Report of the Council for the period
1 January 1981 to 31 December 1981
The Australian National University
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To His Excellency The Right Honourable
Sir Ninian Stephen, GCMG, KBE, KStJ,
Governor-General of the Commonwealth of
Australia and Commander-in-Chief of the
Defence Force.

May it Please Your Excellency

I have the honour to transmit to Your
Excellency the Report of the Council of The
Australian National University for the per­
iod from 1 January 1981 to 31 December 1981
furnished in compliance with Section 33 of
the Australian National University Act 1946.

J.G. Crawford
Chancellor
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Information about the University

In a report of this size it is not possible to give a full account of all the activities of the University in the year under review. This report comprises four sections:

- the Vice-Chancellor’s review of the year, supported by
- a feature on University research,
- brief reports on, and examples of, work in each of the research schools, faculties and centres, and
- tabulated information, statistics, and financial statements.

For those Members of Parliament—and members of the public—who would be interested to have more detailed information on the work of one or more of the research schools, faculties, centres or units, the Registrar would be glad to supply on request copies of any of the detailed reports which all sections of the University submit annually to the University Council. Lists of academic publications of departments in the research schools and faculties, which give an indication of the range of research activities in the University, are available in the Parliamentary Library and to individuals on request.

The address for such inquiries is—
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The Australian National University
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Canberra ACT 2600

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Telex
Natuni AA62760

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Organisation to administer the Australian National University Act
1946

Functions

The Australian National University Act 1946 determines that 'the functions of the University shall include the following:

(a) to encourage, and provide facilities for, postgraduate research and study, both generally and in relation to subjects of national importance to Australia;
(b) to provide facilities for university education for persons who elect to avail themselves of those facilities and are eligible to do so; and
(c) subject to the Statutes, to award and confer degrees and diplomas'.

Council of the University

The Faculties

Board of The Faculties

Faculties
Arts
Asian Studies
Economics
Law
Science

Institute of Advanced Studies

Board of the Institute of Advanced Studies

Research Schools
Biological Sciences
Chemistry
Earth Sciences
John Curtin School of Medical Research
Pacific Studies
Physical Sciences
Social Sciences

Board of The Faculties

University Centres(')
University Library
Residential Halls and Affiliated Colleges
University Union and Sports Union
Student and Staff Associations
Convocation(2)

(1) University Centres include the Centre for Resource and Environmental Studies, Humanities Research Centre, Computer Services Centre, North Australia Research Unit, Centre for Economic Policy Research, Social Science Data Archive, NHMRC Social Psychiatry Research Unit, Australia-Japan Research Centre, Centre for Recombinant DNA Research, Contemporary China Centre, ASEAN-Australia Joint Research Project, Development Studies Centre, Strategic and Defence Studies Centre, ANU Press and NHMRC Health Economics Research Unit. Other centres and activities include the Division of Educational Services which embraces the Centre for Continuing Education, Instructional Resources Unit, Office for Research in Academic Methods, University Counselling Centre, and University Health Service.
(2) Convocation, which elects four of its members to the University Council, comprises academic staff, graduates of the University and others, who create community links for the University throughout Australia and in many other countries.
University Officers

Chancellor
CRAWFORD, Emeritus Professor Sir John (Grenfell), AC, CBE, MEd Syd., HonDSc Ncle (NSW) & Orissa, HonDEc NE, HonDScEcon Syd., HonLLD Tas., PNG & ANU, FAIAS, FASSA

Pro-Chancellor

Vice-Chancellor
LOW, Professor Donald Anthony, MA DPhil Oxf., FAHÄ, FASSA

Deputy Vice-Chancellor
ROSS, Professor Ian Gordon, MSc Syd., PhD Lond., FRACI, FAA

Assistant Vice-Chancellor
PLOWMAN, Colin George, BEc Syd.

Chairman of the Board of the Institute of Advanced Studies
NICHOL, Professor Lawrence Walter, PhD DSc Adel., FRACI, FAA

Chairman of the Board of The Faculties
WHALAN, Professor Douglas John, LLM NZ, PhD Otago

Master of University House
ELLIOTT, Professor Ralph Warren Victor, MA StAnd. & Adel., FAHÄ

Dean of Students
KINLOCH, Hector Gilchrist, BA Camb., MA PhD Yale

Registrar
DICKER, George Edgar, BA DipEd Syd.

Secretary
WILLIAMS, Warwick Raymond, BSc NSW

Librarian
STEELE, Colin Robert, MA Liv., DipLib Lond., ALA, ALAA

Bursar
BOARDMAN, Ellis Russell, MA Oxf.

Head, Buildings and Grounds
ROBERTSON, Allison Alexander, BE Adel.

Officers for ceremonial occasions

Marshal
ELLIOTT, Professor Ralph Warren Victor, MA StAnd. & Adel., FAHÄ

Esquire Bedell
PACKARD, William Percival, MA NZ
The Council met five times during the year in March, May, July, September and November.

Members of the Council as at 31 December 1981

Members Ex Officio
Sir John (Grenfell) Crawford, AC, CBE, M Ec Syd., HonDSc Ncle (NSW) & Orissa, HonDEc NE, HonDScEcon Syd., HonLLD Tas., PNC & ANU, FAIAS, FASSA—Chancellor
The Honourable Mr Justice Richard Arthur Blackburn, OBE, BA Adel. & Oxf., BCL Oxf.—Pro-Chancellor
Donald Anthony Low, MA DPhil Oxf., FAHA, FASSA—Vice-Chancellor
Ian Gordon Ross, MSc Syd., PhD Lond., FRACI, FAA—Deputy Vice-Chancellor
Lawrence Walter Nichol, PhD DSc Adel., FRACI, FAA—Chairman of the Board of the Institute of Advanced Studies
Douglas John Whalan, LLM NZ, PhD Otago, Barrister and Solicitor NZ—Chairman of the Board of The Faculties
Jeffrey Timothy Michael Dalton—President of the Australian National University
Students’ Association

Members elected by the Senate
George Georges
Peter Elliot Rae, BA LLB Tas.

Members appointed by the Governor-General
Norman Keith Boardman, MSc Melb., PhD ScD Camb., FAA, FRS
Lisbeth Angelika Brodribb, AM, MA
PhD Melb., FAIM
Alfred Charles Copeman, BEng Qld, MA Oxf., FIMMAust.
Duncan Robert Steele Craik, CB, OBE, BEc Syd., FASA, FAIM
Pauline Marcus Griffin, BA, DipSocStudies
Syd.
Leonard Thomas Hinde, FIA
Thomas Fulton Coleman Lawrence, AM, BSc BE Syd., FIEAust., FRAeS
Sir Laurence (Macdonald) Muir, VRD, LLB Melb.
William Abernethy Park, CBE, BCom Qld. FASA
Sam Scruton Richardson, AO, CBE, MA Oxf., LLD A. Bello
Brooks Christian Wilson, AM, BEc Syd., MBA Harv.
Arthur John Russel Yencken, MA Camb.

Members elected by the House of Representatives
Richard Emanuel Klugman, BSc MB BS Syd.
Philip Maxwell Ruddock, BA LLB Syd.

Members chosen by Heads of the Research Schools in the Institute of Advanced Studies
Bernard John, MSc PhD Wales, DSc Birm., FIBiol.
Graeme Max Neutze, MAgrSc NZ, DPhil Oxf., FASSA
Members chosen from among the Deans of the Faculties in The Faculties
Eric Peter Bachelard, BScF Melb., MF PhD Yale
Beryl Marie Rawson, BA Qld, MA PhD Bryn Mawr

Member elected by the Professors in the Institute of Advanced Studies
Frank Lancaster Jones, BA Syd., PhD, FASSA

Member elected by the Professors in The Faculties
Liu Ts'un-yan, BA Peking, BA PhD DLit Lond., DipEd HK, HonDLitt Yeung-Num, FAHA

Members elected by the non-professorial academic staff in the Institute of Advanced Studies
Michael William McElhinny, BSc PhD Rhodes, FIP, FRAS, FAA
Adrian John Gibbs, BSc ARCS PhD Lond.

Members elected by the non-professorial academic staff in The Faculties
Benjamin Klaas Selinger, MSc Syd., DrRerNat Stuttgart, DSc, FRACI
Douglas William Smith, BCom LLB Melb.

Members elected by the non-academic staff
Stanley Bryan Furnass, MA DM Oxf., FRCP, FRACP
Pamela Morris Kennedy

Member elected by the research students
Martin James Peet, BSc Ncle(UK)

Members elected by the undergraduate students
John Duncan Anselan Buchanan
Robert Gordon Patch

Members elected by Convocation
Bettina Mary Arndt, MPsyh NSW, BSc
Stanford Bruce Juddery, BA
Richard Christopher Refshauge, BA LLB
David Harris Solomon, BA LLB

Members appointed by the Council
Two vacancies

Secretary to the Council
The Registrar
Vice-Chancellor: Professor D. A. Low, MA DPhil Ox., FAHA, FASSA

The intellectual health of a university ultimately turns on the intellectual strength of the academic leadership it possesses. A key test of a university’s capacities lies in the quality of those it is able to attract to its most senior appointments. Annual reports have a tendency to list these last, however distinguished they may be. This year some of them will be listed first, where they belong.

Amongst the ANU’s 1981 appointments were—

Professor Graeme Clark. A gifted classicist, who is perhaps the only Australian to have been a member of the School of Historical Studies at the Institute of Advanced Studies at Princeton University. A highly regarded former member of the Australian Research Grants Committee (ARGC) and Professor of Classics at the University of Melbourne since 1969, Professor Clark joined the ANU as Deputy Director of the Humanities Research Centre beside Professor Ian Donaldson as Director.

Professor Brian Anderson. University Medallist first in mathematics and then in engineering at the University of Sydney, he was appointed at the age of 26 Professor of Electrical Engineering at the University of Newcastle. Another highly respected former member of the ARGC, he is a Fellow of both the Academy of Science and of the Academy of Technological Sciences, a member of the Australian Science and Technology Council, and one of the three or four Australians who is a Fellow of the (American) Institute of Electrical and Electronic Engineers. Professor Anderson’s six books and several hundred papers and presentations have secured him a leading international reputation. In 1981 the University created a new Department of Systems Engineering, now in the Research School of Physical Sciences, which he now heads.

Professor J. B. Moore. Professor Anderson’s prime scientific colleague who shares in his exceptional international standing and who was appointed Professorial Fellow in Systems Engineering alongside him.

Professor Leon Simon. By all accounts one of the three most outstanding younger Australian mathematicians (and outstanding mathematicians often are relatively young), who was formerly Professor of Mathematics at the University of Melbourne.

Professor Derek Robinson. Also an outstanding mathematician and formerly Professor at the University of New South Wales. He was elected a Fellow of the Academy of Science in 1980 within two years of his arrival in Australia and in 1981 was awarded the Academy’s Lyle Medal. He joins the Research School of Physical Sciences, along with Professor Simon, to be Head of the revitalised Department of Mathematics.

Professor Rodney Baxter. In appointing Dr Baxter, Professorial Fellow in the Department of Theoretical Physics, to a full professorship, the University employed for the first time in 10 years its established procedures for filling a ‘non-established’ chair. Professor Baxter did his PhD here at the ANU. He was awarded the Pawsey Medal for the most outstanding younger scientist in Australia in 1975 and was elected to the Academy of Science in 1977. In 1980 he became only the third person to receive the Boltzmann Prize which is awarded every three years by the International Union of Pure and Applied Physics for outstanding contributions to statistical physics.

Professor William Doe. An outstanding younger clinician and medical researcher from the University of Sydney who, as
Professor of Medicine and Clinical Science in the John Curtin School of Medical Research, is, by all accounts, poised to establish at the Woden Valley Hospital the leading centre in Australia for work on gastroenterology.

Professor Peter Doherty. Appointed to the Chair of Experimental Pathology held vacant since 1973, he was responsible, as a former member of the John Curtin School in the early 1970s, with two colleagues, for what has been described as one of the most important advances in immunology in the last 10 years. The University has been unusually fortunate to attract him back from a chair at the University of Pennsylvania.

Professor Diana Howlett. A human geographer, of sensitivity to, abundant knowledge of, and long-standing practical association with, development problems of the South Pacific. She was lately entrusted by the Australian Development Assistance Bureau (ADAB) with drawing up a perspective until the end of the century on Australian aid to the South Pacific. Professor Howlett as Professor of Geography in the Faculty of Arts is only the second woman to be appointed to a full chair at the ANU.

Professor Dennis Pearce. A leading authority on administrative law and prime adviser to Australian universities on the complex issues arising out of the new Copyright Act. Shortly after being appointed to a chair in the Faculty of Law he was invited to act as Counsel to the new Senate Standing Committee for the Scrutiny of Bills.

Professor Harold Brookfield. Another outstanding geographer greatly experienced in the South Pacific, but also in the Caribbean and elsewhere, whose books on Third World development problems have been widely acclaimed around the world. Formerly at the ANU, he has been successively Professor of Geography at Pennsylvania State University, McGill University, and the University of Melbourne, and is now to be Professor of Human Geography in the Research School of Pacific Studies.

Professor Peter Wilenski. A man with extraordinarily wide qualifications, he is, among other things, a qualified medical doctor, a Master of Public Administration of Harvard University, Principal Private Secretary to a Prime Minister, Secretary of a Commonwealth Government department, member of the Royal Commission into Australian Government Administration, and professor at the Australian Graduate School of Management. Professor Wilenski has been appointed to a fixed-term professorship in the Research School of Social Sciences to work on a major project on Social Justice in Australia.

Dr Robert Gregory. An economist, who at a young age has already had a major impact on at least two areas of Australian economic policy. The 'Gregory effect' is now part of the conventional wisdom of anyone discussing Australia's 'resources boom'. More recently he has disentangled a great deal of the confusion in another national debate—on youth unemployment. In 1981 he was appointed as a Professorial Fellow in the Department of Economics in the Research School of Social Sciences.

Dr Peter Drysdale. Another economist who, under Sir John Crawford, has done more than anyone to build up the Australian end of the Australia-Japan trade relations study which is now embodied in the University's handsomely endowed Australia-Japan Research Centre. He was appointed a Professorial Fellow and Executive Director of the Centre.

Dr Kenneth Freeman. One more outstanding younger Australian scientist who enjoys an outstanding reputation in astronomical circles both in Australia and overseas. In 1981 he became a Professorial Fellow in the Mount Stromlo and Siding Spring Observatories.

There were also other highlights. Professor John Passmore, CorrFellBA, Emeritus Professor of Philosophy (and only the third University Fellow) gave the ABC's Boyer Lectures on 'The Limits of Government'. Emeritus Professor Arthur Birch, FRS (and also about to join the select band of University Fellows) gave the ABC's Boyer Lectures on 'The Limits of Government'. Emeritus Professor Arthur Birch, FRS (and also about to join the select band of University Fellows) was the first holder of the Newton-Abraham Chair of Chemistry at Oxford University. Now, Professor Frank Gibson, FRS, has been appointed to the same chair for the academic year 1982-83. Dr Arthur Stockwin, Reader in the Department of Political Science in the Faculty of Arts, left the University to become the first holder of the new Nissan Chair of Japanese Studies at Oxford. Professor Ralph Slatyer, FRS, re-
turned to the University after his widely appreciated period as Australian Ambassador to UNESCO. Emeritus Professor Alec Hope, one of Australia’s leading poets, was appointed a Companion of the Order of Australia. Emeritus Professor Manning Clark was named Australian of the Year for 1980. The Chancellor, Sir John Crawford, was named Australian of the Year for 1981, was appointed President of the Australian Centre of International Agricultural Research (whose establishment the Prime Minister announced at the Commonwealth Heads of Government Meeting in Melbourne in September) and continued as Chairman of the Consultative Committee on Development of the Australian Development Assistance Bureau. The Vice-Chancellor served as Chairman of ADAB’s counterpart Education Advisory Committee and as President of the Asian Studies Association of Australia. Professor Jerzy Zubrzycki continued as Chairman of the Australian Ethnic Affairs Council. The Deputy Vice-Chancellor, Professor Ian Ross, was appointed by the Minister for Science and Technology to head the Committee of Inquiry into Government Laboratory Services and Facilities. Dr Thomas Valentine was Senior Adviser to the Campbell Committee on the Australian Financial System. Professor John Carver continued as Chairman of the United Nations Sub-committee on the Peaceful Uses of Outer Space.

The foregoing points have been laboured—but without apology.

The 1982-84 Triennium

Critical decisions were made during 1981 about the future funding of the University. Early in the year the Advice of the Universities Council and the Recommendations of the Tertiary Education Commission to the Government for the 1982-84 Triennium were published. After considering these the Government determined in June its Guidelines to the Commission for the forthcoming triennium. These entailed a progressive reduction in the amounts nominated as follows:

<table>
<thead>
<tr>
<th>Universities Council's Advice</th>
<th>TEC's Recommendations</th>
<th>Government's Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent</td>
<td>$1390.0</td>
<td>$1357.3</td>
</tr>
<tr>
<td>Equipment</td>
<td>67.3</td>
<td>67.3</td>
</tr>
<tr>
<td>Capital</td>
<td>67.7</td>
<td>50.0</td>
</tr>
<tr>
<td>Total</td>
<td>1525.0</td>
<td>1474.6</td>
</tr>
</tbody>
</table>

At the same time, the Government announced that its former policies for financial supplementation (in respect of inflation) to universities and colleges would be replaced by a new ‘out-turn budget’ system, under which a total sum would be fixed for the year in question within which the University would have to live, whatever the rates of inflation and wage and salary rises.

In accepting in December the recommendations of the Academic Salaries Tribunal, the Government in effect acknowledged the shortcomings of this new system and announced that it would ‘look again at the adequacy of the allowance provided for cost increases in the 1982 grants ... early in 1982’. At the same time the Government gratifyingly announced its support (and some financial backing) for the newly prepared Superannuation Scheme for Australian Universities (SSAU) which, if implemented in the near future, should bring relief to the acute superannuation cost problems at the ANU that were given prominent mention in the Report for 1980.

The announced reduction in real, overall terms in the ANU’s general recurrent grant for 1982 was a little over 1%. The Universities Council’s Advice noted the decline in the ‘student load’ in The Faculties, and some of its reasons, and then opined that ‘The levels of staffing and expenditure in
The Faculties are significantly higher than in corresponding disciplines in comparable State universities. This appears to be due to the number of small departments and the variety of courses offered at a time of falling student load and the University may well have to look closely at reducing or eliminating some of these activities.

The Council further stated that it recognised 'the special role of the Institute of Advanced Studies in relation to the national research effort. It has taken into account the ASTEC recommendation that financial support for the Institute be maintained at an adequate level. The financial recommendations for the University appropriately recognise the funds needed to enable the Institute to maintain its current high standards of operation and include an element of growth consistent with the increase in special research grants for the State universities. The Council has noted that the expenditure on teaching and research in The Faculties is comparatively high even for the prevailing departmental sizes; the time may be opportune for the University to examine its distribution of funds between the Institute and The Faculties'.

The University has been prompt in its response to these comments. The shifts in the percentage of the University's budget between 1981 and 1982 are of the following order:

<table>
<thead>
<tr>
<th>Department</th>
<th>1981 (%)</th>
<th>1982 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Advanced Studies</td>
<td>50.70</td>
<td>52.15</td>
</tr>
<tr>
<td>The Faculties</td>
<td>24.76</td>
<td>23.57</td>
</tr>
<tr>
<td>Central areas, Library, Computer Centre</td>
<td>24.54</td>
<td>24.28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

There must be questions about whether amalgamating departments does actually reduce costs. However, the Board of The Faculties declined in 1981 to support proposals for new Departments of Fine Art, Human Sciences, and Women's Studies. Work in these fields remains the responsibility of existing associated departments.

On the advice of Review Committees that were already in operation, the Board, at the end of 1981, approved recommendations to amalgamate in 1982 the Departments of Applied Mathematics and Pure Mathematics into a single Department of Mathematics, and the Departments of Physics and Theoretical Physics into a single Department of Physics and Theoretical Physics in 1984. Discussions were instituted about a further amalgamation in the Faculty of Science, and about some comparable steps in the Faculties of Arts, Economics and Asian Studies.

The largest developments ensued upon a decision that in view of the reduction of the University's General Recurrent Grant, when placed alongside the Universities Council's admonitions, upwards of a 5% reduction would have to be made in The Faculties' budget between 1981 and 1982. The Resources Committee of The Faculties spent many hours on this matter in the last part of the year and the hopes of many individuals and of many departments for their futures necessarily received a severe setback. In summary the cuts that had to be effected were as follows:

- Established academic posts in The Faculties cut by 20.5 posts. This included a cut of seven positions from the Faculty of Arts and nine from the Faculty of Science.
- Established general staff posts in The Faculties cut by 25.5 posts. This included a cut of 12 such general staff posts from the Faculty of Science.
- Temporary academic posts reduced by three more; temporary general staff posts by four more. Negotiations were also instituted for the transfer to other parts of the University of another half-dozen general staff posts.
- At the same time part-time teaching funds were reduced from the equivalent of 27.5 posts in 1981 to 16.8 in 1982, or by minus 10.7.
- After allowing for three unavoidable additions all this in summary means that between 1981 and 1982 the cuts in The Faculties as a whole were 33.2 academic posts, 34.5 general staff posts, or a total of 67.7 university posts.

Eleven other academic posts and four general staff posts falling vacant are being filled at a more junior level.
Faculty and departmental funds are being cut by keeping them at the 1981 level.

The percentage reduction in The Faculties' posts for 1982 as compared with 30 April 1981 are—academic posts, 8.5%; general staff posts, 8.85%.

The incalculable consequences for teaching and research in The Faculties will be immediately felt by all of their staff and students in the coming 1982-84 triennium, and the marks could persist for long thereafter.
In 1981 the University again had no funds for its numerous major building needs. In order to relieve the most pressing problems careful attention was therefore given to the application of the grant for minor works.

This grant was used to complete the conversion of one of the car parking levels in the Acton Tunnel to house the Business Archives of the Research School of Social Sciences. The Business Archives settled into the Tunnel in the early part of the year enabling the area vacated in the Coombs Building to be redeveloped into staff studies.

As part of the 1973-75 triennium major works program, funds were granted for the construction of a headquarters for the North Australia Research Unit on a site in the Darwin suburb of Marrara.

Design work, which was well advanced at the time of Cyclone Tracy, was resumed in 1979 and some of the development contracts were let when, late in that year, the Northern Territory Government proposed that the Marrara site be exchanged for one in the suburb of Brinkin, adjacent to the Darwin Community College. It was not until the beginning of this year that the Northern Territory Government had the proposed new site zoned appropriately and had agreed to compensation terms acceptable to the University.

The Governor-General approved the surrender of the Marrara site in March and design work was pressed ahead for the establishment of the headquarters on the new site. Construction is scheduled for completion in April 1982.

Much remains to be done to bring the University site, its landscaping, roads, pathways and parking areas into a more finished state. Progress in this field is limited by the small amount of money which can be made available. However during 1981 some worthwhile improvements were carried out, in particular the completion of the main University Avenue broad walk between the Haydon Allen/Copland underpass and the eastern boundary where it joins the Family/Juvenile Law Courts plaza.

Work which began in 1980 on the conversion from oil to electricity as the source of heating energy continued in 1981. The major boiler house (No. 2) was shut down at the end of April and the heating of all buildings with the exception of some temporary huts was supplied by electricity. At the same time as the boilers were shut down, a computer-based energy monitor and management system known as ‘Minder’ was commissioned. The system, designed in-house, monitors the electrical load continuously and applies a pre-arranged schedule of load shadings to minimise energy consumption and maximum demand; these two elements in our electricity tariff are metered and charged separately by the ACT Electricity Authority. Despite an apparent stabilisation in oil prices during the year and an increase in electricity tariffs, there has been a substantial cost saving in converting from oil. A large part of the benefit accrues because electrical heating can be applied efficiently at the point of use, so avoiding the large distribution losses which were associated with the boiler house based system. As a result of conversion from oil to electricity, the University’s total annual energy consumption has been reduced by 33%, from 375 to 252 terajoules.

These articles are on research projects in the University’s Institute of Advanced Studies, and on teaching and research interests in The Faculties. Examples are taken from each of the seven research schools, from each of the five faculties and from a research centre.
ANU research

The powers of Prime Ministers and Ministers

How much do Australians really know about how effectively their government ministers work? How do these men interact with one another, or with the bureaucracies of their department? Do they control their bureaucracies or, as some accounts suggest, do the bureaucracies dominate them?

During 1981 Dr Patrick Weller of the Department of Political Science, Faculty of Arts, and Michelle Grattan, political reporter for The Age newspaper, published the book Can Ministers Cope? This was the first book ever to be written that analyses the responsibilities, pressures and effectiveness of Ministers in the Australian government system.

Ministers play a central position in our system of government. They act as heads of departments; they contribute to cabinet discussions; they perform in parliament and for the media; they are local members, party activists, and international travellers. They have diverse responsibilities, and work under great pressure. If we are to make a reasonable assessment of how well our democratic system works we must know the limits of the powers of ministers, consider ways of making their tasks more manageable, and be aware of the consequences of their occasional failures to give proper direction. It is crucial to know whether the main problems are in the system of government, or in the people involved.

To try to find answers to such questions Dr Weller and Miss Grattan interviewed 50 ministers and 30 senior public servants in the Commonwealth and State governments and public services. The book describes how the ministers see their jobs, and the complexities and pressure which they face.

Not all the authors' findings fit the impressions of people outside the system. For example, ministers have limited powers over their departments. Nevertheless forceful but diplomatic ones may achieve a great deal. Also public service departments themselves prefer not to have a weak minister. Although their senior officers can dominate such a person, he will not effectively push their cases in cabinet.

How much can a Prime Minister dominate his colleagues? Commentators generally state that Australia has a cabinet, or collective form of government. Yet during the last decade the country has been led by two impressive prime ministers. To what extent can it be argued that Australia has a prime ministerial or even presidential system of government?

Dr Weller is currently writing a second book on prime ministers. He compares the powers of prime ministers in Australia with those of Britain and Canada. He recently visited these two countries to interview prime ministers, ministers, leading officials, and political staff. Comparing the responsibilities and support for prime ministers in the three countries makes it easier to understand the constraints under which each must work.

In writing this second book it is becoming
Mr Malcolm Fraser and Mr Gough Whitlam, two outstanding Prime Ministers of our time. How much power do they really have over their Cabinet colleagues?
obvious to Dr Weller that it is very hard for an Australian prime minister to completely dominate his cabinet; a determined junior minister can force his will in Cabinet. Indeed the Prime Minister's powers are less than most people generally believe. For example, compared with his Canadian and British counterparts, an Australian prime minister is much more vulnerable because, unlike in those countries, he can be dismissed at any party meeting. On the other hand, an Australian prime minister can apparently obtain more detailed policy briefings on items of direct interest. His counterparts do not have the benefit of a large Department of Prime Minister and Cabinet.

During 1982, Dr Weller, Mr David Adams and Dr John Hart will be teaching in the Department of Political Science a new honours course on executive leadership in Western democracies. The material taught will draw heavily on the results of Dr Weller's research, and on Dr Hart's complementary studies of the very different American presidential system. Thus the teaching in the department will receive direct benefit from the investigations of these two researchers.

Limits to coal production

Between now and the year 2000 this country's coal production will probably increase nearly four-fold. While some of this additional coal will be used in Australia, most will go for export. However, for various technical, geological, and social reasons, sustaining the production of such enormous tonnages may prove very difficult. Furthermore, the production, handling, transporting, and use of such large amounts of coal could cause major social and environmental disruptions if their effects are not effectively anticipated.

Much of the additional coal will come from two regions—the upper Hunter Valley of New South Wales, and the Bowen Basin in Queensland. The upper Hunter Valley coal will come mainly from the adjoining shires of Muswellbrook and Singleton, an area that is already relatively heavily settled, and one which supports flourishing intensive agriculture, particularly dairy farms, orchards, and vineyards. Two of the open cut mines planned for this area will become among the world's largest, and there can be no doubt that such large developments will have a major effect on the district.

Early in 1981 the Centre for Resource and Environmental Studies began a major study of the impact of the rapidly expanding coal-mining industry on the environment of the Hunter Valley. The 13 staff members involved are assessing the effects of the mining of coal for many purposes, especially for export, and of its use in new power stations on such other local natural resources as land, water and air. They aim to define the likely constraints that may hold back the extensive lists of projects already approved or foreshadowed.

In greater detail, the project staff aims to investigate the technical, geological, and mining constraints on development; impacts of development on other natural resources and the environment; extent to which such developments may create social problems; implications of various options available for dealing with social and economic problems that emerge, since these may have an effect on the rate of expansion.

Development of an area like the Hunter Valley presents many possibilities for conflict. For example, by the year 2000 coal mining and the associated power station program will consume some 37% of the available water resources. Agriculture and domestic users will probably consume about 20%. However, without proper planning, the coal-related developments could cause considerable water pollution, and by affecting the water supply at critical times they could exacerbate the valley's already serious water-related problems.

Already transportation of the mined coal is causing social conflict. At present most goes by road and the level of hazard to users
of the Hunter Valley’s roads has risen considerably. As the mining developments proceed they will continue to cause rapid expansion of population centres. Already the new or enlarged communities are placing considerable new demands on the limited social infrastructure in the district.

Initially, this project of the Centre for Resource and Environmental Studies will last for three years, and it will be confined to the Hunter Valley. However the Centre expects to go on and examine other coal fields at a later stage. While it views the upper Hunter Valley district as a case study, it expects to produce knowledge that will have much wider application for other major energy developments in Australia.

Radiocarbon shows when or where

If an archaeologist wishes to know the age of an Aboriginal site, he obtains samples of bone, charcoal, or wood and sends them to a carbon 14 laboratory for dating. Similarly, a scientist trying to unravel the past history of the Great Barrier Reef, or of the coastline of the Gulf of Carpentaria will also send in samples of coral, shells, or wood from which
An automatic level stands on a coral micro-atoll on a flat in the Flinders Group of islands, Bathurst Bay, Cape York Peninsula. Carbon dating of samples taken here give information about the history and growth of the Great Barrier Reef, and about changes in the sea level.

The lithium-carbide reactor, an essential feature of the Radiocarbon Dating Laboratory. Here carbon dioxide from the original sample is converted to acetylene. The acetylene will be converted to benzene and its carbon 14 content will be analysed using a liquid scintillation counter.

it will be possible to give an accurate age for the place from where they came.

The technique of carbon dating depends on the fact that the radio-active form of carbon known as carbon 14 spontaneously decays to nitrogen 14 gas. This means that the older the sample, the less carbon 14 it will contain. Thus by measuring the amount of carbon 14 in the sample it is possible to come up with an accurate age, provided that the sample is not more than about 50,000 years old.
The Research School of Pacific Studies established what has become a very successful carbon 14 laboratory in 1965. Originally the Radiocarbon Dating Research Laboratory was set up to allow prehistorians and other specialists within the Research School to obtain accurate dates for their sites. Nowadays the laboratory deals with research problems, and services the needs of many departments within the ANU. It also services the needs of such outside bodies as other universities, the Australian Atomic Energy Commission, CSIRO, and the government of Thailand. Recently, the laboratory has collaborated with the People’s Republic of China in studies of arid lake sediments in Qinghai Province. A Chinese scientist received eight months of training in carbon dating techniques.

Australia has only a limited number of carbon 14 laboratories, and only those at the ANU, the University of Sydney, and to a lesser extent at the University of New South Wales, deal with samples from researchers outside the parent university. A number of other institutions have laboratories modelled on the ANU one, but these are used entirely to cater for their own internal needs.

When he first established the laboratory, its head, Mr Henry Polach, spent much of his time answering the question ‘how old?’. Nowadays radiocarbon techniques have advanced so much that they can be used to answer the question ‘where did it come from?’. In recent years, for instance, the carbon 14 laboratory has revealed carbon dioxide levels in ancient ice samples from Antarctica (which give clues about the climate of that time), the sources of pollutants in Sydney’s air (for the State Pollution Control Commission), and the rate of sedimentation in coastal muds near Port Pirie in South Australia’s Spencer Gulf (which is important for the planning of industry).

The particles of Sydney’s winter brown hazes consist of about 30% of carbon. Does this come from the city’s traffic, or from the burning off of vegetation, timber wastes, cardboard and paper? The State Pollution Control Commission must know this if it is to successfully reduce emissions into the atmosphere. Analysis of the carbon 14 content of the atmospheric particles can give the answer. If the carbon comes from modern vegetation the particles will contain the same proportion of carbon 14 as the vegetation. By contrast if they derive from oil or coal, then they will contain no carbon 14.

About one-third of the laboratory’s work comes from the Department of Biogeography and Geomorphology, and the Department of Prehistory in the Research School of Pacific Studies. Here the laboratory has provided an indispensable back-up for such research as that of Dr G. Singh, who has reconstructed the history of the climate and vegetation of the Lake George area, and that of Dr J. M. Bowler, who has built up a precise history of the arid salt lakes of south-eastern Australia. Dr Bowler is now also using carbon 14 analysis to piece together a precise history of the last 40,000 years in the areas surrounding Lake Frome in South Australia, and Lake Gregory and Lake Woods in north-western Australia. Another one-third of the laboratory’s work comes from joint research projects that apply carbon 14 analysis to new uses.

Not only has the carbon 14 laboratory taken a leading role in pushing forward the techniques of carbon 14 analysis, it has also established the world standards by which carbon 14 measurements anywhere can be checked. Mr Polach and his staff are now developing techniques for accurately analysing very small carbon samples of between 10 and 30 milligrams in size. Current methods require between one and five grams of sample carbon.
Towards more successful government programs for Aborigines

Many government programs genuinely designed to assist Aborigines fail. According to a study recently completed within the Centre for Resource and Environmental Studies, not only do they not meet their aims, they actually do damage to those they seek to help. This happens because they cut across Aboriginal cultural patterns, and because their methods run contrary to Aboriginal ways of learning, teaching and living.

At the Centre for Resource and Environmental Studies, Dr M. Brandi and Mr W. Snowdon, with advice from Dr H. C. Coombs, have since 1978 sought the reasons for such failures. Supported by money provided by the Office of Childcare, Department of Social Security, they have examined ways of increasing the effectiveness of government programs for Aboriginal children and families. After spending extended periods in communities in northern and central Australia where traditions remain strong—with Pitjantjatjara communities in central Australia, and with the Larrakia and Wagaidj peoples at Belyuen near Darwin—the researchers will submit for publication a comprehensive report early in 1982.

The report will cover a host of aspects including: the question of what it means to
be Aboriginal; the ways in which Abor­
igines learn and teach their children and
interact with one another generally; the
implications of Aboriginal customs for such
government responsibilities as law and
order, education, and the payment of pen­
sions, unemployment benefits and other
welfare payments and will conclude with 64
detailed recommendations.

The researchers found that the govern­
ment programs failed because they were
based on the false assumption that Abor­
ingual values, family structures, and teach­
ing and learning methods are the same as
those of white Australians. In particular they
concluded that it is not so much the content
of the programs that is inappropriate as the
manner in which they are delivered. Abor­
ingual styles of teaching, for example, con­
trast sharply with those of European Aus­
tralians.

In addition, although present policies may
formally encourage Aboriginal initiatives
and Aboriginal control of the social pro­
cesses in their communities, ignorance and
inflexibility of bureaucratic processes make
implementation very difficult.

Take Aboriginal learning and teaching
processes. The extended family forms the
basic unit of the Aboriginal society. Children
learn by interaction with adults and their
peers. It could be said that the Aborigines
have not yet invented childhood since child­
ren are involved in the activities of their elders from an early age. They learn by
observation and imitation rather than in­
struction and, in contrast with white society,
Aboriginal children believe it is better to
admit ignorance than to make a mistake. The
Aborigines therefore teach by positively
encouraging correct behaviour rather than
by negative shaming for incorrect behaviour
(as we do). Aboriginal attitudes have a
distinct disadvantage in white Australian-
type classrooms that emphasise individual
achievement and effort, and learning from
mistakes.

Apart from generally recommending that
a greater effort should be made to under­
stand Aboriginal customs and practices, the
researchers specifically recommend that:
school hours should be adjusted to give
children more time with adults (which would
allow government-sponsored and traditio­
nal programs to complement one another);
building programs should be adjusted to
encourage the construction of buildings that
are less confining for Aboriginal children,
and to encourage the construction of houses
that provide adequate accommodation for
extended families; government health and
welfare programs generally should be
changed so that these and traditional ways
complement one another; income mainte­
nance programs should be altered so that they
both provide adequate incomes for extended
families, and so that payments go to those
with the responsibility for feeding those
families (usually wives and mothers).

The current policy of paying unemploy­
ment benefits to the father of a family is not
appropriate for the Aborigines since Abor­
iginal men must share their incomes with
other members of the hunting group rather
than with their families.

Dr Brandl and Mr Snowdon found that
Aboriginal social patterns and customs are
remarkably resilient and persistent, which
means that their findings will have appli­
cation among urban as well as rural Abor­
ingines. They also found that Aborigines
greatly appreciate help from white Aus­
tralians, as long as it is brought by people
really interested in providing it. Unfor­
tunately present government procedures
ensure that some officers directly in contact
with the Aborigines serve with little or no
preparation, and often because of a com­
pulsory transfer rather than as a result of
their own choice. The researchers therefore
recommended that the Government consider
the establishment of a program of voluntary
help for Aboriginal communities along the
lines of Australian Volunteers Abroad.
Australian Aboriginal languages studied

White Australians generally believe that the Aborigines speak simple 'primitive' languages. In fact, most Aboriginal languages consist of some 10,000 words, which is about the same as the working vocabulary of most English-speaking citizens of Sydney, New York or London. Furthermore, Aboriginal languages have complicated grammars that are somewhat reminiscent of Latin and Greek.

Professor R. M. W. Dixon during a session with George Watson of the Mamu tribe and Bessie Jerry of the Girramay tribe at Bilyana some 160 km north of Townsville, in which he recorded their spoken languages. The staff and PhD students of the Department of Linguistics, Faculty of Arts, help the local Aboriginal communities by providing dictionaries and literacy materials in their own languages.
Linguistics, the study of languages, is quite new in Australia. The Department of Linguistics, Faculty of Arts, was one of Australia's first when it was established 12 years ago. Serious studies of Aboriginal languages had begun only a few years previously. Today the department teaches three courses which cover the structures, the interrelationships and the social roles of Aboriginal languages. Six of the department's current staff of eight, and also 10 graduate students, pursue intensive field research on Aboriginal languages.

Some 600 distinct tribes lived in Australia when the First Fleet arrived. Between them they spoke about 200 different languages. Some 50 of these languages have died out, and today perhaps another 50 remain in a healthy state. In the Department of Linguistics, Professor R. M. W. Dixon has a long-term project looking into whether all Aboriginal tongues are related. It appears that all but two or three of the 200 belonged to a single language family, which is the equivalent of the Indo-European family of languages of Europe and India. Different languages of the Aboriginal family can be as different as Bengali and Scots Gaelic—both of which belong to the Indo-European one. Professor Dixon is also working out the nature of the unique original Aboriginal language (which may have been spoken many thousands of years ago) from which the modern languages developed.

The 50 Aboriginal languages that have died out were spoken mainly in the well settled south-eastern and south-western corners of the continent. To reconstitute these, Professor Dixon is carefully analysing old records of local words written down by early European settlers. Comparing word lists and other comments can provide many clues to the phonetic and grammatical structures of these languages.

The languages considered to be in a healthy state are those that are still spoken by hundreds of people in every aspect of their daily lives. However, if these languages are to survive, it will be necessary to provide educational materials in these languages as well as English, and speakers will need to be taught to read and write their own languages, and to record their myths and legends. The Department's PhD students help here. They do not merely confine themselves to compiling academic grammars at the request of the communities involved, they provide dictionaries and literacy materials.

Another 100 or so languages are still spoken or remembered by a handful of people. These must inevitably die out—some, at any time, when the last speaker dies, others in a generation or two. Departmental staff and students are making intensive efforts to record as much of these languages as possible before it is too late. The remaining speakers are enthusiastic about the project. They are happy that some record should be made of languages which may have a much longer history than English and which are the repositories of the laws, the values, and the views of the world of a unique human culture.

