (1931), pp.66-74.

Dallen, R.A. The University of Sydney. Its History and Progress.... Sydney, 1938.

Daniels, G. American Science in the Age of Jackson. New York, 1968.

—— Science in American Society: A Social History. New York, 1971.

—— 'The process of professionalization in American science: the emergent period, 1820-60', Isis, 58, part 2 (1967), pp.151-66.

David, M.E. Professor David.... London, 1937.

Day, A.A. 'The development of geophysics in Australia', J. & Proc. Roy. Soc. N.S.W., 100 (1966), pp.33-60.

De Beer, G. Charles Darwin. Evolution by Natural Selection. London, 1963.

Derrick, E.H. 'The Bancroft Oration: the spirit of the researcher', M.J.A. II (1948), pp.621-7.

Dickins, J.M. and Finlay, Cecily. 'Geological Society of Australasia (1885-?): an historical note', J. Geolog. Soc. Aust., 6, part 1 (1958), pp.53-4.

Dunlop, E.W. John Oxley, Melbourne, 1960.

Dunn, E.J. 'Biographical sketch of the founders of the Geological Survey of Victoria', Bulletins Geolog. Survey Vic., 23 (1910).

Elkin, A.P. (ed.). A Goodly Heritage. ANZAAS Jubilee. Science in New South Wales. Sydney, 1962.

Elkin, A.P. and others. A century of scientific progress: A history of several aspects of Australian scientific development, with particular reference to New South Wales (Centenary Volume of the Royal Society of N.S.W.). Sydney, 1968.

Ellis, M.H. 'Brisbane: the star gazer', Bulletin, 30 Dec. 1961, pp.37-8.

Etheridge, R. 'The Australian Museum - Fragments of its early history', Rec. Aust. Mus., XI, No. 4 (1916), pp.67-78 and XII, No. 12 (1919), pp.339-99.

Etheridge, R. and Jack, R.L. Catalogue of Works, Papers, Reports, and Maps on the Geology, Palaeontology, Mineralogy, Mining and Metallurgy, etc. of the Australian Continent and Tasmania. London, 1881.

Ferguson, J.A. Bibliography of Australia. 7 vols, Sydney, 1941-69.

Fish, S. 'The history of plant pathology in Australia', Annual Rev. of Phytopathology, 8 (1970), pp.13-36.

Fitzpatrick, Kathleen. Sir John Franklin in Tasmania, 1837-1843. Melbourne, 1949.

—— 'The Burke and Wills Expedition and the Royal Society of Victoria', Hist. Studies, Aust. and N.Z., 10 (1963), pp.470-78.

Flemming, C.A. 'The Royal Society of New Zealand - A Century of Scientific Endeavour', Trans. Roy. Soc. N.Z., 2, No. 6 (1968), pp.99-114.

Fletcher, J.J. (ed.). The Macleay Memorial Volume. Sydney, 1893.

—— 'The Society's Heritage from the Macleays', Proc. Linn. Soc. N.S.W., XLV (1920), pp.567-635 and LIV (1929), pp.185-272.

Foote, G.A. 'The place of science in the British reform movement', Isis, 42 (1951), pp.192-208.

Ford, E. 'The Life and Influence of Joseph Bancroft, M.D.', M.J.A., I (1961), pp.153-70.

Froggatt, W. 'The Curators and botanists of the Botanic Gardens, Sydney', J.R.A.H.S., XVIII (1932), pp.101-33.

Gandevia, B.H. The Melbourne Medical Students 1862-1942. Melbourne, 1948.

—— 'A review of Victoria's early medical journals', M.J.A., II (1952), pp.184-8.

—— 'William Thomson and the history of the contagionist doctrine in Melbourne', M.J.A., I (1953), pp.398-404. Includes a bibliography by E. Ford.

—— 'Natural history in Australia. A list of historical papers', Vic. Naturalist, LXXIII (1956-7), pp.131-6.

—— An Annotated Bibliography of the History of Medicine in Australia. Sydney, 1957.

—— 'The Pattern of Australian Medical History', Proc. Roy. Soc. Med., 50 (1957), pp.591-8.

—— Occupation and Disease in Australia since 1788. Sydney, 1971.

Gandevia, B.H. and Tovell, A. 'The First Australian Medical Libraries', M.J.A., II (1964), pp.314-20.

Gentilli, J. 'A history of meteorological and climatological studies in Australia', University Studies in History, V, No. 1 (Perth, 1967), pp.55-88.

Graham, H.B. 'The Hon. David Elliot Wilkie, M.D., a pioneer of Melbourne', M.J.A., I (1956), pp.557-65.

—— 'Happenings of the now long past: the centenary of the Medical Society of Victoria', M.J.A., II (1952), pp.213-47.

Gilbert, L. 'The bush and the search for a staple in New South Wales', Rec. Aust. Acad. Sci., I, No. 1 (1966), pp.6-17.

—— 'Plants, Politics and Personalities in Nineteenth Century New South Wales', J.R.A.H.S., LVI (1970), pp.15-35.