Two thousand Pacific languages sorted out

Twenty-five years ago the outside world knew very little about the languages of Papua New Guinea. Today all 740 Papuan languages spoken in the New Guinea area have been located and analysed.

Under the leadership of Professor S. A. Wurm, the Department of Linguistics, Research School of Pacific Studies, has since the late 1950s provided the central thrust in a great gathering of knowledge about the languages of New Guinea, Australia, the Pacific islands of Melanesia, Micronesia, Polynesia, and South-East Asia. This push, which has involved many academic in-
The map shows the boundaries of the 81 languages spoken on the central islands of Vanuatu (formerly the New Hebrides).
stitutions in Australia and neighbouring countries, Europe, the United States, the Soviet Union, and recently China, culminated in the publication in December 1981 of Part 1 of the Language Atlas of the Pacific Area. With the publication early in 1983 of Part 2 of the atlas, the geographical range of all 2000 languages spoken in the greater Pacific area will for the first time have been brought together in a single definitive work.

The languages of the Pacific proper belong to three different and unrelated groups—namely the Australoid group, into which all Australian Aboriginal languages fall, the Papuan group, which includes most of the languages of the New Guinea area, and the Austronesian group. The languages of Melanesia, Micronesia, and Polynesia all fall into the Austronesian group. Over the millennia these three main language groups have become subdivided into a multitude of different languages that at times have intermixed.

Analysing these languages and unravelling the intermixing has enabled linguistics specialists to sort out the relationships between the peoples of the Pacific, and to suggest where they came from and by what routes. Archaeological finds have provided confirmation of these migration routes and actual dates for when the movements occurred.

For example, the Australian Aborigines apparently stem from an ancient stock that originated to the west of New Guinea more than 60,000 years ago. Archaeological studies in the Department of Prehistory, Research School of Pacific Studies, suggest that the first ancestors of the Aborigines began migrating into New Guinea some 60,000
years ago. They reached Australia overland about 40,000 years ago. Apparently the present day Papuan-speaking inhabitants of the New Guinea area probably began arriving from the west some 15,000 years ago, and the last do not seem to have arrived until as recently as 5000 years ago.

The speakers of the Austronesian languages (Melanesians, Micronesians, and Polynesians) appear to have originated in China and spread out through Taiwan from about 7000 years ago. They penetrated into Melanesia about 1500 years later, and into the islands of Polynesia only about 3000 years ago. The spread into Polynesia ended only relatively recently when the Maoris reached New Zealand in two waves, in 900 AD and 1400 AD respectively.

Study of the Pacific area languages has done more than reveal the origins of its present inhabitants. It has also given an understanding of their cultures. Thus the Language Atlas of the Pacific Area should have considerable political as well as academic impact.

Professor John Passmore, then President of the Australian Academy of the Humanities, first floated the idea for the atlas in 1978. The Academy then approached the Japan Academy with a view to co-sponsorship and Professor Wurm and Professor Shiro Hatatori of the Japan Academy were appointed General Editors. The atlas consists of 47 maps, each with written background information, arranged in two parts. Part 1 covers the languages of the New Guinea area, Oceania, and Australia. It contains 24 maps. Part 2 covers much of South-East Asia, the Philippines, Taiwan, and Japan. It contains 23 maps.

Two complementary publications are planned. The first, Papuan Languages of Oceania by Professor Wurm, will be published in 1982. The second, a linguistic atlas of China, will be published in about five years time. It will be co-sponsored by the Chinese National Academy of the Social Sciences.

Inflation and the law

In 1677, back in the reign of King Charles II of England, Parliament decreed that under the provisions of section 17 of the Statute of Frauds, oral contracts for the sale of goods worth 10 pounds or more should not generally be enforceable. Australian States and Territories inherited this law, and today the same sum ($20) remains for all States except Queensland. In terms of buying power, 10 pounds in England in 1677 would purchase the equivalent of $600 in Australia today.

Inflation has bitten hard into the value of other penalties laid down by law. In Queensland and South Australia the fine for assaulting or resisting a police officer in the execution of his duties has remained unaltered since 1953. Because of inflation $1 then is worth $3.50 now, so the value of the fine has dropped to little more than one-quarter of its value in 19 years. In New South Wales the fine remained unaltered between 1833 and 1979.

Clearly, the system of sporadically adjusting penalties (or tax rates) laid down by law has not worked well during times of high inflation. Mr J. L. R. Davis of the Faculty of Law, who has been investigating the effects of inflation on the provisions of the law, has shown that nowhere in the legal system is the effect of inflation more acutely felt than in the field of damages for personal injury claims.

The majority of people rendered quadriplegic in accidents are between 10 and 29 years of age. Medical opinions differ on how long such victims may expect to live but as medical knowledge has advanced their life expectancy has steadily increased. Nowadays they may expect to need compensation to cover lost earnings and medical and nursing expenses for between 30 and 40 years.

When making compensation awards, judges have assumed that a suitably large
A paraplegic surveys the problem of entering Victoria's parliament.
lump sum payment calculated on current costs and properly invested will provide for the victim's needs. However, according to Mr Davis's study, this is not so. Indeed, he has found that some people rendered quadriplegic between 10 and 20 years ago, and who received what appeared to be very ample compensation at that time now suffer considerable financial hardship.

Gillian Thurston, for instance, became a quadriplegic as a result of a road crash in 1963. She received the then record damages of $139,000. Her lawyer invested the money on her behalf. The Judge ruled that she could expect to live for 30 years. By 1973 nursing costs alone exceeded the income from the invested sum. In 1981, Gillian's nursing costs were exceeding the income by some $5000 per annum. Her widowed mother had to make up the shortfall by selling family assets.

Yet Gillian Thurston was lucky. About half of the people becoming paraplegics or quadriplegics receive no compensation, or wholly inadequate compensation. Those who live at home must pay enormous fees for nursing yet they lack any form of income. Those living in nursing homes must pay $62.65 a week (at least). They receive $69.70 a week from the Department of Social Security, and may earn up to $20 a week in a Sheltered Workshop before that pension is reduced.

Judgments delivered in February and December 1981 in the High Court of Australia substantially increased the level of damages awarded to accident victims with the result that Australia is now in the forefront of those countries operating under the British system of Common Law in the size of its damage awards. However, Mr Davis points out, these awards still help only the small proportion of people entitled to obtain damages under the present legal system. He believes that the needs of the majority can only be met if Australian governments introduce 'no fault' systems of compensation that are based on the needs of the person concerned rather than on deciding who is at fault.

For the first time, the topic of inflation and the law comes up for discussion by the world legal community at the XI International Congress of Comparative Law, to be held at Caracas, Venezuela, during the second half of 1982. Mr Davis prepared the National Report for Australia.

Health and safety at work

On average every day in Australia one worker is killed and 1500 suffer significant personal injury. In terms of lost earnings and compensation payments, industrial injury and disease cost the nation some $2000 million annually. More than five million working days are lost each year—more than twice the number lost from strikes.

While these figures cannot be directly compared with those of other countries, few people doubt that our industrial accident and disease rate is disturbingly high when compared with, for instance, those of the United Kingdom or the United States.

Industrialists, unions, and politicians generally agree on the need to reduce industrial accidents, but they do not agree on how this can best be achieved. One way, which most industrial countries have already adopted, is to introduce statutory standards and to regulate work place conditions by law. For example, in Britain the Health and Safety Executive enforces standards laid down in legislation and has the power to impose considerable penalties. In the United States, the Federal Occupational Safety and Health Administration performs a similar function.

Although each Australian State does have some health and safety legislation, many of these laws are based on the 19th-century British Factory Acts. Consequently they are not necessarily adequate to deal with the hazards created by modern technology or to satisfy the expectations of today's workforce for a clean and healthy working environment. A Victorian committee of review of the State's Labour and Industry Act
1958 recommended reforms to the State's safety legislation in 1978. These should come into force in 1982. Last year the Williams Commission issued a report critical of the legislation in New South Wales, and the State government is currently considering its recommendations.

Mr N. A. Gunningham, Faculty of Law, is preparing a book on the role that the law can and should play in reducing occupational injuries and disease. He considers that the State inspectorates for enforcing the regulations are too understaffed, and their relationship with industry is too close for them to be effective. Prosecutions are rare, and fines for successful convictions average only about $100. The maximum fine that can be levied is usually only about $1000.

Mr Gunningham has investigated the existing legal arrangements in each State, and has analysed the political, economic and social context in which the law operates. In particular, he has examined the role played by the trade unions, governments and employers. In general, he has found, the trade unions have been preoccupied with compensation rather than prevention, and governments have sometimes failed to take firm action for practical political reasons. Employers have often been tempted to sacrifice safety for higher profits and competitive advantage.

In Mr Gunningham's view the basic issue to be confronted is this: should employers regulate themselves by taking whatever action (if any) on work place safety they see fit, or should the State intervene to ensure employers comply to prescribed minimum standards? In Britain during the 1970s an official inquiry chaired by Lord Robens (and on whose recommendations subsequent legislation was based) concluded that industry could be trusted to regulate itself. Other authorities doubt whether market forces alone can satisfactorily determine the amount of money that should be spent on safety, and they argue for a system of regulatory control. This approach has been adopted in the United States.

However, the prospect of State intervention raises further questions. For example, is preventive legislation more effective than fault-based compensation? Or can the costs of regulation be justified? Then there are also the questions of the extent to which workers themselves should be involved in the decision-making process, and of the extent that they should be given rights that they can enforce to protect themselves against the hazards of their work.

Mr Gunningham's studies suggest the need for urgent law reform in a number of areas, particularly those of enforcement, protection from toxic chemicals, and workers' rights—conclusions that are particularly apposite considering the reassessment of the health and safety legislation that the New South Wales and Victorian State Governments are currently undertaking.

Something like 12,000 new chemicals enter the work place in the United States each year, and the number of new chemicals entering the Australian one must therefore also be considerable. Currently there are few controls on how these chemicals may be used in factories, and manufacturers have little obligation to divulge what chemicals are in use. Workers do not even have the right to know what chemicals they are exposed to—a situation that is changing in Scandinavian countries, and to a lesser extent in the United States.

**Flu control at last?**

Influenza epidemics cost countries a lot of money. For example, estimates suggest that the 1968 Hong Kong flu outbreak cost the United States of America some $3 billion in lost earnings and production deficits. Losses from the same epidemic in Australia totalled perhaps $100 million.

Currently Western countries (including Australia) use vaccines against influenza containing flu virus that has been killed. Unfortunately these vaccines do not work very well. For instance, a recently completed eight-year study in an English boys' boarding school showed that repeated use of killed
vaccines gave little protection against future outbreaks of new strains of flu. On the other hand, non-vaccinated boys who caught flu naturally developed an immunity to other new flu strains that lasted at least four years. Other studies suggest that this immunity may last as long as 20 years.

During the past six years, researchers at the Department of Microbiology, John Curtin School of Medical Research, led by Professor G. L. Ada, have played a leading role in unravelling how the body’s immune system works. They now have a clear picture of what happens when a virus, such as influenza, infects the body, and why the killed flu vaccines have failed.

When a virus invades the body it stimulates the production of antibodies, which can prevent the infection by reacting with the protein coats of the virus particles. Vaccines consisting of either live or dead virus particles stimulate the formation of antibodies, and thus normally provide the body with immunity against that particular strain.

The problem is that new slightly different strains of the influenza virus constantly keep appearing, and the antibodies already formed have no effect on infections of the new strains.

Studies at the Department of Microbiology have shown that antibody formation is not the body’s only defence against infection by viruses. The body’s blood and lymph systems contain white cells that have various functions in protecting the body. Invasion by a virus stimulates production of special white cells known as killer T cells that kill not the virus itself, but the cells which it has invaded. Thus the virus cannot reproduce and infect other cells, or other people.

Working with mice, the researchers showed that while vaccinating with live viruses causes formation of both antibodies and killer T cells, using dead virus vaccines does not. Moreover, not only do the killer T cells protect against that particular influenza strain, they also attack infections of any other strain of influenza A virus (the one that causes nearly all the serious epidemics).

In one experiment the researchers inoculated two groups of non-immunised mice with a lethal dose of influenza A virus. Twenty-four hours later they transfused killer T cells into all members of one of these groups. All mice that had not received the transfusion died, while all those inoculated with killer T cells survived. Indeed, further examination revealed that the killer T cells had reduced the amount of infection in the lungs of the surviving mice by 99%.

The human immunity system seems to work in a way similar to that of the mouse. So it appears that live virus vaccines, because they would mimic a natural infection, have a better chance of effectively controlling influenza outbreaks.

In fact, the idea of using live virus vaccines is not new. They present certain risks, but they have been used to control smallpox, poliomyelitis, mumps and measles. Production of such vaccines involves finding the strain of virus that gives immunity to the greatest number of flu virus strains, and then altering it to reduce its virulence. The researchers at the John Curtin School of Medical Research are currently searching for the most suitable strain of influenza A virus for making such a vaccine.

Parasite control through biotechnology

There is nothing novel about vaccinating against diseases caused by bacteria and viruses. Typhoid, cholera, measles and smallpox have all been controlled by immunising people with vaccines. However, we cannot yet control the blood parasite that
Killer T cells (L), the possible key to influenza control. The scanning electron microscope reveals killer T cells attacking and killing a healthy cell (P). Stimulating killer T cells with a vaccine may well control influenza attacks.

(See 'Flu control at last?' on p. 24.)
causes malaria with a vaccine, neither can we control diseases of people and domestic stock caused by the larger parasites like liver flukes and hydatid worms. The problem is simply that it is not possible to grow the parasites outside their host, so we cannot obtain enough of the antigens of these organisms to make large quantities of vaccines.

Dr Michael Howell and his colleagues in the Department of Zoology, Faculty of Science, are trying to use the techniques of biotechnology to get around this problem. They are going about it in two ways—by using recombinant DNA techniques, and by fusing cells together.

The researchers have isolated from the genetic material of sheep liver flukes the part that contains the genetic codes for the antigens of the fluke. They aim to introduce this strip of genes into a plasmid—a self-reproducing circle of DNA—and in its turn to introduce this plasmid into the cells of Escherichia coli bacteria. Thus the scientists intend to make strains of the bacteria which produce the protein antigens of the liver fluke. Bacteria can be made to multiply very rapidly in the laboratory, so it should be possible to obtain almost unlimited amounts of the antigen. Other substances such as insulin and interferon have already been produced by this means.

The zoologists’ second approach involves making hybrid cells by fusing together the genetic content of two different cell types. Mammalian cancer cells cause tumours because they divide ad infinitum. Dr Howell and his colleagues are culturing such cells, and have fused them together with cells of liver flukes. With the right techniques the genetic material of any cell can be mixed together with that of any other unrelated cell to produce a living and reproducing hybrid. The resulting hybrid cells should provide an almost unlimited supply of the parasite’s antigens.

A variant of this technique provides large amounts of antibodies that could be used for diagnosing parasite strains, and for purifying parasite antigens. The zoologists have fused the mammalian tumour cells with others from animals already infected with the relevant parasite. The latter cells are already forming antibodies, and the hybrid cells thus produced combine the features of both parents—they multiply in culture indefinitely, and they provide a large supply of the relevant antibodies.

By a clever twist, it should be possible to link anti-parasite drugs to particular types of antibodies that attach themselves to the outer surfaces of flukes and tape worms, apparently with no effect on the parasite. Much smaller doses of the drugs would be needed, since the antibodies would seek out the antigens of the parasite, and deliver the drugs to their targets.

Yeast is one of man’s oldest servants. We have used it in bread-making and brewing alcoholic drinks since Old Testament times. Thus over the centuries we have come to know a lot about this benign and useful one-celled organism. Now, with the help of genetic engineering, yeast seems set to find a new use, as a producer of pharmaceutical and other industrial products.

Much of the pioneering research on changing genes using the techniques of recombinant DNA has used the now famous colon bacillus, Escherichia coli. Strips of genetic material from the cells of plants and animals (including man) have been added into circular molecules of deoxyribonucleic acid (DNA) known as plasmids. These plasmids can reproduce themselves within a cell of E. coli, and in some cases the ‘foreign’ genetic material will make the bacterial cell produce new sorts of molecules which the E. coli does not normally produce. Thus engineered strains of this bacterium have produced human insulin, and interferon (the anti-viral agent).

While E. coli bacteria have proved most
The scanning electron microscope reveals the external features of the stage of the liver fluke that infects domestic stock. Genetic engineering should make it possible to develop vaccines for these parasites.
suitable for making small amounts of useful substances in the laboratory. Upgrading production to an industrial scale will present major technical difficulties.

Baker's and brewer's yeast (Saccharomyces cerevisiae) also can be changed by introducing plasmids containing foreign genes, and we know more about the cell of this fungus than about that of any other plant or animal. Thus using yeast on an industrial scale will present few problems. Its advantages over E. coli for industrial application include the following: industry already has many years of experience in using yeast; its cells often produce more of the desired substance per molecule of DNA than those of E. coli, thus they produce at a faster rate; being more closely related to the 'higher' plants and animals, it should be easier to use for cloning the genes of animals and plants; the enzyme products of the foreign genes (usually peptides) can be purified more easily from yeast; during some 3000 years of use no strains of brewer's and baker's yeast have ever been known to cause illness.

Dr G. D. Clark-Walker and his colleagues in the Department of Genetics, Research School of Biological Sciences, have been in the forefront of studies into developing plasmids for transferring genetic material from one yeast cell to another. Indeed these researchers discovered what is now the commonly used yeast plasmid everywhere.

Currently the ANU geneticists are trying to modify yeast strains so that they can feed directly on starch rather than the conventional and more expensive sugar-based industrial stocks. While such a strain would greatly benefit industry, the studies needed to develop it will inevitably yield new knowledge about the way yeast cells excrete enzymes—information that should prove relevant to the production and recovery of other new products from yeast.

How migrant families adapt to Australia

Although Australia has actively encouraged immigration for the last 30 years, the Department of Immigration and Ethnic Affairs has little direct information on how successfully the immigrants adapt once they arrive here. Departmental policy does not permit follow-up of individual people of families once they have arrived. So its officers have to judge the success of their immigrant screening procedures indirectly, from statistics on the number of immigrants remaining in the country, and from figures indicating the standard of living in migrant communities.

In the past, sociologists and economists have made studies of the current situation of migrant communities. However, none of these have involved any form of follow-up from the old country to the new. Professor W. A. Scott of the Department of Psychology, Faculty of Science, is currently conducting a study which is looking into the situation, hopes and aspirations of migrants before they arrive in this country, and their success in adapting some two years after arriving. This study, which is supported by the Australian Research Grants Committee, should provide immigration authorities with information that may help improve procedures for selecting immigrants.

Professor Scott has concentrated on families rather than individuals. In 1979 he interviewed 136 families who were applying to move to Australia through six Australian consulates in Europe. The families, which usually consisted of four or more members, were mainly British, Dutch, German or Italian. The sample also included Russian families all of whom were Jewish refugees, and some families who were Greek, Turkish, and Polish. Three-quarters of the families finally received permission to come to Australia, and Professor Scott has managed to maintain contact here with just over half of those he originally interviewed.
While in Europe Professor Scott presented each family with a questionnaire in its native language and asked that it be filled in. The families were asked questions that detailed the economic status in their country of origin, their family structure, the strength of their relationships both with other family members and with people outside, and the psychological stresses they experienced in their native countries.

Here in Australia Professor Scott is again questioning all the families he has managed to contact. His questions concentrate on such items as the family's current environment, the community it now lives in, and the recreation habits, occupations, possessions, acquaintances, and the self-esteem of its members. He asks each person filling in this questionnaire to state how much importance he or she attaches to each item. He will thus be able to obtain a measure showing how each family member's circumstances now compare with those before emigrating. The respondents' own perspectives are being supplemented by seeking the opinions of acquaintances, supervisors and teachers.

The families concerned have been most willing to co-operate, and no interviews of acquaintances, supervisors or teachers are carried out without their permission.

Although Professor Scott is carrying out the follow-up interviews only this year, results of a preliminary questionnaire returned by the migrant families shortly after they arrived in Australia indicate two useful, if tentative, conclusions about how the structure of a family affects its chances of adapting successfully. Families that become quickly involved in their new communities appear to be those in which members are allowed to come and go freely, and had extensive community ties in their former country.

On the other hand, families that quickly achieve a high occupational status appear to be those in which the roles of each member are strictly defined. Such a division of responsibilities allows the male breadwin-
ner to concentrate on his particular role. In the former country, working-class families have tended to operate with such a division of roles more often than those from higher up the social and economic ladder. It remains to be seen whether this separation of roles will be economically advantageous in the long run, or whether it poses other sorts of problems for adapting to Australia.

When we grow old . . .

We like to think of Australia as a young country. In fact it isn't. The average age of the Australian population is growing steadily older. As the birth rate continues to decline, and people's life expectancy increases, the number and the proportion of older people will continue to increase during the next 50 years. The proportion of Australians aged 65 years or more has risen from 4% in 1981 to 9% in 1976. It will probably rise to about 10% in 2001, and then possibly to as high as 14% as the 'baby boom' generation reaches old age about 20 years later.

Such changes must raise many questions about the welfare of the aged in Australian society. For example, how many old people end their days in lonely isolation, and how many remain part of the family? How many live in poverty, and how many live independent lives free from disabling illness? Little information is available. Neither is much known about how effectively families and government services support the dependent aged. Unfortunately, in the absence of information, decisions of government and local government agencies that affect the welfare of older people will tend to be based on misleading stereotypes.

In an effort to provide some up to date information, the Research School of Social Sciences launched the Ageing and the Family Project in April 1980. The project's staff—Dr Hal Kendig (an urban planner), Dr Diane Gibson (a sociologist), and Dr Don Rowland (a demographer)—has recently completed a major survey of the aged in Sydney. Its studies seek to: test the widely-held view that the increasing independence and mobility of the nuclear family is isolating the aged from traditional sources of social contact and assistance in times of need; understand how living arrangements and housing affect the lives of older people, especially those with low incomes or disabilities; explore the implications of the current social and economic circumstances of the aged for the future. While the team defines the elderly as those people who have reached the age of 60 (the pensionable age for women), it has given particular emphasis to those aged 74 years or more.

The work of surveying 1050 of the aged in 30 suburbs of Sydney ended late in 1981, and the results should begin to emerge during next year. However, some commonly held beliefs have already been shown to be misconceptions. For example, when asked the proportion of the aged that live in institutions, people generally give estimates that range from one-third to well over a half. The actual figure is only about 7%. Contrary to popular belief, the great majority of people over 65 live independent lives and they continue to contribute to society. Less than 15% of the aged have any major limitations on their abilities, and many of those who do can cope on their own. Even when the elderly do become frail, most remain in the community supported by family and friends rather than publicly-provided services.

The Project's staff is working closely with the Commonwealth Department of Health, the Department of Social Security, other government agencies, the Australian Council on the Ageing, and with other universities.
The Ageing and the Family Project will provide up-to-date information that will help government agencies to make better decisions about caring for the elderly. How fast did man evolve?

In 1967, Richard Leakey, now Director of the National Museums of Kenya, discovered sediments beside Lake Turkana in northern Kenya that subsequently have yielded both stone tools and the remains of more than 150 fossilised hominids, early relatives of Man. Such finds here and elsewhere in the rift valleys of East Africa have created great excitement in scientific circles because they may provide the key to the origins and evolution of our own species, Homo sapiens.

At Lake Turkana the sediments consist of clay, silts and sands brought down by rivers from what is now southern Ethiopia. These have been laid down in a series of layers, the oldest at the bottom and the youngest at the top. The fossilised remains of the hominids (Australopithecus and primitive forms of Homo), of other mammals, such as pigs, and stone tools occur in many of the beds. Thus by mapping the beds research workers can sort out the oldest fossils from those that came later, and so trace the evolution of the hominids of the area. However, such a procedure does not reveal the actual ages of the fossils and tools in terms of years. Unfortunately there is no effective method for directly dating either the fossils them-
This fossilised hominid skull came from below the KBS tuff at Lake Turkana, Kenya. Dr Ian McDougall at the ANU has accurately dated the tuff as being between 1.8 million and 1.9 million years old. This means that the owner of the skull, who had a surprisingly large brain capacity of 775 cubic centimetres, lived nearly 2 million years ago.
selves or the clays, silts and sands in which the fossils occur.

Within the sedimentary sequence are a number of thin beds of volcanic material that geologists call tuffs. The volcanic material making up the tuffs was also washed down the river systems after nearby volcanoes had erupted. Techniques are available for dating these rocks of volcanic origin, so the tuffs can be used as markers whose ages are known.

One of the volcanic beds known as the KBS Tuff itself contained stone tools at its base and many of the most important hominid fossils were found just above or below it. Previous measurements made in Britain and the United States yielded ages for the tuff that ranged from between one-half and two-and-a-half million years—a distressingly large spread of two million years. Not long ago it was generally agreed that the whole of Man’s evolution had taken considerably less time than this—so much more accurate dating of the KBS Tuff was needed.

Potassium-argon dating provides the best techniques for measuring the age of relatively young rocks such as those at Lake Turkana. This method depends on measuring the decay of one of the naturally
occurring isotopes (forms) of potassium to argon gas; in this technique the K and Ar are measured separately. The British measurements, which used a variant of the potassium-argon method, gave a preferred age of 2.6 million years for the KBS Tuff.

The American measurements, which involved use of the conventional potassium-argon method, gave an age of about 1.8 million years. The difference between the two results caused heated debate.

Dr Ian McDougall of the Research School of Earth Sciences has the expertise and equipment to use both dating methods. He was therefore invited to try and resolve the problem. After visiting Lake Turkana to obtain suitable samples and the necessary understanding of the geology of the area, Dr McDougall has come up with remarkably consistent results using both methods. Potassium-argon dating gave an age of 1.89 million years (give or take 0.01 million years), compared with 1.88 million years (give or take 0.02 million years), using the second variant. Thus Dr McDougall's studies essentially confirmed the earlier American results, but yielded much more precise ages. They also showed conclusively that his rock samples had remained completely undisturbed since they had originally been laid down, so there could be no doubt about the actual age of the volcanic sediment.

These results resolve a controversy that has raged for nearly a decade. They also prove that Australopithecus and early forms of our genus, Homo, coexisted in the Lake Turkana region nearly two million years ago. Moreover, one of these (presumably Homo) was already making stone tools.

Dr McDougall is now in the process of accurately dating the other volcanic beds in the sequence. When completed, these studies will give a reliable time scale for the whole of the sedimentary succession, and hence for the evolution of hominids in this part of East Africa—the region that many authorities regard as the cradle of mankind.

Where did land animals come from?

Australia is renowned as the land of marsupials, and the egg-laying echidna and duck-billed platypus. However, the continent is also the home of another much more ancient but equally curious animal, the Australian lungfish Neoceratodus. Australia is fortunate not only in being the home of one of the three living forms of lungfish, but also in being well endowed with remarkably preserved fossils of lungfish that lived between 350 and 400 million years ago in the Devonian geological period.

In recent times an argument has raged in academic circles about the origin of the amphibia, reptiles, birds and mammals that now live on the land. At some stage late in the Devonian period, fish came onto land and became amphibians. All four-footed animals derive from these. The dispute has been about the nature of the first land-dwelling group.

It used to be suggested that the amphibians came from the superficially rather similar lungfishes, but for the past 40 years palaeontologists have generally accepted that the amphibia evolved from another now extinct group of fishes with lobe-like fins called the Rhipidistia. However, British and American authorities have recently revived the idea that the lungfishes are the closest relatives of the first land-living four-footed animals.

Recently, Dr K. S. W. Campbell, Department of Geology, and Dr R. E. Barwick, Department of Zoology, Faculty of Science, discovered exquisitely preserved fossilised lungfish skulls and jaws from the Early Devonian period in limestone rocks at Burринjuck Dam not far from Canberra. This 400 million-year-old material is in almost perfect condition. Dr Campbell had previously found considerably less well preserved skulls of much the same age nearby. In addition rather younger skulls from lungfishes of the late Devonian period (when the first amphibians appeared) have
This ancient lungfish *Griphognathus whitei*, drawn by Dr R. Barwick, lived some 360 million years ago. Did the first land animals evolve from fish like these?

Fossilised head of *Griphognathus whitei*. 
been found near Fitzroy Crossing in the north of Western Australia.

These fossils provide the key to the controversy about whether the amphibia came from the lungfishes. If the lungfishes are the closest relatives of the amphibians, then the detailed features of the Australian fossils should be similar to their counterparts in the early amphibians.

Dr Campbell and Dr Barwick have shown that the relevant details do not tally. On the contrary, the patterns of the bony plates on top of the skulls, the structure of the brain cases, the peculiar sensing systems of the snouts, the patterns of the bones forming the jaws, and the arrangement of the bones that support the front (pectoral) fins are quite unlike what one would expect in a close relative of the amphibians. Furthermore, these studies have shown that the oldest (and in this instance the most primitive) lungfishes known had already evolved the highly distinctive features that are still characteristic of the group. It therefore seems most unlikely that the first four-footed land animals could have evolved from these or closely-related lungfishes.

Discovering the link between the bony fishes and the amphibia must now await the discovery of new fossils, and to date no sufficiently well-preserved material has turned up in rocks of the appropriate age in Australia. However, Chinese researchers have recently made exciting discoveries in China, and palaeontologists are expecting these new fossils to shed much new light on the problem.

Understanding Islam's influence

Islam is more than a religion, it forms the driving force of many political movements. In Christianity separation of Church and State is taken for granted. Islam decries such a separation. Consequently in Muslim countries the ebb and flow of the various strands of Islamic thought tend to have a more direct effect on the actions of the people and political leaders than does Christianity.

In Indonesia, Muslim parties form the only focus of opposition to the present government likely to have a mass following. Both here and in Malaysia Islamic groups are avid for political power, and a shift in the political balance in Indonesia, or in the racial balance between the Muslim Malays and the Chinese in Malaysia, could yield startling results.

Although an Iranian-style revolution does not seem likely in either of these two neighbours, there are many Muslim leaders in both who look to Iran for inspiration, and others who look to Libya. Thus, although distant from the West Asian hub of the Islamic world (which encompasses the countries of the Middle East, Turkey and Pakistan, and also Egypt, Libya and some other north African ones) our Muslim neighbours are sensitive to religious and political currents that flow there. It is therefore important that we should understand how Islam has conditioned the thinking of these nations.

With such thoughts in mind, the Faculty of Asian Studies established the West Asia Committee in 1979. This committee of seven distinguished academics from several of the University's Faculties and Research Schools arranges research and organises student courses that give an understanding of religious and political movements and events occurring in the mainstream of the Muslim world, and of the relevance of these movements and events to South and South-East Asia.

The committee has set about generating research that focuses on how religious, historical and political issues and also the traditions of the West Asia region affect both the region itself and the Muslim countries closer to Australia. Dr M. A. Saikal of the Department of Political Science, Faculty of Arts, for example, who is a member of the committee, has written a standard work on the rise and fall of the
Shah of Iran. He has also studied the politics of Libya in depth.

Another committee member, Dr S. A. A. Rizvi, has also published a major book on Iran, and Dr S. H. Jafri has a special interest in Muslim fundamentalism in the Indian sub-continent and South-East Asia. Studies by postgraduate students cover a number of topics including the way a modern Egyptian commentary on the Koran is influencing modern Muslim thinking in Indonesia and Malaysia.

The West Asia Committee has encouraged the establishment of such undergraduate courses as 'The Islamic Tradition', 'History of Islamic West Asia' and a short and well-attended one on 'Middle Eastern Politics'. The committee believes that such undergraduate courses can only be effectively taught where there can be cross-fertilisation from top quality research. In addition it recognises that good quality research can only go ahead if students are properly trained at the undergraduate level.

Program in applied Japanese linguistics

For at least the next two generations, Australia's future seems inextricably linked with that of Japan. To do business efficiently with the Japanese, this country will need more people who can speak Japanese. Indeed in recognition of this fact, Australia already has more children per head of population learning Japanese in high school than any other country.

In both Australia and in other English-speaking countries, the number of teachers trained to teach Japanese at the secondary, tertiary, and professional levels is limited. Also the techniques needed to teach Japanese to people whose first language is English need refining. The forms of expression of most European languages are related to those of English. By contrast a student learning an unrelated language such as Japanese must learn new ways to express his or her thoughts that constantly conflict with the way he or she does so in English. In other words, the student learning Japanese has to learn to think all over again. The one learning French or German generally does not. Thus a major task of the teacher of Japanese is overcoming the psychological and cultural influences of the student's English first language.

During March this year the Department of Japanese, Faculty of Asian Studies, in collaboration with the Department of Linguistics, Faculty of Arts, began offering a one-and-a-half year Master of Arts program in applied Japanese linguistics. The aims of this new program are first to train students in the principles of language learning, and in the philosophy needed to establish sound techniques in language teaching, and then to help them to apply these to the teaching of Japanese as a second language. Thus, as in most Master of Arts programs, students taking the course will be expected to do course work and write a thesis. In addition they will have to participate in experimental teaching at the primary, secondary, tertiary, and professional levels. Canberra already offers teaching at all of these levels.

At present, most teacher training programs in Japanese are held in Japan. A few Australians have attended these courses. However, there is much to be said for giving professional training for future teachers of the language in the cultural and linguistic environment of the students they will have to teach one day. The new MA Program represents a joining of forces of Australian and Japanese resources to train teachers of Japanese as a second language. Students will thus come both from Australia and the rest of the English-speaking world, and from Japan. It is hoped that this new program will also have some influence on the teaching of foreign languages generally.

Two-thirds of the money needed to support the program for the first year has come
Contributions to the Report Campbell

The Committee of Inquiry into the Australian Financial System, the 'Campbell Committee', released its final report during September 1981. The report's release provoked an important public debate on a wide range of issues concerning reform of the financial system.

During its two-and-a-half years of inquiry, the Committee drew on expert advice from many individuals in government, in universities, and in the private sector. From the ANU, Dr T. J. Valentine, Department of Statistics, Faculty of Economics, was Senior Adviser, and a further five economists from three of the four departments of the Faculty of Economics were involved in major commissioned studies. These studies ranged from an investigation of policies concerning exchange control and exchange rates to a survey of the economics of assisting particular interest groups such as farmers, or first home buyers. These contributions, which were for publication in volumes accompanying the main report, have had a major impact on a number of key areas of the Campbell Committee's recommendations.

In their commissioned study, Mr E. Sieper and Dr C. G. Fane, Department of Economics, made two main recommendations. They recommended abolishing Australian exchange rate controls, and establishing a fully-functioning foreign exchange market in which the Australian dollar would float free from government intervention.

While the major Western economies, the two economists observed, have liberalised, or even (in the case of the United States and the United Kingdom) entirely abolished exchange controls, Australia has, if anything, moved in the opposite direction. The Campbell Committee recommended that: exchange controls be confined to emergency situations; a private foreign exchange market be permitted; the present bureaucratic fixing of the Australian dollar's value should cease. The Committee urged these reforms against the vigorous official objections of both the Australian Treasury and the Reserve Bank.

Dr P. L. Swan, also of the Department of Economics, carried out two commissioned studies on the Australian taxation system. In the first he recommended a fully integrated system of company and personal income tax. Under this proposal separate company income tax would be abolished, so companies themselves would no longer pay tax. Instead, the company's total income would be allocated among the individuals who owned it, and the company would pay income tax on their behalf at the maximum tax rate—in a way reminiscent of the system in which employers pay income tax on behalf of their employees. Correction of the final tax payable by each individual would be made after submission of his or her annual tax return. Thus the tax on the company's income would be paid as personal income tax by its owners.

The Campbell Committee recommended this 'full integration' proposal—even though the Australian Treasury claimed that such a major reform would be impracticable. If adopted, it would represent a 'world first' for Australia. It would have the advantage of both removing discrimination against some
company investors, and making the use of companies as a shield against tax much more difficult.

In his second study Dr Swan looked at the effects of inflation on the tax base. This study included a critique of the report of the Matthews Committee of Enquiry into Inflation and Taxation, and the Campbell Committee endorsed his criticisms. The Campbell Committee presented a comprehensive system of indexation for inflation based on Dr Swan's recommendations.

With his colleague Mr I. R. Harper, Dr Swan also looked in detail at the effects of government restrictions on the issuing of licences for new trading banks. They concluded that deregulating banks by removing these controls could increase the efficiency of this sector considerably. These conclusions support the Campbell Committee's recommendations for promoting more competition among banks by reducing the government's entry regulations.

Dr R. P. Albon, Department of Accounting and Public Finance, prepared a further consultancy report in conjunction with Mr A. Cheok of the Australian Financial System Inquiry's secretariat that looked into the reasons for and the best way of assisting specific industries, businesses, or sections of the community—such as the footwear industry, farmers, or first home buyers. The two economists argued that the government should provide such assistance through the most direct means possible. Thus it should give direct subsidies and taxation incentives rather than use such indirect methods as manipulating interest rates. Once again the Campbell Committee adopted this general approach. It recommended that using the financial system for helping specific interests should cease.

A Bicentennial History of Australia

To many people, the idea of a history written for Australia's bicentenary in 1988 will conjure up a picture of massive but dry volumes that discuss the main features of Australian history in the time sequence in which they happened. The bicentennial history being jointly produced through the ANU and the University of New South Wales does not fit this mould at all.

The history will consist of a series of nine books (not volumes), each of which will be a complete work that can be read in isolation from the others. Each book will be written with a designed and wide readership in mind.

Throughout the series the emphasis will be on innovation. Participants (who include archivists, cartographers, statisticians, sociologists and political scientists, as well as historians) are experimenting with new research methods, they are investigating new sources, and they are devising new ways of presenting the results. The books will be richly illustrated and, provided everything goes according to plan, all will be published before 1988 so that they can stimulate and influence people's thinking about the past during the bicentennial year. A commercial publisher will print and market the series, and much of the writing phase will have been completed by the end of 1984.

The project is in two parts. The ANU's Research School of Social Sciences coordinates production of five of the books, and the School of History of the University of New South Wales looks after the other four. Professor K. S. Inglis, Research School of Social Sciences, ANU, Professor A. D. Gilbert, Faculty of Military Studies, Royal Military College, Duntroon, and Professor F. K. Crowley, School of History, University of New South Wales, are the General Editors.

Many histories focus on well-known people, periods and events. The bicentennial history will take a different approach. One book will look at Aboriginal Australians from the earliest times up to the first European settlement. It will consider the contacts with the early European explorers from the Aborigines' point of view. Then three books will focus on the Australian
Collins Street, Melbourne, as depicted in *The Picturesque Atlas of Australia*, 1888. One of the books of the bicentennial history will concentrate on what it was like to live in Australia during that year.
people at 50-year intervals during the specific years 1838, 1888 and 1938. Thus instead of providing a chronological history, these three books will give a detailed impression of what it was like to live in Australia during those particular years. A fifth book will investigate Australia’s recent past since 1938, and will bring its inquiries as close as possible to the present day. The Research School of Social Sciences has the responsibility of producing these five books.

The University of New South Wales will provide four books of reference. These will consist of an historical bibliography, an historical atlas, a book of historical statistics, and a handbook of Australian history.

Unravelling the chemistry of insect and plant toxins

In 1980, one property in north-eastern Queensland lost 800 cattle. All had been poisoned as a result of eating larvae of the sawfly, Lophyrotoma interrupta. This case of sawfly poisoning was not an isolated phenomenon; indeed widespread cattle losses have occurred in Queensland many times during the last 70 years. In 1936, a particularly bad year, many properties reported losses varying from between 20 and 600 head, and on one nearly 1000 cattle died.

This particular native sawfly occurs in all States except Western Australia and the Northern Territory. However, it only causes problems in those parts of Queensland that are dominated by the silver-leaved ironbark, on which larvae of the sawfly feed voraciously. Generally cattle deaths occur during late winter or in spring, when heavy infestations of the larvae descend from the trees to the ground, either to form pupae or to find more food. Those that cannot find food congregate into mounds that can be knee-deep. Here the larvae die and rapidly turn into a foul-smelling jelly-like mass.

For some reason cattle very quickly develop a taste for both the living and the dead larvae, and indeed so great is their craving that they have been seen to run in mobs from tree to tree to find more. Many die within two days, usually from massive liver damage.