—— 'William Carron, botanist and explorer, 1821-1876', J.R.A.H.S., XLVII (1961), 292-311.

Gill, E.D. 'Scientific Societies in Australia. The Royal Society of Victoria', Proc. Roy. Aust. Chem. Inst., 28 (1961), pp.129-31.

—— 'The Beginnings of Science in Victoria', Proc. Roy. Soc. Vic., N.S. 84, part 2 (1971), pp.267-9.

Goddard, R.H. 'Captain Thomas Raine of the "Surry", 1795-1860', J.R.A.H.S. XXVI (1940), pp.277-317.

Goodwin, V.W.E. 'Parramatta Observatory. The story of an absurdity', J.R.A.H.S., XXXIII (1947), pp.173-87.

Gould Commemorative Issue. Emu, XXXVIII (1938). Includes a number of articles on aspects of Gould's scientific work in Australia.

Greenop, F.S. Who Travels Alone. Sydney, 1944.

Greenwood, G. and Laverty, J. Brisbane, 1859-1959: a History of Local Government. Brisbane, 1959.

Hale, H.M. 'The First Hundred Years of the Museum, 1856-1956', Rec. S.A. Mus., 12 (1956), 218pp.

Hamilton, R. Presidential address on the rise and fall of the scientific societies of Tasmania, Rep. A.A.A.S., IV (1892), pp.1-30.

Harvard, W.L. 'Sir Paul Edmund de Strzelecki', J.R.A.H.S., XXVI (1941), pp.20-97.

Heaton, J.H. Australian Dictionary of Dates and Men of the Time.... Sydney, 1879.

Heney, H.M.E. In a dark glass: the story of Paul Edmond de Strzelecki. Sydney, 1961.

Herbert, D.A. 'The Brisbane Botanic Gardens', Qld. Naturalist, XIV (1952), pp.69-77.

—— 'A story of Queensland's scientific achievement, 1859-1959', Proc. Roy. Soc. Qld, LXXI (1959), pp.1-15.

Hill, Dorothy. 'Robert Logan Jack: A Memorial Address', Proc. Roy. Soc. Qld, LVIII (1946), pp.113-24.

History of the Launceston Mechanics' Institute and Public Library. Launceston, 1910.

Hoare, M.E. 'Learned Societies in Australia: the foundation years in Victoria, 1850-60', Rec. Aust. Acad. Sci., I, No. 2 (1967), pp.7-29.

—— 'Doctor John Henderson and the Van Diemen's Land Scientific Society', Rec. Aust. Acad. Sci., I, No. 3 (1968), pp.7-24.

—— '"Cook the Discoverer": An Essay by Georg Forster, 1787', Rec. Aust. Acad. Sci., I, No. 4 (1969), pp.7-16.

—— 'Some primary sources for the history of scientific societies in Australia in the Nineteenth Century', ibid., pp.71-6.

—— '"All Things are Queer and Opposite": Scientific Societies in Tasmania in the 1840's'. Isis, 60 (1969), pp.198-209.

—— '"The half-mad bureaucrat": Robert Brough Smyth (1830-89)', Rec. Aust. Acad. Sci., II, No. 4 (1973), pp.25-40.

Howarth, O.R. The British Association for the Advancement of Science: a retrospect 1831-1921. London, 1922.

Hudspeth, W.H. 'The Rise and Fall of Charles Swanston', Pap. & Proc. Roy. Soc. Tas. (1945), pp.1-16.

Huxley, L. Life and Letters of Sir Joseph Dalton Hooker. 2 vols, London, 1918.

Ingleton, G.C. Charting a Continent. Sydney, 1944.

Inglis, K.S. Hospital and Community, a history of the Royal Melbourne Hospital. Melbourne, 1958.

Iredale, T. 'Lhotsky's Lament', Aust. Zoologist, 3 (1924), pp.223-4.

—— 'George French Angas: the father of Australian conchology', Aust. Zoologist, 12 (1954-9), pp.362-71.

Iredale, T. and Whitley, G.P. 'Sir William Denison as a conchologist', Proc. Roy. Zool. Soc. N.S.W. (1964-5), pp.27-30.

—— 'The Circular Head Scientific Journal, and other early Tasmanian Natural History Manuscripts', Aust. Zoologist, 14 (1968), pp.257-8.

Jackson, E.S. 'Historical Notes from the Records of the Brisbane Hospital, 1850-70', M.J.A., I (1923), pp.281-6.

Jeans, D.N. and Gilfillan, W.G.R. 'Light on the Summit: Mount William IV or Kosciusko?' J.R.A.H.S., LV (1969), pp.1-18.

Jenkinson, S.H. New Zealanders and Science. Wellington, 1940.

Jervis, J. 'Alexander Berry, the Laird of Shoalhaven', J.R.A.H.S., XXVII (1941), pp.18-87.

—— 'Rev. W.B. Clarke, M.A., F.R.S., F.G.S., F.R.G.S., "The Father of Australian Geology"', J.R.A.H.S., XXX (1944), pp.345-458.

Kenny, A.L. 'The Halford Oration: Halford the Man', M.J.A., I (1941), pp.129-34.

Kirsop, W. 'W.E. Hearn's Library', La Trobe Library Journ., 3, No. 12 (1973), pp.73-82.

—— 'Scientific Culture in Melbourne, 1851-1900: the Evidence from Library Catalogues', Paps Presented at Annual Conference A'asian Assoc. Hist. & Phil. Sci. (Melbourne, 1973), pp.47-57.

Könekamp, Rosamond. 'William Stanley Jevons (1835-1882): Some biographical notes', Manchester School, 30 (1962), pp.251-73.

La Nauze, J.A. Political Economy in Australia. Melbourne, 1949. See particularly 'Jevons in Sydney', pp.26-44.

Lane, E.A. and Richards, Aola M. 'The Discovery, Exploration and Scientific Investigation of the Wellington Caves, New South Wales', Helictite: Journ. of Australasian Cave Research, 2, No. 1 (1963), pp.1-53.

Le Fevre, R.J.W. 'John Smith, first Professor of Chemistry in Australia', Proc. Roy. Aust. Chem. Inst., 26 (1959), pp.348-53.

Levy, M.C. Governor George Arthur: A Colonial Despot. Melbourne, 1953.

Lewis, A.N. (note). 'Strzelecki in Tasmania', J.R.A.H.S., XXVI (1941), pp. 76-8.

Lewis, R.A. Edwin Chadwick and the Public Health Movement, 1832-54. London, 1952.

Lindsay, R.B. The Role of Science in Civilization. New York, 1963.

McKie, D. 'Scientific Societies to the End of the Eighteenth Century', The Philosophical Magazine, 150th Anniversary Number (1948), pp.133-43.

McLaren, I.F. 'The Victorian Exploring Expedition and Relieving Expeditions', Vic. Hist. Mag. XXXIX (1959), pp.209-53.

MacMillan, D.S. A Squatter went to sea. The story of Sir William Macleay's New Guinea Expedition (1875) and his life in Sydney. Sydney 1957.

McMinn, W.F. 'Botany and Geography in Early Australia: a Case Study', Rec. Aust. Acad. Sci., II, No. 1 (1970), pp.1-9.

—— Allan Cunningham: Botanist and Explorer. Melbourne, 1970.

McPherson, J. 'The Turbulent Dr Lhotsky', M.J.A., I (1938), pp.661-7.

Mack, G. 'The Queensland Museum, 1855-1955', Memoirs Qld Mus., 13, part 2 (1956), pp.107-24.

Maiden, J.H. 'A contribution to a history of the Royal Society of New South Wales (with information in regard to other New South Wales Societies)', J. & Proc. Roy. Soc. N.S.W., LII (1918), pp.215-361.

Marks, Elizabeth N. 'Silvester Diggles - A Queensland Naturalist one hundred years ago', Qld Naturalist, XVII, Nos. 1-2 (1963), pp.16-25.

—— 'Notes on Diggles "Ornithology of Australia"', ibid., Nos. 5-6 (1965), pp.99-102.

—— 'A History of the Queensland Philosophical Society and the Royal Society of Queensland', Proc. Roy. Soc. Qld, LXXI, No. 2 (1959), pp.17-42.

The Basser Library possesses a number of further mimeographed papers by Dr Marks on the history of entomology and entomological biography.

Marshall, A.J. Darwin and Huxley in Australia. Sydney, London, etc., 1970.

Mason, S.F. A History of the Sciences. London, 1953.

Mellor, D.P. 'Founders of Australian Chemistry. Archibald Liversidge', Proc. Roy.Aust. Chem. Inst., 24 (1957), pp.415-21.

—— The Role of Science and Industry, Canberra, 1967, in Series 4, vol V, Australia in the War of 1939-1945.

Mendelsohn, E. 'The Emergence of Science as a profession in Nineteenth Century Europe' in K. Hill, The Management of Scientists. Boston, 1964.

Mennell, P. The Dictionary of Australasian Biography.... London, 1892.

Miller, E. Morris. Pressmen and Governors: Australian Editors and Writers in Early Tasmania. Sydney and London, 1952.

Morrell, J.B. 'The University of Edinburgh in the late eighteenth century: scientific eminence and academic structure', Isis, 62, part 2 (1971), pp.158-71.

Morrison, A.A. 'William Coote', J. Roy. Hist. Soc. Qld, 5, No. 4 (1956), pp.1218-32.

Morton, A. 'History of the Royal Society of Tasmania', Pap. & Proc. Roy. Soc. Tas., (1894-5), Appendix, pp.1-6.

—— 'Some account of the work and workers of the Tasmanian Society and the Royal Society of Tasmania, from the year 1840 to the close of 1900', Pap. & Proc. Roy. Soc. Tas. (1900-01), pp.109-26.