The first step towards doing anything about finding an antidote for the sawfly toxin is to isolate the toxin and elucidate its chemical structure. Dr P. B. Oelrichs of the Queensland Department of Primary Industries’ Animal Research Laboratories first isolated the toxin and sent it for identification to Dr J. K. MacLeod, Research School of Chemistry, ANU.

Unfortunately, extracted toxins usually come in very small amounts that are adulterated with chemically-similar impurities. Dr MacLeod and fellow members of his research group have therefore had to use sophisticated mass spectrometric techniques together with high field nuclear magnetic resonance spectrometry to sort out the structure of the toxins of the sawfly larvae. They have used the same techniques on toxins of plants that have been known to cause stock losses. To date the research group has collaborated with Dr Oelrichs in identifying the toxins of three plants in addition to the sawfly larvae—namely the yellow daisy Wedelia asperrima, the wild sunflower Verbesina enceloides, and the fruit of the white cedar tree Melia azedarach.

The sawfly toxin, it turned out, is chemically related to the poisons of the death cap and angel of death mushrooms of Europe and Asia, which also affect the liver. Many people and domestic animals die from eating these, and recently toxicologists have succeeded in developing an antidote which has proved 100% effective for people, provided they receive it within 12 hours of eating the mushrooms. Tests have yet to be carried out to see if this antidote will save cattle poisoned by the sawfly larva toxin.

Yellow daisy is responsible for serious sheep losses in north-western Queensland.
Animals often die within 24 hours of eating the plant. Dr MacLeod and his colleagues have found that the chemical responsible for its toxicity kills by preventing the cells of animals from taking up oxygen.

The wild sunflower came from North America, and now it occurs in a region that extends from Victoria to central Queensland. It causes serious sheep and cattle losses, particularly during droughts or when domestic stock have been introduced to new pastures. It contains a toxin called galegine, which also occurs in an unrelated plant known as goats rue that grows in North America and the Middle East where it also causes stock losses.
Predicting landscape changes

Two hundred years of European settlement have brought about great and at times unexpected changes to the Australian landscape. Thus sometimes clearing of the forest cover has led to erosion. Grazing and frequent burning of the grasses in the high country of New South Wales, Victoria and Tasmania, originally to provide 'green pick' for cattle and sheep, had the unforeseen effect of converting many of the grassy areas to inedible and flammable shrublands.

Changes in natural or near natural plant communities such as native pastures, or hardwood forests often occur slowly, but they tend to accumulate. Experimenting with, or even detecting important changes (such as a reduction of the carrying capacity) in a reasonable time is often almost impossible. Yet government agencies, or industries such as farming, forestry, or mining, often need to make immediate decisions about introducing new management practices. The consequences of their decisions may last for many years, but they may have nothing better than the rules of thumb of an experienced land manager to go on.

For example, a government agency may have to decide whether to permit clear felling of a native forest, or whether it should regularly use prescribed burns in a forest to prevent wildfires. Often it just has to assume that the forest can withstand the treatment and recover. But it may be decades, or even centuries, before the consequences of the new practices become apparent.

Observers of the way Australian vegetation reacts to such disturbances as fire and grazing have noted that the predictions of the classical 'succession' theory, which was developed in Europe and North America, do not always apply here. After a fire, for example, an Australian forest may not progress through a fixed and predictable succession of stages until finally it returns to its mature climax state. Often it is difficult to detect distinct stages, and where they can be distinguished they are often skipped or modified by later disturbances—phenomena that the classical theory cannot explain.

In the Department of Environmental Biology, Research School of Biological Sciences, Dr I. R. Noble and Professor R. O. Slatyer have reassessed the classical views of how the vegetation may recover from disturbance. They have come up with a unifying theory which explains what happens both in Europe and North America, and in Australia. Already their theory has received acceptance in the United States, where the US Forest Service now routinely teaches it in its training courses, and it has created considerable interest elsewhere.

When attempting to predict the effects of a disturbance like fire on the plants of an ecosystem, the researchers have concluded that all species can be classified into one of only 15 different types, depending on how each species survives the disturbance and on the conditions it needs to continue to grow. For example, one type is represented by many wattle (Acacia) species that can germinate only after a fire. These eventually die out if another fire does not occur within a few decades. However, their hard seeds can remain buried in the soil ready to germinate even if a fire occurs centuries after the wattles have apparently died out.

Knowledge of certain 'vital attributes', which include the species type along with a number of other critical pieces of information about when certain events in the plant's life cycle occur, makes it possible to predict vegetation changes likely under such management practices as prescribed burning, grazing by domestic stock, or forestry. This 'vital attribute scheme', as it has been called, has been successfully applied in fire management models both in Australia and North America.

Currently the scheme permits only broad predictions of the way the vegetation will change. The researchers are now applying it to specific models that will yield the precise predictions needed to allow assessment of the economic, social and aesthetic costs of alternative management practices.
Deep scrub beside 40-year-old snow gums in the Kosciusko National Park, New South Wales. The scrub is the result of frequent fires.
Better catalysts for the chemical industry

Without catalysts we would have no plastics or petrol, and few of the modern solvents, pesticides, or other products of the modern petro-chemical industry. Catalysts bring about the chemical reactions that produce so many of the products we now take for granted. But as petroleum oil resources diminish it will become necessary first to make these products more efficiently, and finally to find new ways of making them from feed-stocks other than petroleum.

Doing either of these things will mean discovering more efficient catalysts, and chemists are trying to do this all over the world. For example, a new process is now operating in which acetic acid—the starting

Ethylene oxide from this plant in Sydney is used to make many products including ethylene, the familiar anti-freeze that is also a basic chemical feedstock. ANU researchers hope to find new catalysts that will make it possible to make such products more efficiently.
material for many chemical processes—is made directly from methanol and carbon monoxide in the presence of a catalyst made from rhodium (a precious metal). Previous processes for making acetic acid from these materials using other catalysts have yielded an impure product, and have used a lot of heat. The new process happens almost at room temperature, and it produces pure acetic acid. Thus it saves a lot of energy and money, despite the cost of the catalyst.

Most catalysts currently used in the chemical industry have resulted from trial and error rather than from the application of detailed knowledge about how they actually work. Dr M. A. Bennett, along with his research group at the Research School of Chemistry, has been investigating in detail the mechanisms of such catalysts with the aim of developing new, more effective ones. Most catalysts contain atoms of one or more of the so-called ‘transition’ metals, and chemists now know a great deal about catalysts that contain the metal atoms bound to reactive organic molecules known as ligands, such as ethylene, carbon monoxide, or the tertiary phosphines. They know much less about catalysts which consist of chemical complexes in which two or more metal atoms are directly linked. Yet such compounds may provide information about how commercial catalysts actually work.

In addition, it now appears that some complex rhodium compounds that contain many atoms of the metal joined together have useful and novel catalytic properties. For example, such catalysts apparently make it possible to form ethylene glycol from carbon monoxide and hydrogen gas under high pressures. Ethylene glycol, as well as being the familiar anti-freeze that drivers in colder parts of Australia put in their car radiators, is a basic chemical feed-stock. Carbon monoxide and hydrogen can be made by treating coal with steam. Thus this reaction raises the prospect of making chemicals from coal rather than petroleum.

Dr Bennett and his colleagues have been investigating such complexes containing linked metal atoms for about two years. To begin with they are trying to make catalytically-active molecules containing just one pair of metal atoms. Later, as their understanding increases, they will move on to molecules containing progressively more linked metal atoms.

Already, Dr K. I. Gell has made complexes containing pairs of metallic atoms linked together, in which one atom comes from the early transition elements, such as molybdenum or tungsten, while the other comes from the later ones, such as platinum or iridium. During their synthesis, a hydrogen atom is transferred from the early transition element to the later one. It remains to be seen if this feature can be used as a basis for catalytic activity.

Using a different approach, Dr D. P. Arnold has developed a new type of ligand in which the physical shape of the chemical complex holds the metal atoms together. Dr M. S. Bilton and Dr G. B. Robertson have worked out the geometrical arrangement present in the crystal of a platinum complex of this type.

Manipulation unmasks molecular mechanics

Everybody knows that the chemical formula for water is H₂O, and you might think we know everything there is to know about this life-giving liquid. In fact water is a scientific oddity. Liquid water consists of many H₂O units that are glued together by what are known as hydrogen bonds. It is this clumping together that makes water a liquid with its particular properties (H₂O should be a gas).

While scientists have known for years that hydrogen bonds hold the units together,
they still do not know for sure just how strong these vital bonds really are. Without this knowledge they cannot predict with certainty just how water molecules will behave. Yet water forms an indispensable part of life and many other natural phenomena, and of many industrial processes.

Staff of the Electron and Ion Diffusion Unit, Research School of Physical Sciences, have designed and recently finished construction of equipment that will enable them to manipulate individual molecules of water and other substances. Among other things the equipment, which is one of the few facilities of its type in the world, will enable them to measure the strength of individual hydrogen bonds. It will allow them to gain a deeper understanding of how catalysts used in industry and for pollution control operate, and will provide very accurate methods of chemical analysis.

Essentially, the equipment consists of two nozzles that can produce streams of molecules in which each molecule is isolated from any other. These streams of molecules, whose energy states can be accurately controlled, are beamed across a vacuum. By bouncing atoms off one of the molecular streams, the scientists can investigate the shapes of the molecules. Or with the aid of a laser they can determine the internal structure of the molecules, and break them into fragments. By crossing two streams of different molecules, they can examine how individual molecules react together chemically.

Molecules are not static things like billiard balls. Instead they vibrate in various ways, and the hotter they are (in other words the higher their energy state) the more they vibrate. To begin with, the researchers in the Electron and Ion Diffusion Unit are con-
centrating on looking at how the vibrational states of molecules affect their shapes. They will then begin fragmenting molecules with a laser, and investigating how pollutant molecules such as carbon monoxide or the oxides of nitrogen react when they collide with oxygen atoms on various surfaces. Such studies will yield the background knowledge needed to develop better catalysts for pollution control.

Already, the researchers have been able to provide the Australian Atomic Energy Commission (AAEC) with detailed information about the properties of hydrogen fluoride, a trace pollutant that can emanate from aluminium smelters. The AAEC needed the information when designing an instrument it is developing for the New South Wales Government for monitoring hydrogen fluoride pollution in such sensitive environments as the Hunter Valley.

**Probing the inner workings of the nervous system**

If you are right-handed, you can train your left hand to operate more efficiently by deliberately using it more often. You control the muscles of your hands through your brain and nervous system, and while improving the co-ordination of your weaker hand depends upon improving their muscles, it also depends on training your nervous system and brain.

Physiologists know that sometimes little-used nerve fibres can be trained to take over the functions of nerves that have been destroyed in accidents or operations. However, nobody knows why.

The nervous system that controls our muscles works something like a telephone system. Electrical messages pass between the brain and muscles through the 'cables' of the nervous system. However, to reach a muscle from the brain (or vice versa) a signal must pass along the length of several nerve fibres located in our brains, in our spinal cord, and in our limbs. Each nerve fibre is a long extension of a single nerve cell, and the passing on of messages between one fibre and the next takes place at the nerve cell, which has many receiving points called dendrites. Through its dendrites a single nerve cell may receive messages from tens of thousands of incoming fibres, and each nerve cell sends an outgoing message along its particular nerve fibre to the next nerve cell. Thus the interconnections operate rather like a telephone exchange.

While physiologists have known for many years how the electrical impulses that carry the messages pass along each individual nerve fibre, they have not been able to sort out how the messages pass across the connections between one fibre and the next nerve cell. Located in the spinal cord, or in the brain, the connections have been just too small to investigate individually, and too difficult to get at.

At the John Curtin School of Medical Research's Experimental Neurology Unit, Dr Stephen Redman and Dr Bruce Walmsley have applied new techniques which enable them both to see (by injecting horseradish peroxidase enzyme) individual nerve fibre connections deep in the spinal column and to detect individual electrical impulses as they cross from one side to the other of the same connections. To date they have looked at the detailed structure of the connections in the spinal column between incoming nerve fibres from receptors (little sense organs) that detect stretching in the muscles and nerve cells where fibres cause the muscles to contract.

Every nerve fibre looks a little like a tree. Towards its end it divides into a mass of branches, and each branch may connect with a different nerve cell. Thus every fibre connects with many nerve cells. Each branch may make contact with the nerve cell in several places, and Dr Redman and Dr Walmsley have found that each nerve im-
pulse in the incoming fibre causes electrical signals which have several different strengths in the next nerve cell. Moreover, the number of these peaks of strength is usually the same as the number of contact points (called boutons). The number may at times be less, but it is never more. The researchers conclude that each peak derives from a different point of contact.

They have contradicted current thinking by finding that the distance of the connection from the main body of the cell that forms the next fibre does not matter. To date physiologists have assumed that signals fade as they pass towards the main cell body, and that those contacts closest to the cell body will have the greatest effect. The two ANU researchers have found that the most distant connections are just as effective.

The two researchers have also found that repeated use of a particular bouton will increase the strength of the signal. In other words each bouton can be trained to operate more effectively. Indeed, the researchers have even found that they can turn on some previously ineffective boutons.

At present nobody knows whether all other connections between nerve cells in the spinal cord and in the brain are similar to those discovered by Dr Redman and Dr Walmsley. They may have yet other structures. However, if the connections in the brain are similar, then we have an explanation of why parts of the brain and the nervous system can be trained.

Investigating the details of continental drift

Today, scientists generally accept the theory of continental drift. According to modern versions, the world's continents move slowly across the Earth's surface pulled along on sheets of the sea floor known as tectonic plates. While geophysicists have been able to deduce the general principles of the mechanism of this process, it is very difficult to make the direct observations on which the theory will eventually stand or fall.

At the Research School of Earth Sciences, Dr M. S. Paterson has developed a machine that will enable users to make at least some of the necessary direct observations. Everybody knows that rocks are normally hard and brittle, but if the theory is correct, then those rocks some 50 km down must be able to flow. Dr Paterson's machine makes it possible to measure the flow properties of rocks under high pressure conditions at temperatures of up to 1400°C.

The Earth consists of three layers—an innermost molten core, a generally solid mantle, and an outermost crust. The continents and the ocean floors represent the outer surface of the crust. The crust and the outer parts of the mantle move around on the earth's surface in a way similar to the skin atop a saucepan of porridge that is being heated on a stove. In the saucepan, hot porridge from the bottom rises by convection and displaces the material already at the surface. It is thought that convection currents in the hot rocks of the earth's mantle carry the crust along in much the same way. However, in the earth's mantle, the flow occurs through solid rock at a temperature of some 1200°C.

Dr P. N. Chopra, who has now moved to Cornell University, USA, has collaborated with Dr Paterson in using the machine to study how a rock known as dunite behaves when subjected to a variety of strains at various temperatures. The earth's upper mantle consists of rock of the same general type as dunite, so Dr Chopra's results can be extrapolated to the geological processes thought to be involved in the earth's convection movements.

In general, his results have confirmed the theoretical predictions of the way the rocks of the mantle should behave to allow con-
Looking back at how galaxies evolve

Are galaxies 'island universes' that drift around in space completely isolated from one another? In the past astronomers have thought so. However, recent discoveries in the United States and at the Australian National University now suggest that galaxies do indeed react with one another. Thus the way they change with time depends partly on the results of close encounters with other celestial bodies.

Light always travels through the universe at the same speed. The sun's rays take about eight minutes to reach us, and light will travel around the Earth seven times in one second. By contrast, the light coming from galaxies lying towards the edge of the universe may take five or 10 thousand million years to reach our planet. By comparing the images of very distant galaxies with those of much closer ones, whose light has taken only a few million years to arrive, astronomers can directly measure how the galaxies have changed with time. Thus they can use telescopes as time machines to 'look back' at the evolution of galaxies.

At the ANU's Mount Stromlo and Siding Spring Observatories, Research School of Physical Sciences, Dr E. B. Newell and Mr W. J. Couch, a PhD student, have been developing and applying such lookback techniques. Not all galaxies appear as isolated entities in the sky, many can be seen in clusters. During the past four years Dr Newell and Mr Couch have carefully observed some 12,000 galaxies in 14 clusters and have obtained lookback times that range from one thousand million to five thousand million years. To make their observations the two astronomers used the 3.9-metre Anglo-Australian telescope and smaller ANU telescopes at Siding Spring, and also the 4-metre telescope at the Inter-American Observatory, Cerro Tololo, Chile.

The two have found evidence that two separate evolutionary processes have gone on in the 14 galaxy clusters. First, they conclude, star formation in galaxies can switch off rather quickly (in terms of cosmic time), in about one thousand million years. Secondly, they discovered, the colour of the cluster galaxies depends on the evolutionary state of the cluster as a whole, which implies that the internal processes of each galaxy of the cluster are influenced by others. Thus evolutionary changes, which take something like ten thousand million years, occur in the galaxies within the clusters, and these changes depend on the environment in which the galaxies find themselves.

The conclusion that star formation can switch off during a one-thousand-million-year period is based on the discovery that certain galaxies are excessively blue for lookback times of about this length. In astronomical terms this period is embarrassingly short. Consequently most astronomers did not believe the blueing effect when two American astronomers first reported it in 1978. The painstakingly detailed studies of Dr Newell and Mr Couch have confirmed that the effect and the time scale are correct. The two suggest that the blue effect is probably caused by the rapid formation of stars from the interstellar dust and gases of the galaxies. The formation slows down and is finally quenched as the interstellar dust
Abell 1689, a cluster of galaxies so distant that the light emitted by its members has taken two thousand million years to reach the Earth. Studying such distant galaxies enables astronomers to look back over thousands of millions of years. In Abell 1689, astronomers believe, they are seeing galaxies in which stars like the Sun, and Earth-like planets have only just formed.
and gases are removed, and the galaxies become redder.

The second discovery that the internal processes of each galaxy within a cluster are influenced by the others was equally unexpected.

Both these findings suggest that galaxies can no longer be regarded as island universes—the properties of each individual galaxy and the way it has evolved depend on its environment. Indeed galaxies remain constantly in motion, swirling around each other in a vast cosmic ballet, and lookback observations have demonstrated the details. The evolutionary pressures on each galaxy are driven by interactions that take place during close encounters with their neighbours.

Astronomers at the Mount Stromlo and Siding Spring Observatories are now confident that additional effort in developing and exploiting lookback techniques will continue to improve our understanding of the forces that shape our universe.
ResearchSchools

Research School of Biological Sciences

**Director:** Professor B. John, MSc PhD Wales, DSc Birm., FIBiol.

Research activities in the Research School of Biological Sciences (RSBS) are concerned with a wide range of fundamental biological problems all of which relate to key properties of living matter including its organisation, its development and its evolution. From time to time in science new technologies are developed which open up areas of research previously regarded as intractable. Biological science is currently undergoing a major revolution following the development in recent years of rapid techniques for cloning and sequencing the basic hereditary material of living systems. Although RSBS has been active in this field for over three years the potential which the new recombinant DNA technology offers for exploitation in relation to fundamental biological problems is now so considerable that it promises to change the face of biology over the next decade. It is therefore an area of inquiry in which the School believes it must be represented if it is to remain at the forefront of biological discovery.

**A CENTRE FOR RECOMBINANT DNA RESEARCH**

In recognition of the need to augment and expand its involvement in molecular genetics, the School was successful during 1981 in gaining Institute and Council support for the establishment within RSBS of a centre which will allow it to build on the not inconsiderable lead it already has in exploiting the new technology. The School sees the centre as serving five functions: it will concentrate and consolidate those School resources already devoted to work of this kind; it will enhance the co-operative programs already being undertaken with the Florey Institute in Melbourne and the University of California Medical School in San Francisco, United States of America; it will formalise, in a much more productive manner, arrangements for the considerable number of visitors, both from within Australia and overseas, who are now coming to the School for training and co-operative work; it will provide at least one centre within Australia which in terms of size, as well as quality, will be able to compete with the much larger laboratories already operating in the United States of America and in Europe; and it will offer the School a means of seeking outside support for much needed additional resources in this expensive, highly competitive and fast-moving field.

**AN INVOLVEMENT WITH INDUSTRY**

One of the first molecular projects to which RSBS turned its attention, that of nitrogen fixation in leguminous plants, as mentioned in the University's 1978 report, has more than justified the confidence in it by the
Institute of Advanced Studies which adopted it as one of its new initiatives. In recognition of the spectacular progress made to date, it has now won handsome support in the form of a grant-in-aid from Agrigenetics Incorporated, USA. This grant will allow the work to proceed further and faster than would have been possible from the School’s available resources and emphasises the importance of financial inputs from industry.

The success of this enterprise also underlines the potential which molecular genetics holds for industrial applications, a fact that is reinforced by the research currently under way in the School on gene expression in yeast and which is included in the research section of this report. This School has agreed to provide an advisory and training program for staff of Biotechnology, Australia, an industrial group which hopes to exploit the potential of the yeast program, and which was recently incorporated into the large industrial group, Conzinc Rio Tinto Australia (CRA).

AUSTRALIAN ECOSYSTEM BIOLOGY

The School continues to retain its interest in biological problems associated specifically with the unique flora and fauna of Australia and believes it has an important national contribution to make in this field. Interests range from studies on the taxonomy, distribution and ecology of native plants and animals to more sophisticated attempts to model the changes in vegetation which follow disturbances to the environment. This topic is highlighted as another illustrative example of work in progress within the School, in the research section of this report.

Research School of Chemistry

Dean: Professor L. N. Mander, MSc Auck., PhD Syd., FRACI

Research activities in the Research School of Chemistry (RSC) are concerned with fundamental studies on the properties and transformations of matter. In recent times there has been enormous progress in solving complex problems of structure determination, and in doing this on smaller amounts of material. This ranges from simple organic compounds through to large molecules of biological importance such as DNA, and from simple inorganic compounds to materials of technological importance such as solid state devices and high strength high temperature alloys. Ability to synthesise molecules or materials with desired properties has also advanced considerably, and in a much more systematic way than hitherto. Accompanying purely theoretical investigations have progressed to the point where meaningful predictions about chemical structure and behaviour are now possible, instead of simply rationalising experimental observations. There is every expectation that these developments will accelerate in precision and scope.

RECENT DEVELOPMENTS

Chemists have recently been able directly to observe ions and molecules in solids and are now on the threshold of ‘seeing’ molecules and their interactions in whole organisms. This is a development analogous to the invention of the telescope and its application to astronomy: in stable systems it enables the design of stronger materials, and in dynamic systems to obtain direct information on the way that molecules interact in both man-constructed situations and intact biological systems. This type of study will be greatly facilitated by a new nuclear magnetic resonance spectrometer which arrived at the School early in 1981. The essence of the technique is to observe the behaviour of atomic nuclei which are placed in an intense magnetic field (generated from a superconducting circuit at the temperature of liquid helium) and irradiated at selected radio frequencies.
In the continuing search for better methods of building molecules, chemists in RSC have sought to duplicate the specificity and efficiency of enzymatic reactions. This may be attempted through the construction of structurally similar compounds or, more often, by making very different molecules which function in an analogous way. In the latter category, inorganic chemists in the School have developed a range of molecular 'cages' constructed around metal ions which served as 'templates'. These cages have considerable potential as catalysts or metal scavengers in industrial, biological and biomedical areas. A recent breakthrough, which should allow facile removal and/or replacement of the metal ion, promises to extend considerably the range and availability of these new materials. Patent coverage of these promising compounds is almost complete, while in the organic section of the School provisional patent protection has been filed on a new process for modifying gibberellins, which are plant hormones currently used for a wide variety of horticultural and agricultural purposes.

A FLEXIBLE STAFFING STRUCTURE
When the Research School of Chemistry was founded in 1967 it had been decided to establish a non-departmental system in which each research activity would be built around one tenured member of staff. Moreover, a slow and steady build-up in the number of these groups was envisaged, so that a full establishment would be attained only by the time a significant proportion of the foundation staff began to retire, thereby opening up further opportunities. In this way the School could ensure that changes of direction in research and the introduction of innovative activities would be possible on a continuing basis. Thus, although the School is sharing many of the difficulties and restrictions imposed by declining budgets, it has been able to maintain full vigour and has been able to establish four new major research activities in each of the years since 1979.

Following two appointments in the inorganic chemistry area, the arrival in May of Professor A. L. J. Beckwith led to an important broadening of research interests in the organic chemistry section. The more recent appointment of Dr D. J. Evans will similarly provide an important extension of research into physical and theoretical chemistry. A consequence of all these changes has been that at least 25% of all research carried out in the School next year will be in areas which were not represented before 1979.

Research School of Earth Sciences

Director: Professor A. E. Ringwood, MSc PhD Melb., FAA, FRS

The primary objective of the Research School of Earth Sciences (RSES) is fundamental research in the earth sciences. Research activities are focused into key areas of geophysics and geochemistry which are inadequately developed at other Australian universities. The School has attained exceptionally high standards in the fields in which it has specialised. Unsolicited assessments by distinguished foreign scientists place RSES among the half dozen leading centres of research in the earth sciences in the world.

Last year the structure of the School was substantially reorganised by amalgamating some research groups and by reorienting the research directions of other groups. It is pleasing to report that the reorganisation has been successful. High research productivity has been maintained throughout the year and the new group structure has permitted a more efficient and rational utilisation of resources. The Research School of Earth Sciences now consists of the following research groups: earth physics, geomagnetism, petrophysics, geophysical fluid dynamics, petrochemistry, geochronology—stable isotope geochemistry, environmental
geochemistry and trace element geochemistry. The research groups are semi-autonomous and do not have separate budgets or permanent establishments. This non-departmental structure provides the School with considerable flexibility in the organisation of its research programs.

Although fundamental research is the School's primary objective, the very nature of the earth sciences makes it inevitable that many of the research projects are simultaneously directed at problems of practical significance and national importance. This situation is also a consequence of the fact that many RSES programs are concerned with the geophysical structure of the Australian continent and its chemical composition and geochemical evolution. Generally speaking, the School's research programs are aimed at interpreting larger-scale structural and compositional features than those which form the targets of mineral companies prospecting for ore bodies. However, these larger-scale studies help to provide much of the scientific infrastructure which is necessary to facilitate effective mineral and hydrocarbon exploration programs. Several of the projects now under way will make a significant contribution to the national interest in years to come.

The program of carrying out a large-scale geophysical study of the Amadeus Basin is one of these. The investigation focuses on seismic refraction, seismic travel-time delays, electromagnetic deep sounding, gravity and heat flow. The objective is to interpret the structure of the entire continental crust and upper mantle beneath the Amadeus Basin in order to gain an understanding of the dynamical processes which have caused the basin to form.

Two other examples of geophysical studies of national importance are worthy of mention. The earth physics group operates a seismic network in South-East Australia, a province which is characterised by sporadic earthquake activity. During the year a substantial shock (magnitude 4.5) occurred at a depth some kilometres beneath the Cataract Reservoir. It is fortunate that the event was not shallower. Detailed studies of the causes and mechanism of this and other local earthquakes are continuing. The School's research on solitary waves in the atmosphere above Northern Australia and Queensland using an infra-sonic array has provided new insight into their mode of propagation. It has also highlighted a very significant and hitherto unrealised risk to aircraft during landing and taking off. These waves have large amplitudes, and although comparatively rare, they have the capacity to cause serious accidents by near-ground vertical and horizontal wind-shear. It is possible that some accidents in the past have been caused by this previously unrecognised hazard. Clearly, further work on this phenomenon is essential.

The geochronology group has been, and continues to be, responsible for measuring the ages of Australian rocks. Most of the existing knowledge in this area derives from the work of this group. This research is essential to understanding the geological evolution of the Australian continent and provides a framework for geologic mapping of old rock systems which is ultimately essential for systematic mineral exploration. Mining companies frequently approach this group for assistance in determining the ages of rocks in areas where they are prospecting. The future application of the School's ion-probe microanalyser is likely to revolutionise the technique of lead-uranium dating of zircons and will have a considerable impact on geochronology generally.

The SYNROC method of immobilising high-level radioactive waste was developed by the petrochemistry group. This method is vastly safer than existing techniques and is currently attracting world-wide attention. After an extensive investigation of many alternative waste forms, the United States Department of Energy chose SYNROC for further development as their official alternative waste form to borosilicate glass. The development of a demonstrably safe method of disposing of radioactive wastes would be of considerable benefit to this country. It would defuse much of the controversy surrounding the mining of uranium, thereby permitting the unimpeded development of a major new industry. Moreover, it might be feasible to consider development of other nuclear industries in Australia with considerable benefit to the national economy.

Finally, the environmental geochemistry group is concerned with the palaeoclimatology of the Australian continent and with studies of the carbon cycle in the southern...
hemisphere. This information is vital to understanding the factors presently controlling climate and to predicting the effects of changes in these factors, such as the increasing levels of carbon dioxide resulting from combustion of fossil fuels.

Several other examples of the practical importance of fundamental research carried out in RSES could be cited. They illustrate the close relationship between fundamental and applied research which is characteristic of the earth sciences.

John Curtin School of Medical Research

**Director:** Professor R. Porter, BMedSc DSc Adel., MA BCh DM Oxf., FAA, FRACP

One requirement of a research institute is that it should be always changing. New knowledge and new technologies must be incorporated within on-going theoretical and practical approaches to the school's goals and objectives. As dramatic advances occur in a branch of science, the institution must adapt its approach to incorporate those advances within its programs. During 1981, the John Curtin School of Medical Research (JCSMR) introduced innovations in science, re-oriented some of its existing activities in the light of emerging new knowledge and new technologies, and continued its significant contributions to areas of medical science which are at the forefront of world achievement. Entirely new programs of work were introduced in the School. Not only did the setting up of the Director's Experimental Neurology Unit introduce a new program of work, but, for example, the expansion of the studies using embryo transplantation in cattle to study the development, from conception, of the immune mechanisms of adult mammals enlarged the School's work in developmental biology and reproductive physiology. In no sense are the research pursuits of the School static and historical.

In addition to these 'internal' changes, dramatic developments in the School's work inevitably accompany the recruitment of new staff. Entirely new research pursuits were introduced as a result of appointments made in 1981. Among the distinguished medical scientists appointed were two professors, filling the long vacant Chairs of Experimental Pathology and of Clinical Science. Other new activities will characterise the future work of the Department of Pharmacology as a consequence of eminent appointments to that department.

Professor William Doe will take up his appointment as Professor of Medicine and Clinical Science from January 1982, filling a post which has been vacant since 1975. The redevelopment of the department began under his leadership during 1981. Professor Doe is a distinguished Australian gastroenterologist who has worked at the Hammersmith Hospital in the United Kingdom and at the Scripps Clinic in California before returning to Sydney to be Associate Professor of Medicine in Sydney University at Royal North Shore Hospital. He serves on the Council of the Royal Australasian College of Physicians. His scientific work specialises in the study of inflammatory bowel disease, in colon cancer and in the basic mechanisms of tissue injury.

Professor Peter Doherty was appointed to the Chair of Experimental Pathology which has been vacant since Emeritus Professor Colin Courtice stood down to become Director of the School in 1973. Professor Doherty will return to Australia in 1982 from the Wistar Institute, Philadelphia, and the Department of Pathology at the University of Pennsylvania School of Medicine where he holds a chair. While he was a research fellow in JCSMR from 1972 to 1975, and following earlier observations of Dr Blanden, Doherty and Zinkernagel made what has been...
described as one of the most important discoveries in immunology in the last 10 years. Professor Doherty's main research interests are in the experimental pathology of virus infections and in immunopathology. This appointment has national significance: the whole discipline of medical pathology in Australia is looking to the John Curtin School's new professor for co-operation and leadership. Work in this field is of paramount importance in relation to medicine. There is a certainty that accumulation of knowledge about the mechanisms of disease will lead to preventative understanding, better treatments and less cost to the community.

Arising out of the Report of the Review Committee in 1978 was the recommendation that the Director of the School should be aided by an external advisory board. It was considered that the Director needed independent advice about the on-going work of the School, its future directions and its responses to medical and community needs. Much discussion of this proposal has occurred since 1978. During 1981, the Vice-Chancellor formally invited a distinguished group of people to constitute the first Standing Advisory Board of the School. The Board's function is to promote the objectives of the School as defined in the Florey charter, to assess the School's present work towards those objectives, and to advise the Director about extensions of the objectives and developments which must be pursued if practical demonstrations of the usefulness of medical science are to be provided and if the community's requirements for accountability are to be met.

Scientific commentary on the work of the School will be available through a number of eminent international medical scientists all of whom have additional experience of large medical research institutions and their administration. On top of this, the Board members include prominent Australian businessmen and industrialists who are identified with the promotion of national interests. They will be able to advise about the orientation of the work to community needs and about accountability to the community. The Board has been asked by the Vice-Chancellor to assist the Director in pursuing the defined objectives of the School, to recommend initiation of new activities and extension and development of present scientific endeavours and to advise on the appropriate methods and machinery for pursuing their recommendations.

A continuing high level of scholarship and important advances in new knowledge continue to flow from all departments of JCSMR. The year 1981 has provided particular recognition of the excellence of the contributions of the School. Oxford University Press published the book Aboriginal Man Adapting by Dr R. L. Kirk, bringing together his observations over the last 20 years and making a very significant contribution to our understanding of human biological adaptation. Professor L. W. Nichol and Dr C. Frieden produced a definitive book in physical biochemistry, Protein-Protein Interactions (Wiley-Interscience) which will provide a standard specialist reference for years to come. Two members of staff of the School, Dr Blanden and Professor Curtis, were listed among the top 1000 scientists in the world—those most cited for work published over the extended period from 1965 to 1978. Their work was said to have achieved and sustained a major impact on world science.
The School's primary role is to undertake research on the societies, cultures and economies of the countries of the Western Pacific—the South-West Pacific, much of South and East Asia, South-East Asia and Australia. The emphasis has always been on basic research and, as a result, the Research School of Pacific Studies (RSPacS) is now able to draw on a great reservoir of first-hand experience to illuminate many issues of current concern for Australia's relations with other parts of the region, and of development within the region.

As part of the continuing process of assessment of the School's work, reviews were made of the Master of Arts programs in demography and international relations located in the Development Studies Centre and Department of International Relations respectively. Both reviews emphasised the satisfactory standards of the courses but made specific suggestions for improvement. Steps have been taken to give effect to these recommendations and to those arising from the 1980 review of the North Australian Research Unit. This Unit and the Australia-Japan Research Centre completed their first full year of operations as integral parts of the School. A special allocation of University funds allowed some expansion of the North Australia Research Unit's work in 1981 and the Commonwealth Tertiary Education Commission made an additional grant for further expansion in 1982-84, thus recognising the national importance of this small group.

Despite the continued tight financial situation in 1981, the School was able to continue to make some innovations, and to exploit new techniques of data gathering, analysis and presentation. More attention was given to research on Korea and North-East Asia—in part based on support from the Korean Traders Scholarship Foundation. The processes and consequences of the internationalisation of production in the Pacific Basin, including the expansion of export processing zones, have attracted the attention of economists and geographers. This interest is strengthened by the link between the School and the ASEAN-Australia Economic Relations Research Project which has been funded by the Australian Government. The University's 'new initiative' scheme has enabled the Department of Political and Social Change to initiate a major study of social change in rural Java. Similarly a 'new initiative' grant has allowed the Department of Biogeography and Geomorphology, in collaboration with the Research School of Earth Sciences, to extend its work on Australia's semi-arid and arid environments. This joint Salt Lakes, Evaporites and Aeolian Deposits Project will, by drilling and other techniques, provide a great deal of new data on Australia's recent environmental history. By redirection of resources the Department of Far Eastern History has moved to increase its work on Japan and begin a project on Chinese influence in South-East Asia. This also involves other disciplines.

A further 'new initiative' grant has strengthened the Department of Anthropology's Iconic Recording Laboratory and allowed greater use of film as a means of data recording and interpretation. During the year two films were completed. The Department of Pacific and South-East Asian History completed Angels of War, a study of the impact of World War II on the people of Papua New Guinea. The Department of Anthropology's film, A Balinese Trance Seance, is being linked with a detailed anthropological monograph to expand the impact of both print and film media.

As noted in the 1980 annual report, many of the social, economic and environmental processes studied in the School can only be fully understood as a result of long-term research. The publication of Part I of the Language Atlas of the Pacific Area marks a major stage in one such enterprise. Other notable books were published and several research findings were announced during the year. Amongst these were the publication of Professor J. D. B. Miller's book The World of
States, Dr R. T. O'Neill's first volume of the official history of Australia in the Korean War 1950-1953 and a volume edited by Dr A. E. Booth and Dr P. T. McCawley on The Indonesian Economy During the Soeharto Era. This last book, together with three volumes of papers on Indonesia: Australian Perspectives, the revised proceedings of the 1979 School Seminar, demonstrates the depth of the School’s expertise on that country. Exciting new data have come from projects such as Dr G. Singh's analyses of cores from the bed of Lake George which have pushed back the vegetational, fire and climatic history of the region near Canberra from 350,000 to 700,000 years BP*. Another example, with which Dr R. M. Jones of the Department of Prehistory was associated, was the discovery of a major archaeological site in South-West Tasmania, apparently occupied during the last Ice Age, 15,000 to 20,000 years ago. Such are the exciting results of long and patient research. Two examples are cited in more detail in the ANU Research section of this report.

*BP has now largely replaced AD as a measure of antiquity. BP—Before Present (time)—also is more readily acceptable to non-Christian scholars than AD—Anno Domini (Year of the Lord (Christ)).

Research School of Physical Sciences

**Director:** Professor J. H. Carver, MSc Syd., PhD ScD Camb., FAIP

The Research School of Physical Sciences (RSPhysS) carries out fundamental research in selected branches of the mathematical and physical sciences including astronomy, mathematics, applied mathematics, atomic and molecular physics, engineering physics, nuclear physics, plasma physics, solid state physics and theoretical physics. These basic disciplines are fundamental to all scientific and technological progress. The School aims to develop research in these subjects at the highest international level with special emphasis on those problems of national significance for which the human and material resources of the School are particularly appropriate.

A significant expansion in the scope of the School’s work occurred with the establishment of the new Department of Systems Engineering and the appointment in December 1981 of Professor B. D. O. Anderson as foundation Head of Department. The creation of this department will give the Institute of Advanced Studies a much more substantial presence in the important field of information science with its broad applications to so many aspects of modern technology. The research work of the Department of Systems Engineering will concentrate on the investigation of fundamental problems in control theory and communications science including, initially: studies of adaptive systems, system identification, large-scale systems, robust control, non-linear filtering and digital signal processing. Applications of these studies are legion and it is expected that the new department will develop strong links with other groups inside and outside the ANU while continuing to pursue its own basic concern with fundamental theoretical research.

Another major development for the School was the appointment of Professor D. W. Robinson and Professor L. M. Simon to chairs of mathematics. These appointments greatly strengthened ANU research in mathematical physics and differential geometry. Professor Robinson will take up his appointment as Head of the Department of Mathematics in January 1982. In addition to these senior appointments, there was an expanded visitors’ program in mathematics supported by the University’s ‘new initiative’ scheme.
There was also some significant reorganisation within the School. During 1981 three existing research units, the Diffusion Research Unit, the Electron and Ion Diffusion Unit and the Ultraviolet Physics Unit, were grouped together to form the Atomic and Molecular Physics Laboratories (AMPL) with the status of a department within RSPhysS. The research carried out in AMPL covers a range of important topics at the interface between physics and chemistry. A major new area of research in this field was opened up this year with the completion of the neutral beam experimental facility. This facility, the first of its kind in Australia, will be used to study collisions between atoms and molecules in specific rotational and vibrational states. These studies have many applications and are, for example, fundamental to the development of new laser systems.

The 14UD accelerator within the Department of Nuclear Physics provides an outstanding facility for nuclear structure studies which has attracted a wide range of Australian and overseas visitors including regular user groups from The Faculties, and from the universities of Melbourne and Auckland. The School’s excellent experimental resources in nuclear physics owe much to the dedication and enterprise of the foundation professor of nuclear physics, Sir Ernest Titterton, who retired at the end of 1981 after a long and distinguished career within the University. Major areas of nuclear research under study with the 14UD accelerator include nuclear reactions induced by heavy ions, nuclear fission at high spins and the shapes of nuclei in excited states. The accelerators are also used to study atomic collisions in solids. In a new project carried out in collaboration with the Research School of Earth Sciences, the old 61 cm magnetic spectrometer was converted into a broad range mass spectrometer of unrivalled versatility for use in isotope ratio studies in geological and meteoritic specimens.