Mozley, Ann. 'James Dwight Dana in New South Wales, 1839-1840', J. & Proc. Roy. Soc. N.S.W., 97 (1964), pp.185-91.

—— 'The Foundations of the Geological Survey of New South Wales', J. & Proc. Roy. Soc. N.S.W., 98 (1965), pp.91-100.

—— 'Richard Daintree: First Government Geologist of Northern Queensland', Qld Heritage, 2, No. 2 (1965), pp.11-16.

—— 'Evolution and the Climate of Opinion in Australia, 1840-76', Victorian Studies, X, No. 4 (1967), pp.411-30.

Musgrave, A. Bibliography of Australian Entomology, 1775-1930. With biographical notes on authors and collectors. Sydney (Roy. Zool. Soc. N.S.W.), 1932.

Nadel, G. Australia's Colonial Culture: Ideas, Men and Institutions in Mid-Nineteenth Century Eastern Australia. Cambridge, Mass., 1957.

Noad, K.B. 'Henry Grattan Douglass', Bull. Post-Graduate Comm. Med. Univ. Syd., 18 (1962), pp.125-47.

Noetling, F. 'Notes on the publications of the Royal Society of Tasmania', Pap. & Proc. Roy. Soc. Tas. (1910), pp.223-30.

Obituaries.

Cockle, J. Proc. Manchester Lit. & Phil. Soc., 9 (1894-5), pp.215-28; Proc. London Math. Soc., 26 (1894-5), pp.551-4 and Proc. Roy. Soc. London, 59 (1895-6), pp.xxx-xxxix.

Haswell, W.A. Proc. Linn. Soc. N.S.W., LIII (1928), pp.485-98.

Hobson, E.C. Tas. Journ. Nat. Sci., III (1849), pp.406-7.

Macadam, J. Proc. Roy. Soc. Vic., VII (1866), pp.113-4.

McLeay, A. S.M.H., 26 July 1848.

O'Hagan, J.E. 'Sir Thomas Brisbane, F.R.S., Founder of Organised Science in Australia', Journ. Roy. Hist. Soc. Qld, 6 (1959-60), pp.594-603.

O'Neill, G. The Life of the Reverend Julian Tenison Edmund Woods. Sydney, 1929.

Orange, A.D. 'The origins of the British Association for the Advancement of Science', Brit. Journ. Hist. Sci., VI, part 2 (1972), pp.152-76.

Orlovich, P. 'The Philosophical Society's Library, 1821-2', Biblionews, 2nd Series, I (2 April 1966), pp.9-12.

Osborne, W.A. 'The Halford Oration: George Britton Halford. His Life and Work', M.J.A., I (1929), pp.64-88.

Palmer, H. Beiträge zur Geschichte der Erkenntnis des Erdmagnetismus. Zürich, 1956.

Parris, H.S. 'From Melbourne to the Murray in 1839', Vic. Naturalist, LXVI (1949-50), pp.203-10.

Paszkowski, L. 'William Blandowski. The First Government Zoologist of Victoria', Aust. Zoologist, 14 (1967), pp.148-71.

—— 'Charles Darwin and Strzelecki's Book "Physical Description of New South Wales and Van Diemen's Land"', Aust. Zoologist, 14 (1968), pp.246-50.

Perry, W. The Science Museum of Victoria: a history of its first hundred years. Melbourne, 1972.

Pescott, R.T.M. Collections of a Century. Melbourne, 1954.

—— 'The Royal Society of Victoria from then, 1854, to now, 1959', Proc. Roy. Soc. Vic., New Series, 73 (1961), pp.1-40.

Piesse, E.L. 'The foundation and early work of the Society; with some account of earlier institutions and Societies in Tasmania', Pap. & Proc. Roy. Soc. Tas. (1913), pp.117-66.

Plomley, N. 'Some notes on the life of Doctor Henry Grattan Douglass', M.J.A., I (1961), pp.801-07.

—— 'The Tasmanian Journal of Natural Science', Pap. & Proc. Roy. Soc. Tas., 103 (1969), pp.13-15.

Powell, O.W. 'Hospitals in the colonies: the changing face of medicine in the 60's', Journ. Roy. Hist. Soc. Qld, 8, No. 3 (1967-8), pp.552-67.

Price, A. Grenfell (ed.). The Winning of Australian Antarctica: Mawson's B.A.N.Z.R.E. Voyages 1929-31. Sydney, 1962.

Rawson, G. The Count. A Life of Sir Paul Edmund Strzelecki, K.C.M.G., Explorer and Scientist. Melbourne, 1954.

Roe, M. Quest for Authority in Eastern Australia, 1835-1851. Melbourne, 1965.

Ross, C.S. 'Our Observatory: the story of its establishment', Vic. Hist. Mag., VI (1917), pp.134-44.

Russell, H.C. 'Astronomical and Meteorological Workers in New South Wales, 1778 to 1860', Rep. A.A.A.S., I (1889), pp.45-94.