The Mt Stromlo and Siding Spring Observatories have continued to make fundamental contributions to galactic and extragalactic astronomy. The major new initiative at the observatories in 1981 was the feasibility study of the Instrument Package for STARLAB, the free-flying space telescope planned jointly by Australia, Canada and the United States of America. The inaugural meeting of the STARLAB Joint Science Working Group was held at Mt Stromlo Observatory in February 1981, and in December 1981 the STARLAB Industrial Symposium took place also at Mt Stromlo. During 1981 a Memorandum of Understanding was signed between MATRA SA and ANU for the design and development of the STARLAB Instrument Package and a Letter of Intent was signed by the Secretary of the Department of Science setting out arrangements for the conduct of definition studies by the three countries but without, at this stage, committing Australian government funds. Construction of the ANU 2.3 m telescope is proceeding and site work at Siding Spring Observatory has commenced. All major designs for the refurbishment of the 50-inch ‘Great Melbourne’ Telescope have been completed.

In the Plasma Research Laboratory the LT-4 Tokamak has been operating with a full range of diagnostic equipment and studies are in progress of plasma disruption phenomena which are of great concern to the world fusion program. A large general purpose plasma machine, WOMBAT, has been constructed for basic studies of wave propagation relevant to plasmas in outer space. The laser laboratory in the Department of Engineering Physics has been extensively upgraded and now produces laser power densities greater than those available in any other laboratory. An example of new lines of research in solid state physics is the installation of a melt-spinning furnace which produces ribbons of amorphous metals. These so-called ‘glassy metals’ or ‘metallic glasses’ are new materials with potentially valuable uses in industry.

Application of the Department of Engineering Physics’ research in solar energy has been made through ANUTECH which has managed the construction of a 25 KWe solar power station at White Cliffs using funds provided by the New South Wales Government. Other ‘spin-offs’ from the School’s work include the surface force apparatus developed by Dr J. Israelachvili of the Department of Applied Mathematics. Versions of this apparatus are being supplied to a number of other laboratories interested in surface and colloid science with applications as diverse as mineral
flotation, geochemistry, soil science, oil recovery, adhesion, lubrication and wear. The optical physics group in the Department of Applied Mathematics has continued to collaborate with Telecom Research Laboratories on optical fibres and their use in communications systems.

**Research School of Social Sciences**

**Director:** Professor G. M. Neutze, MAgrSc NZ, DPhil Oxf., FASSA

The aim of the Research School of Social Sciences (RSSS) is to increase the understanding of and knowledge about features of society and their determinants. The coverage of 'social sciences' in the School is broad, including economics, political science, law, history, philosophy and sociology. All of these areas of study are represented in RSSS but the School is selective rather than comprehensive in its coverage of them. Their application to demography, urban research and the history of ideas are also studied. Research in the School concentrates on Australia but is not limited to this country. For example, the School is an important centre for the study of the history of Britain and Ireland, the demography of Indonesia, Bangladesh and Malaysia, the politics of the Soviet Union and Eastern Europe, and the history of ideas as they developed in Europe. Some comparative studies of different countries are also carried out.

The question about where a study is located arises only in those aspects of the School's research in which the theories and concepts of social science are applied to particular societies. Other parts of research aim to extend those theories and to improve our understanding of societies in general. For example, the Department of Philosophy is developing new kinds of logic which have applications in all social sciences. The Department of Statistics carries out research on methods of analysing data series over time to distinguish underlying trends from fluctuations. Most departments carry out some theoretical and some applied work, but the proportions vary greatly. The units and projects are mainly engaged in applied research.

Some of the applied research in the School is directed at basic understanding of social processes and has little direct application to research. Examples are research on social stratification and on understanding the class structure; on the politics of federalism and of ethnic communities; on determinants of trends in fertility and mortality; and on the beginnings of bureaucracy in Britain. Other parts of the research have more direct relevance to policy. Examples are studies of changes in workforce participation among teenagers and older males; changes over time in the occupational distribution of migrant workers; the living conditions of Aborigines in New South Wales country towns; the effects of inflation in Australia; and the relationship between indigenous and introduced European concepts of law in Papua New Guinea. Finally, a significant amount of applied research analyses the effects of particular policies or groups of policies. Research is in progress on housing policy, welfare policies, state control of union ballots, health policy, provision of services for the aged and alternative means of providing welfare services.

Among the major areas of research which have not been mentioned above are studies of the causes of fertility decline and other aspects of the demography of developing countries, and international migration to Australia in the Department of Demography; resource pricing and taxation, and the Australian labour market in the Department of Economics; relations between the private and the public sectors in the Department of Economic History; political, social and cultural aspects of Australian history in the Department of History; Marxism and revolutionary ideologies, legal ideologies and theory, and the relationship between literature and ideas in the History of Ideas Unit; the analysis of rights in the Department of
Law; ethics and language in the Department of Philosophy; electoral systems and the politics of the Northern Territory in the Department of Political Science; the sociology of education, the professions and business in the Department of Sociology; the theory of probability in the Department of Statistics; and housing markets, urban decision-making and employment in the Urban Research Unit.

NEW DIRECTIONS AND DEVELOPMENTS

Research in the School takes new directions in several ways. Perhaps the most important is the new research areas developed within departments and units. Frequently, but by no means always, new directions are taken through the appointment of new members of staff—a process which is aided by the fact that nearly half of the School's academic staff are on short-term (2 to 5 year) appointments. For example, new research was begun during 1981 on ethnic politics, the mobility of Aborigines, shorter working hours, Australia's external debt, the history of employment policy, the history of male domestic servants in Australia, nineteenth-century Russian liberal and conservative thought, contemporary science and the Communist Party in the Soviet Union, a study of small entrepreneurs, and urban politics.

Some new developments involve changes in the structure of the School. During 1981 a Social Science Data Archive was established to collect survey results and make them available to others for analysis. Two projects began operation during the year. One was on the law and politics of industrial relations and the second on social justice in Australia.

ACHIEVEMENTS

The main achievements of the Research School are its publications. Although important research results are published in articles that come to be widely quoted, in most parts of the social sciences the major achievements are seen in books. During the year the important books published included Volume 8 of the Australian Dictionary of Biography, The Inspector General by O. O. G. MacDonagh, the proceedings of a conference Youth Employment, Education and Training, Innovation and Reaction by C. J. Lloyd and P. N. Troy, and Professor Passmore's Boyer Lectures, The Limits of Government.

Ten students were admitted to the degree of Doctor of Philosophy during 1981, and 8 more were being examined. Due to an increased intake, a total of 50 students were enrolled at the end of the year. Other achievements of RSSS are represented by the extent to which its members are called upon by governments in Australia and overseas for assistance, the research results that are presented at seminars and conferences, and the position of research leadership which the School is increasingly occupying among Australian social scientists.

The Research School of Social Sciences is taking on the task of establishing the Social Science Data Archive following the closure of the Survey Research Centre as a separate organisation.
The Faculties

Chairman of the Board of The Faculties: Professor D. H. Whalan, LLM NZ, PhD Otago

The teaching and research side of the University, now termed The Faculties (in earlier Reports—the School of General Studies) enrolled 5566 students in 1981, of whom 4785 were undergraduates and 781 were postgraduate students. There were 221 PhD candidates.

For comparison, the figures in 1971 were 4002 undergraduates and 452 postgraduates of whom 182 were PhD candidates.

Two-thirds of the University's postgraduate training is now centred on The Faculties. Although the past decade has seen evident growth in postgraduate training, in the most recent years review committees of science departments have noted a decrease in the number of well-qualified research students who present themselves for higher degrees. This is serious for those disciplines, since a stream of postgraduates is their research life-blood. Still, of the five faculties as a whole, graduate recruitment is still good both from within Australia and overseas and intake is largely determined primarily by the number of scholarships which are available, either through the Commonwealth Postgraduate Awards Scheme or in the form of the University's own scholarships. The importance of maintaining University scholarship support is recognised, and the number available has, with budgetary difficulty, been maintained for 1982, but there is now a shortage of funds to support graduate students' research, especially in disciplines which depend on field work.

The Faculties continue to be a national entity, as the Australian National University Act enjoins, with 32% of their students coming from beyond Canberra and its environs. Although this figure is down compared with 38% in 1972, nevertheless the present figure is still a satisfactory achievement given the economic downturn and the diminished value of the Tertiary Education Assistance Scheme (TEAS). These have contributed to the reduction in the proportion of qualified young people coming into universities and have induced the development of the 'stay at home' syndrome, under which students tend to accept places in universities in their home city rather than seek the broadening experience of studying in a new environment.

Reviews of departments in The Faculties, which began systematically in 1975, continued with the completion of reviews of the Departments of Economic History, Statistics, Applied Mathematics, Pure Mathematics, Physics and Theoretical Physics. Reviews of the Departments of Political Science, Sociology and Psychology and of the Faculty of Economics were begun. The review process continues to be a stimulus to the assessment and reconsideration of teaching and research in The Faculties. Almost as important as a review itself is the follow-up report of the Dean of the relevant Faculty two years after a review to consider the manner in which a Department has responded to the review committee's report.

For the first time in The Faculties recommendations of review committees in 1981 led to amalgamation of departments. In December the Standing Committee of Council accepted recommendations that the Departments of Pure Mathematics and Applied Mathematics be amalgamated from 1 January 1982 and that the Departments of Physics and Theoretical Physics be amalgamated as from 1 January 1984. Although the amalgamations were recommended as being appropriate on academic grounds, this action was also partly in response to sug-

Indeed, the most important and worrying aspect of 1981 to the Board of The Faculties and its Committees was the problems associated with the University’s response to the CTEC Report. The Vice-Chancellor’s Report cites the passages from the CTEC Report in which the Commission indicated its view that cost per student was high in The Faculties because of the number of small departments and the variety of courses offered and suggested that the University ‘examine its distribution of funds between the Institute and The Faculties’.

This re-consideration began in July but the extent of the funding cuts was not known until the end of the year and created uncertainty in planning for 1982. In the result, staff cuts totalled 67.7 posts (more than 8.5% of all posts), running costs suffered a reduction of more than 10% in real terms, part-time teaching funds were cut by almost 40% and will be inadequate, scholarships were at risk until the last moment, research assistance and field-work expenses will be very scarce, some chairs remain unfilled and the funds for visiting fellows have almost dried up. Most Australian universities face diminished budgets for the 1982-1984 triennium but the effective cuts to be absorbed by The Faculties in 1982 may well be greater than those in any other Australian university.

The Faculties have pressed on with reconstruction and amalgamation of departments, but its budget is now too tight for efficiency. Yet standards remain high: graduates get at least their share of overseas scholarships and do well on the employment market, research productivity (which is, naturally, seen internally in comparison with the Institute of Advanced Studies) is good and attracts a gratifyingly high level of outside funding from ARGC and other funding bodies, and the expertise of staff in The Faculties is keenly sought by governments, legislatures, commissions and many other bodies. In a situation of increased teaching and administrative loads and reduced time and University support for research functions it is becoming more difficult to respond to such requests and, indeed, to maintain overall academic standards in The Faculties. It is remarkable that standards of excellence remain as high as they do.

Faculty of Arts

Dean: Dr B. Rawson, BA Qld, MA PhD Bryn Mawr

In August Dr W. S. Ramson’s six years as Dean came to an end. He was the Faculty’s longest-serving Dean and the effects of his leadership will continue to benefit the Faculty for some considerable time.

Arts is a broad-based Faculty, combining fields of humanities and social sciences which in some other universities are in separate faculties. This Faculty has valued the contribution which each of its parts makes to the whole and wishes still to maintain this balance and communality of interests, although it thereby lacks the more obvious focus of smaller, more specialised faculties. Contracting resources are making it difficult to preserve a range of offerings commensurate with the varied and sophisticated expectations of ANU students.

THE STUDENT BODY

Mature-age and part-time students now form a significant part of the student body. They are a varied group, and it is not easy for a comparatively small faculty to provide the variety of timetabling and teaching to accommodate all their needs. There are also increasing demands on staff to help students overcome difficulties in completing their year’s work. Some of these difficulties are personal, some relate to learning skills; often they are economic or job-related. Some students in the Public Service had difficul-
ties during this year in obtaining release from work to attend classes and in getting approval for their programs. Strenuous efforts by some staff to be continually involved with students' progress seem to have reduced the potential 'wastage' rate; but the non-completion rate is still causing concern.

One part-time student won a University medal, the first such student to do so. Final-honours arts students were awarded four of the six University medals. A fifth medal was awarded to a student in linguistics, a department of both the Faculty of Arts and the Faculty of Asian Studies.

THE NEW AND THE OLD

New developments foreshadowed in the 1980 report remained frozen during 1981 due to budgetary restrictions. In particular, the Fine Art Program, despite the advantage of collaboration with the National Gallery, was unable to achieve its aims of a separate department, with a chair, and honours and graduate programs.

Departments have had to look increasingly to one another to offer joint supervision and cognate or joint courses to eke out the more restricted range now possible for each of them. Although this raises real and valid concerns about the provision of the core of a discipline, it does have benefits in inter-departmental interaction. Examples may be found between the Department of History and several other departments—Classics, Slavonic Languages and Sociology; Linguistics and Prehistory and Anthropology; English and Philosophy.

A new interdisciplinary major in development studies was designed to co-ordinate existing resources from several departments—Prehistory and Anthropology, Geography, History, Political Science, Sociology, together with departments in the Faculty of Economics. Australian studies and Aboriginal studies majors were also available.

At an inter-faculty level, the Departments of History (Arts) and Economic History (Economics) have co-operated in sponsoring a new course 'Economics for Historians' taught by the Department of Economic History. Several departments in this Faculty co-operated closely with the Faculty of Asian Studies in offering Asia-related courses.

The Faculty takes some pride in the quality of its Australian and Asian focus and in the high level of its members' involvement with government activities, schools and other public institutions. These are obviously 'relevant', 'of national importance', and often with implications for 'public policy'. But these terms should not be interpreted only in their narrower and more obvious sense. More general humane values and the 'European connection' are also important. The roots of much of our culture are European, and the study of the history, philosophy, language, literature and art of European societies, past and present, can broaden the Australian outlook and perspective and deepen the understanding of our own society—now being recognised as a multi-cultural society. It is this study which has been struggling under most disadvantages. There are fewer complementary resources in the Institute of Advanced Studies than for other fields; primary source material (in libraries and museums and on sites) is often far distant and funds and time for field work and outside studies are limited; language departments have demands on them, at a time of diminishing resources, to offer differentiated courses for different student needs and preparedness, extra-curricular activities to intensify language learning, as well as courses making European culture accessible to non-language students. Government policy which suspended the Moscow University Exchange scheme in 1980, continues to deprive the Department of Slavonic Languages of its normal access to a native Russian speaker and its ability to send staff and graduate students to study in Moscow. The fact that in 1982 no department will be able to offer an advanced-year non-language unit in the field of modern European studies reflects the difficulty being experienced in maintaining units in this area. It is an arts faculty above all which must nurture this kind of study and resist a narrow and parochial definition of 'national importance'; but it also needs support from general university and government policy.
Faculty of Asian Studies

Dean: R. R. C. de Crespigny, MA Camb., BA MA(Oriental Studies) PhD

AIMS AND STRUCTURE

The Faculty of Asian Studies has a special position in Australia. As a faculty, it is entitled to award its own specialised degrees at undergraduate and master levels, and it has direct authority for doctoral research. Moreover, as the result of consistent University and government policy, the Faculty has a wider range of interest and expertise in the field of Asian Studies than exists at any other university in Australia, and it is developing a capacity for teaching and research in every area.

Hitherto, the Faculty has concentrated upon the traditional and classical cultural background of the various Asian societies with which it is concerned. At the present time, however, following on from the Review of Faculty in 1978-79, the Faculty is developing courses and combinations of courses which will give increasing emphasis to current political and economic changes in Asia.

The Faculty of Asian Studies contains five departments—Asian History and Civilisations, Chinese, Indonesian Languages and Literatures, Japanese, and South Asian and Buddhist Studies. The Department of Linguistics in the Faculty of Arts is also associated and in addition this Faculty now has representation from several areas of the Research School of Pacific Studies, and from the Faculties of Arts and Economics.

THE UNDERGRADUATE DEGREE IN ASIAN STUDIES

Beginning in 1981, the Faculty enrolled its first students in a new program of study for the BA(Asian Studies) degree. From this year on, students undertaking the three-year pass degree are required to take firstly, three years work in an Asian language; secondly, an introductory course on the history and culture of the relevant region; thirdly, a three-year course in a discipline such as economics, history, geography, political science or anthropology; and fourthly, there is a requirement that within the whole degree program at least six full-year units out of 10, including the language work, must be related to one particular region of Asia.

From this pattern, it is expected that students graduating in Asian Studies will have intellectual and scholarly tools that will enable them to understand the civilisation of a region in Asia and to analyse its contemporary changes in terms of both its indigenous tradition and modern scholarship.

As a corollary to the new structure of the pass degree, the Faculty has also reorganised the four-year undergraduate honours program. The honours degree in Asian Studies, formerly the responsibility of individual departments, has now been placed in the charge of a Faculty-wide Honours School of Asian Studies. Students admitted to the honours program will be assisted in their choice of subjects by co-ordinators of studies for the five areas of China, Japan, South-East Asia, South Asia and West Asia, and will be encouraged to develop their studies and research over interdisciplinary fields. As with the pass degree, it is hoped and expected that the new honours requirements will produce a high quality of cooperation with other faculties and sections of the University.

Since its establishment in the 1960s, the core languages taught by the Faculty have been Chinese, Japanese and Indonesian, with the later addition of Sanskrit and Hindi. More recently, Thai, Arabic, and Persian have been added—all of them now offered as full three-year courses.

During 1981, the Faculty for the first time offered language teaching in Classical Hebrew and Korean. The Korean language program, in particular, was made possible by a most generous grant from the Korean Traders' Scholarship Foundation, and two visiting lecturers, Dr Sang-oak Lee and Dr Chung Chong-wha, came to Canberra to establish the course. In 1982, both Korean
and Hebrew will be offered at second-year level.

With another grant, from the Australia-Philippines Business Co-operation Committee and the Philippines-Australia Business Co-operation Committee, a fellowship in Philippines studies has been established—Ms Bernadita R. Churchill, from the University of the Philippines, was appointed as the first fellow, and took part in the teaching of a new course on the history of the Philippines.

At the end of the year, moreover, the Faculty was advised that it had been awarded funds by the Australian Department of Education, acting on the advice of the Tertiary Education Commission and the Australian Institute of Multicultural Affairs, to establish a program in Vietnamese. Language teaching in this field will be introduced in 1982, and will complement the established courses in the history and civilisations of mainland South-East Asia.

RESEARCH AND ADVANCED TRAINING

The continuing research work of individual members of staff is described in departmental reports to the University Council. Special mention may be made here to the publication of the first volume of Professor J. W. de Jong’s ‘Selected Studies: Buddhist Studies’ was published at the beginning of 1981, and will be followed by ‘Tibetan Studies’. Professor Liu Ts’un-yan is also now preparing the second collection of his Papers from the Hall of Harmonious Wind, on aspects of Chinese classical scholarship.

The research work of other members of staff and students is reflected in an energetic program of seminars, and of Faculty publications distributed through ANU Press.

The Faculty continues to be successful in attracting high-quality students for postgraduate degrees. In particular, the Department of Indonesian Languages and Literatures, under Professor A. H. Johns, is responsible for a number of scholars sent as staff candidates from their universities in Indonesia and Malaysia, a form of international co-operation which it is hoped to develop further.

During 1981, the Faculty embarked on two major initiatives. The first was the introduction of a Bachelor of Letters degree, on the lines of the program already established in the Faculty of Arts, but with special provisions for Asian studies. Through the sponsorship of the Department of History in the Faculty of Arts, the LittB degree is now offered with a specialisation in Southeast Asian history. It is hoped that this new development may also be of interest to universities in South-East Asia.

The second new development was the establishment of a course in applied Japanese linguistics leading to a degree of master. This course, being run jointly by the Departments of Linguistics and Japanese, is designed to provide high-level training for language teachers. It has been supported by a grant from the Japan Foundation, and enrolments have already been received for the first course commencing in 1982.

OTHER DEVELOPMENTS

The visiting fellowship program of the Faculty continued during the year. Among these scholars, Professor Herbert Franke, President of the Bavarian Academy of the Sciences and Emeritus Professor of the University of Munich, visited Canberra for two months and gave a public lecture on ‘Diplomatic Missions of the Sung State 960-1276’. This lecture has now been published by the Faculty, as has also the A. L. Basham Lecture of 1980, given by Dr R. S. McGregor of Cambridge University, on ‘A New Voice for New Times: The Development of Modern Hindi Literature’.

The Dean, Dr de Crespigny, made a brief business trip to China and South-East Asia during August and September. He called on a number of universities and institutes of higher education and research, and discussed possibilities of future co-operation and liaison.

At the November meeting of the Board of The Faculties, a Report on the Implementation of the 1978-79 Review of the Faculty was presented for approval and transmission to Council. Among the points brought out in this report were the continuing development of co-operation in Asian studies across the University as a whole, and the
need for the development to continue with support from other faculties. Within the Faculty of Asian Studies itself, there is foreshadowed a further appraisal of the structure of the Faculty, with a view to encouraging the maximum co-operation and effectiveness in research and teaching across all academic fields and disciplines.

Finally, it must be observed that during 1981 the Faculty of Asian Studies suffered quite as severely in financial terms as any other section of the University from the latest round of budgetary cuts. There is no question, however, that it has a very special role to play in the intellectual and academic life of Australia. Among all universities, the Faculty is exceptional in the variety of courses offered both on modern and on traditional Asia, and unique in its firm requirement that graduates shall possess a working control of at least one Asian language. As a result of this policy, student numbers are limited, but it is firmly believed that the quantitative disadvantages are more than overcome by the quality of graduates, and by the wide influence that the Faculty has obtained through its former students and its continuing work of research.

Faculty of Economics

Dean: Professor A. D. Barton, BCom Melb., PhD Camb., FASA

ENROLMENTS, GRADUATES, EMPLOYMENT PROSPECTS

The Faculty of Economics consists of four departments—Accounting and Public Finance, Economic History, Economics, and Statistics—the Centre for Research on Federal Financial Relations and the Master of Administrative Studies Program. Enrolments in the Faculty increased again in 1981, continuing the trend of the past five years. The increased enrolments for 1981 numbered 30 WSU. This is a very encouraging trend, given the reduction in enrolments elsewhere in the Faculties. All departments benefitted from the additional student numbers. Approximately one-half of the students are part-timers, mostly employed in the Public Service. Full-time students graduating from the Faculty encounter little difficulty in obtaining professional positions in the various economics, accounting and statistics departments of the Commonwealth Government; in industry, commerce and finance; and in the accountancy profession. The better qualified graduates invariably receive several job offers and quite high salaries. The demand for graduates of the Faculty has remained strong throughout recent years and all indicators point to this situation continuing.

DEPARTMENTS OF THE FACULTY

Accounting and Public Finance provides a range of courses in government and business accounting and finance which qualify graduates for admission to the professional accountancy bodies, and courses in public economics. The department lost a reader in July upon his appointment to a senior position in the public sector. Some course changes were made during the year as a result of the Departmental Review and the objective of reducing the accounting major, plus related courses, from a four-year to a three-year program: further progress awaits the Faculty Review. The two new graduate diploma programs, one in accounting and the other in public economic policy, commenced at the beginning of 1981. They are open to part-time candidates only at this stage. Enrolments in both programs were satisfactory.

Economics offers a range of courses in macro, micro and international economics, covering both theoretical analysis and policy issues. The Graduate Diploma in Economics continued with a strong enrolment in 1981, and 71 new students began the course this year, mainly on a part-time basis. Response to the diploma, which aims to update economists in the Public Service and to provide a means of entry into the course leading to the degree of master, has been most gratifying. The diploma program has a
strong policy analysis emphasis. The department again experienced a staffing shortage throughout 1981. One reader transferred to a senior position elsewhere in the University, several lecturing positions remained vacant because of the time taken to fill them, and several tutor positions remained vacant because of the lack of applicants. The shortage of full-time tutors caused problems in the teaching of first-year economics in particular and the department had to rely excessively on the assistance of part-time tutors. The pass rate in Economics I declined partly as a result of these problems. Several tutors and lecturers have recently been appointed to ensure that the problem will not recur in 1982. The third Chair of Economics unfortunately remains vacant. The position had been offered to an outstanding candidate but he eventually declined the offer.

Economic History provides courses in economic development in selected countries from the mid-18th century. The department successfully introduced two new first-year courses in 1981—one as a new introduction to the economic history major and the other as an introductory course in economics designed specifically for history majors. Enrolments in this second course were most gratifying. The Chair of Economic History remained frozen for 1981.

Statistics covers mathematical statistics, econometrics, probability theory and operational research. It provides a major in both mathematical statistics and in econometrics for undergraduates, and a degree of master in statistics by course work which provides a valuable program for statisticians employed by the Australian Bureau of Statistics and CSIRO. The Data-bank has been kept up to date and provides valuable information for various areas of economic policy research in the Faculty and economics departments of the Institute of Advanced Studies. The department again suffered from a staffing shortage in econometrics during the year because of the secondment of one member as Senior Adviser to the Australian Financial System Inquiry and the delay in filling another vacant position. Again, econometricians are very difficult to recruit because of the job opportunities elsewhere.

Master of Administrative Studies Program. The last students from this program graduated during the year and the program has now been wound up. Proposals for the new Master of Public Policy program are still being formulated.

Centre for Research on Federal Financial Relations examines in particular the major issues affecting intergovernmental financial relations in the fields of expenditure responsibilities, financial powers (both taxation and loan), grants arrangements and the scope for intergovernmental cooperation. The centre is financed by the Commonwealth Government. It has only a small permanent staff and much of its research is carried out by visiting scholars. The centre has established interest groups in other cities. 1981 was again a most active year for the centre in terms of visiting fellows, seminars and conferences, and publications. Two highlights of the year's activities comprised the Canada-Australia Colloquium at which a range of public policy issues in both countries were examined; and a seminar series for senior Indonesian Government officials on 'Intergovernmental Financial Relations in Australia', given by Professor R. L. Mathews.

REVIEWS

The reviews of the Departments of Economics and Statistics were completed during the year. All departments of the Faculty have now been reviewed and the reports presented to Council. Many of the recommendations for changes within the Faculty have now been implemented. However, as many of the issues raised in the reviews have Faculty-wide effects, a Faculty Review is now in progress. It is hoped that this will be completed early in 1982.

ASSISTANCE PROVIDED TO OTHER DEPARTMENTS

The Department of Economics continued to provide assistance in international economics to the Faculty of Law diploma and master programs in International Law.
RESEARCH AND PUBLICATIONS

Faculty staff maintained a most active research and publications effort over the year. Eleven books and monographs, and some 84 articles covering a wide variety of theoretical and policy issues, were published. In addition, staff members made submissions to several Commonwealth inquiries (particularly the Australian Financial Systems Inquiry), actively participated in conferences in Australia and overseas, and gave a large number of seminars at other universities and to professional groups.

PRIZES

The Faculty was fortunate in securing several endowments to fund prizes. The Australian Finance Conference has provided funds for prizes in Accounting CO4 (Company Finance) and Monetary Economics.

Faculty of Law

Dean: Professor A. D. Hambly, LLB Melb., LLM Harv.

Most undergraduate law students combine their studies for the degree of Bachelor of Laws (LLB) with a degree course in another faculty, achieving both degrees in five years of full-time study. About 15% of LLB candidates have graduated in another discipline before commencing their law studies. The Faculty also supervises candidates for postgraduate degrees by thesis, and conducts a graduate international law program offering course work for the degree of Master of International Law and the Graduate Diploma in International Law.

The Faculty is obliged to restrict undergraduate enrolments. Competition for admission is intense. In 1981, as in earlier years, more than 1100 applications were received for 185 places.

NOTABLE EVENTS

A team of the Faculty's students won the Australian final of the Jessup International Law Competition, and then in Washington, in contest with teams representing 27 countries, won the international semi-final and ultimately the final. The competition has been conducted under the auspices of the American Society of International Law annually since 1962. This was the third occasion on which the final had been won by a team from outside the United States of America. The students' achievement provides some evidence of the success of the Faculty's international law program and of the moots program, which provides training in techniques of advocacy.

The Faculty conducted the third seminar in the series 'Australian Lawyers and Social Change', the theme being 'The Choice between Judicial and Administrative Tribunals'. The seminar was opened by the Right Honourable the Lord Chief Justice of England, The Lord Lane, and the invited participants represented the judiciary, administrative tribunals, legal practitioners, welfare workers, government departments and academic institutions. The papers were published in an issue of the Faculty's scholarly journal, the Federal Law Review.

The other issue of the Review published in 1981 honours Emeritus Professor Geoffrey Sawer on the occasion of his seventieth birthday. As well as a bibliography and articles appraising his work, there is a tribute from a former student, the Right Honourable Sir Ninian Stephen.

RESEARCH AND PUBLICATIONS

As well as the Federal Law Review, the Faculty publishes the Australian Yearbook of International Law and the ACT Supplement to the Legal Resources Book. Members
of the Faculty are editors of the Criminal Law Journal, the Australian Criminal Reports and the Australian Administrative Law Service.

During 1981, The Torrens System in Australia, by Professor D. J. Whalan, The Law Relating to Parents and Children, by Helen Gamble, and the second edition of Professor D. C. Pearce's Statutory Interpretation in Australia were published. Work was progressing towards the publication of books on diverse topics, including the role of the rule of law, Australian trade union government and the law, the law relating to health and safety at work, the legal regulation of medicine and health care, drug offences, Australian constitutional cases, international fisheries law, Australian international taxation, and the acquisition of skills in legal writing and research. Mr D. L. Pape continued his work on computerised legal retrieval systems.

EXTRA-MURAL ACTIVITIES
The Faculty's professional association with the institutions of government, other branches of the legal profession and the general community is increasingly reflected in the work of its members. Several serve on tribunals or policy-making bodies, a notable recent example being Professor L. R. Zines' appointment to the Royal Commission to inquire into parliamentary deadlocks in Tasmania. Some are consultants to law reform commissions, the Australian Constitutional Convention, and parliamentary committees. Many lectures are given to groups within the Australian Public Service and to legal practitioners, as part of a continuing legal education program. Members of the Faculty have convened a public law and public administration discussion group, which provides an informal meeting ground for members of the judiciary, senior public servants and academics. Members have professional associations with many community organisations, several of them accepting a particular commitment to the organisation and operation of the Canberra Community Legal Service.

Faculty of Science

Dean: Professor E. P. Bachelard, BScF Melb., MF PhD Yale

UNDERGRADUATE TEACHING

The undergraduate student load declined by 6.7% in 1981 compared with 1980—1003 WSU vs. 1075.3. The largest reductions occurred in the Departments of Zoology (30 WSU) and Computer Science (15 WSU). Most other departments showed a decline of less than 10 WSU or even a slight increase. It is too early to know whether the overall decline will continue in the future.

Major changes in course structures in departments were finalised in some instances and at year's end, others were in progress.

The Department of Psychology completed a major revision of its course structure and the revised course will commence in 1982. The new course will offer a total of 11 semester units for the three-year pass course compared with a total of 19 semester units previously. The new course is more structured than in the past and concentrates on essential core material rather than offering the students a wide variety of electives. The course should result in a saving in staff lecturing time and hence be more cost effective without detriment to academic quality. Additional specialist units are to be offered as fourth-year honours or graduate diploma units.

The Department of Biochemistry is well advanced in its planning for course restructuring again with the aim of marshalling a core of biochemical knowledge into units offered sequentially in second and third years. The recommendations of the review committee of the Departments of Physics and Theoretical Physics relating to restructuring the second and third-year physics courses have been accepted en-
thusiastically by the department and will be taken up in 1982. The amalgamation of the Departments of Applied Mathematics and Pure Mathematics as a result of the review committee’s recommendation will result in a rationalisation of mathematics teaching in the University.

The Faculty approved the request from the Department of Computer Science to introduce two new first-year semester units in 1982. These units, Computer Science A03 and A04, are designed as service courses for students who wish to have some knowledge of computers and computer science but who do not wish to continue in that discipline. Experience had shown that attempts to cater for both continuing and non-continuing computer science students in Computer Science A01 and A02 were unsuccessful.

Other departments in the Faculty—for example, Forestry, Zoology—are also actively considering their course structures.

The Department of Chemistry has introduced a program of computer-assisted learning into the first-year syllabus. This program is a pilot study which will be evaluated after two years and will be watched with interest by other departments in the University.

For the second year in succession the Department of Physics mounted a summer ‘bridging’ course to aid students in their transition from school to University. The results again are disappointing—11 enrolled initially, 7 completed the course—and the attempt will not be repeated in 1982. At the request of the Secondary School Science Consultant of the South-Eastern Region of New South Wales, a two-day service course, for science teachers, in elementary electronics was held in the Department of Physics during the August vacation. This was attended by 22 science teachers and was received most enthusiastically. The Department of Zoology held a successful evening meeting with science teachers from the ACT and surrounding areas of NSW and the Department of Chemistry held a two-day workshop in environmental chemistry in conjunction with the NSW Regional Chemistry Teachers’ Association (Goulburn).

The Questacon continues to develop its role in bringing physical science to the community and since it opened to the public in September 1980 it has attracted over 10,000 visitors. It is assisted financially from both government and industrial sources.

**GRADUATE DIPLOMA**

The graduate diploma course introduced in 1981 promises to fill an important gap in postgraduate training and has already been taken up enthusiastically in some departments such as Forestry and Psychology. An interesting development is the proposal, instigated by Professor R. F. Mark of the Department of Behavioural Biology, Research School of Biological Sciences, to introduce a graduate diploma in neuroscience in 1983. This course would enable students to be trained in a developing area of science which is not adequately catered for in any Australian university. Expertise to teach the course is available at ANU and acceptance of the proposal would lead to a greater amount of formal collaboration between the Faculty and the Institute of Advanced Studies than has been experienced previously.

**POSTGRADUATES**

The postgraduate student load increased slightly to 275.5 WSU compared with 257 WSU in 1980. Difficulties in attracting postgraduates—and even honours students—are being encountered by the Departments of Geology and Computer Science because of the good employment prospects available to even pass graduates. Most other departments attract a healthy level of interest from excellent applicants but the availability of postgraduate scholarships and the level of support limits the number that actually commence research.

The Department of Psychology commenced programs of course work, research and supervised field experience, leading to the degrees of Master of Clinical Psychology and PhD in clinical psychology. Seven students completed the first year of the two-year program leading to the degree of master and it is anticipated that 10 to 12 new students will enrol in 1982.

**REVIEWS**

Reviews of the Departments of Physics and Theoretical Physics and of the Departments
of Applied Mathematics and Pure Mathematics were completed in December. The most far-reaching recommendation of both reviews was that each of the two departments should amalgamate, the Departments of Applied Mathematics and Pure Mathematics to a Department of Mathematics, and the Departments of Physics and Theoretical Physics into a Department of Physics and Theoretical Physics. The review committees recommended that both amalgamations should take effect from 1 January 1982. Subsequently the Board of The Faculties amended the date of amalgamation of the physics departments to 1 January 1984. Standing Committee of Council approved the recommendations transmitted by the Board in December.

A more limited review of the Department of Psychology commenced late in 1981.

RESEARCH

The Faculty continued its activity in research and during the year produced four books, 227 journal papers or book chapters, 55 conference papers, 38 monographs or other reports. Outside funding of $304,302 ($366,019 for 1980) was received from the Australian Research Grants Committee and $462,479 ($214,772 for 1980) from other sources.

It is a pleasure to record that Professor Buchdahl was awarded the Walter Burfitt Medal for his outstanding contributions to theoretical physics during the years 1974-79 inclusive, and that Professor Trudinger was awarded the first Australian Mathematical Society Medal.

Two research activities are worthy of special mention. The Agrigenetics Corporation is sponsoring a joint research program in the Department of Botany and the Research School of Biological Sciences on symbiotic nitrogen fixation involving the bacterium Rhizobium and non-leguminous plants. This major contribution, which is mentioned also in the report of RSBS, will add significantly to genetics research in the Faculty.

In the Department of Physics, the future of the shock-tube, a unique research facility, caused the review committee considerable difficulty because of the loss of key research personnel and the expense of maintaining it. However, the value of this facility is now gaining widespread recognition. Work which had commenced for the Jet Propulsion Laboratories (USA) on the braking of artificial satellites sent into orbit has now been formalised into a well-defined program. Professor Ray Stalker from Queensland University and Dr John Baird from the Royal Military College, Duntroon, are continuing their separate studies and two further requests for the use of the facility have been received recently. Professor Boetticher of the Institute of Plasma Physics, University of Hanover, and Professor Fowles of the University of Washington, Seattle, both wish to visit the department to use the shock-tube for separate studies in 1982-83. Retention of this facility in the long-term interests of the University is clearly desirable.
The Centre has a dual role of research and teaching. Its predominant concern is with applied research directed to the provision of objective information and analyses which will stimulate discussion and contribute to the formulation of effective policies on resource and environmental issues. Its research program gives special emphasis to energy but also provides for a substantial effort in relation to resource problems generally and to environmental and related social questions. CRES also undertakes some theoretical research to establish concepts and methods and to devise computer programs for its applied research. In teaching it conducts a course leading to the degree of Master of Resource and Environmental Studies and provides opportunities and supervision for PhD students interested in working on aspects of its program.

The emphasis given to energy reflects the current public concern about Australia’s energy future. Studies during 1981 covered a diversity of topics. These included: Australia’s dependence on oil supplies from the Persian Gulf; pricing of petroleum and petroleum products; the role of the market in creating efficiency and equity between parties in petroleum refining and distribution; factors likely to influence the substitution of non-exhaustible resources from fossil fuels; policies governing energy research and development in Australia; and the role of international organisations such as the International Energy Agency. These studies resulted in a number of papers some of which were delivered to bodies such as ANZAAS and the Pacific Trade and Development Conference. Another embodied a submission to the Parliamentary Joint Committee on Foreign Affairs and Defence.

The Centre continued its joint involvement with the University of Sydney in the Petroleum Industry Research Project which is financed mainly by the New South Wales Government and is concerned with the cost structure of the Australian petroleum industry and with the evaluation of relevant policies and institutions.

Work began during 1981 on a major three-year study, ‘Factors limiting coal production’, the aim of which is to assess the effects of the expansion of the mining and use of coal and other natural resources and the related economic and social impacts. The project, which is being supervised by Professor G. H. Taylor, Professor S. F. Harris and Mr D. I. Smith, will involve a significant proportion of the Centre’s total research staff. The initial study area is the Upper Hunter Valley of New South Wales.

INTERNATIONAL WORKSHOPS

The Centre participated during the year, in collaboration with a number of Pacific and Asian countries, in the organisation and conduct of three important workshops aimed at the study of energy problems. The first of these, in July, was an Energy Planning Workshop, sponsored by the Australian Development Assistance Bureau (ADAB) and largely organised by the Centre, was held in Papua New Guinea. It brought
together representatives from 18 Pacific and Asian countries for a detailed consideration of their future energy plans.

In September, an international planning workshop on impacts resulting from the increased use of coal in Asia and the Pacific was held at the Centre. This workshop was sponsored by the East-West Center, Hawaii, and the Commonwealth Department of Home Affairs and Environment. Its aim was to initiate a research program of three years duration in which major coal producing and consuming nations in the area would cooperate.

In December, the Centre, in association with the Australia-Japan Research Centre, organised an Energy Coal Workshop on the international energy coal trade, especially as this concerns Australia and Japan. Australian, Japanese and North American perspectives were provided on a wide range of relevant topics.

The Centre also organised, in conjunction with the Centre for Continuing Education, an ANU Public Affairs Conference entitled Resource Development and the Future of Australian Society. Outstanding speakers from many walks of Australian life, including five from the Centre, presented papers on different aspects of resource development and its social, economic and environmental consequences. The proceedings are being edited for publication early in 1982 by Professor Harris and Professor Taylor.

A significant theoretical contribution to resource studies was a paper by Professor Harris, The Role of Microeconomic Theory in Policy Formulation, published by the Centre for Applied Economic Research at the University of New South Wales. Other work covered the international relations aspects of resource development.

Work continued on land and agricultural resources. This included preliminary investigations by Dr A. B. Costin of possible projects, especially in relation to marginal or degrading lands. In collaboration with CSIRO, a workshop on phosphorus is being organised for early 1982.

Work by Mr Smith has continued on flood plain management and the use of fluorometric dyes for tracing groundwater flows in limestone areas in South Australia. Hydrological studies begun in earlier years in the Peel Inlet of Western Australia and the Shoalhaven River catchment area in New South Wales were completed as were geomorphological studies in the Shoalhaven area and on Macquarie Island. Coastal management was another important area of study and an oil spill trajectory model was constructed for the Spencer and St Vincent Gulfs areas of South Australia.

A major project on the ecology of mankind in Australia was launched by Dr S. V. Boyd during the year and is expected to take about four years to complete. Dr Boyd was assigned a leading role by UNESCO in its planning for the second decade of its 'Man and the Biosphere' program.

Much effort went into completing the report on the long-term Heritage project which is concerned with the impact of government policies on Aboriginal children and families. Dr Coombs continued his active association with the Australian Institute of Aboriginal Studies, with the Treaty Committee which he heads working towards a formal agreement between the Commonwealth Government and Aboriginal Australians. Dr Coombs also worked with the Law Reform Commission as a consultant on Aboriginal customary law.

Three PhD students and three candidates for the degree of Master of Resource and Environmental Studies received their degrees during 1981. There was a new intake at the beginning of the year of students for the course leading to the degree of master, which covers two years for full-time students and four years for part-time students. A new course commences every second year. Most instruction and supervision is provided by the Centre’s staff but substantial assistance is provided by staff from other sections of the University, notably the Research School of Social Sciences and the Research School of Biological Sciences.
Humanities Research Centre

In 1981, this Centre devoted much of its resources to its theme for the year—'Australia and the European Imagination'. However, as usual, a program of very diverse activities, unrelated to that theme, was also supported.

The Centre was host to 20 visiting fellows, of whom five were working in fields related to the theme. Others were engaged in research in fields such as Russian historical grammar, 17th-century Norman satirists, 18th-century French and American history, musical literacy in medieval Europe, and the tragedies of Seneca.

Of this year's visiting fellows, nine were from within Australia. Those from overseas came from universities (or museums) in the United States of America, United Kingdom, West Germany, France and Canada. Many of these fellows were invited to other Australian universities to read papers, give lectures or participate in discussion. Most of them contributed papers to the weekly program of work-in-progress seminars.

As has become traditional, the Centre also collaborated with other universities and cultural institutions in bringing certain visitors to Canberra and in presenting lectures and readings by these writers and scholars. One of these projects was jointly mounted with the ABC and resulted in a series of broadcast talks on aspects of literature.

The Centre also brought to Australia eight conference visitors. They came from Holland, United Kingdom and the United States of America. In addition, the Centre was able to continue in a small way its policy of awarding Summer Fellowships which bring to Canberra during the long vacation a few selected scholars from within Australia and New Zealand.

In 1981, six conferences were organised. Of the two major events, the first focused on the annual theme and the second was on 'Transmission in Oral and Written Tradition'. Of the four smaller conferences, one concentrated on the work of Christopher Hill, one on 'The Roman Family', one on postgraduate research in the humanities and the last was on 'Speculative Fiction: the Australian Context'. In all, well over 150 papers were read in the Centre in 1981.

NHMRC Social Psychiatry Research Unit

Throughout 1981, the work of the Unit has continued to be in two main areas: the epidemiology of neurosis, and psychiatric disorders in old age. A major task, now completed, has been publication of a book Neurosis and the Social Environment (Academic Press, Sydney). This represents an appreciable contribution of psychiatric epidemiology, using methods developed in the Unit over the last seven years. Work continues on the natural history of neurosis in the general population.

The Unit has developed a standardised interview for assessing an individual's immediate social environment. This has been adopted by many workers in Australia and overseas and has now been translated into German, French and Hindi.

On psychiatric disorders in the elderly, two psychiatrists in the Unit have completed a study of how reliably symptoms of depression or dementia can be identified. This was an essential preliminary to further work on the aetiology and course of such disor-
orders. The Unit's method for assessing the social environment has been adapted for use also in this age-group.

Analysis of data has continued on a survey of the young unemployed in Canberra, which was conducted in collaboration with Jobless Action, with the aid of a grant from the Department of Health.

The Building Research Division of the CSIRO has used a standardised interview method, developed in the Unit, for systematically assessing an individual's field of social relationships. This was used for a study by CSIRO in the Pilbara. The Unit has provided consultations on research methods.

Health Research Project

The Health Research Project was established in 1978 to undertake studies on health economics and statistics. Its main financial support comes from the National Health and Medical Research Council and the University, supplemented by special project grants from other bodies. This support will continue at least to 1988.

The Project's main interests have been in health expenditures and their financing, the demand for medical services, the economics of hospitals—particularly labour costs—and the manufacture and distribution of pharmaceutical drugs. Results are reported in three series of publications—a research report series, a research monograph series, and a series of technical papers.

ASEAN-Australia Economic Relations Research Project

ORGANISATION OF PROJECT

The Project was formally launched with the signing of a Memorandum of Understanding between the University and the Australian Government on 20 November 1981. It had its origins in the ASEAN Summit Meeting in Kuala Lumpur in 1977, when the Australian Prime Minister, Mr Fraser, put forward a proposal for a project relating to Australia-ASEAN economic relations, with the Australian Government meeting all financial costs. The Heads of Government agreed in principle to the proposal. Since then, details have been settled and a substantial program of joint research planned. The Project is to run for three years after which an overall report will be presented to the Australian and the five ASEAN governments. It is being carried out by a research team from the Research School of Pacific Studies headed by Dr R. G. Garnaut.

The Project is now co-ordinating a number of major pieces of research in Australia and in the five ASEAN countries, involving scholars from many academic institutions in all six countries. The work receives general policy direction from an Australian Steering Committee and an ASEAN Steering Committee. The Australian Steering Committee consists of Emeritus Professor H. W. Arndt (Chairman), Dr R. G. Garnaut (Research Director), Professor P. J. Drake (University of New England), Dr P. Drysdale (Australia-Japan Research Centre, ANU), Professor R. B. McKern (Macquarie University), Professor R. H. Snape (Monash University) and Professor R. G. Ward (Director, Research School of Pacific Studies).
RESEARCH PROGRAM

The general aim of the Project is to undertake research likely to be useful to policy-makers concerned with the management of economic relations between ASEAN and Australia. Within these aims, major joint pieces of research involving both ASEAN and Australian scholars have been initiated in the following seven areas: bilateral economic relations; industrialisation and trade in manufactures; trade in services; shipping; food trade and food security; comparative experience in labour market behaviour; trade in minerals and energy; and location of minerals processing.

In addition, a number of less ambitious pieces of work involving one or two scholars have been started on civil aviation, trade in labour services and trade in financial services.

PUBLICATIONS

The Project's publications program will begin in 1982. Publications for 1981 of the Chairman of the Australian Steering Committee, Professor Arndt, are shown in the annual reports of the Department of Economics and the Development Studies Centre, and those of the Research Director, Dr Garnaut, in the annual report of the Department of Economics.
Dean of Students’ report

The ANU throughout 1981, has, above all, maintained its standards of scholarly excellence at all levels of student performance. The quality of postgraduate degrees and diplomas is as high as ever. From the ranks of about one thousand postgraduate students have emerged many theses of great distinction in a wide range of academic disciplines. The research output of students in the humanities, the social sciences and the sciences continues to be of national and international significance. It should be stressed that this scholarly production comes as much from The Faculties as from the Institute of Advanced Studies. Indeed the national significance of both wings of the University is the point I most wish to underline in this report. The priority of research in the Institute is obvious. That same priority is present in the 'teaching' arm of the ANU. This is to be seen, for example, in the continuing strong honours and postgraduate programs in The Faculties. At a time of declining overall numbers of undergraduate students, there is no decline in students with research priorities. I confidently predict that this national and international role of The Faculties will strengthen and expand in the 1980s. Indeed it is likely that the research capabilities of The Faculties will benefit from the downturn in student numbers. Indeed it is likely that the research capabilities of The Faculties will benefit from the downturn in student numbers. Furthermore, The Faculties, faced with budgetary difficulties, are now in a good position to upgrade entrance requirements for undergraduates so that 'small' will be not only 'beautiful' but also an academic benefit. The Faculties of the ANU, happily, need not be so dependent on raw numbers as are State universities.

Many of the points so well made by Dr P. R. Stewart in his 1980 report continue to be true as we move into 1982. In The Faculties, overall numbers of students are declining. Part-time and mature-age students are of increasing importance. The employment situation, including the supposed oversupply of school teachers, has changed the pattern of student intake. The Faculties have moved and are continuing to move towards more flexible timetables and teaching practices. Continuous assessment has become a standard method of 'examining' student performance. Staff-student co-operation both through departmental committees and by informal contacts is at a high level. Again I feel confident that the ambience of the campus is constructive, healthy and creative.

However, again echoing previous reports, there are many financial difficulties for students, especially those from low-income homes. TEAS awards are inadequate in themselves. They do not even cover the cost of living in a hall of residence. Far too few students are eligible for those awards. One unfortunate side effect has been to lessen the appeal of halls of residence as they necessarily price themselves out of much of the market in order to cover their own costs. Students who might once have come onto campus for at least a year increasingly tend to find the cheapest possible alternative accommodation or stay at home, thus losing some of the intangible benefits of a university education.

The residential halls and colleges, therefore, face some difficult times. The University Council is now trying to work out viable solutions to some of those problems. This may include re-using Graduate House for other purposes. This would involve relocating postgraduate students into halls which have been primarily for undergraduates. This may be desirable for other reasons as The Faculties move further in the direction of a stress upon postgraduate studies.

The office of the Dean of Students continues to be lively and busy. In addition to
I conclude as I began. The essential work of the ANU is best seen in the scholarly excellence of its students. Postgraduate theses have already been mentioned. At the end of an academic year I am happy to report on splendid academic results from all parts of The Faculties as well as the Institute. I am especially aware of the very high levels of achievement of our forty or so National Undergraduate Scholars whose records are unvaryingly superb. The ANU will continue to fund new scholars in 1982. I hope that this national responsibility will expand in future.

This is not to demean the achievements of our bread-and-butter ‘pass’ students whose welfare and careers will always be of the greatest concern in a University which not only seeks the origin of things but cares for the seekers.

Hector Kinloch
Dean of Students
Student affairs

The year 1981 was remarkable for the number of matters initiated from outside the University that had a real or potential effect upon the operation of the various student organisations.

The most important of these was an amendment to the Australian National University Act initiated by the Government in order to: prevent the University from requiring membership of a student organisation as a prerequisite for enrolment in the University; to restrict the purposes for which moneys collected from enrolled students by way of the General Services Fee may be expended; and to require annual audited financial statements from student organisations who receive General Services Fee moneys to show how those moneys are received and expended. All the student organisations concerned registered strong disapproval of this action by the Government. The consistently-held view of the organisations is that the University should be free to manage its own affairs and that in accordance with Council’s expressed policy the student organisations should be vested by Council with as much independence in the conduct of their own affairs as is consistent with the ultimate responsibilities of the Council.

An additional amendment to the ANU Act that affected the ANU Students’ Association rather than the other organisations was in effect to prevent the University from making any moneys from the General Services Fee available for payment to the Australian Union of Students. All student organisations find this Government-initiated statutory provision to be offensive. They believe that all student organisations should, subject to their own approved constitutions, be free to affiliate with and pay money to national bodies that adequately represent the interests of their members.

Students generally also found offensive the Government’s expressed intention to direct all Australian universities to charge tuition fees for higher degrees and certain first degrees and to introduce a student loan scheme to supplement allowances paid under the Tertiary Education Assistance Scheme.

The ANU Students’ Association

The ANU Students’ Association continued to support the educational, cultural and political interests of its members both as a body and individually.

It was notable that significantly greater numbers of individual students had sought the help of the Association and its officers.

Paramount among those calls for help were calls for financial help. There is no doubt that a considerable number of students now eke out an existence on financial resources that place them significantly below the so-called poverty line. There is also evidence that many students drop out of, or are unable to come to, the University because they are deterred by the cost.

On matters within the University, members drew the attention of the Association to
problems arising for them from reductions in University funding, particularly for academic departments within the faculties. The Association did what it could, through representatives on departmental committees; Faculty Education Committees; the faculties themselves; the Board of The Faculties; and the University Council, to have these matters considered by the appropriate authorities.

Significant among the matters affected by restriction of funding were: library resources and space; level and extent of tutorial assistance; and the level of student support services such as study skills.

The Association continued its financial and administrative assistance for approximately 50 affiliated clubs and societies whose activities covered a broad range of student interests. It produced the newspaper Woroni, ran Orientation Week and Bush Week, maintained the Childers Street Theatre and produced a weekly radio program through Radio 2XX. Through the Education Collective the Association produced the second annual Counter Course Handbook which aims to give students another view of the value of the courses in which they might choose to enrol. Student theatre was generally quiet, but two productions were staged during the year, Mos- tellaria by Plautus, produced in the original Latin and performed at the Arts Centre, and The Homecoming by Pinter, performed at the Childers Street Theatre.

The conduct of the annual elections of officers of the Association in October 1981 was subject to objections. A Committee of Disputed Returns was convened and declared the elections null and void. New elections are to be held in April 1982. To meet this difficulty the term of the President was extended.

The ANU Research Students' Association Inc.

The Commonwealth Government's proposal to introduce tuition fees for higher degree students in the opinion of the Association would reduce significantly the number of postgraduate students in Australian universities and bring about a dangerous decline in the research activities and output of those universities.

A symposium was held on the topic of procedures for graduate study in the University. A series of proposals for changes in procedures which also took account of the analysis of graduate education by the Wang Committee was prepared for consideration by the Vice-Chancellor. Not all these proposals have met with unanimous approval, but they have initiated or confirmed important steps that are now being taken within the University to improve the quality of supervision of higher degree candidates and to make clearer the rights and responsibilities of those candidates.

On the domestic front, the Association continued to operate successfully its Welfare Fund, the Family Day-care Centre and various social functions.
The Australian National University
Sports Union

During 1981 the Sports Union sought to increase its impact within the University. It extended the range and number of recreational pursuits and broadened the range of instructional classes. Members of the Sports Union took advantage of new offerings in such diverse pursuits as traditional Chinese massage, Tai Chi Chuan, jazz ballet and weight and fitness training.

It is possible that with the new range of recreational activities offered, student interest in the competitive sports may fall off. It is the Sports Union’s intention, however, to continue to provide training in the basic skills of popular sports which students may not have had an opportunity to play during school years.

The Sports Union hoped to be able to extend its facilities (building and equipment) during 1981, but lack of finance made this impossible. In the present stringent financial climate the Sports Union is giving attention to the introduction of facilities that are income-producing such as saunas and spa pools. These have proved to be popular and commercially successful in the wider community.

The Australian National University
Union

Changes to the Union’s policies in 1981 aimed at ensuring that the Union’s services are available and appropriate to as many students as possible. For all students existing food services generally are being improved. The introduction of a full evening meal service will cater more adequately for the needs of part-time students.

The Union’s program of concerts has been put on a new basis to allow the continued and profitable offering of a regular and wide variety of entertainment.

A reduction in the cost of life membership has enabled an increasing number of ANU graduates to maintain their links with the University through continued membership of the Union.

The tenure of office of members of the Board of Management has been brought into line with the academic year in an effort to reduce the frequent turnover of membership that has occurred in the past.

Together with other student organisations that rely heavily on a share of the General Services Fee, the Union anticipates significant difficulties in maintaining services in the face of what it expects to be a falling real income from that source. The Board of Management is examining closely financial strategies to enable it to maintain the Union’s services to students and other members.
Graduate employment prospects

Graduates with the degree of bachelor make up the largest group completing studies each year at the ANU. A large number of these—77% in 1981—provide the University with information about their first destinations on completion of their degrees.

The 1981 national survey of all universities showed that bachelor graduates from the ANU had a higher employment rate (90%) than the average for all other universities (85%). These figures were calculated on the number of graduates in the work force a few months after graduation. The proportion of these in public sector employment continued to remain higher than for other universities because of the large numbers of ANU graduates working in the Australian Public Service both during and after completing their courses. The proportion in private sector jobs, although higher this year than in 1980, was substantially lower than for all universities (12% compared to 22%).

National trends in recent years have shown a decrease in the numbers of bachelor graduates proceeding directly to further full-time study and an increase in the numbers entering the work force straight after graduation. ANU figures point in the same direction but lag slightly behind the national trends.

It is as yet too early to assess the detailed and longer-term effects of the Review of Commonwealth Functions on levels of graduate recruitment to the Australian Public Service. However, during 1981 there were clear indications of increased competition within the generalist graduate entry scheme for Assistant Research Officers. Although selection tests for clerical entry have been fewer in number, graduates have been better placed in these tests than non-graduates. Recruitment to professional computing work has been healthy despite earlier fears to the contrary. Present high levels of competition for clerical and graduate administrative positions can be expected to continue, with better chances of selection likely for graduates in economics, accounting, mathematics/statistics and law, especially economics/law. At the State public service level, in New South Wales in particular, there has been a significant downturn this year in graduate recruitment.

While private enterprise as a whole is maintaining a healthy interest in employing new graduates, there is evidence of increasing interest by the commercial sector, especially in the fields of banking, finance, insurance and retailing. The ANU continues to attract the major private sector commercial and industrial organisations to the campus each year to interview students. A willingness and ability to relocate is probably a significant factor in employment success for many ANU graduates. This year, 27% of new ANU graduates found employment outside the ACT. The rate of mobility among graduates elsewhere is considerably lower.

Among postgraduates of ANU there has been a slight increase in PhD graduates seeking employment and a decrease in the number going overseas. Nationally, figures show a slight increase in the number of PhD and master graduates entering short-term or part-time employment. Although most postgraduates still report finding work in research, academic and appropriate government employment, it can be expected that reductions in tertiary education employment opportunities will steadily change the traditional job options for postgraduates in the next few years. There is evidence that prospective PhD students, at least in some disciplines, are seriously questioning the
merits of continuing with highly specialised studies. As an addition or alternative to those skills which are integral to their specialisations, some are exploring ways of obtaining broader skills that seem likely to improve their employability.
The major event in 1981 was the establishment by the Vice-Chancellor of a committee to review the Library in accordance with the continuing University policy to review its internal operations. This was the first such formal review since the establishment of the ANU Library.

The Committee of Review, which was chaired by the Deputy Vice-Chancellor, Professor I. G. Ross, met on a number of occasions during the year and initiated several research studies of the Library’s operations. It is expected that the Review report will be available early in 1982 and will provide the basis for discussion and implementation of Library policies during the first half of the decade. Some of these Library issues, for instance, continuing storage problems, have been alluded to in previous annual reports. In this context, further material was transferred during 1981 to the A. D. Hope Library store.

The restrictions on periodical expenditure, particularly for new serial titles, meant a continuation of the analyses of existing collections. A beginning was made, particularly in the sciences, to develop formalised collection building rationales, although the nature of the University’s structure and the physical scattering of related groups of users continue to make resolution of problem issues difficult.

The Library Statute makes provision for Rules and Orders. The Library Rules were drafted during the year and were ratified at the December meeting of the Standing Committee of Council. At the end of 1981 the Orders were still being drafted.

The major purchase in 1981 was that of the collection of the late Dr C. Hartley Grattan, formerly Professor of Commonwealth History at the University of Texas and a Doctor of Laws honoris causa at the ANU. This collection of 9000 volumes considerably increases the ANU’s collection in a number of areas, notably American literature and thought in the first half of the 20th century. As a consequence of staffing restrictions, however, it is unlikely that this collection will be checked and fully catalogued for a number of years unless special funds are made available.

Most of the University’s books and periodicals originate overseas and the number of strikes on Australian wharves, particularly in mid-year, has increased the time lag for receipt of material. Thus, while the vastly increased access to overseas databases often has provided online information instantly, the receipt of the printed document is, by contrast, taking longer and longer.

In the area of library automation, consolidation and refinement of the first stage of the acquisitions system led to improvements in the handling of orders. The cataloguing system has now been established as a routine operation for the production of the fiche catalogues. The adoption of the revised international code, Anglo-American Cataloguing Rules, 2nd edition, continued to result in a reduction in cataloguing output, as the slowness of national agencies to convert their output to the new format meant that cataloguing records obtained from them required extensive revision.

The secondment to the Library of two librarians from the National Library of China proved to be mutually beneficial. The first two librarians returned home in November 1981 and will be replaced by two more early in 1982.

News of the death early in the year of Emeritus Librarian A. L. G. McDonald was received with regret and brought to mind the importance of Mr McDonald’s work in establishing the Library, particularly the early development of the collections. Follow-
ing closely on the death of Mr J. J. Graneek, the second ANU Librarian, in 1980, this event broke another link with the Library's past and drew attention to the fact that sources for the history of early ANU Library developments are by no means comprehensive.
The Computer Services Centre is responsible for the provision of general computer services to the University, including the development of an extensive network supporting both interactive processing and remote batch facilities. In addition it is involved in the presentation of lecture courses, seminars and colloquia on various aspects of computing. An important part of its activities is the provision of adequate consulting services and currently advice is given on programming problems, the use of mathematical and statistical packages, and the use of certain graphics packages. The Centre's staff is available to assist members of the University in the planning and execution of computing projects and on certain aspects of the purchase of computing hardware such as terminals and minicomputers.

The Director, Computer Services, Mr R. R. Landford, is responsible to the Vice-Chancellor through a Computer Services Centre Management Committee. Dr R. W. Crompton is Chairman of that Committee and other members are Professor F. H. Gruen, Dr R. A. Jarvis, Dr M. S. Paterson and the Director. The Chairman of the CSC Users' Committee, Mr G. McLaughlin, and the newly-appointed Assistant Director of Computer Services, Dr R. Erskine, have a standing invitation to attend meetings of the Management Committee. Both the Director and the Chairman of the Management Committee are members of the University's Computing Policy Committee.

After the major changes in 1980, the current year has been primarily one of consolidation and settling down. It has also been one in which members of the Computer Services Centre can take much pride. The services provided during 1981 have been of the highest quality in terms of an effective and friendly consulting service, a competent operator service, and good systems performance of the Univac 1100/82 in the Centre and the DEC System-10 in The Faculties. The latter has resulted from hardware reliability and from well-tested software updates which, at no time, caused significant inconvenience to any user.

The PDP11/34 nodes for the Haydon-Allen Complex and in the Forestry Building have been installed and are greatly appreciated by the users in those areas. The reliability of the ANUNET network improved tremendously in 1981 and all augurs well for the continuance of a stable environment.

With regard to Administrative Data Processing, the FACOM M160F has also shown itself to be a reliable machine. The major applications being installed at the moment 'General Ledger' and 'Student Records' are progressing along the right lines although some difficulties have been encountered with the MSA General Ledger software. Controllers and terminals have been acquired and installed in most of the Business Managers' offices in preparation for on-line activities in 1982. The FACOM system has been made available to academic processing on the basis of restricted hours of usage and operational control and a number of users have taken advantage of the different capabilities provided by this machine.
Division of Educational Services (DES)

This year was the first full year of operation for the Division of Educational Services which was established in July 1980 to strengthen the association between a number of centres and units providing a broad spectrum of academic service functions to other areas of the University.

Although each of the units which comprise the Division of Educational Services is independent and autonomous, association of the component parts has been facilitated by a number of joint activities during the year. Units were jointly involved in the planning and presentation of a series of DES seminars, at which various issues, ranging from student study skills to occupational health, were discussed and to which members of the staff of units associated with DES as well as teaching staff of The Faculties were invited. Members of a number of units were also involved in a Working Group set up by the Board of DES to advise the Board of The Faculties on whether to extend the practice of video-taping lectures.

Developments and trends in the work of many of the units which comprise DES can be seen as a response to recent changes in the composition of the student population, to increasing problems of economic survival among students, and to the implications of projected cuts in financing on teaching and learning. With the halt to the expansion of external studies provisions and the curtailment of many shorter accredited courses, the Centre for Continuing Education's national program of refresher courses, conferences and seminars to update and diversify the education of graduates and other professionals is seen to fill a widespread need in the community.

The University Health Service has noted how the low level and reduced availability of TEAS causes significant health problems, with increased tendency to infection coinciding with deadlines for assignments, and more long-term stress associated with work load. The Service works in close cooperation with the Counselling Service in helping such students. The increase in mature-age students has resulted in significant changes in the type of health problems with which the service now has to deal while occupational health problems account for 50% of consultations by general staff.

There has been a significant growth in student usage of the Communication and Study Skills Unit as a result of the increased diversity of first-year student intake, a wider dissemination of knowledge about CSSU among students, and students' preference for intensive, personal tutorials.

The tight unemployment situation for graduates especially generalists, places more and more demands on the Careers and Appointments Service in its major task of assisting students in the transition to work and providing an interface between the University and employers. Employers are encouraged to visit the University, and there has been an expansion in the information library. However, more resource material and more contacts with employers are needed as many students have little idea of job opportunities.

The Office for Research in Academic Methods has mounted an extensive study of student learning methods which will provide valuable information for lecturers faced with larger classes, curtailed tutorials, and less opportunity for close staff/student contact.
The ANU Press publishes original research and scholarly works and provides publishing advice, marketing and distribution services for other parts of the University. In 1981 it published 17 original works and distributed 65 new publications on behalf of other ANU schools, centres and departments.

The Press has continued the development of its Australian and international marketing networks and now has distribution facilities covering most parts of the world. In November it arranged a book display room in the ANU Press building and organised permanent displays of its work in several buildings on the campus.

Several overseas co-publishing arrangements were concluded during the year. Emeritus Professor H. E. Maude’s Slavers in Paradise was published simultaneously by ANU Press, Stanford University Press, The University of the South Pacific, and Gordon and Gotch (PNG) Pty Ltd, with the ANU Press providing all editorial and production services. Other co-publishing arrangements were concluded with Croom Helm Ltd, publishers for Dr J. Fincher’s Chinese Democracy.

The staff of the Press was increased during the year with new positions in the areas of book production and marketing which strengthened the publishing services that could be provided to the University as a whole.

University House fulfils several major roles in the life of the University: as a residence for staff and postgraduate students and for visitors to the University; as a graduate club, which in 1981 had a membership of nearly 1600; and as a centre for professional meetings, seminars and conferences.

Income from conferences, functions and accommodation has allowed the House not only to defray its operating costs of salaries and wages, general overheads and maintenance, but also to undertake some major capital development in the South Wing aimed at increasing amenities and improving services.

The steady upgrading of its facilities has earned for University House a wide reputation as a comfortable and attractive residence, a congenial club, and a lively centre in the University for cultural and social activities. The past year, the twenty-seventh of its history, has been a very successful one in academic, social, and financial terms.
Co-operation with government and other public institutions

The Australian National University allows, indeed encourages, members of the academic staff to give specialist advice and assistance to Federal and State Government departments and to other public institutions, both within Australia and internationally. This help takes many forms—consultancies, membership of committees, involvement in particular projects, secondments, etc. Following are some recent examples of this type of activity. The list is illustrative, not comprehensive.

Chancery

Professor D. A. Low, executive member, Association of Commonwealth Universities; Chairman, Education Advisory Committee, ADAB; joint chairman, Review Mission on Australia’s assistance to the universities of the South Pacific region; President, Asian Studies Association of Australia; President, African Studies Association of Australia and the Pacific; member, Council of the University of Papua New Guinea.
Mr C. G. Plowman, President, Australian Institute of Tertiary Education Administrators.
Professor I. G. Ross, Chairman, Inquiry into Commonwealth Laboratories.

Research School of Biological Sciences

Professor R. F. Mark, member, Council of the International Brain Research Organisation.
Dr I. G. Morgan, member, Science Advisory Group, ACT Schools Authority.
Professor C. B. Osmond, member, National Commission for UNESCO.
Dr J. Shine, member, Scientific Sub-committee of Recombinant DNA Monitoring Committee, Department of Science and Technology.
Professor R. O. Slatyer, Australian Ambassador to UNESCO (until August); Chairman, Advisory Committee for the Australian Biological Resources Committee; member, Interim Council for the Australian Centre for International Agricultural Research; Chairman, World Heritage Committee; member, National Commission for UNESCO.

Research School of Chemistry

Professor A. L. J. Beckwith, member, Australian Research Grants Committee.
Professor D. P. Craig, Chairman, Queen Elizabeth II Fellowships Committee; part-time member, CSIRO Executive.
Professor A. M. Sargeson, member, Australian Research Grants Committee.

Research School of Earth Sciences

Dr P. J. Cook, member, Council of the Australian Institute of Marine Sciences; Co-Project leader, Project 156 of the International Geological Correlation Programme of UNESCO.
Professor A. E. Ringwood, heads the Petrochemistry Group in a large co-operative research program with the Australian Atomic Energy Commission to develop the SYNROC method of radioactive waste immobilisation.
Professor J. S. Turner, member, Australian Marine Sciences and Technologies Advisory Committee.

John Curtin School of Medical Research

Professor G. L. Ada, foundation member, Scientific and Technical Advisory Com-
mittee, World Bank/UNDP/WHO Special Program for Research and Training in Tropical Diseases; member, Global Advisory Council for Medical Research of WHO; member, Australian Recombinant DNA Monitoring Committee and Chairman of its Scientific Sub-committee; member, ABC Science Advisory Committee.

Dr N. G. Ardlie, member: Diet and Heart Disease Committee of the National Heart Foundation of Australia; Board of Directors, National Heart Foundation of Australia (ACT Division).

Professor P. O. Bishop, member, Central Council of the International Brain Research Organisation.

Dr B. G. Cleland, member, Council of the Australian Physiological and Pharmacological Society.

Dr P. D. Cooper, Deputy Chairman, ACT Cancer Society.

Professor D. R. Curtis, Chairman, Fogarty Fellowships Committee; member, Research Advisory Board, National Multiple Sclerosis Society of Australia.

Dr M. A. Denborough, member, ACT Medical Registration Board.

Professor F. W. E. Gibson, member: Medical Research Advisory Committee of NHMRC; Sydney Committee of the Ludwig Institutes of Cancer Research; Clive and Vera Ramaciotti Foundations Advisory Committee.

Dr R. L. Kirk, member, Publications Committee of the Australian Institute of Aboriginal Studies.

Professor B. Morris, member: Committee of the Rural Credits Development Fund; Queen Elizabeth II and Fogarty Fellowships Committees; Therapeutic Goods Standards Committee; Moderator, Department of Science and Technology India/United States/Federal Republic of Germany Bilateral Agreements; Chairman, National Committee for Animal and Veterinary Sciences.

Professor L. W. Nichol, Chairman, National Committee for Biophysics, Australian Academy of Science.


Professor R. Porter, member: Council of NHMRC; Medical Research Advisory Committee of NHMRC; Queen Elizabeth II Fellowship Committee; Nuffield Foundation Australian Advisory Committee; International Union of Physiological Sciences (IUPS) Commission on Motor Control; ASTEC Committee on Medical Research. President-Elect, Australian Neuroscience Society; Biological Secretary, Australian Academy of Science.

Dr H. Rosenberg, member: Australian-American Education Foundation Committee; Minister for Health's Therapeutic Goods Advisory Committee.

**Research School of Pacific Studies**

Professor G. Daws, member, UNESCO Commission Internationale pour une Histoire Scientifique et Culturelle de l'Humanité.

Professor J. Golson, Chairman, National Committee for Pacific Science.

Professor J. D. B. Miller, Treasurer, Academy of the Social Sciences in Australia.

Professor Wang Gungwu, President, Australian Academy of the Humanities.

Professor R. G. Ward, Chairman, Pacific Science Association's Committee for Geography.

**Research School of Physical Sciences**

Professor J. H. Carver, Chairman, United Nations Scientific and Technical Subcommittee on Peaceful Uses of Outer Space; Chairman, Radio Research Board of Australia; Deputy Chairman, Australian Science and Technology Council; member, Anglo-Australian Telescope Board.

Professor K. J. Le Couteur, Moderator, Department of Science and Technology, India/United States/Federal Republic of Germany Bilateral Agreements.

**Research School of Social Sciences**

Dr D. S. Anderson, establishing a National Clearinghouse on Transition from School to Work for the Departments of Education, and Employment and Youth Affairs.

Dr R. Brown, preparing a survey of Australian philosophy for UNESCO.

Professor J. C. Caldwell and Dr L. T. Ruzicka, assisting with the World Fertility Survey.

Dr D. M. Gibson and Dr D. T. Rowland, members, advisory committee on family
survey by Bureau of Statistics; advisers, Department of Social Security on a Melbourne survey.

Dr R. G. Gregory, member, Advisory Council, Bureau of Labour Market Research.

Professor F. H. Gruen, member, National Accounts Advisory Group, Australian Bureau of Statistics.

Mr P. F. Harrison, Commissioner, Land Commission of NSW; member, National Capital Planning Committee; member, Capital Territory Design and Siting Review Committee; assistance with NSW Department of Environment and Planning 'Metropolitan Plans' project.

Dr G. C. L. Hazlehurst, honorary consultant, Administrative Review Council.

Dr C. A. Hughes, Chairman, National Committee on Discrimination in Employment and Occupation.

Dr T. H. Hull, Dr G. L. Dasvarma, Dr R. Kirkland and Dr J. Conroy, assistance to Indonesian population program through assignment to the International Population Dynamics Program.

Dr V. J. Hull, consultant, International Development Centre, Ottawa.

Professor K. S. Inglis, consultant, Committee of Review of the Australian Broadcasting Commission.

Professor F. L. Jones and Professor D. A. Aitkin, members, Australian Research Grants Committee.

Dr G. W. Jones, member, Board of Trustees, International Centre for Diarrhoeal Disease Research, Bangladesh; consultant, Australian Development Assistance Bureau for the ASEAN-Australian population program.

Mr R. G. Jones, member, Working Party on Drug Use Surveys, Department of Health; member, reference panel Australian Water Resources Council study of the River Torrens flood plain.

Professor E. Kamenka, completed two studies of Australian attitudes to, and development of, human rights for UNESCO.

Dr H. L. Kendig, member, steering committee, family support study by the Institute of Family Studies.

Dr J. Marceau, completed report Education, Urban Development and Local Initiatives for OECD.

Mr N. B. Nairn, member, Archives Authority of New South Wales.

Professor G. M. Neutze, lead writer on infrastructure and urban development, Department of Home Affairs and Environment.


Dr C. A. Price, Chairman, Migrant Settlement Council for the Canberra region; Chairman, Australian Government Committee of Review on Migrant Assessment; member, Australian Institute of Multicultural Affairs; commenced study for Australian Institute of Multicultural Affairs on immigrant population; carried out study for Department of Immigration and Ethnic Affairs on immigrant fertility and intermarriage.

Dr D. T. Rowland, producing a statistical report for the Australian Council on the Ageing.

Dr L. T. Ruzicka, joint convenor, Inter-Regional Course on Health Services Research Evaluation, World Health Organisation and International Centre for Diarrhoeal Disease Research, Bangladesh; organiser, ANU/UN/WHO meeting on 'Sex differentials in mortality'.

Dr P. G. Sack, consultant, Australian Law Reform Commission.

Dr A. G. Serle, member, State History Advisory Council (Victoria).

Professor T. W. Swan, member of the Reserve Bank Board.

Mr P. Troy, adviser, New South Wales and Northern Territory governments on housing and urban policy.

Dr E. Young, consultant on fisheries study in Papua New Guinea.

Faculty of Arts

Dr J. A. Ballard, Senior Consultant to the Parliamentary Joint Committee on Public Accounts.

Dr J. A. Ballard, Dr J. Hart, Dr T. B. Smith and Mr I. F. H. Wilson participated in the briefing for officials assigned to the CHOGM conference.

Dr R. J. Campbell, Chairman, ACT Schools Authority.

Dr R. G. Cushing, member, Board of Management of Richmond Fellowship; member, Board of Management of Outreach Inc.
Dr O. F. Dent, consultant, Royal Australian Air Force; consultant, Royal College of Dental Surgeons; adviser, Royal Australian College of Physicians and Ophthalmologists; consultant, New South Wales Health Commission.
Mr L. J. Downer, member, Standing Committee on Spoken English, Australian Broadcasting Commission.
Professor J. A. W. Forge, Chairman, Publications Committee, Australian Institute of Aboriginal Studies; Consultant to Australian National Gallery and the Australian Museum, Sydney.
Professor J. P. Hardy, Secretary, Australian Academy of the Humanities.
Mr P. R. Ireland, member, Russian Syllabus Committee, NSW Board of Senior School Studies; member, Russian language panel, National Accreditation Authority for Translators and Interpreters.
Professor R. StC. Johnson, Chairman, Commonwealth Institutions Accreditation Committee for Advanced Education; Chairman, Northern Territory Accreditation Committee for Advanced Education; member, Australian Council on Awards in Advanced Education; member, Interim Council, Royal Military College; member, ACT Planning and Finance Committee of the Schools Commission; reporter on academic staff development units for the Tertiary Education Commission.
Dr H. J. Koch, land claim research for the Central Land Council.
Dr G. M. Lloyd, member, French Government Scholarship Selection Committee.
Dr I. McBryde, member, Aboriginal Site Advisory Committee, NSW National Parks and Wild Life Service; assessor of courses in cultural resource management Riverina and Goulburn CAEs, NSW Tertiary Education Board.
Dr H. Morphy, assistance to the Northern Land Council; consultant, Film Australia and the National Gallery; member, Arts Committee, Australian Institute of Aboriginal Studies; consultant, Sydney College of Arts; part-author of the international exhibition catalogue, Aboriginal Australia, AGDC.
Professor D. J. Mulvaney, Acting Chairman, Australian Heritage Commission; member, Interim Council of the Australian Museum; Australian Delegate, World Heritage Committee; consultant, Department of Conservation, Victoria, on State Conservation Plan; part-author of the international exhibition catalogue, Aboriginal Australia, AGDC; member, Prehistory Committee, Australian Institute of Aboriginal Studies.
Dr N. Peterson, council member, Australian Institute of Aboriginal Studies; Chairman, Social Anthropology Committee; assistance to the Northern and Central Land Councils on land claims; part-author of the international exhibition catalogue, Aboriginal Australia, AGDC.
Dr B. M. Rawson, member, Commonwealth Government Student Assistance Review Tribunal; member, Ancient History Syllabus Committee, NSW Board of Senior School Studies.
Dr A. Rosenfeld, member, Material Culture Committee, Australian Institute of Aboriginal Studies.
Dr L. J. Saha, member, Multi-cultural Advisory Group and Education Research and Development Committee.
Professor D. P. Scales, University's representative on the ACT Planning Committee for Galbally Report Recommendation 14 (promotion of language skills among professionals dealing with migrants).
Dr T. A. Shopen, member of a committee to evaluate curriculum programs for three new TESL programs at the CCAE.
Miss M. B. Travers, member, Russian Examination Committee, NSW Board of Senior School Studies; Chairman, Russian Syllabus Committee, NSW Board of Senior School Studies; member, Russian Syllabus Committee, NSW Secondary Schools Board.
Dr R. Tonkinson, consultant, Northern Territory Aboriginal Land Commissioner.
Dr P. M. Weller, Convenor, APSA Parliamentary Fellowship Subcommittee; member, Advisory Board of the Parliament’s Bicentenary Publications Project.
Dr A. C. Wierzbicka, Vice-President, Australian Linguistic Society; member, ACT Advisory Multi-cultural Committee.
Dr C. M. Young, study of migrant youth and employment for the Department of Immigration and Ethnic Affairs.
Professor J. Zubrzycki, member, Council of the Australian Institute for Multi-cultural
Affairs; Chairman, Ethnic Affairs Task Force of the Australian Council for Population and Ethnic Affairs; member, Interim Council of the Australian Museum.

**Faculty of Asian Studies**

Dr Chung Chong-wha, Director of a special intensive course in Korean language and background, Department of Immigration and Ethnic Affairs.  
Dr A. Diller, tuition and assessment in Thai language work, Department of Defence and the Department of Foreign Affairs.  
Dr L. A. Hercus, assistance to the literacy program of the Wangumara people of Bourke, NSW, resulting in the publication of a booklet for use in Bourke High School.  
Professor Liu Ts'un-yan, consultant, Department of Foreign Affairs Language Training Agency on Chinese language teaching.