—— Sydney Observatory: History and Progress. Sydney, 1882.

Scott, E. 'The History of Australian Science', Aust. Journ. Sci., I, No.4 (1939), pp.105-16.

—— A History of the University of Melbourne. Melbourne, 1936.

Schofield, R.E. 'Histories of Scientific Societies: Needs and Opportunities for Research', History of Science, II (1963), pp.70-83.

—— The Lunar Society of Birmingham: A Social History of Provincial Science and Industry in Eighteenth-Century England. Oxford, 1963.

Serle, G. The Golden Age: a history of the Colony of Victoria, 1851-61. Melbourne, 1963.

—— From Deserts Prophets Came: The Creative Spirit in Australia, 1788-1972. Melbourne, 1973.

Shyrock, R.H. The Development of Modern Medicine: An Interpretation of the Social and Scientific Factors Involved. London, 1948.

Singer, C. A History of Biology.... Third ed., London, 1959.

Skeats, E.W. Some Founders of Australian Geology. David Lecture, No. 1, Aust. Nat. Research Council, Sydney, 1933.

Smith, B. European Vision and the South Pacific, 1768-1850. Oxford, 1960.

Somer, H.M. 'Short history of the Royal Agricultural Society of New South Wales', J.R.A.H.S., IX (1923), pp.309-32.

Somerville, J. 'The Royal Society of Tasmania, 1843-1943', Proc. Roy. Soc. Tas. (1943), pp.199-222.

Stearns, R. Science in the British Colonies of North America. Urbana, Chicago, 1970.

Steele, J.G. (ed.). The Explorers of the Moreton Bay District, 1770-1830. St. Lucia, Queensland, 1972.

Stieglitz, K. R.von. A short history of Circular Head and its pioneers. Launceston, 1952.

Stimpson, Dorothy. Scientists and Amateurs: a history of the Royal Society. London, 1949.

Stirling, A. Joseph Bosisto. Melbourne, 1970.

Swan, R.A. Australia in the Antarctic: Interest, Activity and Endeavour. London and New York, 1961.

Tasker, W. (ed.). Reminiscences of Sir Thomas Makdougall Brisbane, Bart. Edinburgh, 1860.

Tate, R. Presidential Address, with a history of the Royal Society of South Australia, Proc. Roy. Soc. S.A., III (1879-80), pp.xxxiv-xliv.

—— 'A Century of Geological Progress'. Presidential Address, Rep. A.A.A.S., V (1893), pp.1-69.

Tebbutt, J. Astronomical Memoirs. Sydney, 1918.

Todd, C. Review of meteorological work in Australia. Rep. A.A.A.S., V (1893), pp.246-70.

Tovell, A, and Gandevia, B. 'Early Australian Medical Associations', M.J.A., I (1962), pp.757-9.

Townley, K. 'A Geological Society in Victoria', J. Geolog. Soc. Aust., 6 (1958), p.201.

Turrill, W.B. Joseph Dalton Hooker, Botanist, Explorer, and Administrator. London, 1963.

—— The Royal Botanic Gardens Kew past and present. London, 1959.

Univ. of Sydney. 'One Hundred Years of Geological Science in the University of Sydney, 1866-1966', Univ. Sydney (Dept. of Geology and Geophysics), 1966, Mimeograph, 245 pp.

Univ. of Melbourne. The Melbourne School of Pathology. Phases and Contrasts. Melbourne University, Dept. of Pathology. Melbourne, 1962.

—— The University of Melbourne, 1855-1955. Melbourne, 1955.

Walker, Mary H. Come Wind Come Weather. A Biography of Alfred Howitt. Sydney, 1971.

Walkom, A.B. The Linnean Society of N.S.W. Historical Notes of its First Fifty Years. Sydney, 1925.

White, C.T. 'The Bailey Family and its place in the botanical history of Australia', Journ. Roy. Qld Hist. Soc., 3, No. 3 (1945), pp.362-83.

—— 'Henry Tryon, First Honorary Secretary, Royal Society of Queensland and his place in Queensland Science', Proc. Roy. Soc. Qld, LVI (1945-7), pp.77-80.

—— 'F.M. Bailey: his life and work', Proc. Roy. Soc. Qld, LXI (1949), pp.105-14.

Whitley, G.P. 'The Life and Work of Gerard Krefft', Proc. Roy. Zool. Soc. N.S.W. (1958-9), pp.21-34.

—— 'William Holmes, the Australian Museum's First Custodian', Aust. Mus. Mag., XIII (1961), p.306.

—— 'The First Hundred Years', Aust. Nat. Hist. (1962), pp.111-15.

—— 'John Lhotsky and the Australian Museum', Aust. Nat. Hist. (1965), pp.92-6.

—— 'William Sheridan Wall and the Australian Museum', Proc. Roy. Zool. Soc. N.S.W. (1965-66), pp.42-4.

—— 'T.J. Lempriere, an early Tasmanian naturalist', Aust. Zoologist, 13, part 4 (1966), pp.350-55.