**Faculty of Economics**

Dr M. E. Aiken, member, advisory committee, Office of Commonwealth Auditor-General; senior adviser, Commonwealth Parliament Joint Committee of Public Accounts; lecturer, Executive Development Program, Australian Public Service Board.  
Dr R. Albon, adviser, Commonwealth Parliament Joint Committee of Public Accounts.  
Dr R. Albon, Dr G. Fane, Dr P. Swan, Mr J. Harper and Mr E. Sieper, consultants, Australian Financial Systems Inquiry (Campbell Committee).  
Dr S. C. Bambrick, member: Uranium Advisory Council; Trade Development Council; technical standing committee on economic and social studies; National Energy Research Development and Demonstration Council; National Women's Advisory Council; Trade Development Council Survey Mission to India; CSIRO Advisory Committee.  
Dr P. D. Drysdale, adviser, Department of Trade and Resources on minerals trade and raw materials processing.  
Dr D. F. Nicholls, consultant, Trade Practices Commission.  
Dr D. F. Nicholls, Dr R. J. O'Neill, Mr P. Winer and Mr J. H. T. Morgan, statistical consultants, Department of Defence.  
Ms J. Selby-Smith, consultant, OECD Directorate on Social Affairs, Manpower and Education, Paris.

Mr D. Shand, Director of Research, Expenditure and Review Committee, Parliament of Victoria.  
Dr T. J. Valentine, senior adviser, Australian Financial System Inquiry (Campbell Committee).

**Faculty of Law**

Mr M. L. Barker, member, Australian Water Resources Council Reference Panel for Australian flood plain management.  
Mr H. Burmester, lecturer, Foreign Affairs Department trainees; made a submission to the government on the Environment Protection (Sea Smiling) Bill 1981.  
Mrs R. Burnett, joint judge, High School essay competition for Australia-New Zealand Foundation.  
Dr R. F. Cranston, consultant, Institute of Judicial Administration.  
Mrs C. J. Cook, adviser, Canberra Community Legal Service.  
Mrs R. M. Creyke, assisted in presenting Public Service Board seminars; directed training course, Citizens' Advice Bureau of the ACT Incorporated.  
Mr J. L. R. Davis, lecturer, ACT Magistrates; member, Student Assistance Review Tribunals; University's representative, Legal Studies course panel, ACT Schools Accrediting Agency.  
Mr W. Edeson, lecturer, Legislative Drafting Institute; lecturer, Department of Foreign Affairs Trainees Course; Chairman, Australian Centre for Maritime Studies; consultant, Food and Agriculture Organisation of the UN on Law of the Sea matters.  
Dr P. D. Finn, member, Consumer Affairs Council of ACT.  
Dr J.-P. L. Fonteyne, lecturer, Foreign Affairs Trainees Program.  
Mr S. J. Gates, member, Legal Advisory Committee of the Australian Federation of Consumer Organisations.  
Professor D. W. Greig, delivered opening paper, joint Foreign Affairs/Academic International Lawyers' Seminar, Macquarie University.  
Mr N. A. Cunningham, made a submission to NSW Government Commission of Inquiry into Occupational Health and Safety.
Professor A. D. Hambly, member, Family Law Council; member of two committees established by the Family Law Council; member, Parole Board of the ACT; addressed the Conference of Social Welfare Administrators.

Mr G. J. Lindell, consultant, Commonwealth Inquiry into Disclosure of Electoral Expenditure; lectured to Legislative Drafting Institute and RAAF Staff College.

Dr D. O'Connor, prepared papers for Consultative Committee on Criminal Law Reform in the ACT; President, Australian Branch of the Association International Droit Penal; ACT representative, Law Council of Australia, ALRC Reference on Evidence committee; consultant, ACT Law Society, Law Reform committee, Vice-Chairman, Crime Prevention Council of the ACT; Special Magistrate ACT.

Mr D. F. Partlett, undertakes monitoring work for the International Commission of Jurists.

Professor D. C. Pearce, Legal Counsel to Senate Standing Committee on Scrutiny of Bills; member, AVCC Committee on Copyright; member, CAE's Committee on Copyright; public officer, Copyright Society of Australia, Inc.; lecturer: Public Service Board, Attorney-General's Department, Legislative Drafting Institute, Australian Institute of Tertiary Administrators; made submission on law reform to the Attorney-General's Department and the Western Australian law Reform Commission.

Mr C. J. Rowland, lectured on 'Wills and Estate Planning' to various community organisations.

Mr G. A. Rumble, lecturer, Public Service Board seminars.

Professor G. Sawyer, lecturer, Joint Services Staff College; member, Consultative Committee of the Law Foundation of New South Wales on a new Australian Constitution to be drafted as a Bicentenary Project.

Mr N. C. Seddon, lecturer, ACT Magistrates and Legal Aid Commission (ACT); assisted the shadow Attorney-General on work on the accountability of ASIO; organised and ran the Canberra Community Legal Service; helped in establishing a Tenants Advice Service; adviser, students' Legal Referral Service.

Mr D. W. Smith with Dr Rowson (RSSS), director, residential schools in industrial law for government, management and union representatives; President, Industrial Relations Society of the ACT.

Mr P. K. Wight, consultant, Australian Law Reform Commission's Reference on Evidence; treasurer, Australian Division of International Association of Penal Law.

Dr G. de Q. Walker, consultant, Australian Law Reform Commission's Reference on class actions.

Ms P. Weeks, lecturer, Family Planning Association (ACT); adviser, Canberra Community Legal Service.

Professor D. J. Whalan, Foundation President, Law Section of ANZAAS; AVCC member, Australian Nominating Committee, Commonwealth Scholarships and Fellowship Plan; external consultant, Faculty of Law, University of Papua New Guinea; member, Social Implications Committee, Australian Computer Society; addressed Australian Supreme Court Judges' Conference.

Professor L. R. Zines, member, Royal Commission to inquire into parliamentary deadlocks, Tasmania; attended meetings and did research related to a proposed intervention by Tasmania in a High Court case involving a challenge by Queensland to the Racial Discrimination Act (Cwlth); Honorary Director, Australian Institute of Judicial Administration; prepared an opinion for the Australian Constitutional Convention; lecturer, Public Service Board.

Faculty of Science

Dr D. G. Byrne, consulting clinical psychologist, Capital Territory Health Commission; consultant, National Heart Foundation's Study on Risk Factor Prevalence; member, National Heart Foundation's Committee on Smoking and Heart Disease; member, Research Grant Review Panel of NHMRC.


Dr W. H. Gladstones, member, Human Factors Committee of the Standards Association of Australia.

Dr J. Holman, consultant psychologist, Dufield Place and Koomari; member, Board of Directors of the Handicapped Citizens Association.

Professor W. A. Scott, member, grant assessment panels for ARGC; member, NHMRC;
conducted study on attrition of high-school students in ACT schools.

Centre for Resource and Environmental Studies

Dr S. V. Boyden, work for UNESCO on Integrated Ecological Studies of Human Settlements for Man and the Biosphere Programme.

Dr H. C. Coombs, study with others on the impact of Government programs on Aboriginal children and families for the Minister and Department of Social Security; member, AIAS Committee studying the impact of Uranium Mining on the Aborigines of the Alligator River region for the Minister for Aboriginal Affairs and the Commonwealth Parliament; member, Academy of Science National Committee on the Environment; adviser, Yipirinya School Council which conducts experimental educational program for Aboriginal children of the camp communities around Alice Springs.

Professor S. F. Harris, member, National Energy Advisory Committee and Chairman of its sub-committee on economic and social matters; member, Antarctic Research Policy Advisory Committee; member, Commonwealth Council on Rural Research and Extension; member, National Energy Research, Development and Demonstration Council and member of its Technical Standing Committee on economic and social studies; member, United National Expert Panel on Environmental Aspects of Energy.

Professor G. H. Taylor, member, National Energy Research, Development and Demonstration Council and Chairman of its Technical Standing Committee on social and environmental matters; acting member, ARGC; member, Advisory Committee, Diploma of Coal Geology, Universities of Newcastle and Wollongong; Chairman, organising committee for workshop on energy planning 'Designing for the Future'; joint convenor, workshop on 'The Increased Use of Coal in the Asia and Pacific Region: Achieving Energy and Environmental Goals'.
Joint research projects undertaken with other universities

Research School of Biological Sciences

— Research into ecophysiology of arid plants, undertaken by Professor C. B. Osmond with the Desert Research Institute, University of Nevada.
— Studies in plant responses to salinity, undertaken by Professor C. B. Osmond, Dr G. Seemann and Dr S. von Caemmerer, with Professor Pitman, University of Sydney.
— Photosynthetic biochemistry studies undertaken by Professor C. B. Osmond, Dr M. R. Badger and Dr K. C. Woo with ARC Photosynthesis Unit, University of Sheffield.
— Studies of the hormonal control of leaf senescence in soybean, undertaken by Dr S. L. Letham with Professor L. D. Nooden, University of Michigan.
— Studies of receptors for plant hormones, undertaken by Dr S. L. Letham with Dr G. Polya, La Trobe University.
— Research in identification of calmodulin binding sites in Charo cells using fluorescein-labelled calmodulin introduced by perfusion and micro-injection, undertaken by Dr R. Williamson with Dr B. Grant and Mr C. House, University of Melbourne.
— Immunofluorescence studies of microtubules in cultured plant cells, to determine whether a pre-prophase band of microtubules is present in suspension culture cells that have specifically-oriented divisions, undertaken by Dr S. Wick with Professor L. C. Fowke, University of Saskatchewan.
— Studies in commissural pathways in the wallaby, undertaken by Professor R. F. Mark with Dr D. Ehrlich, Monash University.
— Research in retinal neurotransmitters, undertaken by Dr I. G. Morgan with Dr I. W. Chubb, Flinders University.
— Studies in directional hearing in Australian owls, undertaken by Dr R. B. Coles with Dr M. Konishi, California Institute of Technology, Los Angeles.
— Structure and function of the metallothionen genes studies, undertaken by Dr R. I. Richards with Dr M. Karin, University of California, San Francisco.
— Research in molecular cloning of the relaxin gene, undertaken by Dr J. Shine with Dr H. Niall, Howard Florey Institute of Experimental Physiology and Medicine.
— Structure and regulation of the growth hormone gene research, undertaken by Dr J. Shine and Dr R. I. Richards with Dr J. D. Baxter, University of California, San Francisco.
— Studies in genetics and biochemistry of nitrogen fixation, undertaken by Dr B. Rolfe and Dr J. Shine with Professor A. Puhler, University of Bielefeld, West Germany and Dr R. Carlson, Eastern Illinois University, United States of America.
— Research in genetic variation in quantitative traits, undertaken by Dr J. B. Gibson with Dr L. C. Lai, University of New South Wales.
— Twin study on psychomotor sensitivity to alcohol, undertaken by Dr J. B. Gibson, Dr J. G. Oakeshott and Dr N. G. Martin with Professor G. A. Starmer, University of Sydney.
— Twin and family studies of smoking and drinking habits, undertaken by Dr N. G. Martin and Dr J. B. Gibson with Dr J. D. Mathews, Royal Prince Alfred Hospital.
— Studies in genetic analysis of behaviour in wild house mice, undertaken by Dr J. G. Oakeshott with Dr G. C. Kirby, Flinders University; and research in geographic variation in Tpi gene frequencies in Drosophila melanogaster undertaken with Dr S. J. McKechnie, Monash University.
Research School of Earth Sciences

— Pb, Sr, and Nd isotopic study of the early Archaean and reworked gneisses, West Greenland, undertaken by Dr K. D. Collerson with members of the University of Copenhagen and the Geological Survey of Greenland.

— A joint exercise in October by Monash University, University of Melbourne and ANU to study solitary wave activity in the region of the Gulf of Carpentaria.

— Experimental study of structure development in deformed metamorphic rocks, undertaken by Dr M. S. Paterson with Dr T. H. Bell of James Cook University.

— A joint project on the Central Great Barrier Reef Province, Lady Elliot Island, undertaken by Dr P. Aharon with Dr P. G. Flood of the University of New England.

John Curtin School of Medical Research

— Research on associations between the bovine major histocompatibility system (MHS) and specific diseases with the NSW Veterinary Research Station, Glenfield, the Queensland Department of Primary Industry, University of Sydney and the University of Queensland.

— Studies on the nature of cell-surface antigens with the Department of Pathology, University of Melbourne.

— Research on the immune response to influenza virus infection with the Department of Medicine, University of Newcastle and the Washington University at St Louis, Missouri.

— Research on the role of amino acid transmitters in central synaptic transmission with the Department of Physiology, University of Bristol, and with the Royal Danish School of Pharmacy.

— Long-term studies on the elucidation of a variety of interacting protein systems, with the Biochemistry Department, University of Queensland and the Washington University School of Medicine, St Louis, Missouri.

Research School of Pacific Studies

— Quaternary history of coral reefs and semi-arid areas undertaken by the Depart-
most universities. One of the two sections is based in RSSS.
— Study on the economics of regulation in Australia, undertaken by Dr J. J. Pincus with Dr G. Withers of Macquarie University.
— Research on Marxist legal theory and the development of law and legal theory in USSR, Eastern Europe and China, undertaken by Professor E. Kamenka with Professor A. E. -S. Tay of Sydney University.
— The Ageing and the Family Project and the Sample Survey Centre, University of Sydney, collaborated in a survey of the aged in Sydney.

Faculty of Arts

— National general social survey, undertaken by Dr R. Cushing with Dr B. Headey of the University of Melbourne and Dr J. Kelley of RSSS.
— Ethnic stratification study, undertaken by Dr R. Cushing with Professor Broom of the University of California, Santa Barbara.
— Dr A. Klovdahl used computer graphics facilities of University of Sydney for study of visual representation of network analysis.
— Study of education in developing countries, undertaken by Dr L. Saha with Dr I. Fagerlind of Stockholm University.
— Study of migrant youth employment, undertaken by Dr C. Young with Dr Cox of University of Melbourne.
— Study of ethnic pluralism, undertaken by Professor J. Zubrzycki with Professor Richmond of York University, Canada.

Faculty of Asian Studies

— The Thai Program of the Faculty has established a continuing program of joint research on Thai language and literature with Silpakorn University. The program is maintained both in Canberra and Bangkok.
— Professor Johns of the Department of Indonesian Languages and Literatures, is a continuing member of the English-Malay Dictionary Project at the Dewan Bahasa dan Pustaka, Kuala Lumpur; the Project was originally established at ANU, and is being completed as a joint project.

Faculty of Science

— Collaborative research projects on granite petrochemistry is continuing between Dr B. W. Chappell and Professor A. White of La Trobe University and a new project has been initiated with Dr P. J. Stephenson and students at the James Cook University.
— Dr K. A. W. Crook, in collaboration with Dr P. Cook of RSES, and Dr B. Jones of University of Wollongong, and Dr M. Garrett, Department of Mines, Melbourne, has completed palaeogeographical reviews—work sponsored by ESSO.

Centre for Resource and Environmental Studies

— Petroleum industry research project, undertaken by Dr H. D. W. Saddler with Mr W. Richards of the Department of Government and Public Administration, University of Sydney.
— Work involving a major research project into a study of groundwater movement in a major land-fill site, undertaken by Mr D. I. Smith with Dr M. Knight of the University of New South Wales.
— Work on Padthaway Project, South Australia, undertaken by Mr D. I. Smith with Dr B. L. Finlayson, Department of Geography, University of Melbourne.
In late 1978 the Government accepted the recommendations in the report of the Tertiary Education Commission entitled 'Study Leave in Universities and Colleges of Advanced Education'. The main recommendations were—from 1 January 1979 study leave was to be known as 'outside studies programs' and would not be as widely available as previously; the total time to be spent by members of staff on outside studies programs should not be greater than 7% of available man-years of the staff of lecturer and above, averaged over a triennium; unless there were special circumstances, any period of absence under the outside studies programs should not be greater than six months; and the emphasis on overseas programs should be reduced.

The University immediately appointed a working party to examine the implications of the report. On its recommendations, new procedures were established. These include the establishment of two committees to receive and determine applications for outside studies programs, one for staff of The Institute of Advanced Studies and one for staff of The Faculties. With the co-operation of the staff in giving preliminary notice of their intention to undertake a program and in making formal application well in advance, the committees have been able to monitor and maintain the 7% restriction.

While members of the Institute of Advanced Studies appointed before 1979 have a contractual entitlement of study leave but require approval as to when, they have cooperated fully with the committee in completing the necessary documentation. As there is a need to monitor and maintain the 7% restriction, early warning is required by the committees: members of staff intending to apply for outside studies are now asked to submit a preliminary notice well in advance.

This is followed by a detailed application of proposed program as soon as plans are sufficiently advanced.

In accordance with the Tertiary Education Commission recommendations, the committees consider all applications with a view to the needs of the University and the capacity of the staff member to benefit by the opportunity. Consequently not only are full details required, but also information on past opportunities for study leave/outside studies and an indication of the success of such programs.

The University continues to benefit from the opportunity given to tenure members of the academic staff to devote their full time to a period of research free from other regular duties. Following are examples of the type of program undertaken:

**Institute of Advanced Studies:** In the area of the natural sciences, many workers contributed to international conferences and by personal discussions and collaborative research with overseas authorities extended knowledge in their specialised fields. This type of essential interplay between Australian and overseas scientists is exemplified by the following projects:

- spectroscopic observations on a quasar, active galaxies and the planet Uranus and its rings made at the Mauna Kea Observatory where prevailing conditions permit measurements in wavelength bands unobtainable from sites in Australia;
- an investigation of the physical and chemical properties of minerals under conditions of high temperature and pressure utilising a diamond-anvil press and synchrotron X-ray source, an innovative approach which elucidated the factors governing the formation of iron oxide;
- a study of mutant strains of certain
bacteria, especially those which carry insertions conferring resistance to specific antibiotics and which promise to be of particular use in the continuing investigation of transport and bioenergetic processes within the cell;  
— the gaining of experience in embryological techniques required for the extension of research in Australia relating to foetal-maternal immunological interactions in animals;  
— the development of theoretical methods for studying the condensation of gases on solid surfaces and their application to the absorption of molecular hydrogen on graphite;  
— work on the quantum electrodynamics of molecule-radiation field interaction and on the phenomena in molecular crystals leading to solid state photochemistry;  
— an investigation of giant dipole resonance, a collective oscillation of uncharged neutrons against positively charged protons in atomic states of high excitation and angular momentum, which led, for example, to the first observation of gamma rays from the resonance.

In the area of the humanities, several members of the Institute participated in international conferences and programs with collaborative discussions again being prominent. The nature of the work in this area frequently demands visits to specific geographical locations and the use of source material only available outside Australia. Examples of the programs undertaken are:  
— analysis of the effects of climatic change and the first human impact on vegetation and history of fire in the south-western United States, information which may be correlated with similar findings relating to the Lake George area in Australia to provide a global perspective of these events;  
— an exploration of the latest developments in the economics of public choice, a field which involves the investigation of the way in which collective political, legislative and bureaucratic decisions are made and which attempts an analysis of the problems involved in designing economic constitutions to be more satisfactory from both the practical and the ethical points of view;  
— the use of the library at the Stanford Food Research Institute to investigate agricultural development in poorer countries, the theme of a proposed new book;  
— a study of the languages of the Solomon Islands and the investigation of the suggested link between New Caledonian and Vanuatan languages;  
— participation in a cross-national study of electoral volatility;  
— an investigation of recent developments in the Indian economy, as instanced by a field study in the neighbourhood of Delhi to assess the rapid agricultural development and its economic and social consequences.

The Faculties: In The Faculties the variety of outside studies programs undertaken continues to reflect the great diversity of research and teaching duties undertaken. Many programs reflect the fact that teaching and research do go hand in hand. Programs outside Australia include:  
— a program in Japan to reassess the appropriateness of our approach to teaching Japanese in Australia;  
— work in England on physico-chemical studies on bacterial spores aimed at understanding their resistance to heat;  
— a visit to Holland to study work on coastal and dune stabilization;  
— consultation in Copenhagen on heart disease rehabilitation programs;  
— work in New Zealand to investigate the taxonomy and interrelation between lichens and their habitat by chemical means with the intention of comparing them with Australian lichens;  
— a program in the United States involving the use of recombinant DNA techniques to isolate genes coding;  
— study in Europe, Israel and the United States on developments in spectroscopy with emphasis on the use of lasers;  
— comparative assessment of recent labour law developments between Australia, the United States, Canada and the United Kingdom;  
— continuation in Europe of a book on the 18th-century German solo song combined with preparation for diversified teaching in modern European studies;  
— historical work on the influence of Australians in later 19th-century Britain;  
— research and writing in Poland on semantics and other linguistics material.
Programs undertaken partly or wholly within Australia include:

- a program combining historical research on Sir Edward Braddon, preparation of a Tasmanian electoral handbook and observation of a Commonwealth election in an outlying state;
- preparatory research work on medical physics in several Australian hospitals including the use of the ultra-sonic scanner and X-ray scanner flowing over into teaching in physics honours;
- a study on criminal law procedure undertaken in Perth and emphasising hostile witnesses and witnesses refreshing memory which will also be reflected in a new edition of a teaching casebook.
Degrees and diplomas conferred

Bachelor of Arts

Abotomey, S. J.  
Adorjam, S. A.  
Amar, M. S. G.  
Andrew, J. M.  
Anker, K. D.  
Argument, S.  
Arjom, J. W.  
Arman, I. F.  
Armour, C. A.  
Atkins, C. H.  
Atkinson, S. M.  
Aust, L. L.  
Backhouse, L.  
Bagley, C. C.  
Baker, L. M.  
Barclay, L. M.  
Barney, S.  
Barton, G. I.  
Bass, F. V.  
Beecher, P. J.  
Beesley, T. R. A.  
Belford, F. H. A.  
Benjamin, K. E.  
Best, D. J.  
Bettiens, R. R.  
Black, F. L.  
Boardman, J. F.  
Bodegraven, P. A.  
Bolton, R. T. D.  
Bourke, M. E.  
Briggs, J. E.  
Britton, J. M.  
Britton, S. J.  
Brooks, G. J.  
Brown, R. W.  
Brown, W. J.  
Bugler, C. F.  
Caddies, D. W.  
Campbell, S. O. A.  
Canard, P. B.  
Candy, R. J.  
Carter, G. A.  
Cassidy, F. M. -L.  
Clark, J. A. R.  
Clarke, J. A.  
Clegg, R.  
Collier, M. A.  
Collopy, S. M.  
Cook, B. M.  
Cook, D. P.  
Cook, P. D.  

Corby, W. E.  
Corrigan, M. T.  
Costin, J. F.  
Crowther, C. J.  
Darling, C. E.  
Darmody, P. W.  
Davis, B. B.  
Dawes, W. L.  
Deel, G. H.  
Denton, L. F.  
Dollisson, J. A.  
Dowd, C. J.  
Downey, J. A.  
Dunbar, D. J.  
Egan, L. J.  
Eikenhout, J. M.  
Elkington, D. A.  
Everingham, R. G. M.  
Ewin, R. R.  
Pearn-Wannan, M. J.  
Ferranda, C. R.  
Fierravanti, C. A.  
Fisher, K. J.  
Fitzpatrick, G. M.  
Flaherty, G. M.  
Flynn, M.  
Ford, R. A.  
Foulds, J. R.  
Fox, R.  
Friend, A. E.  
Fuso, F. A.  
Galbraith, D. B. T.  
Galbraith, D. S. C.  
Gartner, M.  
Gibson, F. J.  
Giese, P. M.  
Goodwin, J. Y.  
Gould, M. D.  
Gow, J.  
Greenhalgh, P. N.  
Grimm, A. M.  
Grilinton, F. E.  
Haber, R. A.  
Hallows, G. M.  
Hamilton, J. F.  
Hamilton, M. A.  
Hannan, P. E.  
Hansen, L. A.  
Hartmann, V. A.  
Hayes, M. B.  
Haywood, L. M.  
Henry, P. G.  
Hird, M. A.  
Hoffmann, J.  
Hohnke, N.  
Holder, R. L.  
Hopkins, N. L.  
Horton, M. H.  
Howarth, F. M.  
Hunt, M.  
Hurley, M. J.  
Hutchinson, P. J.  
Hyde, M. E.  
Ilaii, M. L. A.  
Ingram, J. E.  
Irwin, B. L.  
Iverach-King, A. N.  
Jarvis, D. J. A.  
Jellic, C. M.  
Jewell, B. M.  
Jones, M. M.  
Jones, W. C.  
Kavunenko, N. M.  
Kay, K. L.  
Kidd, C. R.  
Kolentsis, H.  
Laid, M. I.  
Lang, J. M.  
Lawton, L. N.  
Leder, C. D.  
Lewis, B. J.  
Ley, J.  
Lindsay, A. P.  
Lindstrom, J.  
Lloyd, P. J.  
Logan, J. D.  
Looi, C. W.  
Lubans, L. A.  
McAlpine, M. N.  
McCoy, D. G.  
McDonald, E. G.  
McFarland, J. M.  
McKechnie, C. A.  
Maher, J. E.  
Mainesbridge, A. W. T.  
Mallory, K. V.  
Manson, J. J.  
Markus, D. F.  
Martin, A. T.  
Martyn, R. D.  
Mather, S. R.  
Matheson, A. C.  
Maxwell, H. E.  
Meogrossi, L. T.  
Mere, R. L.  
Milburn, K. N.  
Mildren, B.  
Miller, B. E.  
Miller, L. F.  
Miller, N. C.  
Miller, R. L.  
Miller, S. R. M.  
Moore, J. A.  
Moore, J. F.  
Moore, S. D.  
Moore, S. V.  
Morton, T. J.  
Mulhall, E. M.  
Mullen, R.  
Mylchreest, I.  
Nash, C. E.  
Neville, I. R.  
Newton, C. P.  
Ng, V. L. Y.  
Nicholson, J.  
Nitschke, B. E.  
Norman, L. C.  
Nutter, D. A.  
O'Connell, J. P.  
Officer, F. M. C.  
O'Hara, D. M.  
Olsson, J. J.  
O'Rourke, M. A.  
Orr, P. D.  
Pallas, T. H.  
Parkes, H.  
Patterson, J. N.  
Pattinson, B. J.  
Percival, A.  
Peterson, R. A.  
Philip, D. A.  
Phillips, M. J.  
Pinder, G. R.  
Pontes-Lopez, J. R. R.  
Pirani, P. G.  
Plach, I. M.  
Politi, M. E.  
Porra, K. I.  
Power, E. L.  
Proctor, I. D.  
Quatermass, L.  
Quiggin, R. W.  
Rasa, M. H.  

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Bachelor of Arts degree with honours

Adams, D. M. Dockrill, F. Y. Lewis, M. J. Plovits, J. V.
Aplin, K. P. Easdown, D. Lithgow, S. A. Podleska, M.
Austy, J. H. Eliason, P. G. Maher, A. F. Rey, C. B.
Bain, I. C. Gardner, A. W. Marques, A. J. R. Richardson, D. J.
Bartos, E. Garrett, A. W. Marques, A. R. Sachse-A"Kerling,
Bath, H. I. Garrett, A. W. Marshall, P. J.
Bergmann, K. Garven, I. S. Martyn, J. T.
Blackwell, A. F. Goldsmith, R. J. Mason, I. A.
Box, A. M. Grimshaw, D. P. Miller, B. T. A.
Bromley, R. Hall, J. J. Miller, H. D.
Brown, M. Hamblin, F. K. Molan, A. E.
Buckley, K. I. Harris, R. B. Moran, M. P. A.
Byth, S. H. Hayunga, H. F. Nettle, D. J.
Caldwell, B. K. Healey, H. J. O'Dea, M. M.
Conyers, B. Heffernan, K. J. Olsson, J. A.
Cooper, J. E. Higgin, M. W. C. Oswald, D. K.
Costello, K. M. Hill, P. A. Parker, H.
Dalrymple, R. E. Ip, F. Parkes, L.
Davis, B. J. Irvine, S. B. Parr, J. A.
Deveson, E. D. Jones, L. R. Patel, A. J.
Di Guglielmo, C. F. Kirk, P. R. Pender, H.

Bachelor of Letters

Blomeyer-Bartenstein, S. B. Feron, P. J. Papsojohnnis, C. A.
Lewis, G. J.

Master of Arts

Bergin, A. S. Dhamarasaroja, P. Harris, S. V. Lee, J. M.
Campbell, S. J. Dowton, P. A. Hendershott, B. K. Lee, N.
Chew, H. H. Dupont, A. A. Hiliry, M. D. Lundberg, J. E.
Coldrey, R. G. Glass, A. D. Hing, M. L. M. Mundy, G. P.
Cooper, J. M. Gill, V. Islam, S. M. S. Mutalib, M. H.
Cundy, B. J. Green, I. Kim, T. H. Mzite, D. J.
Dench, A. C. Harris, R. T. Lawton, R. S. Oasa, H.
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<tr>
<th>Name</th>
<th>Degree</th>
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<td>Bachelor of Arts (Asian Studies)</td>
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<td>Boyles, C. J.</td>
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<td>Burk, V. Y.</td>
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<td>De Clercq, M. P. P.</td>
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<td>Nicholas, S. B.</td>
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<td>O'Neil, P.</td>
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<td>Bachelor of Economics</td>
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<td>Aitken, M. E.</td>
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<td>Anning, J. R.</td>
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<td>Antonijevic, S. L.</td>
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<td>Asome, J. P.</td>
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<td>Austen, J. R.</td>
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<td>Bagdon, T. A.</td>
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<td>Ball, T. A.</td>
<td>Bachelor of Economics</td>
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<td>Barlow, A. R.</td>
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<td>Bell, K. M.</td>
<td>Bachelor of Economics</td>
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<td>Bergin, P. J.</td>
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<td>Betts, J. A.</td>
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<td>Boog, A. G.</td>
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<td>Boundy, J. C.</td>
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<td>Bouvier, R. O.</td>
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<td>Boyles, C. J.</td>
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<td>Bray, K. H.</td>
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<td>Bray, P. A.</td>
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<td>Butler, A. P.</td>
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<td>Butler, B. J.</td>
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<td>Carlson, J. R.</td>
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<td>Carr, P. A.</td>
<td>Bachelor of Economics</td>
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McColl, P. G.  
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Andrews, L. E. W.  
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Whitelaw, R. B.

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Arnold, G. R.  
Butt, M. A.  
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Master of Agricultural Development Economics

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Alam, M. F.  
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Byamugisha, F. K.  
Gunasekera, H. D. B. H.  
Hamid, M. D.  
Huq, K. M. E.  
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Martin, J. F.  
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Musharraf, J.  
Premachandra, W. M.  
Priyono, G.  
Sastrowiharjo, M.  
Ramakrishnan, P. S.  
Tavola, K.  
Tiantong, C.

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Baker, G. M.  
Burtt, J. L.  
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Fenn, M. P.  
Ito, K.  
Kim, Y. J.  
Larum, J. M.  
Rofeta, J.  
Ryu, J. C.  
Weldon, G. R.

Bachelor of Laws

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Barns, S. P.  
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Brennan, M. P.  
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Edwards, M. B.  
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Summers, D. L.  
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Wright, L. M.

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Bonyhady, T. J.  
Brysland, G. I.  
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Harkness, A. J.  
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Little, R. E.
Lundy, P. C.
McEwan, D. C.
Tripathi, S.
Vallenilla, V. E.
Wallace, D. W.

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Ariffin, Z.
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Wallington, L. A.
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Webber, M. J.
West, L. E.
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Zivkovic, D.

Bachelor of Science degree with honours
Agostino, M.
Anderson, D. L.
Anderson, T. A.
Ashley, M. C. B.
Ayers, K. A.
Barrett, A. G.
Beesley, P. L.
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Gauci, R.
Gibson, J. A. E.
Gill, A. C.
Godden, C. F.
Graham, M. W.
Habelko, P.
Hardy, C. M.
### Bachelor of Science (Forestry)

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<td>Morgan, R. J.</td>
<td>Bachelor of Science</td>
</tr>
<tr>
<td>Morrison, P.</td>
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<tr>
<td>Ng, C. C. -F.</td>
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<tr>
<td>Parker, M. W.</td>
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<tr>
<td>Phillips, R. E.</td>
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<tr>
<td>Platts, W. D.</td>
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<tr>
<td>Pribad, F.</td>
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<tr>
<td>Reye, S. J.</td>
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<tr>
<td>Rowell, D. M.</td>
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<tr>
<td>Sandford, M. H. R.</td>
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<tr>
<td>Sharpe, R. J.</td>
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<tr>
<td>Wilkes, C. E.</td>
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<td>Wilks, B. A.</td>
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### Bachelor of Science (Forestry) degree with honours

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Alexiou, P. N.</td>
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<tr>
<td>Briggs, G. M.</td>
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<tr>
<td>Cowley, N. B.</td>
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</tr>
<tr>
<td>Gordon, W. G.</td>
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<tr>
<td>O'Hara, A. J.</td>
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<tr>
<td>Porada, H. J.</td>
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### Master of Science

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Agarwal, V. K.</td>
<td>Master of Science</td>
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<tr>
<td>Browne, P. L.</td>
<td>Master of Science</td>
</tr>
<tr>
<td>Butler, K. L.</td>
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<tr>
<td>Chan, C. W.</td>
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<tr>
<td>Chew, T. S.</td>
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<tr>
<td>Dogra, A. S.</td>
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<tr>
<td>Dudzinski, P. K.</td>
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<tr>
<td>Elizur, A.</td>
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<td>Fatime, M. A. H.</td>
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<tr>
<td>Forrester, R. I.</td>
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<td>Goleby, B. R.</td>
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<td>Grant, D. J.</td>
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<td>Higginson, C. A.</td>
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<td>Ingham, C. A.</td>
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<td>Jayanthi, V. K.</td>
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<td>Jones, A. B.</td>
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<td>Justusson, G. N.</td>
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<td>Kalse, B. K.</td>
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<td>Kami, S. K.</td>
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<td>Lloyd, D. J.</td>
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<td>McArthur, C. R.</td>
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<td>Myint, A. K.</td>
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<td>Ray, P. N.</td>
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<td>Reid, E. J.</td>
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<td>Sampson, A. M.</td>
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<td>Schmidt, B. L.</td>
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<td>Shaukat, N.</td>
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<td>Smith, R. L.</td>
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<td>Smorti, M. G.</td>
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<td>Suangtho, V.</td>
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<td>Tasset, D. M.</td>
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<td>Turnbull, I. F.</td>
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<td>Toth, M.</td>
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<td>Yunus, M.</td>
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### Master of Resource and Environmental Studies

<table>
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<tr>
<th>Name</th>
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<tr>
<td>Amatya, M. S.</td>
<td>Master of Resource and Environmental Studies</td>
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<td>Lal, P. N.</td>
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<td>McDonald, M. A.</td>
<td>Master of Resource and Environmental Studies</td>
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### Doctor of Science

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<tr>
<td>Bradbury, J. H.</td>
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<td>Hawkins, C. J.</td>
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<td>Pitman, I. H.</td>
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### Doctor of Philosophy

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<td>Adams, T. E.</td>
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<td>Aharon, P.</td>
<td>Doctor of Philosophy</td>
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<td>Albon, R. P.</td>
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<tr>
<td>Andrus, L.</td>
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<td>Anson, J. M.</td>
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<tr>
<td>Ash, G. R.</td>
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<tr>
<td>Asnawi, S.</td>
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<td>Babu, T. H.</td>
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<tr>
<td>Balasubramanian, K.</td>
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<tr>
<td>Balnaves, P. A.</td>
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<tr>
<td>Band, D. C.</td>
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<td>Bandara, B. M. R.</td>
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<tr>
<td>Bath, M. L.</td>
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<tr>
<td>Beasley, A. E.</td>
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<td>Bell, D. R.</td>
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<tr>
<td>Berryman, K. M.</td>
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</table>
Prizewinners

Undergraduate awards

University Medal
Awarded to the top candidates for the degree of bachelor, provided they obtain first class honours of sufficient distinction supported by a distinguished academic record.

Richard Munro Baker  Prehistory & Geography
Deborah Mary Gillatt  German
Ralph Samuel Lattimore  History
Michael Gerard Rombouts  Economics
Eric George Sparke  History
David Parker Wilkins  Linguistics

The Tillyard Prize
Awarded to the student whose personal qualities and contribution to University life have been outstanding, and who has completed a degree of bachelor with honours.

Vivienne Bath

The Alliance Française de Canberra Prizes
Philip Edward Roberts  French IB
Jennifer Susan Young  French IIB
Rosalind Anne Sturgess  French IIIIB
Shaun Christopher Gath  French IV (Honours)
Ingrid Smith  (shared)

Ampol Prize
Colin Leslie Alexander Killick

A. N. Hambly Prize
Kerrie Anne Ryan

Ann Donner Memorial Prizes in Medieval Studies
Katrina Mary Edwards  Second-year units
Judith Maureen Pearce  Third-year units
Marion Jennifer Liney  Medieval Studies IV(H)

Ansett Air and Space Law Prize
Thomas Alured De Laune Faunce

Anthony Seealaf Memorial Prize
Norris Colin Robertson

The Australian-American Association Prize for American Studies
Graeme Carl Crocket

Australian Capital Territory Bar Association prize
Peter Francis Waters

The Australian Computer Society Prize
Hugh Lincoln Gibson  (shared)
Peter Gregory Hobson  (shared)

Australian Federation of University Women—ACT Prize
Pamela Ruth Lennard

Australian Finance Conference Prize in Company Finance
Robert Antonie Ceramidas

Australian Institute of Physics Prize
Malcolm Ringland Anderson

The Australian Psychological Society Prize
Carolyn Anne McManus

Australian Society of Accountants’ Prize
Diane Mary Fielding

Australian Society for Microbiology Prize
Carol Anne Feron

The B. C. Meagher Prize for Commonwealth Constitutional Law
Peter Francis Waters

The Botany Prize
Geeta Chaudhri

Commercial Representatives’ and Agents’ Association of Australia Limited Prize
Christopher Millar Jones

The Commonwealth Forestry Bureau Book Prize
Martin Eugene Rayner

Computer Science Honours Prize
Beng Choon Lim

Coopers & Lybrand Prizes in Accounting
Man Cheong Robert Hui  Accounting II

The CSR Chemicals Prize
Ian George Pitt

Dante Alighieri Society (Canberra Branch) Prizes
Ann Elizabeth Kavunenko  Italian I
Eleanor Jean Mackie  (shared)
Danielle Bagorzi  Italian II
Elizabeth Hume Minchin  (shared)
Geoffrey Arthur Morton  Italian III
Rosalind Anne Sturgess  (shared)

Daphne Olive Memorial Prize in Jurisprudence
Keith Lindsay Major

David Campbell Prize
Eric George Sparke

Davies, Bailey & Cater Prize for Law Studies
Brian Nicholas Harvey  (shared)
Frederick Braddon Jolley

E. A. Lyall Memorial Prize
Margaret Ruth Mary Healy
### Economic Society of Australia & New Zealand (Canberra Branch) Prizes
- James Anthony Jowett Economics II
- Michael Gerard Rombouts Economics IV (Honours)
- Freehill, Hollingdale and Page Prize for Commercial Studies
  - Stephen John Gageler
- Geological Society of Australia Prize
  - John Gordon Downing
- George Knowles Memorial Prize
  - Andrew Colin Byrnes
- Goethe Society Prizes
  - Lindy Irene Spence First-year units
  - Philip John Richards Second-year units
  - Ann-Louise Crotty Third-year units
  - Deborah Mary Gillatt German IV (Honours)
- The Hanna Neumann Prizes for Pure Mathematics
  - Jacinta Ann Covington Pure Mathematics III
  - (Honours)
  - John Ivan Eugen Urbas Pure Mathematics IV
  - (Honours)
- Institute of Advanced Studies Prizes for Economic History
  - Michael Kerrisk Economic History A
  - John Nicholas Angley Economic History B
  - Leanne Tracey Thorp Russian Economic History
- Institute of Wood Science Prize
  - Martin Eugene Rayner
- J. B. Were & Son Prize
  - Michael Gerard Rombouts
- The Lady Isaacs’ Prize
  - Matthew Charles Dicker
- The Law Society of The Australian Capital Territory Prize for Contracts
  - John Charles Wood
- L. D. Pryor Prize
  - Christopher Geoffrey Rolls
- The Leslie Holdsworth Allen Memorial Prize
  - David Roy Braddon-Mitchell
- Macphillamy Cummins & Gibson Prize for Commercial Law
  - Alison Jane Maskelyne Hoyle
  - Jane Katherine O’Connor
  - (shared)

### Marie Halford Memorial Prize
- Linda Marie Hobbs

### Permanent Trustee Company (Canberra) Limited Prizes
- Frederick Braddon Jolley Trusts

### Price Waterhouse Prize in Accounting
- Michael Gerard Quinn

### Priscilla Fairfield Bok Prize
- Catherine Jean Lawrence

### Prize in Public Economics
- Kenneth Tallis

### The Professional Officers’ Association Prizes
- Justine Clare Waters Zoology A01
- Kingsley Richard Warwick Jones Physics A11/A12

### The Quentin Gibson Prize for Philosophy
- Keith David Bennett

### Rachel Dorph Memorial Prize
- Simon John Fulke Taylor

### The Ramsay Prize
- Susan Gillian Faragher

### The Royal Australian Chemical Institute Prize
- Christopher James Lennard

### The Scandinavian-Australian Society Prizes
- Elizabeth Jane Young Germanic B29
- Philip John Richards Germanic B30

### Schlich Memorial Trust Prize
- Peter James Kanowski

### The Shell Company Prizes
- Sook How Tay Economics

### The Statistical Society of Australia (Canberra Branch) Prize
- Leanne Tracey Thorp

### The Supreme Court Judges’ Prize
- Vivienne Diane Bath
- Philippa May Beddison Horner
  - (shared)

### The Timbind Utilisation Prize
- Martin Eugene Rayner

### The Trustees Executors (Canberra) Limited Prize
- Stephen John Gageler

### The W.B. Clarke Prize in Geology
- Robert Andrew Creaser

### Postgraduate awards

#### J. G. Crawford Prizes
Up to two prizes are awarded annually to PhD graduates and one to a master degree graduate, for academic excellence.