—— 'Conchologists of the past: George French Angas', J. Malac. Soc., 12 (1969), pp.48-60.

—— Early History of Australian Zoology. (Roy. Zool. Soc. N.S.W.), Sydney, 1970.

—— 'George Masters, naturalist', Proc. Roy. Zool. Soc. N.S.W., (1971), pp.25-32.

Whittell, H.M. The Literature of Australian Birds: A History and a Bibliography of Australian Ornithology. Perth, W.A., 1954.

Williams, L.P. 'The Royal Society and the founding of the British Association for the Advancement of Science', Notes & Rec. Roy. Soc. Lond., 16 (1961), pp.221-33.

Willis, J.H. 'Botanical Pioneers in Victoria'. Vic. Naturalist, LXVI (1949), pp.66, 83-9, 103-9 and 123-7.

—— 'Botanical science in Victoria 100 Years Ago', Proc. Roy. Soc. Vic., LXXIII (1961), pp.41-5.

—— 'The Botany of the Victoria Exploring Expedition (September 1860-June 1861) and of Relief Contingents from Victoria (July 1861 - November 1862)', Proc. Roy. Soc. Vic., LXXV (1963), pp.247-68.

—— 'Flora of the Nut, with a brief account of botanical investigation in the Circular Head District', Rec. Queen Victoria Mus. Launceston, New Series, No. 21 (1966).

Willis, Margaret. By Their Fruits. A Life of Ferdinand von Mueller. Botanist and Explorer. Melbourne, 1949.

Wilmot, R.W.E. The Melbourne Athenaeum, 1839-1939. Melbourne, 1939.

Wood, H.W. 'Sydney Observatory, its history and work', Aust. Journ. Sci., I (1939), pp.189-93.

Woods, J.T. 'C. D'Oyly H. Aplin, first government geologist for the southern district of Queensland', Memoirs Qld Mus., 14 (1964), pp.109-14.

Science and Scientific Associations in Eastern Australia, 1820-1890.

CORRECTIONS AND AMENDMENTS

Page.		
iv	l.7-8	Read 'A third era began in the nineties with a new and....'
,,	l.9	Read 'of university leaders in science who explored....'
iii	l.10-12	Punctuation. 'In both Victoria and Queensland, where relatively rapid urban growth followed separation, men of science...'
,,	l.32	Punctuation. 'Throughout, science...'.
vi	l.33	Read 'the Department of History of the University of Melbourne'.
2	l.4-5	Read 'Equally neglected is the history of technology in Australia'.
,,	n.1	G. Serle.
3	l.17	Read 'with' for 'between'.
,,	n.1	G. Nadel, <u>Australia's Colonial Culture</u>...
4	n.1.	Read 'Nadel, op. cit. p. xii'
5.	n.1	Roe, <u>Quest for Authority</u>.....
,,	n.3	R. Bates...
6.	12	Punct. 'simple proposition, "the best way..."'.
,,	l.23	Read 'technological and scientific independence'
,,	n.3	M. Hoare...
10	l.4	Read 'criteria' for 'desiderata'.
,,	l.6	Read 'establish' for 'assert'.
,,	n.1	K. Fitzpatrick.
11	l.1	Omit 'in ways uniquely its own'.
,,	l.2	Read 'consequently' for 'consequent'.
,,	l.9	Read 'foreshadowing' for 'forecasting'.
,,	n.2	D. Stimpson.
12	l.4.	Read 'most' for 'much'.
''	n.1,19	Read 'an experimentalist'.
13	n.2	<u>Joseph Banks. The Autocrat....</u>
14	n.2	Granville, op.cit......
16	l.8	Read 'capable of presenting or willing to present'.
17	l.16	Read 'were' for 'was'.
18	l.11-12	Read ' The founder members...were very involved in local affairs!
20	l.18	Read 'dispatching' for 'despatching'.
22	l.17.	Read 'alma mater' for 'Alma Mater'.
23	l.4	Read 'marshal' for 'marshall'.
26	l. 12	Read 'and of them' for 'of which'.
,,	l. 18	Read 'Australia's first short-lived scientific periodical'.
28	l.14	Read 'benefitted' for 'benefited'.
31	n.3	Read 'vendetta' for 'vendettas'
32	l.7	Read 'an' for 'as'.