- David Murray Horner
- Sinniah Mahendrarajah

- Paul Ronald Sanberg
University public lectures

Single Public Lectures

Professor J. Thoday
Genetics and educability  25 February
Dr C. Hill
How 'puritan' were the seventeenth-century English Puritans?  11 March
Professor H. Franke
Diplomatic intercourse in the Sung State  960-1076  25 March
Mr D. A. V. Fischer
The export of uranium and the spread of nuclear weapons  8 April
Dr C. Tennant, Dr G. Andrews, Dr M. Whyte and Dr D. Byrne
Psychological distress  22 and 29 April
Professor Wu ru-K’ung
Recent discoveries of early man in China  5 May
Dr A. Gibbs, Dr G. Miklos, Dr J. Shine and Dr B. Rolfe
Genetic engineering  27 May and 3 June

Professor M. Gowing
Science and politics: the first atomic bombs  8 July
Professor F. Venturi
Italy today  19 August
Dr R. Finnegan
Orality and literacy  26 August

1981 Morrison Lecture
Professor T’ien ju-K’ung
Moslem rebellion in China: a Yunnan controversy  17 June

1981 John Curtin Memorial Lecture
Mr Justice J. Staples
Courts, convicts and labor governments in New South Wales from Cable to Dugan and beyond  14 October
Senior staff appointments and promotions

Institute of Advanced Studies

Dr R. J. Baxter  Professor of Theoretical Physics, formerly Professorial Fellow.
Professor A. L. J. Beckwith  Professor, Research School of Chemistry, formerly Professor and Head of Department, University of Adelaide.
Dr A. D. Blest  Senior Fellow in Neurobiology, formerly Senior Research Fellow.
Dr B. G. Cleland  Senior Fellow in Physiology, formerly Fellow.
Dr J. D. Conroy  Senior Research Fellow in Demography, formerly Director, Papua New Guinea Institute of Applied Social and Economic Research.
Dr P. D. Drysdale  Professorial Fellow in Economics, Research School of Pacific Studies and Executive Director, Australia-Japan Research Centre, formerly Reader, Faculty of Economics.
Dr L. K. Fifield  Fellow in Nuclear Physics, formerly Lecturer, Department of Nuclear Physics, University of Oxford.
Dr K. C. Freeman  Professorial Fellow, Mt Stromlo and Siding Spring Observatories, formerly Senior Fellow.
Dr R. G. Gregory  Professorial Fellow in Economics, Research School of Social Sciences, formerly Senior Fellow.
Dr C. N. Haddad  Senior Research Fellow, Electron and Ion Diffusion Unit, formerly Research Fellow.
Dr J. R. Haight  Senior Research Fellow in Behavioural Biology, formerly University of Tasmania.
Dr I. A. Henry  Senior Fellow in Pharmacology, formerly Senior Research Fellow.
Dr B. W. C. Higman  Senior Research Fellow in History, formerly Senior Lecturer, Department of History, University of the West Indies.
Dr P. J. Lloyd  Professorial Fellow in Economics, Research School of Pacific Studies, formerly Senior Fellow.
Dr P. Loveday  Field Director, North Australia Research Unit, formerly Senior Fellow, University of Adelaide.
Dr J. McCawley  Senior Research Fellow in Economics, Research School of Pacific Studies, formerly Research Fellow.
Dr P. L. McFadden  Senior Research Fellow, Research School of Earth Sciences, formerly Reader in Physics, University of Zimbabwe.

Dr L. N. Mander  Professor, Research School of Chemistry, formerly Senior Fellow.
Dr N. B. Manson  Fellow in Solid State Physics, formerly Senior Research Fellow.
Dr J. Marceau  Senior Research Fellow in Sociology, formerly Project Officer, Centre for Educational Research and Innovation, Paris.
Professor M. Moerman  Senior Research Fellow in Anthropology, formerly Professor, University of California, Los Angeles.
Dr H. N. Nelson  Senior Fellow in Pacific and Southeast Asian History, formerly Fellow.
Dr J. E. Norris  Senior Fellow, Mt Stromlo and Siding Spring Observatories, formerly Fellow.
Dr J. N. Shelton  Senior Fellow in Immunology, formerly Senior Research Fellow.
Professor L. Simon  Professor of Mathematics, formerly Professor of Mathematics, University of Melbourne.
Dr B. G. Stacey  Senior Research Fellow in Sociology, formerly University of Canterbury, New Zealand.
Dr N. J. Thrift  Senior Research Fellow in Human Geography, formerly Research Fellow.
Dr D. T. Tryon  Senior Fellow in Linguistics, formerly Fellow.
Dr W. Wernickie  Senior Research Fellow in Developmental Biology, formerly Research Fellow, Friedrich Mieschen-Institut, Switzerland.
Professor P. S. Wilenski  Professor of Political Science, formerly Foundation Professor, Australian Graduate School of Management, University of New South Wales.

The Faculties

Mr R. C. Cornes  Senior Lecturer in Economics, formerly Lecturer.
Dr R. F. Cranston  Senior Lecturer in Law, formerly Senior Research Fellow in Law, Research School of Social Sciences.
Dr J. J. T. Evans  Senior Lecturer, Human Sciences Program.
Dr P. D. Finn  Reader in Law, formerly Senior Lecturer.
Dr I. M. Hughes  Senior Lecturer, Human Sciences Program, formerly Temporary Lecturer.
Dr J. E. Hutchinson  Senior Lecturer in Pure Mathematics, formerly Lecturer.
Dr F. Milne  Senior Lecturer in Economics, formerly Lecturer.
Dr S. K. Mugford  Senior Lecturer in Sociology, formerly Lecturer.
Professor D. C. Pearce  Professor of Law, formerly Reader.
Mr N. C. Seddon  Senior Lecturer in Law, formerly Lecturer.
Dr G. D. Smith  Senior Lecturer in Biochemistry, formerly Lecturer.
Dr T. J. Valentine  Reader in Statistics, formerly Senior Lecturer.

Dr M. J. Weidemann  Reader in Biochemistry, formerly Senior Lecturer.
Dr P. M. Weller  Senior Lecturer in Political Science, formerly Senior Research Fellow in Political Science. Research School of Social Sciences.
Dr C. M. Young  Senior Research Fellow (Fractional) in Sociology, formerly Research Fellow.
Senior staff resignations and retirements

Institute of Advanced Studies
Dr R. F. Cranston  Senior Research Fellow in Law, to Senior Lecturer, Faculty of Law.
Dr R. G. Garnaut  Senior Research Fellow in Economics, Research School of Pacific Studies, to Commonwealth Secretariat Pall Mall, London.
Dr L. B. Gustafson  Professor, Research School of Earth Sciences, to Continental Oil Company.
Dr G. N. Haddad  Senior Research Fellow, Electron and Ion Diffusion Unit, to Senior Research Scientist, CSIRO.

Dr P. C. Young  Professorial Fellow, Centre for Resource and Environmental Studies, to University of Lancaster, England.

The Faculties
Professor S. A. Brown  Professor of Geology.
Dr P. D. Drysdale  Reader in Economics, to Professorial Fellow and Executive Director, Australia-Japan Research Centre.
Lady Alison (Hope) Hewitt  Senior Lecturer in English.
# University statistics

## Full-time staff as at 30 April 1981

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<tr>
<th>Designation</th>
<th>males</th>
<th>females</th>
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<td><strong>Academic activities</strong></td>
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<td><strong>Teaching and research staff (a)</strong></td>
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<tr>
<td>professor</td>
<td>38</td>
<td>—</td>
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<tr>
<td>associate professor/reader</td>
<td>60</td>
<td>6</td>
<td>66</td>
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<tr>
<td>senior lecturer</td>
<td>113</td>
<td>13</td>
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<td>lecturer/lecturing fellow</td>
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<td>visitor</td>
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<td><strong>Total</strong></td>
<td>327</td>
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<td><strong>Research only staff (a)</strong></td>
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<td>professor</td>
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<td>professorial fellow/reader/ senior fellow/ research fellow/post-doctoral fellow</td>
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<td>207</td>
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<tr>
<td>junior research staff</td>
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<tr>
<td>visitor</td>
<td>19</td>
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<td><strong>Total</strong></td>
<td>663</td>
<td>133</td>
<td>796</td>
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<td><strong>Non-academic administrative staff supporting academic activities</strong></td>
<td>214</td>
<td>411</td>
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<td><strong>Technical staff</strong></td>
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<td>technical officer</td>
<td>308</td>
<td>60</td>
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<tr>
<td>technical assistant</td>
<td>205</td>
<td>110</td>
<td>315</td>
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<tr>
<td><strong>Total</strong></td>
<td>513</td>
<td>170</td>
<td>683</td>
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## Designation males females total

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<th>females</th>
<th>total</th>
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<tr>
<td>other</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td>senior administrative officer</td>
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<td>administrative officer</td>
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<tr>
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<tr>
<td>clerk typist</td>
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<tr>
<td>other</td>
<td>32</td>
<td>5</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>162</td>
<td>167</td>
<td>329</td>
</tr>
<tr>
<td><strong>Building planning and maintenance staff</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>professional</td>
<td>15</td>
<td>1</td>
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<tr>
<td>tradesmen</td>
<td>44</td>
<td>—</td>
<td>44</td>
</tr>
<tr>
<td>other</td>
<td>69</td>
<td>28</td>
<td>97</td>
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<tr>
<td><strong>Total</strong></td>
<td>128</td>
<td>29</td>
<td>157</td>
</tr>
<tr>
<td><strong>Other services (b)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent operations</td>
<td>70</td>
<td>68</td>
<td>138</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>128</td>
<td>29</td>
<td>157</td>
</tr>
<tr>
<td><strong>Grand total—all staff</strong></td>
<td>2163</td>
<td>1214</td>
<td>3377</td>
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</tbody>
</table>

(a) Staff of the Centre for Continuing Education are shown under Other services
(b) Includes staff of Management Services Group, Data Processing Unit, Audio-visual and Language Laboratory, Health Services, Counselling and Accommodation and the Centre for Continuing Education
<table>
<thead>
<tr>
<th>Research only staff</th>
<th>Professor Fellow, Reader</th>
<th>Senior Fellow</th>
<th>Research Fellow</th>
<th>Senior Research Fellow</th>
<th>Post-doctoral Fellow</th>
<th>Research Assistant, Officer</th>
<th>Visitor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research School of Biological Sciences</td>
<td>6</td>
<td>3</td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>28</td>
<td>12</td>
<td>3</td>
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<tr>
<td>The Research School of Chemistry</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>2</td>
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<td>The Research School of Earth Sciences</td>
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<td>3</td>
<td>4</td>
<td>3</td>
<td>16</td>
<td>9</td>
<td>1</td>
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<tr>
<td>The John Curtin School of Medical Research</td>
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<td>4</td>
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<tr>
<td>The Research School of Pacific Studies</td>
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<td>The Research School of Physical Sciences</td>
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<td>The Research School of Social Sciences</td>
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<td>11</td>
<td>31</td>
<td>52</td>
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<td><strong>Total research only</strong></td>
<td>60</td>
<td>53</td>
<td>101</td>
<td>53</td>
<td>43</td>
<td>247</td>
<td>220</td>
<td>19</td>
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</table>
# Teaching and research staff

<table>
<thead>
<tr>
<th>Academic activities</th>
<th>Humanities Research Centre</th>
<th>Faculty of Arts</th>
<th>Faculty of Asian Studies</th>
<th>Faculty of Economics</th>
<th>Faculty of Law</th>
<th>Faculty of Science</th>
<th>Centre for Continuing Education</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate Professor, Senior Lecturer, Lecturer, Fellow, Tutor, Visitor</td>
<td>1</td>
<td>13</td>
<td>4</td>
<td>5</td>
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<td>11</td>
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<td>2</td>
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<tr>
<td>Teaching and research staff</td>
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<td>20</td>
<td>39</td>
<td>48</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Total for academic activities</td>
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<td>66</td>
<td>126</td>
<td>96</td>
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<td>34</td>
<td>29</td>
<td>3</td>
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<tr>
<td>Total teaching and research</td>
<td>39</td>
<td>67</td>
<td>128</td>
<td>98</td>
<td>4</td>
<td>34</td>
<td>29</td>
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### Enrolments 1981

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Institute of Advanced Studies</th>
<th>Faculties</th>
<th>University Centres</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>PhD courses</strong></td>
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<tr>
<td>Institute of Advanced Studies</td>
<td>282</td>
<td>13</td>
<td>1</td>
<td>283</td>
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<td>The Faculties</td>
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<td>13</td>
<td>221</td>
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<tr>
<td>University Centres</td>
<td>9</td>
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<td>10</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td><strong>Master degree courses</strong></td>
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<td>Institute of Advanced Studies</td>
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<td>14</td>
<td>73</td>
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<tr>
<td>The Faculties</td>
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<td>96</td>
<td>177</td>
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<tr>
<td>University Centres</td>
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<td>23</td>
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<tr>
<td><strong>Total</strong></td>
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<td>126</td>
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<tr>
<td><strong>Postgraduate diploma courses</strong></td>
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<td>141</td>
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<tr>
<td><strong>Postgraduate bachelor degree course</strong></td>
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<tr>
<td>The Faculties</td>
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<td>82</td>
<td>130</td>
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<tr>
<td><strong>Bachelor degree courses</strong></td>
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<tr>
<td>The Faculties</td>
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<td>930</td>
<td>1837</td>
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<tr>
<td>arts</td>
<td>251</td>
<td>23</td>
<td>274</td>
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<tr>
<td>arts/law</td>
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<td>62</td>
<td>191</td>
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<tr>
<td>Asian studies</td>
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<tr>
<td>Asian studies/law</td>
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<td>327</td>
<td>695</td>
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<td>economics</td>
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<td>35</td>
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<tr>
<td>economics/Asian studies</td>
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<tr>
<td>economics/law</td>
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<td>17</td>
<td>149</td>
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<tr>
<td>economics/science</td>
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<td>38</td>
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<tr>
<td>law</td>
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<td>law (graduate)</td>
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<td>science</td>
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<td>science (forestry)</td>
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<td>205</td>
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<tr>
<td>science (law)</td>
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<td>—</td>
<td>27</td>
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<td><strong>Total</strong></td>
<td>2791</td>
<td>1868</td>
<td>4477</td>
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<tr>
<td><strong>Non-degree courses</strong></td>
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<td>Total undergraduates</td>
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<tr>
<td><strong>Other courses</strong></td>
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<tr>
<td>legal workshop</td>
<td>22</td>
<td>8</td>
<td>30</td>
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<tr>
<td>master's preliminary/qualifying</td>
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<td>37</td>
<td>54</td>
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<tr>
<td>non-degree postgraduate courses</td>
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<td>33</td>
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<tr>
<td><strong>Total</strong></td>
<td>51</td>
<td>66</td>
<td>117</td>
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<tr>
<td>Gross enrolments</td>
<td>3567</td>
<td>2393</td>
<td>5960</td>
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<tr>
<td><strong>Net enrolments</strong></td>
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<td>2388</td>
<td>5955</td>
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### Assisted students**

<table>
<thead>
<tr>
<th>Source</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Government assistance</td>
<td>240</td>
<td>92</td>
<td>332</td>
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<tr>
<td>University assistance</td>
<td>208</td>
<td>77</td>
<td>285</td>
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<tr>
<td>Other assistance</td>
<td>47</td>
<td>15</td>
<td>62</td>
</tr>
<tr>
<td><strong>Total assisted students at the university</strong></td>
<td>495</td>
<td>184</td>
<td>679</td>
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### Degrees conferred

<table>
<thead>
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<th>Degree</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Laws (honoris causa)</td>
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</tr>
<tr>
<td>Doctor of Letters (honoris causa)</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Doctor of Science</td>
<td>2</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Doctor of Science (honoris causa)</td>
<td>1</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Doctor of Philosophy</td>
<td>99</td>
<td>25</td>
<td>124</td>
</tr>
<tr>
<td>Master</td>
<td>75</td>
<td>30</td>
<td>105</td>
</tr>
<tr>
<td>Master of Arts (honoris causa)</td>
<td>—</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Master of Science (honoris causa)</td>
<td>1</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Bachelor—honours</td>
<td>102</td>
<td>81</td>
<td>183</td>
</tr>
<tr>
<td>Bachelor—pass</td>
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<td>357</td>
<td>840</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>764</td>
<td>496</td>
<td>1260</td>
</tr>
</tbody>
</table>

*Adjusted by 5 for students counted in more than one course.

**Only students whose General Services Fee is paid by the scholarship or award can be shown as assisted.
Principal grants and benefactions

Special purpose grants and bequests to the University during the year ended 31 December 1981

Academy of the Social Sciences in Australia, $1500 for research Centre for Resource and Environmental Studies.
Anonymous, $1458 to support research by PhD students in the fields of population or environmental studies Research School of Biological Sciences; $7700 for research Department of Mathematics, RSPhsS; $4000 for special projects Bruce Hall.
Alcoa of Australia Ltd, $500 for Associated Book Publishers (Aust.) Ltd, $250 for films Mr T. Asch, $9599 for production of anthropological studies; $4000 for special projects Bruce Hall.
Alcoa of Australia Ltd, $500 for films Mr T. Asch, $9599 for production of anthropological studies; $4000 for special projects Bruce Hall.
Australia Council Literature Board, $2081 for support Department of English.
Australia Council Music Board, $1000 for support Department of English.
Australia-Japan Business Co-operation Committee, $6500 for Australia-Japan Research Centre.
Australia and New Zealand Banking Group Limited, $2000 for Australia-Japan Research Centre.
Australia Paper Manufacturers Limited, $1000 for Australia-Japan Research Centre.
Australian Academy of the Humanities, $5000 for the Language Atlas Project Department of Linguistics, IAS.
Australian Academy of Science, $5000 for support of IUTAM-IUPAC Symposium Department of Applied Mathematics, IAS.
Australian Atomic Energy Commission, $7500 for research Plasma Research Laboratory; $21,450 for research in geochemistry Research School of Earth Sciences.
Australian Broadcasting Commission, $10,658 for research Department of History, IAS.
Australian Development Assistance Bureau, $156,631 for course leading to the degree of Master of Agricultural Development Economics Research School of Pacific Studies; $112,217 for support of master degree program Department of Demography; $551,127 for Nepal-Australia Forestry Project Department of Forestry; $2560 for general support Development Studies Centre; $74,312 for study on aid to the South Pacific Development Studies Centre; $13,691 to support Indonesian estate crops project Department of Economics, RSPhsS; $20,000 for support for training program for Pacific Island planners Development Studies Centre; $31,000 support for conference ‘Data Requirements for Rural Development Planning in the Asian Tropics’ Development Studies Centre; $5000 for establishment of the Australian-ASEAN Economic Relations Research Project Department of Economics, RSPhsS; $16,729 for fellowship Development Studies Centre; $71,184 for training course on rural development and project planning Development Studies Centre; $65,000 for energy planning workshop ‘Designing the Future’ Centre for Resource and Environmental Studies; $106,870 for Australian-ASEAN Economic Relations Research Project Department of Economics, RSPhsS.
Australian Federal Police, $60,000 for research project Department of Chemistry.
Australian Institute of Multicultural Affairs $4000 for research Department of Demography.
Australian Institute of Nuclear Science and Engineering, $6222 for research Department of Theoretical Physics; $14,630 for research Plasma Research Laboratory; $4100 for research Department of Engineering Physics.
Australian National Parks and Wildlife Service. $46,240 for research Department of Prehistory.
Australian Research Grants Committee, $55,642 for research Department of History, The Faculties; $35,912 for research Department of Psychology; $12,431 for research Department of Zoology; $46,665 for research Department of Biochemistry, The Faculties; $36,199 for research Department of English; $28,282 for research Department of Linguistics, The Faculties; $5842 for research Department of Political Science, The Faculties; $21,600 for research Department of Sociology, The Faculties; $3000 for research Faculty of Law; $20,000 for research Department of Statistics, The Faculties; $1037 for research Department of Applied Mathematics, The Faculties; $9955 for research Department of Prehistory and Anthropology; $9693 for research Department of Asian History and Civilisation; $6180 for research Department of South Asian and Buddhist Studies; $30,551 for research Department of Botany; $155,356 for research Department of Chemistry; $14,683 for research Department of Philosophy, The Faculties; $8980 for research Department of Physics; $10,155 for research Department of Classics; $10,295 for research Department of Geography; $35229 for research Department of Philosophy, The Faculties; $25,561 for research Department of Computer Science; $9010 for research Office for Research in Academic Methods;
$38,706 for research Department of Population Biology.
Australian Vice-Chancellors’ Committee, $16,000 for AUDIP Project, University Pertanian Malaysia
Department of Economics, RSPacS; $4800 for travel support Department of Forestry; $150,000 for AUDIP Fellowship Department of Demography; $1600 for AUDIP Program Department of Demography; $69,618 for AUDIP Project, University of the Philippines
Department of Economics, RSPacS; $1600 for AUDIP Project Department of Forestry; $490 for AUDIP support to Department of Accounting and Public Finance.
Bank of New South Wales, $1000 for Fellowship Faculty of Asian Studies; $1500 for Australia-Japan Research Centre.
BHP Company Limited, $1000 support for National Summer School for talented students of mathematics ANU-AAMT; $2000 for Australia-Japan Research Centre; $250 for travel support Faculty of Law.
Bionic Products Pty Ltd, $5000 for research Department of Physics.
Biotechnology Aust. Pty Ltd, $3000 for research Department of Genetics.
Dr J. M. Bowler, $1650 support for research Department of Biogeography and Geomorphology.
Brambles Industries Limited, $2000 for Australia-Japan Research Centre.
Bundaberg Sugar Co. Ltd, $750 for Australia-Japan Research Centre.
Bunnings Ltd, $500 for Australia-Japan Research Centre.
Burns Philp and Co. Ltd, $1000 for Australia-Japan Research Centre.
Bureau of Transport Economics, $3807 for study of photochemical pollutants Department of Chemistry.
Bushell Trust, $2257 for research Department of Prehistory and Anthropology.
Butterworths Pty Limited, $400 for travel support Faculty of Law.
Caltex Oil (Australia) Pty Limited, $1000 support for project ‘Canberra Science Centre’ Department of Physics.
Carpentaria Exploration Co. Pty Ltd, $624 for advancement of geological sciences Research School of Earth Sciences.
Centre for Applied Linguistics (Washington, DC), $3974 for research project Department of Linguistics, The Faculties.
Clive and Vera Ramaciotti Foundations, $12,500 for research project Department of Human Biology; $13,777 for research project Department of Microbiology; $3000 grant-in-aid to assist exchange visits of Florey Lecturers between Britain and Australia The John Curtin School of Medical Research.
Comalco Limited, $1000 for Australia-Japan Research Centre; $500 support for National Summer School for talented students of mathematics ANU-AAMT; $2500 for fellowship Faculty of Asian Studies.
Commercial Bank of Australia Ltd, $100 for travel support Faculty of Law.
Commonwealth Grants Commission, $39,085 to support work for Grants Commission Department of Accounting and Public Finance.
Commonwealth Legal Aid Commission, $1200 for support of surveys Survey Research Centre.
CRA Services Limited, $2000 for Australia-Japan Research Centre; $5000 for study of Asian studies in Australia Faculty of Asian Studies.
Dr K. A. W. Crook, $1860 for geoscientific projects Department of Geology.
CSIRO, $7500 for research project Research School of Pacific Studies; $10,000 for development of methodologies for faunal surveys Centre for Resource and Environmental Studies; $3500 for project ‘Methodology Study for Natural Areas of the National Estate’ Centre for Resource and Environmental Studies; $25,000 for project ‘Feasibility Analysis of Potential Rubber Production from Guayule’ Department of Geography.
CSIRO Radio Research Board, $2450 for research project Department of Solid State Physics; $2250 for work on an Australian speech data base Department of Engineering Physics.
CSR Limited, $3000 for Australia-Japan Research Centre.
Curriculum Development Centre, $4083 for Japanese language project Faculty of Asian Studies.
Department of Aboriginal Affairs, $3537 for research Development Studies Centre.
Department of the Capital Territory, $25,570 support for project ‘Canberra Science Centre’ Department of Physics.
Department of Employment and Youth Affairs, $2300 assistance for project ‘Examining Performance of NSW Labour Markets’ Department of Geography.
Department of Foreign Affairs, $5982 for assistance on development of Australian studies, University of Venice Research School of Social Sciences; $72,000 support for Indonesian project Department of Economics, RSPacS; $100,000 for Australia-Japan Research Centre; $3000 for travel support Faculty of Law.
Department of Foreign Affairs (Australia-China Council), $3150 for fellowship Department of Developmental Biology; $6560 for scholarship Faculty of Arts; $3000 for fellowship Department of Immunology; $12,000 support for two visiting Chinese engineers Mount Stromlo and Siding Spring Observatories; $41,591 support for ANU-Academia SINICA Quaternary Studies Programme Department of Biogeography and Geomorphology; $5000 support of visiting fellow Department of Economics, RSPacS; $1000 support for visiting professor Department of Far Eastern History.
Department of Health, $1364 for research Department of Microbiology; $273,172 for NH&MRC Social Psychiatry Research Unit; $727 for research Health Research Project; $38,618 for NH&MRC fellowship Health Research Project; $8536 for NH&MRC scholarship Department of Immunology; $24,770 support for archive of survey data on drug use in Australia Survey Research Centre; $14,823 support for Ageing and the Family Project Urban Research Unit; $1529 for research Virus Ecology Research Group.
Department of Primary Industry, $2800 for research Department of Botany; $13,957 for research Department of Zoology; $100,602 for research Department of Biochemistry, The Faculties; $28,254 for scholarship Department of Zoology; $51,700 for research Department of Immunology; $3278 for research Department of Microbiology; $750 support.
for work on viruses of bees Virus Ecology Research Group.
Department of Home Affairs and the Environment, $13,000 for research Department of History, IAS; 
$19,980 for research Department of Biogeography and Geomorphology; $600 support for National Estate Program on Documentation of Aboriginal Sites
Department of Prehistory and Anthropology; $1000 support for project 'Taxonomy of Australian Porcellidiae (Copepoda, Harpacticoida)' Department of Zoology; $3750 for research project Department of Population Biology; $10,391 support for project 'Computer Data Storage and Key Generation for Large Genera of Grasses' Taxonomy Unit.
Department of Immigration and Ethnic Affairs, 
$34,950 for work on understanding the employment needs and aspirations of selected groups of ethnic youth Department of Sociology, The Faculties.
Department of National Development and Energy, $40,000 for research project Plasma Research Laboratory; $29,720 for research in geochemistry. Research School of Earth Sciences; $40,418 for demonstration projects Department of Engineering Physics: $4646 support for AWRC water research program project 'The utility of property acquisition and settlement relocation in flood damage reduction programs' Department of Geography.
Department of the Prime Minister and Cabinet, 
$144,833 for Centre for Research on Federal Financial Relations.
Department of Public Works NSW, $15,500 for work on 'Flood Plain Mapping: Public Awareness' Department of Geography.
Department of Science and Technology, $22,223 for fellowship Research School of Chemistry; $133,789 for National Nuclear Magnetic Resonance Centre; $39,757 for fellowship Research School of Physical Sciences; 
$44,576 for fellowship Research School of Earth Sciences; $17,284 for fellowship Research School of Biological Sciences; $20,809 for research in environmental geochemistry Research School of Earth Sciences; $2000 for environmental issues arising from the harvesting of native hardwood forests in Australia by clear-felling methods Department of Forestry; 
$13,645 for work on biochemical ecology of algal-invertebrate associations of the Great Barrier Reef Department of Environmental Biology; $7236 for research Department of Geology; $25,110 support for scientists to attend conference in Nagoya on photosynthetic carbon metabolism Research School of Biological Sciences; $7336 for research project Department of Zoology; $7236 for research Department of Geology; $57,936 for research into environmental geochemistry and climatic responses of sediments and coral, Research School of Earth Sciences.
Department of Social Security (Office of Child Care), 
$75,021 for Aboriginal Children Program Centre for Resource and Environmental Studies. 
Documentary Educational Resources Centre (USA) $1201 for production of anthropological films Department of Anthropology.
Encyclopaedia Britannica, $1861 for support Department of Biogeography and Geomorphology.
Energy Authority of New South Wales, $568,000 for solar power station project Department of Engineering Physics.
Esso Australia Ltd, $1000 for scholarship Department of Geology; $1500 for advancement of geological sciences Research School of Earth Sciences; $5000 for Australia-Japan Research Centre; $8000 for research Department of Geology; $17,950 for research in economic geology Research School of Earth Sciences. 
Mr E. K. Fisk, $2444 for general support Development Studies Centre.
Gold Fields Exploration Pty Ltd, $1500 for research Department of Geology.
D. & P. Grimshaw, $5200 assistance for the publication of books relating to the Pacific Islands Research School of Pacific Studies. 
Hamersley Iron Pty Limited, $1200 support for production of brochure on Japanese studies Department of Japanese.
Harvard University, $2000 support to the Australian Nominating Committee for the Harvard Chair in Australian Studies Chancery Services.
Hewlett-Packard Australia Pty Ltd, $300 support for National Summer School for talented students of mathematics ANU-AAMT.
Hong Kong Association for Continuing Education, $575 contribution to the Joint Kellogg Fellowship Centre for Continuing Education; $4200 support for Kellogg Fellowship Program Centre for Continuing Education.
Howard Smith Industries Pty Ltd, $500 for Australia-Japan Research Centre.
Dr P. J. Hughes, $9500 support for field work and publications Department of Prehistory. 
ICI Australia Limited, $150 support for National Summer School for talented students of mathematics ANU-AAMT; $1000 for Australia-Japan Research Centre.
International Development Research Centre, Canada, $1273 for support of master degree program Development Studies Centre.
Jennings Industries Ltd, $100 support for National Summer School for talented students of mathematics ANU-AAMT.
W. K. Kellogg Foundation, $68,000 support for program to develop continuing education in areas of South-East Asia and the Pacific Centre for Continuing Education.
Kelvinator Australia Limited, $500 for Australia-Japan Research Centre.
Korean Traders Scholarship Foundation, $31,748 support for program for development of Korean studies Research School of Pacific Studies.
Law Book Co Ltd, $200 for travel support Faculty of Law.
Lee Foundation, States of Malaysia, $1500 support for scholarship Department of Economics, The Faculties. 
Mcllwraith McEacharn Limited, $500 for Australia-Japan Research Centre.
Professor J. A. C. Mackie, $600 support for Department of Political and Social Change.
Professor R. L. Mathews, $5324 for general purposes Centre for Research on Federal Financial Relations. 
Mayne Nickless Ltd, $500 for Australia-Japan Research Centre.
MIM Holdings Limited, $2083 for scholarship Department of Geology; $100 support for University Counselling Service; $2000 for Australia-Japan Research Centre.
Mobil Oil Australia Limited, $100 support for University Counselling Service.
Mr L. Muir, $5000 for seminar on postwar reconstruction Department of History, The Faculties.
National Capital Development Commission, $1201 for research Department of Chemistry.
National Environment Research Council of UK, $58,245 for research in geophysics Research School of Earth Sciences.
National Health and Medical Research Council, $16,000 support for administration of the Australian National Twin Registry Department of Population Biology; $22,224 for research Department of Psychology; $13,226 for research project Department of Zoology; $32,352 for research Department of Biochemistry, The Faculties; $5292 for scholarship Department of Behavioural Biology; $7 for research Department of Demography; $27,785 for fellowship Chancellery Services; $121,184 for research program The John Curtin School of Medical Research.
National Heart Foundation of Australia, $13,000 for research Department of Biochemistry, The Faculties; $25,173 for fellowship Department of Pharmacology; $11,851 grant-in-aid Department of Pharmacology.
Natural Systems Research Pty Ltd, $2750 for academic and administrative services Centre for Resource and Environmental Studies.
OPSM Research and Charitable Foundation Limited, $13,275 for research Department of Physiology.
Pancontinental Mining Ltd, $419 for advancement of geological sciences Research School of Earth Sciences.
Peat, Marwick, Mitchell and Co., $500 for Australia-Japan Research Centre.
Philippines Government, $5013 for fellowship Faculty of Asian Studies.
Reserve Bank of Australia, $15,500 for RCDF Research Project Australia-Japan Research Centre; $2500 for support of youth, employment, education and training conference Research School of Social Sciences; $25,777 for fellowship Department of Economics, The Faculties; $2500 support for conference International Seminar in Public Economics' Centre for Research on Federal Financial Relations; $1585 for RCDF Research Project Department of Immunology; $7334 for research project Virus Ecology Research Group; $2000 for conference program Centre for Economic Policy Research.
Dr J. L. Richardson, $491 support for research Department of Biogeography and Geomorphology.
Professor A. E. Ringwood, $3500 for general support Research School of Earth Sciences.
Riker Laboratories Australia Pty Ltd, $2000 for research The John Curtin School of Medical Research.
Roche-Maag Limited, $3600 for research Department of Zoology.
Ron Irvin Pty Ltd, $250 support for National Summer School for talented students of mathematics ANU-AAMT.
Rotary Club of Canberra, Belconnen, $9879 support for research The John Curtin School of Medical Research; $1500 support for project ‘Canberra Science Centre’ Department of Physics.
Rotary Club of Canberra, Ginninderra, $750 support for project ‘Canberra Science Centre’ Department of Physics.
Rothmans University Endowment Fund, $17,000 for fellowship Department of Biogeography and Geomorphology; $17,000 for fellowship Department of Philosophy, IAS.
Royal Canberra Hospital, $5000 for scholarship Department of Psychology; $15,643 support for clerical assistant Department of Clinical Science.
Royal Netherlands Embassy, $2400 to aid the teaching of Dutch Department of Germanic Languages.
Royal Southern Memorial Hospital, $17,813 for research Department of Human Biology.
Sanex Australia Pty Ltd, $1800 support for ACT Postgraduate Committee in Medicine Chancellery Services.
Schools Commission, $10,384 support for project ‘Canberra Science Centre’ Department of Physics; $7990 support for work on computer-aided teaching and provision of specialist instruction in basic skills for Australian schools Department of Engineering Physics; $7884 for innovations program Department of Engineering Physics.
Shaikh Ahmed Salah Jamjoon, $19,876 for support of Islamic studies Faculty of Asian Studies.
Shaw's (Wholesale) Co. Pty Ltd, $5000 for research Department of Physics.
Singapore National Trades Union Congress, $3000 contribution to joint Kellogg Fellowship Centre for Continuing Education.
Southern Highlands Rural Development Project (Papua New Guinea), $3050 for support of study of the role in dietary protease inhibitors in the pathogenesis of enteritis necroticans Department of Chemistry.
Snowy Mountains Engineering Corporation, $400 for fellowship Faculty of Asian Studies.
State Rivers and Water Supply Commission of Victoria, $2250 for Dartmouth Dam Project Research School of Earth Sciences.
State Pollution Control Commission (NSW), $12,077 for research Department of Population Biology.
St Jude's Children's Research Hospital, $26,915 for research Department of Microbiology.
Tertiary Education Commission, $5600 for evaluative study of higher education teaching-and-research units Department of Classics.
The Agricultural Development Council, Inc., $21,336 for scholarships in course leading to the degree of Master of Agricultural Development Economics Research School of Pacific Studies.
The Australia-Japan Foundation, $9000 for scholarship Faculty of Law; $6500 for support of project in biochemical ecology Department of Environmental Biology.
The Commercial Bank of Australia Ltd, $1000 for Australia-Japan Research Centre.
The Commercial Banking Company of Sydney Limited, $1000 for Australia-Japan Research Centre.
The Commonwealth Industrial Gases Ltd, $1000 for Australia-Japan Research Centre.
The Ford Foundation, $17,377 for research Department of Demography.
The Ian Potter Foundation, $1000 support to attend Joint Oceanographic Institution meeting for deep earth sampling in West Germany Research School of Earth Sciences; $500 support to attend The International Conference on chemistry of the platinum group metals in Bristol Research School of Chemistry.
The John Claude Kellion Foundation Limited, $3000 for research Department of Immunology.
The Kroc Foundation, $29,038 for research project Department of Immunology.
The Myer Foundation, $10,000 for study of Asian studies in Australia Faculty of Asian Studies.
The National Bank of Australasia Limited, $1000 for Australia-Japan Research Centre.
The New South Wales State Cancer Council, $3097 for research Department of Sociology, The Faculties.
The Rural Industries Bank of WA, $1000 for Australia-Japan Research Centre.
The Tanner Lecture Trust, $9417 to host the Tanner Lecture on human values Chancery Services.
The University of Aston, Birmingham, $8812 for Hewitt Schmidt Camera Project Mount Stromlo and Siding Spring Observatories.
The Wellcome Trust, $6168 for research training scholarship Department of Asian History and Civilisations.
United Nations Educational Scientific and Cultural Organization, $930 support for Fiji project Development Studies Centre; $1109 for publication ‘A Biosocial Survey in Hong Kong’ Centre for Resource and Environmental Studies; $1542 for publication ‘Ecology of a City’ Centre for Resource and Environmental Studies; $7830 for research project Centre for Resource and Environmental Studies; $2436 for study of rural electrification in Papua New Guinea Centre for Resource and Environmental Studies.
United Nations Fund for Population Activities, $267,980 support for the National Family Planning Co-ordinating Board in projects in the development of demography in Indonesia Research School of Social Sciences.
United Nations University (Tokyo), $4925 for research Department of Geology; $3000 for Australia-Japan Research Centre; $2500 for fellowship Faculty of Asian Studies.
Woden Valley Hospital, $12,000 for private practice trust fund research project Department of Immunology.
World Health Organization, $5000 for research Department of Microbiology; $19,172 support for preparation of manuscript on smallpox and its eradication The John Curtin School of Medical Research; $31,887 support for international conference ‘Male-Female Differences in Mortality’ Department of Demography.
Financial statements
Dear Sir John

Australian National University
Financial Statements year ended 31 December 1981

In compliance with Section 33(2) of the Australian National University Act 1946, the Council of the University has submitted for my report the following financial statements for the year ended 31 December 1981:

- Statement of Income and Expenditure—Recurrent Funds
  - Supporting Statement
  - Institute of Advanced Studies
  - The Faculties
  - General University Activities and Overheads
  - Central Areas

- Statement of Income and Expenditure—Restricted Purpose Funds

- Consolidated Statement of Assets and Liabilities

- Statement of Capital Accumulation

- Trading Activities:
  - Consolidated Balance Sheet
  - Consolidated Statement of Income and Expenditure (excluding Housing Operations)
  - Consolidated Balance Sheet (Housing Operations)
  - Consolidated Statement of Income and Expenditure (Housing Operations).
The statements, which are accompanied by explanatory Notes forming part of the statements, have been prepared having regard to the accounting policies outlined in Note 1.

Copies of the statements, which are substantially in accordance with the form approved by the Minister for Finance pursuant to Section 33(1) of the Act, and the accompanying Notes, are attached for your information.

In accordance with Section 33(2) of the Act I now report that the financial statements are in agreement with the accounts and records of the University and, in my opinion:

(a) the statements are based on proper accounts and records, and
(b) the receipt, expenditure and investment of moneys and the acquisition and disposal of assets by the University during the year have been in accordance with the Act.

I have not audited the accounts of the subsidiary company, ANUTECH Pty Ltd but I have examined that company's accounts and the auditor's report thereon. The accounts have not been consolidated with those of the University but details are shown at Note 9 to the University's financial statements. The auditor's report on the accounts of the subsidiary company was not subject to any qualification.

Yours faithfully

B. R. E. Beasley
Acting First Assistant Auditor-General
The Australian National University financial statements
for the year ended 31 December 1981

The accounts of The Australian National University for the year ended 31 December 1981 are presented in the following statements:

1 Statement of Income and Expenditure for the year ended 31 December 1981
   1.1 Recurrent Funds
      1.1.1 The Institute of Advanced Studies
      1.1.2 The Faculties
      1.1.3 General University Activities and Overheads
      1.1.4 Central Areas
   1.2 Restricted Purpose Funds
2 Consolidated Statement of Assets and Liabilities as at 31 December 1981
3 Statement of Capital Accumulation
4 Trading Activities
   4.1 Consolidated Balance Sheet as at 31 December 1981
   4.2 Consolidated Statement of Income and Expenditure (excluding Housing Operations) for the year ended 31 December 1981
   4.3 Consolidated Balance Sheet (Housing Operations) as at 31 December 1981
   4.4 Consolidated Statement of Income and Expenditure (Housing Operations) for the year ended 31 December 1981
5 Explanatory notes accompanying and forming part of the financial statements for the year ended 31 December 1981

I. G. ROSS
Acting Vice-Chancellor

D. BINGLEY
Acting Accountant
Statement by Principal Accounting Officer
To the best of my knowledge the accompanying statements have been properly drawn up so as to show fairly the financial transactions of The Australian National University for the year ended 31 December 1981

Canberra
19 November 1982
1. Statement of Income and Expenditure for the year ended 31 December 1981

1.1 Recurrent Funds

<table>
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<tr>
<th>Notes</th>
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<td><strong>Income</strong></td>
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<td>Australian Government Grants:</td>
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<td>i) Standing appropriation</td>
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<td>ii) For running expenses</td>
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<td>105,697</td>
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<td>Transfer from Capital Accumulation—Capital Works and Services funds applied to general expenditure</td>
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<td>Income from investments</td>
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<td>General Services Fee</td>
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<td>Sundry income</td>
<td>374</td>
<td>108,723</td>
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<td><strong>Less: Transfers to Restricted purpose funds</strong></td>
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<td>89</td>
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<tr>
<td><strong>Less: Recurrent funds transferred to Capital Accumulation for the purchase of</strong></td>
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<tr>
<td>Equipment</td>
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<td>Library books</td>
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<tr>
<td>Stores stocks</td>
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<td>6,767</td>
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<tr>
<td><strong>Less: Expenditure</strong></td>
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<tr>
<td>Institute of Advanced Studies (Statement 1.1.1)</td>
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<tr>
<td>John Curtin School of Medical Research</td>
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<td>8,965</td>
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<tr>
<td>Mount Stromlo and Siding Spring Observatories</td>
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<td></td>
</tr>
<tr>
<td>Research School of Physical Sciences</td>
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<tr>
<td>Research School of Earth Sciences</td>
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<tr>
<td>Research School of Biological Sciences</td>
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<tr>
<td>Research School of Pacific Studies</td>
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<tr>
<td>Research School of Social Sciences</td>
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<tr>
<td>Research School of Chemistry</td>
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<td>Analytical Services Unit</td>
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<tr>
<td>Centre for Resource and Environmental Studies</td>
<td>988</td>
<td>51,955</td>
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<td><strong>The Faculties (Statement 1.1.2)</strong></td>
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<td>Arts</td>
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<td>Asian Studies</td>
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<td>Economics</td>
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<td>Law</td>
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<td>Science</td>
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<td>Administration</td>
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<td>Scanning Electron Microscope Unit</td>
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<td>Humanities Research Centre</td>
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<td>General University Activities and Overheads (Statement 1.1.3)</td>
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<td>Central Areas (Statement 1.1.4)</td>
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<td>Disbursement of General Services Fee to student bodies for amenities or services not of an academic nature</td>
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<td>Expenditure on provisions for</td>
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<td>Long service leave</td>
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<td>Recreation leave</td>
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<td>Maternity leave</td>
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<td>103,025</td>
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<td>Surplus/(Deficit)</td>
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<td>Less: Abnormal item</td>
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<td>Expenditure on provision for long service leave</td>
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<tr>
<td>Less: Transfers to Special Reserves</td>
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<td>Twenty-seventh Pay</td>
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<td>Public Policy and New Initiatives</td>
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<td>8,460</td>
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<tr>
<td>Net Surplus/(Deficit) Transferred to Capital Accumulation Account</td>
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<td>(9,618)</td>
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</table>

To be read in conjunction with the accompanying notes.
### Statement of Income and Expenditure for the year ended 31 December 1981

**Supporting Statement 1.1.1—The Institute of Advanced Studies**

**Attachment to Statement 1.1**

<table>
<thead>
<tr>
<th></th>
<th>John Curtin School of Medical Research</th>
<th>Mount Stromlo and Siding Spring Observatories</th>
<th>Research Schools of Physical Sciences</th>
<th>Research Schools of Earth Sciences</th>
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<td>Salaries and allowances</td>
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<td>Payroll tax, workmen's compensation insurance and superannuation</td>
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<td>1,469</td>
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<td>Scholarships</td>
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<td>Academic visits</td>
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<td>Advertising</td>
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<td>14</td>
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<td>Movement expenses and other travel</td>
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<td>92</td>
<td>63</td>
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<tr>
<td>Field research expenses</td>
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<tr>
<td>Materials, supplies and freight</td>
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<td>467</td>
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<td>Publications and subscriptions</td>
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<td>21</td>
<td>(1)</td>
<td>16</td>
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<td>Maintenance of buildings and site services</td>
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<td>49</td>
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<td>Maintenance of equipment and furnishings</td>
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<td>Fuel and power</td>
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<td>Postages and telephones</td>
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<td>40</td>
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<td>General expenses</td>
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<td>22</td>
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<td><strong>Total Expenditure</strong></td>
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<td><strong>2,262</strong></td>
<td><strong>9,434</strong></td>
<td><strong>3,500</strong></td>
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To be read in conjunction with the accompanying notes.
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<th>Biological Sciences</th>
<th>Pacific Studies</th>
<th>Social Sciences</th>
<th>Chemistry</th>
<th>Analytical Services unit</th>
<th>Centre for Resource and Environmental Studies</th>
<th>Total</th>
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<td>$000</td>
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<td>269</td>
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<tr>
<td>135</td>
<td>114</td>
<td>97</td>
<td>70</td>
<td>—</td>
<td>14</td>
<td>1,424</td>
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<tr>
<td>110</td>
<td>33</td>
<td>15</td>
<td>88</td>
<td>—</td>
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<td>35</td>
<td>94</td>
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<td>56</td>
<td>45</td>
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<td>6,147</td>
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<td>5,055</td>
<td>207</td>
<td>988</td>
<td>51,955</td>
</tr>
</tbody>
</table>

137
### 1.1 Statement of Income and Expenditure for the year ended 31 December 1981

**Supporting Statement 1.1.2—The Faculties**

**Attachment to Statement 1.1**

<table>
<thead>
<tr>
<th>Faculties of</th>
<th>Arts</th>
<th>Asian Studies</th>
<th>Economics</th>
<th>Law</th>
</tr>
</thead>
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<tr>
<td></td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
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</tr>
<tr>
<td>Salaries and allowances</td>
<td>5,324</td>
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<td>1,929</td>
<td>1,450</td>
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<td>Payroll tax, workmen’s compensation insurance and superannuation</td>
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<td>376</td>
<td>307</td>
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<tr>
<td>Scholarships</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Academic visits</td>
<td>97</td>
<td>31</td>
<td>49</td>
<td>26</td>
</tr>
<tr>
<td>Advertising</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Movement expenses and other travel</td>
<td>36</td>
<td>2</td>
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<td>3</td>
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<tr>
<td>Field research expenses</td>
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<td>1</td>
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<tr>
<td>Materials, supplies and freight</td>
<td>75</td>
<td>14</td>
<td>45</td>
<td>28</td>
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<td>Publications and subscriptions</td>
<td>21</td>
<td>5</td>
<td>9</td>
<td>29</td>
</tr>
<tr>
<td>Maintenance of buildings and site services</td>
<td>23</td>
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<td>10</td>
<td>7</td>
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<tr>
<td>Maintenance of equipment and furnishings</td>
<td>68</td>
<td>12</td>
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<td>19</td>
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<tr>
<td>Fuel and power</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Postages and telephones</td>
<td>3</td>
<td>—</td>
<td>2</td>
<td>—</td>
</tr>
<tr>
<td>General expenses</td>
<td>14</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td>6,785</td>
<td>1,886</td>
<td>2,447</td>
<td>1,876</td>
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</table>

To be read in conjunction with the accompanying notes
<table>
<thead>
<tr>
<th>Science</th>
<th>Faculties Administration</th>
<th>Scanning Electron Microscope Unit</th>
<th>Humanities Research Centre</th>
<th>Total</th>
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<tbody>
<tr>
<td>$000</td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
</tr>
<tr>
<td>$7,325</td>
<td>350</td>
<td>34</td>
<td>137</td>
<td>18,056</td>
</tr>
<tr>
<td>1,517</td>
<td>63</td>
<td>6</td>
<td>33</td>
<td>3,706</td>
</tr>
<tr>
<td>—</td>
<td>957</td>
<td>—</td>
<td>—</td>
<td>957</td>
</tr>
<tr>
<td>93</td>
<td>—</td>
<td>—</td>
<td>91</td>
<td>387</td>
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<td>—</td>
<td>—</td>
<td>71</td>
</tr>
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<td>3</td>
<td>597</td>
</tr>
<tr>
<td>29</td>
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<td>43</td>
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<td>277</td>
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<td>288</td>
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</table>

139
1.1 Statement of Income and Expenditure for the year ended 31 December 1981
Supporting Statement 1.1.3—General University Activities and Overheads
Attachment to Statement 1.1

<table>
<thead>
<tr>
<th>General University Activities and Overheads</th>
<th>The Library</th>
<th>Computer Services Centre</th>
<th>Division of Educational Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$000</td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
</tr>
<tr>
<td>Salaries and allowances</td>
<td>642</td>
<td>3,043</td>
<td>1,346</td>
<td>1,477</td>
</tr>
<tr>
<td>Payroll tax, workmen's compensation</td>
<td>220</td>
<td>518</td>
<td>271</td>
<td>282</td>
</tr>
<tr>
<td>insurance and superannuation</td>
<td>11</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Scholarships</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Academic visits</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Advertising</td>
<td>17</td>
<td>9</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>Movement expenses and other travel</td>
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<td>331</td>
<td>253</td>
<td>35</td>
</tr>
<tr>
<td>Materials, supplies and freight</td>
<td>—</td>
<td>7</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Publications and subscriptions</td>
<td>820</td>
<td>12</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Maintenance of buildings and site services</td>
<td>69</td>
<td>150</td>
<td>783</td>
<td>33</td>
</tr>
<tr>
<td>Maintenance of equipment and furnishings</td>
<td>815</td>
<td>92</td>
<td>56</td>
<td>19</td>
</tr>
<tr>
<td>Fuel and power</td>
<td>355</td>
<td>17</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Postage and telephones</td>
<td>257</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Grants and subventions</td>
<td>387</td>
<td>—</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>Total Expenditure</td>
<td>3,683</td>
<td>4,192</td>
<td>2,796</td>
<td>1,945</td>
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</table>

To be read in conjunction with the accompanying notes
1.1 Statement of Income and Expenditure for the year ended 31 December 1981

Supporting Statement 1.1.4—Central Areas

Attachment to Statement 1.1

<table>
<thead>
<tr>
<th></th>
<th>Central Administration</th>
<th>Buildings and Grounds</th>
<th>Administrative and Student Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
</tr>
<tr>
<td>Salaries and allowances</td>
<td>1,019</td>
<td>1,538</td>
<td>4,307</td>
<td>6,864</td>
</tr>
<tr>
<td>Payroll tax, workmen's compensation insurance and superannuation</td>
<td>224</td>
<td>275</td>
<td>875</td>
<td>1,374</td>
</tr>
<tr>
<td>Academic visits</td>
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<tr>
<td>Advertising</td>
<td>13</td>
<td>—</td>
<td>—</td>
<td>13</td>
</tr>
<tr>
<td>Movement expenses and other travel</td>
<td>50</td>
<td>—</td>
<td>1</td>
<td>51</td>
</tr>
<tr>
<td>Materials, supplies and freight</td>
<td>137</td>
<td>(41)</td>
<td>54</td>
<td>150</td>
</tr>
<tr>
<td>Publications and subscriptions</td>
<td>8</td>
<td>—</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Maintenance of buildings and site services</td>
<td>6</td>
<td>1,544</td>
<td>2</td>
<td>1,552</td>
</tr>
<tr>
<td>Maintenance of equipment and furnishings</td>
<td>128</td>
<td>14</td>
<td>(11)</td>
<td>131</td>
</tr>
<tr>
<td>Fuel and power</td>
<td>14</td>
<td>—</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Postages and telephones</td>
<td>56</td>
<td>128</td>
<td>—</td>
<td>184</td>
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<tr>
<td>General expenses</td>
<td>37</td>
<td>59</td>
<td>108</td>
<td>204</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td><strong>1,712</strong></td>
<td><strong>3,517</strong></td>
<td><strong>5,343</strong></td>
<td><strong>10,572</strong></td>
</tr>
</tbody>
</table>

To be read in conjunction with the accompanying notes
### Statement of Income and Expenditure for the year ended 31 December 1981

#### 1.2 Restricted Purpose Funds

<table>
<thead>
<tr>
<th></th>
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<th>$000</th>
<th>$000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Government Grants for Research</td>
<td>559</td>
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<td></td>
</tr>
<tr>
<td>Subsidies and donations</td>
<td>5,998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income from investments</td>
<td>525</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sundry income</td>
<td>1,587</td>
<td>8,669</td>
<td></td>
</tr>
<tr>
<td><strong>Less: Funds applied to the purchase of:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>352</td>
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<td></td>
</tr>
<tr>
<td>Library books</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings and site services</td>
<td>15</td>
<td>370</td>
<td>8,299</td>
</tr>
<tr>
<td><strong>Add: Transfers from Recurrent funds</strong></td>
<td></td>
<td></td>
<td>89</td>
</tr>
<tr>
<td><strong>Less: Expenditure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salaries and allowances</td>
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<td></td>
</tr>
<tr>
<td>Payroll tax, workmen's compensation insurance and superannuation</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Scholarships</td>
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</tr>
<tr>
<td>Academic visits</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Movement expenses and other travel</td>
<td>510</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field research expenses</td>
<td>234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials, supplies and freight</td>
<td>647</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications and subscriptions</td>
<td>101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of buildings and site services</td>
<td>252</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of equipment and furnishings</td>
<td>302</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel and power</td>
<td>128</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postages and telephones</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants and subventions</td>
<td>571</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General expenses</td>
<td>303</td>
<td></td>
<td>7,807</td>
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<tr>
<td><strong>Surplus/(Deficit)</strong></td>
<td>581</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less: Transfers to Reserves</td>
<td>126</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Net Surplus/(Deficit)</strong></td>
<td>455</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Statement of accumulated funds

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance 1 January 1981</td>
<td>4,654</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add: Surplus</td>
<td>455</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Less: Abnormal item</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>—Adjustment to previous years' income and expenditure</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balance 31 December 1981—Transferred to Accumulated Funds</strong></td>
<td>5,059</td>
<td></td>
<td></td>
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</table>

To be read in conjunction with the accompanying notes.
2. Consolidated Statement of Assets and Liabilities as at 31 December 1981

<table>
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<th>Notes</th>
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<th>$000</th>
<th>$000</th>
<th>$000</th>
</tr>
</thead>
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<tr>
<td>Accrued Current Liabilities</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advances—Australian Government Grants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creditors and accruals</td>
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<td></td>
</tr>
<tr>
<td>Recurrent funds</td>
<td>2,329</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricted purpose funds</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trading activities funds</td>
<td>420</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Provisions</td>
<td>10</td>
<td>2,241</td>
<td></td>
<td>30,996</td>
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<tr>
<td>Net Current Assets c/f</td>
<td>143</td>
<td>161,071</td>
<td>7,708</td>
<td></td>
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</tbody>
</table>
## Net Current Assets b/f

<table>
<thead>
<tr>
<th>Notes</th>
<th>$000</th>
<th>$000</th>
<th>$000</th>
<th>$000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7,708</td>
</tr>
</tbody>
</table>

### Add: Non-Current Assets

#### Buildings
- Non-residential and service installations: 59,645
- Trading activities: 7,579
- Capital improvements: 534, 8,113, 67,758

#### Land and dwellings
- Recurrent funds: 205
- Trading activities funds: 632, 837

#### Leasehold land and dwellings

#### Equipment and furniture
- Teaching, research and administration: 55,978
- Residences: 215
- Trading activities funds: 757, 56,950

#### Library books

#### Investments

#### Commonwealth Superannuation and Provident fund

<table>
<thead>
<tr>
<th>Notes</th>
<th>$000</th>
<th>$000</th>
<th>$000</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>2</td>
<td></td>
<td></td>
<td>14,373</td>
</tr>
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</table>

#### Recurrent funds

#### Restricted purpose funds

#### Trading activities funds

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<th>$000</th>
<th>$000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>1,771</td>
<td>59,097</td>
<td>216,849</td>
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</table>

#### Less: Long Term Liabilities

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<th>$000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>811</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8,035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,530</td>
<td>9,565</td>
<td>63,486</td>
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#### Net Assets

<table>
<thead>
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</thead>
<tbody>
<tr>
<td></td>
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<td>161,071</td>
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</tbody>
</table>

To be read in conjunction with the accompanying notes.
### 3. Statement of Capital Accumulation for the year ended 31 December 1981

<table>
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<tr>
<th>Notes</th>
<th>$000</th>
<th>$000</th>
<th>$000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Balance 1 January 1981</strong></td>
<td></td>
<td></td>
<td>148,708</td>
</tr>
<tr>
<td>Australian Government Grant for Capital Works and Services</td>
<td></td>
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<td><strong>Less:</strong> Transfer to Recurrent funds—Capital Works and Services funds applied to general expenditure</td>
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<td>Transfer from Statement of Income and Expenditure</td>
<td></td>
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<tr>
<td>expenditure from Recurrent funds for asset items surplus/(deficit)</td>
<td>6,767</td>
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<tr>
<td><strong>Add:</strong> Assets purchased from funds</td>
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<td>Restricted purpose funds</td>
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<td>Trading Activities funds</td>
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<td>Gifts received other than in cash</td>
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<td>1,171</td>
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<tr>
<td><strong>Less:</strong> Disposal of equipment and adjustment of asset values</td>
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<td>Abnormal item—adjustment to previous years' income and expenditure</td>
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<td><strong>Balance 31 December 1981—Transferred to accumulated funds</strong></td>
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</table>

To be read in conjunction with the accompanying notes.
4. Trading Activities

4.1 Consolidated Balance Sheet as at 31 December 1981

<table>
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<tr>
<th>1980</th>
<th>Notes</th>
<th>Under-graduate</th>
<th>Graduate</th>
<th>Siding Spring Exhibition</th>
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<td></td>
</tr>
<tr>
<td>Capital and Reserve Funds</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>15,834</td>
<td>Accumulated capital</td>
<td>402</td>
<td>435</td>
<td>71</td>
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<tr>
<td>(32)</td>
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<td></td>
<td><strong>461</strong></td>
<td><strong>509</strong></td>
<td><strong>76</strong></td>
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<td><strong>509</strong></td>
<td><strong>76</strong></td>
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</table>

To be read in conjunction with the accompanying notes.
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<th>Staff Centre</th>
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<th>Arts Centre</th>
<th>Concessions Area</th>
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<td>—</td>
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<td>23</td>
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<td>119</td>
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<td>(52)</td>
<td>23</td>
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<td>80</td>
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<td>24,012</td>
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</tbody>
</table>
### 4. Trading Activities

#### 4.2 Consolidated Statement of Income and Expenditure (Excluding Housing Operations) for the year ended 31 December 1981

<table>
<thead>
<tr>
<th></th>
<th>Undergraduate $000</th>
<th>Graduate $000</th>
<th>Spring Exhibition $000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
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</tr>
<tr>
<td>Tariffs, admission fees, rent</td>
<td>1,535</td>
<td>892</td>
<td>35</td>
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<tr>
<td>Casual meals and catering</td>
<td>276</td>
<td>793</td>
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</tr>
<tr>
<td>Buttery and canteen</td>
<td>27</td>
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<td></td>
</tr>
<tr>
<td>Membership and registration fees</td>
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<td>63</td>
<td></td>
</tr>
<tr>
<td>Book sales (gross profit) and related income</td>
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<td>—</td>
<td></td>
</tr>
<tr>
<td>Subsidy based on Universities Financial Assistance Act 1966, Section 8</td>
<td>149</td>
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<td></td>
</tr>
<tr>
<td>Sundry income</td>
<td>21</td>
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<tr>
<td>Interest earned</td>
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<td>36</td>
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<tr>
<td><strong>Total Income</strong></td>
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<td>1,804</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Undergraduate $000</th>
<th>Graduate $000</th>
<th>Spring Exhibition $000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Expenditure</strong></td>
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<td>Operating expenses</td>
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<td>Administrative expenses</td>
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<td>Property and equipment maintenance costs</td>
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<td>Interest paid</td>
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<tr>
<td><strong>Total Expenditure</strong></td>
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</table>

<table>
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<th>Graduate $000</th>
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<tr>
<td><strong>Surplus/(Deficit)</strong></td>
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<td>Add: University contribution</td>
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<td><strong>Net Surplus/(Deficit)</strong></td>
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**Add: Balance of Accumulated Income/(Expenditure) at 1 January 1981**

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<th>Graduate $000</th>
<th>Spring Exhibition $000</th>
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</thead>
<tbody>
<tr>
<td>Income/(Expenditure)</td>
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<td>(24)</td>
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<tr>
<td>University contribution</td>
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<tr>
<td>Transfer to capital</td>
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</tr>
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<td>Funding for capital expenditure</td>
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<td>Net funds transferred</td>
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<td>(22)</td>
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**Balance of Accumulated Income/(Expenditure) at 31 December 1981**

<table>
<thead>
<tr>
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<th>Graduate $000</th>
<th>Spring Exhibition $000</th>
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</table>

To be read in conjunction with the accompanying notes.
<table>
<thead>
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<th>Staff Centre</th>
<th>ANU Press</th>
<th>Centre for Continuing Education</th>
<th>Arts Centre</th>
<th>Concessions Area</th>
<th>Total</th>
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</tr>
<tr>
<td>2</td>
<td>7</td>
<td>(7)</td>
<td>(6)</td>
<td>—</td>
<td>(57)</td>
</tr>
<tr>
<td>14</td>
<td>(52)</td>
<td>15</td>
<td>(16)</td>
<td>80</td>
<td>40</td>
</tr>
</tbody>
</table>
### 4. Trading Activities

#### 4.3 Consolidated Balance Sheet (Housing Operations) as at 31 December 1981

<table>
<thead>
<tr>
<th>1980</th>
<th>Notes</th>
<th>Housing Operation</th>
<th>Siding Spring Housing</th>
<th>Total Housing Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$000</td>
<td></td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
</tr>
<tr>
<td>15,015</td>
<td></td>
<td>20,474</td>
<td>706</td>
<td>21,180</td>
</tr>
<tr>
<td>(28)</td>
<td></td>
<td>334</td>
<td>72</td>
<td>406</td>
</tr>
<tr>
<td>1,303</td>
<td></td>
<td>1,138</td>
<td>-</td>
<td>1,138</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16,290</td>
<td></td>
<td>21,946</td>
<td>778</td>
<td>22,724</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Represented by:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,536</td>
<td></td>
<td>2,978</td>
<td>197</td>
<td>3,175</td>
</tr>
<tr>
<td>122</td>
<td></td>
<td>70</td>
<td>2</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,658</td>
<td></td>
<td>3,048</td>
<td>199</td>
<td>3,247</td>
</tr>
<tr>
<td></td>
<td>Less: Current Liabilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>26</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,635</td>
<td></td>
<td>3,022</td>
<td>198</td>
<td>3,220</td>
</tr>
<tr>
<td>Add: Non-Current Assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,049</td>
<td></td>
<td>1,255</td>
<td>-</td>
<td>1,255</td>
</tr>
<tr>
<td>454</td>
<td></td>
<td>632</td>
<td>632</td>
<td></td>
</tr>
<tr>
<td>12,100</td>
<td></td>
<td>17,834</td>
<td>-</td>
<td>17,834</td>
</tr>
<tr>
<td>91</td>
<td></td>
<td>54</td>
<td>-</td>
<td>54</td>
</tr>
<tr>
<td>310</td>
<td></td>
<td>206</td>
<td>9</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16,639</td>
<td></td>
<td>22,371</td>
<td>839</td>
<td>23,210</td>
</tr>
<tr>
<td>Less: Long Term Liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>349</td>
<td></td>
<td>425</td>
<td>61</td>
<td>486</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16,290</td>
<td>Net Assets</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To be read in conjunction with the accompanying notes.
4. Trading Activities

4.4 Consolidated Statement of Income and Expenditure (Housing Operations) for the year ended 31 December 1981

<table>
<thead>
<tr>
<th>1980</th>
<th>Notes</th>
<th>Housing Operation</th>
<th>Siding Spring Housing</th>
<th>Total Housing Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$000</td>
<td></td>
<td>$000</td>
<td>$000</td>
<td>$000</td>
</tr>
<tr>
<td>1,211</td>
<td></td>
<td>1,247</td>
<td>38</td>
<td>1,285</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>4</td>
<td>—</td>
<td>4</td>
</tr>
<tr>
<td>267</td>
<td></td>
<td>448</td>
<td>21</td>
<td>469</td>
</tr>
<tr>
<td>1,482</td>
<td></td>
<td>1,699</td>
<td>59</td>
<td>1,758</td>
</tr>
<tr>
<td>546</td>
<td></td>
<td>617</td>
<td>18</td>
<td>635</td>
</tr>
<tr>
<td>326</td>
<td></td>
<td>345</td>
<td>8</td>
<td>353</td>
</tr>
<tr>
<td>598</td>
<td></td>
<td>576</td>
<td>21</td>
<td>597</td>
</tr>
<tr>
<td>1,470</td>
<td></td>
<td>1,538</td>
<td>47</td>
<td>1,585</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>161</td>
<td>12</td>
<td>173</td>
</tr>
<tr>
<td></td>
<td>Abnormal Items</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>—</td>
<td>Surplus on sale of dwellings</td>
<td>7</td>
<td>305</td>
<td>—</td>
</tr>
<tr>
<td>—</td>
<td>Adjustment to previous years' income and expenditure</td>
<td>(2)</td>
<td>2</td>
<td>—</td>
</tr>
<tr>
<td>12</td>
<td>Net Surplus/(Deficit)</td>
<td>464</td>
<td>14</td>
<td>478</td>
</tr>
<tr>
<td></td>
<td>Add: Balance of Accumulated Income/(Expenditure) as at 1 January 1981</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(40)</td>
<td>Funding for Capital Expenditure</td>
<td>(86)</td>
<td>58</td>
<td>(28)</td>
</tr>
<tr>
<td>(28)</td>
<td>Balance of Accumulated Income/(Expenditure) at 31 December 1981</td>
<td>334</td>
<td>72</td>
<td>406</td>
</tr>
</tbody>
</table>

To be read in conjunction with the accompanying notes.
Explanatory Notes Accompanying and Forming Part of the Financial Statements for the year ended 31 December 1981

Note 1—Principal Accounting Policies
Basis of Accounting
The financial statements have been prepared under the historical cost convention and changes in price levels are not reflected in the accounts with the exception of furniture and equipment in dwellings, leasehold land and dwellings and trading land and dwellings (other than land let to the University and used primarily for academic activities) (note 3).

In previous years the University's accounts for (i) recurrent funds for academic purposes, (ii) funds for capital works and services and (iii) restricted purposes funds were prepared on a cash basis in accordance with fund accounting principles. From 1981 the principles of accrual accounting will be progressively adopted for all of these funds. Stock is valued at average cost for these funds.

The University's accounts for trading activities are maintained on an accrual basis, except that depreciation accounting principles are only applied in the housing operations. All trading activities are conducted from University buildings for which no replacement provision is made; cash provisions are, however, made by appropriate trading activities for building maintenance and equipment replacement. Stock is valued at the lower of cost or net realisable value for the trading activities.

As a consequence of the changes in accounting principles, comparative figures are not available on all statements.

Note 2—Investments and Housing Loans
University investments consisting of debentures, mortgages, public securities, real estate and shares in listed companies are reported at acquisition cost in the Consolidated Statement of Assets and Liabilities. In the opinion of the University's officers, based where appropriate on independent professional advice, the market value (or value to redemption, where applicable) of each of the above categories of investment at 31 December 1981 was not less than its acquisition cost. The acquisition cost of shares in listed companies was $11,273,664 which had a market value of $13,608,186 at 31 December 1981.

Included in the Investments category of Non-Current Assets are 2 shares at $1 each for Anutech Pty Ltd. All shares in this company are beneficially owned on behalf of the University.

It is the policy of the University to exclude unearned interest on investments at 31 December 1981.

Note 3—Non-Current Assets (excluding investments)
With the exception of (i) gifts, (ii) leasehold land and dwellings, (iii) Siding Spring land and dwellings and (iv) furniture and equipment in dwellings, the University's non-current assets are generally reported at acquisition cost in the Consolidated Statement of Assets and Liabilities. Gifts are reported at University officers' valuations whereas the remaining categories referred to are calculated as follows:

<table>
<thead>
<tr>
<th>Housing Operation</th>
<th>Siding Spring Housing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leasehold land and dwellings</td>
<td>Land and dwellings</td>
</tr>
<tr>
<td>Furniture and equipment in dwellings</td>
<td>Furniture and equipment in dwellings</td>
</tr>
<tr>
<td>Replacement/Market value</td>
<td>$</td>
</tr>
<tr>
<td>Less:</td>
<td></td>
</tr>
<tr>
<td>Unfunded backlog depreciation</td>
<td>5,530,026</td>
</tr>
<tr>
<td>Provision for depreciation</td>
<td>1,925,674</td>
</tr>
<tr>
<td>Recorded value</td>
<td>17,834,345</td>
</tr>
<tr>
<td></td>
<td>748,699</td>
</tr>
<tr>
<td></td>
<td>56,097</td>
</tr>
<tr>
<td></td>
<td>60,620</td>
</tr>
<tr>
<td></td>
<td>631,982</td>
</tr>
</tbody>
</table>

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Note 4—Loans for Building Purposes
In 1971 and 1974 amounts were advanced from a superannuation reserve, as long-term investments at commercial interest rates, to permit the completion of student residences for which insufficient funding was available from external sources. In 1978 the University’s bankers advanced funds, under normal loan conditions, for the completion of the University’s Arts centre building.

Note 5—Agency and Trust Funds

<table>
<thead>
<tr>
<th></th>
<th>$</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance 1 January 1981</td>
<td>18,065,254</td>
<td></td>
</tr>
<tr>
<td>Receipts and income</td>
<td>8,772,170</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26,837,424</td>
<td></td>
</tr>
<tr>
<td>Less: Disbursements</td>
<td>1,673,378</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance 31 December 1981</td>
<td>25,164,046</td>
<td></td>
</tr>
</tbody>
</table>

The agency and trust funds include the 1966 Supplementary Superannuation Benefits Fund. At 30 June 1976, the past service benefits of members of that fund exceeded the value of the assets held on behalf of the fund by an actuarially estimated amount of $10,729,000. The rates of contribution to the fund have been based on official advice.

Note 6—Contingent Liabilities
Guarantees have been given (i) under the University’s Staff Members’ House Purchase Scheme to secure bank loans totalling $729,942 to University employees, (ii) to secure an overdraft facility of $250,000 negotiated by the University Union for building purposes, (iii) to secure a loan of $362,988 to the University Sports Union for building purposes and (iv) to secure an overdraft facility for $5,000 made available to the University Research Students’ Association Family Day-care program. The University and Anutech Pty Ltd are joint parties to a contract with the Energy Authority of New South Wales for an experimental solar power project commissioned by the Government of New South Wales.

Note 7—Sales of Dwellings
Prior to 1981, surpluses or deficiencies from the sale of dwellings were excluded from the operating statements of the University’s Housing Operations.

Note 8—Trading Activities Losses
In 1981 the University contributed $4,326 for Narellan House to write-off accumulated losses at 31 December 1981. From 1981 the University will have no involvement in Narellan House.

Note 9—Anutech Pty Limited
The financial position of the company at 31 August 1981 and comparative figures for 1980 are shown below:

Balance Sheet as at 31 August 1981

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share Capital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Authorised</td>
<td>10,000.00</td>
<td>10,000.00</td>
</tr>
<tr>
<td>10,000 shares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>at $1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issued and fully paid</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>2 shares at $1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grants in respect of capital project</td>
<td>800,000.00</td>
<td>400,000.00</td>
</tr>
<tr>
<td>General reserve</td>
<td>17,732.33</td>
<td>12,456.33</td>
</tr>
<tr>
<td>Share Capital and Reserves</td>
<td>$817,734.33</td>
<td>$412,458.33</td>
</tr>
<tr>
<td>Represented by:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash at bank on hand</td>
<td>2,389.55</td>
<td>19,216.80</td>
</tr>
<tr>
<td>Australian National University</td>
<td>5,326.00</td>
<td>147,456.33</td>
</tr>
<tr>
<td>Debtors</td>
<td>10,720.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18,435.55</td>
<td>166,673.13</td>
</tr>
<tr>
<td>Non-Current Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Development (Notes A &amp; C)</td>
<td>936,262.75</td>
<td>319,520.00</td>
</tr>
<tr>
<td>Total Assets</td>
<td>954,698.30</td>
<td>486,193.13</td>
</tr>
<tr>
<td>Less: Current Liabilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outstanding commitments and accounts</td>
<td>106,963.97</td>
<td>73,734.80</td>
</tr>
<tr>
<td>Loan—Australian National University</td>
<td>30,000.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>136,963.97</td>
<td>73,734.80</td>
</tr>
<tr>
<td>Net Assets</td>
<td>$817,734.33</td>
<td>$412,458.33</td>
</tr>
</tbody>
</table>
Statement of Income and Expenditure for the period ended 31 August 1981

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest earned</td>
<td>5,276.00</td>
<td>12,456.33</td>
</tr>
<tr>
<td>Indonesian Project</td>
<td>10,720.00</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total Funds Received</strong></td>
<td>15,996.00</td>
<td>12,456.33</td>
</tr>
<tr>
<td><strong>Expenditure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesian Project</td>
<td>10,720.00</td>
<td>—</td>
</tr>
<tr>
<td><strong>Total Expenditure</strong></td>
<td>10,720.00</td>
<td>—</td>
</tr>
<tr>
<td><strong>Surplus</strong></td>
<td>5,276.00</td>
<td>12,456.33</td>
</tr>
<tr>
<td>Transfer to General Reserve</td>
<td>5,276.00</td>
<td>12,456.33</td>
</tr>
<tr>
<td><strong>Retained Funds at 31 August 1981</strong></td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Notes to and forming part of the Accounts for the year ended 31 August 1981

Note A: Accounting Methods
(i) The financial statements have been prepared under the historical cost convention and changes in price levels are not reflected in the accounts.
(ii) The company's principal activity in the financial period was the building and development of a solar power station for the Energy Authority of New South Wales. The power station is being financed by a grant provided by the Authority and will be handed over to the Authority on completion of the project. Consequently, associated costs have been capitalised as project development.

Note B: Provision for Taxation
No provision for taxation was raised as the company is exempt under Section 23 of the Australian Income Tax Assessment Act.

Note C: Project Development Costs

<table>
<thead>
<tr>
<th></th>
<th>1981</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payroll and related expenditure</td>
<td>133,659</td>
<td>18,786</td>
</tr>
<tr>
<td>Research contracts</td>
<td>19,513</td>
<td>15,212</td>
</tr>
<tr>
<td>Plant and equipment</td>
<td>356,548</td>
<td>33,648</td>
</tr>
<tr>
<td>Research materials and stores</td>
<td>148,301</td>
<td>53,966</td>
</tr>
<tr>
<td>Project management and professional fees</td>
<td>199,818</td>
<td>144,461</td>
</tr>
<tr>
<td>Overhead and running expenses</td>
<td>49,856</td>
<td>49,312</td>
</tr>
<tr>
<td>Building works</td>
<td>11,236</td>
<td>500</td>
</tr>
<tr>
<td>Travel and other expenses</td>
<td>17,331</td>
<td>3,635</td>
</tr>
</tbody>
</table>

$936,262 $319,520
Note 10—Provisions
As a consequence of the changes in accounting principles referred to in note 1, provisions have been created in the Recurrent Funds to show the University's liability as at 31 December 1981 for long service leave, recreation leave (including recreation leave bonus) and maternity leave. The provisions as at 31 December 1981 are:

<table>
<thead>
<tr>
<th></th>
<th>Recurrent Funds</th>
<th>Trading Activities Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Service Leave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Current</td>
<td>605,000</td>
<td>278,657</td>
</tr>
<tr>
<td>- Long term</td>
<td>8,035,000</td>
<td></td>
</tr>
<tr>
<td>Recreation Leave</td>
<td>1,628,000</td>
<td></td>
</tr>
<tr>
<td>Maternity Leave</td>
<td>8,000</td>
<td>26,010</td>
</tr>
<tr>
<td>Relief Staff</td>
<td>—</td>
<td>161,974</td>
</tr>
<tr>
<td>Maintenance of Buildings and Site Services</td>
<td>—</td>
<td>662,543</td>
</tr>
<tr>
<td>Maintenance and Replacement of Furniture and Equipment</td>
<td>—</td>
<td>354,051</td>
</tr>
<tr>
<td>Other</td>
<td>—</td>
<td>46,851</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$10,276,000</strong></td>
<td><strong>$1,530,086</strong></td>
</tr>
</tbody>
</table>

Note 11—Reserve for Twenty-Seventh Pay
The University maintains a Twenty-Seventh Pay Reserve to meet the extra costs associated with the cyclical occurrence of an additional pay period (which will next occur in calendar year 1991) as a consequence of the policy of fortnightly payment of most employees.

Note 12—Provision for Doubtful Debts
Debtors of the University’s trading activities are shown net of Provisions for Doubtful Debts which total $40,224.

Note 13—Abnormal Item—Adjustment to Previous Years’ Income and Expenditure
As a consequence of adherence to cash accounting principles prior to 1981 (note 1), the balance of the University's Capital Accumulation account at 1 January 1981 included $14,630,923 received in 1980 which related to the 1981 Australian Government Grant for running expenses. Accrual accounting principles adopted from 1981 have resulted in this amount being included in the income reported in Statement 1.1 and as a result it is necessary to adjust the previous year's income and expenditure.