Page.		
33	1.17-18	Read 'usually more erudite than' for 'More often heavier than'.
36	n.2	P.P. King, Narrative of a Survey....
,,	n.4 1.6	Read King, op. cit. for Narrative of a Survey...
,,	,, 1.5	Read 'Australian geology' for 'Australian zoology'.
39	n.3 1.1	H. Maiden.
40	1.1-2	Read as '...Agricultural Society elected Field, "who barely knows a plough from a harrow", as president'.
,,	n.5	B. Field, Geographical Memoirs....
43	1.1.	Read 'the notebooks' for 'Brisbane's notebooks'.
,,	n.1.1.1	Ingleton, op. cit.
44	1.18	Omit 'common'.
46	n.1	W.S. Macleay, Horae Entomologicae....
,,	n.4	B. Field, op.cit.
47	n.4	H. Somer.
48	1.18	Read 'alma mater' for 'Alma Mater'
50	1.6	Punct. 'G.R.' for"G.R.".
51	1.20-21	Read and add ' The geological éminences grises , so far as Wilton was concerned, were Hutton and his disciples, who opposed the Neptunist standpoint'.
56	n.4	C. Wilton,'Australian Geology'.
53	n.5	G. Nadel,op.cit., pp.139-42 and M.Roe,op.cit.,pp.161-4.
57	1.1.	Omit 'singularly'.
,,	1.5	Read 'proved' for 'proven'.
,,	n.3	K. Fitzpatrick, op.cit.,p.192 and E.L. Piesse,op.cit.,p.118
60	n.3	Omit 'Ibid'.
63	n.1	J. Henderson, Observations on New South Wales....
64	1. 15	Read 'exhorted' for 'exorted'.
68	1.3	Read 'required' for 'requiring'.
,,	n.4	C. Singer, History of Biology.
70	n.2	Singer, op.cit.,pp. 177-80...
72	n.1	J. West, History of Tasmania.
74	n.1.18	Read 'seems' for 'seem'.
77	1.22-23	Read '... how much reliance and what resources Hooker .... would place on trusted ....'
79	1.13	Read 'led' for 'Lead'.
80	n.4	Read 'Hortus siccus' for 'Nottus siccus'
81	1.10	Punct. Full point after 'communications'.
82	n.3 1.6	Quotation mark after '... Circular Head District',...
83	1.12	Read 'lieut-governor' for 'Lieut-governor'.
85	n.1.1.6.	K. Fitzpatrick, op. cit.pp. 25-203.
,,	n.4	K. Fitzpatrick, op. cit.pp.195.
86	n.1	Miller, op.cit., pp.3i-5.
,,	n.3	Fitzpatrick, op.cit., etc
87	1.12	Read 'Jane Franklin' for 'Lady Jane Franklin'.
,,	n.4.	Fitzpatrick, op. cit.,p.2o2.
88	n.1.	J.C. Ross, A Voyage of Discovery....
90	n.1	W.B. Turrill, Joseph Dalton Hooker.

Page.

90	n. 2	J.C. Ross, A Voyage of Discovery.
,,	n. 5	,, ,, , ,, ,, ,, ,,
91	n.3	H. Palmer, op. cit., pp. 195-6 and Ross, op.cit....
92.	n.3	Fitzpatrick, op. cit.,p.198.
93	n.3	M.E. Hoare.
94	1.13	Read 'attack' for 'knock'.
''	1.27	Insert square brackets in place of round in 'which it never did call itself'.
,,	n.2	Fitzpatrick, op.cit.
95	n.1.1.3	Miller,op.cit.,....
98	last 1. of quotation.	Omit full point.
100	1.10	Read 'enthusiasm for and skill in' for 'enthusiasm and skill in'.
,,	n.1	P. Strzelecki.
,,	n.3	N. Plomley.
102	n.1	S.F. Mason.
104	n.2	K. Fitzpatrick, op.cit.,pp334-64.
107	1.9-11	Read 'With something of the lawyer's ordered mind and faced with the need for a policy of financial stringency, he was anxious to put in order all the endowments and privileges attached to his office'.
108	1.3.	Read 'useful arts' for 'arts'.
,,	1.9	Insert quotation mark after 'in these Colonies'.
109	1.4	Read 'might' for 'may'.
,,	1.7	Square brackets around 'it'.
110	1.10	Read 'Royal Society's' for 'society's'.
,,	1.23	Read 'in the colonial Empire' for 'outside Britain'.
,,	1.24	Read 'rarely' for 'scarcely'.
111	1.19-21	Read '... collapsed as a scientific institution, although in 1843 it had been generally supposed that it would be the Tasmanian Society whose 'light' and 'presumptuous arrogance' would be 'extinguished... at Government House...'.
114	n.2	Athenaeum, No.882(1845),p.860.
117	1.16	Omit 'then'.
,,	n, 3	W. Denison.
119	1.28-30	Read ' More enlightened men realized that partnership in science was essential in the future for the successful elucidation of Australian phenomena'.
,,	1.14	Read 'Acaciae' for 'acaciae'.
120	1.2 of last para.	Read 'were' for 'are'.
124	1.18	Omit comma after 'problems'.
126	1.15	,, ,, ,, 'Foreign litterati'.
,,	1.18	Omit 'strident'
,,	n.2	M. Aurousseau.
129	n.2.	This reference should become note 3 on p.128, coming after 'Square' at line 22.

Page.

129n.2 H. Cameron.

130 n.2 E. Lane and Aola Richards.
131 n.1 Nadel, op.cit., pp.120-60.
,, n.3.Denison, op. cit.,...

132 1.1. Read 'of' for 'on'.
,, n.3 Lhotsky, op.cit.
133n.1 G. Nadel, op. cit.

134 n.1 ,, ,, ,, ,,
135 1.5 Omit comma after 'indeed'

137 1.9 Read 'credibility' for 'credence'.
,, 1.15 Read 'met' for 'sustained'.

140 n. 3 Singer, op. cit.
144 n.1 J. Jervis.
,, n.3 Nadel, op. cit.
141 n.1,1.6. Read 'marine invertebrates' for 'marine invertebra'.

152 1.10 Read'Gipps' for 'he'.
,, 1.3 up Read 'had a poor reputaion in Tory circles' for 'was poorly ~~xxxxxxxx~~ remembered in Tory circles'.

153 1.6 Read 'Macleays'' for 'Macleay's'

159 1.4 Read 'cocoon' for 'cacoon'.

162 1.19 Read 'support' for 'condone'.

163 1.1.of quotation. Square brackets replace round.
,, 1.13 up Read 'de' for 'De'.
,, 1.10 up Read 'prise' for 'prize'.

164 n.3 J. Cumpston.

166 n.1,2,3. Read Aurousseau, op. cit. for Aurousseau, Letters of Leichhardt.

169 n.3, 1.7. Read 'de' for 'De'.

170 1.23 Insert quotation mark before'an interest in science'.

171 1.17 Read 'try to patent' for'Try and patent'.
,, n. 3 Cumpston, op.cit.

176 1.21 Read 'opposed' for 'intransigent'.

180 n.2 1.3 Read 'a' for 'the'.

186 n.4 1.3 Italicize Sci.
188 n.1 F. Mueller.
191 n.2 M.B. Jackson.
195 n.2,16 Joan Radford.
,, n.3 M.E. Hoare, '"The half-mad bureaucrat..'.

198 n.2 R. Pescott.
,, n.4 E. Dunn.

203 n.6 C. Ross.
204 n.2 G. Neumayer.
205 n.3,1.2 M.E. Hoare.
207 1.3 Omit 'Rev'.
,, 1.11-12 Add 'reinstate Bleasdale and Wilson, Who had resigned'.

Page.

209 n.3 Serle, op. cit.

211 l.12 Read 'were' for 'was!

212 n.1 Insert '£' and omit 'for' in l.2.

214.l.5 Read 'preference for' for 'tolerance of'.
,, l.1-2 up Read 'not all of the colony's best efforts in science were represented in the Royal Society'.

215 l.11 Read 'on' for ' of'.
216 n.l. J. Osborne.

217 l. 13 Read 'emphazize' for 'recommend'.
,, n. 5 G. Blainey.

220 l.9 Read 'try to' for 'try and'.

221 n.1 W. Clarke.
222 n,5 Blainey, op. cit.

223 l.5 Read 'after 1862' for 'from 1862-6'.
,, n.2 J. Bleasdale.

234 n.3 Add quotation mark after 'History of Municipal Government...'

235 n.3 Greenwood and Laverty, op.cit.

237 n.2 Laverty, op. cit.

239 n.1 Greenwood and Laverty, op.cit., pp.183-5 and Laverty, op. cit. pp211-9 and 406-14.

238 n.3, last line. Read "filthy lucre"3.

~~XXXXXX~~

251 n.1 Bolton, op.cit.
257 l.2 Add quotation after 'country'.
,, n.2 E. Ford.

261 n.4 J. Tenison-Woods.

264 l.3 Read 'financial' for 'fiscal'.
272 In quotation use square brackets in place of round in l.5 and l.14

274 n.2 La Nauze, op. cit., pp. 30-7 ...... La Nauze, op. cit.,pp.39-44

276 l.4 Read 'try to ' for'try and'.
277 n.2 Omit'Charlotte'.
278 l.15 Read 'of' for 'in'.
,, l. 22 Read 'Herpetology' for 'herpatology'.

279 l.14 Read 'W.S. Macleay' for 'William Macleay'.

281 l. 7 Read 'herpetology' for 'herpatology'.
,, l.8 Add (= Neoceratodus)after Ceratodus forsteri.
283 l.4 Read 'loth' for 'loathe'.
286 n.3 Correct IX(1875),p.9.
289 l.13 Read(1880-1) for (1880-81)
,, l.15 Read 'less' for 'least'
290 l.12 Read 'vessel' for 'vessell'.
,, n.4 C. Todd.

291 n.4 IV(New Series),pl299

Page.

291 n.1 D. MacMillan.

293 n.1, l.5 G. Whitley.
294 n.2 N. Maclay.

297 n.1 N. Maclay.

304 n.1 and 5 Aurousseau, Op. cit.

307 l.3 Read 'lungfish' for 'ceratodus'.

310 l.18 Read 'annex' for 'annexe'.

313 l.16 Hyphen to be inserted before 'scientists' and omit after same word.

315 n.1 pp. xxxii-xxxiv.

SCIENCE AND SCIENTIFIC ASSOCIATIONS
IN EASTERN AUTRALIA? 1